

THE MORSE CODE

LEARNING & PRACTICE

AIR TRAINING CORPS

HOME GUARD

W.A.A.F.S. W.R.N.S. W.A.T.S.

SAILORS SOLDIERS AIRMEN

etc.

Dbb, 47

N41

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NGMANS



In the same series

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This book covers the syllabus in Navigation issued by the Air Ministry for the pre-entry training of cadets in the Air Training Corps.

It presupposes only a very little knowledge of mathematics as all the problems met with in this part of the syllabus can be worked out by the use of graph paper, ruler and protractor.

A wide range of useful exercises is included at the end of the book, and there are many clear drawings in the text.

MORSE CODE

LEARNING AND PRACTICE



by
R. G. SHACKEL, M.A.

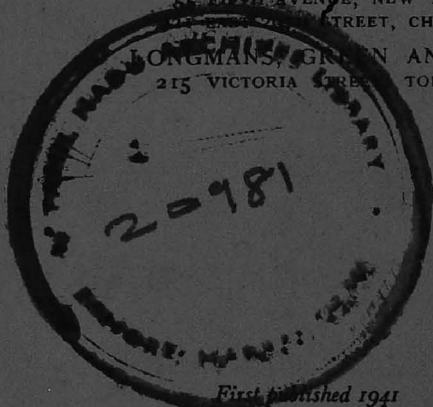
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INTRODUCTION

THE **Morse Code** was devised in 1832 for use in telegraphy by an American, Samuel F. B. Morse. It has been modified since by international agreement.

The Morse Code is made up of arrangements of:

- (a) dots ($\cdot$), a dot being the unit of time in the code (length of time of a sound signal, of light signal, etc.);
- (b) dashes ($-$), a dash being a longer interval of time and equivalent, as near as can be, to three dots;
- (c) the gaps between the dots and dashes combined to represent a letter or figure; each of these gaps is equal to one dot when the code is used at an appreciable speed;
- (d) the gaps between letters or figures in a group; these spaces are equal to one dash, or three dots, when the code is used at an appreciable speed;
- (e) the gaps between the words; these spaces are equal to two dashes when the code is used at speed.

When the Morse Code is used at a speed of 30 words per minute (30 w.p.m.), one word per minute being 5 letters per minute, or its equivalent, the length of a dot should be $1/24$ th of a second. Thus, for a speed of 15 words per minute (15 w.p.m.) the length of a dot is $1/12$ th of a

second and of a dash $1/4$ th of a second; it is usually considered that such a length of dot and dash is suitable for instructional sending by an experienced sender, long intervals of time being left between letters, etc., and these intervals gradually reduced to increase speed as the code is learned.

Since the greater proportion of Morse Code reception is by sound, the following must be realized. Although the code for letters, figures, etc., is usually expressed in dots and dashes (for example, A is $\cdot -$, i.e. a dot followed by a dash, B is $- \cdot \cdot \cdot$, a dash followed by three dots, etc.), the values of the sound periods are more important; successful reception at any appreciable speed depends upon an automatic interpretation into letters of the collection of sounds heard, and not by thinking in terms of dots and dashes. Thus, it is more useful to express the letters and figures in the code in terms of their sounds. For a dot it is convenient to regard the sound as "de" (the French "de", or the English "der" with a very short r), and a dash as "dah". Some teachers use "dit" for the dot, but "de" is quicker and more clipped and is preferred by the author.

Thus, A $\cdot -$ is, in sound, de dah, or, as it is usually written, d' dah;

B $- \cdot \cdot \cdot$ is dah de de de, or, as it is usually written, dah d' d' de;

C $- \cdot \cdot -$ is dahdedah de, or, as it is usually written, dah d' dah de.

It should also be noted that, to avoid confusion between somewhat similar-sounding letters in the alphabet when used in signal work, some letters are not pronounced in the usual manner, viz.:

A is pronounced as Ack to distinguish it from J and K,
 B " " Beer
 D " " Don
 P " " Pip
 T " " Toc
 V " " Vic
 M " " Emma to distinguish it from N,
 S " " Esses to distinguish it from Z,
 and in signal work these pronunciations should always be used.

This method has been extended in order to avoid error in the dictation of letters, e.g. over the telephone, or when reading lamp signals for another person to write down the letters as told to him. It is common to use names for the letters beginning with the appropriate letters, e.g. Charlie for C, Johnnie for J, Queenie for Q, Zebra for Z, etc. These are part of the procedure in signal work which cannot be dealt with here. A common set used is:

Ack	for A	Johnnie	for J	Sugar	for S
Beer	„ B	King	„ K	Toc	„ T
Charlie	„ C	London	„ L	Uncle	„ U
Don	„ D	Monkey	„ M	Vic	„ V
Edward	„ E	Nuts	„ N	Willie	„ W
Freddie	„ F	Orange	„ O	X-Ray	„ X
George	„ G	Pip	„ P	Yorker	„ Y
Harry	„ H	Queen	„ Q	Zebra	„ Z
Ink	„ I	Robert	„ R		

For Figures:

