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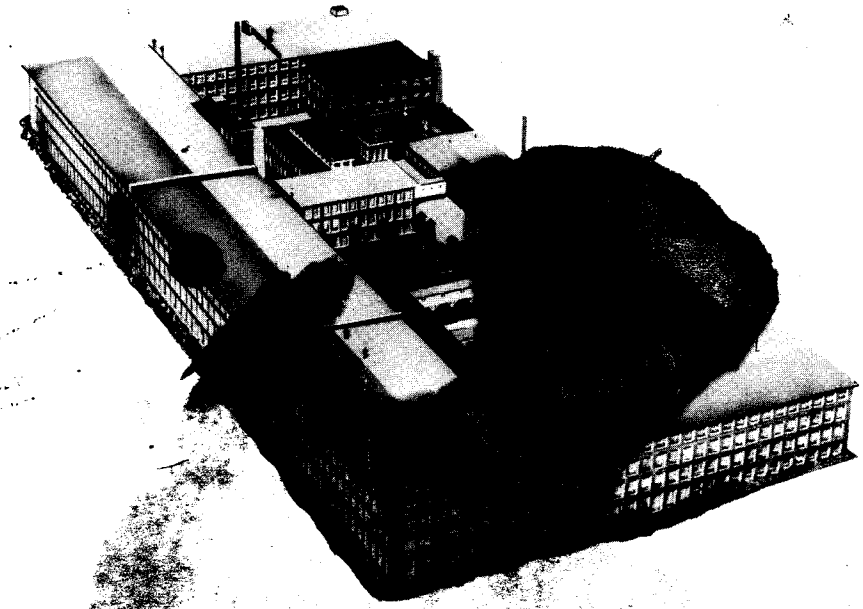

INSULINE CORPORATION OF AMERICA

Manchester, New Hampshire

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INTERNATIONAL

MORSE CODE

A COURSE OF
PRACTICAL INSTRUCTION

Prepared by

LT. COMMANDER F. R. L. TUTHILL, U.S.N.R.

and

LT. (J.G.) E. L. BATTEY, U.S.N.R.

INSULINE CORPORATION OF AMERICA

Manchester, New Hampshire

Quality Products
for over a
Quarter of a Century

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Manchester, N. H.

The Insuline Corp. takes particular pride in presenting this course in the International Morse Code to America's young men and women who want to learn to use this means of communication in order to be able to be of greater service to their country. It is particularly gratifying to have had the cooperation of the members of the very competent staff of the U. S. Naval Training School at Noroton Heights, Connecticut.

We are particularly grateful to

LT. COMMANDER F. R. L. TUTHILL, U.S.N.R.

and

LT. (J.G.) E. L. BATTEY, U.S.N.R.

noted code experts for their painstaking work in writing this manual and supervising the recording of the code records

INSULINE CORP. OF AMERICA

PREFACE

MANY members of the huge army of listeners-in will at some time or other have heard mysterious buzzing sounds on the "radio" which, although recognizable as systematic signals, will have been unintelligible to those unacquainted with the Morse Code. And no doubt they have often had their curiosity aroused by these signals and have wished that they could interpret them. Familiarity with the International Morse Code would have enabled them to do this, provided, of course, that they were acquainted with the language used and that no secret code was employed.

By issuing the present short course of instruction in the Morse Code the Insuline Corp. has made it possible for all who are willing to make the small effort entailed in mastering it to learn not only how to understand the Code, but also how to transmit messages in it. The course will be an invaluable aid to all those who find it necessary or desirable to learn the Code for professional or other reasons. The utility of a practical knowledge of Morse to all members of the Air Force, the Navy, the Army and the Marine Corps—and the Officers' Training Corps, as a part of their equipment for useful service and as a means to advancement, is too obvious to need pointing out. Without such knowledge the training of Boy Scouts and Girl Guides is incomplete. By means of it, ships at sea can keep in constant touch with the world from which they are temporarily separated. In certain branches of the postal and railway services a practical knowledge of Morse is indispensable and in aviation in general it is of the utmost importance. Nor is its utility confined to ordinary, every-

day work; there have been many dramatic instances of its value in the most unexpected circumstances. For example, miners entombed in the depths of the earth by falls of ground or other accidents in the mine-workings have more than once been saved from death by the fortunate chance that one among them has been familiar with the Code and has thus been able to communicate with the rescue parties and guide them in their work by tapping in Morse on the wall of their prison.

But apart from its practical utility in the struggle for existence, a knowledge of Morse opens up a vast field of interest to "short wave" enthusiasts. By its means they are able to "listen-in" to ships "talking" to one another on the high seas, or to stations ashore, and to follow "conversations" between stations in many parts of the world. They can get first-hand and immediate news of dramatic events on land and sea in a much more thrilling form that in the cold print of newspaper reports. The messages pulsing through the ether will carry to their ears word-pictures of exciting happenings to which less fortunate listeners are deaf. They can hear the frantic call for help of a blazing vessel and the reassuring replies of ships hastening to her aid from all sides, and with the aid of the successive messages they can form a mental picture of the crew of the stricken craft battling with the flames and of the rescuers plunging through the waves at their utmost speed and gradually nearing the scene of the disaster. The curtain of the World's stage will be raised for them, and all the drama of humanity—its struggles, its hopes and fears, its joys and sorrows—will be brought home to them and made almost as real as if they were themselves taking part in it.

For those interested in foreign languages Morse is of especial value; the more languages they know, the more use will they

be able to make of the Code, and the more use they make of the Code, the more practice will they get in those languages.

The Insuline Course of Instruction in the Morse Code consists of ten carefully graduated lessons recorded on five double-sided gramophone records, and the present booklet contains full and practical instructions as to how to make the best use of the records.

