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CONTENTS

		PARAGRAPHS
CHAPTER	I. Arm Signals.....	1 to 25
CHAPTER	II. Whistle Signals.....	26 to 28
CHAPTER	III. Two-arm Semaphore.....	29 to 39
CHAPTER	IV. Flag Signaling.....	40 to 49
CHAPTER	V. Selection and Operation of Signal Stations.....	50 to 75
CHAPTER	VI. Tests.....	76
CHAPTER	VII. Visual Signaling Equipment.....	77 to 109
CHAPTER	VIII. Company Signal Flags.....	110 to 112
CHAPTER	IX. Conventional Telephone Signals....	113
CHAPTER	X. Ciphers.....	114 to 133
CHAPTER	XI. The Field Message.....	134 to 137

CHAPTER I

ARM SIGNALS

1. In the din of battle, when the noise and confusion render the use of the voice impracticable for the transmission of orders and instructions from the leader to his men, we resort to signals. These must be simple, easily learned and remembered. They must be frequently used in training so that all may readily know them.

2. The soldier learns to do things properly by seeing them done—by having them demonstrated to him. The excellent illustrations of the Arm Signals prescribed by paragraph 43 of the Infantry Drill Regulations are here presented in the hope that they will be of assistance to our instructors in the training of their men in this important subject.

3. In making signals, either arm may be used. Officers who receive signals on the firing line “repeat back” at once to prevent misunderstanding.



**FORWARD
BY THE RIGHT (LEFT) FLANK
TO THE REAR**

Forward, MARCH; By the
right (left) flank,
MARCH; to the rear,
MARCH

4. Face and move in the direction of march; at the same time, extend the arm vertically to its full extent and lower it to the front (flank, rear) until horizontal.

**QUICK TIME**

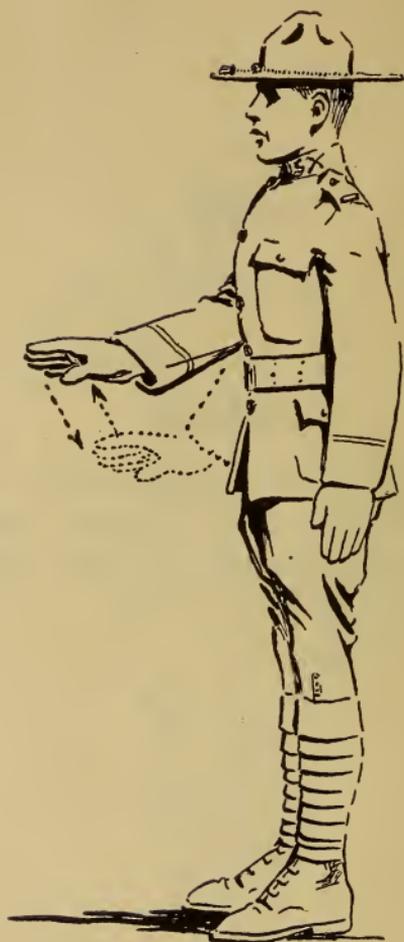
Quick time, MARCH

5. Raise the right elbow to a position above and to the right of the right shoulder; extend the forearm to the left, right hand above the head.

**HALT**

HALT

6. Carry the hand to the shoulder; thrust the hand upward and hold the arm vertically.



**LIE DOWN
OR TAKE COVER**

LIE DOWN (OR TAKE COVER)

7. Turn toward the skirmishers and raise the hand in front of the elbow, forearm horizontal; thrust the hand downward several times, palm toward the ground.



DOUBLE TIME, MARCH OR RUSH

DOUBLE TIME, MARCH OR RUSH

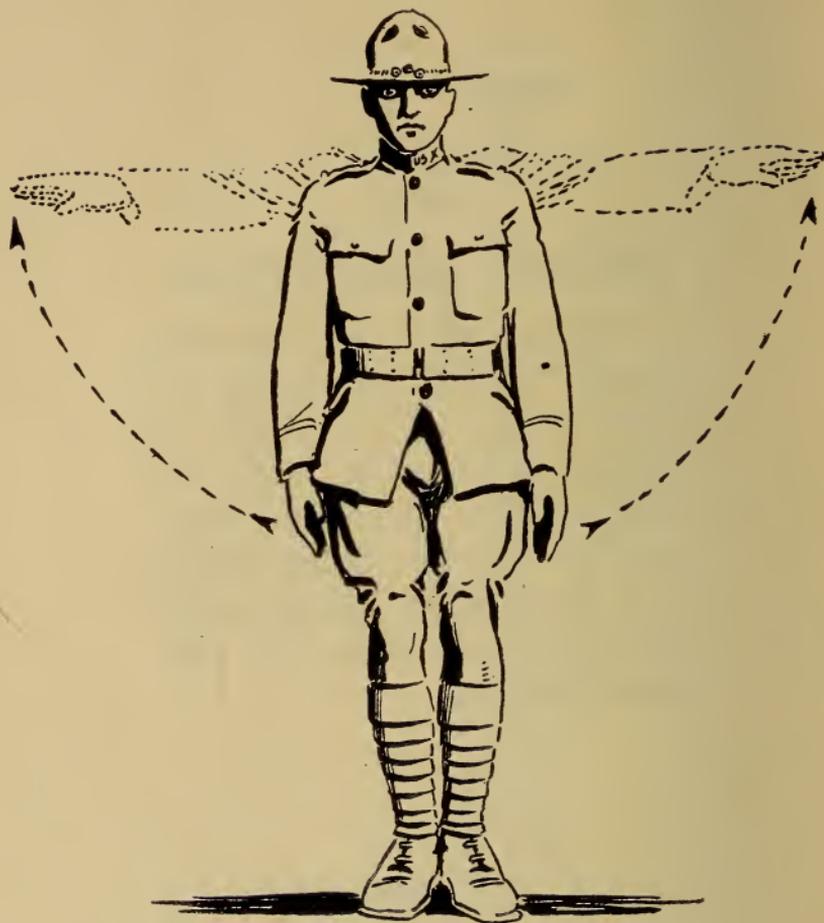
8. Carry the hand to the shoulder; rapidly thrust the hand upward the full extent of the arm several times.



CHANGE DIRECTION

CHANGE DIRECTION

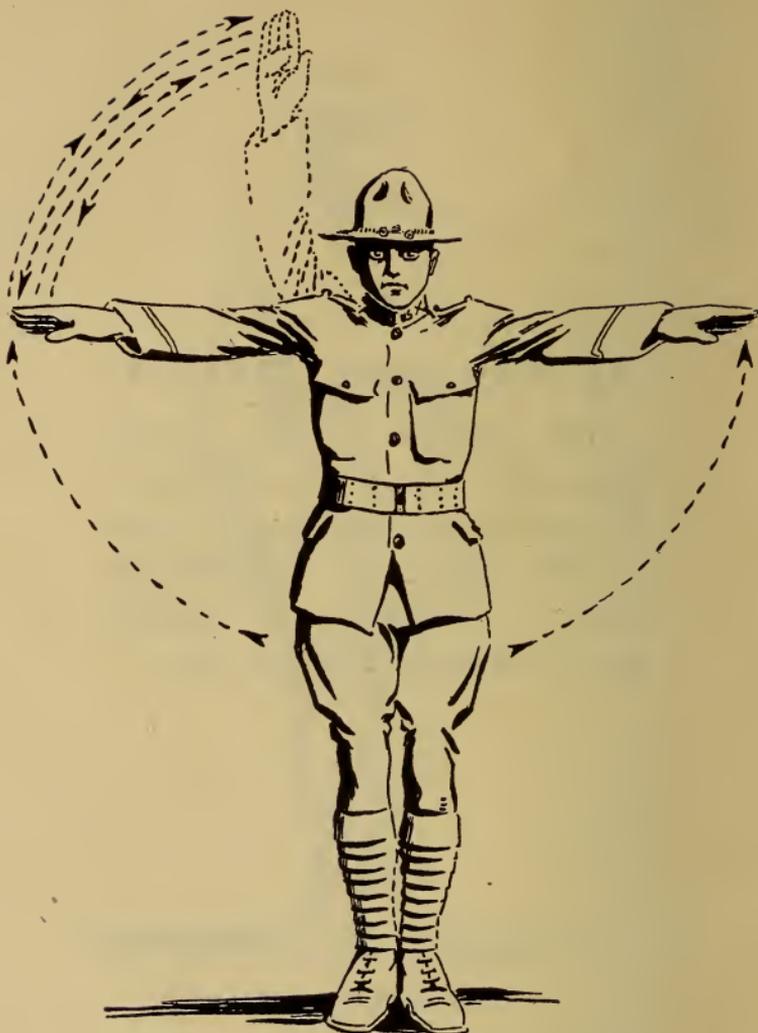
9. The hand on the side toward which the change of direction is to be made is carried across the body to the opposite shoulder, forearm horizontal; then swing in a horizontal plane, arm extended, pointing in the new direction.



AS SKIRMISHERS

As skirmishers, MARCH

10. Raise both arms laterally until horizontal. If necessary, lower the arm in the direction of march after completion of signal as in **forward march**, etc.



AS SKIRMISHERS, RIGHT (LEFT)

**As Skirmishers, right
(left), MARCH**

11. Raise both arms laterally until horizontal; swing the arm on the side toward which the deployment is to be made, upward until vertical and return it to the horizontal; repeat several times; hold the other arm steadily in the horizontal position.

**ASSEMBLE**

ASSEMBLE, MARCH

12. Raise the arm vertically to its full extent and describe large horizontal circles.



**RANGE.
BATTLE SIGHT**

RANGE

13. To announce range, extend the arm toward the leaders or men for whom the signal is intended, fist closed; by keeping the fist closed battle sight is indicated.



RANGE 500 YARDS

RANGE

14. Open the fist once for 500 yards, twice for 1,000 yards, etc.



**RANGE
INCREASE 100 YARDS**

**RANGE, INCREASE 100
YARDS**

15. Thrust the fist upward once for each additional 100 yards.

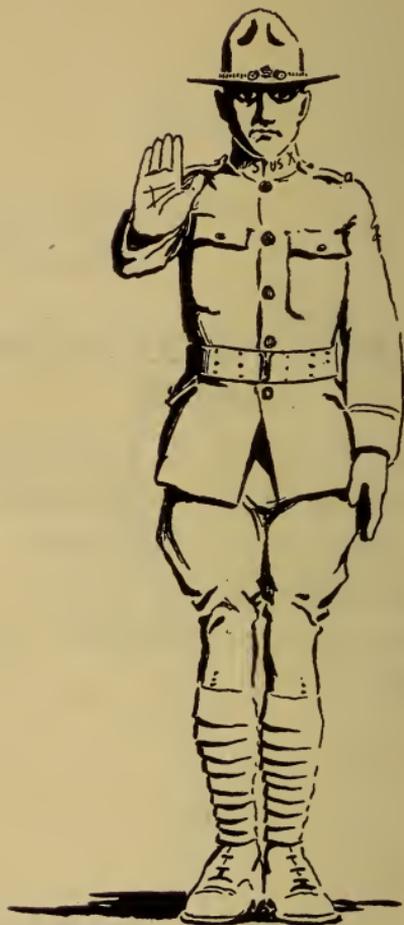


**RANGE
INCREASE 50 YARDS**

RANGE, INCREASE 50 YARDS

16. To add 50 yards, describe a short horizontal line with the forefinger.

To change elevation, indicate the complete new range.



