SIGNALLING.

The Semaphore Method.—The following chart illustrates the correct formation of the letters and figures of the semaphore code. This method of signalling is valuable because it can be employed in emergency without the use of instruments (other than the arms of the signaller), and it is a great aid to the learning of procedure and the development of precision in all signalling.

Flags.—If flags are not available, they may be easily made. Signal flags are 18 inches square and are of two colours—blue for a light background and white, with a two inch horizontal blue stripe, for a dark background. The blue stripe, however, is optional. The poles or staffs should be about three feet in length, round, and tapered from butt to tip. Both flags and poles should be made of light-weight material.

Arcs and Circles.—As indicated by the chart the alphabet is completed by rotating the flag or flags to distinct positions within several circles. To make figures the first ten letters of the alphabet (excluding the letter J) are used in order after the numerical signal has been sent. To return again from figures to letters the alphabetical signal is sent. A figure or a group of figures in the body of a word-message, for instance, is preceded once by the numerical signal and followed once by the alphabetical signal. If each flag is moved through a shallow arc to its correct position for a letter, it is easy to keep it unfurled. It is likely to wrap itself around the pole if it is jerked out in a straight line from the body.

The alphabet should be learned in easy stages, a circle at a time. After the first circle has been performed
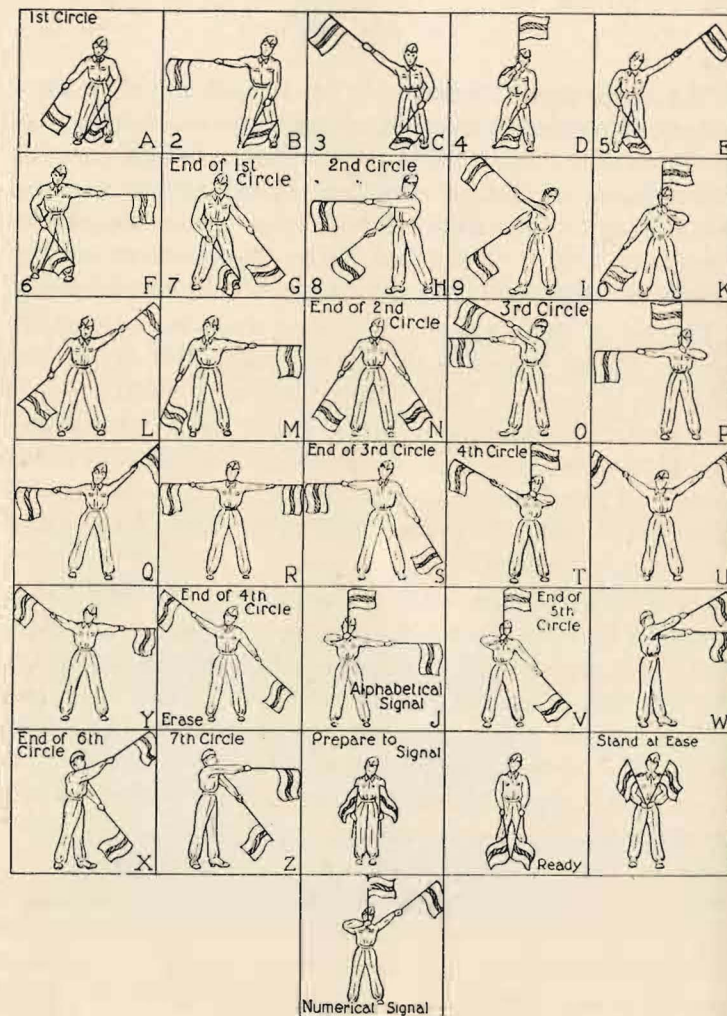
205

Fig. 1.

several times, words based on this position such as *cab, fad, dad, bad, bed, bee,* and *feed* should be practised. The flag that is not in use is kept in the "ready" position, but once a word is begun both flags do not appear together in the "ready" position, unless a letter is repeated as in *bee,* until the word is completed. To indicate the end of a group of figures, or a group of letters to make a word, both flags are brought to the "ready" position. After profitable practice has been given in reading the letters of the first circle, the letters of the second circle should be introduced, and new words formed such as *man, high, kill, kin, klim, hide,* etc. In this way the learning of the alphabet may be kept interesting throughout and what is learned may stick.