Insuline Corp. of America

THE INTERNATIONAL MORSE CODE

A Course for Individual Study

This course, consisting of ten scientifically prepared lessons, is designed to provide the student with a means of self-instruction in receiving and sending the International Morse Code. Upon completion of the course the student will have attained a receiving speed of at least 15 words-per-minute. With this foundation he will be ready for more advanced practice, such as actually listening to faster code "on the air," especially on the short waves (high frequencies.) The course also provides a splendid groundwork for the man who expects to go into radio work in any of the armed services.

The make-up of the Code should be understood before actually starting the course. The Code consists of various combinations of dots, dashes and spaces. For purposes of adjusting our thoughts to terms of "sound" we will hereafter refer to a dot as "dit" (or "di"), and a dash as "dah." All code is based on the following time units, with the "dit" as the basic unit.

Dit	■	(Basic time unit)
Dah	▬	(Equivalent to three dits)
Element Space	■	(The space between parts of any character; equivalent to one dit)
Character Space	▬	(The space between any two characters; equivalent to three dits, or one dah)
Word Space	▬▬	(The space between any two words or groups; equivalent to seven dits)

The student should familiarize himself with these relative time units. They are particularly important when practicing sending.

PHONETIC METHOD OF INSTRUCTION

The phonetic method of instruction (entirely by sound) is used in this course. Each character is introduced to the student as a complete sound, rather than a combination of dits and dahs. If you do not use the sound method, you will go through a double deciphering process,

first to hear the signal, then to determine its "dot-dash" make-up. Learning by sound eliminates the second step. You recognize each signal instantly as the character it represents. Each character has a distinct sound-formation all its own.

At all times think of each character as a sound. Example: di-dah (A) ; dah-di-di-dit (B) ; etc. Do not count the number of dits and dahs to determine the character. Think only of the complete sound. The elementary work of recognizing each character by sound is one of the most important phases of learning the code.

The International Morse Code

ALPHABET

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

NUMERALS

1	di-dah-dah-dah-dah
2	di-di-dah-dah-dah
3	di-di-di-dah-dah
4	di-di-di-di-dah
5	di-di-di-di-dit
6	dah-di-di-di-dit
7	dah-dah-di-di-dit
8	dah-dah-dah-di-dit
9	dah-dah-dah-dah-dit
Ø (Zero)	dah-dah-dah-dah-dah (To differentiate Zero from the letter O, it should always be written thus: Ø.)

PUNCTUATION MARKS AND SPECIAL SIGNALS

International Distress Signal (SOS) di-di-di-dah-dah-dah-di-di-dit
Period di-dah-di-dah-di-dah
Comma dah-dah-di-di-dah-dah
Question Mark di-di-dah-dah-di-dit
Double Dash (=) (BT) dah-di-di-di-dah
End of Message (AR) di-dah-di-dah-dit
End of Work (VA) di-di-di-dah-di-dah
Wait Sign (AS) di-dah-di-di-dit
Invitation to Transmit (K) dah-di-dah
Hyphen dah-di-di-di-di-dah
Parentheses dah-di-dah-dah-di-dah
Colon (OS) dah-dah-dah-di-di-dit
Semicolon dah-di-dah-di-dah-dit
Decimal Point Sign di-dah-dit
Quotation Marks (AF) di-dah-di-di-dah-dit
Error Sign di-di-di-di-di-di-di-dit
Apostrophe di-dah-dah-dah-dah-dit
Fraction Bar (XE) dah-di-di-dah-dit
Sign Indicating Test di-di-di-dah
Dollar Sign ($) (SX) di-di-di-dah-di-di-dah

FOUR IMPORTANT POINTS

Four major factors in learning to receive code are (1) Concentration, (2) Practice, (3) Confidence and (4) Patience.

CONCENTRATION: This is of the utmost importance. When practicing code, clear your mind of everything else. Permit nothing to interrupt you. Learn to concentrate strictly on the work immediately at hand. Speed and proficiency in mastering the code depends largely on the individual, his ability to concentrate and the amount of effort he applies. Concentration is vitally important when you are first starting to learn the code. You must get the characters firmly fixed in your mind during the primary lessons and this requires every ounce of concentration you can apply. You cannot easily "catch up" later on as the speeds will be greater. Don't let "outside" noises distract you. Keep your mind on the signal you are copying. If local room noises occur, try to disregard them, pay no attention to them. Concentrate only on what you are copying.

PRACTICE: Progress in code reception will be directly proportional to the amount of practice you apply. Speed proficiency is mostly a matter of practice, and more practice.

CONFIDENCE: From the start, resolve that you are going to master the subject of code reception. Do your best at all times. Never permit yourself to become discouraged over your progress. There is no definite known time as to how long it will take a person to learn the code, or to reach certain speed levels. Individual progress will vary. Never give up.

PATIENCE: Don't become impatient regarding the time it may take you to learn the code. You may reach certain speeds above which you find it difficult to progress. If this occurs don't feel that you are lost. Keep plugging steadily and you will succeed. For every student there are certain speed levels where temporary "stagnation" occurs. But be patient, apply yourself conscientiously and you will later make up for lost time.

VALUABLE SUGGESTIONS AND HINTS

Aim to get each character on paper just as soon as possible after

hearing it. Immediately upon recognizing a character, stop thinking of it as a sound; think of it then only as a letter or numeral to print or type. This leaves the mind free to grasp the next sound while you are recording on paper the previous character.

When copying, if you miss a character, don't worry about it—go on to the next. Just as soon as the first sound of the next character is heard, stop trying to figure out what the "missing" character was. During periods of practice the aim should be to get down everything possible, without worrying about missed characters. As your ability to copy increases you will miss fewer characters. The more alert you are, the faster you can get characters on paper after hearing them, and you will miss fewer, because you will have more time to think of the next signal.