**ARE YOU READY?
OR
I AM READY**

ARE YOU READY?

or

I AM READY

17. Raise the hand, fingers extended and joined, palm toward the person addressed.

**COMMENCE FIRING**

COMMENCE FIRING

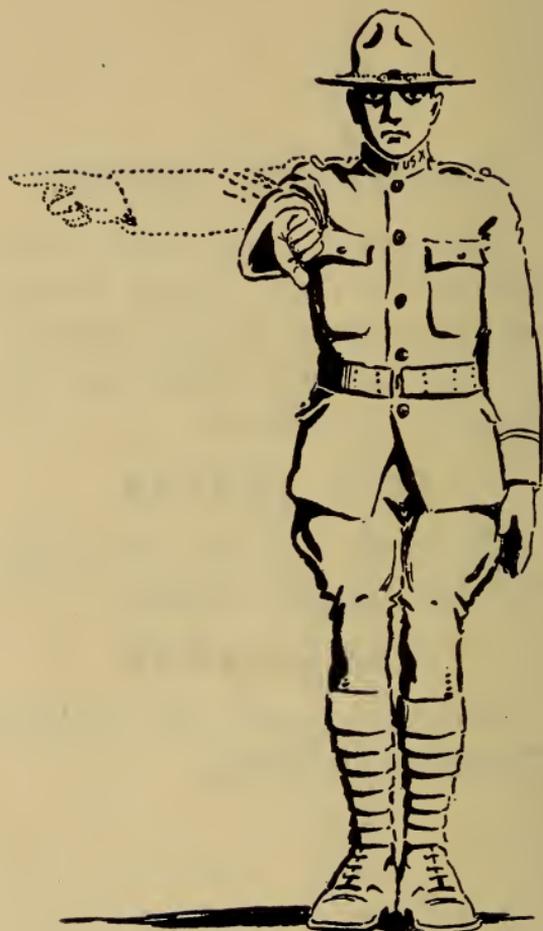
18. Move the arm extended in full length, hand palm down, several times, through a horizontal arc in front of the body.

FIRE FASTER

Execute rapidly the signal **Commence firing**.

FIRE SLOWER

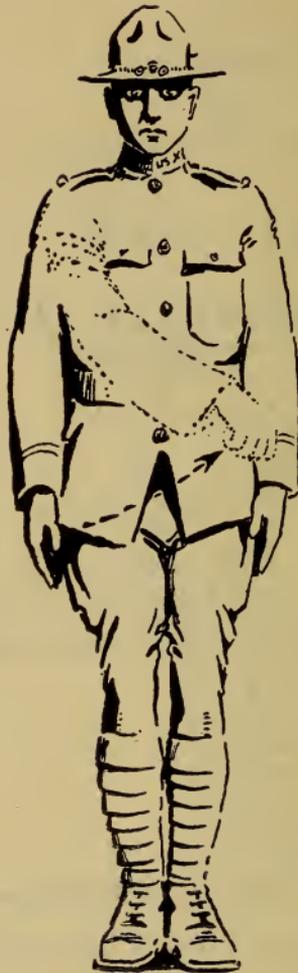
Execute slowly the signal **Commence firing**.



TO INDICATE NEW TARGET

TO INDICATE A NEW TARGET

19. Extend the arm in full length to the front, palm to the right (left); swing the arm to right (left), and point in the direction of the new target.

**FIX BAYONET**

FIX BAYONET

20. Simulate the movement of the right hand in **Fix bayonet.**

**SUSPEND FIRING**

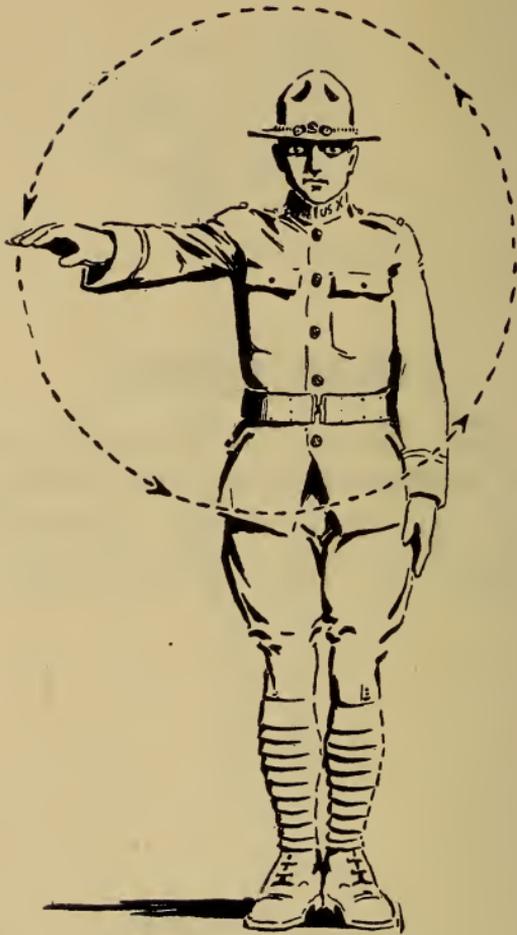
SUSPEND FIRING

21. Raise and hold the forearm steadily in a horizontal position in front of the forehead, palm of the hand to the front.

**CEASE FIRING**

CEASE FIRING

22. Raise the forearm as in **suspend firing** and swing it up and down several times in front of the face.



SECTION

SECTION

23. Extend the arm horizontally toward the section leader; describe large circles with the entire arm.

**SQUAD**

SQUAD

24. Extend the arm horizontally toward the section leader; swing the hand up and down with the wrist.

25. The signals, **section** and **squad**, are intended primarily for communication between the platoon leader and his section leaders. The signal **section** or **squad** indicates that the section leader is to cause the signal which follows to be executed by section or squad.

CHAPTER II

WHISTLE SIGNALS

26. **Attention to orders.** A **short blast** of the whistle. This signal is used on the march or in combat when necessary to fix the attention of troops, or of their commanders or leaders, preparatory to giving commands, orders, or signals.

27. When the firing line is firing, each squad leader suspends firing and fixes his attention at a **short blast** of his platoon or section leader's whistle. The platoon or section leaders' subsequent commands or signals are repeated and enforced by the squad leader. If a squad leader's attention is attracted by a whistle other than that of his platoon or section leader, or if there are no orders or commands to convey to his squad, he resumes firing at once.

28. **Suspend firing.** A **long blast** of the whistle. All other whistle signals are prohibited.

CHAPTER III

TWO-ARM SEMAPHORE

29. Signaling by hand flags with the Two-arm Semaphore code is authorized for general use in the Army. On account of the small size of the flags (18 inches square) the signaling range is comparatively small and the use of the code is of limited application.

30. This method of signaling will be found useful under many circumstances and is particularly adaptable when rapid communication for short distances is needed.

31. The range is dependent upon the light and background. The limit of range under ordinary conditions will not, as a rule, exceed one mile.

32. Every man in the organization should be required to master the Two-arm Semaphore Code, both as a sender and receiver. One can never tell when he may be called upon to use it, and the ability of a single man to do so may be the means of transmitting important information that may vitally affect military operations.

33. The men should be trained in the code, not only with the flags, but by making the signals with the arms alone, without anything in their hands.

34. Great care should be taken with beginners to see that they learn to make each letter of the alphabet with the arms and flags in exactly the proper position. A man who forms the habit of faulty positions will slur his letters and render them almost impossible to

read. It will be difficult to correct this deficiency when the habit has once been acquired. Care must be taken with hand flags to hold the staffs so as to form a prolongation of the arms. As an aid to this the index finger may be extended along the staff in the direction of the flag.

CONVENTIONAL SIGNALS AND INSTRUCTIONS

35. In calling a station face it squarely and make its call letter. If there is no immediate reply wave the flags over the head to attract attention (see Signal **ATTENTION** in code.) Repeat the call at frequent intervals until the distant station acknowledges it (see code, letter R, **ACKNOWLEDGE**). This indicates that the receiving station is ready to receive the message.

36. When the sender signals "end of message" (see below) the receiver, provided the message is understood, extends the flags horizontally, as in the letter R, and waves them. The sender does the same to indicate that he understands that the message has been received and understood.

Conventional Signals

37. The following Conventional Signals are authorized for use with the Two-arm Semaphore.

End of Word.....	Interval.
End of Sentence.....	"Chop-chop," ¹ twice.
End of Message.....	"Chop-chop," three times.

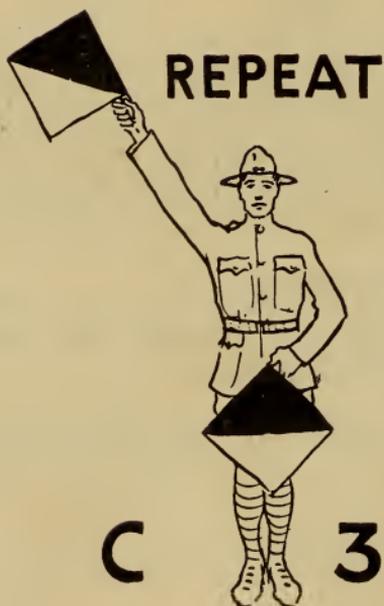
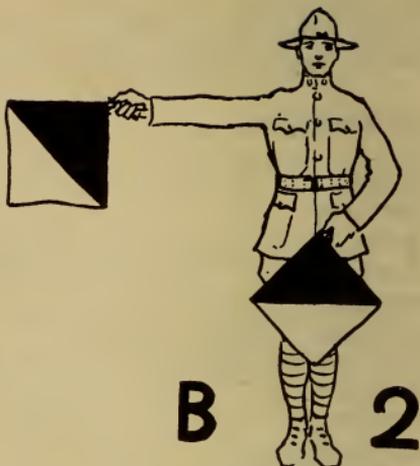
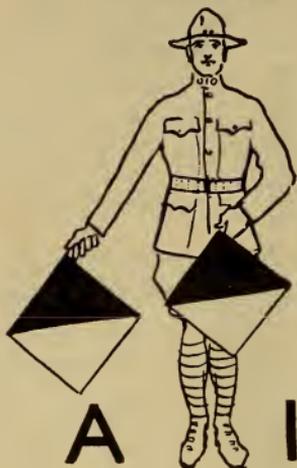
¹ To make the "chop-chop" both arms are placed at the right horizontal and then both moved up and down in a cutting motion.

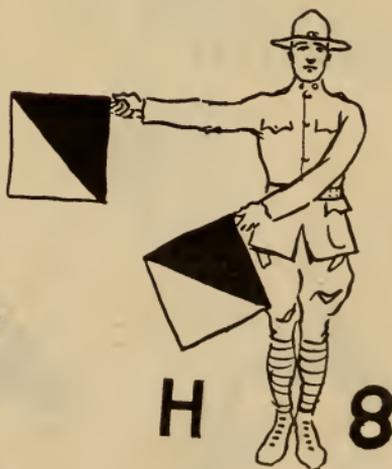
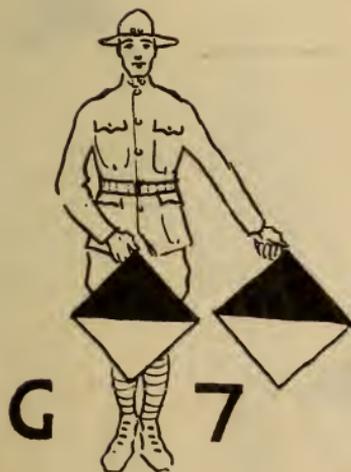
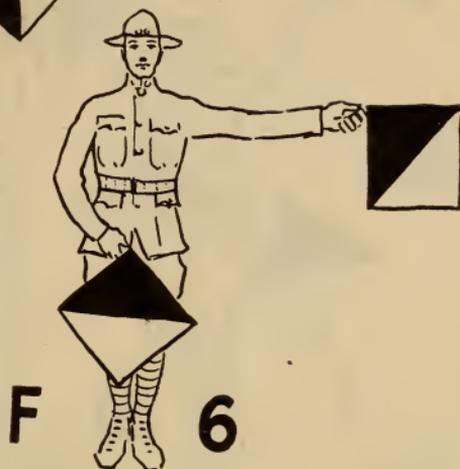
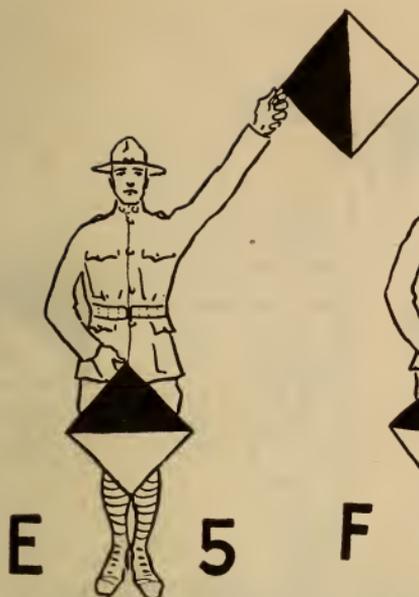
Between preamble and address	“Chop-chop,” twice.
Between Address and Text	“Chop-chop,” twice.
Between Text and Signature	“Chop-chop,” twice; “Sig”; Interval.
Acknowledgment ²	R
Error	A
Negative	K
Preparatory	L
Annuling	N
Affirmative	P
Interrogatory	O
Repeat After Word	OA; follow with word.
Repeat last message	OOO
Send faster	QRQ
Send slower	QRS
Cease sending	QRT
Move to YOUR right	MR
Move to YOUR left	ML
Move up	MU
Move down	MD

Numerals must be preceded by the signal “numerals” (flags crossed above the head) and when completed, followed by “Interval.” The numerals are the first ten letters in their regular order. When communicating with the Navy the numerals are required to be spelled out.