Sight and Sound.—It is well to divide the time allotted equally between sending and receiving semaphore signals. After practising the reading of signal either from flags, arms, or semaphore cards, the cadets should be drilled in open formation in the art of making the signals correctly and quickly. As the letter is formed, its phonetic name should be sounded. (See phonetic alphabet). This practice aids in fixing the position of the letter in the mind and in learning to identify sight with sound. The reasons for using the phonetic alphabet in reading a message will be obvious to any one who tries to make himself heard in a strong wind.

Slopes and Angles.—Quick and accurate reading of signals depends to a great extent on good sending. The flag staff should be grasped firmly about 10 inches from the end of the butt. This lower position of the staff should lie along the inner side of the rigid forearm, except for the making of letters such as D and K, when the arm is bent, and the forefinger should lie along the

staff and point to the flag. The flag staff should not be allowed to droop or sway in the hand and permit one flag to cover the other in letters like H and W. The angle the arm makes with the body should be as exact as that illustrated and prescribed in the chart. As the arms (and flags) are moved swiftly and smoothly from one position to another, the signals should be made sharp and distinct. A signaller who is properly trained for his job will not vary the time interval between signals, and will assure, on his honour, that his signals are correctly made. A good sender keeps his reader in mind. If there is to be any sudden jerking of the flag, it should be just as the flag reaches and leaves its position in forming a signal. As the signaller becomes proficient, he can snap his flag into and out of a letter or signal without losing his rhythm. For the present, however, watch your slopes and angles

Working in Pairs.—As soon as the alphabet has been mastered pair-work should be begun. Two stations, for instance, are set up with two cadets at each station. At each station one cadet faces the distant station and the other stands with his back to it. At the sending station the cadet who is facing the distant station makes the signals that are called to him, and reads aloud any signals that may be sent to him. The other cadet is in charge of the station. At the receiving station the reader calls out to the writer, who is in charge of the station, the signals that are sent to him and sends any acknowledgements that are required. The cadets at each station should exchange duties to give equal practice to all.

Procedure.—In order to transmit a message, it is necessary to know the form of the army message, the procedure signals involved, and how groups are counted.

A—Message as originally written.
C—Checked by signal clerk.
B—Rechecked by actual signaller, and sent along with A and C.

Fig. 2.

A full list of these signals is given below, but perhaps the best way to discover their significance is to see how they function in the transmission of a message. Imagine that two stations are in contact with each other: the following will illustrate what normally happens as a message passes from one to the other.

Points to observe:

1. The officer wrote for transmission the following: Casa Loma R2 30 S5. Report at once 1525.

2. The signal clerk noted the signature and the instruction *Important,* and entered the priority signal D in the proper place; then he counted the groups and entered 9 in the proper space for the groups; and finally he entered the T.H.I. 1530.

3. The signaller actually sent the following: $\overline{VE}$ Z ii GR9 ii z ii Casa v Loma $\overline{AAA}$ R2 ii 30 ii S5 ii Report at once $\overline{BT}$ 1525 ii 1530 $\overline{AR}$

Sender	Receiver
$\overline{VE}$ Z ii D	K
D	A
GR 9	I
ii Z ii	A
Casa	A
v	A
Loma	A
$\overline{AAA}$	A
R 2	B
ii	A
30	CK
ii	A
S 5	E
ii	A
Report	A
at	A
once	A
$\overline{BT}$	A
1525	AEBE
ii	A
1530	AECK
$\overline{AR}$	R

When sending the figure check it is not necessary to send the numerical sign.

If the receiver does not answer a group, the sender repeats it until he does.

If the sender makes a mistake in a group, he sends the erase signal and begins the group again.

If the receiver wishes time to verify the number of groups he sends Q and later when satisfied that he has received the message correctly, he sends R.

In order to conceal the identity of a unit in the field a four-letter pronounceable code name is used.

