

The
FIELD ARTILLERY
Journal



IN THIS ISSUE:

Maps

APRIL, 1943



FIELD ARTILLERY GUIDE

- Designed for *field reference*, not for garrison training.
- Compactly combines *essential* matter widely scattered through many texts and manuals.
- Enthusiastically *endorsed* by all — Privates to Generals and back again.
- Actually *in use* both here and abroad.
- *Comprehensive and clear, yet concise* — dead wood is eliminated.
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U. S. FIELD ARTILLERY ASSOCIATION

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WE WELCOME the *Military Review* to the ranks of the monthly military journals. Published as a quarterly for many years by the C&GSS at Ft. Leavenworth, it is changing to keep pace with the quickened tempo of present events. Size will remain substantially the same, as will the per-copy price. Annual subscriptions are now \$3, and for the overall picture you'll get no more for your money anywhere else—except possibly in the pages of THE FIELD ARTILLERY JOURNAL!

SHINING VARNISH on tripod legs is the bugaboo of some units. Of course, when 'scopes are used properly they merely peek above defilade, so these legs won't be seen by a terrestrial observer. And instruments should be carried (as all men should move) under or behind cover. But many cases can arise where aerial observers conceivably could locate an OP by the glint from such surfaces. Have any of you worked out a solution to this problem? or is it actually as serious a one as some units suggest?

Another thing: what steps are being taken to cut down men's pale-face gleam? and what about the shining whiteness of maps and firing charts? and belt-buckles' glitter?

As a matter of fact, the field is wide open for a top-notch article on practical, common-sense camouflage. There is too little literature on this subject written from an artilleryman's point of view. Won't some of you sound off?

CHANGES OF ADDRESS still roll in, but there are still many members who overlook letting us know of your movements. This delays delivery of your JOURNALS, annoys and inconveniences you, and causes your *Association* unnecessary expense when the Post Office Department notifies us of the change. This last wouldn't be so bad if it were done accurately, but experience shows practically a zero batting average; the only one who can set us straight is you yourself.

So please send in your change of address as soon as you know of it. We'll carry on from there.

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The Field Artillery Journal

"Today's Field Artillery Journal is tomorrow's training regulations."

APRIL, 1943—Vol. 33, No. 4

	PAGE
COVER: SOVIET BATTERY F.D.C.	
PROJECTIONS	242
APPROACH TO FOREIGN MAP READING, PART II	243
<i>By Capt. Robert B. Rigg, Cav.</i>	
A "FROG" AT FORT SILL, PART I	255
<i>By Lt. Charles H. Taquey, FA</i>	
THE PACK HOWITZER HRRS THE SILK	257
<i>By Capt. Lucian B. Cox and Lt. Herbert E. Armstrong, FA</i>	
THE NEW TACTICS, PART I	261
<i>By Col. Conrad H. Lanza</i>	
PICTURE CRITIQUE	266
<i>By Lt. George R. Metcalf, FA</i>	
PERIMETERS IN PARAGRAPHS	268
<i>By Col. Conrad H. Lanza</i>	
ACTION IN TUNISIA	277
DOUGHBOY OBSERVERS	277
STREAMLINING THE MORNING REPORT	278
"THE MOUNTAIN BATTERY" (SONG)	280
<i>By Col. Gerald E. Griffin</i>	
REMARKS ON CORPS ARTILLERY	282
<i>By Brig. Gen. John E. Lewis, FA</i>	
THE EMPLOYMENT OF CORPS ARTILLERY (CONCLUDED)	283
<i>By Col. John J. Burns, FA</i>	
RADIO IN FIRE DIRECTION	291
<i>By Lt. James H. McBroom, Jr., FA</i>	
"SOUTHWICK" G.F.T.	292
<i>By Maj. Stephen L. Nichols, FA</i>	
AN EXPERIMENT ON GUADALCANAL	294
<i>By Capt. William Gray, FA</i>	
THE CAMPAIGNS IN RUSSIA	296
<i>By Col. Conrad H. Lanza</i>	
DIVISION ARTILLERY RADIO NETS IN A DEFENSIVE SITUATION	305
<i>By Capt. Misha N. Kadick, FA</i>	
THE SANDS GRAPH	306
<i>By Capt. H. I. Holdeman, FA</i>	
NOT IN THE BOOK	310
DIARY OF WAR EVENTS	311
BOOK REVIEWS	312

Published monthly by the United States Field Artillery Association. Publication office 3110 Elm Avenue, Baltimore, Md. Business and editorial office. United States Field Artillery Association, 1218 Connecticut Ave., Washington, D. C. Address all communications to the Washington office. Entered as second class matter August 20, 1929, at the post office at Baltimore, Md. Accepted for mailing at the special rate of postage provided in Sec. 1103, Act of October 3, 1917, Copyright, 1943, by The United States Field Artillery Association. Subscription price \$3.00; Canada \$4.00; foreign \$3.50; single recent copies to members, 25 cents; non-members, 35 cents. THE FIELD ARTILLERY JOURNAL does not accept paid advertising. It does pay for original articles accepted, but unsolicited manuscripts must be accompanied by return postage if they are to be returned. *Addresses, and changes of rank, will be changed as frequently as desired, upon notification; not otherwise. Changes should reach the editor three weeks before date of next issue. Immediate notice should be given of any delay in the receipt of the magazine.*

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PROJECTIONS

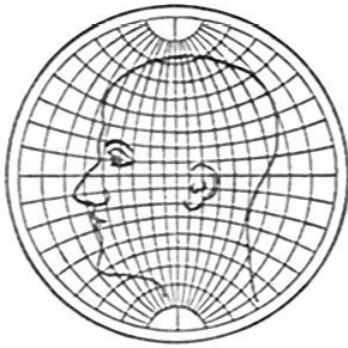


Fig. 1—Man's head drawn on a globular projection

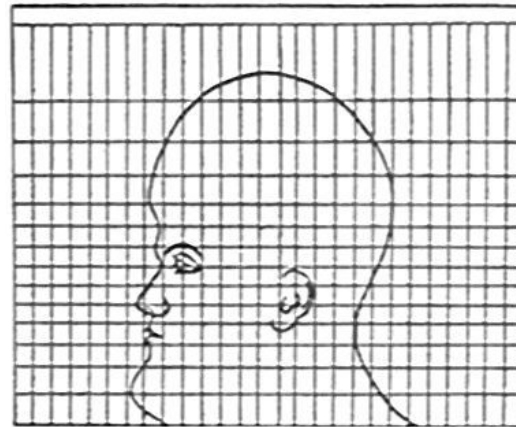


Fig. 2—Man's head plotted on a Mercator projection

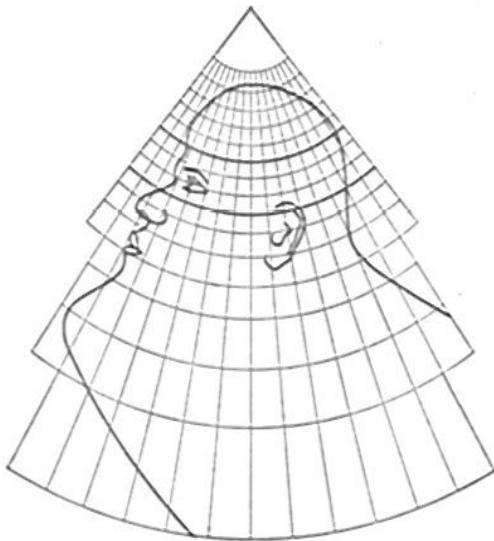


Fig. 3—Man's head plotted on a Lambert projection

"One picture is worth a thousand words" is an old saying. Its truth is strikingly evident in these seven different projections of the same man's head. Academic discussions of the distortion effects of different projections fade away when familiar objects are thus pictured.



Fig. 4—Man's head plotted on a gnomonic projection



Fig. 5—Man's head plotted on a stereographic projection



Fig. 6—Man's head plotted on a polyconic projection



Fig. 7—Man's head plotted on an orthographic projection

APPROACH TO FOREIGN MAP READING

PART II¹

By Capt. Robert B. Rigg, Cav.

Republished from "The Military Engineer"

Not only in the preparation of war plans in times of peace but also in carrying out those plans in times of war, an officer must put his knowledge to practical use. The importance of being able to do this in reading foreign maps can not be too strongly emphasized. In global warfare, in which maps made in many foreign countries may have to be utilized, a knowledge of some of their characteristics, the peculiarities of the languages and alphabets, and a guide to a logical approach of study are invaluable. Therefore, much is given here on the technicalities of languages and names, and in addition a suggestion for a method of approach which should always be borne in mind to help make reading and interpreting a foreign map easier and more accurate: "Compare the foreign map with another one in a language you know and learn to interpret the former by this comparison."

It will usually be difficult to secure an English map of the same scale as the maps which can be obtained in non-English speaking countries; therefore, the comparison mentioned is not going to be one in which many points can be compared. However, if the map observer who is required to use a map in a language or script with which he is unfamiliar will take the best available English map and from it mark on the foreign one the names, localities, and features which he can identify by their geographic location, he will have accomplished more than he realizes. There is no better way of learning than by comparing. Where possible, of course, it is best to secure several maps for comparison.

In dealing with all foreign maps there is one initial obstacle which the map reader must surmount in order to read or use the map at all. The "obstacle" is the learning of the local alphabet, geographical terms, and the symbols peculiar to the foreign map. This situation is comparable to that of entering a foreign country with a vocabulary sufficient to allow one to live, eat, and travel without undue difficulty. The individual can not enter into any involved conversation, but can get along. So it is with the facts brought out here; the map reader is able to "get along." Complete mastery of the subject would, however, require lengthy study and application, as is true with any subject.

MAP SYMBOLS

As mentioned in the first section of this article,¹ the map should be carefully analyzed by following the outlined steps in observation. To "decipher" any unknown subject it is necessary to work from some known factor. Symbols follow the same general form the world over and it is only necessary to seek out their detailed or local peculiarities. Therefore, the map reader should tackle symbols next. If the map has a legend, a dictionary in that particular foreign language will clarify the symbols, as their definition is generally given in words. A study and mastery of symbols used on United States topographic maps will give an officer the best foundation possible for reading foreign symbols. Our topographic symbols are excellent in that they are simple and almost self explanatory of the subjects they portray. One can

¹The first section of this article was published in THE FIELD ARTILLERY JOURNAL for October, 1942.

INSERT
JAPANESE TOPOGRAPHICAL MAP
OF HAKODATE AREA

TABLE I.—COMPARISON OF METRIC, ENGLISH AND RUSSIAN LINEAR MEASURE (APPROX.)

<i>Metric System</i>	<i>English System</i>	<i>Russian System</i>
1 millimeter	.04 inch	
1 centimeter	.39 inch	0.4 <i>diuim, diuīme</i>
1 decimeter	3.93 inch	
1 meter	39.37 inches (1.1 yds.)	1.4 <i>arshin(e)</i>
1 kilometer	3,280 ft., 1,093 yds., or 5/8 mi. (less 19 ft. 2 in.)	.93 <i>verst</i>
25.4 mm., 2.54 cm.	1 inch	1 <i>diuim, diuīme</i>
30.48 cm., or .30 meter	1 foot	1 <i>fut</i> or 8 <i>vershkov</i>
91.44 cm., or .91 meter	1 yard	3 <i>fut</i> or 1.3 <i>arshin(e)</i>
1.61 km., or 1,610 meters	1 mile (statute, 5,280 ft.)	1.5 <i>verst</i> or 750 <i>sazheni</i>
1.85 km., or 1,850 meters	1 mile (nautical, 6,080 ft.)	
2.54 cm.	1 inch	1 <i>diuim, diuīme</i>
4.44 cm.	1 3/4 inches	1 <i>vershok</i>
0.30 meter	12 inches	1 <i>fut</i> (foot)
0.71 meter	28 inches	1 <i>arshin</i> = 16 <i>vershkov</i>
2.13 meters	7 feet	1 <i>sazhen</i> = 3 <i>archin(e)</i>
1.07 km.	.66 mile, or 3,500 ft.	1 <i>verst</i> = 500 <i>sazheni</i>

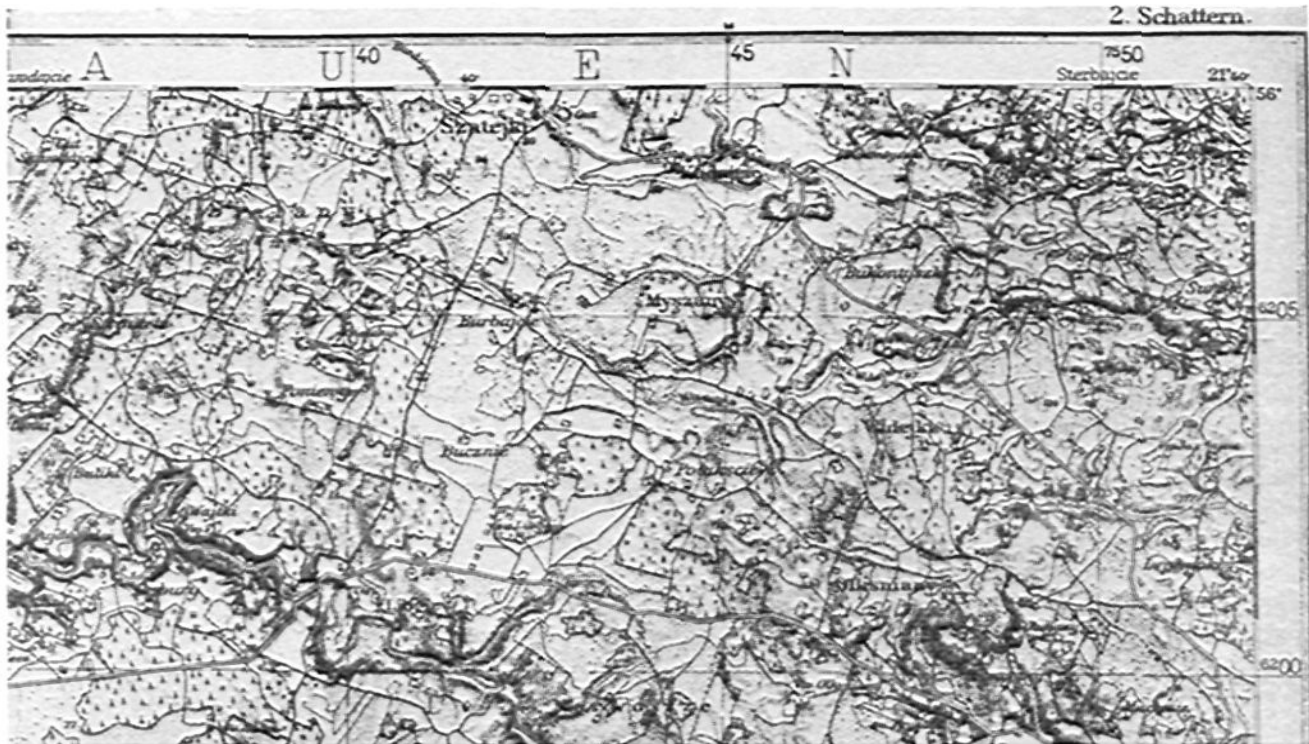


Figure 1.—German map, scale 1:100,000. Figures for heights on the map are shown in meters. "N" at top and 6200, 6205 on right margin are part of grid system. Topographical symbols below apply to this map.

Zeichenerklärung der Karte 1:100 000.

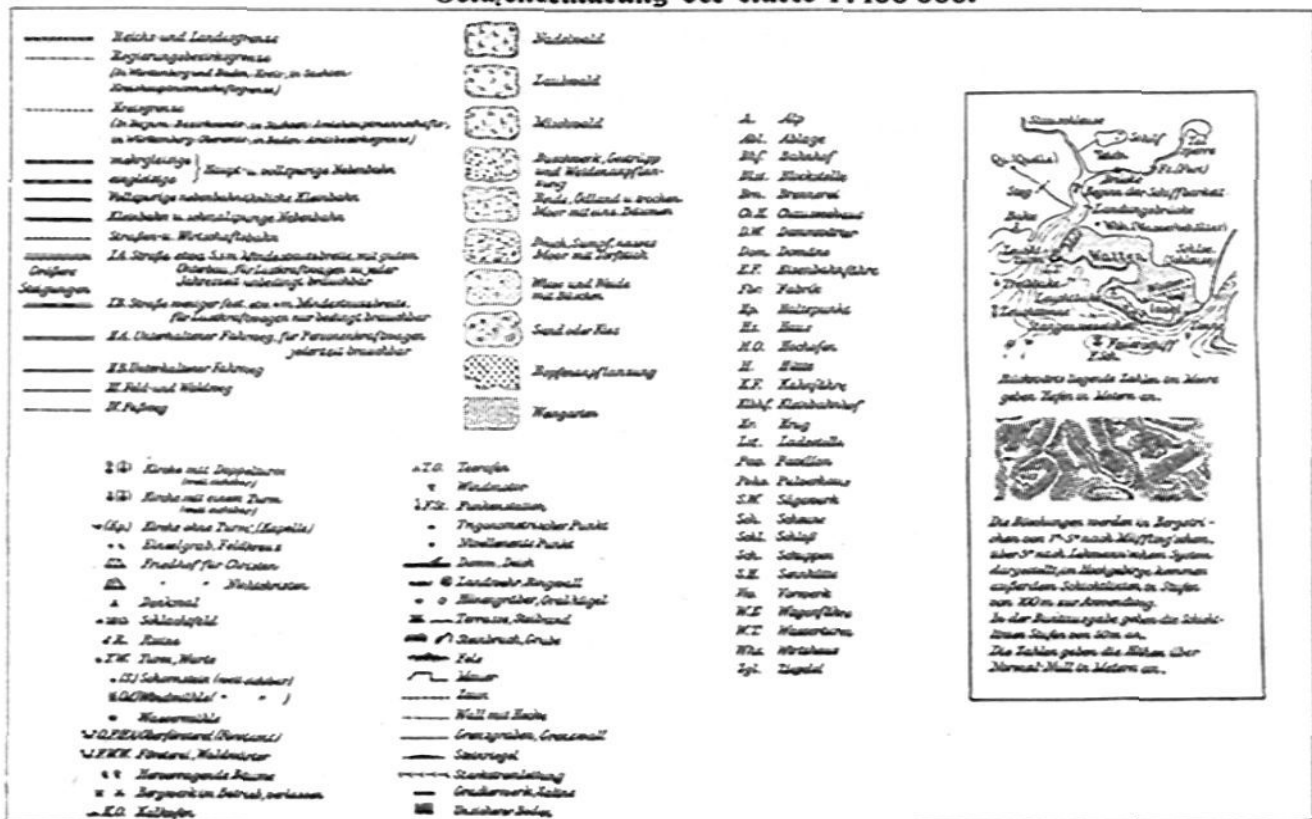


Figure 2.—Legend to German maps of scale 1:100,000. Sample map on right shows use of the symbols.



Figure 3.—Symbols for German map of scale 1:25,000. Map at top has been reduced to 2/3 actual size. It illustrates the use of the symbols shown.

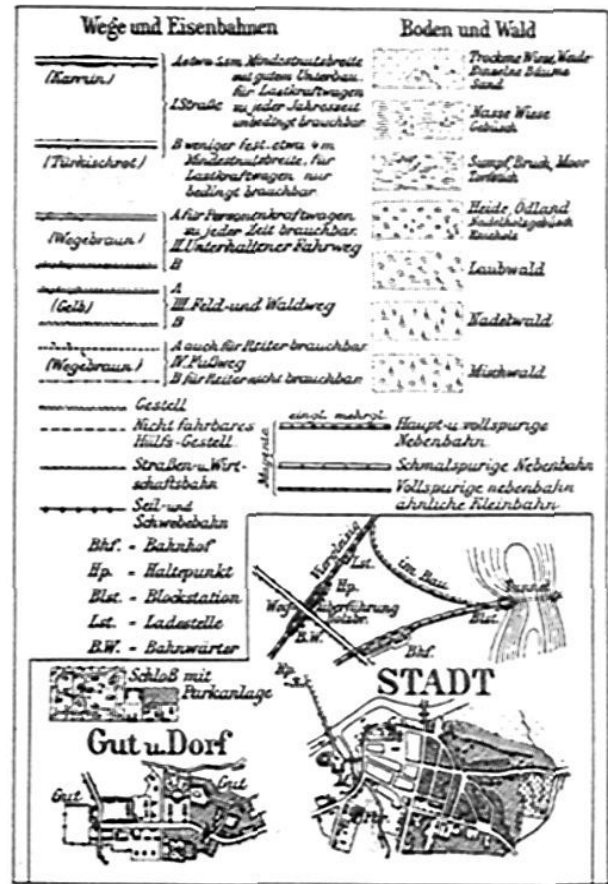


Figure 4.—Sample of German map containing symbols for railroads, highways, roads, types of forests and abbreviations for railroad switches, stops, and stations, towns and cities.

expect foreign symbols to be a little more complex and, sometimes, to branch off into details.² (See Figures 1, 2, 3, and 4.)

Systems of Linear Measure.—Foreign maps differ materially from our own standard military maps in respect to grid system and linear measure. We are used to stating distances in terms of statute miles and yards whereas the European speaks in terms of kilometers and meters.

The Metric System is in general use in most foreign countries, and a working knowledge of it is necessary in order to make effective use of foreign maps. Only actual practice can acquaint one with the differences between the Metric and our own system.

Linear measure of the Metric System starts with the *millimeter* and progresses up to the *kilometer*. The former equals about four hundredths of an inch and for all practical purposes the latter can be considered generally as six-tenths of a mile.

The best rule of thumb to use with meters is to remember the proportion "one meter equals one and one-tenth yards." (See Table I.)

Grids.—With few exceptions, foreign maps, like our own,

bear the geographical grid (that is lines of latitude and longitude). If all the actual grid lines do not appear on the map, the border will be divided up so that they may be drawn. The "Atlas Grid" with its combination of letters and figures is often used. (See Figure 1.)

The only real difference between foreign grids and our own lies in their use of meters where we use yards. For instance, on a map of scale 1:100,000, a 5,000-meter grid square would just fall short of equalling 5,500 yards on ground or 2 inches on the map. It would be normal for us to use 5,000-yard grid squares on a map of this scale. Contour intervals on foreign maps are reckoned in terms of meters also.

Almost without exception longitude is reckoned for all nations from the Greenwich Observatory just outside London, England. However, exceptions do occur. Some nationalities of map makers choose to reckon longitude from a position in their own country. Often French maps reckon it from Paris rather than Greenwich, and some German maps from Berlin. This is illustrated in the accompanying map of Morocco, Figure 7. However, these are still the exception. Latitude is, of course, always measured from the equator.

Relief.—This is portrayed in one of four ways or a combination of several. These four ways are contours, shading, hachuring, and spot heights. Hachuring is a favorite European method. (See Figure 5.) Depending

²A detailed treatment of conventional signs and symbols used on maps of the following countries is to be found in *F.M. 30-22, Military Intelligence—Foreign Conventional Signs and Symbols* (July, 1942); Italy, France, Germany, Great Britain, Japan, Russia, Spain, and Turkey. The manual contains much information in compact form. Its study is recommended.

upon the angle of slope, several types of hachuring are used. It best portrays terrain of sharp relief contrasts, but is weak on showing gentle slopes.

Shading is also favored by many foreign publishers, but this method, like hachuring, serves more to give an eye picture rather than actual land heights. Shading is excellent for showing both rugged and rolling terrain, but no method can substitute for contours. Spot heights in foreign maps are almost without exception shown in meters, not feet. The heights will appear in figures and one should always consult the legend to find out whether the figures appear in feet or meters.

The combination of shading and contours is most effectively used on the Japanese map (Insert) illustrated here. This is, by the way, an excellent map for teaching these two methods of showing relief.

RUSSIAN MAPS

Russian maps represent a step between the simple foreign maps and the more difficult ones. The more simple foreign maps are those using the Latin alphabet such as British, French, Spanish, Italian, German, Norwegian, et cetera. The more difficult ones are Chinese, Japanese, Arabic, Siamese, et cetera, which use special characters and ideographs.

Russian maps use the Cyrillic alphabet which is not greatly removed from the Latin. The first step in learning to read

Russian maps is to master the Russian alphabet and know the English equivalents for each Russian letter. This will allow the reader to transliterate Russian names. Unless the observer

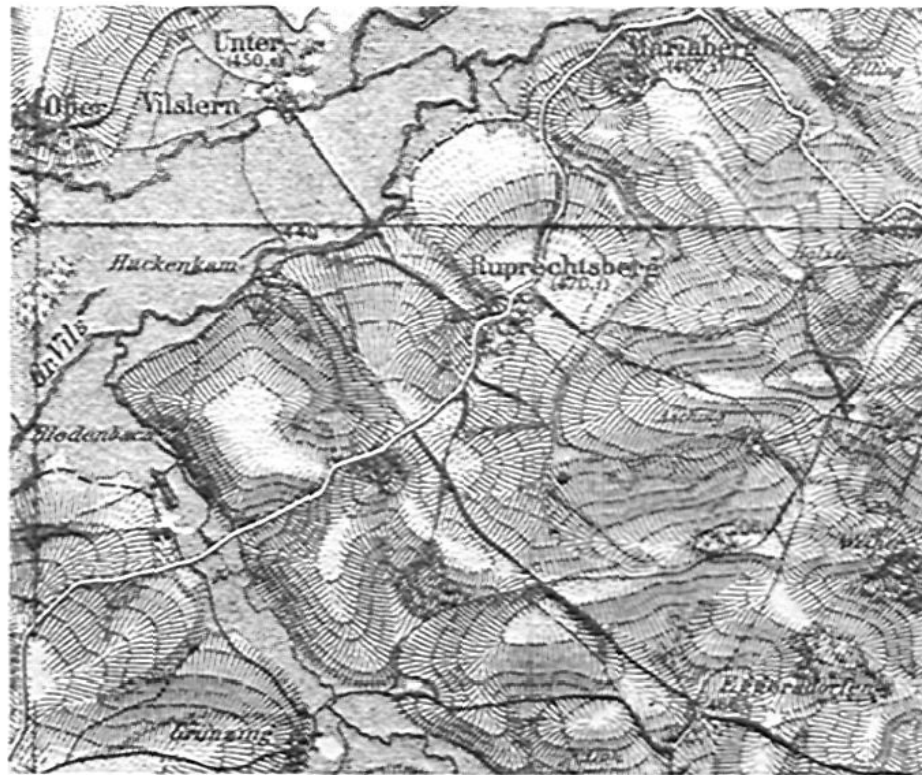


Figure 5.—Section of heavily-hachured European map, scale 1:25,000, Approximate contours are used here with hachuring more to show details of the terrain rather than definite contour heights.

does know Russian, their map names will have no significance until transliterated. The Table here gives English equivalents of the Russian characters now in use.

To render Russian map names in English it is simply necessary to substitute the proper English equivalent for the respective Russian letters. This is performed by the use of a transliteration table, Table II.

To use this table one simply starts out by taking the larger geographical names and substituting the English for the Russian characters. If room is available they can be written above the Russian name.

For example, ЛЕНИНГРАД would be LENINGRAD. It thus can be seen that this is simply a letter for letter substitution. In the case of KHARKOV (ХАРЬКОВ), we find the use of the "mute soft sign" which is Б. As shown in the footnote of the alphabet table, this is often transliterated as ' and the name would appear as KHAR'KOV. However, it is recommended that when this letter and the Russian letter for the "mute hard sign" appear in map names that they simply be omitted in the transliterated (English) name. Thus the proper rendition here would be KHARKOV. These "soft" and "hard" signs affect pronunciation, not transliteration.

Do not mistake the Russian Б (B) for Ъ, which is the "mute hard sign," or Б, the "mute soft sign." On October 15, 1918, the Russian alphabet was revised and shortened.

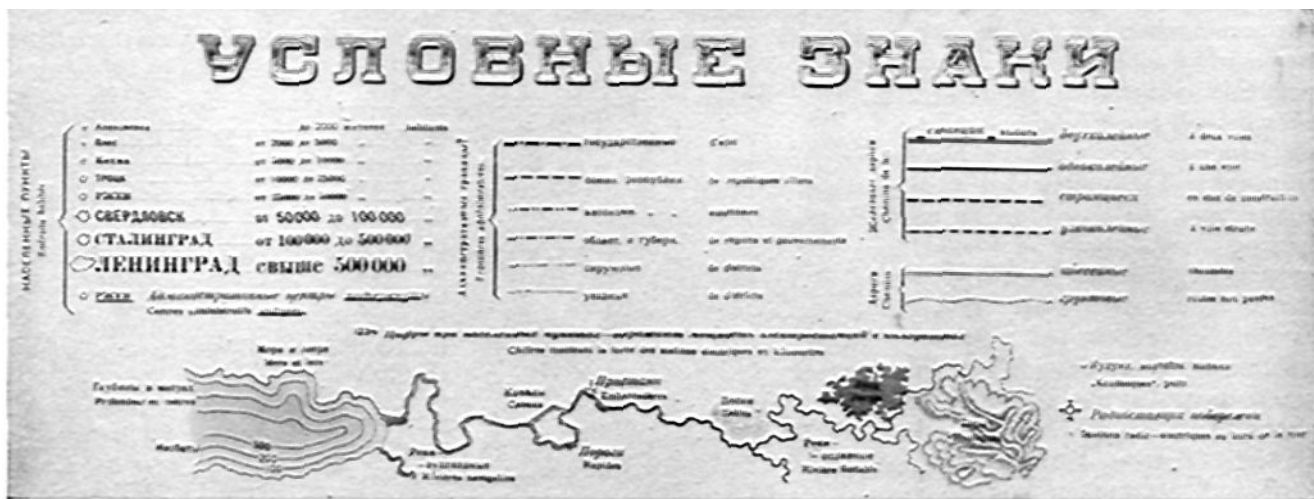
TABLE II.—TRANSLITERATION OF THE RUSSIAN (CYRILLIC) ALPHABET as officially adopted by the United States Library of Congress

Russian	English	Russian	English
А а	A a	Р р	R r
Б б	B b	С с	S s
В в	V v	Т т	T t
Г г	G ¹ (H)	У у	U u
Д д	D d	Ф ф	F f
Е е	E e	Х х	Kh kh
Ё ё	E e	Ц ц	Ts ts
Ж ж	Zh ²	Ч ч	Ch ch
З з	Z z	Ш ш	Sh sh
И и	I i	Щ щ	Shch shch
Й й	I i	Ъ ъ	Mute, hard sign ³
К к	K k	Ы ы	Y y
Л л	L l	Ь ь	Mute, soft sign ⁴
М м	M m	Э э	E e
Н н	N n	Ю ю	Iu ⁵
О о	O o	Я я	Ia ⁶
П п	P p		

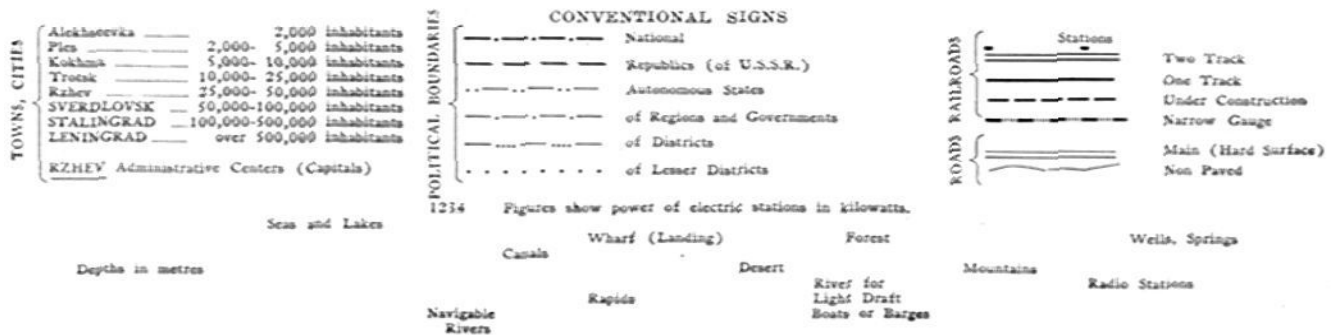
¹A, when it stands for h in foreign words. ²British transliteration tables list this as j. ³Recently abolished. Never transliterated. ⁴It softens previous consonant. Often transliterated as '. ⁵Seen as YU in British tables. ⁶Seen as YA in British tables.



Figure 6.—Typical Russian cartography. Area around Moskva, scale 1:1,500,000.



Legend to Russian map above



English translation of legend

The old one contained several more characters which do appear on very old maps; they should be disregarded when seen.

Russian Map Names (See Table III).—The most difficult part in reading Russian maps lies in reading names which appear in script. For this reason a special table has been made to show Russian geographical names: first the English name, second in transliterated Russian, third in Russian capital letters.

Town, city, district, regional, province, republic, and other such political names will appear on Russian maps in printed capital-letter form. Mountains, rivers, lakes, and small geographical features will generally appear in Russian script. Often, to add to difficulty in reading these names, they will be in blue, with town and city names printed over them in black. (See Russian map and legend, Figure 6. Also see first section of article for additional details.)

Since 1917 Russian place names, mainly town and city, have been undergoing radical changes. The first changes occurred when the Soviet Government undertook the changing of names which sounded of the Tsarist regime. Such names as *St. Petersburg*, *Aleksandrovsk*, and *Ekaterinoslav* became *Leningrad*, *Zaporozhe*, and *Dnepropetrovsk*. The process has been continual since the revolution. In recent years many places have again been renamed, this time in honor of Soviet statesmen and heroes.

Symbols.—The best and most authoritative source in English for the study of Russian symbols is the War Department's *TM 30-254, Military Dictionary (Russian, English — English, Russian)*. It contains the conventional signs and military symbols used by the Soviet Army. Their topographic symbols bear resemblance to ours, and are well executed. This manual should be the standard reference when using or studying Russian maps. This Technical Manual lacks the Russian script in the present edition (which is a temporary one); however, it is complete in all other respects.

Russian bench marks are represented by triangles with a dot in the center of each; triangulation points are shown by squares with dots. Symbols for sand, clay, stone pits, as well as quarries and factories use initials beside them. The sign for a well is a small circle with a dot in center, and depending on the type of well, the symbol is accompanied by an initial.

Cemeteries are characterized by two types of symbols:

TABLE III.—TRANSLATION OF RUSSIAN GEOGRAPHICAL NAMES

<i>English</i>	<i>Transliterated Russian</i>	<i>Russian (Capital letters)</i>	<i>Russian Script</i>
City	Gorod	ГОРОД	Город
Village, Town Settlement	Selo	СЕЛО	Село
Fort	Selenie	СЕЛЕНИЕ	Селение
Fortress	Fort	ФОРТ	Форт
Castle	Krepost	КРЕПОСТЬ	Крепость
House	Zamok	ЗАМОК	Замок
Bridge	Dom	ДОМ	Дом
Land	Most	МОСТ	Мост
Coast, Shore	Zemlia	ЗЕМЛЯ	Земля
Island	Bereg	БЕРЕГ	Берег
Peninsula	Ostrov	ОСТРОВ	Остров
Plain, Field	Poluostrov	ПОЛУОСТРОВ	Полуостров
Desert	Ravnina	РАВНИНА	Равнина
Steppe	Pustynia	ПУСТЫНЯ	Пустыня
Swamp	Step	СТЕПЬ	Степь
Forest	Boloto	БОЛОТО	Болото
Plateau	Les	ЛЕС	Лес
Mountain or Hill	Ploskogorie	ПЛОСКОГОРИЕ	Роскогорие
Ridge, Range (Mountains)	Gora	ГОРА	Гора
Mountain Ridge	Khrebet	ХРЕБЕТ	Хребет
Cape	Gornyi Khrebet	ГОРНЫЙ ХРЕБЕТ	Горный Хребет
Mountains	Mys	МЫС	Мыс
Peak	Gory	ГОРЫ	Горы
Pass	Vershina	ВЕРШИНА	Вершина
Valley	Prokhod	ПРОХОД	Проход
North	Dolina	ДОЛИНА	Долина
South	Sever	СЕВЕР	Север
East	Iug	ЮГ	Юг
West	Vostok	ВОСТОК	Восток
Snow	Zapad	ЗАПАД	Запад
Water	Sneg	СНЕГ	Снег
Spring, Well	Voda	ВОДА	Вода
Stream	Kolodez	КОЛОДЕЗЬ	Колодезь
River	Protok	ПРОТОК	Проток
Lake	Reka	РЕКА	Река
Sea	Ozero	ОЗЕРО	Озеро
Gulf	More	МОРЕ	Море
Sound, Strait	Zaliv	ЗАЛИВ	Залив
Port, Harbor	Proliv	ПРОЛИВ	Пролив
Great	Port, Gavan	ПОРТ, ГАВАНЬ	Порт, Гавань
Small	Veliki	ВЕЛИКИ	Велики
Long	Malyi	МАЛЫИ	Малый
Old (former)	Dlinnyi	ДИЛННЫЙ	Длинный
New	Prezhni ²	ПРЕЖНИИ	Прежнии
White	Novyi	НОВЫИ	Новый
Black	Belyi	БЕЛЫИ	Белый
Red	Chernyi	ЧЕРНЫЙ	Черный
Green	Krasnyi	КРАСНЫЙ	Красный
Blue	Zelenyi	ЗЕЛЕНЫИ	Зеленый
Yellow	Sini ²	СИНИИ	Синий
Road	Zheltyi	ЖЕЛТЫИ	Желтый
Highway	Doroga	ДОРОГА	Дорога
Highway ¹	Bolshak	БОЛЬШАК	Большак
	Bolshaia Doroga	БОЛЬШАЯ ДОРОГА	Большая Дорога

¹Actually, Big Road. ²Final "I" dropped at end of word.