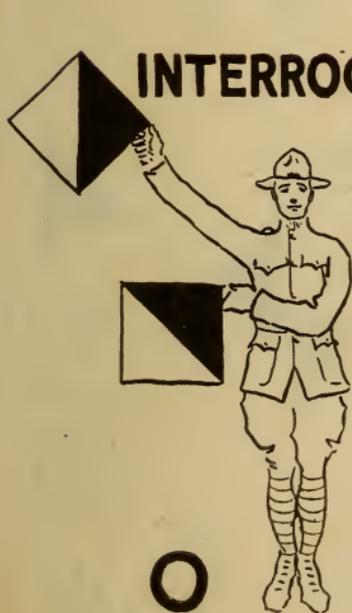
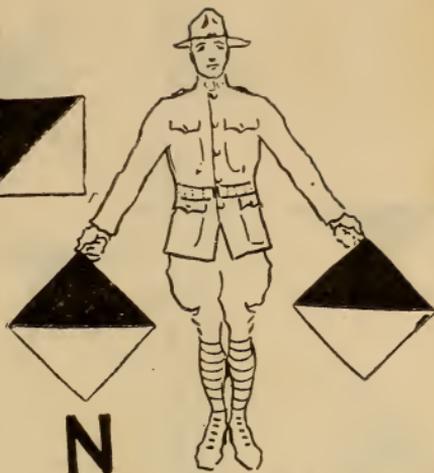
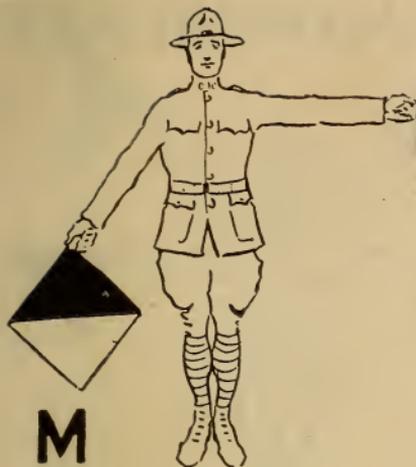
38. Many men merely learn the letters of the alphabet. They should be required to continue their training to include the conventional signals.

² Indicates that message has been received and understood.

ERROR**REPEAT**





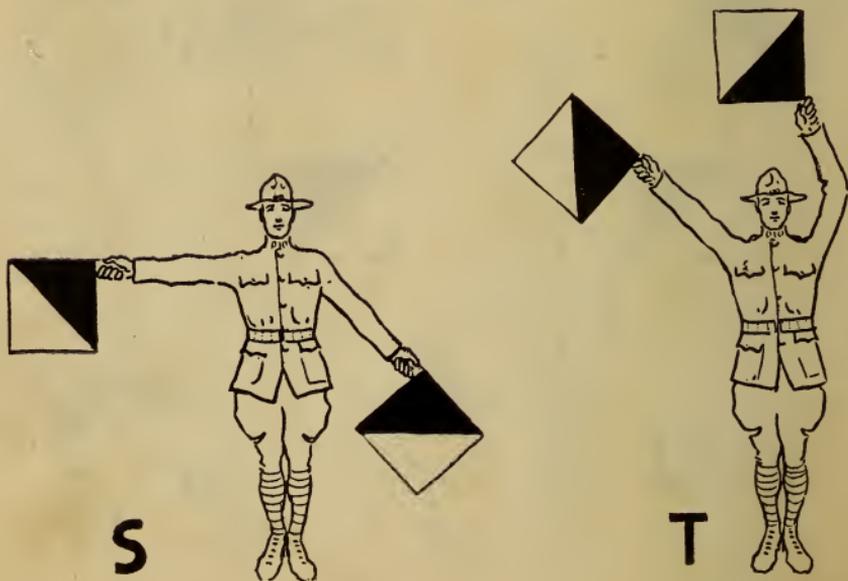
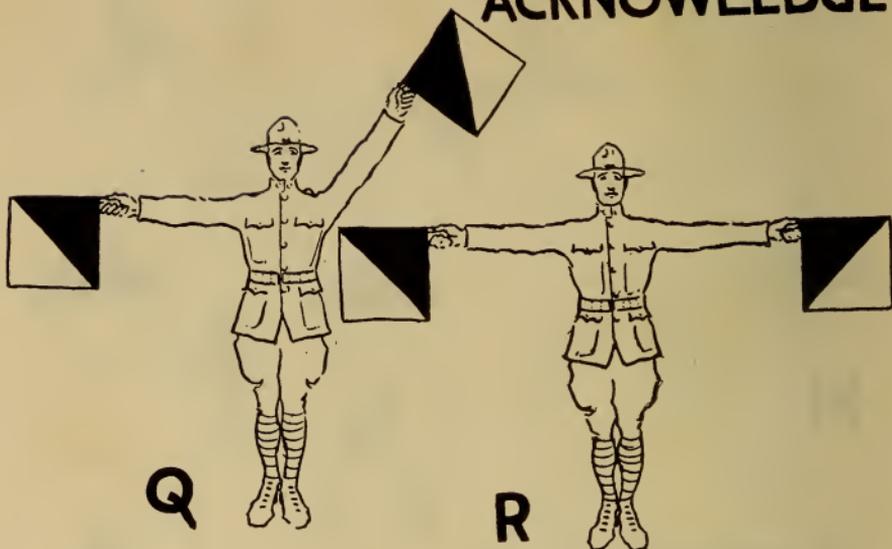


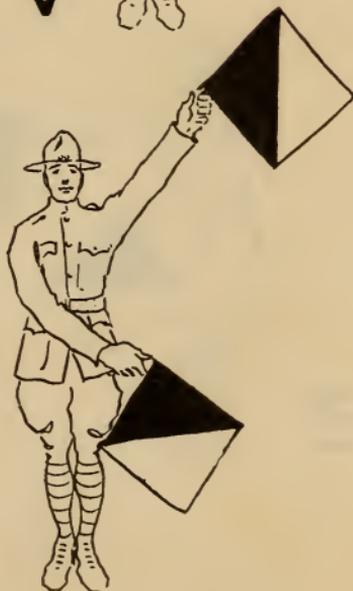
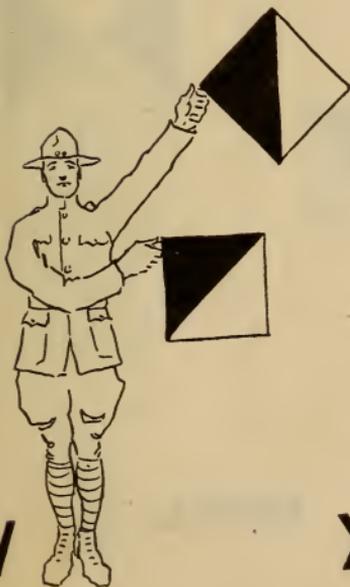
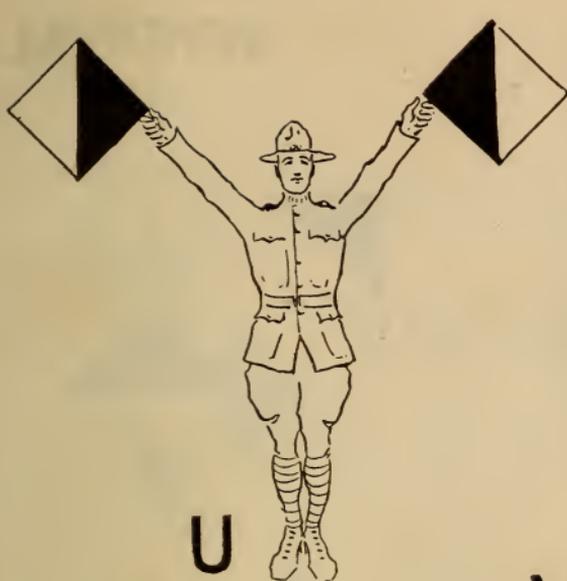
INTERROGATORY

AFFIRMATIVE

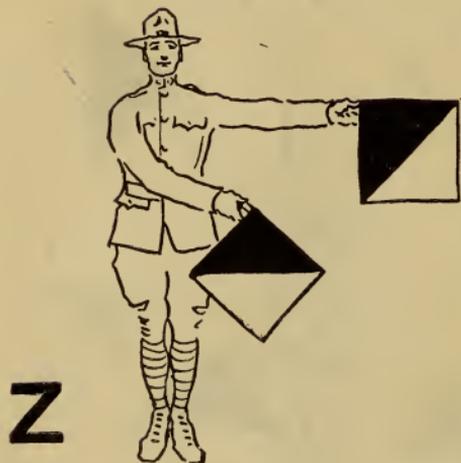
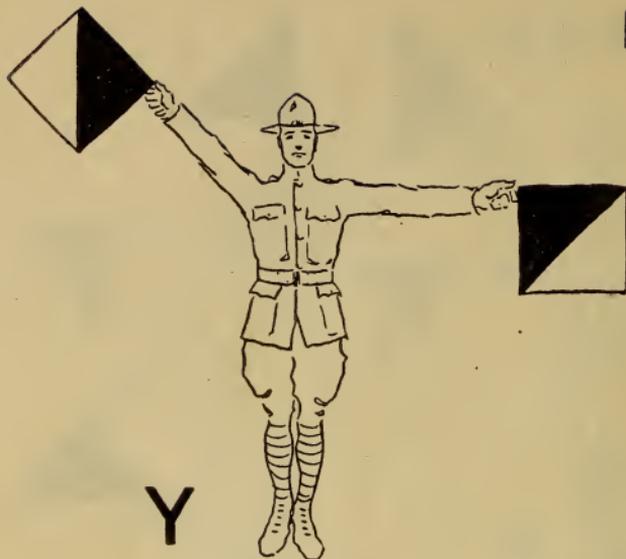


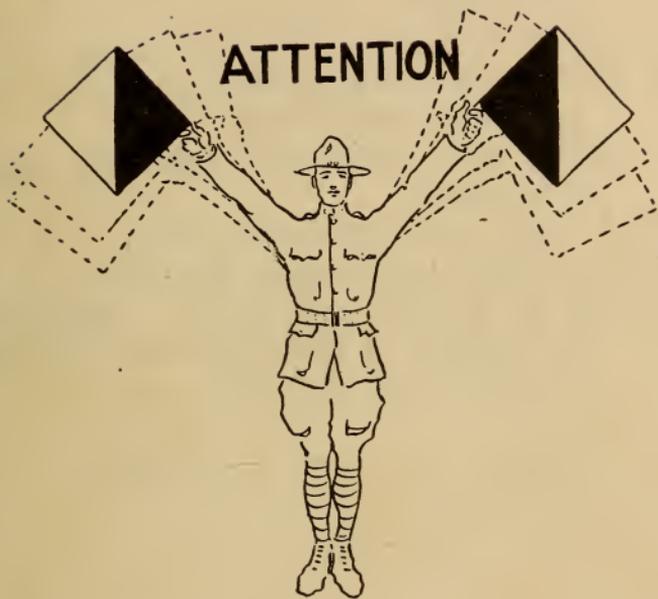
ACKNOWLEDGE





INTERVAL





Hints

39. The following hints will be found useful in training:

A to D: Left arm at "Interval," right arm progresses upward.

E to G: Right arm at "Interval," left arm progresses downward.

A to G: Complete series, with one arm at "Interval."

K to N: Right arm inclined 45° downward, left arm progresses downward.

P to S: Right arm horizontal, left arm progresses downward.

H, I, and O: Left arm crosses the body.

W, X, and Z: Right arm crosses the body.

Opposite letters: A and G, B and F, C and E, H and Z, I and X, J and P, K and V, O and W, M and S, and Q and Y.