Procedure Signals.—When letters are "barred" they are run together in sending as if they formed one letter:

$\overline{VE}$	1. I have a message for you.
	2. The commencing signal.
K	Go ahead (example: sender VE Z: receiver K).
ii	Separative signal. (There are four standard ii's: one pair after each of the following—Originator's number, Date, In reply to number (whether or not it appears) and Time of origin.)
A	General answer on semaphore.
GR	Signal preceding the figures which denote the number groups in a written message.
Z	1. Signal to show that written message is for delivery at the receiver's station.
	2. Used in the "address to" of a written message to signify that the following is the address or list of addresses to which the message is sent for action.
T	1. Signal to show that a written message is for re-transmission.
	2. General answer on morse (extensively used on morse flag and lamp).
W	Signal for the word "repeated" if it appears in the "address to" space of a written message.
V	From.
$\overline{AAA}$	Break signal used immediately before the originator's number in plain language written message.
$\overline{BT}$	1. Break signal used immediately before the originator's number in a message in cipher.
	2. Break signal at the end of the text in all written messages.

CK̄ Short figure-check to follow: used on morse.
AK̄ End of transmission.
IMI Send again.
AA 1. Unknown station call.
     2. All after.
WA Word after.
WB Word before.
C Correct.
Q Wait. ex: Q 1. Wait one minute.
R Received correctly.

Additional Visual Signals.

MH Move higher or further away.
ML Move to your left as you face me.
MO Move lower or closer.
MR Move to your right as you face me.
OL Open light.

The Counting of Groups.—Any word, code name, collection of letters in cipher, combination of letters, series of figures or signs count as one group, e.g., BRQXN, NCO, 1½, A/2, XR3, 1525, ☉, but 5 lbs. or 1630 hrs. would each count as two groups.

A pair of brackets or of inverted commas is counted as one group, but the signal for block letters is not counted.

A hyphen forms part of the preceding group and is not counted by itself. Commander-in-chief, for instance, is counted as three groups. The time of origin in a message is counted as one group, but the T.H.I. is not counted although it is sent.

THE MORSE METHOD.

The morse method of signalling is commonly used on buzzer, flag, and lamp. On buzzer its advantages are accuracy, dependability, secrecy, and distance. It is used generally in all branches of the fighting services, and every sailor, soldier, and airman should have a working knowledge of the morse code.

	The Morse Code	The Sound	The Phonetic Alphabet
A	· —	dit dah	Ac
B	— · · ·	dah dit dit dit	Beer
C	— · — ·	dah dit dah dit	Charlie
D	— · ·	dah dit dit	Don
E	·	dit	Edward
F	· · — ·	dit dit dah dit	Freddie
G	— — ·	dah dah dit	George
H	· · · ·	dit dit dit dit	Harry
I	· ·	dit dit	Ink
J	· — — —	dit dah dah dah	Johnnie
K	— · —	dah dit dah	King
L	· — · ·	dit dah dit dit	London
M	— —	dah dah	Monkey
N	— ·	dah dit	Nuts
O	— — —	dah dah dah	Orange
P	· — — ·	dit dah dah dit	Pip
Q	— — · —	dah dah dit dah	Queen
R	· — ·	dit dah dit	Robert
S	· · ·	dit dit dit	Sugar
T	—	dah	Toc
U	· · —	dit dit dah	Uncle
V	· · · —	dit dit dit dah	Vic
W	· — —	dit dah dah	William
X	— · · —	dah dit dit dah	X-ray
Y	— · — —	dah dit dah dah	Yorker
Z	— — · ·	dah dah dit dit	Zebra

	Numerals	Pronunciation	Short Figures	
1	· — — — —	wun	· —	A
2	· · — — —	too	· · —	U
3	· · · — —	thr-r-ee	· · · —	V
4	· · · · —	foer	· · · · —	4
5	· · · · ·	fife	·	E
6	— · · · ·	six	— · · · ·	6
7	— — · · ·	sev-en	— · · ·	B
8	— — — · ·	ate	— · ·	D
9	— — — — ·	niner	— ·	N
0	— — — — —	owe	—	T