Owe	for 0	Foer	for 4	Ate	for 8
Won	„ 1	Fife	„ 5	Niner	„ 9
Too	„ 2	Six	„ 6		
Thr-r-r-ee	„ 3	Seven	„ 7		

MORSE CODE ALPHABET

A (Ack)	.-	is d' dah
B (Beer)	....	„ dah d' d' de
C	....	„ dah d' dah de
D (Don)	...-	„ dah d' de
E	.	„ de
F	...-	„ d' d' dah de
G	---.	„ dah dah de
H	....	„ d' d' d' de
I	..	„ d' de
J	-	„ d' dah dah dah
K	--.	„ dah d' dah
L	....	„ d' dah d' de
M (Emma)	--	„ dah dah
N	-. .	„ dah de
O	---	„ dah dah dah
P (Pip)	-	„ d' dah dah de
Q	---.-	„ dah dah d' dah
R	...-	„ d' dah de
S (Esses)	...-	„ d' d' de
T (Toc)	-	„ dah
U	...-	„ d' d' dah
V (Vic)	-	„ d' d' d' dah
W	---.	„ d' dah dah
X	---.-	„ dah d' d' dah
Y	-	„ dah d' dah dah
Z	---..	„ dah dah d' de

Note that to avoid confusion throughout this book the symbol

0 is used for the letter O
and

0 is used for the numeral 0

NUMERALS

1	.-----	is d' dah dah dah dah
2	..-----	„ d' d' dah dah dah
3	...-----	„ d' d' d' dah dah
4	-----	„ d' d' d' d' dah
5	.....	„ d' d' d' d' de
6	-.....	„ dah d' d' d' de
7	--....	„ dah dah d' d' de
8	-----	„ dah dah dah d' de
9	-----	„ dah dah dah dah de
0	-----	„ dah dah dah dah dah

ABBREVIATED OR SHORT NUMERALS

It is often the practice, in using figure code only, to shorten some of the symbols as indicated below.

1	..	is d' dah
2	..-	„ d' d' dah
3	...-	„ d' d' d' dah
4	-	„ d' d' d' d' dah
5	.....	„ d' d' d' d' de
6	-.....	„ dah d' d' d' de
7	--....	„ dah d' d' de
8	-----	„ dah d' de
9	-----	„ dah de
0	-	„ dah

It is also becoming common in figure code work to use the abbreviated 0 (i.e. T or dah), even though the full symbols are used for the rest of the numerals.

LEARNING THE CODE

The first stage in learning the Morse Code is the memorizing of the sounds appropriate to the letters, etc. The more general practice is for them to be learnt in alphabetical and numerical order. The writer was taught by another method, using similar groupings, or opposites, viz., in this order: (1) EISH, (2) TMO, (3) NDB, (4) AUV, (5) AWJ, (6) R and K, (7) G and Z, (8) P and X, (9) F and L, (10) Y and Q, (11) C. Some teachers consider that this results in delay in developing speed at later stages, owing to a tendency to confuse opposites, etc., but the author has not found any noticeable difficulty when using the method. However, in this book the alphabetical "grind" method will be used and tests given to work with it.

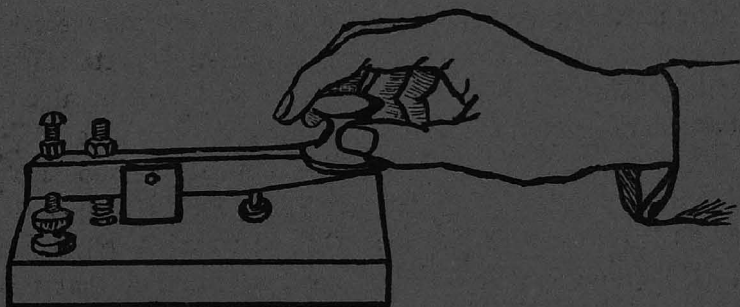
In learning the code beginners must not be self-conscious; they must repeat the sounds until they are familiar, e.g. they should repeat "d' dah de, d' dah de", until on hearing the sounds d' dah de they automatically say R.

A pair of beginners can quickly learn the code by saying the sounds to one another. It is also interesting to realize how soon one finds one's self looking at hoardings and saying the sounds for the words, e.g. at a "Bus Stop" one begins to say "Dah d' d' de", etc.

The usual method of practice is to use a buzzer, or valve

oscillator, but a good speed can be attained by two learners without these instruments, merely by one saying the sounds, as given previously for the letters and numerals, and the other, in turn, interpreting them; the exercises and tests given in this book can quite well be used by such a method.

In using a buzzer, or valve oscillator, the handle of a Morse Key (see figure) is depressed so that an electric circuit is completed which gives rise to a sound. The period



of depression of the handle has to be made to correspond to a dot or a dash as required. It is advisable to obtain personal help from an experienced sender of Morse Code in order to attain a correct style of sending. Essentially, this needs the following points:

- (a) Keep the forearm horizontal and in line with the metal rod of the key (this needs a suitable height of chair for the table used);
- (b) Hold the knob of the handle lightly and comfortably ;
- (c) Keep the elbow still and make all the movements of the key by wrist action. Flexibility of wrist movement is the primary thing and practice will

cause this to develop. Experience will teach the suitable gap between the key contacts for one's use; this, of course, must be small.