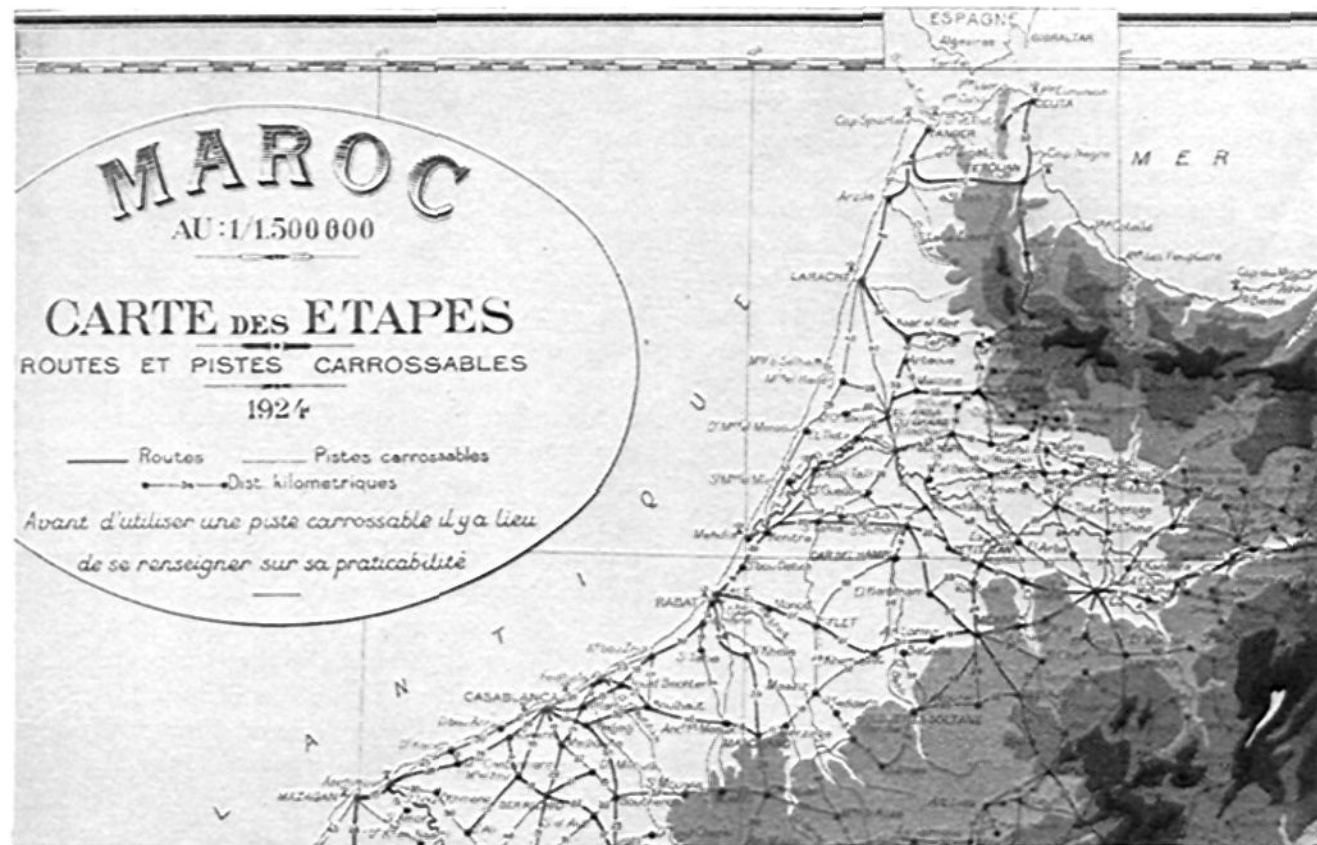


Figure 7.—A portion of a French map of Morocco, scale 1:1,500,000 (reduced about ½). Longitude on this map is reckoned east and west of Paris meridian.

one for Christian, the other for non-Christian cemeteries. Factories have two types of symbols depending upon whether they have smoke stacks or not. Milestones, sign posts, and silos are marked on maps where they are prominent. "Terrain patterns," such as swamps, meadows, mixed forest, thin forest, et cetera, are classified and symbolized in almost the same fashion as on our topographic maps.

Russian Linear Measurement.—The verst is the nearest equivalent of our statute mile. It equals 3,500 feet, .66 of a mile, or 1.07 kilometers. Other units of Russian measure are shown in Table I.

MAPS OF ARABIC-SPEAKING COUNTRIES

Maps of areas in which the Arabic language predominates are for the most part published in English or French, though some are to be found in Arabic script. As Arabic is a study in itself and for the reason that English maps are obtainable, the names shown in the table of geographical equivalents are the English transliterations of the Arabic names (Table VII).

The transliteration of Arabic into Latin script has long been a subject over which there has been a difference of opinion. The question has been whether place names should be "decoded" with the phonetic equivalent, or with direct transliteration of Arabic characters. The official British sources use the latter method on their maps because of the existence of a wide difference of pronunciations within even small localities. For example, one character in Arabic script

may have any one of the following equivalents in so far as its pronunciation is concerned: *dz*, *z*, *dh*, *dth*, and *d*.

The British Government has, however, spelled names in Mesopotamia, India, Anglo-Egyptian Sudan, and Egypt exactly according to the official surveys of those respective countries.

It is difficult to pick up two maps of the same area by different publishers in English and not find some difference of spellings between place names. Here the map observer's patience will be tried. Adopt the spellings of a Government or military map in preference to civilian ones.

To make map reading practical in Arabic-speaking countries, the map reader will best be understood by natives if he pronounces Arabic script according to the table in the Royal (British) Geographical Society's *Alphabets of Foreign Languages Transcribed into English*. This transliteration table differs some from the one in the United States Government's "Foreign Languages," and is recommended because it is more explanatory and practical. Moreover, this latter publication is now out of print.

Good British maps exist for Anglo-Egyptian Sudan, Arabia, Egypt, Iraq, Transjordan, and Palestine; French for Syria, Algeria, Morocco, Tunisia, and all other parts of French Africa (see Figure 7). One of the best sources for a detailed study of the latter is the large French atlas entitled *Atlas des Colonies Francaises. Protectorats et Territoires Sous Mandat de la France*. This was published in Paris in 1938 by *Societe d'Editions Geographique*

Maritimes et Coloniales. The atlas is well worth viewing if for no other reason than to see superb cartography.

Italian maps of Libya, Eritrea, and Italian Somaliland in existence before this war did not measure up to British and French standards.

In all of these countries, with the exception of their coastal areas, the Nile Valley, Palestine, and Syria, much has yet to be done in the matter of surveying. The cartographer still lacks detailed and accurate field notes from which he can plot accurate information on the map. Blank spaces exist on maps of desert areas, but they also exist on other areas from lack of proper survey.

CHINESE MAPS

China has been backward in the compilation and publishing of maps. The country is inadequately surveyed. The coastal regions and a few of the adjacent provinces are the better mapped portions of that nation. The interior of China, except for the location of major geographical features, is relatively unmapped.

Not all Chinese maps are printed in the Chinese characters. Some are in English, and other nations have made maps of that area too. Because of the small amount of cross-country travel within China prior to the present conflict the demand for maps has not been great enough to warrant any production.

when he has reason to believe the Chinese map might contain information not shown on other maps. There is a large amount of factual detail which can be obtained from any map regardless of the text in which it is printed, as certain symbols are basically the same the world over. The reader should look upon every map as being an aid to him in some respect.

Rivers, lakes, land relief, roads, trails, cities and towns, mountain peaks, passes, canals, railroads, bridges and dams; these are geographical features whose symbols vary so little among all foreign maps that the good map reader can understand them with almost no effort. The greatest mistake one can make in approaching any foreign map is to feel afraid of it. In *learning* to read foreign maps overconfidence is an asset. Here the individual will make mistakes, but in the process he will learn—only by being bold. On maps of Chinese or Japanese text, the officer should start working from known symbols and characters with this thought in mind.

All foreign maps of China and Japan (that is, maps not in Chinese or Japanese characters) must render their names phonetically. This results in such differences as *Sian* in German whereas the same term (small) would be *hsiao* in English. The German rendition of the Chinese word for "stream" is *tschuan*, while in English it is *ch'uan*. The Chinese town as spelled on an American map, *Changli*, would appear as *Tschang Li* on a German map. *Nanking* in English differs from *Nankin*, as the name is rendered in French.

The standard system of writing the sound for Chinese characters is the *Wade*, named after Sir Thomas Wade, who invented it. The spelling of Chinese names originated from the sound of Chinese characters, so the observer will find the similarity between other foreign renditions of Chinese names in their sound. The actual source for English spelling of town names in China is the *Official Chinese Post Office Guide* published by the United States Government Printing Office.

The language is difficult; however, it is not quite so difficult to decipher as the symbols would indicate. The greater portion of Chinese characters are a combination of two parts. These two parts are termed the radical and the phonetic.

Radicals might be termed a sort of alphabetical or index structure upon which all characters are built. There are 214 radicals. The main function of the radical is to index the group to which any given character belongs. Radicals are listed according to the number of strokes each one contains. Some are complete words, others are simply structures upon which the full meaning characters are built. Generally the radical is to be found at the left of the character of which it is a part, although it can be at the top, bottom, or right.

The geographical equivalents listed in the table for Chinese are for use with Chinese maps rendered in English text. *Ho* is the most common of all terms used for river; *Yangtze Kiang* means "Great River," and *Hwang-Ho* means "Yellow River"; *Hwang Hai* is "Yellow Sea"; *Han* is the Chinese word for cliff. The word *t'ien*, listed for field, actually means rice field.

TABLE IV.—CHINESE GEOGRAPHICAL TERMS

English	Chinese
city, town	ch'eng fu, shih, hsien
fortress, fort	lei
land	ti
island	tao
plain, field	t'ien, p'ing yüan
forest, wood	lin
plateau	kao yüan
mountains	shan
rock	shih
north	pei
south	nan
east	tung
west	hsi
water	shui
stream	ch'uan
river	kiang, ho
lake	hu
sea	hai
port, harbor	chiang, wan
great, big	ta, yangtze
little, small	hsiao
old	lao
white	pai
black	hei
red	hung
yellow	hwang

The main point of difficulty in reading Chinese maps lies in our inability to read Chinese characters. However, this should not inhibit the reader from tackling such a map

TABLE V.—JAPANESE NUMERALS

English	Japanese (Chinese)	English	Japanese (Chinese)
zero*	0 〇	nine	9 九
one	1 一	ten	10 十
two	2 二	eleven	11 十一
three	3 三	twelve	12 十二
four	4 四	thirteen	13 十三
five	5 五	twenty	20 二十
six	6 六	twenty-two	22 二十二
seven	7 七	hundred	100 百
eight	8 八	thousand	1,000 千

*Sometimes the character for ten is used.

TABLE VI.—JAPANESE LINEAR MEASURE WITH ENGLISH AND METRIC EQUIVALENTS

Japanese	English	Metric
1 <i>bu</i>	1/9 inch	0.3 centimeter (.003 meter)
1 <i>sun</i>	1.2 inches	3.04 centimeters (.03 meter)
1 <i>shaku</i>	11.9 inches (.99 feet)	0.30 meter
1 <i>ken</i>	5.9 feet	1.82 meters
1 <i>cho</i>	119.0 yards	109.0 meters
1 <i>ri</i>	2.44 miles	3.93 kilometers
10 <i>bu</i> = 1 <i>sun</i>	1 meter = 3 <i>shaku</i> , 3 <i>sun</i> and 3 <i>bu</i>	
10 <i>sun</i> = 1 <i>shaku</i>	1 kilometer = 9 <i>cho</i> and 10 <i>ken</i>	
6 <i>shaku</i> = 1 <i>ken</i>	1 mile = 14.8 <i>cho</i>	
60 <i>ken</i> = 1 <i>cho</i>	1 foot = 1.006 <i>shaku</i>	
36 <i>cho</i> = 1 <i>ri</i>	1 inch = .84 <i>sun</i>	

JAPANESE MAPS

The cartography of Japanese maps ranges from poor to excellent. They print maps in both English and Japanese. They are too often inconsistent in the spelling of place names in English, especially so with regard to their maps of Manchukuo and Northern China. Town names will be spelled one way, and provinces or regions of the same name will be spelled differently. Only in Korea, which is under Japanese control, do the spellings approach consistency. The difficulty of rendering Japanese names in English accounts for many misspellings.

The author has seen a letter from the Japanese Post Office Department which was in answer to an American query as to what was the official spelling of Tokyo. This Japanese letter stated that the correct spelling was "Tokyo." However, the envelope in which the letter came was postmarked with the spelling "Tokio." This is a typical example of their inconsistencies.

Like Chinese, the big difficulty with reading Japanese maps lies in the

interpretation of the Japanese characters. Their writing was borrowed from the Chinese at a time when the Japanese had none of their own. Their pronunciation of these characters differs greatly from the Chinese pronunciation of these same ideographs. Chinese is a difficult language to read, write, and speak, but the Japanese is even more so. For a clear explanation of the structure of elementary Chinese and Japanese characters see *War Department M.I.S. Information Bulletin No. 14*. This contains an excellent discussion of this very difficult subject.

For Japanese topographical and military symbols the officer should refer to *War Department Technical Manual 30-480*. This document lists all symbols and their definitions. Some of these symbols can be seen on the Japanese map illustrated here (Insert). This particular map is an example of their better cartography. Its combination of contour lines and shading make for an effective portrayal of land relief, and the spot heights add further detail. Much can be learned from a study of this map with *TM 30-480* as reference text on the symbols.

Japanese and Chinese characters are a subject too complex for further discussion here with any benefit to the reader. Table V lists the characters for numbers which are easily interpreted. Fortunately, the strokes are the simplest, and these are characters which are easy to memorize. Numbers above ten are combinations of characters from one to ten; see twenty-two for an example.

NOTES ON GEOGRAPHICAL TERMS

Turkish.—This language is divided into the "Old" and the "New." The former is made up of the Arabic alphabet plus three Iranian (Persian) characters, and it contains both Arabic and Iranian words. The New language uses the Latin alphabet.

The word *dereler* is the plural for *dere*, valley; *adalar* plural for *ada*, island. There is no sure way of transliterating from Arabic into the "New Turkish" unless one possesses a knowledge of the old language. As both

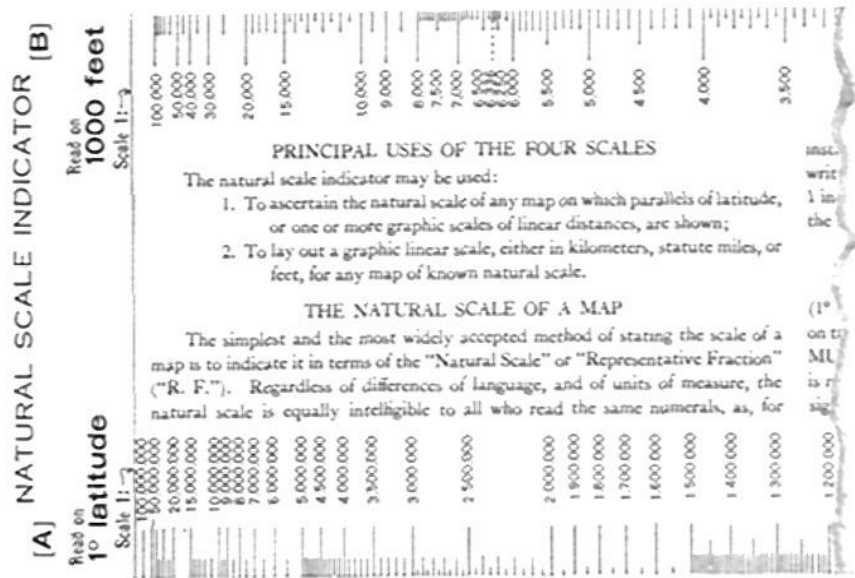


Figure 8.—Portion of "the Natural Scale Indicator"

Latin and Arabic are still in use, some confusion exists in geographical spellings.

Malay.—This is written in Arabic characters, and contains many words of Arabic. Pronunciation differs some from the Arabic. It is the most important language of the Asiatic East.



Figure 9.—Portion of an official Siamese map, scale 1:2,000,000, in Siamese text, showing Singapore and vicinity.

Hindustani.—This is the commercial language of India. Excellent British maps exist for India and adjacent areas.

OTHER CONSIDERATIONS

Accuracy.—One of the quickest indexes to the topographical security of a map can be found in the observation of the coast, shore, and river lines. These not only reveal the accuracy of cartography, but the extent of survey. The key lies in the execution of these lines. For example, the upper sources of the Amazon River appear on maps as rivers of rather smooth and unwinding quality. However, from maps of lower reaches of these rivers it is a known fact that they twist and wind greatly. It is evident that these upper reaches have had little or no surveying, and the cartographer has no alternative but to connect up a series of widely separated known positions to make the lines of these rivers. Thus lack of survey is revealed by difference in character of river lines. Look at the shore lines of a lake in a territory well surveyed, and compare it with a lake in Central Asia where there is a lack of survey. The former is a lake of intricate detail whereas the latter will be a lake of a smoother shoreline.

For the accuracy of a map's cartography, study its shorelines. If a detailed shoreline has a tendency to wave in and out with somewhat the same regularity of indentation, the cartographer did not take care in executing the true irregularities. This is a carelessness in cartography and, if evident, the reader should watch for similar irregularities. In comparing maps for this remember that they should be of the same or nearly the same scale. The smaller the scale the more smooth the coast, shore, and river lines will appear.

Unknown Scale.—One of the most helpful devices for making use of foreign map material is a "Natural Scale Indicator." This is of thin hard cardboard 3 by 15 inches with scales on all four edges. It is used to determine the scale of a map when actual scale is unknown. In order to use this, there must be on the map a unit which is known to be either a statute mile, a kilometer, 1,000 feet, or one degree of latitude. The length of any one of these units will reveal the scale of the map in terms of Representative Fraction on the "Natural Scale Indicator." A scale for this purpose is printed by the United States Geological Survey. (See Figure 8.)

Type Faces.—In deciphering names on maps which use the Latin or Cyrillic alphabet, take the names by their (printed) type grouping. Most maps are made in such a way that the styles of type used suggest the features. For example, all mountain names will be in the same kind of type. Smaller ranges will of course be in a smaller size type. Town and city names use a perpendicular capital and lower case combination with letters shaded. State, province, district, county names will appear in perpendicular capital letters, which is the general rule for names of political divisions. All letters here will be shaded.

River, stream, and lake names take on a loose quality of lettering which generally resembles writing more than lettering. Mountain ranges and hills are named in a slanting and simple type with nothing but capital letters. Therefore, in looking for other geographical features of the same type as just transliterated, let the type faces guide.

TABLE VII.—ASIATIC EQUIVALENTS OF ENGLISH GEOGRAPHICAL NAMES

<i>English</i> city, town	<i>Arabic</i> medina, beled	<i>Japanese</i> shi, tokai	<i>Malay</i> nagri	<i>Persian</i> sheher, abad	<i>Turkish</i> sheher	<i>Hindustani</i> pura, nagar, -abad
borough	suk, belide		kampong	basar	basar, kasaba	besti, gram
village	kefr, gereh	mura	desa	dih		
hamlet					chan	
fortress, fort	qele, husn	yosai	benteng kotta	dis, derghale	kale, hissar	kot, durg
gate	bab	mon, kado	pintu	der	kapu	kewar
castle, palace	galat, qesr	shiro, kyuden	dalam	hissar, dis, eiwan	konak, saraj	derbar
house	beit	uchi	ruma	chane	ew	gra
bridge	shisr, kintere	hashi	tjukang	pul	kopru	pul
land	bilad, buldan, dar	rkiu, hondo	tanna, bumi	-san	jer, el, il	desht, watan
coast, shore	shat	kaigan, engan	tepi	kenar-i-derja		derja, kinare
island	tschesire	shima	pulo, nussa	tschesire	ada	tapu, dip
peninsula	tschesire	hanto		tschesire	tschesire	
plain, field	desht, tehameh	hara, heichi hatake, ta	padang, tagal	hamun	owa sher	maidan
desert	sahara	sabaku		desht, bejabar	kum, shol	
heath	hamad			charzar, char- istan		
swamp	hur ¹	numa	muara	abgir	batak	thel
forest, wood	ghabe	hayashi, mori ²	utan	bishe	orman	shengel
mountains	djebel	-san, ² yama	gunung, bukit	kuh	dagh	girwan, pahar
chain, range			pasir		bel	
cape	ras	misaki	tandjong	ser-i-kuh	dagh, burun	tek, ponta, eni
rock		iwa, banjaku	karang	seng	kaja	pathar
mount	djebel	mori	gunung, bukit	kuh	dagh, tau	gebirge
peak	kul, tel	itadaki	kapala	ser, bala	bash, tepe	
pass	abba, eber, mar	toge		derbent, teng	derbent, kapu, bojun	ghat
valley	wadi	tani	padang	dere	dere	
north	shemal	kita	utara	shemal	yeldis	uttur
south	temin	minami	kidol	shenub	gible	dekhan
east	sherk	higashi	wetan	bashter	gun	pureb
west	gherb	nishi	kulon	chawar	bati	petshnem
snow		yuki		berf		him
water	ma	mizu	aik, adjer	ab	su	tshel, paniya
spring, well	ain, bir	izumi, ido	assal, pohon	tsheshme	bunar quju	kuan
stream	seil	ogawa	soongi	tshu	irmadshik	
river	nahr, wed	kawa	kali	rud	irmaq	nedi
lake	birkeh	mizu-umi, ko	ranu, danu	derjatse	gol	
sea	bahr	umi	laut	derja	denis	derya
gulf		iri-umi, wan	legan	cher-i-derja		gub
bay	gobat	iri-umi, wan	telok, lebak	chelidshi-derja	liman	gubba
channel		kaikyo	selat		boghas	gele
straits		kaikyo				
lagoon				dehane-i-rud		
port, harbor	mers mina, chair	minato	laboan, telok	bendar	iskele	ghat, bendar
great, big	kebir	okii	besar	busurg	ulu, bojuk	maha, bera
little, small	seghir	chiisai	kitjil	churd		shota
long	ridh, tewil	nagai	pandiang	diras	usun	lamba
high	ali	takai	tinghi	bulent	juksek	untsha
upper	fokani	ue-no	udik, ala	bala	jokara	uper
lower	dun, tahta	motto hikui	ilir	pajin	ashaga	adher
old	kedim	furui	tua, umur	kohen	eski, erge	barha
new	shedid	atarashii	baru	nau	jeni, sanga	naya
white	bejad	shiroi	puti	sefid	bejad, ak	sukel
black	sauda	kuroi	itam	sijah	kara	kala
red	ehmer	akai	mera	surch	kizil	
green	chidr	midori, ao	hiedju	sebs	jeshil	harit
blue	serk, esrek	aoi	biru	kebud	gok	nila
yellow	esfer	kiiro	kuning	sert	sari	pit
fine, fair	hasn			chob	jaus	su-
saint	keddis	sei, seija				deua

¹Plural is "ehwar." ²Placed after name, that is, Fujisan. ³Actually "Grove."

Spellings.—City, town, and village names on maps are or should be spelled according to the official postal guide of the nation concerned. Not all map makers practice this, but the better ones do. This is rapidly becoming a standard practice.

Most countries have such guides or lists which name the majority of their towns. Those which have not had them in past years are Spain, Afghanistan, Saudi Arabia, Persia, Ethiopia, Nepal, Bhutan, and a few other such countries which lack mapping bureaus. China has not had one of its own, nor has the Soviet Union. One for the latter nation was published in France, but, of course, its spellings of Russian names are in French, and some adjustments are necessary in order to obtain the correct English forms of these Russian names.

The best source for the spelling of all African and Asiatic names is the Royal (British) Geographical Society's P.C.G.N. (that is, Permanent Committee on Geographical Names) lists. English and American cartographers use these lists extensively. The lists give the geographical name in its actual local script, alphabet, or characters in addition to giving the prescribed English spelling.

The International 1:100,000 Series of Maps are the best small-scale English maps available for comparison with foreign maps. They cover the greater part of the land surfaces of the globe. Some sheets are out of date in respect to boundaries, but they do represent a compilation of the best maps for the particular area they cover. Their standard of cartography is very high. These maps can be obtained through the American Geographical Society, New York City.

SUMMARY

The greatest assets that one can have for reading any kind of a foreign map are patience and confidence. If the reader is willing to work hard at "deciphering" in the beginning he will find his map reading easier in the future.

In the final analysis, the terrain dictates military movements, whether they involve large operations or just a squad. A map is, therefore, as much of a weapon as a gun, and if properly used, the map will aid the user in making decisions which result in success.

Books named herein are not available for purchase. They may be found, however, in some unit and possibly public libraries.

NORTH AFRICAN COMMENTS

"Service here is most interesting. I am enjoying contacts with some French officers nearby—but I enjoyed my first contacts with a camel a lot less. They bite like a bulldog, and it almost takes a crowbar to open their jaws. There is just one rein. My beast was a plow camel (primary duty) and not used to riders, so ran away; when I hauled in enough slack to bring the brute's head to his shoulder, he bit me in the thigh.

"African heat, at least where we are, is over-rated. Any sum spent on a good bedding roll seems justified from this side."

FLEXIBILITY IMPERATIVE

During the entire initial operation of one 105-how. battalion in North Africa, FDC methods were used. Only forward observation methods of conduct of fire were employed, and were successful and rapid over observation ranges of as much as 9,000 yards. For maximum success the Battalion S-3 and Battery Executives (Btry FDC) must be gunnery experts. Flexibility is the keynote of the system.

Total time of a problem was tempered more by the time needed for fire for effect than by that for adjustment. For instance, in one case a battery fired 350 rounds at a single target in varying types of fire for effect, before accomplishing its mission: this target was a 240-mm. coast defense battery of three guns in concrete emplacements. Other missions required only 8 rounds for effect to accomplish. But with these methods, adjustment was always secured in a maximum of three rounds (precision fire) or salvos (if bracket fire was used).

FROM NORTH AFRICA

"The main gratification to us as artillerymen is to find that the things we have learned out of our Sill work are not only true and correct, but right down the old alley. It gives you a great deal more confidence to find that you have less difficulty in handling your tools under fire than on the firing point at school. The only thing is that to be able to have the utmost flexibility and power, you must 'throw the book' at them. In order to do this, it is essential that officers have all the necessary items of knowledge and technique at their finger tips. You find that you have no time to consult FMs and notes when machine guns are firing point-blank at you. Don't under-estimate the enemy's ability, because he is good and throws everything he can at you."



A "FROG" AT FORT SILL

By Lt. Charles H. Taquey, FA

Lt. Taquey will be remembered as the French officer whose experiences with the French pack artillery in the Alps in June, 1940, were described in *War in the French Alps* and *Mountain Guns in Today's War* in the January and February, 1942, issues of the JOURNAL. He subsequently enlisted in our Army for parachute training, winning his wings at Fort Benning early last fall. Next he tackled the Officer Candidate Course at Fort Sill. Commissioned in January, Lt. Taquey has been serving with our parachute field artillery.

"Are you really coming from America, Monsieur?" asked the Frenchman who showed me around his ranch near Marseilles on a windy morning of January, 1940. "Then tell me, how are the Indians?" "The Indians? I scarcely saw any Indians in the United States." "Is that so! But Monsieur, I think that you are bragging when you say that you have been in America." Now I could supply the old Marquis de Baroncelli, "king" of the French cow-boys, with valid proofs of my trips to America.

Fort Sill, Medicine Bluff, Signal Mountain and Mt. Scott! Shadows of Sitting Bull, Stumbling Bear, and Big Tree! Shadow of Colonel Grierson and of the Quakers so opportunely evoked in *Carbine and Lance* for the relief of overworked Candidates! A long time shall pass before I may forget you. Even you, Geronimo, whose name we call under the canopy of our parachutes (even if you do hardly deserve such an honor, you whose chief passion was an unreasonable taste for "fire water"), you will remain for me the symbol of these plains. You were as they are, all contrast and antithesis.

Fort Sill! There the wind blows freely, carrying the cold of the northern ranges after the most unexpected heat waves in the midst of the winter. And at other times the "toughening process" of American soldiers is readily accomplished without the benefit of General Rommel's hothouses. There the sons of the White Man are taught scientific methods of killing under the eyes of the last Redskins. And, to their surprise, they learn that Indian Warfare may be sometimes as important for the Artilleryman as the procedure of Fire Direction.

A Candidate arrives at the O.C.S., branch of the Field Artillery School. He has been sent there by a Board of Officers which passed on his aptitude to lead men, to adapt

his mind to new circumstances, to learn, and to teach. He is officer material. At first he may have misgivings.

Let's suppose that you are such a Candidate. You may come from any walk of life, from Wall Street or the dust bowl, direct from college or from the battlefield. You may think that you are a leader because you have effectively led men under fire; maybe you have been an officer in a foreign army, or your excellent record as N.C.O. makes you much more conversant with the mechanism and psychology of command than any "Ninety Day Wonder" may ever hope to become. Possibly you are an "armchair strategist"; logistics and geopolitics of the highest caliber are your favorite dish; you eat it three times a day, and it happens that you digest part of it. To the contrary, you may think that you are too young, too inexperienced to exert command and assume responsibilities; or the idea of firing guns big and small may not appeal to you so much as a commission in the Air Corps. As a lawyer you would prefer to be part of the Judge Advocate General's office, or to devote your time as an economist to the planning of the post-war world.

But you are in the Army now; you are "officer material," nothing more, nothing less; and the Army needs artillery officers. The problem is to dress you up; adjust the qualifications that you may have, supply some which you lack; teach you the mechanics you will need in the fulfillment of your daily job; make you able to learn from experience what no book will ever teach you; and impart to you the Unity of Doctrine, the *esprit de corps* and at the same time the initiative which is the basis of any efficient army. The solution to so many different requirements can be provided only by a school. There the Lawyer will learn that logics apply to Gunnery and to the Rules of Evidence as well; the Farmer will find a new use for his knowledge of the terrain; the Strategist will swallow, willy-nilly, the A.B.C. of the trade; the N.C.O. will be taught to make decisions; and the College Boy, as well as the others, will go through some tough experiences which will distinguish him among other men, give him confidence, and ultimately make a Chief out of him. Probably your greatest benefit will be to forget quickly many details of such a large picture shown to you in so short a time and to feel therefore the urge, immensely greater than before, of learning them again by the sweat of your brow.

You are at Fort Sill and with little time at first to think of the Indians. The course starts with motors. In former times it was horsemanship. You understand without difficulty the dictum, "A modern army smells oil, an old fashioned one smells dung." You read the assignments—at least you try to—and you begin to understand why the Second Front did not start earlier, and why radio commentators insist fatiguingly on the "Problem of Transportation." A 6×6 truck is more temperamental than 6 horses, even 6 mules, and it needs more attention than a beautiful woman. First echelon maintenance, weekly, monthly maintenance, driver's inspection, command inspection, check and recheck, without forgetting tightening and six or seven kinds of lubrication. You think of the plight of motorized columns short of supplies 3,000 miles from our shores. At the end of a short week you have a motor march. Your assignment: Bn S-2, and you will relieve the road marking party. Easy, you think. Wait until you have left six or seven of your buddies behind on the road!

Materiel follows. You learn the importance of small details for the achievement of broad aims. The Bracket Locking Ring Lock Screw and the Piston Rod Outer Locking Nut haunt your dreams. If you keep your head throughout the S.N.L. you can also get valuable dope on the psychology of foreign nations. The French, mind you, contributed most of our 155 howitzer, and their cautious mind becomes evident to you once your instructor has demonstrated the fastidious safeties of that piece which can hardly be fired until everybody has said his prayers. By that time demerits ("gigs," you will call them) start falling. You just imagine that they are shells of splinters and you fix your locator card or button your shirt with the same spirit you would use in digging slit trenches under fire. Up to now, after all, everything is fine. The writs have not been arduous, you were authorized to use your books, and a small crop of U's bring to your section nothing worse than a few hours of compulsory study hall.

The first week of gunnery is the real beginning of adventures, and if a dangerous life appeals to you, you have what you want. Experienced or not, you will have your troubles. Y-azimuths will be the main cause. Although they call them angles, I rather think that they are Gremlins gone crazy for having turned all their life in the clockwise direction. You will lose valuable time thinking out the nature of the little bird who adds 6,400 to your declination constant, when needed, and you will be disgusted by his failing to subtract 3,200 from some of your deflections. As to the base angles you will meet in survey, their labyrinth of criss-cross polygons will remind you of Crete—not because of the German invasion but because the Minotaur used to live there.

Weeks follow weeks; each one has a name; the bewildering third, the scintillating fourth, the bloody fifth, etc.—you will learn them more quickly than I can forget them. Each one will have a surprise in store for

you; firing battery, ballistics, unobserved fires, survey, MIFMIF, K-transfer, correction difference, vertical and horizontal photos (remember the last item, gentlemen), time fire, ricochets (remember that one too), high bursts and center of impact, . . . These will be the tools of your trade.

As if it were not enough, service practice starts without delay. There you will find the pace really terrific. "Class assemble; poor judgment; waste of ammunition; a mis-sensing; you do not know your procedure; how the h— can you hope to get an adjustment? Any questions? Sit down. Next problem. 45 left of the truck body and at a nearer range, at the limit of a light green field, a small piece of materiel. Student so-and-so, your target." "BA, Sh HE Ch V, FD, BDL 640, Si 300, F ⊕, EI 450." "On the way." "Eh, EH . . . LOST . . . Eh, Eh . . . Sir, I think I have lost it. . . ." "I ain't your mother, kid! What is your next command? . . . Sound off . . . Do something, DO SOMETHING, D-O S-O-M-E-T-H-I-N-G! . . . Cease firing. End of problem. Class assemble."

Axial precision, axial bracket, small-T precision, small-T bracket, forward observation, large-T precision, large-T bracket—under such an avalanche no wonder if you jump brackets in precision and split them in bracket! Your correspondent "dood it" with full success. Still little confident in your grocery-store arithmetic when using the *c* and tottering when you try to find out on the spot the result of $75 - 6$, you will hear to your dismay (among other "latrine rumors") that small-T involves the use of two other factors and large-T three! Three new factors you will have to add, subtract, multiply, all by head, and God knows what else! You have never been closer to committing suicide. "Nonsense," says your gunnery instructor, "small-T is just like axial and large-T is easy. Any other question? Take a writ." You go on stumbling in the December snow watching your shots, and jump from one foot to the other as your nose cannot be kept dry; or it is August and you sizzle on your iron chair.

From one day to the next you scramble your methods, sense a deviation in forward, work out deflection first in large-T, but you do not get discouraged; you do not repeat more than twice the same mistake. You avoid the shame of being sent back to your former unit with an assignment in relation with your present rank, or the horrors of Prep School. You have shown your desire of becoming an officer. You get through gunnery.

Communications are awaiting you. Elementary, my dear Watson! No code, no theory, no nothing. They show you the sets, outline the procedure, give you tips about wire—and a miracle; to your great surprise, you pass the test. It is true that the shorter the time, the more you have to open your ears and eyes. You know that communications are everything in modern battle and that you may not have a better occasion to have a crack at it until D-day.

(To be concluded)

The Pack Howitzer Hits the Silk

By Capt. Lucian B. Cox and
Lt. Herbert E. Armstrong, FA

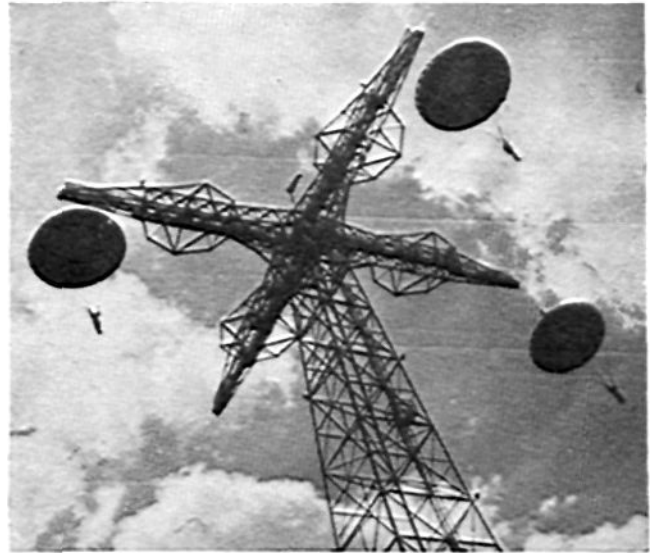
If the men who designed the 75-mm. Pack Howitzer and the dauntless mule skinner who first "packed out" had seen a vision of what was subsequently to happen to their field piece, they might have renounced boots and breeches and transferred to QM for sake of sanity. The vision would have presented a far different picture from their accepted scheme of things. Instead of boot-clad redlegs loading the patient (?) mules, they would have seen lads in strange, green suits beneath an airplane placing the loads (wrapped in neat, oblong canvas containers) in udder-like blisters on the plane's belly. Instead of a slow animal column moving into a battery position, the vision would have shown men and bundles floating to earth beneath silken canopies from speeding airplanes.

Today this is no vision. Parachute Artillery is the latest weapon in our armed forces. It was designed to add the sting to the thrust of parachute infantry. In the winter of 1941 officers and men of the 4th FA (Pk How) Bn proved at Fort Bragg that the piece could be dropped from a bomber. The purpose of their experimentation was to develop a means of rapidly getting the howitzer into inaccessible places. However, if the piece could be dropped, why not the gun crews too? At that time parachute infantry was already a well-established part of the fighting units. Who ever heard of infantry without artillery support?

On February 24, 1942, the War Department authorized the activation of a test battery to conduct experiments to determine the feasibility of parachute artillery. Volunteers were accepted from the old Provisional FA Brigade at Fort Bragg, from which four officers and 150 enlisted men were selected. Naturally, these men had to meet the required physical standards for parachutists.

The first objective was to pass the Parachute Course, at that time given by the Infantry School at Fort Benning. None of the instructors pulled any punches in putting us through our paces.