The faster you can print, type, or write (as the case may be), the easier it will be for you to copy code. When the mind does not have to struggle with the problem of typing, printing or writing in addition to code, full concentration on *code* is possible. It is urged, therefore, that the student make every effort to increase his ability to print, type and write rapidly and legibly. Whenever a pencil is used for copying code groups *printing* must be used. When pencil is used for copying plain language, it is permissible to *write* (*longhand*). The typewriter should not be used until (1) your code speed is at least 12 w.p.m. and (2) your typing speed at least 25 w.p.m. Typing speed should always be considerably faster than code speed. Whether you are using pencil or typewriter, *be neat at all times.* Avoid "strike-overs." Take pride in your work.

COPYING BEHIND

The real answer to the ability to copy code at high speeds is development of the knack of "copying behind." Contrasted with "copying ahead," where you anticiapte what is coming (a faulty, dangerous practice), the ability to copy "behind" should be cultivated as soon as possible. You should start by trying to carry two characters in your head before you record either on paper. As soon as you recognize the *second* character, you put the *first* on paper, and so on. By constant practice you will find yourself able to carry several characters in your head at a time, and, later, you will carry whole words.

A simple exercise, which the individual can carry out by himself,

is suggested to train the mind along the lines of "copying behind." Take a clean sheet of paper and draw a line down the middle. On the left-hand side of the line, write a list of simple 3-letter words (CAT, DOG, MAN, BOY, MUD, etc.). Then, while spelling the first word (CAT) out loud, write on the right-hand side of the paper the next word down on the list (DOG). Then spell out loud the word DOG, but at the same time write down the next word (MAN). Continue this process down the entire list. This may be found difficult at first, but a rather quick improvement will be noticed after the third or fourth trial. The mind is thus being trained to carry one word, while another part of the mind is directing the writing of a different one. Upon such a simple foundation may be laid the future ability to copy several words behind.

AN AUXILIARY CHARACTER MEMORIZING SYSTEM

If difficulty is encountered in memorizing the sound-formation of each character, the following system may be found helpful.

Make up 36 small cards, preferably from cardboard. On one side of each card print a letter of the alphabet or numeral. (It will take 36 cards for the entire alphabet and numerals 1-Ø.) On the reverse side of each card put the "sound symbol" for the respective character (di-dah, if the character on the face of the card is A; dah-di-di-dit if the character is B, etc.). Shuffle the cards and run through them, first with the face-side up, then with the reverse-side up. As you come to any given printed character repeat to yourself the sound of that character. Example: If you come to the numeral 4, repeat to yourself "di-di-di-di-dah"; then you can check yourself by turning the card over. If using the back of the cards, the procedure will be reversed; you will say the sound-symbol to yourself and then repeat the character that it represents, checking yourself by looking at the face of the card. Care must be taken to always use the *"sounds";* never call a character by "dot-dash," etc.

A helpful trick is to carry a set of these cards in your pocket, taking them out from time to time throughout the day and running through them. This will be found particularly useful throughout the early stages of the course.

IMPORTANCE OF MIXED-CHARACTER GROUPS

The greater part of this Code Course consists of groups of mixed-characters (letters and numerals), all characters being given in equal quantities. The reason for this type of study is that the proficient operator must be able to recognize all characters with equal ease. It is a fact that the letters most used in every day English are, in code, easiest to remember and fastest to form (have the smallest number of dits and dahs). On the other hand, those letters used the least in English have the most complicated arrangement of dits and dahs and are both hard to remember and take longest to form. By constant practice on mixed-character groups, all characters are learned equally well. The use of mixed-characters gives you the only sure foundation upon which to build a satisfactory receiving abiilty.

GENERAL HINTS

Advancement in code is primarily a matter of practice. Apply as much time as possible in practice, but don't go beyond the point of fatigue. If you find your mind getting tired and the characters become confusing, stop practicing. Relax awhile and begin again.

As you go about your daily duties, whistle or repeat to yourself as rapidly as possible the code symbols for the signs on billboards, street signs, etc. It is good practice.

In copying, if you miss a character or make a mistake, don't become confused. Just make a dash (—) on the paper in place of the missed character, and think only of the next character to be heard. If you permit yourself to worry over a character missed, you will lose one or more following characters. It is natural to miss a character occasionally, but when you do don't worry about it.

Don't look back over what you have copied. It will disrupt your train of thought.

Ability to copy code cannot be acquired in a day. It takes time. Realize this and don't become discouraged over seemingly slow progress.

To learn how to receive and send code is an educational accomplishment. The lessons of this course are designed to carry you to your goal quickly and with the minimum of effort.

REGARDING SENDING PRACTICE

Information on the correct use of the telegraph key is given elsewhere in this booklet. **IMPORTANT:** Use of the key should not be attempted until completion of Lesson No. 4. It has been proven by experience that students should not start sending practice until they can successfully and easily recognize all characters. The reason is simple: In learning to send correctly we must first know how good code sounds.

Upon completion of Lesson No. 4, it is suggested that the student combine sending practice with his receiving practice, sending the material covered, lesson by lesson. While learning Lesson No. 5, the student should practice sending the material covered in Lesson No. 4. Upon completion of Lesson No. 5, sending practice based on the material in that lesson should start. Never attempt to send the material contained in any lesson until you have first mastered its reception.

In order to acquire the correct formation of each character, it is recommended that while practicing any given lesson, the student play through the appropriate record, sending each character after it is heard and trying to make his sending sound like the recorded characters. Practice sending to yourself out of a book or newspaper. It will increase your receiving speed.

THE TEN LESSON COURSE

The course presented herein consists of ten separate lessons. They have been systematically prepared and must be studied *in order.* ***Caution:*** Do not attempt to start any lesson until you have thoroughly mastered *all* preceding lessons. Each lesson is outlined individually and the method of approach explained in detail. Follow the instructions carefully.