CHAPTER IV

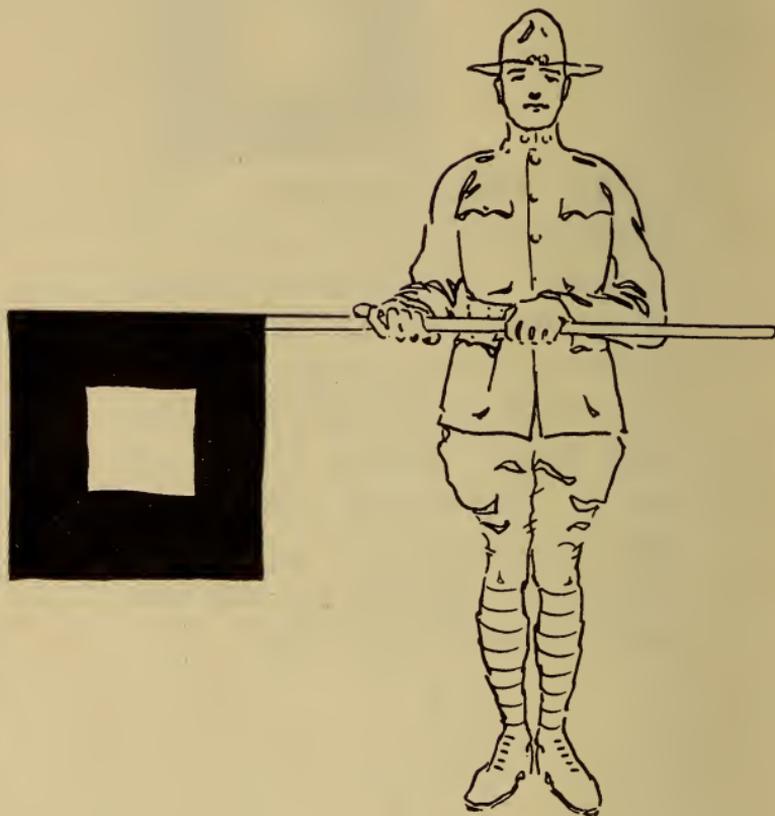
FLAG SIGNALING

40. Flag signaling is commonly known as "Wig-wag" signaling.

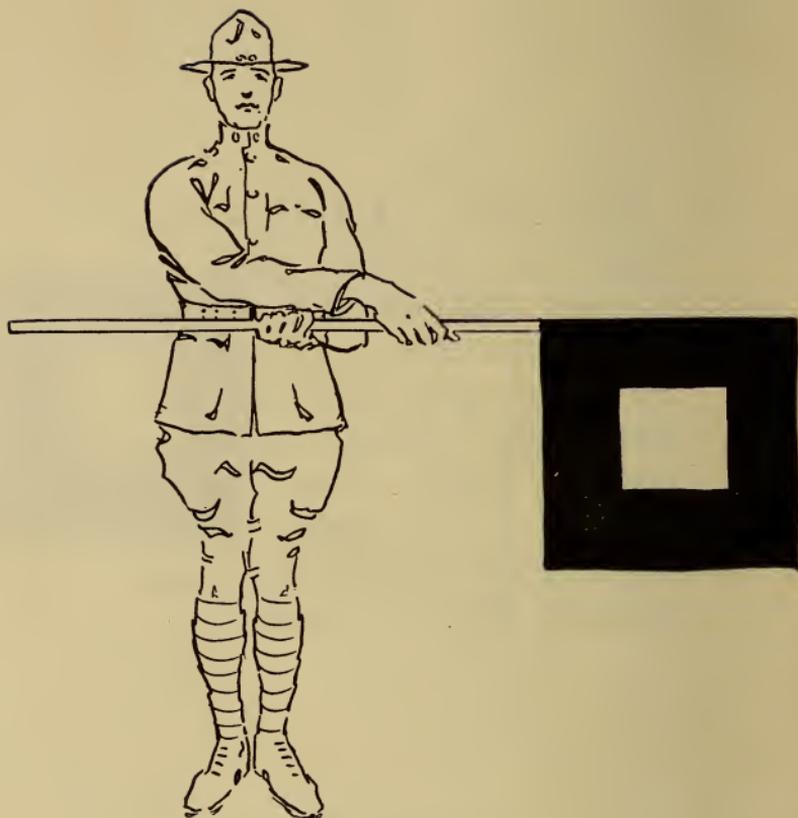
41. The General Service code is employed, in which there is one position and three motions.

**THE POSITION**

42. The Position.—The signalman, facing directly towards the distant station with which it is desired to communicate, holds the flag in a vertical position. The left hand grasps the staff at a convenient place and the right hand at a suitable distance further up on the staff towards the flag.

**FIRST MOTION**

43. First Motion.—The first motion (the **dot**) is to the **right** of the sender and embraces an arc of 90° starting from the **position** (flag vertical) and returning to it. The flag is moved in a plane at a right angle to the line connecting the two stations.



SECOND MOTION

44. Second Motion. —

The second motion (the **dash**) is to the **left** of the sender and is made similar to the first motion.

**THIRD MOTION**

45. Third Motion.—The third motion (**front**) is made by carrying the flag downward directly in front of the sender and immediately returning it to the **position** (flag vertical). The flag is moved in a plane the prolongation of which is the line connecting the two stations.

THE FLAG SIGNALING CODE

46. The code employed in flag (wig-wag) signaling is that known as the International or General Service Code. It differs from the regular Morse Code in that there are no space letters in the alphabet.

Alphabet

A · —	N — ·
B — · · ·	O — — — —
C — · — ·	P · — — ·
D — · ·	Q — — · —
E ·	R · — ·
F · · — ·	S · · ·
G — — ·	T —
H · · ·	U · · —
I · ·	V · · · —
J · — — —	W · — —
K — · —	X — · · —
L · — · ·	Y — · — —
M — —	Z — — · ·

Numerals

1 · — — — —	6 — · · · ·
2 · · — — —	7 — — · · ·
3 · · · — —	8 — — — · ·
4 · · · · —	9 — — — — ·
5 · · · · ·	0 — — — — —

Punctuation

Period.....	• • • • •
Comma.....	• — • — • —
Interrogation.....	• • — — • •
Hyphen or dash	— • • • —
Parentheses (before and after the words)...	— • — — • —
Quotation mark (beginning and ending)....	• — • • — •
Exclamation.....	— — • • — —
Apostrophe.....	• — — — — •
Semicolon.....	• — • — • •
Colon.....	— — — — • •
Bar indicating fraction.....	— • • — •
Underline (before and after the word or words it is wished to underline).....	• • — — • —
Double dash (between preamble and address, between address and body of message, between body of message and signature, and immediately before a fraction) ..	— • • • —
Cross.....	— • — •
End of word.....	Front.
End of sentence.....	Front, Front.
End of message.....	Front, Front, Front.
Signal separating preamble from address; address from text; text from signature.....	— • • • —
Acknowledgment.....	R.
Error.....	• • • • • •
Negative.....	K.
Preparatory.....	L.
Annuling.....	N.
Affirmative.....	P.
Interrogatory.....	• • — — • •
Repeat after word.....	Interrogatory, A (word).
Repeat last message.....	Interrogatory three times
Send faster.....	QRQ.
Send slower.....	QRS.
Cease sending.....	QRT.
Wait a moment.....	• — • •
Execute.....	IX, 1X.

Move to your right.....	MR.
Move to your left.....	ML.
Move up.....	MU.
Move down.....	MD.
Finished (end of work).....	••• — • —

Notes

47. The facility with which wig-wag signals are read by the receiver depends to a great degree upon the technique and accuracy with which they are sent. If the sender slurs his letters and does not make each one of them plain, the difficulties of the receiver are very much increased. It means that he will have to "break in" and have the words or letters repeated. This results in a great loss of time.

48. Much time will be saved in the transmission of a message by sending slower and making every letter distinct, than by trying to rush through the message and having the receiver constantly "breaking in" and calling for repetitions.

49. In training men in the technique of sending, the following hints with respect to the sender will be found valuable:

1. Require him to face accurately in the direction of the receiving station. If he faces at an angle to the station the difficulties of receiving are multiplied.

2. Have him hold his elbows close to his body and make the motions by moving the forearms and wrists. Do not let him get into the habit of swaying the body to the right and left on the first and second motions and to the front on the third motion.

3. The motions must be made with a sweeping movement of the flag to keep it from becoming wrapped around the staff. Never allow a man to continue sending with his flag tangled around the staff. Make him straighten it out before continuing.

4. Require him to come back to the *position* accurately at the end of each letter, and then make a slight pause to indicate the end of the letter.

5. Require him to make the first and second motions accurately at right angles to the line connecting the two stations. Many senders have a tendency to throw the flag too far to the rear, thus increasing the difficulties of the receiver.

6. Do not allow him to send faster than the receiver at the distant station is able to receive. It only results in "breaks" and repetition.

CHAPTER V

SELECTION AND OPERATION OF SIGNAL STATIONS

50. Selection of Station.—To select a visual signal station, choose a point perfectly in view of the communicating station; fix the exact position in which the flagman is to stand, so arranged, if possible, that when viewed from the communicating station he will have behind him a background of the same color for every position in which the signals may be shown.

51. Background.—To determine the color of the background, first ascertain whether the communicating station is higher, lower, or level with your own. If it be higher, the background for your signals, viewed thence, will be the color of the field, woods, etc., behind and lower than your flagman. If it be lower, your background will be the color of the ground, etc., behind and lying higher than your flagman. If the stations are of equal elevation, then the background for your signals will be that directly behind the flagman.

52. The color of the flag must contrast as strongly as possible with that of the background. With green or dark, or with earth-covered background, the white flag should be used. The distant station is the best judge of background, and should it indicate the color of flag wanted, and that flag should be used.

53. Location of Stations.—Complete visibility of stations being provided, stations should be so located that messages may be readily carried to them. Do not establish stations far from commonly traveled

roads, unless there be reasons in the physical contour of the country or otherwise for such locations. In this connection stations should be located so as not to be exposed to the enemy.

54. Moving Stations.—If a signal station asks another to move its station either to its right or left, so that its signal will be more distinct, each station will see that a signalmen holds a flag above his head. The station asking for the change will lower its flag immediately upon the distant station arriving at a position with a good background.

GAINING AND MAINTAINING COMMUNICATION BETWEEN SIGNAL STATIONS

55. Each signal station will have its call, consisting of one or two letters, as Washington, "W"; and each operator or signalist will also have his personal signal of one or two letters, as Jones, "Jo." These being once adopted will not be changed without due authority.

56. Whenever one's station call is observed, the called station should at once respond, making at the close of the response the particular signal by which it is identified.

57. The calling station should at intervals when calling give its own call or signal.

58. Attempts to attract the attention of a station, in order to be successful, must be persistent. They should never be abandoned until every device has been exhausted, and they should be renewed and continued at different hours of the day and night.

59. During the time that signals are being made to attract attention, the calling station must watch closely

the station called, not relaxing its efforts until communication is established or the station ordered abandoned.

60. Locating the Signalman.—To find a signalman near any known station, note with the unaided eye some prominent landmark near which the looked-for person or object is supposed to be, and direct the telescope upon the place; if the eye is placed at the eyeglass of the telescope, the prominent or directing landmark will be found in the field of view. It will be easy then to scale the country near the marker until the signalman is found. When the compass bearing of the object sought for is known, the telescope may be aligned by a line drawn with the proper compass bearing. Commencing then with the view at the horizon, the telescope is slowly moved from side to side, taking in fresh fields of view each time a little nearer the observer, until the whole country shall have been observed from the horizon to quite near the station. When the direction only of the object can be given, and it is sought for, the whole landscape in that direction to the horizon should be divided into sections by imaginary lines, the limits of these sections being bounded between visible landmarks through which the bounding lines are supposed to pass. Each section should be scrutinized little by little, until the glass has been passed over every spot. Such search will seldom fail to be successful.

HANDLING MESSAGES

61. Records.—A record of the date and time of the receipt or transmission of every message must be kept.

62. The duplicate manuscript of messages received at, or the original sent from, a station should be carefully filed.

63. **The Address.**—Every address must contain at least two words and should be sufficient to secure delivery.