Punctuation Signs and Signals

$\overline{AAA}$	· — · — · —	comma	
i i i	· · · · · ·	full stop (written thus ⊙)	counted
$\overline{DU}$	— · · · · —	hyphen	
$\overline{FI}$	· · — · · ·	decimal point	
$\overline{KK}$	— · — — · —	brackets	counted
$\overline{RR}$	· — · · — ·	inverted commas	counted
$\overline{UK}$	· · — — · —	block letters	
$\overline{XE}$	— · · — ·	oblique stroke	
$\overline{MM}$	— — — —	fraction sign	
	· · · · · · · ·	erase signal	

Degrees of Priority

O i i U	most immediate
U i i A	emergency air attack
O	emergency operation
P	immediate
D	important

The underlined names or syllables of the phonetic alphabet are always used when naming the letters they represent. The others are used only when conditions require them.

The code can be learned and practised best by thinking of the letters as sounds rather than as dots and dashes. The letter A, for instance, should be learned as the sound ditdah and not as the sign . —.

In the following chart the letters are arranged in single groups for practice:

| (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
E	T	A	N	R	K	W	G
I	M	U	D	P	C	J	Z
S	O	F	B		Y	L	Q
H		V			X		

Learn one group at a time and as you master each group make up words from its letters; for example, group (1) gives the words *he, she, is* and groups (1) and

(2) together supply the words, *this, these, them,* etc. Whole sentences soon follow.

Before the cadet tries to make the sounds of the various letters and figures on the buzzer, he should hear them made correctly by his instructor. From the very beginning the cadet should try to sense the *rhythm* of each letter. The letter F, for instance, has the rhythm dit, dit, dah, dit. The first two dits run up to the dah and the last dit falls over on the other side.

The time taken to sound each letter remains the same. It is the interval between letters that varies when the speed of sending is raised or lowered. This is very important. A good signaller does not send faster than he himself can receive, and a gentleman will accommodate his speed to the ability of his receiver.

When sending do not grip the key or pound it. Little pressure is necessary to make the contact. Place the first two fingers of the hand on the upper, farther side of the key and the thumb under the nearer side. Assume a restful position with the arm and hand relaxed. Tension of any kind makes the sending jerky and often leads to
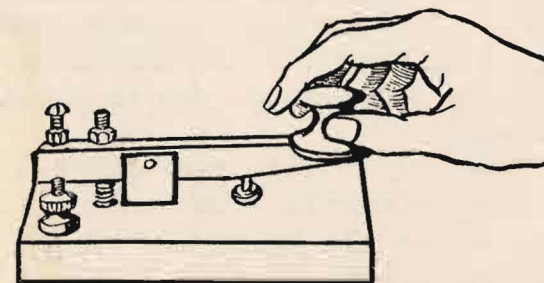
THE MORSE KEY.

inaccuracy. With the fingers on the key and the elbow on the table, raise the wrist slightly to assure that the forearm is not rigid and begin. Without taking the fingers off the key, practise making a series of dots or dits; then practise making a series of dashes or dahs. After you have mastered the proper handling of the key, begin working on the groups in the order in which they have been given above. Frequent short periods (20 minutes) of practice in sending or receiving are likely to produce better results than long and infrequent or irregular periods. To become a proficient operator, will require considerable tenacity of purpose. but once the skill is mastered it is yours for a lifetime.

MORSE LAMP

To signal by morse lamp the sender uses a key, cut into a circuit with an electric light bulb, and the reader reads short and long flashes of light.

On the following page are given the circuit diagrams for both a buzzer and a lamp. If the materials are available, a student can easily make a very serviceable buzzer and lamp for sending the morse code. Speed and accuracy in sending and receiving cannot be achieved in a short period of time. Regular short periods of practice throughout the year are necessary to attain proficiency.

The rewards for your efforts, however, will be apparent as soon as you enter the communications branch of any of the services. You cannot tell when this knowledge and skill may help you out of a difficulty, or assist you to increase your usefulness.