LESSON No. 1 — *INSTRUCTIONS*

Adjust phonograph to 78 r.p.m. Use Record No. 1. This lesson is divided into two sections. Section 1, on the first half of the record, covers the characters **E I S H 5 4.** Section 2, on the second half of the record, covers the characters **T M O Ø 9 X.** The object of this lesson is to learn these twelve characters.

PROCEDURE:

First play the record through, following along character by character with the letters and numerals shown at the bottom of the page. Repeat this as many times as necessary, until you are familiar with the sound of each character.

When you feel you can recognize each character by sound, close the instruction book and play the record through, printing each character neatly as heard. Check your results. Repeat this practice until you make 100% copy (no errors).

As soon as you make perfect copy of Lesson No. 1, proceed to Lesson No. 2. Do not attempt the second lesson until you master the first.

LESSON No. 1

EEEE IIII SSSS HHHH 5555 4444 E I S H 5 4 5 H S

I E 4 S 5 I H 4 S 5 H 4 H I 5 S E H I S E 4

5 H S I E S H 5 4 H S E I 5 S 4

TTTT MMMM OOOO ØØØØ 9999 XXXX T M O Ø 9

X 9 Ø O M T X O 9 M Ø X O 9 Ø X 9 O T

Ø M O T M X Ø O T 9 M X Ø 9 T O X 9 M Ø

LESSON No. 2 — *INSTRUCTIONS*

Adjust phonograph to 78 r.p.m. Use Record No. 2. The object of this lesson is to learn the characters **A R L W J 1** (Section 1) and **U F P V 2 3** (Section 2).

PROCEDURE:

First, review Lesson No. 1.

Second, play record No. 2 through, following each character as shown at the bottom of the page. Repeat this until you are familiar with the sound of each character of the new lesson.

Third, close the instruction book and play the record through, printing each character carefully as heard. Check your results. Repeat this procedure until you make 100% copy on the entire lesson. While practicing Lesson No. 2, occasionally review Lesson No. 1 in order to keep the mind refreshed on all characters so far learned.

When Lesson No. 2 has been completed, proceed to Lesson No. 3. Do not even listen to Lesson No. 3 until the first two lessons are completely mastered.

LESSON No. 2

AAAA RRRR LLLL WWWW JJJJ 1111 A R L W W J

1 J W L R A 1 L J R W 1 L J W 1 L A W R

L A R 1 W J A L R 1 L

UUUU FFFF PPPP VVVV 2222 3333 U F P V 2 3 2 V

P F U 3 P 2 F V 3 P 2 V 3 V P U F 3 2 V P F

U 2 3 F V P U F 2 V P 3 U 3 F 2 V

LESSON No. 3 — *INSTRUCTIONS*

Adjust phonograph to 78 r.p.m. Use Record No. 3. The object of this lesson is to learn the characters **N D B 6 7 8** (Section 1) and **G Q Z K C Y** (Section 2).

PROCEDURE:

First, review Lessons No. 1 and No. 2.

Second, play record No. 3 through, following each character as shown at the bottom of the page. Repeat this until you are familiar with the sound of each character of this new lesson.

Third, close the instruction book and play the record through, printing each character as heard, always taking care to print legibly. Check your results. Repeat this procedure until you make 100% copy of the entire lesson. While practicing Lesson No. 3, occasionally review Lessons No. 1 and No. 2 to keep all characters fresh in your mind.

When, and only when, Lesson No. 3 has been mastered, proceed to Lesson No. 4.

LESSON No. 3

NNNN DDDD BBBB 6666 7777 8888 N D B 6 7 8 7 6

B D N 8 N B 7 D 6 8 B 7 6 8 7 N 8 D B B 6

8 B N 7 D 6 B

GGGG QQQQ ZZZZ KKKK CCCC YYYY G Q Z K C

Y C K Z Q G Y G Z C Q K Y Z C K Y C G Y G

Y Q C Z K Y G C Q K Z Q Y Z C K Y Q C Z

K G

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LESSON No. 2 — *INSTRUCTIONS*

Adjust phonograph to 78 r.p.m. Use Record No. 2. The object of this lesson is to learn the characters **A R L W J 1** (Section 1) and **U F P V 2 3** (Section 2).

PROCEDURE:

First, review Lesson No. 1.

Second, play record No. 2 through, following each character as shown at the bottom of the page. Repeat this until you are familiar with the sound of each character of the new lesson.

Third, close the instruction book and play the record through, printing each character carefully as heard. Check your results. Repeat this procedure until you make 100% copy on the entire lesson. While practicing Lesson No. 2, occasionally review Lesson No. 1 in order to keep the mind refreshed on all characters so far learned.

When Lesson No. 2 has been completed, proceed to Lesson No. 3. Do not even listen to Lesson No. 3 until the first two lessons are completely mastered.

LESSON No. 2

AAAA RRRR LLLL WWWW JJJJ 1111 A R L W W J

1 J W L R A 1 L J R W 1 L J W 1 L A W R

L A R 1 W J A L R 1 L

UUUU FFFF PPPP VVVV 2222 3333 U F P V 2 3 2 V

P F U 3 P 2 F V 3 P 2 V 3 V P U F 3 2 V P F

U 2 3 F V P U F 2 V P 3 U 3 F 2 V

LESSON No. 3 — *INSTRUCTIONS*

Adjust phonograph to 78 r.p.m. Use Record No. 3. The object of this lesson is to learn the characters **N D B 6 7 8** (Section 1) and **G Q Z K C Y** (Section 2).

PROCEDURE:

First, review Lessons No. 1 and No. 2.

Second, play record No. 3 through, following each character as shown at the bottom of the page. Repeat this until you are familiar with the sound of each character of this new lesson.

Third, close the instruction book and play the record through, printing each character as heard, always taking care to print legibly. Check your results. Repeat this procedure until you make 100% copy of the entire lesson. While practicing Lesson No. 3, occasionally review Lessons No. 1 and No. 2 to keep all characters fresh in your mind.