The parachute course lasts four weeks or "stages." In the mornings of the first three stages the men learned the ins and outs of parachute packing and nomenclature. Afternoons of "A" stage we devoted to tumbling,



calisthenics, trampoline, and the much dreaded double-time. "B" stage offered training with devices such as a landing trainer (known affectionately as the death ride), trainaseum or "Plumber's Nightmare," suspended harness, practice in door exits from a mock plane, also more tumbling and more double-time. "C" stage took us to the two towers (now four) where we had our first real parachuting experience from the free tower, our teeth rattled by the "shock harness," and, incidentally, more tumbling and more double-time.

At this point we were so groggy we would have jumped from a plane with a pillow case. However, we were given the opportunity to test our 'chute-packing ability by making five jumps in the next week ("D" stage) from a plane in flight. Then, on April 17, 1942, the four officers and remaining 112 enlisted men of the Parachute Test Battery became the first qualified parachute artillerymen in the history of the Army.

After these preliminaries the real work began. Lieutenant Joseph D. Harris (99th FA) was the battery commander. The executive, Lt. Carl E. Thain (4th FA), had the problem of training cannoneers not only in the use of the 75-mm. pack howitzer (more than half of the men came from other than pack outfits), but also in their new duties in going into position from a plane. The main burden of the difficult job of compiling a T/O and T/BA fell to Lt. Lucian B. Cox (3rd FA Obsn Bn). Lt. Herbert E. Armstrong (3rd FA Obsn Bn) was the test officer.

The Infantry School appointed a board to supervise the experiments dealing with parachute artillery: Major John B. Shinberger (504th Prcht Inf), Captain Harry "Tug" Wilson (AC), and Lt. Armstrong. Major Shinberger

became the godfather of the battery; without his initiative and contagious enthusiasm most of the work might never have been accomplished. Captain Wilson (often referred to as "the original army parachutist") offered technical advice coming from about 20 years' experience in experimental army parachute work.

Of course, many problems presented themselves. The first to be tackled was that of packing the howitzer itself for parachute descent. A detail was selected from the



battery to work with Captain Wilson, Lt. Armstrong, and members of the Infantry Parachute Group. These men, under Cpl. James Denning, were Privates James Martin, George Alcorn, Wendel King, Anthony Koshinski, Gordon Roberts, and Robert Cogdell. The excellent work and initiative of these men is shown in all of the final results, and is still being shown.

During the first week the test section worked on packing and loading the plane. The type of aircraft used was the C-53 and the C-47 (similar troop transport aircraft). The plane was fitted with streamlined external delivery racks which could be attached to the bottom of the fuselage. From these were suspended six of the howitzer loads. The howitzer was broken down and the conventional loads were packed in standard Air Corps aerial delivery units—cylindrical, padded canvas containers. Two of these, however, had to be adapted to fit the front and rear trails; end covers from the containers were placed on the ends of these two loads, but instead of felt padding around the middle, plain cotton duck was used merely to provide streamlining. Since the wheels were too bulky to be carried beneath the plane they were placed side by side in a small wooden cradle and thrown out the door. The breech block was disassembled and packed in one of the delivery units; this was the only change from the standard mule loading.

Each load was hoisted by its points of suspension in order to test center of gravity and the method of packing. Following is a list of loads and their weights when packed for dropping:

Top sleigh and cradle	246 lbs.
Bottom sleigh	260 lbs.
Front trail	260 lbs.
Rear trail	181 lbs.
Wheels	200 lbs.
Tube	264 lbs.
Breech block	188 lbs.

The wheels on the parachute artillery howitzers are those with pneumatic tires. An aiming circle (15 lbs.) was padded and packed with the bottom sleigh. The parachute used was a standard 24-ft. cotton canopy.

Other equipment was tested too. Although we had decided that a range finder would be excess baggage in a parachute situation, one was dropped packed in the same container used for howitzer loads, landing in perfect working order. This might throw some light on the controversy over the delicacy of the range finder.

A complete test of the feasibility of parachute artillery would naturally result in the evolution of a T/O and T/BA for parachute artillery units. The principal factors governing particular personnel and items were:

- (a) Can it be dropped by parachute?
- (b) Is there available space and pay-load allowance in assigned airplanes?
- (c) Is there available transportation after the initial parachute landing?
- (d) Is it useful in the probable tactical employment of artillery units?

The first factor excluded only motor vehicles; small gasoline prime movers could be dropped, but they were eliminated because of other disadvantages. The factor of plane load limits coupled with the absence of ground transportation eliminated such items of equipment as cumbersome wire-laying equipment, powerful but heavy radio equipment, unessential fire control and topographical equipment. We found it to be a problem of a careful balancing of many factors. Since speed seemed of primary importance, lack of transportation after the initial parachute landing proved the most persuasive factor in the compilation of a T/BA. It was interesting to select a standard item of equipment and then try to justify its inclusion as essential. Often this preliminary consideration revealed that it was not only unessential, but also that even the basic field artillery unit might well dispense with its use as an unnecessary luxury.

Many items of equipment available to other branches of the service proved excellent substitutes for field artillery equipment which was too heavy or too bulky for our purposes. The suggestions and contrivances of our enlisted personnel were often invaluable in solving a problem

of conserving weight or space. When enforced makeshifts proved so successful we began to see the infinite possibilities of parachute artillery with equipment designed for its specific needs. An excellent example of this can be found in the final selection of topographical equipment. After working for months with the only unit of its kind in the Army, the officers of the Parachute Test Battery decided that the topographical set "A"—with its dusting powder, many bottles of ink, calipers, a myriad of scales, pins, and drawing pens—would be about as useless in a parachute situation as a silk bedspread in a pup tent. A more adaptable set was selected to consist merely of range fans, small portable map boards, plotting pins, a few pencils, some overlay paper, and triangular scales. The number of items in the set would, of course, depend upon the number of personnel who need them. For want of a better term the requisition called this Parachute Field Artillery Set "A"; basis of issue: one per battery. Whether the powers-that-be will understand the need for this kind of adaptation and substitution remains to be seen. As far as that goes, we believe that in view of the situation about the only things an officer need carry with him in the way of fire-control equipment are field glasses, firing tables, and a map or photo if available. These, along with aiming circles, should be enough. If ever an officer had to "come out firin' from the hip," he will have to do it from an airplane.

Equipment from many branches of the service was examined, and many items were tried by the test section. It was not humanly possible in the time allotted to test all equipment which might fill even one of our needs. Often an instrument would be highly recommended by one office and as vehemently deprecated by another office. Whenever possible, actual field conditions were created for dependable tests of equipment. Often items were reluctantly omitted from the T/BA merely because they were not immediately available or because, in the absence of rigid field tests, a single voice of disapproval rendered that item's reliability dubious.

In addition to the factors already mentioned as governing the selection of basic items of equipment, we were agreed that every possible effort should be made to make each plane-load a self-sufficient howitzer section. Each plane should carry a complete field piece, ammunition, pioneer tools, instruments for indirect laying, communication equipment, and sufficient personnel to service the piece. We were able to accomplish all of these and our solution to the problem was submitted in our report to higher headquarters. Of course, the loading of the plane was limited by the weight factor so that it was difficult to pack more than 25 or 30 rounds in the plane loaded with the howitzer. However, a sufficient supply of ammunition can be carried in other planes and the 30 rounds in the

initial drop containers are sufficient to last until more are brought up in the planes immediately following. We decided that a howitzer with a dozen rounds is worth considerably more than half a howitzer with a thousand rounds.

Much hard work and close collaboration between all men working upon the tests enabled us to evolve an entirely unique combat unit. Basic armament remained unchanged. The fundamental characteristics of Field Artillery remained. Yet a thousand of the smaller but no-less-essential items of equipment were modified, or substitute equipment used. Loading plans for this equipment provided for the contingency of planes destroyed before reaching an objective jump field. Thus, conceivably, a single transport might reach the objective and its one howitzer section land and deliver effective fire within ten minutes.

On April 23, 1942, a few spectators witnessed the first RSOP from an airplane. Two officers (Lt. Harris and Lt. Thain), two detail men, and a howitzer section under Sergeant Charles Raby (senior chief of section) made the



jump. The howitzer loads were in the plane as described above. In addition a radio SCR-194, two telephones EE-8-A, a small reel of wire, and an axle were packed in a small container, while the gun sight and BC 'scope head were packed in another. These and the wheels were thrown from the door in a "daisy chain"—all bundles were thrown out at the same time, the opening action of the first opening the second, and so on. In 20 minutes the howitzer was assembled and the first simulated round fired. However, this was the first time. At present the average time is between 8 and 9 minutes, the best time being 5½ minutes.

It is useless to dwell upon the various trials and errors or the many experiments attempted. However, we did arrive at an SOP during the many trials and demonstration jumps the battery made. Early in the game we became more or less a flying circus, being called out to

make a demonstration jump for practically anybody; this naturally interfered with experimentation. On the second jump Private Walter Blankenship volunteered to jump with the gun sight in a specially constructed case; he reported no ill effects from carrying the additional weight down with him, and this became SOP from that time on.

All tactical jumps were made from an altitude of 800 feet, although combat jumps would be considerably lower. Ground patterns varied with the velocity of the wind, the best (smallest) being within an area of 170 yards, which is very good considering the conditions which govern the size of the ground pattern.

Twelve rounds of ammunition with fuze M-48 were dropped in the same type of container, suffering absolutely no damage. It seems likely that plane tables and most of the survey equipment would be merely burdensome in a parachute situation, so no steps were taken to test these for dropping. However, a small map board to be carried by key enlisted men and officers is contemplated. On all jumps the officers carried field glasses.

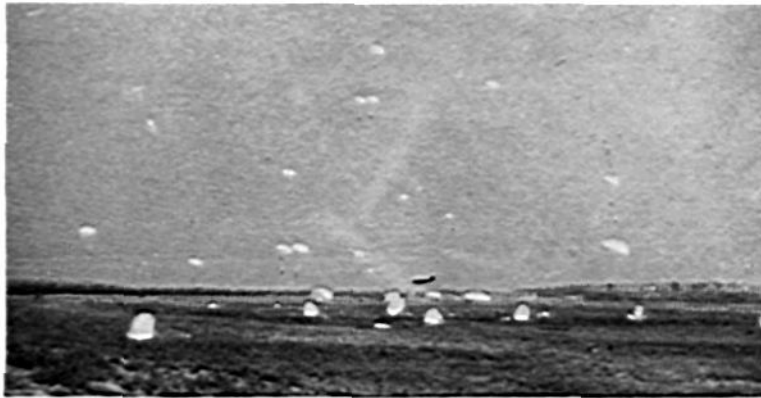
Upon reaching the jumping point loads were pushed from the door of the plane, followed immediately by the first jumper. Other loads were being released from the bottom of the plane at the same time the men were jumping out. Each man was assigned a particular part of the equipment to bring to the assembly point. Various colored 'chutes were used so that the cannoneers could identify the loads they were to retrieve—they could spot these while they were still in the air and maneuver their own 'chutes toward them. The chief of section would find the front trail and hold up its parachute so that the other men would know where to assemble the howitzer. Everybody, even the detail men and officers, would help in carrying the parts. After the howitzer was assembled the detail men would unpack their own bundles and go about their business.

Another consideration, that of transportation facilities upon hitting the ground, left little room for conjecture. The pieces obviously have to be man-handled. That, while somewhat difficult, isn't quite so impractical as it may sound. One night on a problem with the infantry, two of our gun crews showed that they could keep pace with the infantry even though the route was strictly cross-country, through ravines, woods, and streams for 12 miles. Although the men were tired when the objective was reached, they

were in fighting condition. It seems very improbable that we will jump as far as 12 miles from our combat objective.

When the old provisional Parachute Group moved to Fort Bragg and became the Airborne Command, jobs were created for artillery staff officers. Meanwhile the Parachute Test Battery continued to make demonstration jumps—more or less an orphan outfit. Lt. Donald A. Fraser joined us. It was at Fort Bragg that we had the experience of making our first night jump.

Finally — at long last — our patient waiting was rewarded. The battery was activated as a battalion. The old test battery had a rather good record to look back on. Very few of the men had been injured. Only a small part of the equipment had been damaged: some signal equipment was smashed because of a parachute malfunction; one howitzer was damaged when an inexperienced



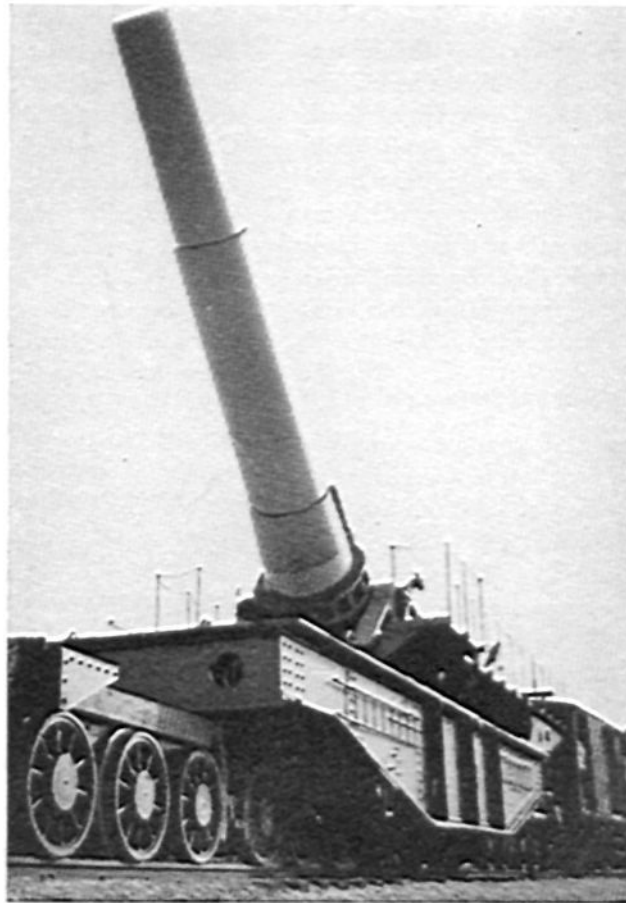
officer authorized releasing the six external loads at once.

Few of us have had the good fortune to feel that we were so essentially a part of something entirely new. Likewise, few of us have been so fortunate in witnessing the development of a new branch of the service, aside from the non-military questions of the physiological and psychological effects of parachute training and jumping. Only the fittest survive the test of the jumps, yet we were continually amazed by the morale and physical endurance of the enlisted men of the battery.

Perhaps living and growing with parachute artillery from its inception extends one's imaginative powers. Yet, with men like ours, all of the Axis armies could not prevent a parachute invasion of Europe. The tremendous assault and shock power of the rapidly multiplying Airborne Divisions will not be confined to the shorelines and prepared landing fields. Every square mile of Axisoccupied territory is a potential bridgehead for the second front, for a dozen fronts. This new Army will establish its bridgeheads in the dark of night, riding on silent silken wings—and each bridgehead will be prepared for the armored car and tank to which the infantry had been so vulnerable. Engineer parachutists will be building landing fields overnight so that airborne troops may be poured into the breach. And, supporting the doughboys with its greater fire power, the Parachute Artillery will be hitting the silk.

Have You Given Us Your Latest Address?

By
Col. Conrad H. Lanza



Railway artillery runs into large calibers. This French piece is 400-mm., or about 16". Chief trouble with it was that it didn't have enough company or support.

THE NEW TACTICS

Tactics are always changing—especially during a war, when each side by the use of new weapons, new quantities of weapons, or new methods seeks to gain the advantage. New tactics are thus born. In a great war tactics remain in a very fluid state: they change as the minds of leaders conceive new ideas, and as forces of production place at the disposal of commanders new and greater numbers of implements of war.

The present world-wide war rages in climates and in terrain as diverse as the frigid lands of Russia, the sandy, torrid deserts of the Sahara, the humid tropical jungles of southeast Asia. Conditions greatly affect tactics, but neither rain nor shine, heat nor cold, mountains, swamps, nor deserts prevent the war from marching on. In the air, on the ground, under the sea, in every way, it is a total war.

In this vast arena whose limits are the entire world, with millions of men in the field, tactics must conform to local conditions. No system of tactics can apply universally or at every time. Battles force participants to adopt tactics suitable to the climate, to the terrain, and above all to the enemy. Here are three variables. A change in any of them requires a corresponding change in the tactics to be employed. By participating in battles, troops that survive may learn the kind of tactics that succeed. This is the costly

way. We can teach a child that stoves are hot by sitting on them, but this is not a recommended way as the fact that stoves burn can be demonstrated in other ways than by injuring children. Battles burn too, and if lost bring death and disastrous consequences to the country which loses. It is far better to teach troops the correct tactics *before* they enter the battle. This reduces the probability of losing lives, and increases the chances of gaining victory.

In peace, lessons from a preceding war can be studied at leisure; proper deductions can be made by careful consideration of the reports of opposing sides. In war, only reports from one side to the contest are ordinarily available. Although generally far from complete these must be evaluated quickly. Lessons deduced under war conditions are not so accurate as those made in time of peace, yet they must be determined and applied. No troops can participate in all battles and by experience learn all battle lessons. Experiences of one furnish valuable information for all others; these are the guides to troops in training, awaiting their turn to fight. Confidence is inspired by troops knowing that their training is based on the newest tactics.

No tactical rules will apply universally. What happened in Russia in a sub-zero blizzard will not necessarily recur in the mild climate and different terrain of south Europe. But experiences in Russia may be partly applicable elsewhere, and wholly so if our troops find themselves on similar terrain and in similar weather. Thus the study of all battles in this great war is useful. Lives may be saved and victory brought closer by noting what troops have already done in the great battles and campaigns of a war now in its fourth year.

EVALUATION OF WAR REPORTS

Reports on the war in France in 1940 are reasonably satisfactory. The tactics then used are, however, already partly out of date. The campaign of 1940 can not now be safely used as a guide to current tactics. Reports on the Balkan campaigns of the spring of 1941 are meager. The Axis naturally has not published its report for our benefit, and the defeated Balkan states were left in a position where they couldn't render any reports.

The war in Russia during 1941 and 1942 is little known. Communiques and rare reports have been laconic, and limited to only so much of the truth as favored their respective countries; national propaganda has to be sifted out. Reports from the British side in Egypt and Libya and from operations of the Allies in southeast Asia, are better documented.

From reports of whichever side happens to be winning come statements as to booty captured. Assuming these may be substantially correct, they give at least the minimum number of guns, tanks, trucks, etc., that the loser had in the sector involved. Each side occasionally lists the enemy divisions identified, giving an approximate idea of strengths. Sometimes reports of prisoners taken enable strengths of particular units to be judged.

Personnel losses of the enemy are reported daily by the Russians, separately for each theater of operations. If these reports were accurate they would be very valuable. However, they in no way agree with the German reports which, published at the end of periods, give totals over a considerable length of time. Neither do German reports which total Russian losses during periods agree with the Russian report which invariably follows within a few days and which indignantly denies having suffered any such losses. The British, as a rule, do not report their losses. Without knowing the personnel losses a true evaluation of tactics and of the results of particular battles can not be made. Gains and losses of terrain in campaigns are fairly well known, but these are not necessarily a true measure of the success or defeat incurred.

THE GENERAL SITUATION IN RUSSIA

In June, 1941 the population of Russia was around 190,000,000. The Axis in Europe, including the minor vassals, totalled about 180,000,000. Manpower of the combatants was nearly the same. However, the Axis was (and still is) under necessity of maintaining large forces to

guard over 2,000 miles of coast facing the Atlantic and at the same time keep in subjection France, the Low Countries, Norway, and the Balkans, besides supporting a substantial army in North Africa. The only forces which Russia had to detach was the army in eastern Siberia watching the Japanese in Manchukuo, which sector has so far been tranquil. Exact figures are not available, but it appears that when the Russo-German war started, Russia was able to muster quite superior forces against the invaders.

By 1943 Russia had lost to the Axis a territory containing roughly a third of its population, the number remaining under the jurisdiction of free Russia being about 130,000,000. This is nearly the same as the population of the United States. The Axis gained a small increment through its occupation of the Baltic States, which are partly anti-Russian; its manpower is now about 185,000,000, exclusive of what volunteers are obtainable from occupied countries. To date the latter figure is so small that it can be neglected. If all the forces of the Axis could be concentrated against Russia, it would have a decisive preponderance in strength. Due to the invasion of North Africa by an Anglo-American expedition, the defeat of the Axis army in Egypt, and growing numbers of American and British troops in Great Britain who threaten to open a new front in western Europe, the Axis has had to increase the number of troops on duty outside of Russia. Latest accounts indicate that the Russians, notwithstanding the losses they have sustained, are still able to bring superior numbers of troops on the field of battle.

Numerical strength of the Russian armies has had a great influence in their successes which commenced in November, 1942. This was not the only reason, for they regularly had had superior numbers before. Another reason for their winning some really great campaigns is that both their strategy and their tactics show recent decided improvement. Russia learned the correct tactics by experiences gained in one and a half years of almost uninterrupted defeats, in which she lost not only one third of her people but twice that proportion of food, mineral, and industrial areas. This was the hard way to learn—the sitting-on-the-stove method. Having been burned, she is now employing new tactics, with noticeably improved results.

THE OFFENSIVE

All important achievements in the present war to date have been won through offensive action. The defeat of France in 1940, of Yugoslavia and Greece in 1941, and the occupation of an important part of Russia, were obtained by aggressive offensives. In East Asia the Japanese similarly won numbers of countries and islands covering a vast territory. In both cases the victors have been obliged to detach large forces to protect what they gained, and now have reduced forces with which they may be unable to undertake further largescale

offensives. If has become the turn of the other side to attack the Axis' over-extended defensive lines.

There is a limit to which offensives can be profitably pushed. If the enemy can not be defeated beyond a possibility of recovery, occupation of territory may be a weakness. If the territory is necessary on account of the resources it produces, this advantage must be balanced against the reduced force left for continuing the offensive.

Despite its desire to continue an offensive to the bitter end, Germany has not been able to do so in Russia, although this did happen in Poland, France, the Balkans, and East Asia, where the enemy was completely exterminated. Compared with the size of Russia and the forces employed, the other campaigns were materially smaller. Russia has had an active front up to 1,800 miles long, whereas in no other case did it much exceed 300 miles. What is a practicable method for a comparatively small front may be quite inappropriate for a very large one.

On large fronts it has been impossible to prevent stabilized situations from arising, either on the whole front or on substantial parts of it. It was possible in Poland and France, in Norway and in the Balkans, and in East Asia, to conduct campaigns which from start to finish proceeded uninterruptedly to final victory. It has not been possible to do this in Russia—temporary stabilizations, and separate detached campaigns, are common. If on a small front the war *can* be rapidly conducted to a decision, it does not follow that this *must* happen—it is just a possibility. In North Africa, war on a small front has continued for over two years and neither side has yet been able to win decisively. Offensives do not always secure decisive advantages even if they succeed in winning territory and capturing prisoners and materiel. To be decisive, the offensive must destroy the opposing hostile force. If the enemy merely retreats something has been won, but how much this is worth usually appears only after the lapse of some time.

The difference between war on a large front (such as in Russia) as compared with small fronts (such as occurred in France and the Balkans) has required all concerned to make substantial changes in tactics and equipment. Perhaps most important changes have been the large increases in artillery and in armored troops, the two arms most prominent in recent campaign. As regards artillery, the density of batteries in line is approaching the figures of 1918. It just had to be done. Experience demonstrated the necessity for having ample fire support, which could be obtained in no other way than from the artillery.

On October 24, 1942, the British Eighth Army drove the German and Italian troops out of their front line defenses at El Alamein by an intense artillery preparation of six hours, from midnight to dawn. Instead of covering an extended

front of many kilometers it concentrated on selected sectors to be used later as lanes of attack for armored forces. But the armored forces did not advance until November 2nd. In the meantime, infantry secured the ground cleared by the artillery fire. In rear of the infantry, in what had been the enemy's foreground, engineer troops painfully, laboriously, and methodically removed thousands of land mines, to permit the rapid passage of fast-moving armored fighting vehicles.

On November 2nd another artillery preparation was fired against the new enemy line, which was not protected by a deep mine belt before it. This preparation lasted but four



French tanks were a bit lonely in 1940. These vehicles must be used in relative mass, with ample replacements available.

hours, from 0200. The armored forces then rushed in at high speed, through the lanes previously opened up, and continued on into the enemy rear areas. Here they turned, in this particular instance, to concentrate in rear of the enemy's north flank. There then ensued a tank battle; the British, winning this, pushed the enemy's armor towards his rear. As a separate phase, British infantry (following through the gaps made for the armored troops) proceeded to turn to both right and left, rolled up the remainder of the enemy's front, and later attacked islands of resistance left in enemy rear areas.

On December 16, 1942, a Russian army along the Don River attacked on a front of about 30 kilometers. An artillery preparation of no prescribed length smothered the enemy's front until the OPs could see that he had been driven out. Thereupon infantry crossed the river on the ice and occupied the further bank and nearby hills. Engineer troops then laid light timber structures on the ice, by means of which the armored troops were able to cross. These pushed through the infantry, along previously selected routes which avoided strong points

and centers of resistance. The aim was to reach quickly deep into rear areas, and by seizing and destroying supplies, disrupting lines of communication, and capturing command posts, spread disorder within the enemy's ranks. The armored troops paid little attention to enemy troops holding out in their own rear—these were left to the infantry, which followed behind and was charged with reducing as rapidly as possible those enemy positions which had been by-passed. Thereafter the armored troops operated far ahead. They lived off the country, securing supplies of gasoline, oil, and rations by capture from the enemy. At times they were 30 miles ahead of the infantry. Enemy armored forces coming up, a battle zone many miles deep was created. Within this zone troops of both sides advanced, circled, and retired. Attacks came from any and all directions, by both day and night. It was open warfare of a most rapid and changing nature. It rolled on day after day, armored forces in advance always seeking to strike deep into the armies of the opponent. Infantry in rear were busy with reduction of encircled enemy forces; these operations were relatively minor, but some employed large forces and required weeks of constant battle.

These two battles, El Alamein and the Don River, are fair examples of the new tactics for initiating a powerful offensive. Whereas 1918 offensives consisted of an artillery preparation followed by the infantry attack, there are now three phases instead of two. The new tactics provide for

- a. An artillery preparation, to open the way for either infantry or armored forces;
- b. An attack by armored forces through the enemy's front into his rear areas;
- c. An attack by infantry against the enemy's former front, then against individual enemy centers of resistance.

Exceptionally, the infantry and armored force attacks may be reversed as to order. In the German attacks in France and Russia, the armored forces have usually preceded the infantry attack and in general operate well in advance of following supporting troops.

Three types of artillery are indicated for the three phases of an offensive. For the artillery preparation, the heaviest available artillery is employed. Main reliance is on guns of about 150-mm. and 240-mm. calibers, as these are the smallest sizes which will blast troops out of trenches without requiring an excessive number of rounds. This is not only the practice on the battlefields of Europe, but has been that of the Japanese too: reports from survivors of the attack on Corregidor comment on the accuracy and deadliness of the Japanese 150-mm. and 240-mm. batteries; it was these that caused the casualties, and primarily brought about the fall of our Far East fortress. It was the same at Sevastopol—the Axis' heavy artillery caused the fall of that great naval center. For the artillery preparation, absolutely necessary to pierce a front prepared for defense, artillery command is

centralized in order to concentrate the fire on those sectors which it is intended to penetrate.

Artillery as mobile as tanks is provided for the armored troops—usually guns on self-propelled mounts. A fair part of this artillery may be of smaller calibers, to fire on personnel (not in prepared defenses) and on hostile armored forces. Heavy calibers may be necessary.

For the infantry advance, following in rear of armored troops, all calibers of artillery are required. The infantry may meet other infantry in the open or behind defenses; it may meet hostile armored troops; it may have to conduct siege operations against strong points some of which may be of great extent. It is not necessary that this artillery have the mobility of that accompanying armored forces, but it should be motorized and some of it should have considerable cross country mobility.

The commander of the infantry force has as his primary mission the prompt opening of a practicable route forward to the armored troops, by which ammunition and supplies can be furnished to them. Enemy islands of resistance are usually so located as to block roads and railroads. The infantry commander must decide the order in which these enemy groups, holding out in rear of his front line, are to be reduced. It may take less time to open a roundabout route than it would to capture a strongpoint which blocks the most direct route. A secondary mission is to be prepared to establish a line of defense to block enemy armored troops raiding toward our own rear areas, and to afford protection to any friendly armored forces needing it.

Intimate liaison is required between the armored forces and the following infantry. Armored troops supply themselves from captured stores as far as possible. If they fail to capture enough, they must know when supply trains will arrive. Disaster may strike the armored troops or individual units, so they must know in advance where they can find the protection of the infantry line. The infantry needs to be informed as to the possibility of enemy forces penetrating to their zone in order that it can prepare to meet such a situation.

In the Don River attack the terrain contained many villages. The enemy had prepared quite a few of them for resistance, and when he fell back left garrisons in them. This action blocked all roads and finally led to a slackening of the advance of the armored forces until the following infantry could complete the reduction of the villages. After the battle of El Alamein the Axis had only a few towns organized for defense, and these were hundreds of miles apart; it was practicable to bypass any of them, so in this case no resistance was made other than brief halts along desirable stream lines which afforded an opportunity to plant mine fields to delay the pursuit.

The wastage of tanks and other vehicles in an offensive is extraordinary. The Russian losses in their offensive near Rzhev, in November and December, 1942, averaged for a 10-day period over 100 armored vehicles a day. In the south sector losses have seldom been less

than 50 a day and amounted at times to over 200. Losses in trucks exceed those in armored vehicles. Replacements of tanks and trucks to forward armored troops engaged in an open campaign must be provided for on a liberal scale.

A constantly increasing amount of infantry in offensives is being mounted in trucks. Some trucks may be equipped with armor, for use in moving infantry during an attack. Trucks in an attack over rolling open country will make from 12 to 20 miles an hour, and the artillery barrage can be adjusted to this speed. In the 1914-1918 war an infantry rate of advance of 100 yards in four minutes was fast—and this was less than 1 mile per hour. For truck (or motorized infantry) attacks the artillery barrage may be concentrated on the enemy's front line and held there until the trucks are close. When the barrage lifts the trucks dash in and ordinarily arrive before the defenders can emerge from their shelters. This method was used in North Africa, as in the Axis attack on Tobruk in June, 1942. Trucks in attack are irregularly spaced in both interval and depth. If the artillery covers their approach with smoke (normal practice), the trucks are difficult targets for the defenders to hit. Still, some are hit and more are disabled from accidents due to rough ground; truck replacements on a large scale must be anticipated in any offensive.

Air infantry has been used on only a limited scale. In attacks against an island, such as Crete, they are obviously necessary. Airborne infantry appears to have been little used in offensives in Russia.

Air forces are required for offensives, and upon them main reliance is placed for constant reconnaissance and liaison. They precede the armored troops, locating centers of resistance and positions of enemy reserves, giving the ground commander information from which he can choose what to attack and what to by-pass. They also locate and regularly report the positions of friendly troops—an indispensable service.



Russia's 21-cm. howitzer has well proved itself in the present war. Tracks give it greater flotation, and higher degree of stability in firing, than would wheels. Small carts are used to move ammunition about the position: when hoisted, they form loading trays.

Air forces for attack, or to assist the attack, are constantly used in Russia by the Axis, and less so by the Russians. It is not yet certain whether this is due to Russian lack of planes or because they do not approve of the use of planes to attack ground troops. The Axis habitually uses planes to bomb enemy front lines, supplementing the artillery. Russians depend almost entirely upon the artillery. The Axis usually uses dive bombers for attacking prepared positions, whereas the British have reported that the use of dive bombers for attacking ground troops is not worth while. From all evidence now available it appears that dive (or other method of) bombing does give substantial effect against ground personnel only during daylight; it is less effective than artillery. This explains the Russian increase in artillery. Naturally, if there is insufficient artillery dive bombing may be required, which seems to be the situation of the Axis in Russia. Against especially fortified positions — such as Sevastopol, which had permanent forts of concrete and steel with roofs impenetrable to the largest artillery projectiles—bombing is required.

(To be concluded)

USE OF A SHORT TRAIL LOG WITH 75-MM. HOWITZER

Some batteries of 75-mm. pack howitzers have had excellent results under varying conditions with the use of a short trail log wired or bolted to the spade of the pack howitzer. This trail log is a timber approximately 24" in length and 6" in diameter, with the rear surface roughly rounded to conform to the trail pit. It may be prepared in advance and fixed semipermanently to the spade.

In preparing the position the trail pit is dug on the arc of a circle whose radius is the distance from the center of the axle to the spade. The use of the short trail log and of this type pit provides a spade support always perpendicular to the line of recoil.

PICTURE CRITIQUE

By Lt. George R. Metcalf, FA



Name the errors yourself—even if it's a non-tactical service practice!

If (as Lt. General Ben Lear says) "A pint of basic training sweat will save the soldier a quart of blood in battle," then the green training light points toward the best methods.

And we know from scientific tests that pictures provide the finest paragon for teaching a particular military subject. Toward this goal, the Signal Corps has advanced tremendously. Movies and film strips, touching every conceivable training problem, are rapidly becoming available, and their value is incalculable. If, however, to our present method of showing purely impersonal pictures we add a personal touch—that of bringing the enlisted man actually into the scene, making him actor as well as an onlooker—we completely avail ourselves of the finest teaching medium known.

Let's look at the record, however. Commanders, following the procedure outlined in Field Manual 21-5, *Military Training*, continually punctuate their training mechanism with visual aids. But of the six distinct training steps which are deemed essential for each military lesson, only the first three—PREPARATION, EXPLANATION, and DEMONSTRATION—lend themselves ideally to movies and strips. The final three—APPLICATION, EXAMINATION, and DISCUSSION—are omitted, although they are extremely adaptable to pictures if the enlisted man is allowed to play a distinct part. And the production of such films, moreover, is relatively easy.

The instructor completes his preparation, explanation, and demonstration of a given subject with the aid of movies and strips, and the students (through application) are tested in their new behavior pattern; the follow-through necessitates examination: in gas drill, it's a trip to the gas chamber; in rifle instruction, a trip to the range.

It is at this point, while the APPLICATION or EXAMINATION is still in progress, that pictures can be "snapped" for ideal use in the last portion of the teaching process—DISCUSSION. While men put on their masks you can take pictures of them showing good and bad postures; while men are firing on the range, good and bad illustrations are provided. Show these same "shots" on film strips a couple of hours later when the exercise is being

critiqued, and soldiers (seeing themselves as others see them) will take immediate steps to improve.

A good critique must always meet two essential requirements—presentation immediately after examination when the subject matter is still fresh in the student's mind, and a personal touch so direct that the audience is "all ears." The *picture critique* method meets both of these. Film strips can be produced within *two hours* of the time they are "shot." And, of course, films in which members of the organization are shown will get a lot more attention than verbal thrusts or movies covering the subject impersonally. Why? Simply because human beings like to see themselves.

Now as to the mechanics of the process. Any amateur with proper care can turn the trick. Nothing complicated.

As Battery Commander, find yourself a member of your organization who has taken pictures; from a group of a hundred or more this should not prove difficult. Find that man a miniature camera—one which takes 35-mm. movie film—Eastman, Leica, or Sept. Then get several rolls of Kodak Direct Positive Panchromatic Safety Film, Super-Pan Reversible Agfa, or (if these are unobtainable) standard negative film; load your camera, and you are ready to work. By using the former film, a comparatively recent development, positive pictures can be secured without further printing from negative to positive.

Take your man to the scene of action and point out what you intend to emphasize at the discussion. One film will give you 36 "shots"—Eastman Bantam, 72. Immediately after taking your pictures, develop the films for use two hours hence.

In this connection, the Eastman Company sells for \$3 a Positive Film Developing Outfit which is sufficient to develop 8 rolls of Kodak Direct Positive Panchromatic Film. As mentioned, this constitutes a single process; its beauty lies in the fact that the entire job can be done in only one developing tank of the well known drum-and-trough type. The only part of the process which necessitates darkroom facilities is the initial insertion of film into the tank, and this can usually be accomplished in a

changing bag. By following the seven steps clearly indicated in the directions, taking a total of 35 minutes, the films are soon ready for inspection. Another 20 minutes of water washing, followed by sponging and drying, and the films are ready for projection. Transferring from standard negative film to positive takes slightly longer, but can be accomplished within two hours.

Projection of the film takes place in standard projectors, available at all posts, camps, or stations. In showing films taken by a 35-mm. Eastman Bantam, revolve the lens turret 90 degrees before projecting.



Maybe the road is straight and the fields bare, so the AT gun couldn't be concealed on a curve. But that is no reason for bunchine of cannoneers so that one burst (machine gun or bomb from a plane, or a shell) would surely get them all. Riflemen assigned to close-defense work should keep their minds on their job, not be distracted by watching the firing, get out from the smoke cloud where they can see!

Now as to cost. A roll of Kodak Positive or Agfa Reversible sells for \$1.32 on the open market and can probably be secured for less through army contracts. Even adding the cost of development, pictures can be projected for less than 5 cents apiece.

The variety of subjects to be covered are many, although naturally not all-inclusive. For instance, one would hardly show a man filling out a military form, except to illustrate the position of his pen, pencil, or the position of his hands on the typewriter.

On the other hand, in case of servicing the piece, gas mask training, rifle practice, and such, the method can be put to excellent use. If desired, a battery commander can delay showing the results to his class until a rainy day forces his men indoors.

Another excellent subject is the field exercise. For example, a battery executive notes some of his men unduly exposed to counterbattery fire. What better way to demonstrate this point than to project a few pictures showing the details? With pictures, a commanding officer can securely nail down his comments.

Maneuvers are another time to use this procedure to advantage. Men clearing from roads at the approach of enemy planes make good photographic objects.

So also do the lines or positions in which men pitch their tents, bed down for the night, form a chow line, wash their dishes, and such.