64. **The Count for Check.**—In counting the words contained in the message for the purpose of checking it the following rules are observed:

1. All that the sender writes for transmission after the word "To" is counted.

2. Whenever more than one signature is attached to a message count all initials and names as a part of the message.

3. Dictionary words, initial letters, surnames of persons, names of cities, towns, villages, States, and Territories, or names of the Canadian Provinces will be counted each as one word; *e.g.*, New York, District of Columbia, East St. Louis should each be counted as one word. The abbreviation of the names of cities, towns, villages, States, Territories, and provinces will be counted the same as if written in full.

4. Abbreviations of weights and measures in common use, figures, decimal points, bars of division, and in ordinal numbers the affixes "st," "d," "nd," "rd," and "th" will be each counted as one word. Letters and groups of letters, when such groups do not form dictionary words and are not combinations of dictionary words, will be counted at the rate of five letters or fraction of five letters to a word. When such groups are made up of combinations of dictionary words, each dictionary word so used will be counted.

5. The following are exceptions to paragraph 55, and are counted as shown:

A. M.....	1 word
P. M.....	1 word
O. K.....	1 word
Per cent.....	1 word

65. Sending Numerals.—To lessen liability of error, numerals which occur in the body of a message should be spelled out.

66. No message will be considered sent until its receipt has been acknowledged by the receiving station.

67. When a station has sent all messages on hand, the signal "Cease signaling" should invariably be made. When nothing more is to be sent from either station, both will make "Cease signaling."

68. Receiving a Message.—In receiving a message the observer must call out each letter as it is made by the sender. He must not wait for the completion of the word. He must not get into the habit of anticipating what will follow from the signals already made.

69. Secrecy.—Secrecy in communication is vitally important. Even though the code used is unknown to the enemy, yet the waving flag or other means of visual signaling will inform the enemy that he has probably been observed. This should be avoided, and stations located where they will be most difficult of discovery. If there is reason to believe that signals are seen by the enemy, they should be made in cipher and only upon the expressed authorization of the signal officer charged with the duties of maintenance.

Extraordinary care should be taken in transmitting cipher messages, *and, where practicable, they should be repeated.*

DUTIES AND RESPONSIBILITIES OF PERSONNEL

70. A Relief.—A signal relief consists of a minimum of two men. In sending a message, one man manipulates the signal apparatus and the other reads the message to him word by word. In receiving, one man acts as observer and calls out the letters as they are made by the sender, and the other acts as recorder, taking down the letters as they are called out by the observer.

71. Assignment of duties will be made so that a continuous watch for signals may be kept and responsibility for neglect to promptly answer calls determined.

72. Strict and entire attention should be required of each man connected with a station, and no persons should be allowed to loiter around or within hearing of the words called out to the signalman.

73. The person in charge of a station is responsible for the discipline of his party.

74. Daily inspection should be made to insure that all signaling instruments, appliances, and material are in readiness for instant use.

75. Signalmen upon stations will examine, from time to time, every prominent point within signal distance to see if communication is attempted therefrom.

CHAPTER VI

TESTS

76. The old time signaling test usually resulted in requiring a man to send and receive a certain number of letters of the alphabet in a given time. This was no test of his ability as a signalman. The signal test should include:

1. The establishment of a signal station.
2. The calling of the distant station.
3. The acknowledgment of the call.
4. The sending of a complete message.
5. The receiving of a complete message.
6. The closing of the station.

CHAPTER VII

VISUAL SIGNALING EQUIPMENT

THE WAND

77. The wand is a stick of light wood about 18 inches long and one-half inch in diameter. It is held loosely between the thumb and forefinger and waved rapidly to the right or left to indicate the elements of the alphabet. It is used for practice purposes, and the signals made by it are only intended to be read at very short distances. Its effectiveness may be increased by tying a handkerchief near the outward end.

FLAG KITS, GENERAL SERVICE AND SEMAPHORE

78. Three kinds of flag kits are issued by the Signal Corps for use with the General Service Code and the Two-arm Semaphore Code: the combination, standard, 2-foot kit; the combination infantry, 2-foot kit; and the standard 4-foot kit.

79. **The Combination, Standard, 2-foot Kit.**—The combination, standard, 2-foot kit consists of 1 case, canvas; 1 staff, 3-joint; 1 flag, red, white square; 1 flag, white, red square; 2 staffs, semaphore; and 2 flags, semaphore, standard. The red flag is made of red galatea, 2 feet square, with an 8-inch white center. The white flag is of similar size and material, the only difference being an alternation of colors in the body and

center. The means of attachment to the staff consists of a loop at the center and two ends of white tape at each edge of the back of the flag body. The staff for these flags is made of hickory in three joints, each joint being 23 inches long, and is assembled by means of a brass screw ferrule. Brass eyes are provided on the first and second joints to receive the tape ends at the edge of the flag. The semaphore flags are 18 inches square, divided diagonally into two parts, one of red and the other white, the red portion constituting the upper half of the flag. The staffs are 24 inches long. The carrying case is of convenient size and shape to carry the flags and staffs above enumerated and is bound with leather and fitted with shoulder straps.

80. The Combination Infantry, 2-foot Kit.—The combination, infantry, 2-foot kit is essentially the same as the combination, standard, 2-foot kit, except that 1 infantry flag, as prescribed by paragraph 183, is substituted for the two 2-foot red and white flags above described.

81. The Standard 4-foot Kit.—The standard 4-foot kit consists of 1 case, canvas; 1 staff, 3-joint, and 1 flag, red, white square; and 1 flag, white, red square. The flags are 3 feet 9 inches square, with 12-inch centers, and the staffs are considerably heavier than those of the standard 2-foot kit, each joint being 36 inches long. The 4-foot kit is the standard field flag kit, and the range at which signals can be exchanged with it depends on a variety of factors, such as conditions of the weather, the location of stations, the proficiency of signalmen, etc. The speed for continu-

ous signaling is seldom greater than five to six words per minute.

82. Powers and Limitations of Flag Signaling.—The advantages which may be claimed for this method of signaling are portability of apparatus, adaptability to varied weather conditions, and great rapidity of station establishment. The disadvantages are the lack of celerity of the signals, their impenetrability to dust or smoke, and the comparatively short ranges at which they can be read. These ranges vary with the background, light, vision, and power of glasses if used.

83. Care of Flag Material.—Signal flags should be examined at the close of drill or practice and repairs made to any rents or loose ties discovered. Flags, when soiled, should be thoroughly washed and dried in the sun. Signals made by clean flags are much more easily read than those made by dirty ones. Staffs should be handled with care, especially when jointing or unjointing. Care should be taken not to bruise the ends of the brass ferrules. Ferrules fitting together so loosely as to permit separation of the joints in signaling must not be hammered or jammed, but should be tightened by wrapping one or more thicknesses of thin paper around the one which is inserted in the other. If a ferrule becomes loose on a staff it should be tightened without delay.

THE HELIOGRAPH

84. Description.—The complete heliograph consists of:

- 1 sole-leather pouch with shoulder strap containing:
- | | |
|------------------|-----------------------------|
| 1 sun mirror | } inclosed in a wooden box. |
| 1 station mirror | |
| 1 shutter. | |
| 1 sighting rod. | |
| 1 screw driver. | |
- 1 small leather case sliding by two loops upon the strap of the pouch containing 1 mirror bar.
- 1 skeleton leather case containing:
- 2 tripods.

85. The mirrors are of plate glass, 412 inches square. The station mirror has a paper disk covering the un-silvered spot in its center. The shutter is 612 inches square, has six leaves, operated by a key; and the key bar is provided with a stop to regulate the adjustment. The two tripods are alike, so that the mirror bar or shutter may be fitted to either, and each has a hook to which a weight may be suspended for stability.

86. Assembling.—There are two ways of assembling the heliograph, and the position of the sun is the guide in determining which of the two should, in any given case, be employed. When the sun is in front of the operator (that is, in front of a plane through his position at right angles to the line joining the stations) the sun mirror only is required; with the sun in rear of this plane both mirrors should be used. With one mirror the rays of the sun are reflected directly from the sun mirror to the distant station; with two mirrors, the rays are reflected from the sun mirror to the station mirror, and thence to the distant station.

87. With one mirror.—Firmly set one of the tripods upon the ground; attach the mirror bar to the tripod; insert and clamp in the sockets of the sun mirror and

sighting rod, the latter having the disk turned down. At a distance of about 6 inches, sight through the center of the unsilvered spot in the mirror and turn the mirror bar, raising or lowering the sighting rod until the center of the mirror, the extreme point of the sighting rod, and the distant station are accurately in line. Firmly clamp the mirror bar to the tripod, taking care not to disturb the alignment, and turn up the disk of the sighting rod. The mirror is then moved by means of the tangent screws until the "shadow spot" falls upon the paper disk in the sighting rod, after which the flash will be visible at the distant station. The "shadow spot" is readily found by holding a sheet of paper or the hand about 6 inches in front of the mirror, and should be constantly kept in view until located upon the disk. The screen is attached to a tripod and established close to, and in front of, the sighting disk in such a way as to intercept the flash.

88. *With two mirrors:* Firmly set one of the tripods on the ground; clamp the mirror bar diagonally across the line of vision to the distant station; clamp the sun mirror facing the sun to one end of the mirror bar and the station mirror facing the distant station. Stooping down, the head near and in rear of the station mirror, turn the sun mirror by means of its tangent screws until the whole of the station mirror is seen reflected in the sun mirror and the unsilvered spot and the reflection of the paper disk accurately cover each other. Still looking into the sun mirror, adjust the station mirror by means of the tangent screws until the reflection of the distant station is brought exactly in line with the top of the reflection of the disk and the top of the un-

silvered spot of the sun mirror; after this the station mirror must not be touched. Now step behind the sun mirror and adjust it by means of the tangent screws so that the "shadow spot" falls upon the center of the paper disk on the station mirror. The flash will then be visible at the distant station. The screen and its tripod are established as described in the single mirror assembling.

89. Alternate method with two mirrors.—Clamp the mirror bar diagonally across the line of vision to the distant station, with the sun mirror and the station mirror approximately facing the sun and distant station, respectively.

90. Look through small hole in sun mirror and turn the station mirror on its vertical and horizontal axes until the paper disk on the station mirror accurately covers the distant station.

91. Standing behind sun mirror, turn it on its horizontal and vertical axes by means of the tangent-screw attachments until the "shadow spot" falls upon the paper disk on station mirror.

92. Adjustment.—Perfect adjustment is maintained only by keeping the "shadow spot" uninterruptedly in the center of the paper disk, and as this "spot" continually changes its position with the apparent movement of the sun, one signalmen should be in constant attendance on the tangent screws of the sun mirror. Movement imparted by these screws to the mirror does not disturb the alignment, as its center (the unsilvered spot) is at the intersection of the axes of revolution. Extra care bestowed upon preliminary adjustment is repaid by increased brilliancy of flash.

With the alignment absolutely assured and the "shadow spot" at the center of the disk, the axis of the cone of reflected rays is coincident with the line of sight and the distant station receives the greatest intensity of light. Remember the distant observer is unquestionably the better judge as to the character of the flash received; and if, therefore, adjustment is called for when the "shadow spot" is at the center of the disk, the alignment is probably at fault and should be looked after at once. In setting up the tripods always see that the legs have a sufficient spread to give a secure base, and on yielding soil press firmly into the ground. Keep the head of the tripod as nearly level as possible and in high wind ballast by hanging a substantial weight to the hook. See that the screen completely obscures the flash; also that the flash passes entire when the screen is opened. This feature of the adjustment is partially regulated by the set screw attached to the screen frame. The retractile spring should sharply return all the leaves of the screen to their normal positions when the key is released. Failure to respond promptly is obviated by strengthening or replacing the spring.

93. Operation.—It is of the utmost importance that uniformity in mechanical movement of the screen be cultivated, as lack of rhythm in the signals of the sender entails "breaks" and delay on the part of the receiver. Dark backgrounds should, when practicable, be selected for heliograph stations, as the signals can be most easily distinguished against them.

94. To find a distant station, its position being unknown, reverse the catch holding the station mirror

and with the hand turn the mirror very slowly at the horizon over the full azimuth distance in which the distant station may possibly lie. This should be repeated not less than twice, after which, within a reasonable time, there being no response, the mirror will be directed upon a point nearer the home station and the same process repeated. With care and intelligence it is quite probable that, a station being within range and watching for signals from a distant station with which it may be desired to exchange messages, this method will rarely fail to find the sought-for station.