On learning to send, the beginner must be careful not to rush the signals; the dots and dashes may be made longer than the time intervals suggested for an experienced sender giving instruction. Gradually, as familiarity with the key grows and as the wrist moves freely and automatically, the length of the sounds can be reduced.

PRACTICE EXERCISES AND TESTS

The main portion of this book consists of series of exercises and tests, graded for speed and aiming at a gradual improvement in speed. They have been carefully designed from experience in order to give similar practice to all letters and numerals and also special practice with difficult combinations of letters, and also of letters and figures. Further, the tests are arranged for use horizontally or vertically, and in either direction, i.e. left to right, right to left, top to bottom, and bottom to top. They give a wide range of practice and the number used at each speed must depend upon the progress of the learner or learners.

The tests are usually arranged as follows:

1. Letter Groups, normally in groups of five letters.
2. Figure Groups, usually in groups of five figures.
3. Mixed Letter and Figure Groups, in groups of five.
4. Plain Language (P/L).

Various signals commonly used for procedure, and special symbols are introduced during the tests. Only a minimum are dealt with here, for the Services, etc., use their own special procedure.

In the use of code signals in groups it is the common practice to use a separation signal between each group. This signal is *ii* (d' de d' de).

In writing down Messages in Code Groups, Receivers should always write in Block Capitals.

SET 1. LEARNING THE ALPHABET AND NUMERALS

1 (a). Using A B C D E F G.

After learners have said, or heard repeated the sounds for these letters (p. 6) the following groups of five letters each should be sent by buzzer, or the sounds spoken as indicated on page 8. They should be sent or said quickly (p. 4) with long intervals between; about 6 seconds is suitable on starting.

Separation
sign

CEGCB

....

DABGF

FADBE

GDECA

GCFAD

BFDEC

DFEBG

ACGBA

EBGAF

CBFDG

1 (b). Using H I J K L M N. (Sounds on p. 6.) Tests are to be used as in 1 (a).

Separation
sign

HLJNI

....

MKHIL

JNIML

HJNMK

NKLHN

KLINJ

IHNKJ

LMKHI

HMJIM

KJNLN

1 (c). Using O P Q R S T. (Sounds on p. 6.) Tests are to be used as in 1 (a).

Separation
sign

ROTPS

....

QOPRS

TSQRO

TQSOP

QPSOR

PTRQT

PROQT

SOPTR

SQPTQ

OTRPQ

1 (d). Using U V W X Y Z. (Sounds on p. 6.) Tests are to be used as in 1 (a).

Separation
sign

XUYWV

....

ZVWYX

VYZXU

YXUZW

WZVUX

WZYUV

YVUZW

XUVWY

UXWVY

VWZXU

1 (e). Using numerals 1 2 3 4 5. (Sounds on p. 7.) Tests are to be used as in 1 (a).

Separation
sign

41352

....

31542

32145

14235

15223

45314

24514

23153

53431

52421

1 (f). Using numerals 6 7 8 9 0. (Sounds on p. 7.) Tests are to be used as in 1 (a).

Separation
sign

96807

....

69780

07698

06897

89770

90668

70986

78096

68069

87907



SET 1 (continued). CONTINUATION OF LEARNING THE ALPHABET AND NUMERALS

1 (g). Using letters A to H inclusive. Tests are to be used as in 1 (a).

Remember A = Ack, B = Beer, D = Don.

Separation
sign

CEHAB

....

DFCGB

FHDBE

GDECA

GDAEC

FBAHC

EFCHG

AHBEF

ABGFD

HCFDG

1 (h). Using letters I to Q inclusive. Tests are to be used as in 1 (a).

Remember M = Emma, P = Pip.

Separation
sign

KIOMP

....

JLNKQ

LPJQM

QKOIN

OMKJN

LIQPO

JQNIO

KMPLJ

QNPLI

QJKOM

1 (i). Using letters R to Z inclusive. Tests are to be used as in 1 (a).

Remember S = Esses, T = Toc, V = Vic

Separation
sign

RTVXZ

....

YUWSV

QUSYW

RVTZX

ZWYTU

SZRXW

XSUZV

WTYRZ

VYRWT

ZSXUY

1 (j). Using all the numerals. Tests are to be used as in 1 (a).

Separation
sign

64830	....	17295
59261		48037
91645		83720
28074		61953
05497		32186
10752		96348
83529		04671
37108		25469
46983		70502
72316		59804

1 (k). Using all the alphabet.

Send or say very slowly, allowing approximately 6 seconds per letter.

(i)
Separation
sign

DBRMK	....	NGSLU
ZQXWT		YFHPV
COAJI		EBWFI
RIPVH		OMAGN
QXLZC		JUDKS

(ii)
Separation
sign

XQULP	....	GEWJA
DHMXC		ZRYOF
BVSNI		EKPTU
GZJWO		MQCHL
KFARY		DVNBS

SET 2. WORKING AT 2 WORDS PER MINUTE (2 w.p.m.)