Although mistakes can always be spotted, psychologically one would do well to remember that injured morale can dog the steps of anyone adopting too much criticism. Some of the best results should follow a presentation of pictures showing a job excellently performed.

A distinct advantage in this teaching method, not previously mentioned, is that it tends to keep men on their toes. When the men of a command know that any of them may have his picture taken while saluting, they are all bound to become more alert, for they realize their image may be thrown on the screen at a later period. Correct procedures performed over and over—whether saluting or shooting—build correct habits.

There are various other possibilities that the enterprising commander should consider. He can take a sound recording system into the field and make a record of what he sees at the time the picture is taken, or by using a walky-talky radio set can broadcast back to headquarters and have a reproduction set pick up the voice there. One of the big advantages to be found in this spot recording stems from the fact the instructor gets down his thoughts while his perspective is still keen, instead of waiting for a more remote, less favorable time.

Further merit in this teaching method comes from the fact it affords one of the best means of testing the student. For example, take a set of film strips at service practice; show them to the men for (say) five seconds apiece, followed by ten seconds in which good and bad points must be written out; and grade the results. Two purposes are served; the men participate in the instruction, and the instructor gets a chance to see which men are progressing with the class median, which ones are slow to get the hang.

How about trying it?



By contrast, this "37" crew is observing the best principles. Silhouette is low; no unarmored anatomy is unduly exposed; each man has his rifle quickly available; trails are braced against shifting of the gravel.



PERIMETERS in PARAGRAPHS



(Based upon latest information available at date of writing, and subject to correction as more complete reports are received.)

By Col. Conrad H. Lanza

THE SOUTHWEST PACIFIC

SOLOMON ISLANDS

On Guadalcanal Island, ground operations in the latter part of January were limited to minor patrol actions in which American forces took the initiative. Japan had by this time decided to abandon further efforts to try to hold on to Guadalcanal, and was preparing to withdraw as many of its men as possible. This was unknown to our forces at the time. Therefore, when information was received that hostile ships were assembling in unusual numbers in the northern Solomons and that great activity was apparent at Japanese bases nearest to Guadalcanal, this was naturally interpreted as the prelude to a proposed new attack on American positions.

On the night of 23/24 January, 1943, a naval task force shelled the new Japanese base on Kolombangara Island for 15 minutes, from 0200. Fires were started and considerable damage appeared to have been caused. The Japanese air force had sighted and tracked the task force during the preceding day, and it was expected that the enemy would make some reaction. Two enemy destroyers were located in the vicinity, but as they failed to intervene our task force sailed away.

On 25 January a force of American troops which had landed some days previously on Guadalcanal beyond the Japanese positions and then attacked toward the east met another force which had been sent westward from Henderson Field. Only minor opposition had been met, resulting in the enemy losing 293 killed and 5 prisoners, with some 77-mm. guns. It was now realized that there was no longer any large enemy force on Guadalcanal. Small forces still remained, though, and patrol encounters continued to occur for a number of days.

On 29 January an American task force was about 70 miles south of Guadalcanal, in the vicinity of Rennell Island, covering transports en route to Guadalcanal against the reported Japanese ships in the north Solomons supposed to be engaged in preparing for another attack. Late in the afternoon the task force was attacked by some 25 enemy torpedo planes. An air battle against surface

ships and planes protecting the ships occurred; it lasted off and on for three hours. The majority of the attacking planes appear to have been shot down and destroyed, but before this was accomplished they succeeded in torpedoing our heavy cruiser *Chicago*. The ship was not sunk, but it was badly damaged and unable to proceed under its own power. It was taken in tow. Next day about a dozen Japanese torpedo planes made a new attack. They concentrated on the *Chicago*, unable to maneuver and making but four knots under tow. All Japanese planes but one are reported as having been downed, but several torpedoes again hit the *Chicago*. This ship closely resembles a battleship; this probably explains why the Japanese attack was concentrated upon her.

On the following two nights enemy barges were observed, under destroyer cover, off the Jap end of Guadalcanal. At the time it was believed they were engaged in landing reinforcements, but it has since developed that they were withdrawing troops. American destroyers proceeded to attack the barges, and sank some of them. While on this duty the destroyers were attacked on 1 February by Japanese dive-bombers with fighter protection, who succeeded in sinking the destroyer *Dehaven*. That night about 20 Japanese destroyers, engaged in removing Japanese troops from Guadalcanal, were attacked by American motor torpedo boats; at least one Jap destroyer was torpedoed and sunk and about 2 others were hit, as against a loss of 3 of the motor torpedo boats. Next morning, 2 February, 16 of these Japanese destroyers were located by the Air Force about 100 miles to the north, and one of them was damaged. In the late afternoon our planes were out again; they found and hit an enemy cargo transport and downed 9 out of 10 Zero planes, without any losses.

Enemy planes bombed Guadalcanal on the 3d. Next day the 20 enemy destroyers were again located about 200 miles north-northwest from Guadalcanal. A first attack sank 1 enemy destroyer, damaged two others, and downed 7 Jap planes; our losses were 6 planes, including 4 torpedo planes. In the afternoon our planes returned.

finding 18 enemy destroyers—2 of which were damaged by our attack. The enemy had 10 Zeros downed, while 4 of our planes were lost. This engagement ended a period of naval and air activity in the Solomons.

On 9 February a Japanese communique announced their withdrawal from Guadalcanal as having been completed in an orderly manner, by reason of their troops having accomplished their mission of detaining important American forces. It seems that the Japanese did remove most of their troops, but not all. Intentionally or otherwise some remained on Guadalcanal, and have continued to engage in minor warfare with our troops. For practical purposes, after a seven months' campaign, Guadalcanal can now be considered to be wholly in American possession, with a good air base and satisfactory anchorages and harbors for ships.

The Japanese have established new bases in the Solomon Islands, and developed old ones. A main air base is on Kolombangara Island and another on Munda Island, both in the New Georgia group of islands. Other bases exist on Bougainville Island, while the main base is probably near Rabaul, New Britain. All of these places are being regularly attacked by American planes; Rabaul is visited almost nightly by air forces belonging to the Australia command, who drop impressive tonnages of bombs. The New Georgia bases are raided practically every day, sometimes several times, by planes based on Guadalcanal. Enemy air activity over Guadalcanal appears reduced to that necessary for observation. This hostile form of activity extends southward to include our base on Espiritu Santo Island of the New Hebrides group, where an occasional bomb is dropped.

NEW GUINEA

On 23 January the last enemy resistance in the vicinity of Buna was overcome. The unusual number of 117 Japanese prisoners is reported to have been taken. This ended a campaign which started last July, when Japanese troops crossed the Owen Stanley Mountains and approached Port Moresby. Crossing of these mountains being extraordinarily difficult, when the Americans and Australians were ready only minor forces went overland. Main forces and supplies were moved by air and debarked on the north coast. Here in a hot, wet, tropical country, savage fighting has been going on for about three months during which the Japanese positions were gradually reduced by a series of concentric attacks until they have now been eliminated.

The Australian and American forces released by the ending of a first campaign are not being held idle. They are proceeding northwest along the coast toward the Japanese bases near Lae and Salamaua.

The situation in New Guinea is now:

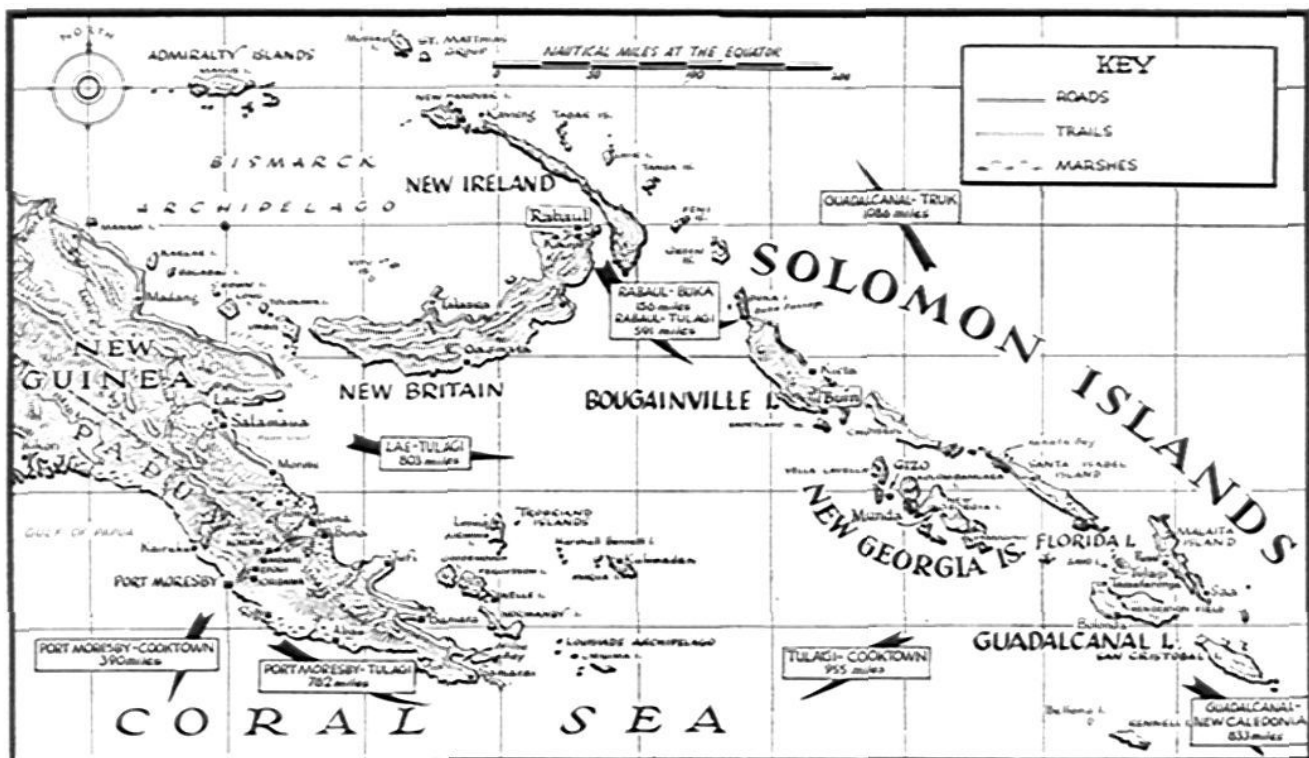
The Allies (Americans and Australians) hold all of Papua, and Merauke, an air base in the southeast corner of Dutch New Guinea.

The Japanese hold all of Dutch New Guinea (less Merauke), and Northeast New Guinea.

Recent reports are that the Japanese have been developing bases on the north coast of New Guinea.

COMMENTS

1. Guadalcanal and Buna are the first American (and Australian) successes on land against the Japanese. According to the Japanese statement of 9 February, the fighting at these two places has given Japan time to prepare defenses at other places "on the road to Tokio." Japan has had time to consolidate



her gains in occupied areas, but just what she has accomplished is uncertain.

2. General MacArthur's Australian command is watching Japanese progress very closely, and regularly reconnoitering by air as far north as the equator. It appears that in addition to new bases in the Solomons and in New Guinea (already mentioned), strong Japanese bases have been established on Timor, and at least some kind of bases on the Eilanden Islands. Further north bases exist on Celebes

and on Amboina Island.

3. The main Japanese naval base appears to be at Truk, with other important naval bases at Palau and at Ponape. Each of these three places is a group of islands surrounding a sheltered harbor and is reportedly strongly defended. Between these bases are numerous islands which contain airfields from which the Japanese are able to reconnoiter in all directions. It is therefore impracticable for surface forces to approach anywhere near these bases without discovery.

CHINA

A year ago there was considerable land and air activity in China. Commencing last summer this has decreased, and Chinese military activity against the Japanese is now at a low mark. China has made it plain that this condition is caused at least in part by the small part of "lend-lease" supplies which she is receiving from the Americans and the British. It is reported that the volume of supplies does not exceed 2% of "lend-lease" totals, and that of this small amount only from one quarter one half actually gets to China.

Admitting that the Chinese complaint may be a substantially correct statement of the facts, the wonder is that China receives anything. Two per cent of "lend-lease" exports amounts to several hundreds of millions of dollars. The will to give China more exists, her needs are recognized. The difficulty is to get goods to her.

Japan occupies the large cities on the China coast and blockades the smaller places by sea power. The land route from the south, since the capture of Burma, is closed except for air transportation over very high mountains. China's north boundary with Russia is open; however, Russia is not in a position to furnish much supplies, and even if she were it would be necessary to ship them over vast deserts in order to reach Chungking and the areas where the mass of the Chinese live. Under these circumstances it is not practicable to give China very much. Consequently it is not surprising that whereas last summer the American air force in China made about 25 raids a month against Japanese objectives, and at the same time intercepted Japanese raids against Chinese objectives, this same air force now is rarely reported in action. The presumption is that the supplies of gasoline and parts (previously brought in over the Burma road) are exhausted and that prevailing methods of supply are insufficient to permit of more activity.

Outside of the military situation, the economic condition of China is not good. Japan, in addition to occupying and blockading the coast and some important frontiers, garrisons certain key points within China, particularly along the great rivers which are the normal arteries of commerce. Due to the few railroads and their limited capacity, most commerce moves by water or over a few roads and thus passes through these key points. With Japan

holding these, the free part of China is unable to receive essential food and raw and manufactured materials.

Rice, a staple food, is raised only in certain sections of China. After harvests, Japanese raiding parties visit these areas and destroy what they do not carry away. Chinese communiques reporting that the Japanese have been driven back do not alter the fact that the food is not being shipped to those who need it so badly. Cotton is normally raised in China in sufficient quantities for her needs. Part of the cotton-growing area is in Japanese controlled territory, and practically all of the cotton manufacturing industry, with its looms, is in the key points garrisoned by the Japanese. There is a great and growing shortage of clothing in China. The peculiar kind of shoes which Chinese wear is mostly of cotton manufacture, so shoes too are disappearing. All the oil refineries are at the key points held by the Japs, so gasoline and oil for trucks is about all gone. There are oil regions in China, but they are in the northwestern deserts, not in the densely populated areas. China would like to develop these, which would be possible if there were any well drilling outfits. But there are none. And if there were, there are no refineries and no transportation facilities. Efforts have been made to run motor vehicles with gas produced from charcoal burners; this is a practicable substitute although not too efficient, but there are no means for distributing the charcoal in large enough quantities.

Metal goods of all kinds are disappearing. No more telephone wire or telephones for either military or civil purposes. No more repair parts for all kinds of things. The economy of free China is slowly and steadily bogging down. In February of this year the Japanese started a new series of gigantic raids to destroy still more of Chinese food and material resources. They point out that they are in a position to throttle China economically unless it deserts the United Nations and joins the Japanese New Order.

Consequently the Chinese cry for help. They object to the decision that Germany be considered as the objective for the main offensive and Japan temporarily designated only for holding attacks. China claims that if this plan is carried out it may result in the loss of China (and its 400,000,000 people) to the cause of the democracies.

The Chinese demand has received very careful consideration by the United States and Great Britain. There is some risk that by making the main attack against Germany,

Japan *may* obtain time to consolidate her position in China. Still, if the opposite course should be followed, as China suggests, and the main attack be made against Japan, this *might* give time to Germany to consolidate her position in Europe. If two major attacks are made, against both Japan and Germany, they would run the risk of neither's being sufficiently strong to win.

Some risks must be accepted in war. The decision has

been made that all the aid that the over-all situation permits will be freely given to the Chinese, whose valor and persistence in fighting the Japanese under most trying conditions for now nearly six years is fully appreciated. Conditions are not, however, such as will permit the British and Americans to send their major forces to the help of China at this time. It is to be sent, according to most solemn promises, just as soon as the overthrow of Germany in Europe can be accomplished.

TUNISIA

On 8 November, 1942, American and British troops landed in Morocco and Algeria. Immediately thereafter the Axis High Command held a conference as to what measures should be adopted to meet the change in the strategical situation brought about so unexpectedly by the Allies. They had also to consider the effects of the victory won by the British 8th Army at El Alamein in Egypt, which in the 12 days ending on 4 November had decisively beaten Marshal Rommel's Axis Army, which had contained three armored divisions. During this battle these divisions lost around 75% of their armor.

This Axis conference appears to have been held at Rome, on or about 11 November. A decision was quickly reached. As President Roosevelt had delivered on 8 November, to the French authorities at Tunis and to the Bey of Tunis, notes requesting free passage for Allied troops en route to attack Tripolitania, it was known that the Allies intended to invade Tunisia. The Allied invasion fleet to Algeria had passed through the Strait of Gibraltar, where it had been observed and the approximate strength of the invaders determined. There was good information as to the British strength in Egypt, and it was known that the mission of the British 8th Army required it to advance westward into Libya and Tripolitania.

With this situation before them, the decision was

- a.* To seize Tunisia before the Allies could get there.
- b.* To abandon Tripolitania and transfer all troops and materiel there to Tunisia, north of Gabes.
- c.* After completion of the foregoing, to attack the Allies according to the then situation.

In compliance with this decision, Axis troops landed and seized Tunis and Bizerte on 15 November. At this time the Allies had not yet entered Tunisia, although they did so shortly thereafter. Contact between Allied and Axis ground forces in Tunisia first occurred on 18 November and (as previously described in this JOURNAL*) ended by 15 December in a fairly stabilized situation. This resulted in the adoption of a line for the inclement winter season extending southward from the Mediterranean and passing west of Mateur and Tebourba, east of Medjez-el-Bab, west of Pont du Fahs and Kairouan, and east of Gafsa. No

substantial change in this line occurred until the end of January, 1943.

During all this time the Axis, in accordance with its plan of 11 November, established bases at Bizerte and at Tunis, with minor advanced bases at Sousse and Sfax. Bizerte was a French fortress, the fortifications of which were intact, including much underground space. How much armament, ammunition, and stores were on hand when the Axis seized it is not known. Some reports stated the armament was intact, with full supplies, while others say that a considerable part of the armament had been dismantled and sent to France. Since all of France has been in possession of the Axis since the middle of November, it must be presumed that there has been time to return to Tunisia any removed armament and that the fortress of Bizerte is now restored.

Replacements for personnel and materiel for Marshal Rommel's defeated army were forwarded by the Axis direct to Tunisia, and there held for him. Consequently reports received at Allied headquarters, that Rommel's troops were very deficient in equipment and strength, were correct. What he needed was accumulated for him, however, and when he arrived in Tunisia his status quickly changed. All Axis supplies in Tripolitania were as far as practicable forwarded to Tunisia. As the pursuing British 8th Army did not report any large amount of booty, it seems that the Axis succeeded in removing most of it in the 2½ months which they had available.

Other supplies for Tunisia were forwarded by sea and air from Italian ports. The British Navy estimates that between 1/4 and 1/3 of what was shipped this way was sunk by submarines or through air attacks. Axis personnel largely went by air, so very little of this was lost. By various methods the Axis managed to assemble an army in Tunisia, completed about the end of January by the arrival of Rommel's forces (less a rear guard). The rear guard, reported to be about three Italian divisions plus an armored screen, established itself along the Mareth line, about 60 miles inside the boundary of Tunisia. This is a line of hills not over 2,500 feet high extending south from the Mediterranean near Mareth (an unimportant village) and previously prepared for defense

*February, 1943, p. 143.



by the French. Defenses consisted of concrete gun emplacements and pill boxes, still intact. The guns had long been removed, and the wire and other obstacles protecting the foreground had either been removed or been stolen by the native inhabitants. There are a certain number of underground concrete shelters and magazines, all long empty. Even the telephones and telephone wires had disappeared. Still, the line of intact concrete works (which the natives were unable to steal) affords a good basis for a defensive position.

However, the real defense of Tunisia from an invasion from the south is not the Mareth line, but a series of lakes, swamps, and depressions extending westward from near Gabels for about 250 miles to Biskra. The Axis early occupied Gabels but had insufficient forces during the winter to extend the line further to the west. The Mareth line is a bridgehead in front of the Gabels-Biskra line, and will compel the British 8th Army to make a direct assault (requiring considerable forces) or else make a lengthy and difficult detour to the south through a bad desert.

On 30 January the Axis commenced offensive operations by a minor attack against French troops holding the Faïd Pass on the main road from Sfax to Sbeitla. After

an artillery preparation starting at dawn, German armored troops with some Italian infantry attacked and drove the French out of the pass, back about 6½ miles, thereby securing the west exit of the pass. The 12th Air Force (U.S.) intervened in this fight to save the French, and claims to have destroyed 12 enemy tanks and 6 trucks. In the afternoon arrangements were made for American troops to retake the pass. The enemy was identified as belonging to the 12th Panzer Division and the Italian Superba Division.

The American counterattack was delivered during the morning of the 31st, with tanks and infantry and considerable artillery support. The enemy held the high ground and so had good OPs overlooking the American attack, which had to go up hill. German artillery fire was very accurate, and was supplemented by dive bombers. Between them they caused a number of casualties. Under cover of this Axis artillery fire, hostile armored combat patrols came around the flanks of the American attack. The attack came to a halt, without having succeeded in driving the enemy back. The situation then stabilized in this sector.

On the same day an Axis attack, which was repulsed, was made against British troops in the Pont du Faïhs sector. Yet another attack was made by a light American column which by-passed Sened in south Tunisia, found to be held by the enemy, and pushed on to Maknassy. This column doubled back next day—1 February—and together with another American force jointly attacked Sened, forcing the enemy (estimated at 800 men) out of that place. Sened's military installations were then destroyed, and the Americans withdrew.

No further activity of importance occurred after these minor fights until 14 February. During this period Allied GHQ ordered the relief of the French forces who had lost Faïd Pass and who were still holding the line from there south to Gafsa, inclusive. The reason assigned for the relief was to re-equip the French units with improved American materiel which was now available for issue. This relief started at the north end and was completed at Gafsa—or rather was scheduled to be completed at that place—on the 14th.

At this time the situation was generally quiet. The following information concerning the enemy was available. According to British reports, as announced by Prime Minister Churchill on 11 February, the Axis strength in Tunisia was nearly 250,000 men. American reports gave the enemy as of 13 February over 170,000 men, and on 14 February reduced this slightly to 92,000 in north Tunisia and 75,000 in south Tunisia. Against this force, Mr. Churchill had announced that nearly 500,000 British and American troops had already landed in north Africa. French forces in North Africa under General Giraud were reported as about 100,000. Altogether, the Allies west of Tunisia outnumbered the Axis greatly. South of Tunisia was the British 8th Army. The strength of this army has not been announced, but

in Egypt it had had about 10 divisions. Of this number Mr. Churchill states that he reviewed at Tripoli in the last days of January a force which from his description amounted to about 4 divisions, presumably the army reserve. Of the balance of about 6 divisions it is not known how many, if any, were detached for garrisoning places other than Tripoli, or whether this army has been reinforced by new divisions or has lost divisions. However, the Axis appears to be confronted on its south boundary by a British force at least equal in number, or nearly so, to the entire Axis force. If it were not for the Gabes-Biskra defensive line the Axis would be in a bad way. Fortunately for them their south defense appears to be unusually solid.

In view of the supposed inferiority of the Axis force, the opinion at Allied GHQ was that the Axis mission was to delay a decision; an important Axis attack was not expected.

From a tactical point of view, the Allies had had nearly three months to observe the enemy. A summary of available reports indicates that the Allies normally had air superiority, but that the Axis could obtain it temporarily whenever anything happened. And the German Messerschmidt fighter planes were claimed to be superior to any Allied fighters present on this front.

German artillery was reported as being "superbly" handled — meaning accuracy. This opinion seems to have been due to observation of German 88-mm. batteries, firing with the advantage of better OPs than the Allies had. This was because, with one exception, the Axis line was based on strong hill positions overlooking the foreground and permitting good adjustment of fire. These German guns also have a small dispersion error.

Notwithstanding reports that dive bombers are not worth much, German dive bombers have affected troops in battle and this type of plane has had considerable success. The siting by Axis troops of small weapons (including machine guns, infantry mortars, antitank guns, etc.) has been stated to be excellent, presumably the result of experience in war. The general opinion of German tanks was that they were markedly inferior to American models. This included the German Mark VI tank, described as weighing 56 tons, mounting an 88-mm. gun plus machine guns, and protected by armor as thick as 7½ inches. The British claimed to have met some of these tanks and to have overcome them without any difficulty at all. Besides, it was still believed that Marshal Rommel's famed divisions were so reduced in strength that they were not formidable.

Allied troops were considerably mixed in line: large American forces were under French generals, American generals commanded some British forces, and British generals had American units.

On 14 February the Axis started a new offensive. As before it was in the Faïd Pass area, of which the Axis now held the west exit. A secondary attack launched from high ground north of Sened advanced northwestwardly.

Without warning and without artillery preparation, the Faïd Pass attack came at 0700, when about one armored division advanced rapidly westward. It had accompanying artillery fire, overhead fighter cover, and dive bombers to reconnoiter to the front and attack enemy batteries. This hostile force overran the American positions. Some American batteries were brought under the enemy's counterbattery fire or were attacked by dive bombers and were unable to fire more than one round per gun at the advancing Axis tanks. The tanks moved in part close to the road, with a substantial force on a ridge to the north of the road. By 0900 the Axis had reached a line 14 miles from their line of departure, leaving in their rear numerous American units who now found themselves cut off. Axis infantry with more tanks came up and proceeded to invest these now isolated detachments.

A counterattack by American armored units was ordered, to recover the lost terrain and disengage the troops who were separated from their base. This attack got under way about 1300. The enemy's reconnaissance service appears to have discovered the preparations for this attack, for he was on the alert. The Axis started out against the advancing Americans with a force reported as 100 to 150 tanks. Their formation was a large, open V, mouth toward the front. The wings of the V were Mark IV tanks (comparable to American medium tanks), while in the center were Mark VI tanks, also in V formation. The enemy was supported throughout the battle by constant air intervention and efficient artillery. This tank battle swayed to and fro until 1730, when by mutual consent it broke off. The Axis had made further territorial gains, and at the end of the battle was 18 miles ahead of where it had been in the morning. The Allies had lost very heavily in armored vehicles.

The enemy column from near Sened met no special opposition and also advanced about 18 miles. In view of this situation, Allied GHQ ordered the evacuation of Gafsa by the French troops who were awaiting American relief, and also withdrawal of troops north from Gafsa. The new line was to cover Feriana in the south and extend north to Sbeitla; at the end of the day the line was 6 miles east of the latter.

In the afternoon of 15 February American armored troops, part of the II Corps, attacked the Axis east of Sbeitla. This attack had good success: it drove the enemy back some 6 miles to close to Sidi-bou-Zid, a local crossroads. Here the attack stopped, but at the time the local American commanders were so well satisfied with the situation that they believed they would be able to take Sidi-bou-Zid during the night. As this place was only about 8 miles from Faïd Pass there were hopes that this too could be recaptured. No night attack was made, however.

The enemy column from Sened continued on north this day toward the battlefield, but without opposition. What this hostile column did that night was not noted.



TUNIS, with a population exceeding 200,000, is even more important than Bizerta in that its possession would give us Cape Bon, from which it is only 60 miles to Sicily. It commands the Sicilian narrows. The important airdrome at Auina, on the north of the Lake of Tunis, has been severely hammered. Reconnaissances have shown extensive damage to the port installations, one basin of the harbor having been completely destroyed. Attacks by Middle East aircraft have destroyed ships, jetties, and a fuel depot at La Goulette, at the mouth of Tunis Canal. Modern Tunis is almost a miniature Paris, with the original city (the Medina) in its center. Ancient Carthage, 10 miles from Tunis, is reached by the tramway built alongside the canal route.

On the morning of the 16th the Axis force at Sidi-bou-Zid assumed the offensive. Again it had good air and artillery support. The American armored forces were meeting this attack when another hostile armored force appeared from the south, taking the Americans in flank and rear. To avoid envelopment by what appeared to be a vastly superior enemy, the Americans withdrew. A running fight followed, with the enemy working to get around the American flanks and the Americans falling back to avoid being encircled. The artillery of the enemy continued forward on self-propelled mounts and advanced by bounds from one firing position to another. By afternoon the chase had led to the vicinity of Sbeitla, which was soon set on fire by the opening salvos of the Axis batteries. Much of this Axis success was attributed to the big Mark VI tanks. The American advance of the 15th had disengaged some of the cut-off American units, but the repulse of the 16th removed the possibility of rescuing the remainder.

On the morning of the 17th Axis forces passed around to the north and to the south of Sbeitla. The Allied line was thereupon ordered withdrawn completely from the valley in which Sbeitla lies to the high ground a few miles west thereof. This involved the abandonment of Sbeitla, Kassarine, and Feriana. To save personnel losses, property in the valley was abandoned. The enemy occupied all of these towns and the valley during the same day.

There is very little information as to the losses incurred during the three days' battle for Sbeitla. According to Axis reports they captured 2,876 prisoners, mostly Americans; killed and wounded an estimated 5,000 Allied soldiers; and captured or destroyed 169 tanks, 95 armored cars, 102 guns (including 36 self-propelled), and 6 planes (found on air field near Sbeitla). Against this loss American reports state that the enemy lost about 20 tanks on the 15th. No reports have been received for other days. The planes taken by the enemy are reported by our Air Force as being unserviceable, unable to fly. Enemy identifications for the battle were the 21st Panzer Division (which was astride the Faid Pass road) and the 10th Panzer Division (which came in later from the south).

Now as to the results of this battle. According to enemy radio reports on 15 February, their troops occupied along the Gabes-Biskra line, Kebilli (Kebili on some maps) and Gafsa. Occupation of the latter town has been confirmed by our own military reports. From Gafsa the Axis proceeded to the occupation of Matloui, Tozeur, and Nefta by 18 February; these three places are on the railroad from Gafsa, which pierces the Gabes-Biskra line at an important oasis. These movements, made possible by the withdrawal of the Allied right from south Tunisia, placed the east half of the Gabes-Biskra line in Axis possession. So far the west half of this line is unoccupied by either side.

On 20 February the Axis attack in central Tunisia was renewed, this time northwest from Kasserine. At date of writing the decision in this sector has not yet been reached.

The British General Sir Harold R. L. G. Alexander, who has been in command in Cairo with Egypt, Tripolitania, and

the British 8th Army under him, on the 20th assumed command of the Allied forces in Tunisia in addition to other duties. This places all Allied forces arrayed against the Axis in Tunisia under a single commander—undoubtedly a wise move. General Alexander was reported inspecting the American forces on the 20th, and is quoted as having stated that this front must be stabilized pending the forthcoming attack in south Tunisia by the British 8th Army.

The 8th Army has completed a triumphal march from Egypt—nearly 1500 miles in 3½ months; on 20 February it was opposite the Mareth line. No important combats had developed in this area. The Mareth line may be attacked frontally, or it may be turned by traversing rather difficult desert country to the south.

COMMENTS

1. The 12th Panzer Division (reported as identified on 30 January) was probably the 21st Panzer Division. The 12th Panzer Division was last reported in Russia, and while it is possible that it was moved from Russia to Tunisia, the Russian situation is such as to make this doubtful. Further confirmation should be awaited. The 21st Panzer Division was identified on 15 February. This is a first class division which has been in North Africa for about two years. In reporting the *12th*, there may have been a transposition of numerals.

2. The 10th Panzer Division, identified also as of 15 February, has not been previously reported in Africa. This may well have been a correct identification.

3. Marshal Rommel has had under him the 15th Panzer Division, which has not yet been identified in line in Tunisia. This also is a first class division, but it is possible that the Axis has not yet been able to secure tanks to replace those it lost at El Alamein. If this be the case, it can be expected to appear shortly using captured, salvaged tanks. This is standard practice. Rommel has also two Italian armored divisions, the Ariete and the Littoria. These were reported as not having suffered heavily in the battle of Egypt at El Alamein, because they were on the unattacked flank. They must consequently be considered as still available.

4. The rest of Rommel's force included the 90th Motorized and 164th Motorized German Divisions and six Italian Infantry Divisions, of which three may have been broken up on account of severe losses. However, the Axis may have replaced them with new divisions, of which the Superba Division is one.

5. There is no precise information as to what Axis units in addition to these are in Tunisia. If Mr. Churchill's estimate of a total strength of 250,000 is accepted, there may be about 10 divisions, in addition to those listed above. The Axis strength is increasing continuously.

6. The Allies have announced their plan to crush the Axis in Tunisia by a pincer movement from the west and from the south. The correct military rule in such a case for the party scheduled to be crushed is to contain one of the claws of the pincers while destroying the other claw. This presupposes having a force sufficiently great to do this. Napoleon was the great master of this type of maneuver. As Napoleon is carefully studied in German military schools it can be expected that the Axis will attempt to carry out such a maneuver, and the attack initiated on 14 February may be the commencement of an attempt to crush the Allies in west Tunisia while holding the British 8th Army south of the Gabes-Biskra defense line.

ACTION IN TUNISIA

Daylight Air Attack on Artillery Battery on the Road

The tactical situation decreed that a battery of motorized 105's be detached from the battalion and sent to relieve a battery of 105's (armored artillery) needed for a tank push.

The battery departed with 200 yards' interval between vehicles; air sentries, front and rear, were alert on each truck. After about a 20-mile march, two ME's came out of the sun and attacked the column from the rear. The rear machine guns opened up, and the signal for dispersal was passed from sentries in the rear of the truck to the driver by beating on the cab with a pick handle. Trucks dispersed as per training. Men dismounted, scattered, hit the ground, and fired everything they had. The ME's went down the road and scored direct hits on gas tanks of three vehicles. They began to burn. Machine gunners on the prime movers (with 105 ammunition around their feet) and on the ¾-ton M.G. trucks, held their ground and returned fire. The planes circled and returned, machine guns and 20-mm. cannon roaring. Hits were scored on two more vehicles, including a battery ammunition truck and an ammunition truck and trailer attached from the battalion train. Flames reached the ammunition after about ten minutes. All hell broke loose as the 105's exploded. One machine gunner was blown from the truck to the ground. Net result: five

vehicles and three howitzers destroyed by fire; two men slightly wounded; one ME-109 shot down; one ME-109 last seen smoking, going over the horizon.

LESSONS LEARNED FROM THE ATTACK

1. **Germans don't like our .50-cal. machine guns. They steered clear of trucks on which machine guns were mounted.**
2. **German pilots invariably strafe from the direction of the sun.**
3. **The Germans went after prime movers and ammunition trucks.**
4. **Half-tracks with multiple machine guns and shields for gunners should be an organic part of every battery.**
5. **When attacked, the column should disperse on *either* side of the road and halt. Men should dismount and fire everything available.**
6. **The planes travel fast and their initial direction is invariably on the road.**
7. **Strafing is not dangerous to men dispersed and scattered.**
8. **A battery should never be put on the road in daylight in the face of enemy air activity, except in an extreme emergency for short moves.**
9. **The practice of loading several gas cans on each vehicle should be followed only when the operation is of such a nature that re-supply of gas from other sources is impossible.**

DOUGHBOY OBSERVERS

An Incident in the Action at Ousseltia Pass

The pass on the road from Ousseltia to Kairouan had been taken. Our mission was to support the infantry in holding the pass. The infantry commander decided to take a commanding mountain about three miles to the front of the main pass. A night attack was launched and, after initial success, was promptly repulsed.

Our OPs were on mountains overlooking the bowl in which the action was taking place. The BCs had a field day: it was like a box seat at the opera. Along about four o'clock in the afternoon, after a day full of missions, an infantry company commander called in from his OP: "I've seen some 88's going into position along about coordinates 872-468. Can you take them under fire?" A check-up was made on the observers—none could see the target. It was suggested to the doughboy captain that since he could see the target, he fire the mission. Immediately came the reply that he didn't know where our guns were or the line of fire, etc. The officer at the FDC said, "Give me sensings on the rounds as they look to you." The infantryman agreed. FDC dashed off some data; a round of smoke was fired. Replied

the infantryman: "It looks about 150 yards over and 75 yards left of the spot where the guns are." The officer at FDC said to the computer, "200 left, 300 over." The next one was short and right. "100 RR, 200 SS" went to the computer. The 'phone echoed with shouts of glee as the doughboy shouted, "You set fire to a truck." After a question or two it was determined at FDC that numbers 3 and 4 were in, but one and two were right and up on a slope. "On number 3 close three" went to the guns. Fire for effect was with HE, and apparently in the right place. Just to clinch the thing the final volley for effect was with white phosphorus and time shell, which was declared very effective by the excited doughboy.

The above illustrates that, without prior practice, many infantrymen can and should call for fire. If the FDC officer has imagination (give them double what they ask for—there is a tendency to under-estimate, and then, too, be *sure* to bracket) fire can be delivered accurately. In this situation wire was complete (a defensive situation) so the communication problem was secondary.

Streamlining the Morning Report

On the basis of exhaustive research and field tests conducted by the Adjutant General's School, three basic AGO forms and procedures have been completely revised by The Adjutant General. They are the Company Morning Report, Headquarters Morning Report, and Strength and Status Report. The forms will be issued to the field at an early date.

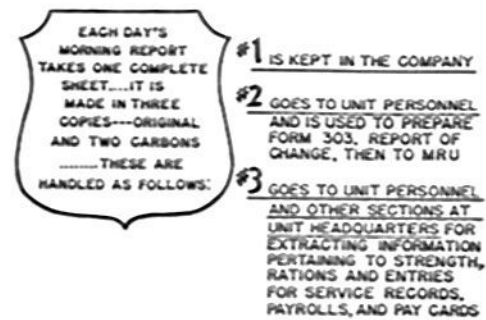
The new company morning report is a single-sheet form. Its principal feature is the remarks section. Its strength section has been abbreviated to bare essentials, and the ration section has been simplified. The BC will report the basic facts; namely, the change of duty or status of the individual. With that information in hand, plus only *essential* statistical information, the personnel section will perform the technical accounting function.