When, and only when, Lesson No. 3 has been mastered, proceed to Lesson No. 4.

LESSON No. 3

NNNN DDDD BBBB 6666 7777 8888 N D B 6 7 8 7 6

B D N 8 N B 7 D 6 8 B 7 6 8 7 N 8 D B B 6

8 B N 7 D 6 B

GGGG QQQQ ZZZZ KKKK CCCC YYYY G Q Z K C

Y C K Z Q G Y G Z C Q K Y Z C K Y C G Y G

Y Q C Z K Y G C Q K Z Q Y Z C K Y Q C Z

K G

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LESSON No. 4 — *INSTRUCTIONS*

Adjust phonograph to 78 r.p.m. Use Record No. 4. This lesson covers all letters of the alphabet and all numerals. The object is to increase the speed of recognizing and printing all 36 characters. Speed attained by this lesson is approximately 5 words per minute.

PROCEDURE:

First, review Lessons No. 1, No. 2 and No. 3.

Second, play record No. 4 through, following each character as shown at the bottom of the page. Repeat this several times, until you are able to recognize all 36 characters as heard.

Third, close the instruction book and play the record through, printing each character as heard and keeping your printing as neat as possible. Check your results after each playing. Repeat this procedure until you make perfect copy of the entire lesson. If any difficulty is encountered with certain letters, stop and review the lessons in which the difficult letters were covered.

When Lesson No. 4 has been thoroughly mastered, proceed to Lesson No. 5. (Start Sending Practice at this point.)

LESSON No. 4

T 4 6 W 8 M 1 A L 5 Y 7 Z C Ø P K H V U

N E 2 J Ø Q Z V R K P G X Z O J Y 4 U W

B M J Q H P 9 3 C X 9 A 5 B 7 G 2 8 N 6 V

R T 1 Q Ø S K Y D L Z F 1 Q P J 1 A B 9 X

4 F Z V T C U Ø 8 B 3 W L Q

LESSON No. 5 — *INSTRUCTIONS*

Adjust phonograph to 78 r.p.m. Use Record No. 5. The object of this lesson is to learn to receive 2-character groups. Speed attained by this lesson is approximately 7 words per minute.

PROCEDURE:

First, review Lesson No. 4.

Second, play record No. 5 through, following each character as shown at the bottom of the page. Repeat this several times, until you are familiar with the sound of the various two-character combinations.

Third, close the instruction book and play the record through, printing each group as heard, leaving a space between each group as you print. Remember that neatness is important. Check your results after each playing. Repeat this procedure until you make perfect copy of the entire record. Review Lesson No. 4 occasionally, if any difficulty is encountered in recognizing individual characters.

When Lesson No. 5 has been completely mastered, proceed to Lesson No. 6.

LESSON No. 5

41 CJ UT 57 NR OL Ø6 29 SC BP HK QV 38 Ø4

XJ WF 21 65 73 YZ IG BZ ND 64 Ø9 71 QD CS

HT AE 65 AX JR Ø3 GW VC EQ XU 26 MB AT RS

IZ Ø2 ME NK YV NA 68 14 DC UO BD AK GJ HE

RF DW PN IK MQ ZO TU YX LA JP

LESSON No. 6 — *INSTRUCTIONS*

Adjust phonograph to 78 r.p.m. Use Record No. 6. The object of this lesson is to learn to receive 3-character groups. Speed attained by this lesson is approximately 8 words per minute.

PROCEDURE:

First, review Lessons No. 4 and No. 5.

Second, play record No. 6 through, following each character as shown at the bottom of the page. Repeat this several times, until you are familiar with the sound of the various three-character combinations.

Third, close the instruction book and play the record through, printing each group as heard, leaving a space between each group as you print, and not forgetting neatness. Check your results after each playing. Repeat this procedure until you make perfect copy of the entire record. Review Lessons No. 4 and No. 5 as necessary.

When you can make perfect copy of Lesson No. 6 with ease, proceed to Lesson No. 7.

LESSON No. 6

924 385 175 FOE QHJ SPM GIW AIR 173 AZY 675

NHR QMS FOB PAV 937 483 GBW AKI TCN GZP SML

BVU OWE HYG FRJ 928 3Ø1 YOZ 317 VUO WEH

GJF RJD JER XBI 386 KGP TWV KSH UGM QOY 183

592 YRA BCL NJV 285 376 UXD BCO

LESSON No. 7 — *INSTRUCTIONS*

Adjust phonograph to 78 r.p.m. Use Record No. 7. The object of this lesson is to learn to receive 4-character groups. Speed attained by this lesson is approximately 9 words per minute.

PROCEDURE:

First, review Lessons No. 5 and No. 6.

Second, play record No. 7 through, following each character as shown at the bottom of the page. Repeat this several times, until you are familiar with the sound of the various four-character combinations.

Third, close the instruction book and play the record through, printing each group neatly as heard, leaving a space between each group as you print. Check your results after each playing. Repeat this procedure until you make perfect copy of the entire record. Review Lessons No. 5 and No. 6 as necessary.

Proceed to Lesson No. 8, when Lesson No. 7 has been mastered 100%.

LESSON No. 7

1579 DKOA NLKJ PWVF 132Ø QESU 8641 IZXJ MVCH

GTRY YSWT KVUD 1Ø72 NOXU ERCM JBXH 5938 AILF

PQGZ 7462 VABE QUWG MKTE HLXJ 2814 STRD JYXO 569Ø

IFZC MWOD PFCM UJTG MYLV SDUK QIZR BAHE

DXRK VQUC PMHN SWOS TLBI EADG

LESSON No. 8 — *INSTRUCTIONS*

Adjust phonograph to 78 r.p.m. Use Record No. 8. The object of this lesson is to learn to receive 5-character groups. Speed attained by this lesson is approximately 10 words per minute.