2 (a). **LETTER GROUPS. One-minute tests at 2 w.p.m.**—two groups of 5 letters each.

Tests, horizontally or vertically, to be sent in one minute, which allows approximately 5 seconds per letter and a break between groups during which the separation sign is sent. In future this will be indicated once as in each set of tests.

For rest of instructions, see below, on p. 17.

Beginning sign

. - -

ADRWJ
CNFHU
LVEYX
MZJNC
GOPDI

.

XEMYK
BPGSZ
KWTPH
AVRLK
QSUFB

Ending sign

. - . - . - .

SPAOL
FMICY
QNKZG
HRXJU
VGWDB

.

GURZW
XHKBJ
TDPMV
IFZCL
PAQYH

From now the usual procedure of using a beginning and an ending sign should be introduced. The general beginning sign is $\overline{VE}$, the bar above the letters indicating that the code for the two letters is sent without separation, i.e. as or d' d' d' dah de.

This is followed by $\overline{BT}$, dah d' d' d' dah, for all code messages.

For all groups and messages the ending sign is $\overline{AR}$, or i.e. d' dah d' dah de.

If the sender makes a mistake in sending, he uses the "rub out" signal, which is 6 or more dots sent quickly.

2 (b). **FIGURE GROUPS. One-minute tests** 2 (c). **MIXED GROUPS. One-minute tests**
at 2 w.p.m.--8 figures. at 2 w.p.m.--9 letters and figures.

Allow nearly 7 seconds per figure.

Allow approximately 6 seconds per letter or figure.

.....			
-----	46280	....	193
	59307		281
	94761		538
	28439		706
	02653		819
	85172		640
	13594		072
	71825		027

.....			
-----	H6U2P	....	4K7A
	3VF8R		G5W2
	J5CS2		1NY6
	7B3QM		8X2Z
	DI9X5		Q4DE
	0LT6V		3F5J
	P42K9		B7Z8
	5QC1W		R29D

2 (d). **PLAIN LANGUAGE** (P/L). The following sentences and phrases are suitable for two-minute tests at 2 w.p.m.

Allow approximately 5 seconds per letter and a longer break between words. Note that the **beginning sign for P/L is AAA**, or d' dah d' dah d' dah, after **VE**.

In taking down plain language write in ordinary handwriting, joining up letters to complete words. The use of block capitals for names is to be ignored. It is dealt with on page 52.

Report on your position
 Estimate its velocity
 Return as soon as possible
 Collect the extra petrol
 Moving forward at dawn
 Am now returning to base
 Look for queueing cars
 Oblique lines of defence
 Keep on a straight course
 Triangle of velocities
 Handley Page Hereford
 Your target now K 6 D 68
 A Caproni C A 312 Bis

These can be used
 as memory tests
 later at higher
 speeds or for work
 with lamp.

In future, the general beginning sign VE is not shown : it is, however, always used.

2 (e). **LETTER GROUPS.** Two-minute tests at 2 w.p.m. Four groups of 5 letters each. Approximately 5 seconds per letter. These tests are useful for sending practice for beginners.

-----	BWVGA	...	REMDK	...	QXLJC	....	YFHPZ	-----
	LXDKC		PNZGH		IVFDS		AWJUR	
	DTQNF		YIJBU		RHZGP		CEMYK	
	JZYHU		SCVAW		OMTKN		QXLGB	
	MSPRE		XFQTL		YAWUB		NSIDO	

2 (f). **MIXED GROUPS.** Two-minute tests at 2 w.p.m. 18 letters and figures. These are also useful for sending practice. Allow approximately 6 seconds per letter or figure.

-----	NG72W	....	X3L1A	....	RP2Y0	....	J5H	-----
	8CSZ9		OK4D2		Z7E6Q		M3F	
	U4N9B		G8T6Y		C0R8K		N54.	
	5HJ2P		0E2XL		3V9BW		7DQ	
	P6DL7		5HMK9		8YZC1		X4J	

SET 3. WORKING AT 3 WORDS PER MINUTE

3 (a). **LETTER GROUPS.** One-minute tests at 3 w.p.m.—
13 letters. Tests to be used horizontally or vertically in
one minute, i.e. approximately 4 seconds per letter.

Beginning
sign

Ending
sign

-----RDYGE	....	XTULA	....	WPM.-----
NHQBZ		JO FVI		SCK
TAPKD		RWNZB		JLV
CIGUY		MHXSQ		FOE
UBJWF		PDGKX		RVA
SYOEN		TZQIC		HML
XLRFU		KWJAD		PGB
PGCRH		BIOSM		ENQ
VOATL		WFKJY		XDU
ZEMCG		SVHNR		QBI
FQLDA		VJWXT		AKY
JWSZI		QGMPH		UNR
DEVNO		CALYF		BTX

3 (b). FIGURE GROUPS. One-minute tests at 3 w.p.m.—
10 figures. Tests can be used horizontally or vertically.
Allow approximately 5 seconds per figure.