The new form measures $4\frac{3}{4} \times 8\frac{3}{4}$ inches and is in triplicate. All three sheets of one set are glued together on a top stub. One-time carbon sheets are interleaved, and can be discarded as used. All copies of the form, and carbons, are perforated, so that they can be easily removed from the stub. The form is designed for typewriter use, with carefully calculated spacing. However, a pencil may be used when a typewriter is not available. A pressboard backing is provided for use with a pencil, so that the impress will not carry through to the set below. After being completed, retained copies are kept in a permanent binder, so arranged that the date is the first item to be seen when leafing through the binder.

The remarks section is simplified, both for making entries and for reading. The reader no longer is puzzled by an apparent flow of one remark into another. Remarks are placed one below the other, each remark starting a new line. At the left is a narrow column in which the hour of the entry is noted. Then, in a wide space, is inserted the proper remark. At the right is a narrow column, left blank for use by machine records units. In this column the MRU will code remarks, thus using the morning report as a check against AGO Forms 303 (Report of Change).

The only material change in the style of each remark is that the Army serial number will follow the name of the individual. This is done to assist in machine records accounting. Provision is made for attaching an extract copy of a special order when a group of ten or more individuals are concerned, a supporting remark to that effect being made in the remarks section. Upon the original assignment of an individual, sufficient identifying data will be included with the name and Army serial number to enable the MRU to set up a status card for the individual, in case a Form 303 is not received.

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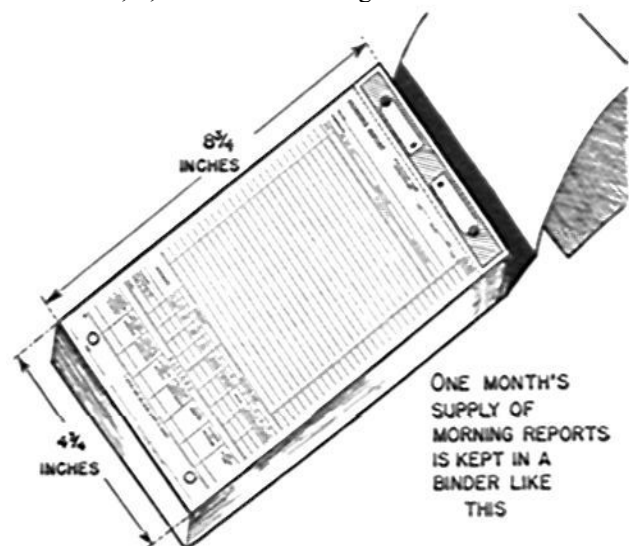


Entries in the remarks section are made as events occur, while the incident is fresh in mind. For this purpose, a set of forms can be removed from its binder, the entry made, and the form returned to the binder pending its completion.

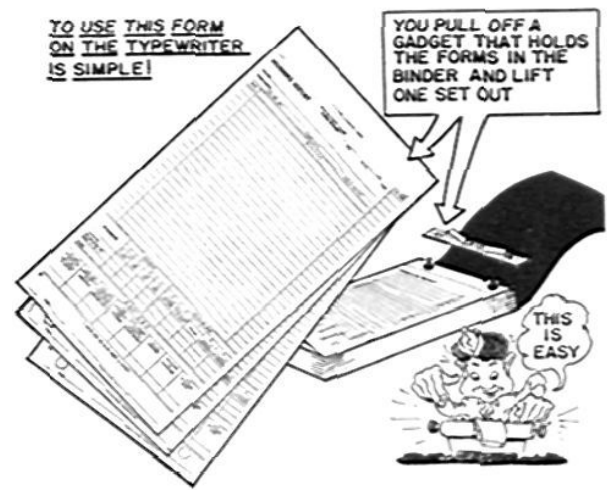
Record of Events entries are made in the new form as in the current one. Upon completion of the individual remarks, a line is inserted below the last remark. Below that is entered the record of events, when appropriate.

The strength section of the new form contains 9 columns instead of 38. Four of the columns are for officers, and five for enlisted men. The principal strength data needed by an organization commander are the number of effectives he has—the number of fighting men. This is provided by a column headed "Present for Duty." Other columns in the strength section merely account for differences between effectives and total strength. There is also a column for those attached for rations only. All this information is contained in the top line of the strength section column by column, showing yesterday's strength. In the second line, column by column, is entered the plus or minus for today. In the bottom line are today's entries, the net figures obtained by adding or subtracting line 2 from line 1.

The ration section is simple and contains eight columns. Under minimum conditions, however, only five columns need be used. The first column, headed "Enlisted Strength for Rations," contains the totals of columns 5, 6, and 9 of the strength return. The next



column is headed "Less: Men Authorized to Mess Separately," and specifies the number of men so authorized. The next column is "Less: Men Attached to Other Organizations for Rations Only." Both these columns are subtracted from the first column, to give the net number of enlisted men for whom rations will be drawn. Then comes a column in which is entered the number of officers, or others (except enlisted men attached for rations) who are messed with the organization. This figure is added to the preceding column and is needed only when field rations are drawn by officers, civilians, and others. The next column shows the total number of individuals for whom rations are drawn, whether on garrison or field ration. Then comes a column for percentage adjustment when the organization is on a garrison ration. A percentage is entered only when the strength is 50 men or less. The last column shows the net number of rations due the organization, whether field or garrison. The proposed ration section furnishes a means for computing accurately both field and garrison rations. When the organization is on field rations, only six of the eight columns are used. If no officers are rationed with the battery, only five columns are used.

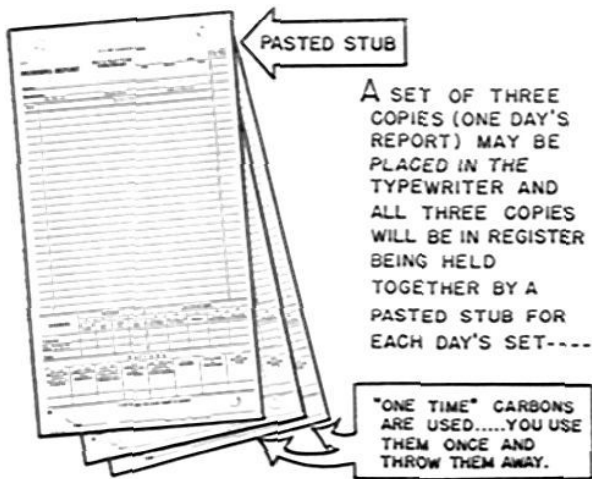


Sets of the new form will be issued in binders, each binder containing a month's supply. The binder is 2-post, with a simple locking device, and is finished in leatherette. Inside the cover are printed instructions for use of the forms. Another binder, designed along the same lines but with a stiff cover, will be furnished for permanent binding of retained copies.

The headquarters morning report form, tested in the same way, is designed on a single sheet. It is bound in pads, however. Two copies are used each day, original and duplicate, with standard carbon paper. It is 8 x 10½ inches.

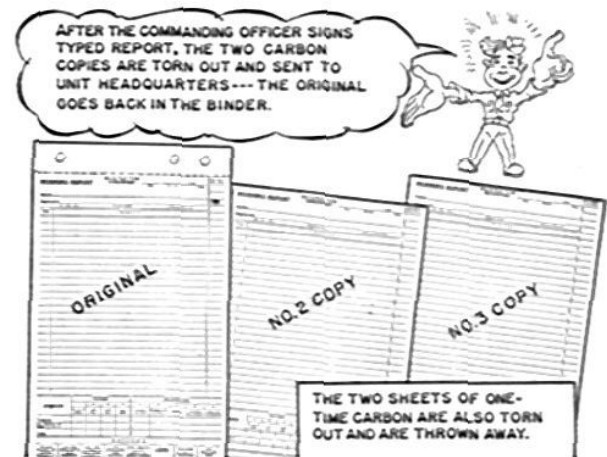
Another new form for use with the morning report is a Strength and Status Report. It shows the detailed strength and the status of all personnel. As at present designed, this is for daily use.

A revised Army Regulation (AR 345-400) has been prepared, prescribing the use of the company and the headquarters morning reports, and the strength and status return. The draft was prepared at the Adjutant General's School. It is written in simple style, with many examples, and is based on experience in the field and on consultation with officers in the War Department.



At the top of the new morning report are spaces for inserting the date, designation of station, organization, parent unit, and arm or service. Confusion in the minds of inexperienced personnel is obviated by the printed designation of date: "Morning Report Period Ending Midnight" The bottom line of the form is for the signature, not merely the initials, of the organization commander. A signature carries authenticity which, at a later date, is not inherent in mere initials.

When the report for the day is completed, it is distributed as follows: The original remains in the battery for permanent filing; the duplicate and triplicate are sent to the unit personnel section. The duplicate is then forwarded to the machine records unit, and the triplicate is retained in the personnel section and is used for posting service records, pay rolls, soldier's qualification cards, and other personnel records.



THE MOUNTAIN BATTERY

By COL. GERALD E. GRIFFIN

Moderato

1. Fall in! Fall in! At - ten - tion! You
 2. Oh, I'd rath - er be a sol - dier With a
 3. For when we are com - mand - ed To
 4. Here's to pack and a - pa - re - jo, And to

red leg - ged moun - tain - eers; With your gun and your pack And your
 mule and a moun - tain gun Than a knight of old With
 o - pen up with ball, We slap our guns to
 cra - dle, gun, and trail; And the damned old fool, The

box of tack, Non - coms and can - non - eers. Bap - tized in Min - da -
 spurs of gold, Or a Ro - man, Greek, or Hun. For when there's some - thing
 geth - er And with them stand or fall. To right and left be -
 bat - ry mule, Who was nev - er known to fail. Then fill your glass - es

THE MOUNTAIN BATTERY

rall. *fenergico*

nao — Be - side the Su - lu — Sea; — With a tow, and a tow, And a
do - ing, They al - ways send for me. — To start the row, With a
fore us Our shrap-nel bursts we see, — With a tow, and a tow, And a
high, — And drink this toast with me. — Here's a how, and a how, And a

rall. *a tempo* *ffenergico*

tow, row, row, From a Moun - tain Bat - ter - y; With a
tow, row, row, From a Moun - tain Bat - ter - y. To
tow, row, row, From a Moun - tain Bat - ter - y. With a
how, how, how, To a Moun - tain Bat - ter - y! Here's a

rall. *a tempo* *ff tutta forza*

rall.

tow, and a tow, And a tow, row, row, From a Moun - tain Bat - ter - y.
start the row, With a tow, row, row, From a Moun - tain Bat - ter - y.
tow, and a tow, And a tow, row, row, From a Moun - tain Bat - ter - y.
how, and a how, And a how, how, how, To a Moun - tain Bat - ter - y!

rall.

REMARKS ON CORPS ARTILLERY

Delivered to Corps and Division Commanders of the Second Army

By Brig. Gen. John E. Lewis, FA

Corps artillery missions are (1) counterbattery; (2) more counterbattery; (3) some more counterbattery; (4) neutralization of the enemy observation, command, and communications systems; (5) reinforcement of the fires of division artilleries, particularly in and on flanks of the corridor being used by the main effort; and (6) interdiction of routes of approach and supply.

While the most important target for a division artillery is the enemy automatic weapons which produce infantry casualties (these are situated between the enemy front lines and a line distant not over about a thousand to 1,500 yards in rear), the most important target for corps artillery is the enemy artillery, which for the last 25 years has produced more than 50% of all battle casualties. The enemy artillery, therefore, can be called "The Great Killer," and everything at our command should be devoted to its suppression.

Proceeding under the hypothesis that the paramount mission of corps artillery is counterbattery, then counterbattery is a Command function and both Commander and Staff of the corps artillery should devote an overwhelming amount of their time and effort to this, the most important aspect of their mission.

It is suggested that a counterbattery system be adopted which is as simple and as capable of decentralization as is humanly possible, and dependent to the *minimum* on immediate and continuous use of communications. There is a *timeliness* about the delivery of counterbattery fire which is all-important. If the enemy has as much sense as we have, he will promptly move a battery which has been neutralized. Therefore, when an attack is contemplated, we should carefully refrain from general counterbattery and fire only on those batteries whose habits, direction of fire, and targets are a particular cross to us. These, when located, should be fired on as emergency counterbattery missions, which of course involves the instant and reliable use of communications and prompt response by fire units. Ninety per cent of all counterbattery can be executed as deliberately and systematically as a public execution. Emergency counterbattery only requires speed in command action. All types require speed in execution.

The great mass of counterbattery fire should be delivered as scheduled fire in either preparations or counter-preparations. Data therefor should exist in the form of data sheets in the battery positions, thus avoiding reliance on the communications system when there is danger that it will have been interrupted or soon will be interrupted by enemy artillery fire.

In the initial phase of preparations or counter-preparations, for the duration of approximately two missions, it is believed that practically every gun—whether

Army, Corps, or Division—should be employed against the enemy artillery. After this primary counterbattery phase is over, a considerable portion of the corps artillery should be devoted to continuing and maintaining the counterbattery. Any corps units not thus employed are available to reinforce the fires of the division artillery, for neutralization of the enemy observation, command, and communications systems, and for longer range interdictions.

Certain means must be available:

1. **Accurate enemy information (supplied primarily by field artillery observation battalion, artillery observation planes, maps, mosaics, wide-angle photos, oblique pair photos, our own forward observers, and division artillery);**
2. **Reliable and flexible communications;**
3. **Responsive fire power;**
4. **Adequate ammunition supply; and**
5. **Cooperation of the supported commanders.**

Let us look at a somewhat typical sequence of events for the corps artillery in a rather typical offensive operation.

a. *During the development phase* about half of the howitzer battalions should be pushed forward to support the divisions, largely by counterbattering the enemy artillery. Probably one gun per battery per division will be pushed well to the front to interdict bottlenecks in the enemy's road net, to force his early development or otherwise impede his progress.

b. *As the coordinated attack approaches*, generally all of the corps artillery plus reinforcing GHQ units should be gathered unto the bosom of the corps.

c. *During the first few minutes of the attack*, whether it be preceded by a preparation or not, not only the corps artillery but also a material part of the division artillery should be used to smother the enemy artillery with counterbattery. When this primary counterbattery phase is past, then a major portion of the corps artillery not necessary for the maintenance and continuation of counterbattery should reinforce the fires of division artillery. It constitutes an *ace-in-the-hole* for the Corps Commander, enabling him to intervene in the battle by giving material assistance to the main attack or by massing the appropriate amount of artillery to crush counterattacks.

In my own Brigade, wire is strapped through Regimental switchboards to Battalion Fire Direction Centers so that counterbattery and other emergency missions are transmitted directly to them. Of course, this wire is paralleled by radio. We anticipate using five volleys on emergency counterbattery missions, with maintenance starting after a lapse of 20 minutes. We hope to have available for this fire two battalions per enemy battery, although one battalion is fairly acceptable.

THE EMPLOYMENT OF CORPS ARTILLERY

By Col. John J. Burns, FA

THE SECOND OF TWO PARTS

TYPES OF OPERATIONS

Approach March

Consider first the employment of corps artillery during an advance when contact is expected with the enemy during the ensuing day. The corps will have adopted that one of the formations described in paragraph 154 of FM 100-15 which is considered best for carrying out the plan of maneuver.

Since the corps is advancing, its immediate and perhaps its ultimate mission is offensive.

Similarly, the missions of the one or more advance guards of the division are offensive, and remain so until the defensive is imposed. Offensive missions include establishment and maintenance of contact, seizure of points critical to the later successful execution of the plan of maneuver of the divisions and of the corps, and break-through of hostile covering forces. Such a break-through serves to dislocate and harass the enemy's main body with a view to delaying its entry into action, preventing it from organizing a position or getting an attack under way, or even initiating its defeat and destruction. If the hostile covering forces hold, the advance guard may be reinforced (especially in artillery) so that it can determine the enemy's main organization. However, if the advance guard runs into a superior force, its role may become defensive. Then it digs in on the most advantageous ground that can be secured to cover the development of the remainder of the force.

How can the corps artillery commander employ part or all of the corps artillery to further the mission of the corps during the approach? The general mission assigned the corps artillery by regulations is to be prepared to execute counterbattery, destruction of hostile defenses, and long



155-mm. gun, manned by U. S. troops in England.

range interdiction fires, and also to reinforce the fires of division artillery.

If the hostile covering force is permitted unmolested to use long range artillery with air observation, it can force the early deployment of our covering force and the premature commitment of the head of the main body, and cause a certain amount of devastation. At the same time, under protection of this fire the enemy can retain his troops in close formation. With his greater maneuverability he can seize critical

terrain features. These advantages may enable him to seize the initiative.

While our combat aviation, if available, can be diverted to neutralize the enemy's artillery, it lacks the sustaining power to keep that artillery neutralized. To be effective, it must knock the artillery out in spite of the activity of the opposing air force. But it is clearly the mission of the corps artillery to obtain this ascendancy over the hostile artillery and thereby insure the freedom of action of the friendly force.

Fortunately we have the new 4.5" M-1 gun and the 155-mm. M-1 gun, and soon will have the 155-mm. M-1 howitzer at our disposal. These weapons have great tactical mobility, wide, easy traverse, and long ranges. Their other characteristics are sufficiently different to meet practically all the requirements of various types of terrain. When available, a battalion of one of the above types of weapon which is best suited to the terrain and to meeting the hostile threat should be attached to each combat team in the first line when contact with the enemy is expected in the near future.

A battalion of extreme range weapons may often very profitably be attached to divisions for employment with

the principal column of the division. If paratroops have been landed, or if mobile forces have by-passed hostile elements to seize well in advance such key positions as bridgeheads or the exits of defiles, long range artillery may often be able to render them invaluable support. There should be no hesitation in pushing the long range corps artillery well forward behind the advanced infantry elements to enable it to accomplish such a mission. Provisions for its security should be made by the corps commander. Radio-equipped observers from the artillery should accompany these paratroops and mobile forces.

Long range artillery with its wide traverse can be used to mislead the enemy. If pushed well forward and fired in a certain direction, it may cause the enemy to make false dispositions. It should be noted that the artillery so employed can still take part in its real mission. Extreme-range artillery should habitually march well to the rear and be pushed forward when needed.

For a daylight march, corps battalions attached to combat teams should be stripped of all vehicles, equipment, and service elements not immediately essential for combat. Ammunition sections should join their batteries and the optimum load be carried. This is necessary, for the forward movements of all sorts of troops after contact with the enemy has been made will preclude any possibility of vehicles returning for a re-supply of ammunition. The battalion should march at the head of the combat motor elements of the main body of the combat team. If division artillery is present at the head of the motor column, it should precede the corps battalion.

For a night march, unless it is to extend into daylight, the battalion should march as a complete unit at the rear of the combat team. Any intervention of artillery at night in the situation under consideration cannot be counted upon to be effectual.

The commander of the corps artillery battalion should remain close to the combat team commander who, together with the artillery battalion commander of the combat team, will ordinarily be near the head of the main body of the principal column. The battalion reconnaissance officer and detachment should march between the advance guard and the main body, constantly reconnoitering positions. Coordination of artillery battalions is best obtained by attaching the corps battalion to the light battalion.

As the advance guard approaches the area where it will be exposed to artillery fire, or when there is an opportunity of taking the enemy in close formation under long range fire, the long range corps battalion should be pushed forward. It should strive to reach deep into opposing territory to attack close columns and assembly areas and interdict principal routes, forcing early development. The infantry will take up an approach march formation and may advance across country. Light artillery can also advance under cover of the fire of the corps artillery.

In order to be able to intervene rapidly, the battalion should often advance by echelon, the rear echelon

leapfrogging as soon as the forward echelon is in position ready to fire. Bounds of the echelons depend somewhat on the phase lines of the infantry, but mostly on the range of the weapons and the nature of the terrain. Bounds for corps artillery are generally rather long, and should be coordinated with those of the light battalion. The reconnaissance officer pushes his reconnaissance right behind the advancing infantry.

A liaison detachment provided with radio equipment should be sent by the corps battalion to the light artillery battalion of the combat team. This detachment must keep the battalion commander informed of the location of the most advanced infantry elements. It transmits requests for supporting fires from the infantry and for reinforcing fires by the light artillery. It completes the information picture for its battalion commander as far as possible. A simple location code system of transmitting information in the clear is essential.

As soon as it is evident that the corps battalion may be committed, it is essential that its air observation be available. Later, when more or less stubborn resistance is encountered, assistance from sections of the flash and sound battalion will be required. These sections should be attached to the divisions early. Their commander pushes reconnaissance behind the advancing infantry for necessary locations. Both sections normally work for the attached corps artillery and the division organic medium artillery.

The echelon in position answers calls from ground and air observers, from the infantry, and from the light artillery commander attached to the infantry. It fires on enemy batteries and targets of opportunity, and executes harassing and interdictory fires. This manner of advancing by echelons is similar to that employed by the light artillery, although bounds are longer and targets usually more distant. Often the corps battalion will alternate its displacements with those of the light battalion; it must be prepared to reinforce the fires of the light artillery.

As the enemy's resistance increases in stubbornness and it becomes obvious that the battalion will soon occupy a single position, the battalion commander should consider resuming centralized control. Too, he considers his early subordination to centralized control by the next higher echelon of command. As far as practicable, the position should be located toward the center of the corps disposition.

The groupment commander of battalions attached to a division during an advance keeps informed of their situation. He plans for the rapid return of the battalions to his centralized control. He concerns himself with their ammunition supply, and their retaining adequate air observation and obtaining timely service from the flash and sound battalion. He keeps the corps artillery commander informed of the situation as it relates to his battalions.

The groupment commander has a very definite responsibility

to keep each of his battalion commanders informed of the locations of the advance elements of the infantry of the adjacent combat teams. For this purpose he places a radio-equipped liaison detachment with each of his battalions and with the division artillery section.

An officer representative of the CB-FRC group of the corps artillery section should accompany the division artillery officer of each division in the first line. His duty is to keep constantly informed of the general situation as known at the division artillery command post, of the various locations of elements of the division organic and attached artillery, and of targets discovered. He also keeps abreast of the ammunition situation and follows the activities of the flash and sound ranging sections.

All this information is essential to the corps artillery commander to enable him to maneuver the remainder of the corps artillery in furtherance of the general plan. Usually he will adapt the dispositions of uncommitted artillery to that already in place. The corps artillery commander prepares to take over the direction of the artillery as soon as it appears that the corps commander will intervene in the combat.

If the advance has been stopped, advance guards go on the defensive and dig in to hold important terrain pending their reinforcement or to cover the development of the remainder of the forces. The corps commander may indicate to his division commanders the separate or coordinated actions he desires them to execute with the means already at their disposal, or he may take control. Additional corps artillery may and should be attached as necessary to the divisions to enable them to accomplish their more or less independent missions. These missions will usually include the determination of the nature and locations of the enemy's organization; for this a minimum of infantry and a maximum of artillery is desirable. The difficulty of ammunition supply is the most serious limiting factor in the amount of artillery that can be used.

If the corps commander takes control, he does so to coordinate closely the actions of all his troops in furtherance of his general scheme of maneuver based on his ultimate mission. The corps artillery commander accordingly puts into operation his plans for centralizing control over the corps artillery. Detached battalions revert to groupment and corps control as soon as communication facilities permit.

The corps artillery commander will be familiar with the general scheme of maneuver adopted by the corps commander for the accomplishment of his mission. The march formation of the corps during the advance will be in accordance with that scheme. The corps artillery should be located in this formation so as to be readily disposed of by the corps commander to influence the action as he deems desirable. Groupments not attached to the divisions usually follow in stages the several routes used by the divisions. "The commanders and staff officers (of these groupments) must take every opportunity to make personal

reconnaissance of areas (in the zone of advance of the divisions they are following) likely to be the scene of operations." In selecting tentative positions, they give consideration to facilitating their later incorporation under centralized control.

The disposition of the unattached groupments behind the divisions should be such as to facilitate their entry into action against a more or less organized position. Since "a force with an offensive mission should advance to strike the enemy with overwhelming force before he can fully organize his defenses, shift his means, or take other effective counteraction," dispositions must be so made that large masses of artillery and quantities of ammunition can be pushed forward rapidly.

Pursuit

The enemy having been decisively defeated, pursuit is started and pushed to the utmost physical limit of the men, with the object of annihilating the enemy. The pursuit should be executed on a broad front. Constant contact and pressure should be maintained against the retreating forces. This is combined with an outflanking or encircling maneuver to cut the enemy's lines of retreat.

At the beginning the action is somewhat similar, but in reverse, to that of the advance guards making contact. Under cover of the troops in position, tactical groupings are organized. These conduct themselves as advance guards, though much more boldly and aggressively. One or more highly mobile forces is organized for the outflanking or encircling maneuver.

The general mission of the corps artillery remains as quoted previously. Its counterbattery action is extremely important, for the enemy will attempt to withdraw under cover of its artillery, especially that of long range. Important also are interdiction fires to block defiles and disrupt road and rail traffic, and fires on targets of opportunity, to prevent the enemy from reorganizing in the rear of his covering forces or delivering a counterattack. Deep fires are used to block the retreating forces and to prevent reinforcements moving up to their aid.

For accomplishment of these missions the corps should boldly push forward behind the advancing elements as much long range, powerful artillery of adequate tactical mobility as can be supplied with ammunition. In close country, or where the quantity of long range guns is inadequate, long range howitzers should be used. Only the best weapons (considering range, traverse, and tactical maneuverability) should be used. The ammunition supply problem will be a serious one, but it is no more difficult to supply good artillery of a certain caliber than it is the more obsolete types.

Each tactical grouping (probably a combat team) taking part in the pursuit should have attached at least a battalion of suitable corps artillery. This battalion should be stripped for combat. Its ammunition sections should join their firing batteries and carry the maximum practicable load.

If the pursuit is the sequel to a long, violent battle,

the ground may be considerably churned up. This may restrict the displacement to horse-drawn light or tractor-drawn medium or heavy artillery until engineers can repair the routes. The difficulty of ammunition supply until this band of terrain is passed is obvious.

The necessity for decentralized command and command liaisons, the principles of displacements, and the provisions for reestablishing centralized control when organized resistance is again encountered, are practically the same as



British 6" howitzer in North Africa—dug in, revetted with sand-bags, well camouflaged in its rocky emplacement.

during "the approach." As usual, air observation is required during daylight. At night, the corps artillery must resort to map firing.

In general, except as just indicated, everything that has been said about "the approach" applies to the pursuit, modified in view of the difference in attitude of the commander. In the approach the commander was aggressively feeling his way, feinting to outmaneuver his opponent—in the pursuit the opponent is staggering, the commander is going in for the kill.

Withdrawal

The type of withdrawal covered here involves breaking off contact and the successive renewal of resistance on one or more rearward positions. These new positions should be "selected at such distance from one another that the enemy will be compelled to regroup his forces, displace his artillery, and renew his preparations for attack." They should also be sufficiently distant to allow the troops designated to hold them enough time to organize their fires before they come under hostile fire.

As soon as a rearward position and the dispositions for it are known, the corps artillery makes necessary reconnaissances. It completes organization of the positions

so the guns can open fire upon arrival under maximum centralization of control. Artillery displaces as rapidly as possible to minimize the time lost from firing.

If reinforcing artillery is expected to join on a rear position, everything possible is done to permit its immediate entry into action upon arrival. Its commanders and details should arrive early. If this is impracticable, the artillery present should complete reconnaissances, surveys, and communications for the incoming artillery. This can

easily be provided for as soon as the reorganization of command has been effected. Ammunition stocks should be built up and adjusted data determined, especially if the reinforcing artillery will arrive at night.

In a situation involving a forced withdrawal it may be assumed that the opposing forces are closely engaged. It is the long range corps artillery which will probably be most available and easily withdrawn to the rear position. In addition, it is the type of artillery best suited for the next phase of the battle. All or part of the division artillery will be left in position to support the troops covering the withdrawal of the artillery and other forces which the commander has been able to assemble and regroup. Usually an outpost will be thrown before the rear position to protect the covering forces as they pass through to the rear. At this time the corps artillery supports the outpost. Naturally, the outpost is

located just within the extreme effective range of the long range supporting artillery, so as to gain time.

In addition, the corps artillery has the missions of forcing the enemy's advance guards to deploy, breaking up his formations, interdicting roads, covering destroyed bridges and other important obstructions, and executing counterbattery. The corps artillery must be prepared to mass its fires on the enemy's infantry and armored forces when they launch the assault on the rearward position.

However, if the purpose of the withdrawal is to gain time and the loss of ground is relatively unimportant, withdrawal from the successive positions will be made before the enemy can push his attacks to the main lines of resistance. In this situation, displacements of the corps artillery to the rear should be started by the most advanced elements—by battalion whenever practicable. Heavy weapons of little mobility and difficult to handle, are withdrawn early and kept moving to a distant place, safe from capture.

Often, to avoid the catastrophes of a daylight withdrawal, troops (including the corps artillery) will have to fight furiously to hold their positions until dark. The corps artillery will have to support one or more counterattacks

launched to gain the necessary respite. If forced back nevertheless, the backward movement is carried out step by step rather than by bounds. Corps artillery in exposed advanced positions is pulled back to deepen the position being held rather than back to a rear position.

If, finally, the situation does not permit a withdrawal, rear guards are organized from intact bodies of troops. Corps artillery battalions should be attached to them. Rear guards hastily organize a defensive position (a short distance to the rear of the first position) through which the disorganized troops pass to gain distance and reorganize at the first opportunity. The rear guards gain time by forcing the enemy to deploy rather than by permitting him to approach for close combat. It is here that the corps artillery with its long range can do good work. Its presence is also essential to combat the long range artillery that the enemy will have with his pursuing troops. It will also be effective in breaking up or delaying hostile formations, interdicting roads, covering destroyed bridges, etc., and supporting counterattacks.

Corps artillery with the rear guards will displace by echelon. The action will be somewhat like that of the advance guard moving from phase line to phase line, except here it is to the rear. Keeping in mind that the object is to avoid close combat, what has been said about the "approach march" will apply to the retirement.

Attack

Upon meeting the enemy, combat teams (in conformity with the scheme of maneuver of the higher command) attempt to seize the initiative by pushing ahead with the support of their light and corps battalions. If they can outgun and outrange the enemy they should obtain considerable success, otherwise an organized attack may be necessary. This, for convenience, is usually considered from an artillery viewpoint as consisting of several phases: that before the preparation, the preparation, the attack of the first objective, the attack of the second and other objectives to include the final one, the breakthrough, and the exploitation.

In the phase before the preparation, fires will be limited to those batteries which have already disclosed their positions by firing or which have otherwise been discovered. Alternate positions should be occupied by these batteries at the earliest opportunity. Their offensive fires prior to the preparation will usually consist of interdiction, harassment, destruction, and counterbattery. By limiting the amount of ammunition which each unit may expend during this phase, control over the activity of the artillery can be exercised with a view to preserving secrecy.

Corps artillery of a type known already by the enemy to be opposing him can do excellent preliminary work. Missions can be undertaken which require more time than will be available during the preparation. If incoming artillery is pushed well forward or to previously unused positions, an equal quantity of the same type of artillery

which had been firing should be kept silent. Otherwise, the additional firing may arouse the suspicion of the enemy.

All artillery in position should prepare defensive fires to thwart any offensive launched by the enemy before the attack of the friendly force can get under way. These fires will consist of counterpreparation and final protective line fires integrated with those of the infantry.

As regards the study of the preparation, reference is made to an article on this subject by the same writer, published in the August, 1942, issue of THE FIELD ARTILLERY JOURNAL.

During the attack proper there usually will be several phases. The first is usually preceded by an artillery preparation to soften the principal defensive works of the enemy's position. This phase's objective is set within the range of the light artillery and consists of terrain which should be held before proceeding further. When this objective is taken, the infantry will reorganize and light artillery and sometimes some corps artillery will displace forward to support the second phase. During the intervals between phases, provision for defensive fires must be made. Often a short preparation will be needed to soften the second and successive objectives and so pave the way for the infantry. Accordingly, each phase can be considered as a separate little battle, starting with defensive fires while the attack is being organized, a preparation, support during the attack, and defensive fires preparatory to the next phase.

The corps artillery plays its role in all of these little battles to insure the success of the attack. When battalions are no longer needed for counterbattery they support the attack of the infantry by reinforcing the fires of divisional artillery. The corps artillery commander coordinates the displacement of the corps artillery, under a plan of displacements drawn up prior to the launching of the attack.

The taking of the last objective should set the stage for the breakthrough. Corps artillery is particularly adapted to supporting efforts to widen the breach and roll up the flanks at the point of breakthrough.

Army decides the amount of artillery that should be available to a corps for an attack, but the corps artillery commander should be prepared to submit his recommendations. Once the artillery to be available has been determined, he organizes the command in accordance with principles previously discussed.

Closely tied in with the problem of organization of the corps artillery is that of its early attachments and deployment. In general, corps artillery should be so disposed that the mass of fire (at least half) can be placed on any part of the corps front and practically all of the fire on the principal corps objective.

Certain principles are well kept in mind when deciding upon the dispositions to be made:

—The disposition of incoming corps artillery should be built around that already in position.

—Some long range weapons should be pushed well

forward to reach far into the enemy's position. This will permit effective counterbattery against long range artillery. It will permit the postponement of displacements.

—Some corps artillery must be able to fire in the zones of adjacent corps.

—The various calibers of weapons should be echeloned in depth: batteries in battalions, battalions in regiments or groupments. The requirement that practically all the corps artillery be able to fire on the principal corps objective will limit the depth of echelonment.

—Groupments armed with weapons of little tactical mobility or which are very difficult to put or take out of position should be placed opposite the holding attack or fixed flank.

From the above it is observed that there is no such thing as a distinct position zone for the division artillery, another for the corps, and a third for the army. Higher echelons should push their artillery forward to accomplish their missions. The result is that the positions of the artillery of the various echelons will overlap in the same areas.

It is desirable to place groupments laterally so that one or more are behind each division in line. This disposition follows as a natural consequence of the attachment of battalions to combat teams. It facilitates the reinforcement of fires of the division artillery and the assignment of missions. The groupments armed with wide traverse, long range weapons should ordinarily be placed near the center of the corps zone, with a mission of covering the corps front.

Types of missions which are most properly assigned to elements of the corps artillery greatly influence deployment and the organization of command. The problem is one of definitely fixing responsibility and at the same time of preserving a high degree of flexibility. The general mission already quoted for the corps artillery must be constantly kept in mind—it remains the same through all phases of the attack, and primarily it is *counterbattery*.

In suballotting this mission, there are two problems to be solved. The first is to give subordinate commanders definite responsibility for certain areas and types of fire within and without them. The second involves the quick delivery of effective counterbattery fires on targets which disclose themselves after the preparation has started.

The first problem can be solved by making the division artillery responsible for all fires (less counterbattery) short of the XX line, which usually just includes the first objective. Corps artillery can then be made responsible for all counterbattery as far as the ZZ line and all fires between the XX and ZZ lines. The army with its extreme range weapons is given the primary responsibility for all fires beyond the ZZ line, which is determined after considering the ranges of weapons. If the corps artillery has weapons of distinctly different range and traverse characteristics (such as the 155-mm. howitzer and 155-mm. gun), the use of a YY line between the XX and ZZ lines is indicated: the

longer range weapons then become responsible for all fires between the YY and ZZ lines.

It will be noted that the corps zone has been divided into bands parallel to the front. These bands are further divided into squares by bands perpendicular to the front. Division artillery, for example, is responsible within the division zone. Corps groupments should be given perpendicular zones which usually, though not necessarily, conform to the division zones. Long range weapons are also given perpendicular zones of responsibility. But it must be remembered that all artillery must be prepared to fire outside its normal square or zone into a contingent zone. As the attack progresses from phase to phase, the squares drop back deeper into enemy territory.

To solve the problem of delivering quick, effective counterbattery fires on targets disclosing themselves after the preparation has started, the following may be considered:

Allow any artillery unit to take under fire an enemy battery discovered by one of its ground or air observers, provided this action does not interfere with its immediate mission.

Organize a counterbattery forward report center with more or less direct telephone and radio communications with battalions designated as counterbattery units. These should include all types of weapons, and should be so located that the entire corps front (extended into adjacent corps zones and of maximum depth) can be covered. These counterbattery battalions should remain under their own groupment commanders, but the counterbattery officer has priority for counterbattery missions. The setup is available to the corps artillery commander for such emergencies as a dangerous tank attack.

The counterbattery officer's section, acting as a fire direction center, handles only those targets requiring immediate counterbattery action. Other counterbattery missions are assigned directly to the commanders of the appropriate groupments. The counterbattery officer will ordinarily obtain locations from the artillery observation battalions, air observers, ground observers whose battalions are unable to deliver the fire, and front line troops. He assigns the mission to the counterbattery battalion best situated for its accomplishment, which then has primary responsibility for observation of its fire, using its own air or ground observers. However, the CBO has a responsibility to the extent of endeavoring to arrange for the observer who discovered the target to adjust on it or observe the effect of the fire.

With the system described above the corps artillery can promptly fire on all types of targets of opportunity, particularly enemy batteries. Interdictory, harassing, destructive, and neutralization missions should be assigned directly to groupment commanders.

Defense

This discussion considers only the case where the commander has no idea of withdrawing. He intends to hold

at all costs the defensive position selected. Time is available to the defender.

Artillery should be deployed in accordance with the general principle of having great depth and all-around defense. Previous remarks regarding echelonment apply to the defense as well as to the attack. However, the echelonment should be in much greater depth.

The defender will want to subject the enemy to artillery fire as soon as possible. This fire should become more dense as the enemy approaches, until it reaches its full intensity just as the hostile infantry and armored forces launch their assault against the main position. It is essential to subject the enemy to very intense artillery fire if he penetrates the position and to be able to support counterattacks launched to eject him.

Early long range fires on the enemy are desirable in order to reach deep into his lines to interdict routes, destroy dumps and bridges, interfere with troop movements, especially reinforcements, and gain the advantage in counterbattery. Long range artillery should be pushed well forward to accomplish this. Sometimes it will be advantageous to place some of it in front of the main line of resistance, to be withdrawn before the outposts are forced back. Other long range weapons should be placed close behind the main line of resistance. This artillery should be of the more mobile type.