PROCEDURE:

First, review Lessons No. 6 and No. 7.

Second, play record No. 8 through, following each character as shown at the bottom of the page. Repeat this several times, until you are familiar with the sound of the various five-character combinations.

Third, close the instruction book and play the record through, neatly printing each group as heard, leaving a space between each group as you print. Check your results after each playing. Repeat this procedure until you make perfect copy of the entire record. Review preceding lessons as necessary.

Upon completion of Lesson No. 8 (when this lesson can be copied without error), proceed to Lesson No. 9.

LESSON No. 8

LUYNI MQVKZ GDUJI 6158Ø BFOKV 7Ø239 TCHAW

Ø5689 GRJES 32971 TOJIM FGHNV BWRZL Ø8426

CPSUQ KAEYX DXRBW 98352 ZLYMI 647Ø1 43921

UQXVN WMBOT PACHF 678Ø5 LYZCD SREJG DNIRB

ZRUKG WXPHM KTAFC GLSEV 189Ø6 YQJZO RKPAL

UCLZD MCWIO BFGUM

LESSON No. 9 — *INSTRUCTIONS*

Adjust phonograph to 78 r.p.m. Use Record No. 9. The object of this lesson is to learn to receive at 15 words per minute. 2-, 3-, 4- and 5-character groups are used in this lesson.

PROCEDURE:

First, review Lessons No. 5, No. 6, No. 7 and No. 8.

Second, play record No. 9 through, following each character as shown on the bottom of the page. Repeat this several times, until you are familiar with the sound and spacing of the groups of different lengths

Third, close the instruction book and play the record through, printing carefully each group as heard, leaving a space between each group as you print. Check your results after each playing. Repeat this procedure until you make perfect copy of the entire record. Review preceding lessons as necessary.

Upon successful completion of Lesson No. 9, proceed to Lessons No. 9A and No. 10.

LESSON No. 9

JAGZK QESU 41 FOE CJ POFE 385 UT 957Ø8 YKXG

DIFEQ NVCH 57 VHJ NR BNVD 924 OL SAWNR JYVF

BLPFS PWVF Ø6 SPM 29 ICUT BCO SC COGUL CQOZ

PEBIT 1972 BP GZW HK WAVF DCT QV SHVXO 684Ø

FAOZX GTRY XJ AUR WF SVJE YIE YZ GNNKL AILF

TJMGA TLBI 35 QMS AP LNPM AKI QG 46132 BDSE

LESSON No. 9A — *INSTRUCTIONS*

Use Record No. 9. The object of this lesson is to increase speed up to the capabilities of the student. By increasing the revolutions of the phonograph turntable, the speed of the material on Record No. 9 may be speeded up to as fast a rate as desired. To determine the approximate speed, total the number of characters heard in one minute and divide by five. In radio code average words are figured on the basis of five-characters-to-the-word. If you run the phonograph so that 100 characters are heard in one minute, the speed will be approximately 20 words per minute, etc. It is recommended that the student increase speed gradually, advancing to a faster speed only when solid copy is made at the slower speed.

LESSON No. 10 — *INSTRUCTIONS*

Adjust phonograph to 78 r.p.m. Use Record No. 10. The object of this lesson is to learn the Punctuation Marks and Special Signals commonly used in radio work.

PROCEDURE:

First, play record No. 10 through, following the material shown at the bottom of the page. Repeat this as many times as necessary, until you are familiar with the sound of each punctuation mark and special signal.

Second, close the instruction book and play the record through, putting down on paper each punctuation mark, etc., as heard. Check your results after each playing. Repeat this procedure until you can make a perfect copy of the entire record.

LESSON No. 1Ø

.. „ ?? == $\overline{AR}$ $\overline{AR}$ $\overline{VA}$ $\overline{VA}$ $\overline{AS}$ $\overline{AS}$ K K - - ( )

: : ; ; " " EEEEEEEE EEEEEEEE ' ' / / V V $ $

$\overline{SOS}$ $\overline{SOS}$

EXAMPLES: MARY WORE JANE'S SO-CALLED HAT; IT WAS ½ SIZE TOO SMALL. "MISFIT" WAS NO WORD FOR ST EEEEEEEE FOR IT, BUT WHY DID SHE WEAR IT?