95. The exact direction of either station searching for the other being unknown, that station which first perceives that it is being called will adjust its flash upon the distant station to enable it when this light is observed to make proper adjustments. If the position of each station is known to the other, the station first ready for signaling will direct a steady flash upon the distant station to enable the latter to see not only that the first station is ready for work but to enable the distant station to adjust its flash upon the first station.

96. Smoked or colored glasses are issued for the purpose of relieving the strain on the eyes produced by reading heliograph signals.

97. Care of Apparatus.—Minor parts of the instrument should be dismantled only to effect repairs, for which spare parts are furnished on requisition. Steel parts should be kept oiled and free from rust. Tangent screws and bearings should be frequently inspected for dust or grit. Mirrors should invariably be wiped clean before using. In case of accident to the sun

mirror, the station mirror can be made available for substitution therefor by removing the paper disk. If the tripod legs become loose at the head joints, tighten the assembling screws with the screw driver.

98. Powers and Limitations of the Heliograph.—Portability, great range, comparative rapidity of operation, and the invisibility of the signals, except to observers located approximately on a right line joining the stations between which communication is had, are some of the advantages derived from using the heliograph in visual signaling.

99. The principal disadvantages result from the entire dependence of the instrument upon the presence of sunlight and that when within range it is an attractive target. The normal working range of the heliograph is about 30 miles, under favorable circumstances, though instances of its having attained ranges many times greater than this are of record. The heliograph can be depended upon to transmit from 5 to 12 words per minute.

DIRECTIONS FOR USING THE 14-CM. SIGNAL LAMP, TYPE EE-6

100. The 14-cm. signal lamp is used for transmitting visual signals generally from front to rear. Its approximate range when using the clear bulb is from 1 to 3 kilometers during the day and from 2 to 6 kilometers during the night, depending on atmospheric conditions. With the red bulb, the range is about half as great.

101. The equipment required for operating the lamp comprises a leather strap, 3 dry cells connected in

series and carried in a small leather case, a sending key or button mounted in the same leather case, the lamp with one light bulb, and a connection cord which plugs into a socket provided in the battery carrying case. When not in use, the lamp may be carried by the strap hung over the shoulder.

102. Adjustments and Operation.—(1) Insert the lamp connection cord into the battery socket and open the lid.

2. Holding the lamp in the left hand, sight it on the receiving station through the small tube on the top of the lamp. In order to provide a steady support for the lamp when the station is to remain for any length of time at one location, drive a stake into the ground and rest the lamp on this. The special "lamp tripod" or the heliograph tripod with a special head may be used for this purpose, if available. The station should preferably be installed in the shade as direct sun rays falling on the reflector will give a continuous glare, making the electric light signals invisible to the receiving station.

3. Send the message. Messages are sent by using the General Service Code, and they should always be as short as possible. Every time a letter is omitted, the chance of error is reduced.

A dot is made by a short flash of about $\frac{1}{2}$ second duration.

A dash is made by a longer flash of about 2 seconds duration.

The interval between the elements of a letter is of about $\frac{1}{2}$ second duration.

The interval between letters is of about 2 seconds duration.

The interval between words is of about 4 seconds duration.

In order that lamp signals may be easily read, it is necessary that the signals be not too rapid. Fifteen to twenty characters per minute should be the upper limit. Successive letters should be well spaced.

An interval of two seconds between letters will enable the receiving operator to call off each letter to his assistant as he receives it. In general, two men for each shift are necessary to operate a lamp station. At the sending station, one man dictates the message letter by letter and watches the receiving station for breaks. The other sends the message. At the receiving station, one man receives the message and calls it off by letter to his helper, who writes it down.

To call a station, its call letter should be sent several times and at intervals the station calling should signal its own call letter. As soon as the station observes that it is being called, it will answer by signalling its call letters and the signal BR, "go ahead." The message is then transmitted and the receiving station acknowledges receipt of each word—

By one dot, if it has been understood.

By the interrogation mark, if it has not been understood and repetition is desired. (While the interrogation mark is official, two dots are invariably used for this signal.) At the end of the message, the sending station signals AR, meaning "end of message." The receiving station sends a dot if the message has been understood.



**METHOD OF CARRYING AND OPERATING
THE 14-CM. SIGNAL LAMP**

4. When not using the lamp, close the lid to protect the mirror and lamp.

5. *Warning.*—Do not use the projector for continuous illumination as the batteries are designed for intermittent service and will quickly run down on continuous service.

103. Focusing Lamps.—When a lamp is broken or burned out, a new one is put in its place. It is then necessary to focus the lamp. This is done in the following manner:

1. At night, throw the light beam against a wall or flat surface distant about 40 feet. In daylight, improvise some dark object against which to throw the beam. This will probably have to be closer than 40 feet, but it should be kept as distant as possible in order to be able to see better that the rays are approximately parallel.

2. Adjust the position of the mirror by means of the three adjusting screws until the spot of light is round and as small as it is possible to make it. This minimum should be a circle of about 1 foot in diameter.

104. Preparing "Reserve" Batteries for Use.—The type 4-0 "reserve" batteries supplied with the lamp must be watered before being put into use the first time. This will probably be done at the nearest supply depot a short time in advance of the need for them. Watering is accomplished as follows:

1. Remove the cork from the carbon electrode.

2. Fill with distilled or rain water and continue adding sufficient water to keep the cell full during the first hour. Then fill every 30 minutes until no more water is absorbed.

3. During the entire operation, take care not to spill any water on the top of the cell, as this establishes a circuit between the two terminal clips and discharges the cell rapidly.

4. When the watering is finished, that is, when no more water is absorbed, empty out the water and replace the cork.

105. Sources of Trouble.—If the lamp fails to light, check up all connections at the battery terminal clips and at the sockets and plugs. See if the lamp is broken or if the wires are broken in the connection cords. Try a new lamp. If this does not light, put in a new battery.

106. Do not touch the mirror and do not clean it unless absolutely necessary. If it is too dirty to use, clean it with slightly soapy water or pure water and a piece of the medicated cotton furnished with the set. *Do not use a rotary movement when polishing or cleaning, but wipe carefully from the center outward.*

107. Do not leave the lamp cover open when not in use. Do not forget to open it when you start sending.

108. Do not lift or carry the lamp by the connector attached to it.

109. When working at a receiving station, do not neglect to keep a constant watch on the stations with which you are supposed to communicate. Also, when transmitting signals, keep the lamp constantly sighted on the receiving station and hold it steady.

CHAPTER VIII

COMPANY SIGNAL FLAGS

110. The signal flags described below are carried by the company musicians in the field.

In a regiment in which it is impracticable to make the permanent battalion division alphabetically, the flags of a battalion are as shown; flags are assigned to the companies alphabetically, within their respective battalions, in the order given below.

First battalion:

- Company A, Red field, white square.
- Company B, Red field, blue square.
- Company C, Red field, white diagonals.
- Company D, Red field, blue diagonals.

Second battalion:

- Company E, White field, red square.
- Company F, White field, blue square.
- Company G, White field, red diagonals.
- Company H, White field, blue diagonals.

Third battalion:

- Company I, Blue field, red square.
- Company K, Blue field, white square.
- Company L, Blue field, red diagonals.
- Company M, Blue field, white diagonals.

111. In addition to their use in visual signaling, these flags serve to mark the assembly point of the company when disorganized by combat, and to mark the location

of company headquarters in bivouac and elsewhere, when such use is desirable.

112. The color scheme of the company flags is arranged on a definite system. This may be learned by considering the National Colors, in the order of their sequence—**Red, White, and Blue.**

The backgrounds are:

First Battalion—**Red.**

Second Battalion—**White.**

Third Battalion—**Blue.**

The centers are:

First two companies of the battalion—**Squares.**

Second two companies of the battalion—**Diagonals.**

The squares and diagonals also run in the National Colors sequence.

CHAPTER IX

CONVENTIONAL TELEPHONE SIGNALS

113. There are certain letters of the alphabet which are at times confused with other letters of similar sound. Such is particularly true when using the telephone. This condition gives rise to delays and errors, especially when transmitting cipher.

To provide a ready means of phonetically distinguishing similar sounding letters, the following is authorized:

A—Able
B—Boy
C—Cast
D—Dock
E—Easy
F—Fox
G—George
H—Have
I—Item
J—Jig
K—King
L—Love
M—Mike

N—Nan
O—Opal
P—Pup
Q—Quack
R—Rush
S—Sail
T—Tare
U—Unit
V—Vice
W—Watch
X—X-ray
Y—Yoke
Z—Zed

Example: If the operator receives "buy" as "vie," and difficulty is experienced in distinguishing "B" from "V," "buy" may be spelled "boy-u-y."

CHAPTER X

CIPHERS

114. Ciphers embrace all means whereby writings may be transcribed in occult terms. All ciphers employ some distinct method for transcription, which method is termed a key. In practice the key is usually applied directly in enciphering and simply reversed in deciphering messages.

115. Ciphers are almost infinite in number and vary greatly in complexity. Probably no one is absolutely unreadable, but even the simplest cipher has the advantage of delaying the reading of the message and of requiring more or less expertness in use, hence the value of ciphers in the military service. The only cipher codes necessary to consider here are those obtained by the use of the cipher disk and the route cipher.

THE CIPHER DISK¹

116. The cipher disk is a simple but useful device for disguising the meaning of a message; it is composed of a circle of cardboard, celluloid, or other material revolving upon a card. The alphabet, reading from left to right, is printed on the card in upper-case letters.

¹ At the end of this book is printed the forms for the construction of a home-made "cipher disk." The pages are perforated along the side so that they may be extracted from the book without damaging it. Cut out each circle and paste on cardboard. Place the small circle on top of the large one and run a pin through the center of both. You have a cipher disc ready for use. (See pages 113 and 114.)

On the circle is printed the alphabet, reading from right to left, in lower-case letters.

117. If it is desired to encipher a message, the key letter or the first letter of the key word or words is set opposite "a." Let us assume it to be "E." The cipher letters to be written are those opposite the text letter when the letter "a" on the circle is set opposite "E" on the card. For example, "Send powder" would be written "marb pqiban." Numbers when enciphered with the cipher disk must be spelled out.

118. Having a cipher disk as above described, this mere transposition of letters would delay but a short time the deciphering of a message by one not knowing the key letter, as it would be necessary only to place, in turn, opposite "a," each of the letters of the alphabet, beginning with "B," and noting the letters opposite the enciphered letters. But this simple disk can be used with a cipher word, or, preferably, cipher words, known only to the correspondents, and it is entirely improbable that a message so enciphered could be deciphered in time to be of any value to the enemy. Using the key words "permanent body" to encipher the message "Reenforcements will reach you at daylight," we would proceed as follows: Write out the message to be enciphered and above it write the key words, letter over letter, thus:

PERMANENTBODYPERMANENTBODYPERMANENTB
 reenforcementswillreachyouatdaylight
 yanzvznlppkqfxijbpwanruqpeplomccwhmi

119. Now bring the "a" of the circle under the first letter of the key word on the card, in this case "P."

The first letter of the message to be enciphered is "r"; "Y" is found to be the letter connected with "R"; and it is put down as the first cipher letter. The letter "a" is then brought under "E," which is the second letter of the keyword. "e" is to be ciphered and "A" is found to be the second cipher letter. Then bring "a" to "R" and the cipher letter "N" will represent "e," the third text letter of the message. Proceed in this manner until the last letter of the cipher words is used, and, beginning again with the letter "P," so continue until all letters of the message have been enciphered. Divided into groups of five letters, it will be as follows "yanzv znpp kqfxi jbpwa nruqp eplom ccwhm i."

EMPLOYMENT OF CIPHER DISK

120. If messages are enciphered by a mere transposition of the letters of the alphabet, the cipher disk can be used to quickly decipher the message, as the following example will show: Assume that "a" is used to represent "F," "b" to represent "E," "c" to represent "D," "d" to represent "C," "e" to represent "B," etc., in regular sequence, and that the message to be enciphered is: "We are short of rifle ammunition; send 20,000 rounds at once."

121. This would be enciphered, if divided into groups of five letters, as follows: "jbfob nyrom raoxa ubfft lxxmx rsnbs cmjbs mhmyr lnfsc orlsc nfmrs db."