Unless covered by a strong obstacle (such as a broad river), heavy artillery of little tactical mobility should be placed deep in the position. However, the long range weapons, though ordinarily echeloned in depth, are emplaced well forward. Short range corps weapons are usually pulled back to fire within the main line of resistance.

To maneuver fires in depth, the following may be taken as a guide in determining the desirable echelonment of the artillery:

—Place some long range guns so as to fire with increasing intensity from extreme ranges to within 1,000 yards behind the enemy's front line.

—Emplace the corps artillery, considered as a whole, so that at least two-thirds can fire in a zone extending about 1,500 yards behind the enemy's front line.

—So place the corps artillery that all of it, except some of the long range guns, can fire in a zone extending from about 1,000 yards in front of the main line of resistance to about 500 yards behind it.

—Place some artillery to protect the flanks and rearward approaches to the position.

To maneuver fires laterally, so place the bulk of the artillery that it can mass fire in front of any part of the corps front and place some fire in part of the sectors of adjacent corps. Locating groupments behind the divisions in line facilitates both this and the reinforcing of the fires of division artillery; it also assures a better disposition for immediate counterbattery action.

This leads to the subject of organization of command for the defense. The guide furnished in the first part obtains. However, due to the wide front which is characteristic of the defensive and the possibility of compartmented terrain, groupments including different types of weapons may be desirable. This is particularly so where unity of command should be preserved.

Control should be as highly centralized as the time preceding the enemy's attack will permit. The basic plan should be drawn with the expectation that decentralization for particular units may be forced by uninterrupted communications. Every effort must be made to maintain communications in the interest of centralized control. This permits the commander to decisively influence the battle at critical times with heavy massed fires.

A counterpreparation should be drawn up, designed to disorganize the hostile forces massed in their front-line zone just prior to the jump off. As indicated above, at least two-thirds of the corps artillery should be able to participate in the counterpreparation. It is usually delivered just prior to the jump off, if the time of this can be ascertained. The enemy will seek to conceal his H-hour. Further, by changes in the tempo of his preparation he will try to give false impressions of the exact time of the jump off in the hope of leading to the disclosure of more of the defender's batteries—he prefers to neutralize as many of these as possible prior to the jump off in order to ease the way for his infantry. For this reason the general counterpreparation is fired only on order of a higher commander (army or corps), or when a prescribed event occurs.

It is usually desirable to integrate the fires of the corps artillery in the barrage plan for the final protective line of the infantry and artillery of the divisions. Close coordination is required to insure proper distribution of fires and workable signals. However, the corps artillery should also be prepared to mass its fires on any critical point in front of the main line of resistance.

If the enemy penetrates the position, corps artillery



will be called upon for protective fires and later for support of the counterattack. If the enemy continues to advance, the foremost artillery displaces by echelon, step by step to the rear. The purpose is to maintain the original depth of the position until a favorable turn of events or darkness intervenes.

The corps artillery commander handles counterbattery as in the attack. The same distinction between counterbattery missions requiring immediate action against newly discovered targets, and those already known or not requiring immediate action, is observed.

Long range interdiction, counterbattery, counterpreparation, protective barrage, and other fires require large quantities of ammunition. These must be brought up before the enemy launches his attack. His overall superiority makes this necessary.

If time is limited, the corps artillery commander on the defensive will have to attach most of the corps artillery to the divisions. However, he will seek centralization as far as possible and will complete defensive preparations as time permits.

The corps artillery commander should consider the possibility of employing the artillery of divisions in reserve, in process of reorganization, or advancing to the

scene of action (but still distant). Truck-drawn artillery enjoys a great advantage in mobility over the foot elements of a division. This will permit its temporary commitment without precluding its subsequent employment with its division elsewhere.

In the defense, artillery taken from such divisions should be used to deepen the defensive zone so that its withdrawal will not disturb the general artillery disposition. On the offense, on the other hand, it should be echeloned deeply from positions well forward. Pushing this artillery well forward would upset the whole disposition if it were suddenly withdrawn. Placing it all well to the rear would not permit any of it to cover the displacement of the organic artillery during the attack.

Author's note: The manner of employing corps artillery in various operations, as developed in this article, conforms closely to the doctrines enunciated in FM's 6-20, 100-5, 100-15. Corps artillery will often have an important place in task forces during the development of the strategic war in the far flung places of the world where our forces are being built up. It will have a greater role in the struggle of the giants when they finally grapple for a decision. Aggressive imagination, energy, and mental flexibility are just as essential as a thorough knowledge of principles in exploiting the potentialities of corps artillery.

HEADQUARTERS, 6TH ARMORED ARTILLERY GROUP

Camp Chaffee, Arkansas

The Editor,
FIELD ARTILLERY JOURNAL,
Washington, D. C.

Dear sir:

I have seen everything. There can be nothing else worth looking at. At service practice conducted yesterday by the 93rd AFA Bn (Lt. Col. Beverley E. Powell, Commanding) the batteries firing were A, B, and *Service*. Service Battery had the equipment of C Battery and was firing along with the other two Howitzer batteries. The battalion ammunition officer was the battery executive and the gun squads were the regularly assigned service battery personnel. This was no "smart aleck" stunt.

The finest way to gain detailed technical training in gun squads, and for the young officers, is still by conducting gunners' examinations as prescribed in FM 6-125. Since the young officers have to become expert in order to instruct and examine, they themselves become thoroughly trained. To derive the most benefit from this training, the examination must be kept free from vicious competition, as existed in gunners' examinations some years ago. In the course of giving this instruction, each battalion commander of the 6th Armd Arty Group did not exempt his service battery, and as a reward for qualifying 25% or more expert gunners, each service battery is permitted to fire.

The air observer in one of the organic observation planes took off from the field, adjusted service battery on a combat target (through FDC), landed, and camouflaged the plane in seven minutes. This time happened to be better, by thirty seconds, than any time made by A or B batteries. The resultant boost to the morale of service batteries is unbounded and the incentive for the howitzer batteries is evident, as there results throughout each battalion an appreciation of the importance of "hot" firing batteries.

Yours truly,

THOMAS E. DE SHAZO,
Colonel, FA,
Commanding.

RADIO IN FIRE DIRECTION

By Lt. James H. McBroom, Jr., FA

Radio in fire direction presents a very interesting problem. Shall the sets at the fire direction center be remotely controlled? If so, by whom? In answer to this question, the following system has been worked out and proven successful.

In fire direction radio communication, five portable short range sets are employed. Three of these sets operate in the firing battery nets and the other two handle communication with the two liaison officers. All five sets are remotely controlled from the fire direction center by means of a five-pair conductor cable 800 yards long, thus permitting the radio station to be set up well out from the command post. This cable is wound on a reel borrowed from the wire section, which is mounted in a homemade version of the reel unit mounted in the rear of the radio truck. As soon as the radio truck arrives at the radio station a man jumps out, grabs the end of the cable, and runs toward the fire direction center. Three pairs of the wires are connected to the computer's telephones, and the other two terminate in 'phones which take care of liaison communication. The computers operate their telephones with head-and-chest sets, which are at the same time connected in the normal simplex circuit. Thus we have a three party line composed of the computer 'phone, the simplex 'phone at the gun position, and the remote control unit at the radio station. If the computer wants the gun position, he rings two short rings; if he wants the radio station, he rings three short rings; and his own "number" is one ring.

If the line between computer and guns goes out, the following procedure would be used. For this example, let the call sign of the set at the radio station be ORANGE and the one at the guns (Btry C) be APPLE.

COMPUTER: Rings three short rings.

REMOTE CONTROL OPERATOR: "Radio."

COMPUTER: "Charlie guns."

REMOTE CONTROL OPERATOR: "Wait." Puts set on air and says, "APPLE from ORANGE, fire commands, go ahead."

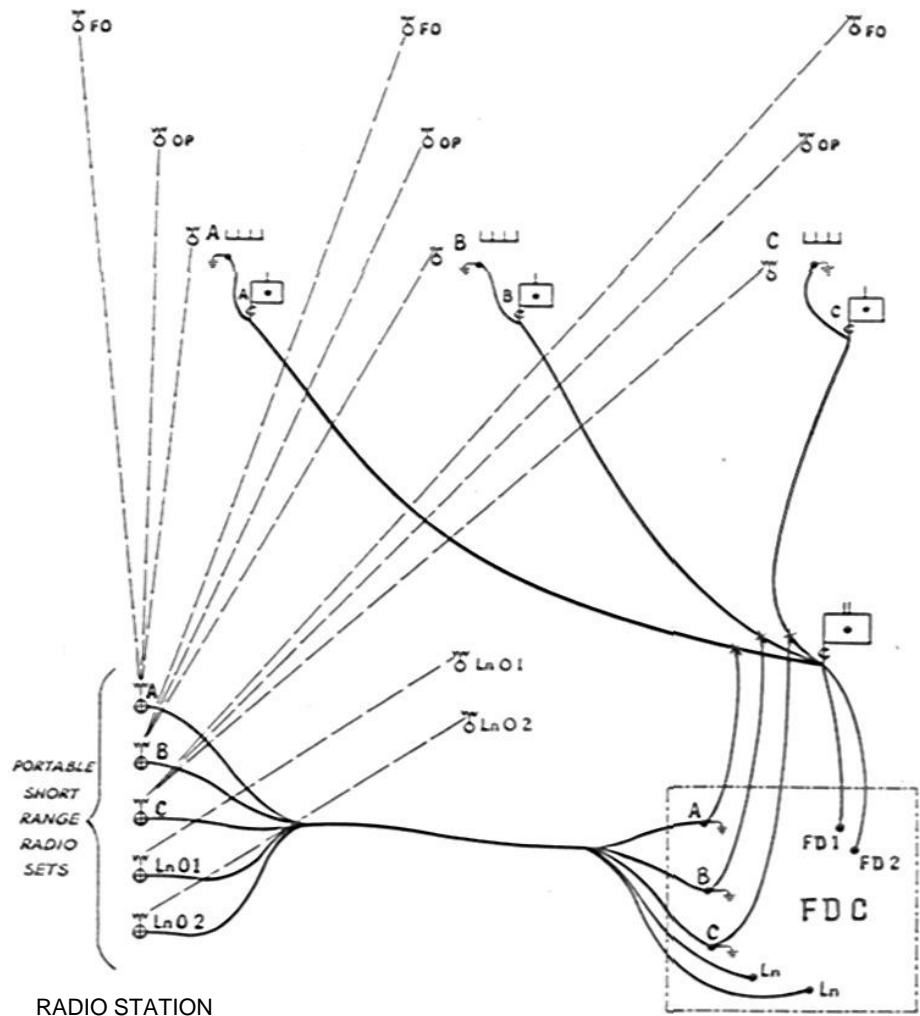
RADIO OPERATOR AT GUNS: "Roger, go ahead."

COMPUTER: "Battery adjust, . . ."

Liaison missions, as well as forward observation missions, are handled in a similar manner. We see that the computer has no worry concerning call signs, as that is taken care of at the radio station.

As an interesting sidelight, let us take the case when a forward observer is adjusting a battery through the fire direction center by radio, and the fire direction center is using wire to the guns. The computer uses the same 'phone in conversing with both forward observer and guns. "On the way" comes to fire direction center by wire and to forward observer by radio. The forward observer hears the original "On the way," so the fire direction center does not have to repeat it.

The system is simple, efficient, and (above all) *it works*.



"SOUTHWICK" G.F.T.

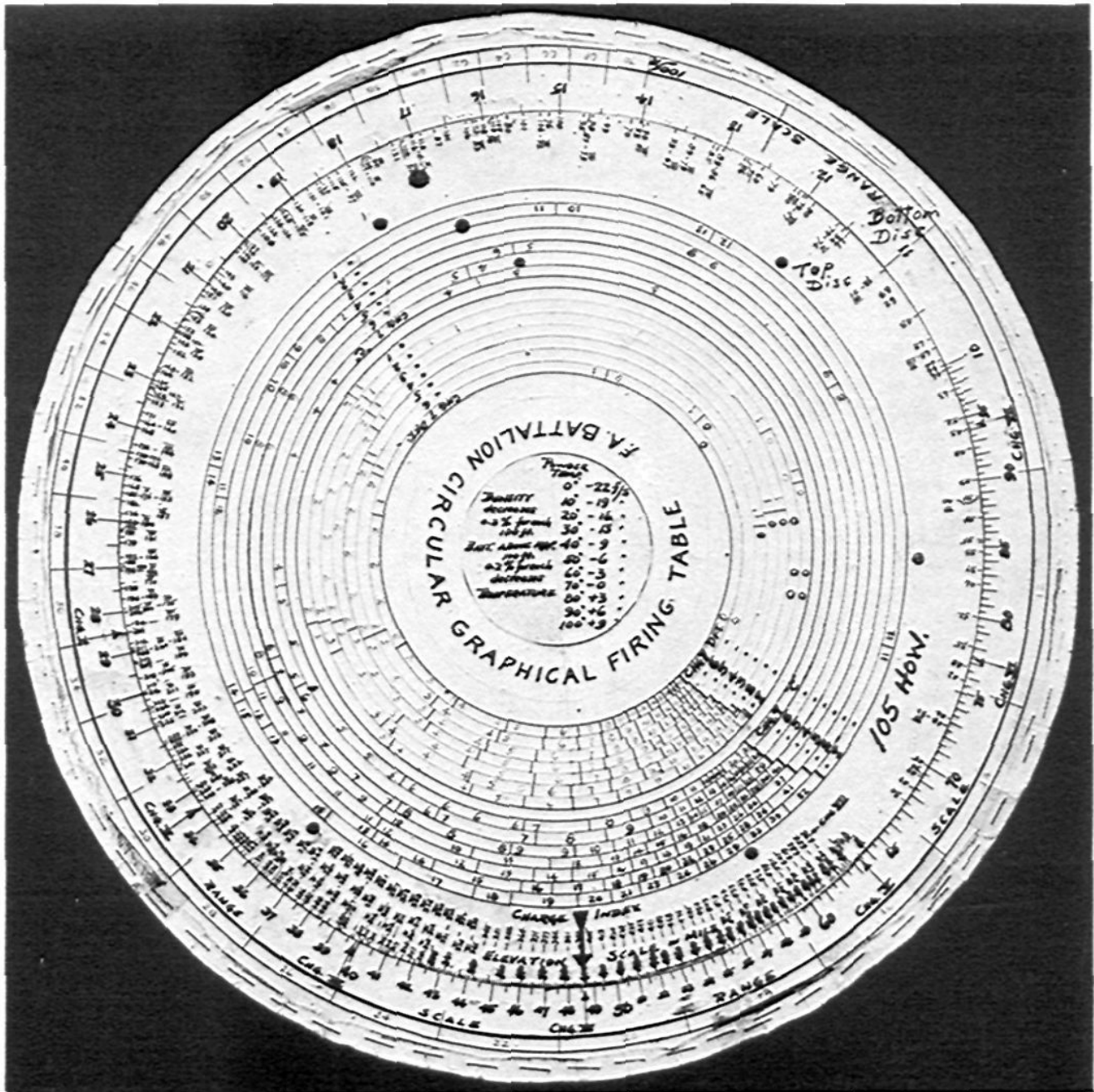
By Maj. Stephen L. Nichols, FA

When our battalion was ordered overseas as part of a combat team, it was equipped to within a gnat's eyebrow of its TBA allowance. All FDC personnel had been so trained to rapid use of and implicit faith in the graphical firing table that they could conceive of no other method.

There is no point in dwelling on the details. Twenty days at sea, destination in sight, two explosions, and in an hour and ten minutes a transport with thousands of dollars'

worth of equipment slid under in forty fathoms of Pacific Ocean. All that was left was what the men could carry—and that wasn't much.

After two months of doing all sorts of work for the Army Air Force and Navy, it began to look as though we might sometime get new howitzers. Defensive positions had been selected and survey was going forward by means of string, a pocket compass, and some darned



good guess work. But a good FDC team needs equipment to keep in form. Letters were written to Division Artillery, hundreds of miles away, pleading for graphical firing tables and one, *please* General, just one FM 6-40! At the time, however, Division Artillery was having troubles of its own; most of its stuff was being transshipped, so no equipment was forthcoming.

On one momentous occasion our operations sergeant (one John Flannagan, who lived up to his name) brought in a salvaged barracks bag. It stunk to high heaven and the contents were falling apart, but in it was a 105-mm. howitzer firing table, still legible.

Capt. Nathan M. Southwick, FA, assistant S-3, went into action. He practically ran the four miles to a naval construction battalion, borrowed a log table, and ran the four miles back. Within an hour the CP was a beehive of activity with all hands working on graphical firing tables. The result was a slipstick made out of scrap 1 board; it was accurate enough, but moving the slide was like opening a garage door.

Meantime Division had sent expressions of sympathy, and some Field Manuals. After weeding out the ones on Graves Registration, Automobile Upholstery, etc., we found a couple of Aircraft Identification discs. That's about all there is. One of the discs was covered with paper, the range laid out logarithmically on the outer

circle, and the elevations entered to correspond. A cooperative navy photographer reproduced a sufficient number of copies, reducing the size from 18" to about seven. It is unique in that it carries all seven charges with no slide to change—or lose. It can be reproduced in quantity without difficulty. When backed with cardboard, it is reasonably durable. A computer can carry a half-dozen spares as easily as one.

It should be borne in mind that the one shown here is a working model, and erasures have made some elevations hard to read. Also, blue ink in the drift circle failed to register well on the commercial film. The table is now being perfected; the final gadget will be legible, will carry all necessary data including time for graze burst, and will have a guide for lining up data with the range.

Oddly enough, on the day our circular tables came from the photographer, five standard G.F.T.s arrived from Division Artillery!

Another interesting piece of equipment is a coordinate square whittled out of scrap pieces of Flexo-Glass. Working with the crudest of tools, Maj. J. A. Costain, our battalion S-3, made several of these handy little gadgets. They were originally intended only to serve until the issue articles were received, but the substitution proved to be so much more accurate and easier to handle that we will probably continue to use them.

LAYING IN ACTION

One battalion reports from North Africa that it used a 1/50,000 map as a firing chart, both unobserved and observed. Battery positions were surveyed in from a battalion IP which was picked from the chart by inspection. Position and target areas were tied in by registration, and a battalion orienting line used. K was computed and used, as was also a deflection correction.

On the following day fire had to be delivered without benefit of metro data or re-registration. Both K and Df correction from the previous day were used with excellent results—not a good practice, perhaps, but in a pinch considerably better than nothing.

In other situations no survey was used, but laying was by compass, and old shooting-from-the-hip methods (tempered with obvious changes to suit forward observers) were used.

In all cases, the initial method of laying the first battery in position was by compass on a point to which compass had been determined by measuring the line between the battery's inspection-location and target-on-the-map. At least part of the first salvo was always sensible.

NORTH AFRICAN COMMENT

"The 105-mm. howitzer has proved to be a superb piece of equipment. According to reports received from enemy officers who received its fire, it is most effective. With superquick fuze, the projectile seems to detonate almost above the ground, and its splinter effect is terrific, being practically parallel with the ground. Its morale effect is good, too. French officers thought it to be at least a 155-mm., and pronounced it better (or worse, from their viewpoint at the time) than German 105-mm. effect. With delay fuze, one round penetrated over 18" of stone masonry before exploding; destruction inside the house was complete: two opposite walls as thick as the one penetrated were blown out."

COMBAT HAS SHOWN

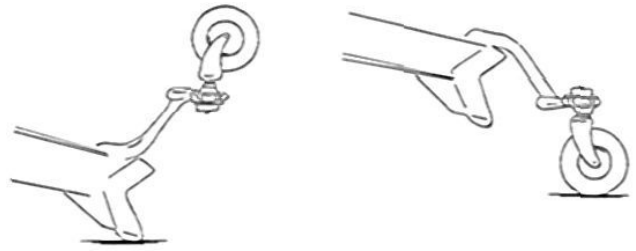
that radio nets containing a considerable number of sets are definitely feasible. One battalion had to put all its sets in a combined command-and-FDC *single channel*. It worked to perfection, but it was found that the *NCS must run it*. Using this system, battalion effect on a target averaged only four minutes from initial round until final round for effect had been fired.

AN EXPERIMENT ON GUADALCANAL

During our training in New Caledonia preparatory to arriving on Guadalcanal, experiments were made to determine the best method of moving 105-mm. howitzers without the aid of prime movers. Reports from the fighting front indicated that motor transportation was scarce and that most of the movement of artillery had to be accomplished by hand power. Various tests were conducted to learn the most feasible way of hauling guns up a sandy beach and across country.

Our first attempt consisted of attaching long drag ropes to a gun and putting the entire battery on them, with six to ten men lifting the trail so the spade would not dig into the sand or earth. This proved to be not too satisfactory.

Next we split bamboo limbs in two and laced the halves together with wire. The curved portion of the

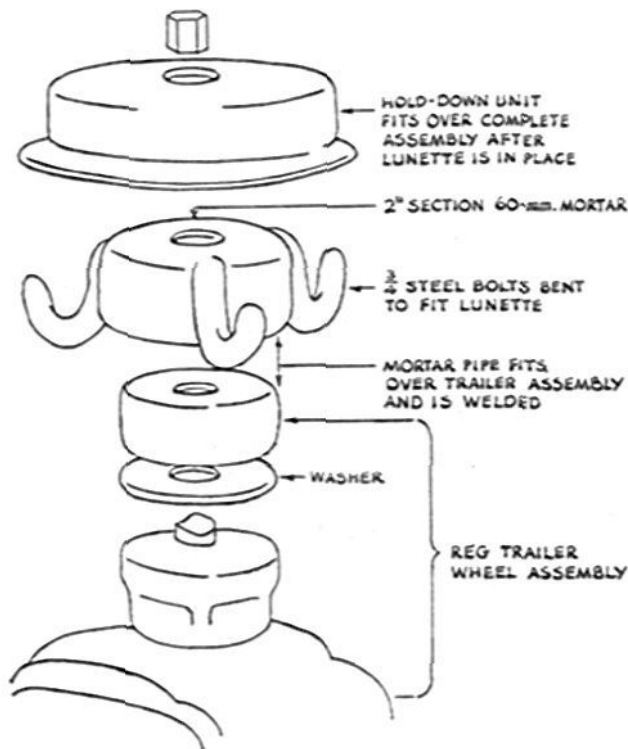


FIRING POSITION

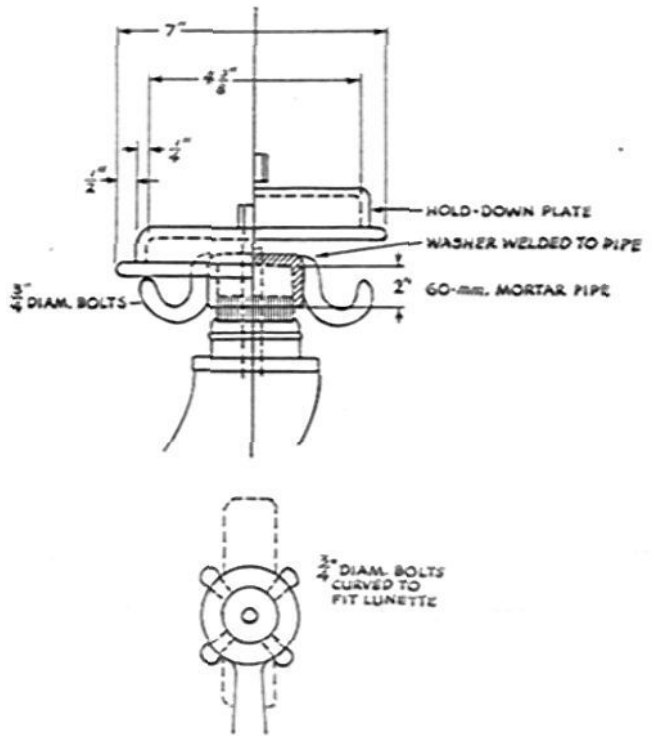
TRAVELING POSITION

By Capt. William Gray, FA

Author's note: Our battery was in the task force which occupied New Caledonia in March, 1942. We were equipped with 25-pounder guns and found them excellent, with very little dispersion. We mounted panoramic sights on the 25-pounder in place of the English dial sight and used an aiming circle rather than the English director; this enabled the battery to operate entirely with the mil system instead of with degrees and minutes. We also added another brake on the 25-pounder, to give that gun a dual brake system. Before leaving for Guadalcanal we were issued 105-mm. howitzers and added the "third wheel" here described.



ASSEMBLY DRAWING



TOP VIEW: LUNETTE IN PLACE TOP
PLATE NOT IN PLACE



Aussies on New Guinea were compelled to sledge broken-down loads of the 25-pounder. Fifth wheels could not often be used because jungle trails were usually too narrow and terrain too rough for an assembled gun.

bamboo halves formed the bottom of this improvised platform, with the trail resting on it. We even built up a type of prow so that the entire set-up looked somewhat like a toboggan. This proved much more satisfactory, as one platoon of the firing battery was able to move a gun at a time with the aid of drag ropes. However, this "snow-plow toboggan" proved to be extremely cumbersome to lug around, especially as all we were allowed to load on board ship consisted of what could be tied to the gun.

Finally we hit on a plan which we thought might work, and after many trials and errors the following device was evolved and proved to be most satisfactory. Incidentally, it has met all the tests of the terrain on Guadalcanal that we have encountered so far. Our first problem was to obtain four small trailer wheels, one for each gun. This was solved by a visit to the Motor Salvage Pool—plus lots of red tape! The upper pivot on this trailer wheel was cut off 2" above the lower pivot band. To that was welded 2" of an old, salvaged 60-mm. trench mortar pipe about $\frac{1}{4}$ " thick; this fitted over the round surface above the lower pivot and passed loosely through the ring of the lunette. Welded to the outside of this mortar pipe, we placed four $\frac{3}{4}$ " steel bolts which we cupped at one end so that the cupped ends would fit over the lunette of the howitzer. This completed the seat for the trailer wheel; most of this work was done with the aid of a small bellows-operated forge, charcoal, and 10 francs for the use of the charcoal.

Running through this mortar pipe was a 3" bolt $\frac{3}{4}$ " thick, which was welded into the top surface of the lower pivot. A holddown band was improvised out of a 2" sleeve $\frac{1}{4}$ " thick ("borrowed" from the U. S. Navy) with a $4\frac{3}{8}$ " inside diameter. To this was welded a piece of $\frac{1}{2}$ " steel plate 1" in width, which was rounded off on the edges and fitted on the outside of the 2" sleeve. This made the total overall diameter of the sleeve-plus-steel-ring, 7". Onto the other end of the sleeve was welded a 5" diameter round piece of $\frac{1}{2}$ " steel plate, which completely blocked up that end of the sleeve. A hole was cut in this large enough to allow the 3" bolt to pass through. A nut clamping onto the 3" bolt completed the picture.

Thus we had improvised a "third wheel" for the trail of the 105-mm. howitzer, giving it a tricycle appearance. With the trail latched in the travelling position, the lunette (supported by the wheel) rested on the ground so that each gun section could fairly easily move the gun around by hand with drag ropes, swinging the trail just as one would a trailer. In the firing position the lunette, of course, is in the upper position with the wheel inverted in the air. If we haul the gun by prime mover the bolt is loosened, the sleeve and its welded accessories removed, and the wheel detached—a 26-second job.

Credit for this "invention" must be divided into four parts: Sgt. Elbie Lane finally put us on the right track; Tech. Sgt. Leslie Green worked out all the details with the kind assistance of our ordnance company; Lt. Gordon Douglas gave some helpful suggestions; and I pulled rank.

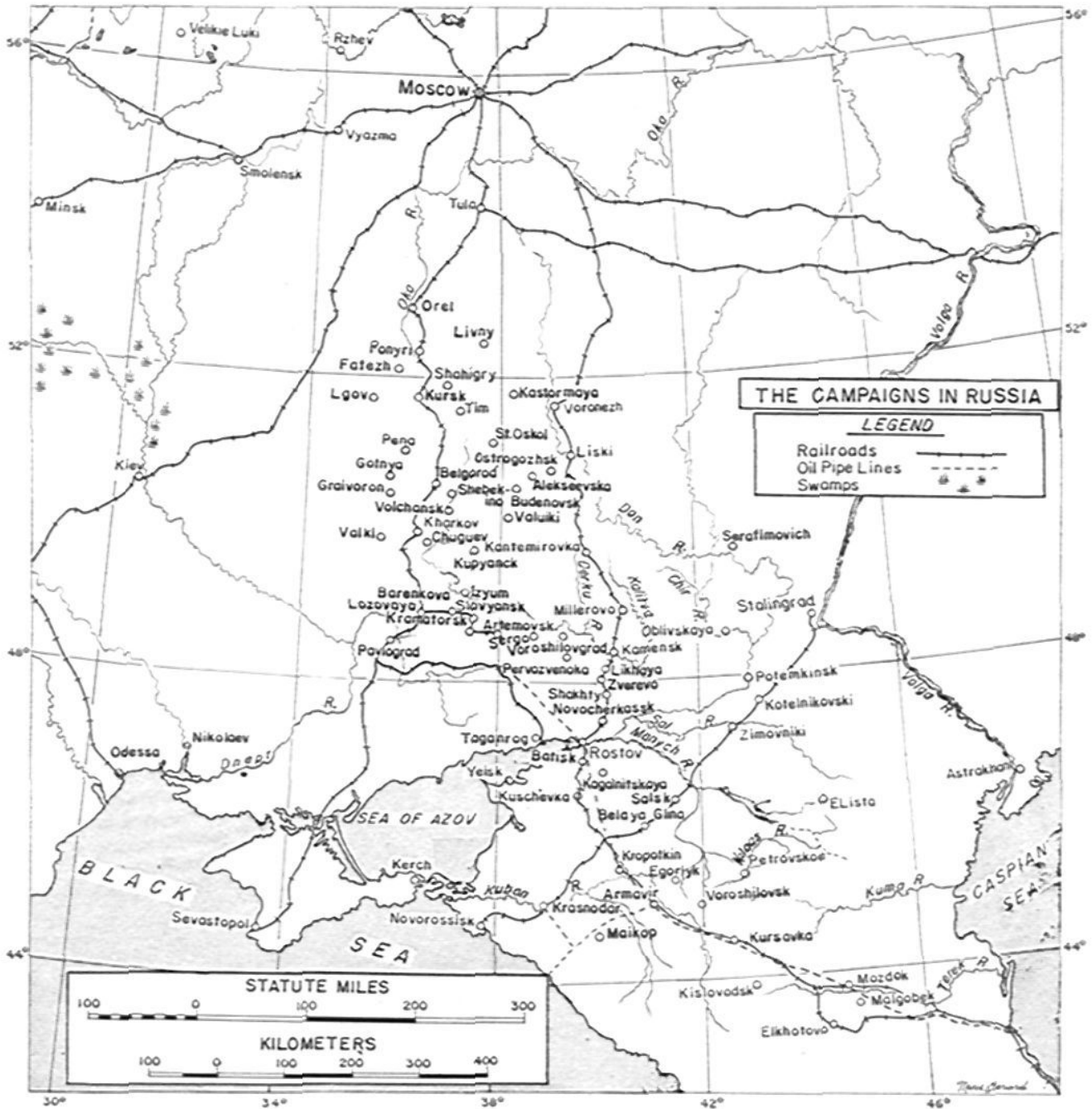


Where New Guinea trails would accommodate a 25-pounder's width, the ground was so rough and grades so steep that block-and-tackle had to be used.

The Campaigns in Russia

(Based on best information available at date of writing, this article is subject to later historical correction.)

By Col. Conrad H. Lanza



RUSSIAN OFFENSIVES AROUND STALINGRAD

Later information clarifies some details regarding the historic contest about Stalingrad. A corrected list of the German organizations within the defenses of Stalingrad as of January 20, 1943, is:

Sixth Army: Colonel General Friedrich von Paulus, commanding (not Hoth, as previously stated).	
Corps: IV, VIII, XI; XIV Panzer, LXI.	
German Panzer Divisions:	3 14th, 16th, 24th.
German Motorized Divisions:	3 3rd, 29th, 60th.
German Infantry Divisions:	11 (or 12) 71st, 75th, 76th, 94th, 100th, 113th, 295th, 297th, 305th, 371st, and/or 376th, 389th.
Rumanian Infantry Divisions:	2 1st, 20th.
Army Troops:	
German Infantry Divisions:	2 parts of 44th, 378th, 384th.
Artillery	regiments: 39th, 40th, 44th, 46th, 51st, 53rd (Trench Mortars), 37th (AA), 104th (AA).
Engineers	battalions: 50th, 162d, 294th, 336th, 549th.
Total Divisions	21 (or 22)

Stalingrad was first invested by the Russians on November 27, 1942, after a four-day offensive in two parts:

a. A north force crossed the Don River in the vicinity of Serafimovich, with the mission of cutting off Stalingrad from the west.

b. A south force, having crossed the Volga River below Stalingrad, had the mission of cutting off Stalingrad from the south.

In earlier articles,* account has already been given as to how these two Russian offensives succeeded by 20 January in driving the Axis forces west of the Don River to beyond Millerovo, while those east of the Don were forced south of the Sal River.

In the meantime the Russian Don Group of Armies, under Colonel General Konstantin Rokossovsky, was quietly preparing for an attack on Stalingrad. Between 27 November and 8 January no serious attacks were made, although limited attacks and raids were frequent. These served to secure identifications and to obtain information concerning the dispositions of the besieged. In this delay the Russians complied with so much of the rule laid down by Napoleon (in Maxim XLI), as prescribes

"Begin by beating the enemy's covering force, drive it from the field of operations, and eject the remnants behind some natural obstacle, such as mountains or a great river; having accomplished this mission, a covering army should be placed on the near side of the obstacle until siege works are completed and the place taken."

There were no mountains in this theater of operations, and the "great rivers" beyond which the Axis covering forces had been driven by January were on the south the Sal River, over 100 miles away; on the west the enemy had been driven in turn over the Don, the Chir, and the Kalitva

Rivers, the last about 180 miles away from Stalingrad. It therefore appeared reasonable to expect that active siege operations could now be pushed without danger of the investing armies being attacked from the rear. The Don Group contained four armies. Of these the 62nd Army (Major General Chiukov) was in Stalingrad, having been there from the earliest operations about the city, never having been completely driven out. The artillery of this army was east of the Volga River, with advantageous emplacements for enfilading enemy lines. Foot elements held a part of Stalingrad, north of the central business section; solidly entrenched in buildings and factories, they were carrying out a bloody, daily combat from house to house. These Russians secured replacements regularly from across the Volga. Before the river froze they crossed in motor launches at night; these boats moved so fast that few were hit by enemy fire. After the river froze, small parties traveled back and forth across the ice. Thus the 62nd Army managed to keep its front line at full strength, although its losses were serious. In city fighting, hand weapons and light mortars were used. Tanks were found to be vulnerable in city streets, and artillery could not be manned under fire from buildings close by. Streets could not be crossed under machine gun fire, so fighting proceeded by breaking from one building to another, or traversing streets and other open spaces by tunnels. Often a building would for days be occupied on some stories by Russians while other stories or the cellar were held by the enemy.

The encircled German Sixth Army contained at the beginning of the siege 330,000 men, of whom 220,000 (just 2/3) were combat troops. They made no attempt to break out. Had they done so in the early days of the investment they might have lost Stalingrad, but they might also have succeeded in saving their army by joining Field Marshal von Mannstein south of the city. That no attempt was made was presumably due to orders from German GHQ to hold on to Stalingrad at all costs, for the German reason for wanting Stalingrad was stated by Hitler on 8 November, 1942, as

"One cuts off thirty million tons of traffic [to Russia proper], including nine million tons of oil. There flows the entire wheat gathered from the Ukraine and the Kuban, [and] manganese ore. I wanted to take it."

And apparently Hitler wanted to hold it. Present available information indicates that German GHQ did not realize until about 24 December the strength of the Russian offensives which had commenced in mid-November. Not until then were strong measures taken; these included

1st: withdrawal of the front, including abandonment of Caucasia. A delaying action was to be fought, to gain time to meet what was now acknowledged was a numerically much superior enemy, splendidly armed.

2nd: raising of large new Axis forces with which it was hoped the balance of strength in favor of the Axis could be restored certainly before summer and possibly sooner.

It was now too late, however, for the Stalingrad garrison to sally forth; the relieving forces were too far off. The perimeter of the Stalingrad defenses had been reduced from an original 80 × 40 miles to 20 miles (north

*Pp. 186 and 220. March, 1943, FIELD ARTILLERY JOURNAL.

to south) by 30 miles in width—this width including the airfields through which some supplies were still arriving. The Russians actively attacked the transport planes and reduced this service so much that it was no longer important.

In early January, the Sixth Army made active attacks along its north front, continuing attacks which had started in December. The selection of this sector for an offensive may have been on orders from German GHQ, as it was opposite to the direction required for escape. It seems that German GHQ believed that the main Russian force was in this direction, and that if it could be driven off or annihilated Stalingrad would not only be in no further danger, but the Russian communications to their troops advancing westward across the Kalitva River would be cut. But in addition to the 62nd Army in Stalingrad, the Don Group had three other armies: the 21st was north of Stalingrad and the other two west and south of that city. Whenever the Germans attacked all four Russian armies counterattacked, leading to fierce fighting all around the perimeter of the defenses. The Russians had superior numbers, and were willing and anxious to fight to reduce the manpower and supplies of the besieged. In this mission they succeeded very well. The Germans made minor gains on the north but lost at other places, particularly on the west side. In twenty days starting about 20 December, the Axis losses in killed and wounded amounted to nearly 100,000 men, almost 5,000 a day. Part of these wounded were evacuated by air. By 10 January the Sixth Army had only some 230,000 men for duty, of whom perhaps 150,000 were combat troops.