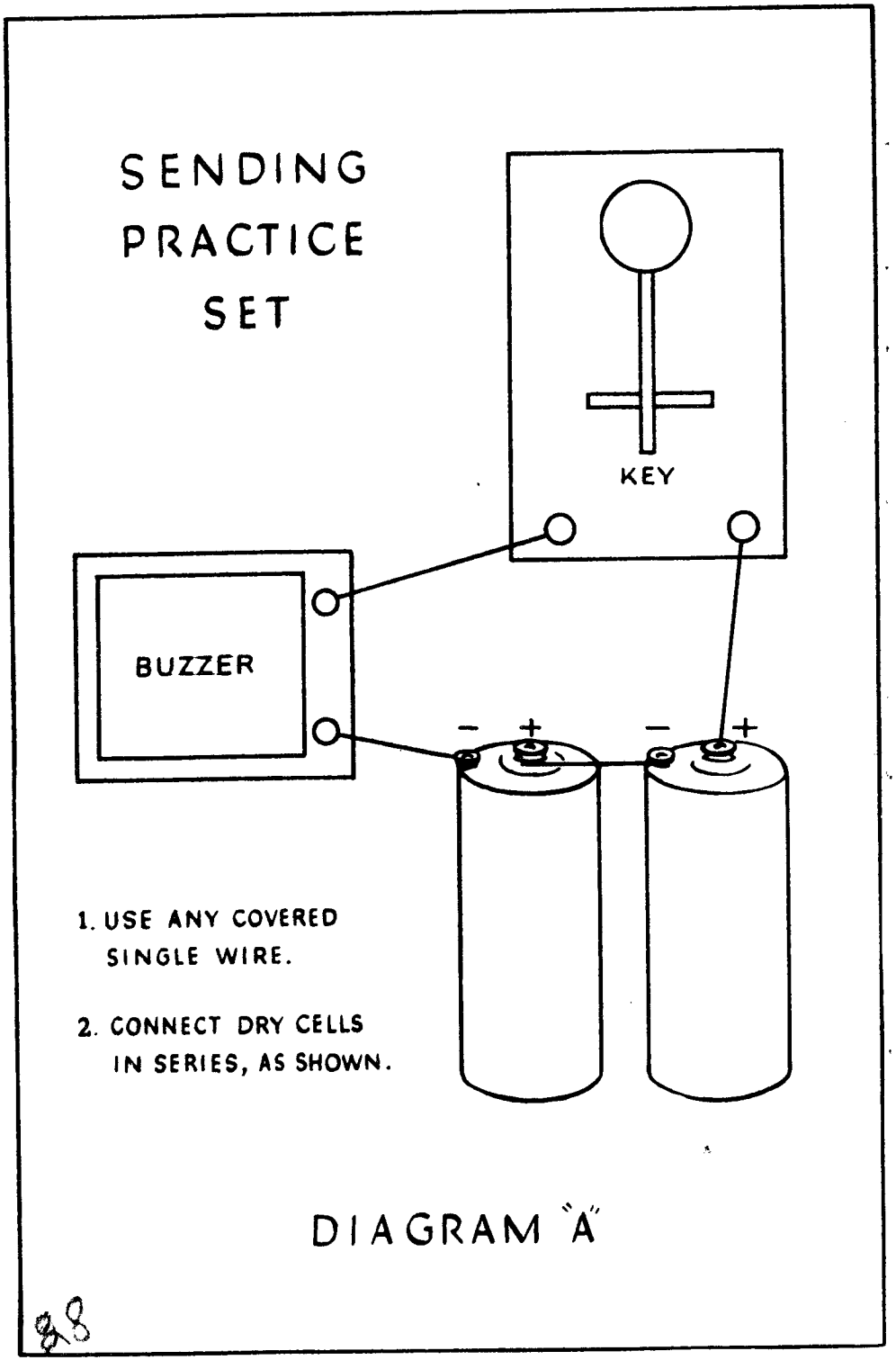


DIAGRAM "A"

EQUIPMENT FOR SENDING PRACTICE

It will be necessary before starting any sending practice to obtain certain equipment for this purpose. The most simple set-up consists of (1) a telegraph key, (2) a buzzer, and (3) two dry cell batteries. These items are available at any radio store that sells amateur radio equipment, or from any large mail order house. The proper method of connecting this practice outfit is indicated in Diagram "A."

There are certain ready-made practice sets on the market. These will be found on display in the larger radio stores. Signal sets, such as used by Boy Scouts, are quite adaptable to use with this course.

HOW TO SEND CORRECTLY

It must be remembered that it will take time and application to learn to send. Good sending is an art in itself. "Practice Makes Perfect." You can develop the ability to send well if you have the will to learn and the will to practice.

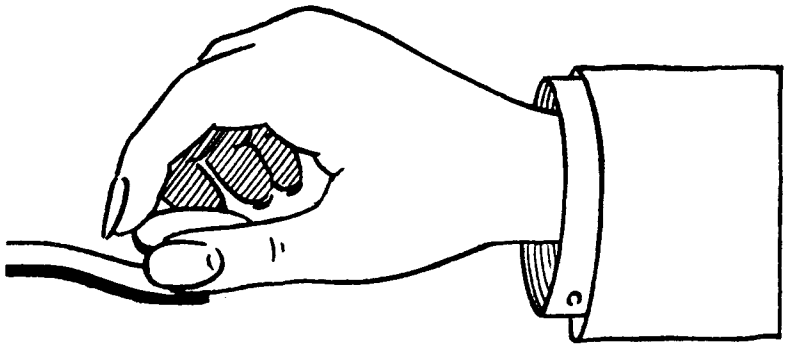
KEY ADJUSTMENT

Correct key adjustment is that adjustment which "fits" your particular touch. There should be a vertical movement of about one-sixteenth inch at the key knob. This is measured from the *top surface of the knob.* It is set by the rear screw adjustment. When the knob's top surface goes down about one-sixteenth inch upon pressing the key, you have the approximate "average" spacing between the key contacts. The contact points should be perfectly aligned by means of the side screws. These screws should be tightened, then loosened just a bit so that the key moves freely and does not bind. Recheck the contacts after this adjustment to be sure they are true.

Although the "one-sixteenth inch" rule is a good one to follow for first adjustment, the amount of vertical movement can later be changed to suit the individual. The spring tension, likewise, must be set for the individual operator. It should be remembered that *too heavy* a spring tends to make your sending "choppy", causing you to "chop" your dashes and dots, as well as being tiring for long periods of sending. Similarly, *too light* a spring tends to cause you to "run" characters together, there being insufficient "control" of the key. It is believed that a somewhat heavy spring allows better "control", particularly of "dots".

How to Grasp the Key

Place the thumb against the left edge of the key knob; the first finger on top of the knob at the rear and lapping over the rear edge just a bit; and the second finger against the right edge of the knob, about in the center or slightly to the rear of center. The thumb and second finger should press gently against the side, enough to hold the key and partly aid its upward motion after depression, *but in no event should the grip be tense.* The first and second fingers should be slightly arched, not held out straight. The third and fourth fingers should be permitted to curl naturally, toward the palm of the hand, but they should not be tightly clenched. Keep the fingers, hand and wrist relaxed at all times.



CORRECT METHOD OF GRASPING KEY

Correct Sending Posture

Sit upright in your chair, square with the operating table, with your arm on a line with the key. The arm should rest lightly on the table, with the muscle of the forearm supporting the weight, and with *the wrist off the table.* The key should be mounted so that the knob is approximately 18 inches from the edge of the table.