CIRCUIT DIAGRAM FOR SENDING MORSE CODE BY BUZZER
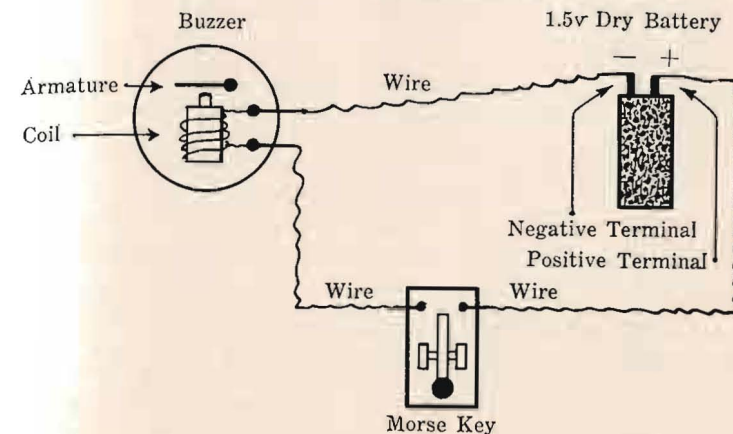
CIRCUIT DIAGRAM FOR SENDING MORSE CODE BY LAMP
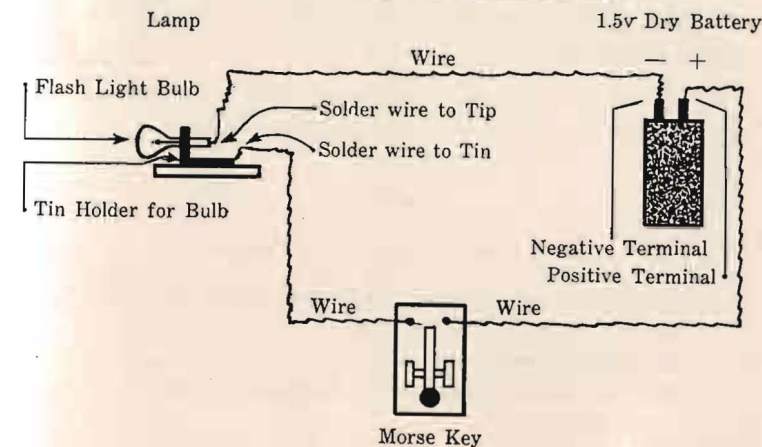
MESSAGE PROCEDURE BY LAMP

Sender	Receiver
$\overline{VE}$ Z	K
$\overline{GR}$ 8	k
ii 2 ii	d
Dopi	T
v	T
Bozo	T
$\overline{AAA}$	T
H 3	v
ii	T
29	un
ii	T
M 1	a
ii	T
all	T
quiet	T
$\overline{BT}$	T
1315	avae
ii	T
1320	avut
$\overline{AR}$	T

A long dash on the lamp signifies to the sender that the reader is checking the groups and the message as a whole. When he is satisfied that all is correct, the reader sends R.

By lamp the end of a group is indicated by a pause longer than the time interval between letters.

TEST

Your Knowledge and Skill in Signalling

1. What is the value of being proficient in semaphore signalling?
2. How can flags be kept unfurled?
3. Why should angles be exact?
4. How are groups indicated by semaphore? Flag? Buzzer? Lamp?

5. Recite the phonetic alphabet.
6. Explain with illustrations how the flag should be held for semaphore.
7. In pair-working why should only one man face the distant station?
8. What are the priority signals? Where are they entered on the message form and by whom?
9. What is the significance in the Call and Instructions of each of the following letters—Z, W, T?
10. When is $\overline{AAA}$ sent before the originator's number?
11. What are the four standard ink-ink's?
12. Where is the signal $\overline{BT}$ used? Why?
13. What is the difference in meaning between the signals $\overline{BT}$ and $\overline{AR}$?
14. Trace in detail the duties of a signaller immediately after he has received a message from an officer for transmission.
15. What does the signaller send that does not appear on the receiver's message form in the transmission of an ordinary message by buzzer?
16. Why are code names used?
17. Invent ten code names.
18. What are the uses of the separative signal?
19. How many groups are there in each of the following: QM, 7¾, X-ray, LONDON, "aircraft", 1500 hrs., Dmk 5, M(16)G, Lm/45, figure-check.
20. What are the advantages of signalling by buzzer?
21. How would you send the following groups by semaphore: ½, 11¼, 2.5?