The Don Group of Armies having assembled the necessary artillery and ammunition and prepared for attack, on January 8 sent a note to General von Paulus requesting surrender. It pointed out that his army was surrounded by vastly superior forces, that all relief efforts had been repelled, and that there was therefore no chance of either escaping or being relieved. Next day General von Paulus replied, refusing to surrender.

The Russians' attack started early on 10 January. Their plan was to first reduce that part of the defender's territory which lay west of Stalingrad, by attacks from north, west, and south. When this fell the Axis would be holding an area approximately a semicircle centered on the middle of Stalingrad. Russian attacks would thereafter be concentric, with the mission of reducing the radius of the semicircle by constant day and night attacks. During the entire period the 62nd Russian army would attack vigorously in all directions from within Stalingrad.

These four Russian armies had strong artillery and air support, and shelled and bombed the Axis troops day and night without intermission. Progress was made from the beginning, for the Russians were willing to accept losses provided they made gains. The 62nd Russian army made a particularly strenuous attack within Stalingrad, at the very center of the Axis forces. All

Stalingrad fighting was most savage and entailed severe losses to both sides. It being impossible for either side to move on streets or in the open, engineer troops were employed to blast entrances into buildings and to tunnel under streets. The radio was invaluable in this fighting, as it could be used both to adjust artillery fire and to coordinate movements.

On the west the main Russian effort appears to have been from the west, from where strong tank and infantry attacks moved eastward one after another. They were supported from the north and south by enfilading artillery fire and limited attacks. After twelve days of uninterrupted fire, the Russians had (by the evening of 21 January) bit off the west salient from Stalingrad and confined the defenders to a circle which extended around the city, less the constantly expanding sector held by the 62nd Russian Army.

Without intermission the attack was now changed, according to the plan, to uninterrupted day and night attacks all around the circle to reduce its size. The Axis troops resisted strongly. With the loss of the west salient and the airfields, they received no more help from the outside and realized that there was no escape for them. But German GHQ ordered the battle to continue and refused to allow surrender. The continuation of the fighting employed four Russian armies which interrupted important roads and railroads passing through Stalingrad. Consequently, from the Axis viewpoint, the longer the city held out the better it would be for their field armies now fighting hundreds of miles away in a retreating, delaying series of actions.

von Paulus seems to have faithfully carried out his orders, whatever his personal opinion may have been. He resisted as long as he could. His lines daily became smaller. On 26 January the Russians made a big advance on the west side, and next day split the German Sixth Army into two segments by driving a wedge straight through to the Volga River. The end was in sight. Fighting continued in the south German segment until 31 January. On this date the last Germans, reduced to only a few hundreds and including the Sixth Army's CP (located in a cellar), was captured. The north segment held out until 2 February, when the last of them surrendered.

So ended a great Russian success. It was due primarily to superior numbers. But it was also due to excellent leadership which took no chances, made necessary preparations, and then inexorably carried out a good and workable plan.

The Stalingrad campaign discloses certain useful data regarding modern warfare and tactics.

As previously stated, the total Axis force had been 330,000 in all, of which 220,000 were combat troops, thus indicating that the services used 1/3 of the total strength. Approximately 6,700 guns are reported by the Russians as having been taken or destroyed. This gives 30 guns per 1,000 combat troops, or roughly 300 per division. These figures include corps and army artillery, antiaircraft

batteries, and antitank batteries. Apparently about half of the artillery was normally present with divisions, the other half being divided among corps and army artillery, the air corps for defense of fields and for antiaircraft fire, and for defense of essential services and depots. If we allow only 15 men per gun, which is a small number if we include usual overhead, just about 100,000 men were required to handle and service 6,700 guns. This would be 45% of the combat force, and gives some idea of the amount of artillery required in a modern army.

The German army had over 61,000 trucks. This number includes both combat vehicles and those employed by the services. It amounts to roughly 200 trucks per 1,000 men, and appears to be an average number. Tanks are reported as having numbered 1,550, and required presumably at least 15,000 men to fight and serve them—or about 7½% of the combat strength.

German personnel is only partially accounted for as follows:

Prisoners in Russian hands taken since 27 November, 1942	91,000
Killed and wounded prior to 10 January	140,000
Killed after 10 January	40,000
Unaccounted, presumably wounded after 10 January	59,000
Total	330,000

Prior to 21 January the airfields could be used by the Germans at night, and some wounded were evacuated this way. There is no record as to how many.

There is no information yet available as to Russian strength. The victor in a battle can count prisoners, enemy dead, and materiel, and therefrom deduce important information. He need not reveal his own figures, and particularly his own losses. If we knew what Russian losses had been incurred to win a really great campaign, we could evaluate it better.

IN CAUCASIA

Determination by the Axis (about December 24, 1942) to withdraw from a large section of occupied Russia, including most of Caucasia, led to their forces in this area initiating a withdrawal on the 29th. As it was not immediately noticed by the Russians, it secured a start of some three days. Without severe fighting the line, as described in an earlier article,* had by 17 January arrived at the Kalaas River, with the Russians holding Kursavka and Petrovskoe.

Further north the Axis Army of Field Marshal Mannstein, which had been defeated in its attempt to relieve Stalingrad and had now abandoned this mission, had fallen back to the Manych River. This river is the site of numerous irrigation developments and consists of a series of dams behind each of which is an artificial lake. It is therefore quite an obstacle along considerable parts of its course. The Axis problem was to withdraw the forces on both the Manych and the Kalaas Rivers across the Don and out of Caucasia without undue losses. Special attention was

to be given to saving personnel and keeping units intact, secondary consideration to saving of materiel—some of which being of old models was in any case scheduled to be replaced by 1943 models before spring. The Axis decided to retain in Caucasia a bridgehead around Novorossisk and the peninsula west thereof adjacent to the Strait of Azov. Novorossisk had been a Russian naval base, their last one on the Black Sea, as they had lost in turn Odessa, Nikolaev (the main base), Sevastopol, and finally Novorossisk. Russia had ports further east, but not bases. The holding of this bridgehead therefore deprived the Russian fleet from reestablishing itself, denied the entrance to the Sea of Azov to Russian vessels, and protected the Crimea from an invasion landing near Kerch (which the Russians had successfully accomplished in January, 1942). The Russian mission was to overwhelm the two Axis forces, both believed to be retiring to the vicinity of Rostov, before they could cross the Don River. Two Russian forces, one on the Manych and one on the Kalaas and advancing respectively southwest and northwest, formed a Group of Armies under Lieut. Gen. Rodion Y. Malinovsky.

The Axis made no great resistance on either the Kalaas or the Manych Rivers, so the Russians crossed both on January 18th and advanced onward. On the 22nd Salsk was taken after a stubborn fight by a spearhead which was ahead of troops on both flanks. In the south, Voroshilovsk and Armavir (both important cities) were taken on the 21st and the 23rd. On the latter date the Germans, to gain time, made a serious counterattack on the south side of the Manych River and with its front perpendicular thereto. This struck the Russians in flank, they were rolled up, and this particular pursuit stopped for the moment. This attack was continued next day, the Russians being pushed off to the northeast. The German High Command, considering that the mission of the attack (to disengage the retreating troops) had not yet been fully accomplished, continued the counterattack notwithstanding pouring rain during the succeeding days, to include the 27th. Several Russian divisions were badly mauled by this attack, made largely by panzer units, and one division's CP was captured complete by a rapid advance of armored troops.

This German attack secured time for the Axis troops in the south, who had further to go to reach Rostov than did their comrades along the Manych River. During this period of counterattack they fell back to the Kuban River, where a delaying action was prepared. The Russians forced this line on 29 January by an attack which penetrated into Kropotkin. They report having taken 150 prisoners and 5 tanks in this engagement, and estimate the enemy had 1,000 men killed. The right of the Russians coming from Caucasia at this time was near Egorlyk, while the left of the Russians coming from the north was near Belaya Glina, which was only about 50 miles from Kropotkin and Egorlyk. In view of this situation the Axis on this front withdrew rapidly to an east-west

*FIELD ARTILLERY JOURNAL, March, 1943, pp. 220 to 224.

line through Kushchevka; its force detailed to hold the Novorossisk bridgehead here split off from the main body and withdrew toward the Caucasus Mountains to the south. These movements united the two Axis armies into a continuous front and similarly united the two Russian groups—always excepting the Novorossisk forces.

On February 3d the Russians occupied Kushchevka without special effort, the Axis falling back to the stream line south of Bataisk to Kagalnitskaya. The Russians delivered a strong attack against the left of this line on the 4th. This started with a strong artillery preparation and was followed by an infantry and tank attack. It seems that the Axis had withdrawn, for the Russian reports do not claim that any prisoners were taken and estimated the enemy's

the entire Rostov area, thereby clearing all of southeast Russia east of the Don River.

While the advance on Rostov was in progress, Russian troops turned off from near Kropotkin to advance on Novorossisk. The first impression was that the Axis troops in this sector had been cut off and were approaching extinction. To hasten their end an expedition was prepared to proceed by water and land in the rear of the enemy's positions, which it was assumed would be rearguard positions in the mountains north of Novorossisk.

On February 2d the first Russian attacks against the mountain positions northeast of Novorossisk failed. The over-water expedition was debarked west of Novorossisk during the night of 3/4 February. It included tanks. The Axis had been on the lookout for this possibility, and had

German and Rumanian troops available to meet this new attack. They formed a circle around the Russian beachhead and attacked it from all sides during the 4th. Russian attempts to reinforce this landing were only partially successful; the last of the beachhead fell to the Axis on the 7th.

On February 11th the Russian fleet attempted to penetrate into the bay and harbor of Novorossisk, while at the same time strong attacks were made from the north against the line of the Kuban River near Krasnodar; this naval expedition failed, but the land attack captured the city. On the 12th a new Russian attack developed along the coast southeast from Novorossisk. As usual with the Russians this attack was preceded by strong artillery fire. The terrain in this location is limited; high mountains approach close to the sea, requiring an advance either along a narrow beach, which is interrupted by

numerous cliffs, or over the mountains themselves. The attack failed.

* * * * *

The Caucasus campaign has returned to the Russians the valuable agricultural region of the Kuban, together with the oil district of Maikop, which is temporarily out of commission. It has shortened the Axis front by some 300 miles, and simplified the supply problem by reducing the maximum distances by more than 300 miles. It has shortened the Russian front also, but at the same time increased the length of Russian lines of communications.



A thoroughly well-organized position! It is dug in, revetted with stout logs, and covered with camouflage net. Wheels of the Russian 15.2-cm. howitzer (M. 09) are on full-width platform for good wet-weather support, and a trail has been dug. Ammunition is carefully yet conveniently stored, with boards between layers; it has weather protection from above, and burlap flaps to keep driving rain away. Cannoneers have smooth footing. Data is chalked on the gunner's side of the shield. The only discordant note is the camouflage-net pole at the left, which would be in the way if the trail had to be shifted very much. The whole thing looks almost like a demonstration set-up—which perhaps it is.

losses at only 100 killed. The Russians now daily attacked the Axis line, gradually extending the battle to the entire front. On February 8th and again on the 12th the Axis delivered strong counterattacks. In general the Axis line, which was a bridgehead in front of Rostov, held until February 14th. During this period Russian troops had crossed the Don River on the ice above Rostov and established themselves on the right bank. Constantly reinforcing this end of his line, General Malinovsky threatened an encirclement of Rostov.

During the night of February 13/14 the bulk of the Axis troops withdrew from Rostov to a new position east of Taganrog. During the following day the Russians occupied

Reports indicate that the Axis withdrawal was accomplished without incurring serious losses. Omitting losses around Novorossisk, those reported by the Russians as inflicted on the Axis throughout Caucasia for the period 18 January to 14 February are:

Killed	3,100
Guns	202 including 200 found (or taken) at Armavir
Tanks	62
Trucks	774
Prisoners	425

These figures are exclusive of other losses alleged to have been inflicted by a cavalry raid through Axis rear areas, starting on or before 21 December and lasting for 40 days; these are stated to have amounted to 6 planes, 46 guns, 40 tanks, 300 trucks, and 4,000 troops "disposed of."

IN SOUTH UKRAINE

On 18 January, 1943, a Russian Group of Armies under Col. Gen. Nikolai F. Vatutin held the line Derku River—Donets River (less Kamensk, which was an Axis bridgehead). That day Russian troops forced a crossing over the frozen Donets below Kamensk and, turning, attacked the city from the rear. A German infantry regiment which was in reserve west of the river and which attempted to intervene, was driven off with severe losses. The Russians report that the Germans lost in this battle 400 men killed, a battery, and 28 trucks. This battle continued into the following day, when the Germans are reported as having lost 1,900 killed, 980 prisoners, 93 guns, and 180 trucks. The Russians now had a good bridgehead, so proceeded to move additional forces to west of the Donets.

In view of this situation the German High Command ordered a counterattack to start on the 23rd, utilizing forces east of the Donets below Kamensk. These were to clear the entire area between the Don and the Donets while a similar attack was being made across the Don eastward along the Manych River. The two counterattacks together would, if successful, separate the Russian forces on opposite sides of the Don and would give the Axis additional time to effect an orderly withdrawal in accordance with the decision made in December. The German attack (utilizing panzer troops) moved east on the 23rd and the following day, then stopped. Whether this was due to orders from superior authority or to enemy opposition is not yet known. The net result was the same as occurred across the Don: the Axis gained a few days to proceed with their withdrawal.

Satisfied with this result, the German High Command ordered a renewal of the counterattack in the same area and with the same mission. This was delivered on 29 January by the German XXIV Corps and the Italian I Alpine Corps. German reports are that an unstated number of Ukrainian troops aided in this attack, which as before succeeded in driving the Russians some distance eastward.

On 1 and 2 February the Russians, having realigned their forces, recommenced their offensive along the Donets.

They made some progress, enlarging the bridgehead around Kamensk. Not much success having been obtained in this sector, the Russians commenced a new operation to cross the Donets further north and still another further down the river. The latter attack followed the Axis forces which, having completed the counterattack east of the Donets, withdrew across the river. Both Russian attempts succeeded in crossing the Donets, one near Izyum and the other east of Shakhty. The two forces moved to the south and west respectively. Russian armored troops from Izyum reached the line Barvenkova—Lisichansk on 6 February, and some Russians reached Kramatorsk on the 7th, with Axis troops still at Slavyansk. A German division with about 100 tanks attacked the Russians north of Kramatorsk, going east toward Slavyansk, the garrison of which had been ordered to attack west, join the relieving force, and withdraw with it. A very heavy engagement resulted. The German attack toward Slavyansk and the attempt of the garrison to attack westward met opposition from in front and from both flanks. But the German attack went through, the armored forces piercing the intervening enemy lines with a loss of about 30 tanks. The Germans also lost heavily from the attacks on their flanks, but part of the garrison made good its escape while the Russians entered Slavyansk.

Strong Axis attacks were delivered against the Russians at Kramatorsk on 9 February; these succeeded for the time in holding the Russians to this vicinity. West of Izyum the Russians found less opposition; they reached Lozovaya on the 11th. Their forces on the south Donets received aid from the Caucasus armies, which crossed the Don northeast of Novocherkassk on the 11th and advanced toward Rostov. A general Russian attack on the 12th, south of Kamensk, drove the Axis back to the line Likhaya—Zverevo by the 13th and to beyond Shakhty on the 14th. This cleared the railroad from Kamensk to Rostov.

An independent Russian attack across the Donets (also on the 14th) secured Voroshilovgrad, which is an important industrial center. Russian attacks near Kramatorsk, however, failed to gain ground. An advance by a Russian force from Lozovaya reached Pavlograd on the Samara River on 20 February.

The situation at this date was that the Axis was holding an industrial and mining center in hilly and rough country in the south Ukraine, along the general line Pavlograd (Russia)—Kramatorsk (Russia)—Artemovsk (Axis)—Sergo (Axis)—Pervozvanovka (Axis)—Taganrog (Axis).

* * * * *

There is no reliable information as to losses in the south Ukraine campaign. Indications are that they were not unduly severe for either side. The net result was that the Russians, in about one month, made a maximum advance of about 75 miles and an average advance of about 30 miles across the Donets River.

NORTH UKRAINIA AND VICINITY

On January 16, 1943, Col. Gen. Philip I. Golikov commanded a group of Russian armies holding the line Voronezh (in part)—Liski (inc.)—Ostrogzhsk (exc.)—Aleksievka (exc.)—Valuiki (inc.). This front formed almost a right angle at Liski. Gen. Golikov decided to attack the south branch of this angle, with axis of advance along the general line Aleksievka—Kursk. The front opposed to the proposed attack was a new one, not yet well organized. Prior to January 12th, the front had been south from Liski along the Don River. On that day, notwithstanding that the Axis had had six months in which to fortify this line and had in fact erected an elaborate system of defense of wire and obstacles, it had been broken through in a few hours. This had been accomplished by a tremendous artillery preparation which flattened the defense and destroyed (or drove out) the garrisons. The Russians had employed the next few days in exploiting their initial success, in establishing a new line with a different orientation, and in displacing their batteries forward with ammunition for another preparation for the next operation. Everything was ready, and it was hoped before the enemy was established in his present position.

The front of attack covered about 50 miles from southwest of Budenovsk to northeast of Ostrogzhsk. The Axis held this front with the following force:

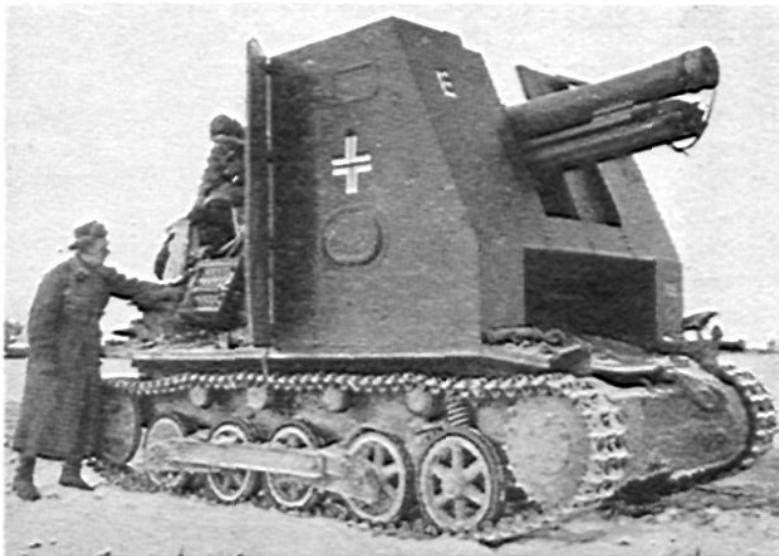
	Divisions	
Hungarians	9	5th, 6th, 7th, 9th, 12th, 13th, 19th, 20th, 23rd.
Italians	4	2nd Alpine, 3rd Alpine, 4th Alpine, 156th.
Germans	8	188th, 385th, 387th, plus 5 not identified.
Total	21	

These troops, recently defeated and forced back, were below strength.

On January 17th, a violent artillery preparation was opened over the front of the attack. Russian villages are easily prepared for defense, and are difficult obstacles for infantry to assault. The artillery concentrated on opening passages between selected villages for armored troops, who at the proper moment dashed forward through these openings and reached the enemy's rear areas. Here they fanned out, attacking villages and towns from flanks and rear. Aleksievka was taken, but the attack on Ostrogzhsk failed. With this exception the attack was a great success, many prisoners being taken and a considerable advance made. The battle continued on the next day with a general advance to the northwest. Ostrogzhsk still held out, but

the Axis line otherwise crumpled. In two days the Russians report having taken prisoners as follows:

Hungarians	22,000
Italians	7,000
Germans	2,000
Total	31,000

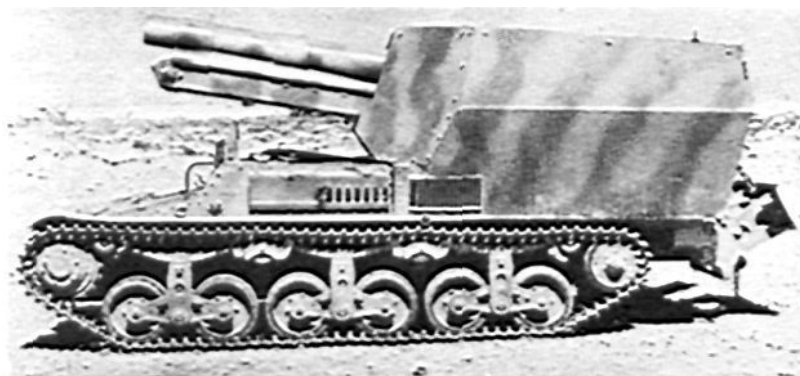


Germany's self-propelled guns show improvement. Older models, like this one captured in Russia, are high, unwieldy, relatively low-powered (here a Mk. I tank chassis is used). By contrast . . .

On the 19th 5,000 more prisoners (mostly Italians) were taken. Ostrogzhsk fell on the 20th. Rapid movements of armored troops encircled enemy bodies attempting to withdraw. All Russian units were supplied with sufficient artillery to enable them to overcome any ordinary resistance. Armored divisions had self-propelled artillery and contingents of motorized infantry and so were able to attack any enemy forces opposing them. German hedgehogs, which previously held out for long periods and thereby blocked lines of communications and of supply, went down within from a few hours to two or three days under the fire of heavy batteries now available in large numbers.

By the 23rd the Russian advance had gained an average of 22 miles and the number of prisoners had increased to 64,000, or approximately 30% of the entire estimated enemy combat force. This indicated that further serious opposition was not to be expected. The Russian armies were now given new objectives. The right wing was ordered to march west through Staraya Oskol, the left wing southwest toward Kupyansk. The Russians were using large numbers of air sleds with airplane motors, for reconnaissance and for supply. When all other transportation broke down these air sleds functioned. On open ground they could make a mile a minute. Snow rafts, carrying 12 men with equipment, were also employed, but these had to be towed by a tractor or truck.

On the same day the German High Command ordered a withdrawal of the front from Voronezh northward toward Orel, to a new front to be established east from Kursk. The initial movement was to commence that night; troops east of the Don would move straight to the rear from Voronezh toward Kursk. Involved in this maneuver were the German 45th, 57th, 68th, 82nd, 299th, 323rd, 340th, 377th, and 383rd Divisions—9 in all. These were infantry divisions, apparently second class divisions holding what had been a



... this piece recently captured in North Africa seems much more workable. Caliber has been stepped up to 15-cm., silhouette is down. Chassis is French—perhaps Renault. Note the retractable spade to add stability when firing.

stabilized and reasonably tranquil sector. Under cover of weak rear guards, they got away during the night of 23/24 January and were not interfered with during the following day. On 25 January a new Russian attack was launched, through Voronezh north and south of that town and extending over a front of some 60 miles. The weak rear guards were overrun and mostly captured. Armored forces, assembled hastily during the 24th, went through gaps made by the artillery on the extreme flanks; the northern one passed through Zemlyansk, 30 miles northwest of Voronezh, and the southern one came from the right of the forces which had taken Ostrogozhsk; 11,000 prisoners were taken this day. Zemlyansk had not been evacuated by the Axis, and they held part of that place at the end of the day.

On the 26th the Russians fired a great artillery preparation against Zemlyansk and sent on a wide circle armored troops who later attacked that town from the west and southwest. Under this combined attack, the place fell.

The Russians now commenced another maneuver. Their plan was to encircle the slow-moving infantry divisions which were retiring, still in good order, from the old Voronezh front. The armored forces on the north were ordered to proceed from the vicinity of Zemlyansk, by-pass Kastornaya (known to be defended), and seize Lachinovo, a small station on the railroad 7 miles west of Kastornaya. The armored forces from the south were ordered to proceed to the same area, establish liaison, and then proceed jointly to attack Kastornaya and then block the retreat of the slow

infantry divisions. Very strong Axis air forces appeared during the day to attack everything moving. It was found impossible to make much progress with the contemplated maneuver until after nightfall, when the armored troops moved out. Avoiding conflicts as incompatible with their mission, both armored forces passed west of Kastornaya and joined near Lachinovo. On the morning of the 28th they attacked and seized Kastornaya with 2,000 prisoners and a division CP, though not without serious fighting. They then proceeded eastward to block the slow infantrymen. The distance from Voronezh to Kastornaya is about 60 miles. Infantry should have been able to cover this distance within five days; it is not known why they did not: presumably they did not expect the Russian maneuver and were intent in maintaining an orderly and dignified retreat. On the 28th, still east of Kastornaya, they unexpectedly found themselves encircled. On January 29th, the Russians attacked this surrounded German force from all directions and mercilessly shelled, bombed, and attacked them.

In the meantime, the Russian advance from the Ostrogozhsk area was proceeding. It arrived near St. Oskol and captured the remnants of the three Italian Alpine divisions, together with all three division commanders.

The battle east of Kastornaya continued on until the 4th of February, after which date the Russians fail to report it. Up to that day the German losses were reported as totaling

Killed	17,000
Prisoners	27,500
Guns	516
Tanks	143
Trucks	1,217

Making allowance for corps and army troops (including services) which would normally be present with 9 divisions and the usual number of guns, tanks, and trucks for a force of this size, it would seem that some of the Germans escaped—probably as many as 20,000. Even with this number the Germans suffered a serious defeat. In addition to the 27,500 prisoners noted above, the number taken on the south attack (including the Italian Alpine divisions) now amounted to 84,000.

Without waiting for the final extinction of surrounded enemy groups, the Russians pushed two advances, one west from Kastornaya toward Kursk and the other from the vicinity of Valuiki toward Kharkov. The latter was directed to encircle Kharkov from both north and south rather than make a frontal attack.

After the severe and in fact disastrous defeats along the Don on January 12th, near Ostrogozhsk on the 17th with the succeeding pursuit, and the disaster to the 9 slow infantry divisions east of Kastornaya, the Axis did not have troops left to defend Kursk. Nothing better

than demolitions and delaying actions were possible until new divisions could be brought up.

With very serious fighting, the Russians on the south occupied Kupyansk on February 3d and Shahigry and Tim (east of Kursk) on the 4th. St. Oskol, which had a hedgehog defense system, went down before the Russian heavy artillery on the 5th. Large numbers of Axis stragglers and detachments were picked up. The northern armored forces by-passed Kursk and reached Fatezh on the 7th. Everywhere large quantities of stores were captured. On February 9th Ponyri (north of Kursk) and Belgorod (north of Kharkov) were captured, the latter after a severe fight. Shebekino fell on the same day, and the Russian lines around Kursk and Kharkov gradually contracted. German reinforcements arrived at Kharkov; it was obvious that a fight would be made for this city. The first serious opposition came on the 10th, but did not prevent the Russians from taking Chuguev and Volchansk.

It was now decided to attack Kharkov from all sides, making the main effort from the north by an armored force marching south from Belgorod, while only holding attacks would be made on the east and southeast. Although the Russians claim that this plan succeeded, the available accounts indicate that it did not quite work out as expected. The holding attacks were made and conducted as planned, to the east and southeast of the city. The main attack met considerable opposition, but on the 14th it reached the north exits of Kharkov, where it was stopped. Next day there was violent street fighting. The Germans turned the left of this force and began to roll it up. Night ended this battle.

On the 16th it was snowing hard but the battle was renewed all around Kharkov. The holding attacks continued to demonstrate, and the northern Russian attack continued to meet strong opposition against which its utmost endeavors made only slight gains. Unexpectedly a Russian force had passed around the city to the west and entered with heavy tanks from this direction—reaching the center of the city before it met effective enemy forces. A German Elite Division almost immediately counterattacked this new enemy and threw it out of town, but the local commander decided that the combination against him was too strong. He made an able withdrawal during the remainder of the day and the ensuing night, evacuating the city by the southwest exit while the Russian holding attacks continued to hold. On the 17th the Russians entered Kharkov; the German garrison, which appears to have been two 1st class divisions plus 1 panzer division, cleared off a Russian regiment in their way south of the city and made off.

The Russian advance on Kursk met only slight opposition. That large city was entered on February 8th. The Axis had not yet been able to assemble large forces in this sector.

By February 20th the line of Col. Gen. Golikov's armies was about Livny—Ponyri—Fatezh—Lgov (exc.)—Pena—

Gotnya (exc.)—Graivoron—Valki (exc.)—Lozovaya—all inclusive except as noted.

* * * * *

COMMENTS ON THE RUSSIAN WAR

1. During the month ending February 20th, the great Russian success was by the armies which seized Kursk and Kharkov, accomplishing an advance of about 150 miles plus the recapture of Stalingrad. The Axis losses are rather accurately known as around 330,000 for the latter battle. They are not accurately known for the other major campaign, but appear to have been not less severe than at Stalingrad. If to these losses are added those in other sectors, the total Axis loss will amount to at least 700,000, of which probably not over 100,000 wounded will later return to the colors.

2. The Axis is aware of the danger caused by these losses. New troops are being raised in Germany and in its vassal states. It has been reported, but not confirmed, that these will amount to 3,000,000 men. This number, although not certain, is possible. Of this number all of the lost divisions, amounting to about 40, are (according to German announcements) being reconstituted. These are not likely to be ready for the field until next June, and may be held in GHQ Reserve. With corps and army troops and services, this will account for 500,000 men, and can be counted upon to permit the release of some divisions from France, the Balkans, etc., for immediate employment in Russia. Any balance, which may be as high as the 2,500,000 men stated to be in process of being raised, could commence to arrive in line about March 1 as replacements in considerable numbers. It can therefore be expected that the Axis army in Russia will increase in strength from about this date.

3. German generalship has not been good throughout. The loss of Stalingrad following the preceding defeats along the Don and west thereof, and the defeats southwest and west of Voronezh, indicate poor leadership. On the other hand the Axis retreat out of Caucasia appears to have been well handled. Russian leadership has been excellent, and is a vast improvement in comparison with that shown in the early part of the war. The German mistake appears to have been under-estimation of the Russian strength. Whether this was due to failure of the Intelligence Section of the General Staff or was due to rejection of its reports by someone is not yet known.

4. The Axis defeat is serious but not necessarily irreparable. Just as the Russians staged a come-back after what appeared to be disastrous defeats, so is it possible that the Axis may do the same. It will be necessary to watch closely, and not assume that the war is nearing a conclusion and will shortly be over. This is a possibility, but not a certainty.

5. An outstanding cause of the Russian success has been the strong increase in artillery of divisions and higher units, which artillery stays in line, with mobility capable of following the type of division to which it is attached. Against the Russian heavy artillery, the usual type of field fortification has become nearly useless.

6. Both sides in this war are increasing the percentage of armored and motorized troops. The danger of having a large block of foot troops in line is shown by what happened to the slow German infantry divisions around Voronezh. The present tendency in modern tactics is to reduce foot troops to a minimum.

7. Reports indicate that guns and tanks in line are steadily becoming larger. The small gun—75-mm, or less—and the small tank still have restricted uses. In battle they cannot stand against the larger guns and the larger tanks. How far this increase will go is not yet known, but the end is not in sight. For battle, each side is attempting to have a larger number of big guns and big tanks than the other side. This race is definitely on.

Division Artillery Radio Nets in a Defensive Situation

By Capt. Misha N. Kadick, FA

In the fixed defense of a particular sector, wire is the primary means of communication. This normal means of communication is disrupted when the shoreline or sector is under attack. This disruption (which has been experienced in Singapore, Burma, and other areas) is caused by (1) knocking out of field wire and cable by bombing prior to and during the actual ground attack, and (2) cutting of wires by saboteurs. This latter can be depended upon to occur simultaneously with the attack.

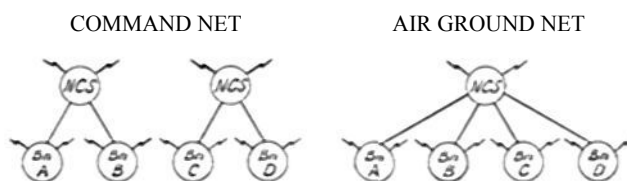
In order to maintain continuity in communications, therefore, it is necessary to have a well-worked-out SOP for radio procedure. To prevent a break in the continuity of communications an SOP might require that NCS and all other stations in the Division Artillery Net turn receivers on at the first information of air attack, landing, or any enemy activity whatsoever. There would be no transmissions unless wire is out, and then the usual precautions would be strictly enforced. A sharp eye must be kept for nearby enemy aircraft, and transmissions should be short. The usual procedure of establishing the net must be foregone until danger of air attack has passed—otherwise stand-by with receivers on will suffice. This requires the calibration of all sets to be checked continually.

If the normal procedure is to establish the radio net after wire communication has failed, there will undoubtedly be a long period during which there will be no communication unless it is visual or by messenger. This delay cannot be tolerated during such a critical time.

In order to insure the proper execution of SOP at the

proper time, it is necessary to have radio exercises as frequently as possible. Each point of procedure should be drilled to the point where it is second nature to everyone concerned. It cannot be expected that SOP be planned and written and then executed in the proper manner at the proper time unless it is continually practiced; the plan of operation must be very familiar to all communication personnel.

A few words with reference to the organization of the Division Artillery radio nets. Some have found the normal setup of one NCS for the entire net of four or more secondary stations to be unsatisfactory. One possible solution is as indicated on the diagram:



This organization is capable of standing up under the pressure of any desired amount of traffic: It provides means of handling more than four battalions whenever necessary. Often, in a situation such as this, there are battalions attached to the Division Artillery in addition to the organic four. The difficulty experienced with only one NCS, even though there are two separate nets, is that stations, when under heavy pressure at the breakdown of wire communication, are unable to clear the proper amount of traffic to NCS.

FIRING TABLES VS. RANGE QUADRANTS

From the Southwest Pacific comes this logical question: "Is there any physical reason why the firing tables for the 105-mm, howitzer do not go above 1164 mils elevation in the higher charges, when the range quadrant operates to 1212 mils?"

An authoritative answer is that "the physical reason for the limitations is based on the maximum elevation prescribed and for which the carriage is constructed, which is 65° or 1156 mils. The range tables are carried one step, approximately 100 yards, beyond the maximum of 1156 mils in order to permit interpolations of values for the maximum elevation.

"The excess of possible quadrant operation for some 50 mils beyond possible elevation of the carriage is merely to provide space for positive and free movement in setting the quadrant, so that it will not run against a stop right at the maximum elevation."

SENDING HIS 2-YEAR RENEWAL

a Battery Commander abroad writes: "Damn good article by Commo [page 884, Nov. '42 JOURNAL]; his setup works well here in North Africa. If my experience is of any value, travel as lightly as possible, as you will lose most of your stuff in campaign anyway."

THE SANDS GRAPH

By Capt. H. I. Holdeman, FA

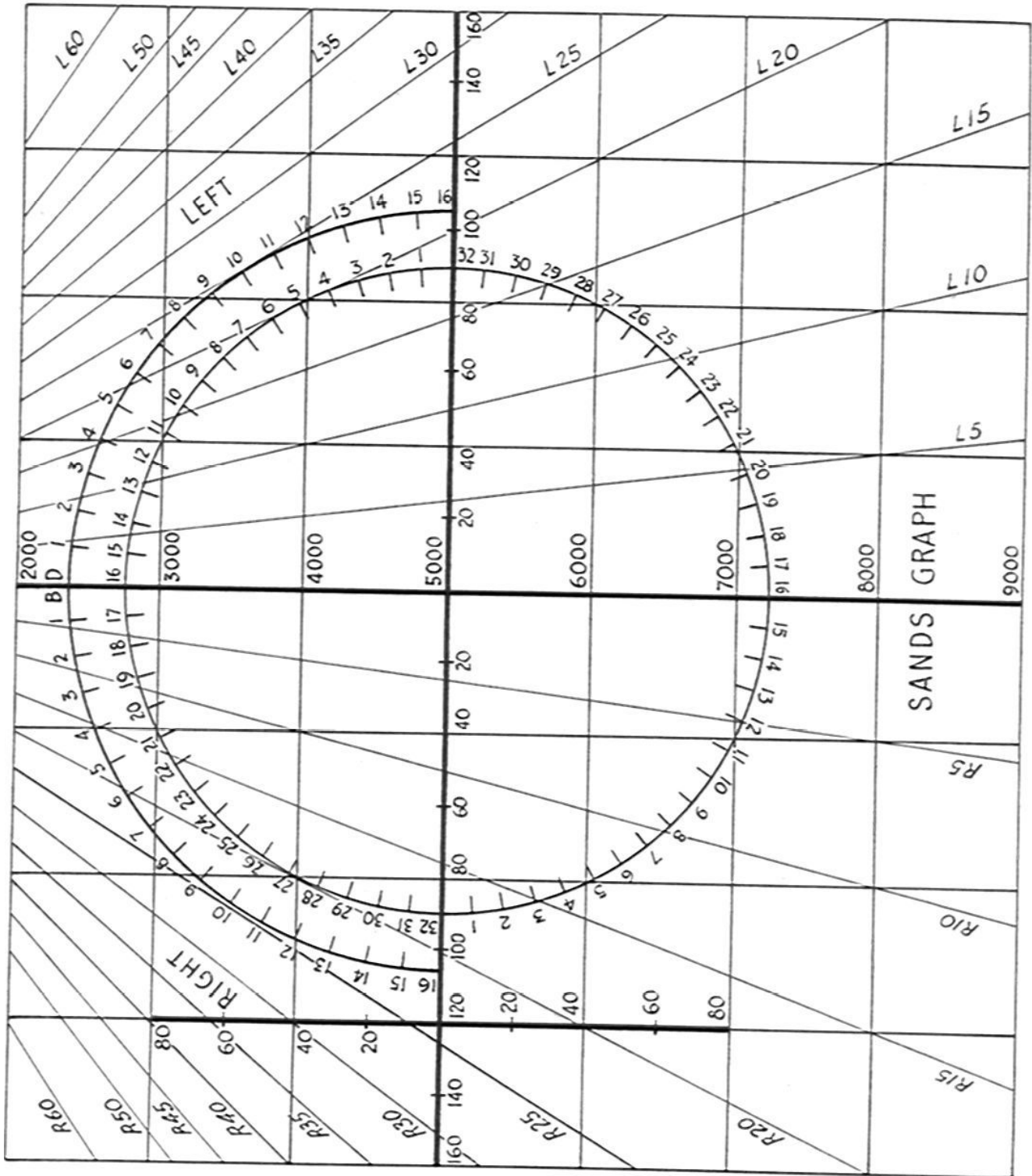


Figure 1

With many long months of campaigning against an enemy with air superiority, the British officers had learned the folly of placing their guns in a straight line with an interval of only 20 to 25 yards between pieces. All gun positions I observed in Libya were in a diamond-shaped formation with an interval from 75 to 100 yards. With guns in such staggered positions the value of a mechanical means that, in the hands of an experienced operator, will give the deflection differences for each gun as fast as the readings can be called off, soon made itself apparent. Another thing that enhanced the graph's value was that it automatically made corrections for obliquity, which is not done in our present method of converging a battery.