Proper Wrist Action

The first step in actually manipulating the key is to develop the proper wrist action. Keep the wrist flexible. Avoid becoming tense. The wrist may be limbered up by exercising the wrist up-and-down, like a hinge, and by rotating the wrist in circles, clockwise.

To close the key: The hand moves forward and downward, while the *wrist moves upward.* To open the key: The hand moves backward and upward, while the *wrist moves downward.* In effect, you should find your hand engaged in a rocking movement, forward-downward, backward-upward, forward-downward, backward-upward, etc. Keep the wrist loose. The wrist should move *upward* when you close the key. Do not remove the hand from the key between characters.

Spacing

The too-often-forgotten element in good sending is "correct spacing." Spacing is just as much a part of a character, or a word, or a sentence, as the units we hear as sounds. Basically, a "dash" is equal in length to three "dots"; the space between parts of any character is equal to one "dot"; the space between any two letters or characters is equal to one "dash"; the space between any two words or groups is equal to seven "dots." By aiming at all times to keep these relative lengths throughout our sending, we will develop machine-like precision insofar as the human-element permits.

Developing Rhythm

Before attempting to actually form characters you must develop the correct "rhythm" of making dots and dashes. Rhythm is the *correct roll* of dots and dashes.

Correct dot-rhythm may be developed by sending a series of dots, at an even, moderate rate of speed. In practicing this exercise it is helpful to repeat to yourself, aloud preferably, a series of evenly spaced "di's"; thus: "di-di-di-di-di-di-di-di," etc. Continue this for two or three minutes, keeping your sending in time with your vocal efforts. Avoid speeding up as you send this series of dots; keep at an even rate for the entire period. Aim to make all dots the same length.

Correct dash-rhythm may be developed similarly by making a series of dashes at an even rate, repeating to yourself at the same time,

"dah-dah-dah-dah-dah-dah-dah-dah," etc., and continuing for two or three minutes at a time. In these exercises always consider two things, (1) "is my wrist flexible?", (2) "am I keeping sy speed even?"

Proper rhythm may also be developed by sending a series of dots-and-dashes (di-dah-di-dah-di-dah-di-dah), and similarly a series of dashes-and-dots (dah-di-dah-di-dah-dit), aiming at all times to keep all dots the same length, all dashes the same length and *all spaces between* the same length.

SENDING HINTS

Aim to send perfect code. Send at the speed at which you make a minimum of errors. Accuracy and perfection come first—speed will come with practice.

"Learn by Sending." Constant sending practice builds copying ability. You not only improve your sending, but you also increase your copying ability, by sending to yourself (on an oscillator or buzzer).

Try at all times to make all dots the same length, and all dashes the same length.

Don't run characters or parts-of-characters together. Keep each character separated from adjacent characters by proper spacing. Examples of "running" characters together: Sending PD for AND, NST for TEST, etc.

Certain adjacent letters are easily run together, unless care is taken. Watch for such combinations as TK, TE, TH, AN, AI, TR, etc., which may easily be misinterpreted as one character if run together.

Think of each character as a sound. Say them aloud to yourself as you practice sending.

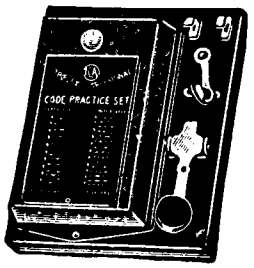
Avoid leaving too-long spaces between parts of characters, especially where a "dit" and "dah" come together. Example: Numeral 3—too much space often is left between the "dits" and the first "dah," making it sound like SM.

Don't pause in the middle of words. Keep equal space between all letters of any word. Letters should be separated by a space equal in length to the length of a dash.

Presenting...

The ICA Series of Code Sets

Manufacturers of radio-electronic equipment for over a quarter-century, ICA has designed this Code Set Series especially for the beginner interested in code communication.



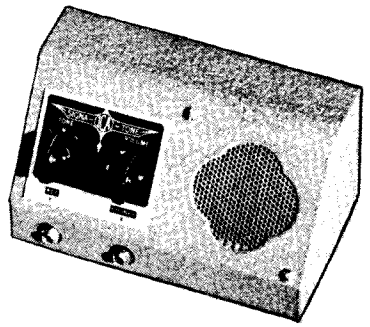
ICA "TRIPLEX"—No. 70

A compact well-made Code Practice Set. Ideal for learning telegraphy—Radio Code Signals and Blinker or Navy Signaling. Simple and economical to operate. Requires but two standard flashlight batteries. Legible code instructions mounted on signal box face. Composed of a high frequency buzzer-blinker light and telegraph sounder. Panel board switch permits changing from one type signal to another. Two clips provide for connecting additional set, permitting sending or receiving by either set. Individually packed with complete instructions.

"DUAL TRIPLEX"—No. 71. A double "Triplex" complete with wiring. May be arranged for sending and receiving.

ICA DE LUXE SIGNATONE No. 4300

Audio Oscillator—Code Practice Set—Keying monitor. Complete with tube and speaker for 110 V AC—DC. May be used as CODE PRACTICE SET—Phones and keys may be connected for inter-communication for classroom or club code instruction. KEYING MONITOR—to improve "ham's" fist. MODULATION SIGNAL—SIGNAL TRACER.



SIGNATONE CLASSROOM MODEL No. 4301—Complete with tube

Designed primarily for class and radio club use. Intended for use with earphones, these are preferable to speakers, for instruction purposes. If desired, however, speakers may be used instead of phones.

Features 3-tone audio output, continuously variable control and extra terminals for keys and phones. Quality is same as De Luxe Signatone. For 110 volts AC-DC.

Complete instructions furnished for a class room set-up for send-receive practice.

See your local dealer or write for further information.

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