122. Place "a" of the circle opposite "B" of the card and notice whether the cipher letters "jbfob"—the first group—are intelligible. They give "SAWNA continue this, for "SAW," the first three letters may

the text word. Now, the next group is "nyrom," and these give "ODKNP." We know that "a" does not represent "B" because the first 10 cipher letters give the meaningless letters "SAWNAODKNP." Turn "a" to "C" and we have the first group "TBXOB" which is without meaning. Turning "a" to "D" we get "UCYPC," a meaningless jumble. Turn "a" to "E" and we get "VDZQD," which is meaningless. Now turn "a" to "F" and we find that "jbfob" means "WEARE," which gives us the two words "We are." We continue to the next group, "nyrom," which gives us "SHORT." We now have these letters "WEARE-SHORT," which at a glance we read "We are short." It would appear that we have now found the key letter, and after deciphering several additional groups we are confirmed in this belief and the information hidden in the cipher is ours. Continue deciphering with "a" opposite "F" until the end of the message. Sometimes the key letter is changed after two, three, or four letters. It is a matter of minutes only to run through the alphabet and learn the meaning of a message so enciphered.

IMPROVISED SUBSTITUTE FOR CIPHER DISK

123. Cut vertical strips, each about one-half inch wide, from lined writing paper. Paste these end to end so that two strips will be made up, one with 26 spaces and the other with 52 spaces. Write the alphabet twice, beginning with letter "A," down the 52-spaced strip, and write it once backwards, beginning with letter "Z," down the 26-spaced strip. These two strips, when laid side by side, may then, by sliding

the 26-spaced strip up and down to the appropriate letter on the 52-spaced strip, be made to perform the functions of a cipher disk.

124. Another Substitute for Cipher Disk.—In case no cipher disk is available, take the squared paper on the back of a message blank; put A in the upper left

Inverted alphabet

A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B
B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J
E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D
R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q

Code word. Continue alphabet after each code letter

and then write out the alphabet backwards, starting with Z and putting one letter along horizontally in each square. Do not repeat A at the end. Under A write the code word vertically, each letter under the preceding. Then continue the straight alphabet horizontally on each line. After Z give the first part of the alphabet which preceded the letter of code. This sheet can then be used to code or decode the messages readily. For the first letter in each group, substitute the letter found in the B alphabet under the letter to be substituted in the top alphabet. Continue with the A alphabet for the second letters, and so on. To decode a message use exactly the same process.

THE ROUTE CIPHER

125. This is a cipher in which the words of a message are retained unchanged, but are so disarranged by preconcerted rules that the sense becomes unintelligible.

The message as received seems to be a number of disconnected words without meaning, but by arrangement in proper order in accordance with certain rules can be easily read. Messages enciphered in this manner may be translated by persons not in possession of the key, and therefore the information contained therein should *only be of such a character as to be of little value to the enemy unless acted upon immediately*. The usual method employed in arranging a message for this cipher is to write the words in vertical columns. The number of words in each column should always equal the number of columns, being made so, if necessary, by the addition of sufficient "blind" words. A preconcerted route is agreed upon, as up the first column, down the third, up the second, etc. The message is then transmitted without reference to the columns, but is deciphered at the receiving station by column arrangement and perusal along the original route.

126. For example, to encipher the message "Move daylight. Enemy approaching from north. Prisoners say strength one hundred thousand. Meet him as planned," arrange as follows:

Move	strength	planned	say
daylight	one	as	prisoners
enemy	hundred	him	north
approaching	thousand	meet	from

127. Here the route is down the first column, up the fourth, down the second, and up the third.

THE PLAYFAIR CIPHER

128. The Playfair Cipher is based on the selection of letters from a square in groups of two at a time. The square is formed of six vertical and six horizontal

lines, enclosing twenty-five spaces. As there are twenty-six letters, I and J are always placed in the same square. Starting with the upper left hand corner, the letters of the code word are written horizontally across. No letter is repeated if there happen to be two of it in the code word. (If I and J are both in the code word, they will both be placed in the square corresponding to the one which comes first.) Then the rest of the alphabet is filled in, in order, leaving out any letters already given in the code word.

The message to be coded is then divided into groups of two letters each. If the two letters of a group happen to come the same, the second is replaced by X and then the second starts the succeeding group of two letters. A period is replaced by Q.

129. An uncompleted group is filled with any letter which will not be confusing, and numbers are spelled out. To select the substitutes, each group is taken alone. The positions of the two letters in the group are noted on the code chart, and the two substitutes selected according to the three possible cases which arise:

1. If both letters are in the same horizontal line, the letter just following each is substituted. (If a letter is at the extreme right of the line, then go back to the first letter in that line for its substitute.)

2. If both letters are in the same vertical column, the letter immediately below is substituted. (If a letter is at the bottom of the column, go to the top of that column for its substitute.)

3. For all other cases, the two letters can be considered as two corners of a square or rectangle, formed

by the letters between them. The substitute will be the letter at the corner of the same rectangle, horizontally across.

130. After the message has been coded, it is written in groups of five letters each, filling out a last incomplete group as before. For decoding, the message received is written in groups of two letters, and the reverse process of the coding will give the letter of the message in the clear. Any superfluous letters which were necessary in the coding will be eliminated in writing out the message for the addressee.

131. Messages to be coded should be as short as possible, for two reasons. It saves time all around, and it gives less opportunity for being worked out by the enemy. Any code in use can be deciphered if enough messages in that code can be gathered together. So messages should be brief, and the code word changed frequently. Never send out the new code word in an old code message.

132. The methods of enciphering with the Playfair Code are illustrated as follows. In deciphering a message the process is simply reversed.

When both letters of a pair occur in the same horizontal column.

<i>For</i>	<i>For</i>	<i>Take</i>		
C	O	L	U	M
B	I	J	A	D
F	G	H	K	N
P	Q	R	S	T
V	W	X	Y	Z
<i>Take</i>	<i>For</i>	<i>Take</i>	<i>For</i>	

Upper: The pair is CL.
The substitutes are OU.

Lower: The pair is ZX.
The substitutes are VY.

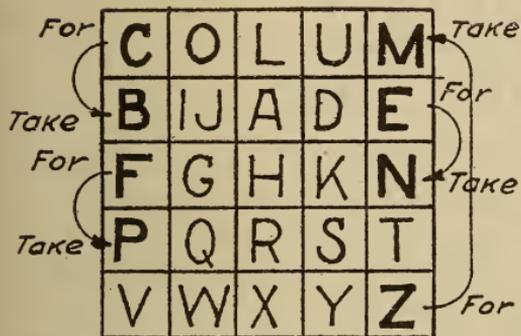
When both letters of a pair occur at opposite corners of a square.

C	O	L	U	M
B	I	J	A	D
F	G	H	K	N
P	Q	R	S	T
V	W	X	Y	Z

Upper: The pair is MH.
The substitutes are LN.

Lower: The pair is WP.
The substitutes are VQ.

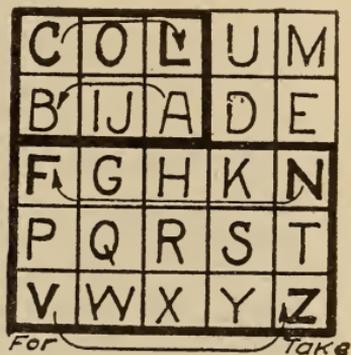
When both letters of a pair occur in the same vertical column.



Left: The pair is CF.
The substitutes are BP.

Right: The pair is ZE.
The substitutes are MN.

When both letters of a pair occur at opposite corners of a rectangle.



Upper: The pair is CA.
The substitutes are LB.

Lower: The pair is NV.
The substitutes are FZ.

Enciphering a message.

C	O	L	U	M
B	I	A	D	E
F	G	H	K	N
P	Q	R	S	T
V	W	X	Y	Z

133. The code word is COLUMBIA. It is entered in the squares of the first row and the first three squares of the second row. This code word may be entered in any order desired the only requirement being that the receiver has the same system of entries. Always select keywords in which no letter is repeated.

The message is:

LINES CUT SEND REPAIRMEN.

The message is then divided into groups of two letters each.

LI NE SC UT SE ND RE PA IR ME NZ.

The message is then coded:

{	LI		NE		SC		UT		SE		ND		RE		PA		IR		ME		NZ
}	OA		TN		PU		MS		TD		KE		TA		RB		AQ		EN		TM

The message is then divided into groups of five letters and sent.

OATNP UMSTD KETAR BAQEN TMQZA*

*The last three letters are added to complete the last group.

CHAPTER XI

THE FIELD MESSAGE

134. The term "Field Message" is applied to all messages sent over field lines of information, whether by electrical or visual means. They should be plainly written by the sender on the blank forms in the field message book.

135. **Detailed Instructions.**—The blank spaces at the top of the blank are for the use of the signal operator. Nothing should be written in them. The remainder of the heading will be carefully filled in as follows:

1. (*From*). Here insert the name or designation of the unit or detachment from which the message is sent. Examples: 318th Infantry. Support No. 3. Advance Party. Corporal Allen's Patrol. The idea is that the entry must definitely identify from whom the message is being sent.

2. (*At*). Here enter the location of the unit or sender. This serves to eliminate the necessity for repetition in the body of the message. For example: The message is from a patrol which is out to the front. It is important that the commander who sent the patrol out know just exactly where the patrol leader was when he wrote the message, for it will be of great assistance to him when he reads the message and compares the location indicated with his map. The designation of such location may take the following forms: The Hanly House. Cross-roads 876. 200

yards south of road-fork 893. North edge of woods 400 yards east of Beckett store. Hill 562 one mile east of Hardytown.

3. (*Date*): The message must be dated placing the day of the month first and following this with the month and then the year. For example: 12 May 20.

4. (*Hour*): Here enter the exact time of signing the message. This entry should be made immediately after the message is signed by the sender. It is important that the exact time be entered on account of other messages coming in and the time each was written may be determining factors in making an estimate of the situation.

5. (*Number*): Messages emanating from a certain source should be numbered serially. In the case of a patrol the first message should be numbered 1 and the numbers carried along serially for the present operation of the patrol. This is necessary in order that the officer who sent the patrol out may know whether he receives all of the messages sent in. Say he receives message No. 1 and an hour later he receives No. 3. He knows at once that No. 2 is missing and can take the proper action in the matter.

6. (*How Sent*): Here enter the method of transmission of the message. Buzzer, Phone, Telegraph, Wireless, Blinker Lantern, Helio, Flag, Cyclist, Mounted Messenger, Foot Messenger.

7. (*To*): Here enter the full address of the person or unit to which the message is to be sent. Signalmen should check up this address and make reasonably sure that it is sufficient to insure delivery.

136. The Body.—(1) The message should be worded

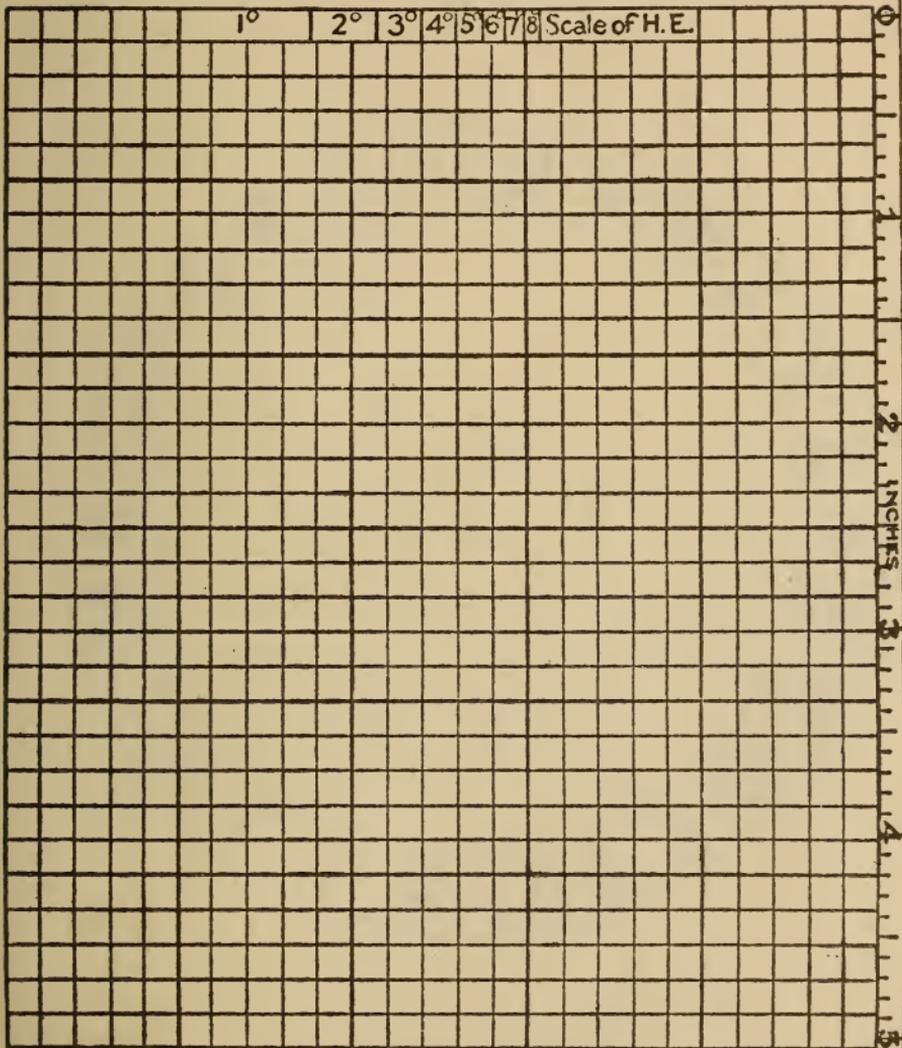
like a telegram. Words not important to the sense will be omitted. Do not leave out essentials.