-----	17360	....	92845	-----
	83591		04267	
	74928		16530	
	39472		80156	
	28156		39074	
	91847		25603	
	05619		43728	
	46035		78912	
	50283		67491	
	62704		51389	

3 (c). MIXED GROUPS. One-minute tests at 3 w.p.m.—
11 letters or figures. Tests can be used horizontally or
vertically. Allow nearly 5 seconds per letter or figure.

Remember that the beginning sign is BT.

-----	Y2J4B	....	L8Z6G	....	W	-----
	RK3X9		VF7D5		P	
	0CS1H		5UQ3M		9	
	6A02N		Z4E8J		K	
	F7QV5		0PGL2		1	
	H3D7W		X2Y1C		R	
	9S8UB		0E6N3		5	
	N6CJ0		4XR7Z		H	
	5VW9F		K3PG8		4	
	LQ1P6		2B0SY		M	
	J9P3Q		G7W9X		6	

3 (d). **PLAIN LANGUAGE** (P/L). The following sentences and phrases are suitable 2-minute tests at 3 w.p.m., i.e. approximately 26 letters. Allow 4 seconds per letter.

Remember that the beginning sign for P/L is AAA (d' dah d' dah) after VE.

.....

Please state the correct time
We are awaiting instructions
Attack the alternative target
Man the reserve trenches at once
Send your runners immediately
Four pigeons released as asked
Ammunition totally expended
We are forced to land hurriedly
Contact now made with the patrol
Gain height before attacking
Rubber dinghy seen one mile west
Report on fire seen in south east
Locate destroyer hugging coast
It was a Focke Wulfe 200 Condor
Send each word of message twice

.....

These can be used
as memory tests
later at higher
speeds or for work
with lamp.

3 (e). LETTER GROUPS. Two-minute tests at 3 w.p.m.—26 letters. Useful for sending practice. Tests can be used horizontally, or vertically, as indicated. Allow 4 seconds per letter, or 23 seconds per group + separation sign.

-----	GWPNT	....	RLDJY	....	KKAUS	....	VHCMZ	....	FOQIB	....	T
	ZEMLA		IURQN		OHFTC		SPXWY		KVJDE		D
	DKYIR		OGZMH		LPWXB		QJEFU		SANCT		P
	BFOCJ		KASPE		QGMIV		NRDLT		XHYWZ		U
	SQUHX		FTWCI		JNZYD		GAKOB		PLEM		V
											
	V		X		R		H		L		

3 (f). MIXED GROUPS. Two-minute tests at 3 w.p.m.—22 letters. Useful for sending practice. Use horizontally or vertically (using 4 columns + 2 letters). Allow approximately 4 seconds per symbol.

-----	PLH5S	....	9FX3M	....	C7D0R	....	8YBG2	....	J6	-----
	4VMU8		Z1LW0		6Q9EN		K307A		CH	
	ZG72B		5P4VK		S3WL8		1R0XF		U9	
	6J0NY		Q2D7S		4GX1R		P9L5H		VB	
	Q3FC5		KJ6U8		MY2A5		SZ4W6		R7	

SET 4. WORKING AT 4 WORDS PER MINUTE

4 (a). **LETTER GROUPS.** One-minute tests at 4 w.p.m.—
15 letters. Tests can be used horizontally or vertically.
Allow 3 seconds per letter and 20 seconds per group of
5 letters and the separation sign.

----- NGDOY DZEXM KQARJ -----

UHCIF WBLSV TXRPO

XYEQN ZMKDJ LTWBU

RAIGV SCOHP FDMEW

IVQTX BJYLZ NKFCS

MWGAU HPROE DZKLC

QTBFI JXSVN YCDZM

PKWUH EQABL ROUFN

OMYCT XIJGD SAPKV

ZBURW FEQNH XLIYT

SPVMG AOCKR IJHWD

EZXBM LUFYQ WNVTR

GSJHA ODIPC BKKQL

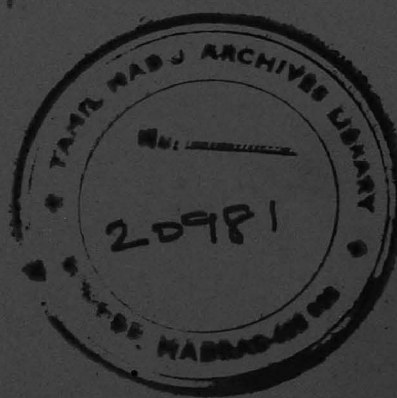
YEMZR VUNFW JPTOK

CXDLB QAHIX PSJGQ

4 (b). **FIGURE GROUPS.** One-minute tests at 4 w.p.m.—
13 figures. Tests can be used horizontally or vertically.
Allow 4 seconds per figure.

----- 64918	 02753	 481 -----
76305	94128	572
08273	51947	936
31682	47509	320
23890	75614	865
90426	19375	714
59764	80231	098
15037	28496	157
47519	36082	603
82541	63860	249
71492	56083	817
43267	09851	012
97865	42310	591

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4 (c). **MIXED GROUPS.** One-minute tests at 4 w.p.m.—
 14 symbols. Tests can be used horizontally or vertically.
 Allow nearly 4 seconds per symbol. Beginning sign = BT.