In our newly organized armored artillery we have been placing such heavy emphasis on speed that we have sacrificed some of our accuracy. Yet despite all of our plans for attaining speed we have included in our training a certain amount of precise tactics so that we always will be able to deliver any kind of fire within the capabilities of our weapons. Consistent with this training, along with our rule of thumb methods of converging a battery we must have a precise method of taking under fire point targets, such as dug-in CP's, ammunition dumps, and gun emplacements.

The Sands Graph furnishes this precise method. As used by the British it is ideal for a four-gun battery with the base piece on the right, but required a few changes before it could be adapted to our six-gun batteries with an interior gun as the base piece. The procedure for making and operating the modified graph are outlined in the following paragraphs.

CONSTRUCTION

To construct the Sands Graph one needs a plywood board, a sheet of celluloid, and a sheet of cross-section paper, all measuring 8 x 10 inches. The cross-section paper should be marked off into 1" squares and each square divided into 100 smaller squares. A washed X-ray photograph can be used for the sheet of celluloid.

The sheet of cross-section paper is placed so that one of the 10" sides is designated as the top and one as the bottom (Fig. 1). A heavy range line is then drawn in the center of the sheet from top to bottom, marked off at 1" intervals and graduated in yards from 2,000 to 10,000 using the scale of 1,000 yards per inch. On the 5,000-yard line, selected arbitrarily, a heavy dispersion line is then drawn from right to left, marked off at 1/2" intervals, and (starting with zero at the center) graduated right and left in yards using the scale of 40 yards per inch. Three inches to the left of the range line, a vertical dispersion line is drawn extending two inches above and below the horizontal dispersion line. With zero on the horizontal dispersion line, it is also marked off at 1/2" intervals and graduated in yards using the scale of 40 yards per inch.

With the intersection of the range line and horizontal dispersion line as the center, draw a dispersion circle with a

diameter of 4 1/2". Mark the circle at 100 mil intervals, and with the origin at the point where the right side of the circle crosses the horizontal dispersion line, graduate both the upper and lower half of the dispersion circle from 0 to 3200 in a counter-clockwise direction. With the same center as that used for the dispersion circle, draw a deflection semi-circle above the horizontal dispersion line, using a diameter of 5 1/4". Mark off the deflection circle at 100 mil intervals and, denoting as Base Deflection the point where the deflection circle crosses the range line, graduate to the right and left from 0 to 1600; about 800 mils to the right of 0 print the word LEFT and 800 mils to the left of 0 print the word RIGHT just above the graduations.

Using the mil relation you will find that an opening of 5 mils produces a deflection of 20 yards at a range of 4,000, and of 40 yards at a range of 8,000. On the chart mark the intersection of an extension of 20 yards on the dispersion line and 4,000 yards on the range line, also the intersection of an extension of forty yards on the dispersion line and 8,000 yards on the range line, on both the right and left halves of the chart. Draw a deflection line through the two points on each side of the range line from the top to the bottom of the chart. Since the mil relation is a straight-line formula it can readily be seen that for any point on the line a shift of 5 mils will give a deflection in yards shown at the range indicated by extending the point horizontally to the range line and vertically to the dispersion line. The deflection line on the right is marked L5 and the one on the left marked R5. In like manner additional deflection lines at 5 mil intervals can be drawn to include up to 50 mils.

The chart can then be pasted to the plywood board and water-proofed with shellac.

The sheet of celluloid is used to make a transparent indicator sheet (Fig. 2). Place it over the graph and with a sharp needle scratch two lines at right angles across the sheet of celluloid so that they will coincide with the range and dispersion lines. Scratch an arrow indicator at the top on the range line so that it is just below the deflection semi-circle.

A small case can be made from scrap canvas to carry both the chart and indicator sheet.

One more step is needed before the chart is ready for use. The battery executive must make up a chart showing the changes in elevation necessary to bring the bursts of his guns up on a straight line. The table in Fig. 3

RANGE DISPERSION IN YARDS											
Range	Ch	10	20	30	40	50	60	70	80	90	100
1700	I	1	3	4	6	7	8	10	11	13	14
2500	I	2	3	5	7	9	10	12	14	15	17
3000	II	2	3	5	6	8	9	11	12	14	15
3600	III	1	3	4	5	7	8	9	10	12	13
4300	IV	1	2	3	4	5	6	7	8	9	10
5500	V	1	2	2	3	4	5	6	6	7	8
6900	VI	1	1	2	3	4	4	5	6	6	7
8500	VII	1	1	2	2	3	4	4	5	5	6
10000	VII	1	2	2	3	4	5	6	6	7	8

Figure 3

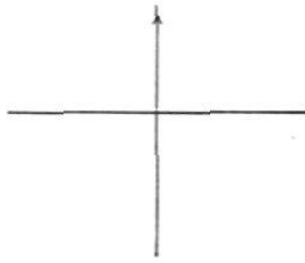


Figure 2

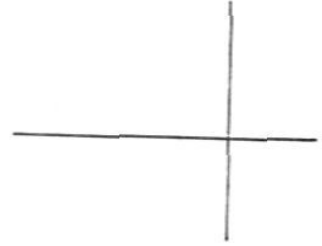


Figure 5

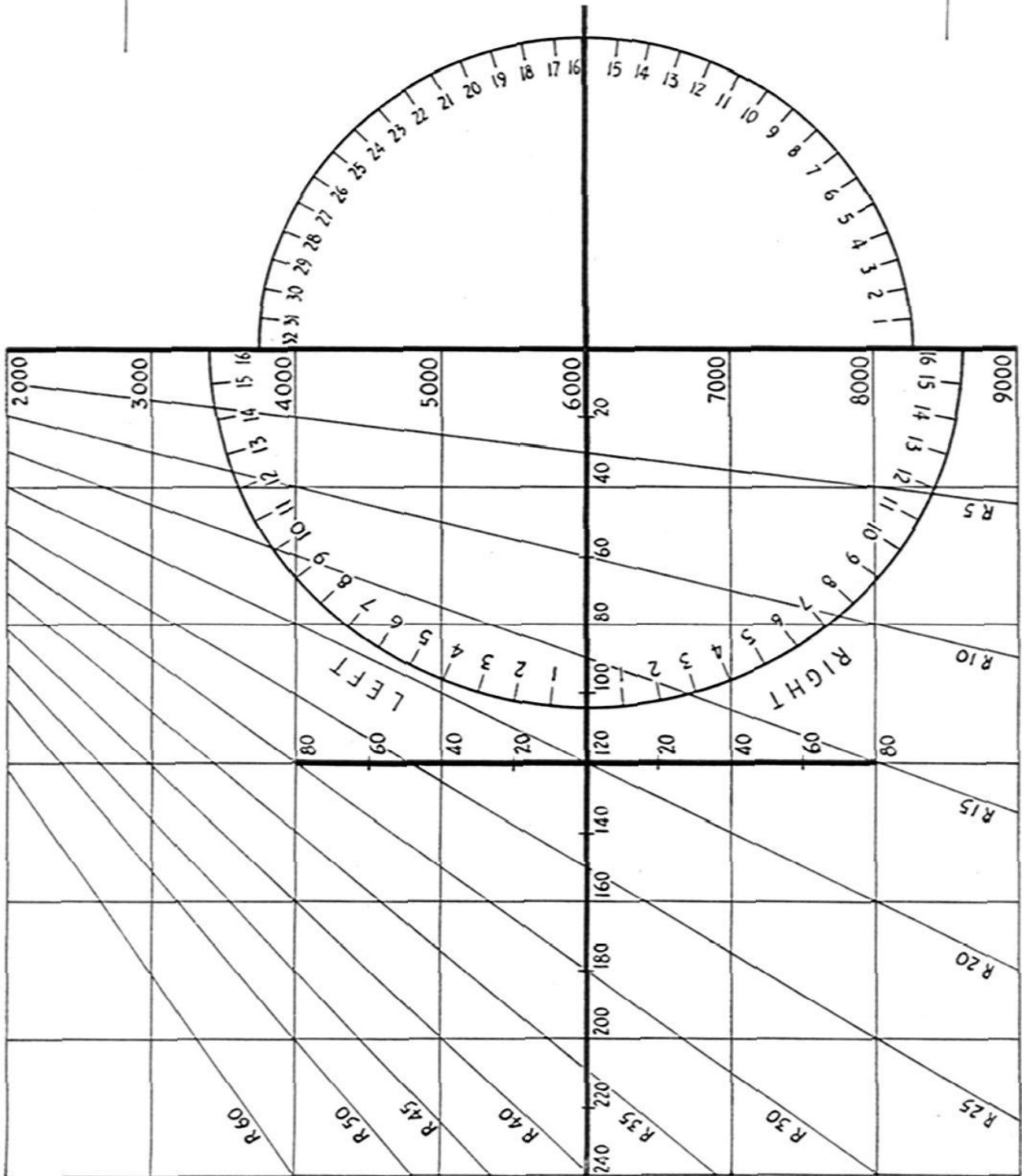


Figure 4

for the 105-mm. howitzer should be pasted on the back of the executive's firing table. It is made by listing the change in site that can be applied to each gun to correct for depth dispersion. To avoid too complicated a chart, the corrections are figured for one range for each charge and used for all ranges for this charge. The range selected is the range midway between the $\frac{3}{4}$ range for the charge in question and the $\frac{3}{4}$ range for the next lower charge. It can be readily seen by inspection of the firing tables that with proper selection of the charge the error will be well within the limits of dispersion of the gun.

OPERATION AND USE

The use of the chart can be best explained by following through a type problem. The battery has been moved into position and adjusted on a target to be used as a B.P. At the command of the executive, each gunner refers to the base piece and reads his deflection. At the same time one of the cannoners from each piece paces the distance to the base piece. The executive writes these deflections and distances for each piece in one corner of the indicator sheet with china marking crayon. The figures thus recorded are as follows:

No. 1—2258 μ —63 yds.
 No. 2—3050 μ —87 yds.
 No. 4—2020 μ —50 yds.
 No. 5— 510 μ —86 yds.
 No. 6—1270 μ —78 yds.

These figures are now used to place on the indicator sheet a graphical representation of the gun position as it is on the ground. Mark the position of the base piece on the indicator sheet at the intersection of the two lines. Working with the dispersion circle, using the upper half for all pieces to the right of the base piece and the lower half for all pieces to the left of the base piece, the position of No. 1 is marked by moving the indicator to 2258 on the upper half, approximating the last two digits, and plotting the position of No. 1 63 yards to the right on the dispersion line. The indicator is next moved to 3050 and the position of No. 2 plotted at 87 yards. No. 4 being to the left of the base piece, the indicator is moved to 2020 on the lower half of the dispersion circle and its position plotted at 50 yards. All gun positions are plotted to the right regardless of their locations with respect to the base piece. Nos. 5 and 6 are similarly plotted. The gun positions may be plotted as soon as the battery is laid, but if after adjustment the base deflection differs by a great amount from the referred deflection, the positions must be replotted after adding the correction to each reading.

The forward observer reports a dug-in antitank gun to be knocked out. When its position is plotted on the firing chart the shift is found to be BDL 507 and Range 6920. With the use of the Sands Graph the shifts to converge the battery and the changes in site necessary to bring the bursts on the

same line can be given to each gun while the base piece is adjusting.

With the indicator sheet over the graph and keeping the location of the base piece immediately over the intersection of the range and deflection lines throughout the entire operation, rotate the indicator sheet in a clockwise direction until the indicator is pointing to BDL 500 on the deflection circle. From the position of No. 1 on the deflection sheet follow the cross-section lines on the graph vertically to the 7000-yard range line. Interpolating by inspection between the two nearest deflection lines, it is seen that a shift of L5 is needed to converge No. 1 on the base piece. By referring horizontally to the vertical dispersion line it is found that No. 1 has a range (to the nearest 10 yards) 60 yards greater than the base piece. So as not to affect the elevation, a minus site is needed to correct for this and bring the bursts on the same line. Consulting the table in Fig. 3, it can be seen that for Charge VI used at this range the correction will be minus 4 μ and the site to be read to No. 1 is 296. Following the same procedure, the deflection and site corrections for each piece are as follows:

No. 2—R4, Site 294
 No. 4—R7, Site 303
 No. 5—R12, Site 396
 No. 6—R16, Site 301

Use of a transparent straight edge will facilitate the reading of the chart.

It will be noted that with our standard procedure for converging a battery No. 2 would have shifted to the left, whereas the true shift is to the right.

The range of the graph can be made to cover the entire range limits of the gun, but as it is laid out here it can be used for the extremes by dividing by two the figures obtained at 5,500 for a range of 11,000 yds., and doubling the figures obtained at 3,000 for a range of 1,500 yds.

ALTERATIONS FOR A FOUR-GUN BATTERY

For the majority of artillery in our army (composed of four-gun batteries that go into position with the base piece always on the right) Figs. 4 and 5 show respectively the original Sands Graph and Indicator sheet as used in the British Army, with the exception that the range dispersion line is added.

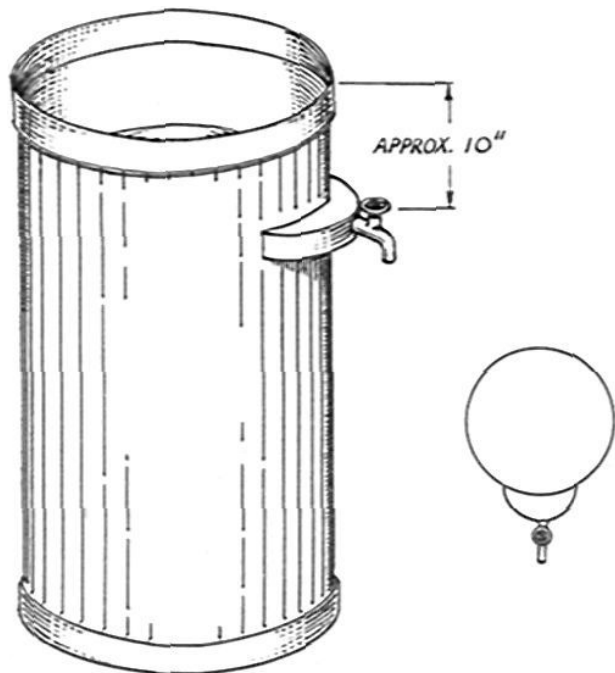
The principles involved in its construction are the same. Since all guns are to the left of the base piece, only those deflection lines to the left of the range line are needed. The dispersion circle has become a semi-circle entirely to the right of the range line, with the mil graduations counter-clockwise with zero at the bottom. The part of the dispersion line to the right of the range line is used as an indicator. The deflection circle has shifted to the left by 1600 mils to be entirely to the left of the range line. The dispersion line to the left of the range line is used as an indicator for base deflection shifts.

Not in the BOOK

DE-GREASING

Next time you see mess-kits being washed in GI cans, notice the quantity of grease on top of the water in the last (clear water) can after 25 or 30 men have washed their mess-kits. It is practically impossible to withdraw a mess-kit from this water without having a fine film of grease over it. This grease will quickly become rancid, and many men will suffer from diarrhea within a very few days.

This upper layer of water can be readily drained off after every 15 or 20 men have washed their mess-kits, if a wide mouth spigot is mounted about 3" below the water line. The spigot must be large enough to carry off water and grease at the same time, otherwise the grease-removal will not be complete. Fresh water must of course be added to raise the water level again.



EDITOR'S NOTE: *This feature is devoted to ideas sent in by our readers describing methods or devices which, though not specified by official literature, have proved useful in service.*

CAPT. JOHN F. LARRICK, FA

A RADIO SEEKS COVER!

For field work two of our new radios are fairly well protected against the elements in the Command Car installation, but the most beautiful baby of all is poorly situated in the quarter-ton, which can become a veritable bath tub in rainy weather.

The attached pictures describe a solution to the problem. These canvas gadgets remind us of a typewriter cover plus a flap for access to the radio controls. They are made up with enough slack to allow shrinkage and quick removal. A 1" hole accommodates the portable aerial when the set is removed for ground operation. Two snaps to hold down the operating panel flap are an added improvement, but not essential. This cover also gives protection to the vibrator pack while the vehicle stands idle in the motor park.

Our Camp Canvas Repair Shop made up sixteen from salvage canvas during spare time, providing two spares in a light battalion. If your people claim "no spare time," try cigars.

LT. JOHN W. COYNE, JR., FA



VISUAL AIDS

of interest to Artillerymen have been released, as noted:

Training Films

- 5-991—Explosives and Demolitions—Bangalore Torpedoes
- 17-1006—Attack and Defense of Road blocks
- 21-1018—Keep It Clean (Fighting Men series)
- 21-1019—Crack That Tank
- 21-1028—Heroes (Fighting Men series)

Film Bulletins

- 50—Schnelle Truppen
- 56—Western Battle Front

Diary of War Events

(As Reported in the American Press)

FEBRUARY, 1943

- 1st U. S. tanks and infantry in Tunisia attack the Germans at Faïd Pass while two other columns begin a pincers effort against Maknassy.
- 2nd Jap sea and air forces launch effort to regain control of Solomons area.
German war losses estimated as 4,000,000 killed, captured, or permanently incapacitated.
U. S. forces in Central Tunisia drive Germans out of Sened station.
- 3rd Germany's position on the whole southern Russian front becomes perilous.
R.A.F. bombs Cologne factories.
- 4th Russian troops advance within 35 miles of Sea of Azov, now control all principal routes to Rostov.
British subs sink 10 Axis ships along enemy's supply line to Tunisia.
Flying Fortresses shoot down 25 German planes during raid on Germany.
- 5th Russians continue to push ahead in Caucasus and Ukraine.
Jap torpedo planes attacked U. S. convoy south of Guadalcanal last week; 17 planes were shot down; all of our ships got through.
- 6th Russians advance within 5 miles of Rostov.
British subs sink 3 Axis supply ships in Mediterranean.
Brazil declares war on Japan.
- 7th Soviet troops occupy Azov.
On Guadalcanal U. S. troops occupy Titi, 5½ miles west of Cape Esperance, flanking last Japanese strongholds.
- 8th British bombers raid Lorient, German sub base in western France.
U. S. bombers from Africa raid Naples harbor. In China they were active along Yunnan-Burma frontier.
Sixty Jap planes raid Kweilin, China.
- 9th All enemy land resistance ceases on Guadalcanal.
In China a major battle is under way on the Yunnan-Burma frontier.
U. S. bombers strike various points in Tunisia, attack Messina (Sicily), bomb Rangoon.
- 10th British Eighth Army advances into southern Tunisia.
Our Navy reports U. S. planes sank at least 2 Jap destroyers (perhaps 5) in Solomons duel.
- 11th British Eighth Army clashes with Rommel's troops.
General Eisenhower given command of all North Africa Allied forces, is promoted to full general.
Japs retire toward Mudo (12 miles from Salamaua), beaten by MacArthur's forces in Wau region.
- 12th Russians continue unchecked advances in Ukraine and Caucasus.
Snow restricts ground activity in Tunisia.
R.A.F. raids naval base at Wilhelmshaven.
- 13th Soviet forces within 11 miles of Kharkov.
British repel German attack east of Ousseltia.
- U. S. planes in the Solomons make 3 attacks on the Jap base at Munda, and 1 on Kolombangara.
- 14th Germans admit both Rostov and Voroshilovgrad fall to Russians.
British planes raid German sub base at Lorient.
Allied planes over Tunisia downed 6 German transport planes. U. S. forces suffer sharp setback.
U. S. Navy reports 6,066 Japs killed and 127 captured in final Guadalcanal drive.
- 15th British bombers attack Cologne, Milan, and the naval base of Spezia.
U. S. Air Force shoots down 11 Zeros in Shortland Islands area.
- 16th Russians recapture Kharkov.
Britain-based U. S. bombers raid sub base at St. Nazaire.
In Solomons, Navy reports 2 Jap destroyers sunk and probably 13 more damaged. U. S. cruiser *Chicago* reported sunk in Solomon engagement, 22 planes lost. Japs lost 60 planes.
- 17th German forces get clear-cut local victory over American troops in North Africa.
Russian troops continue to advance beyond Kharkov.
British bombers and fighters again raid Lorient sub base.
- 18th American troops retire to Tebessa in Algeria.
Creation of U. S. Sixth Army, comprising most of the American troops in Australia and New Guinea, is announced; CG: Lt. Gen. Walter Krueger.
- 19th Russians continue their drive north of Kharkov.
Allied bombers raid cargo ships and airdrome at Buin.
China slows down Japanese Salween drives.
- 20th British again bomb naval base at Wilhelmshaven.
- 21st U. S. Navy reports largest submarine, *Argonaut*, missing.
- 22nd Germans break through to within 4 miles of Thala, near Algerian frontier.
Two Axis supply ships sunk in Mediterranean by British subs and 2 more destroyed by British bombers in raid on Melos, Italy.
- 23rd Russian forces again break through west of Kharkov.
- 24th American and British troops in Tunisia supported by air power hurl Germans back into Kasserine Pass.
- 26th Allies force Rommel back in central Tunisia.
Wilhelmshaven is bombed again.
- 27th Heavy fighting continues in Northern Tunisia.
U. S. A.A.F. bombs Brest; British light bombers attack Dunkerque after major night raid on Cologne.
German counterattack halts Russian advance to some extent.
- 28th Allies continue to repulse German attacks in northern Tunisia.
British bombers attack France, the Netherlands, and Belgium.
Bitter fighting in Kramatorsk region.

BOOK REVIEWS

IDENTIFICATION. The Military Service Publishing Co., 1943. 326 pages; illustrated. \$2.00.

At last we have a comprehensive and clearly illustrated book on the world's military uniforms, insignia, and flags! The figures are no fashion plates—they're not meant to be; but they do show what goes where, and what it means. Navies and air forces are not neglected at all, but the emphasis does lie on army uniforms and insignia, with which our people will doubtless have more contact.

From Argentina to Yugoslavia, 58 countries are dealt with in three parts each. First is a brief summary of the chief political, economic, historical, and military data. Next comes a glossary of military terms with their American equivalents or (as in the case of Australia) a glossary of slang our men will encounter. Then are given the uniform and insignia illustrations—usually two or more for each country, one covering enlisted men and the other the

officers; these are so arranged that all grades are made clear, and branch or other special insignia as well.

Finally there is a magnificent color section. This includes insignia of our aviation squadrons; world aircraft wing and tail markings; a quite complete group of shoulder-sleeve insignia of our army and also of the Civilian Defense Corps; officers' insignia; and flags of the world.

Although this handbook is admittedly and necessarily a bit incomplete in spots, it is without doubt the best in its field. A copy should be in every headquarters and day-room, and soldiers abroad will find it doubly useful.

SIBERIA. By Emil Lengyel. 405 pages; index; end paper map. Random House, 1943. \$3.75.

Emil Lengyel knows Siberia and he presents its story to his readers in clear vivid language that gives it sturdy reality. His book briskly challenges the popular concept of Siberia as a frozen land of somewhat negative importance

NEW RESTRICTIONS

Under Post Office Department Order No. 19687 (Jan. 7, 1943) and War Department Circular No. 19 (Jan. 12, 1943):

a. "No parcel exceeding 5 pounds in weight, or 15 inches in length, or 36 inches in length and girth combined," may be mailed "to APO's overseas for individuals." (Note: This prevents our sending standard Graphical Firing Tables to such addresses.)

b. No parcels may be mailed "to APO's outside the continental United States unless they contain such articles only as are being sent at the specific written request of the addressee, approved by the battalion or similar unit commander of the addressee."

c. This request "will be in the form of a separate communication and will not be included in a letter containing extraneous matter." It must include "(1) a general description of name of the article requested and (2) the grade or rating, complete address, and signature of the individual (addressee) making request."

d. "The request will be presented to the battalion or similar unit commander who will approve it when the circumstances justify. Requests of officers and personnel not assigned to organizations or assigned to separate companies and detachments will be approved by the next higher headquarters or by the theater headquarters."

e. "The required certification of an officer will be indorsed on the request through use of the word 'Approved,' followed by the signature and grade of the certifying officer, together with indication that he is commanding a battalion or higher organization. In no circumstances will requests be approved by other than battalion or regimental commanders or other officers of field grade having supervisory authority over the individual making the request."

f. These restrictions do NOT apply to shipments to military agencies (including, of course, units).

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noted chiefly for political exiles. Its development in the past few decades has gone far beyond such grim and narrow limits.

From its early history up through the czarist regime its slight progress was marked by barbaric cruelty and selfish, politically short-sighted exploitation. But a new day dawned for Siberia with the inception of Soviet rule. The vastness of this great "sub-continent" has in it a lure of adventure with special appeal to such hardy types as explorers, pioneers, and political idealists, and these types are reflected in its social and economic development.

The Trans-Siberian Railway has become the line of the industrial march while the best agricultural land is in the west. Naturally there are still regions of sparsely settled land in the frontier stage of development. The raw growth and daring spirit of the country give it a half familiar pioneer flavor reminiscent at times of American history.

Altogether this is a lively book with warmth and color and vividness that one would hardly expect from the stark title—*Siberia*.

F. E. J.

MODERN CAMOUFLAGE. By Maj. Robert P. Breckenridge, CE. 268 pages; appendix; bibliography; index; illustrated. Farrar and Rinehart. \$3.50.

Protective concealment has received quite a boost, especially in the field of what may be called "industrial camouflage," which is the subject of this book. Unquestionably an expert in this field, the author approaches his job with enthusiasm. It is unfortunate, however, that so many of his illustrations rely on an artist's conception of emphasis, or on blurred photographs, to give the purported effect of different camouflage treatments. Surely enough progress has been made that the art (or science, if you will) of camouflage could stand up under sharp photography. *Modern Camouflage* will be of considerable value, however, to planners, architects, and industrialists, and some portions will benefit the armed services as well.

THE PSYCHOLOGY OF MILITARY LEADERSHIP. By L. A. Pennington, Romeyn B. Hough, Jr., and H. W. Case. 264 pp.; glossary; index. Prentice-Hall, Inc., 1943. \$2.95; text edition, \$2.25.

This is one of the most practical handbooks on the subject which has yet been produced, providing the officer with certain principles of action to which he may turn for the solution of military problems pertaining to the human element. The book reflects the experience of its authors: Mr. Pennington is Assistant Professor of Psychology at the University of Illinois; Lt. Col. Hough, U. S. A. (Ret.), is Librarian of the Army War College; and Mr. Case, Assistant Manager of Engineering

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★ Sale of the above books is limited to military personnel, and to other persons coming within the meaning of the classification "Restricted." These books are NOT available for purchase from appropriated funds.

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laugh." Proceeding on this simple rule, he subjects his stock of material to the test of whether it makes him "(a) laugh out loud; (b) chuckle; (c) smile broadly." He amiably suggests that if you don't like the finished product you can "make your own anthology," adding philosophically that "Indeed, everyone is, in a way, an Anthology." But the chances are that you will like it very much indeed, just as it is. At least with its astonishing variety of authorship there's bound to be something especially delightful for practically everyone. Some of the choicest gems of British wit from Chaucer and Shakespeare to present day writers are assembled in the 800 odd pages.

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A Subtreasury of American Humor is a repository of sparkling wit gleaned with double-team editorial discrimination from the works of American writers. Mr. White is a humorist of note. Katharine S. White, his wife, as an editor of *The New Yorker* knows humor when she sees it. Together they have done an outstanding job of assembling choice bits of American humor.

Their work is refined into classifications in deference to the subtle varieties of humor. First there are *Stories of People* with examples from Dorothy Parker, Mark Twain, and others; *Fables and Other Moral Tales*, inevitably featuring James Thurber; *All Sorts of Dilemmas*, in which Cornelia Otis Skinner discourses on *It's a Wise Parent; Parodies and Burlisques; Satire; Nonsense*; and a number of other classifications.

In a psychological sense these two volumes have a timeliness as appropriate as the latest serious texts on the prosecution of the war. They are a welcome change from the steady stream of war literature that in the nature of present international conditions is pouring from the press with frenzied claims for attention.

F. E. J.

THE WAR: FIRST YEAR. By Edgar McInnis. 272 pages; documentary appendix; chronology; source note; index; maps. Oxford University Press, 1940. \$2.00.

THE WAR: SECOND YEAR. By Edgar McInnis. 282 pages; documentary appendix; chronology; index; maps. Oxford University Press, 1941. \$2.00.

THE WAR: THIRD YEAR. By Edgar McInnis. 296 pages; documentary appendix; chronology; index; maps. Oxford University Press, 1942. \$2.00.

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North America	230	Western Pacific	280
South America.....	195		
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Mediterranean Lands.	124		

*Oceania, 463; Australia, 240; New Zealand, 77.

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balanced, and highly readable, it sorts out the myriad accounts of seemingly unrelated events and shows the coherent pattern of the efforts of friend and foe. There is no over-done show of "scholarliness," no cluttering of footnotes—just honest, straightforward narrative.

Raymond Gram Swing wrote a foreword for the first of the three volumes, Walter Millis one for the third—both are recommended as highly as the body of the books themselves. Both men appreciate thoroughly the tremendous task of separating wheat from chaff, fact from rumor, truth from propaganda. And both pay deserved tribute to Dr. McNinnis's ability in this connection. Indeed, the author is as successful in his more general field as is Col. Lanza in his even-more-difficult technical one.

By this we do not mean to imply that Dr. McNinnis skims past naval and military operations. On the contrary, his accounts of them are models of clarity. The fact is, however, that sheer space restrictions require that some incidents be treated somewhat briefly, and of course proper perspective of the over-all picture dictates such handling. But the searcher will be hard put to think of a spot or incident of any importance which is not well handled.

For reference, for refreshing, for learning what has been happening while one has been isolated from the news, for sound historical background—for all these and many more purposes, these excellently organized books are recommended.

HEADHUNTING IN THE SOLOMON ISLANDS. By Caroline Mytinger. 416 pages; endpaper map; illustrated. The Macmillan Co. \$3.00.

The author, who is an artist, and her friend go trekking in the Pacific island to paint the natives. From the illustrations, one gathers she actually did find time for painting; but the book deals primarily with the attendant adventures, which were varied and many. The author's sense of humor is delightful; she produces chuckles at her own expense as often as at anyone else's.

The chief value of the book at this time, aside from the humor (which is always good to come upon), is her vivid description of the locales in which she hunted. They are complete from the ground to the sky and from her words one can see the colors and smell the odors. From Guadalcanal to Rabaul—the islanders saw her and she them; she saw them clearly enough to be able to put them on paper and make them seem very alive as they march from the pages to your mind's eye.

To get the human side of an art expedition, *Headhunting in the Solomon Islands* is an excellent book; if you wish to know more about the technical side of such an affair, Malvina Hoffman's *Heads and Tales** published several years ago will complement *Headhunting in the Solomon Islands* very well. The two should go together.

J. M. C.

*Scribner's: \$5.00.

BEHIND THE FACE OF JAPAN. By Upton Close. 427 pages; index. Appleton-Century Company, 1942. \$4.00.

" . . . The truth is that there is no higher or lower, no superior or inferior standard of living as between Japan and the West. The question is simply one of difference. . . ."

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Upton Close gets my vote for a needed job, well and thoroughly done. *Behind the Face of Japan* deserves your attention.

A. V. R.

HE'S IN THE ARMORED FORCE NOW. By Capt. Addison F. McGhee, Jr. 256 pages; photos (pictures by Army Signal Corps). Robert M. McBride and Company, 1942. \$2.50.

Captain McGhee picks up his story of the Armored Force with a group of new arrivals at the Armored Force

*T. Kawahami in *Foreign Affairs*, April, 1934, as quoted by Close.

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School post, Fort Knox, Kentucky. The tale sticks with these soldiers as they develop and learn. Some go to Officers' Candidate School; others quickly grasp the essentials and become good soldiers in the ranks.

He's in the Armored Force Now has about 80 pages of text and about 175 pages of Signal Corps pictures (with descriptive explanations alongside). There is an abundance of interesting fact and information and a fairly complete chapter on the history and development of the Armored Force.

The book will be very helpful to those civilians who have friends in the Armored Force. Its interest for military personnel lies principally in the numerous pictures of Armored Force materiel in action.

A. V. R.

PSYCHOLOGY AND THE SOLDIER. By Norman Copeland. 136 pp. Military Service Publishing Co., 1942. \$1.00.

Our allies have produced a number of excellent books which were practically unknown here until an American edition was published. The magnificent *Attack* (Miksche) is one example; *Psychology and the Soldier* is another, and thanks are due its publishers for making it available.

"Morale," as a word, has been much overworked in the past year or two, yet it is the essence that turns fair successes into true victories. It is intimately related to training and discipline. Professor Copeland summarizes its importance and the psychology behind it (both to soldiers and to civilians) in these words:

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So it is plain that he is not concerned with namby-pamby sentimentality in his approach. Instead, he analyzes the elements which contribute to that all-important "attitude of mind"—and he does it in clear, readily understood, non-technical language. A wide range is covered—from primitive fear through military discipline, physical condition, and leadership, to *esprit de corps*; each factor receives its prominent place in the building of a sound, impregnable morale.

Psychology and the Soldier is a sound book which should be read by both service men and their families. It is especially helpful to junior officers.

SALUTE TO VALOR. By Linton Wells. 280 pages. Random House. \$2.00.

Salute to Valor is a newspaper correspondent's tribute to heroes of the United Nations in the current World War.

This is a timely book, written in terse reporting style that is singularly appropriate to the subject. It depends for its interest solely on facts, instances of personal heroism

so splendid in their own right that they have no need of verbal embellishments.

In some cases news accounts of the past months are pointed up in brief review to focus on particular acts of heroism. Other accounts were obtained at first hand by the author at the originating source. All are alive with the qualities of courage and daring.

Each of the United Nations contributes to the roster of heroes through its regular branches of service and its particular organizations. There are inspiring examples of familiar home town types, personalized by name, daring all for the cause of freedom. Soldiers, Sailors, and Marines of all ranks; Commandos; snipers; the Death-and-Glory boys of the Royal Navy; the "V" army of the occupied areas; heroes on the home fronts; "women who take it"—all these are the subjects of *Salute to Valor*.

The nature of the story necessitates the sampling method which the author takes into account in dedicating his book "To those whose equally valiant deeds have gone unsung."

F. E. J.

BOMBS AWAY: THE STORY OF A BOMBER TEAM. By John Steinbeck. 185 pages; photographs. The Viking Press, 1942. \$2.50.

This volume does a good job of describing clearly and non-technically what makes a bomber crew tick. It was written for the Army Air Forces, and only the style is Steinbeck's—the "meat" is fact, not fiction. Sixty photos by John Swope round out the account.

The ship itself is described, then the careers of six typical youngsters are traced as they train for their jobs of pilot, navigator, bombardier, crew chief, radio man, and gunner. The team is then put together so the reader can see the whole in action.

In short a fine book for up-and-coming youngsters or for those who want to learn something of the subject.

ROOTS OF STRATEGY. Edited by Maj. Thomas R. Phillips. 441 pp. Military Service Publishing Co. \$3.00.

This collection includes the most influential military classics written prior to the 19th century. *The Art of War* by Sun Tsu is the oldest existing military work, and probably the greatest military classic in any language; it has guided Chinese and Japanese military thought for 2,400 years. *The Military Institutions of the Romans* by Vegetius circulated in manuscript form during the Dark Ages, then came into its own as the counterpart of our Field Service Regulations during the renaissance of military thought, which accompanied the Renaissance in general. Frederick the Great's *Instructions for His Generals* had great but brief application, as they were soon eclipsed by the *Maxims* of Napoleon. And of course

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MEET THE ANZACS! By W. L. Holland and Philip E. Lilienthal. 47 pages. American Council Institute of Pacific Relations, New York. 10c.

Meet the Anzacs is a well-written booklet on the history, politics, economics, and geography of Australia and New Zealand.

The work is necessarily incomplete, but does give a fair understanding and general knowledge of the land "down under."

It is worth the 10 cents it costs and is worthwhile for an hour's reading.

A. V. R.

AMERICANS VS. GERMANS: THE FIRST AEF IN ACTION. 189 pp. Penguin Books-Infantry Journal, 1942. 25c.

This little booklet is a compilation of battle descriptions written by American soldiers of the 1917-18 war. They fall into two groups: one dealing more with units than with separate fighters, the other with the emotions and acts of the individual. All have previously appeared in the *Infantry Journal*, but this reprint puts them in convenient form.

ALASKA COMES OF AGE. By Julius C. Edelstein. 62 pages. American Council, Institute of Pacific Relations. 15c.

Appearing as No. 8 in this publisher's series of Far Eastern Pamphlets, this little booklet gives a well rounded and up-to-date sketch of one of our most important territories. History, geography, economy, communications, possibilities—all these are covered in an interesting fashion.

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NEW BOOKS



With a view to providing our Members with a convenient guide relative to the latest books available on military and related subjects, we are publishing a partial list of books reviewed in recent issues of The Field Artillery Journal. Not only these books but any book on any subject may be ordered from our Book Department. See our discount offer on the first page of Book Reviews.

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