2. Proper names in any part of the message will be printed in Capitals, thus: SMITH, TOLEDO, KICK-APOO, EMMITSBURG, TOMS CREEK, etc.

3. The message must be signed by the last name of the sender, and when there is any doubt about it, sufficient information to identify him should be included.

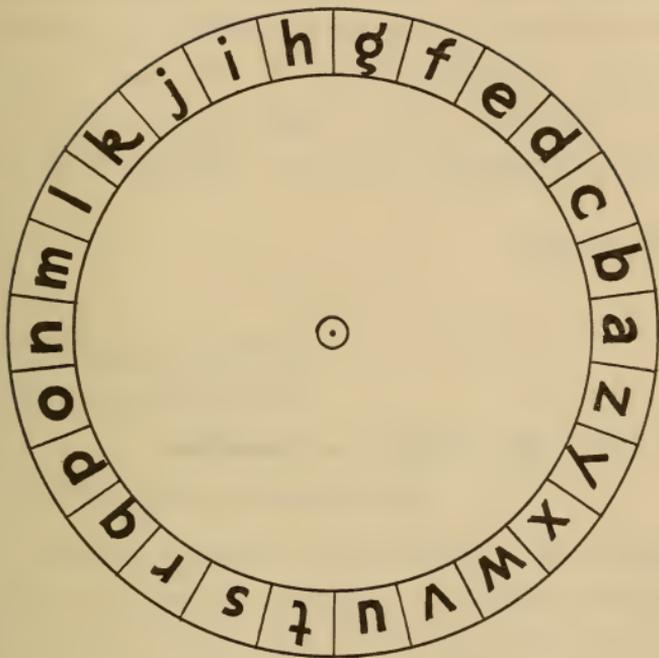
137. The Field Message Book.—The Field Message Book issued by the Signal Corps contains 50 message blanks with duplicate sheets and two sheets of carbon paper. Proper instructions for their use are printed on the cover of the book.

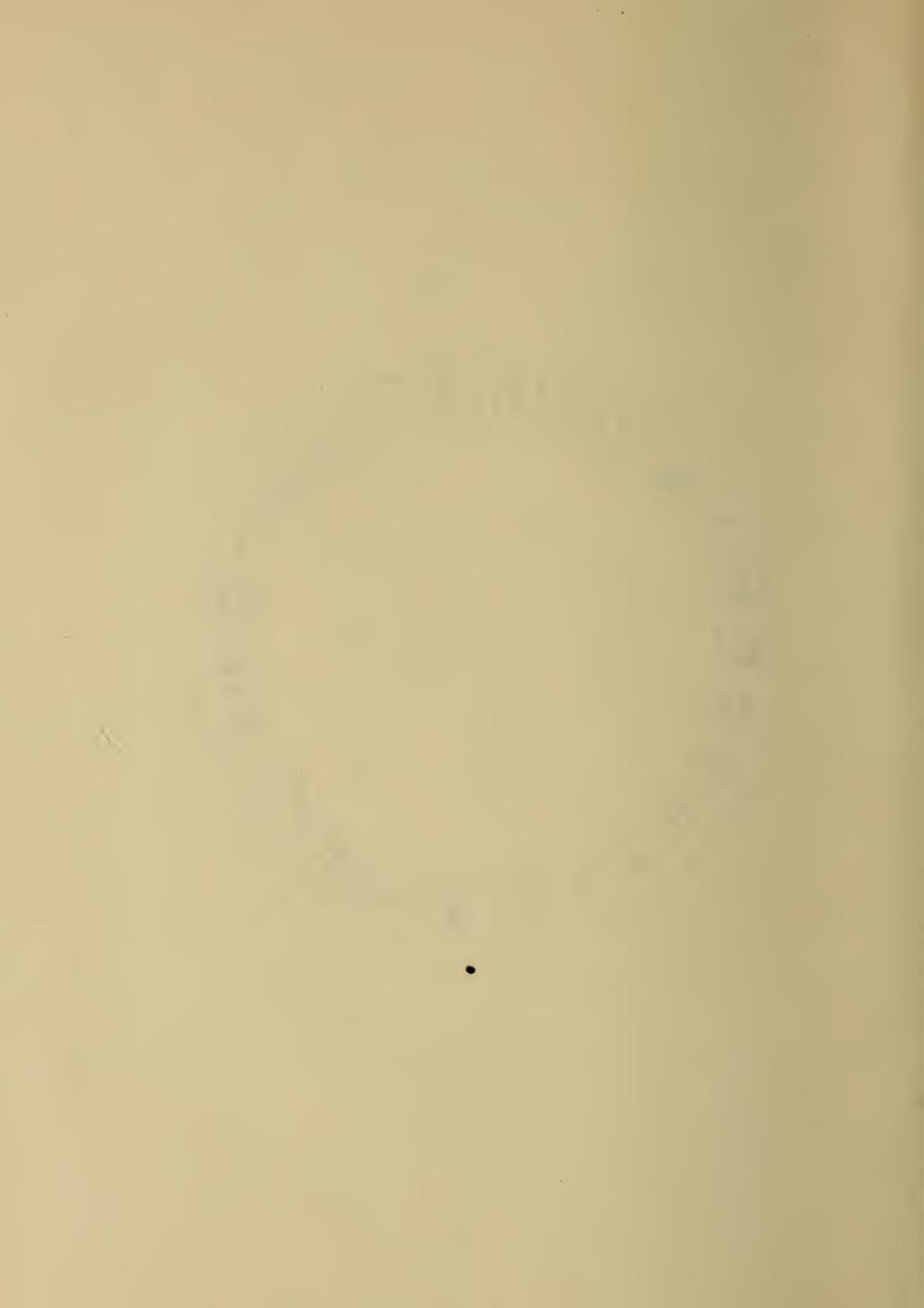
When 6 ins.=1 mile, V. I.= 10 feet and each small square is 50 yds.
 When 3 ins.=1 mile, V. I.= 20 feet and each small square is 100 yds.



Scale of this sketch is ins.=1 mile







Practice Sending These Messages:

From: Private Hanley.

At: Station 4.

20 June 20. 10.30 a. m. No. 1.

To: The First Sergeant.

Please take my name off the signal black list. I got a copy of "Military Signaling" and boned up the dope from it. I have qualified today. I would advise every man in the company to get a copy of the book. It makes signaling easy to learn.

HANLEY.

From: Sergeant Hobson.

At: The Second Platoon.

3 June 20. 10.20 a. m. No. 2.

To: The Company Commander.

My platoon needs a book that is a complete manual of infantry training. I have examined "Platoon Training" and find that it just fills the bill. Recommend that a copy be secured for each squad of the platoon. I guarantee a good record in the platoon test if we are provided with this book.

HOBSON.

Practice Sending These Messages:

From: Lieutenant Brown.

At: Company K.

10 September 20. 1.30 p. m. No. 1.

To: Lieutenant Hasker.

That was a fine talk you gave your platoon this morning. Where did you get all the dope?

BROWN.

From: Lieutenant Hasker.

At: Company B.

10 September 20. 2.30 p. m. No. 1.

To: Lieutenant Brown.

I got the dope for my talk on Military Courtesy from "Thirty-Minute Talks." There are nineteen more talks in the book equally as good as the one I used this morning. Every officer should have a copy of the book. It is certainly a time saver.

HASKER.

Practice Sending This Message:

From: Corporal Smith.

At: The reading room.

4 October 20. 4.30 p. m. No. 5.

To: Company Clerk.

Have you ordered a copy of the "Infantry Journal" sent to the Company Library. All of the other companies of the battalion are getting the magazine and we want it in our company. Hope you will do the necessary in this case.

SMITH.

Practice Sending This Message:

From: Captain Howard.

At: Target Range.

9 July 20. 9.10 a. m. No. 1.

To: First Sergeant.

Several men came to range this morning without their "Infantry Score Books." I do not want any man to fire without making a record of his firing dope in the score book. See that all men have them when they come out. No man can remember all his shooting dope. He must record it. The "Infantry Score Book" is the best we have for making this record.

HOWARD.

Practice Sending This Message:

From: The Library Committee.

At: Company H.

10 July 20. 3.30 p. m. No. 1.

To: The Company Commander.

The Library Committee requests that the following books be procured from the Infantry Association for the Company Library. "Mass Physical Training," "Tactical Walks," "Platoon Training," "Company Administration," "Scouting and Patrolling," "Thirty Minute Talks," "The Drill Master," "Military Signaling." "The Infantry Score Book," "Ludendorf's Own Story," "Military Sketching" and "Map Reading." The committee also recommends that we subscribe for the "Infantry Journal" for the reading room.

HAWES, Chairman.

Practice Sending This Message:

From: Private James.

At: Company B, 66th Infantry.

4 September 20. 7.30 p. m. No. 1.

To: Infantry Association, Union Trust Building,
Washington, D. C.

If I had a good military book to read tonight I could put in my time more profitably than by just sitting around and thinking about my troubles. Send me copies of the following soldier books: "Scouting and Patrolling," "Infantry Drill Regulations," "The Infantry Score Book" and "Thirty Minute Talks." I'll learn a lot out of these books that will help me over the rough spots of soldiering.

JAMES.

Practice Sending This Message:

From: Captain White.

At: Campbellton.

3 Sept. 20. 1.30 p. m. No. 2.

To: C. O. Third Battalion.

Do you know that our U. S. Infantry Association at Washington conducts a book department that is equipped to handle all of our orders for military books? We owe it to the Association to buy our books from them. Suggest that the adjutant canvass the companies and find out what books they want for the company libraries.

WHITE.

Practice Sending This Message:

From: Corporal White's Patrol.

At: Hill 483, West of Hamilton.

23 June 20. 4.32 p. m. No. 1.

To: C. O. Support No. 4.

By employing tactics recommended in "Scouting and Patrolling" for the formation and conduct of a patrol, we managed to elude the enemy's patrols and got to this point where we are able to observe the enemy's entire outpost formation. Recommend that every man in the company be supplied with a copy of "Scouting and Patrolling." The book is published by the U. S. Infantry Association, Washington. The price is 75 cents per copy.

WHITE.

Practice Sending This Message:

From: Corporal Jenkins.

At: The fourth squad.

4 September 20. 11.20 a. m. No. 1.

To: The Company Commander.

Each man of my squad has secured a copy of the "Infantry Drill Regulations" and "Scouting and Patrolling" from the Infantry Association. We have studied and practiced the things included in the text and are now ready for a test in drill and in scouting. Will be glad to undergo test at your convenience.

JENKINS.

MARINE CORPS HISTORICAL LIBRARY

Practice Sending This Message:

From: Support No. 3.

At: Road fork 882.

28 June 20. 5.15 a. m. No. 3.

To: Outpost Commander.

Outguard number three, support number three rushed by enemy at daylight. Two killed, two wounded, one missing. Others safe. Am investigating. Apparently outguard commander had faulty disposition. Had he been familiar with outpost problem in "Tactical Walks" affair would not have happened.

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