----- X9A5J	... V4P6B	 F8DZ	-----
3C7RI	LU0H5	6Q1K	
S2N9Z	4Y8MW	03U0	
7XPG3	S8F1V	2C9B	
QK5ZY	7JWD6	LVH9	
N400A	M6B9Y	G1Z7	
8R3CK	5H4WP	0X2S	
D6FV5	A9JT3	NDE8	
2LY1Q	0SU4I	8RLQ	
KF9P6	X21CZ	W73U	
V5G4H	2DY0J	7BA6	
EM8S9	NG5X4	C0QR	
9BU3V	W1DYF	5J8P	
A0LH7	TK2S9	Z6N3	

For **SENDING PRACTICE** use two columns for two-minute tests.

4 (d). **PLAIN LANGUAGE (P/L).** The following sentences and phrases are suitable for **two-minute tests at 4 w.p.m.** Allow approximately 3 seconds per letter, the rest of the time for the breaks between words. Beginning sign is AAA

Weather is rapidly deteriorating
Operation successfully completed
Enemy massing in rear of copse
German raider now attacking convoy
Send out reconnoitring patrol
Barometer reported falling rapidly
Please give some artillery support
You will relieve the centre section
Send lorry with rations and tools
Protect artillery control machine
Fairey Swordfish Torpedo Carrier
Short Sunderland Flying Boat ahead
Avro Manchester heavy bombers left
Junkers 87 Dive Bombing Stuka down
Please show correct very lights
Armoured columns reached objectives
Infantry held up by intense sniping
Patrol to starboard of course taken
Submarine reported in vicinity
Mines located in western channel
Sweepers proceeding to area
Work completed and passage clear

These can
be used as
memory
tests later
at higher
speeds
or with
lamp.

SET 5. WORKING AT 5 WORDS PER MINUTE

5 (a). **LETTER GROUPS.** One-minute tests at 5 w.p.m.—20 letters in four groups of 5 each. Tests can be used horizontally, or vertically (using 2 columns); the vertical lines divide the columns to help the sender. Allow 15 seconds per group + separation sign.

-----	XDNJR	....	BVPUS	....	MKGZF	....	HYWCL	....
	EQOAI		ZUDWX		GCYNS		RJFMT	
	VHBPk		LWSDN		JFMGO		XEZAR	
	UCGYT		OFNPB		QHLWK		JDSXV	
	RMKFA		GJWYV		ZLBPC		DQUHN	
	BGMKN		CRQZA		DUJFI		VXHWP	
	ZARWM		QHGC I		PBVDY		FKNJU	
	WKQNJ		SYBLR		VAXMP		GZCGD	
	FIUCH		PEXGJ		NRKAQ		BVLZO	
	NJXVU		DAZFH		WSCR L		MPBKY	

5 (b). **FIGURE GROUPS. One-minute tests at 5 w.p.m.**—16 figures, arranged for convenience in four groups of 4 figures. Tests can be used horizontally, or vertically (using two columns). Allow 15 seconds per group + separation sign.

-----					-----
1756	2039	4857	2617		
8263	5901	7438	0542		
3618	7490	2516	4790		
4092	6157	8342	1365		
5940	3862	1770	8938		
7128	5334	9065	7142		
6237	9580	3194	2659		
0391	4774	2901	3586		

5 (c). **MIXED GROUPS. One-minute tests at 5 w.p.m.—18 symbols.** Tests can be used horizontally, or vertically (using two columns but omitting the last two symbols). Allow nearly 3 seconds per letter or figure.

-----	K5B1L	....	V9S3J	....	F4P8X	....	R0I	-----
	6G7YE		2H4QT		3W2CA		5UQ	
	Z9DN3		08NB7		J0FK1		Z6W	
	3VL9R		1PG6S		2YI7D		MC4	
	TQ0X5		Z02A8		HN6U3		9EL	
	W1F4J		B5R7V		K8Q0S		G2Y	
	0PC6D		7U3ZI		5M9HT		4NX	
	S2GZ8		X1VH4		L6RW7		K8B	
	4UH5F		6CJ0Y		9TA3M		PI7	
	JX3Q9		KB7F2		VS4G5		L1H	

5 (d). **PLAIN LANGUAGE** (P/L). The following sentences and phrases are suitable for two-minute tests at 5 w.p.m. Allow approximately 3 seconds per letter.

These tests introduce the use of the full stop and the comma.

For a full stop we use AAA, -----, d' dah d' dah d' dah.

For a comma we use GW, -----, dah dah d' d' dah dah.

The full stop sign is the same as the beginning sign for plain language.

Full orders for night operations just arrived.

Prepare Wellington bombers, all fully loaded.

Conditions bad, ice rapidly coating planes.

Returning to base owing to fuel tank leakage.

Enemy formation sighted, flight attacking.

Raider hit, out of control, pilot baled out.

Proceed to starboard of convoy and patrol.

Give signal, by verey light, when to reform.

Infantry, unbroken, advancing behind barrage.

Tank support urgently required on left flank.

Armstrong Siddeley Cheetah engines in use.

Westland Lysander, with Bristol Perseus XII.

Troopcarrier Junkers J.U. 52, with B.M.W. engines.

North American N.A. 73, Allison liquid cooled engine.

Hampden bomber, Bristol Pegasus 1,000 H.P. engine.

It should be noted that some sections of the Services use **III** for a full stop, i.e., d' de d' de d' de, and **AAA** for a comma, i.e., -----, d' dah, d' dah, d' dah.

5 (e). **LETTER GROUPS.** Two-minute tests at 5 w.p.m., suitable for sending practice
Two tests horizontally (use in either direction also), or vertical tests, using four columns.

(i)

-----	{ YNCKE	....	RGQI	....	BVLZA	....	HPOXS
	{ KJWMF		YTNDX		GCQFW		ZBRVP
	{ GXDBW		CPVSZ		MRYIJ		KUFQL
	{ RQTHO		LBMJV		PNDXK		GYCEW
	UALPD		HFJQE		WKRVB		CZMIG

One minute test

(ii)

-----	{ RNPUV		KIXAL		GEQDM		BSCYK
	{ HTFOJ		ZNWYS		KRMNX		UGEQF
	{ BLYSQ		UOTXD		MJAVR		EWKPZ
	{ XALCR		NCFQM		PHBOD		JGUVI
	DGZEH		AYLUB		ZWKCP		FRTJO

5 (f). **MIXED GROUPS.** Two-minute tests at 5 w.p.m., also suitable for sending practice. The tests are used, horizontally in two rows as indicated, vertically using the necessary part (36 symbols) of four columns. Allow 3 seconds per letter or figure.

-----	{ Z8A3J	....	P0D5G	....	C6V4T	L9Q1N	.....
	{ 7HFX2		8U6RM		WS3K0	0	
	{ B5Y4I		G1Y2V		8EB9R	7P3DX	
	{ 6V9KW		5ZHJ0		M4CS2	F	
	{ IQ2L7		0A3N9		5U8EY	6J4RF	
	{ C0G1K		X4F2L		B7H5P	J	
	{ 4UDW9		EN21A		ZQ7M3	X6V8T	
	{ K84PC		2BMY6		9FW1U	A	
	{ 3ZJ5L		R7Q8X		D04GV	Y05S3	
	{ ER2N1		6TVHK		1PKI9	B	

SET 6. WORKING AT 6 WORDS PER MINUTE

6 (a). **LETTER GROUPS.** One-minute tests at 6 w.p.m.—25 letters in five groups of 5 letters each. Tests can be used horizontally, or vertically using five columns. Allow approximately 10 seconds per block of 5 letters and the rest for separation signs.

(i)	-----	RWJLS	....	ETXYM	....	BZKPJ	....	ADONC	....	G [•] FQIH	-----
		IQXHF		OKLAG		VCYTJ		WUSBR		DMPZN	
		KMGPN		CIBFH		RQALD		EVXJT		USYWO	
		VADCQ		URJNQ		SGWFH		IPKMY		LBEXT	
		BTUYE		WPVDS		OIXMN		QHGZL		KACRJ	
(ii)	-----	BQELG	....	SYZIJ	....	HDPOC	....	RVFXW	....	KUNZM	-----
		FKJTC		LNXDU		YEWQG		AHMZI		VRBSO	
		PZAMV		BEROC		IJNLX		UYSKQ		DHGWF	
		XDRWO		QVGTH		KSFMU		CNJBL		IPEYA	
		SHYUN		FMWKA		VZBTR		OEDGP		CJXLQ	
(iii)	-----	GPNDV	....	XREQY	....	BZIFH	....	CWLSJ	....	TMUKA	-----
		COAYS		MTWDG		JLRUP		EXBQK		FIZNV	
		TQIBR		UFJAH		WNSXK		MZVDY		OLPGC	
		HXWUL		KCNZV		GTMDQ		OARPF		EYSJB	
		FKJME		LBPSI		OCYAV		HNTUG		RXDWQ	

6 (b). **FIGURE GROUPS.** One-minute tests at 6 w.p.m.—20 figures. Tests can be used horizontally, or vertically using two columns. Allow 15 seconds per block + separation sign.

-----	84710	....	26395	....	78230	....	19456	.....
	39265		77801		46598		42310	
	05839		64315		20971		67248	
	71492		08546		38052		76319	
	26504		11923		97684		30875	
	98765		01234		86320		14795	
	45203		69471		02589		76381	
	14397		25896		58601		30427	
	83670		96120		37945		25819	
	20514		83759		41486		73062	

6 (c). **MIXED GROUPS. One-minute tests at 6 w.p.m.**—22 letters and figures. Tests can be used horizontally, and vertically using the five columns of one group of 5 except three single symbols from the last column. Allow approximately $2\frac{1}{4}$ seconds per symbol or 13 seconds per block of 5 + separation sign.

(i)									
-----	H4B2W	....	N7D6P	....	A3J9Z	....	K1S5C	....	I0 .----
	8FUL6		2QVG5		XE7R0		4Y9M0		1T
	C3G9P		8F1RK		4QH5U		W2SB7		V8
	7Y0ME		L3J4Z		N6DI2		8XA9P		5R
	KH5X2		YC0B9		1F8VS		LD3Q6		Z7
(ii)									
-----	P8X5C	....	E9Q7S	....	D1F6B	....	R2H0L	....	A4 .----
	7N1KU		4V8ZG		9W3TY		6K50J		2V
	H4BM0		F2XJ3		L8PR7		C1SD9		W5
	6QA2K		0MG1Y		5UN4Z		3EP8I		9T
	VF9J3		LR5C6		QK0G2		XB7Z4		U1
(iii)									
-----	X7T1G	....	R4Y8D	....	M9V0C	....	X5U2K	....	B6 .----
	3WPH5		2Q9AL		8F4ES		7J60D		0I
	J86ZK		S00B3		P2RL1		V9MG4		Q7
	0FY9C		1WN6Z		5HT7U		3QZ8P		20
	LD2V4		JX5W7		QB6Y3		CR0H1		F9

6 (*d*). **PLAIN LANGUAGE** (P/L). The following sentences and phrases are suitable for **two-minute tests at 6 w.p.m.** Allow about 2 seconds per letter, the rest of the time for the intervals between the words. Besides using the full stop (AAA) and comma (GW) we shall also introduce the symbol for a **dash or a hyphen** (short break). It is DÜ, -----, *dah d' d' d' d' dah*.

 Target located — bombing successfully completed.
 Road blocked by bombed transports. Send assistance.
 Trench mortars active on right, all silent in centre.
 Gun flashes observed from canal bank at southern end.
 Our mechanized forces are in touch with the enemy.
 Transmit your regular signals for position finding.
 Line broken—send linesmen out immediately. Urgent.
 Stand by for train steaming out of station X 15 a 38.
 Submarine sighted in area 60 N. 10 W. Send patrol at once.
 Messerschmitt Jaguar, Mercedes Benz D.B. 601 engine.
 Fairey Albacore fitted with Bristol Taurus 1065 H.P.
 Bell Airacobra P—400 Interceptor Pursuit aeroplane.
 Consolidated PPY twin-engine Catalina flying-boat.
 Its Pratt and Whitney engines give 2,100 h.p., and crew is 7.
 Gross weight 30,100 lb., wing span 104 ft., range 3,900 miles.

6 (e). **LETTER GROUPS.** Two-minute tests at 6 w.p.m.—50 letters. Tests can be used horizontally as shown, or vertically using five columns. They are also useful for sending practice. Allow 10 seconds per block of 5 letters, the rest for the separation signs.

-----	{ UNXEF	....	QIVLB	....	PTSCH	....	GYKMW	....	UDZAR	
	{ SOYGC		JDKNU		QMZAW		RLVBE		PKTHF	.....
	{ KZBRV		EFWCP		JNUBG		DTHOL		YSXMI	
	{ YALDJ		HKIQO		AREFC		SMXUG		ZWLNP	
	{ QHUTM		SXGYR		DKNWO		FZPAJ		BGECH	
	{ WESVP		ADFMZ		LBXNY		CUSQI		RVJOL	
	{ VPGCH		XEJWN		UKQDH		NZYBX		AOMFB	
	{ DZLUQ		RIYVB		GMORE		FPIJV		KCWXN	
	{ XNKAM		OZCPH		JVFSL		DHRTG		UQYIV	
	{ FOWIR		LTUGM		PKYZX		NQWAC		DJESG	

6 (f). **MIXED GROUPS. Two-minute tests at 6 w.p.m.**—44 letters and figures. Useful for sending practice or tests. Tests can be used horizontally as indicated, or vertically using four columns + four symbols of the next column. Allow approximately $2\frac{1}{2}$ seconds per symbol, or 13 seconds for a block of 5 symbols + the separation sign.

(i)

-----	{ J0P8R	A3Z5Q	V7B6H	T4S10	X9G2U	.....
	{ 4D6KW	9PIF0	2MLC5	3D8E		
	{ Y2NB7	GW1C6	098EY	A6X5V	I3B4R	
	{ 5FH3Q	L7S4M	0PZ1D	9K2R		
	{ AL1X9	2N8DU	FG4J3	P0Z7H	M6S5Y	
	{ I6C2T	K9E3V	W1I7Q	U5J4		
	{ 8S10V	7B5HX	9T4KA	6L2CF	P0D7G	
	{ G4MZ9	R0YJ6	U3XN8	W7Q1		
	{ 5PX7B	AC24V	6SQ0L	3N9GD	T8F1E	
	{ I00M3	1ZUW8	RK2J5	H0Y8		

(ii)

40

(iii)

-----	{ X6G2J	....	R8D0F	....	M5B1Z	....	S7K40	....	H9V3N	-----
	{ 1A8PE		2L5IC		9Y0TU		6Q3W			
	{ C0UM9		Y7GP4		K6RJ3		B8X2I		D4L8F	
	{ 7Z05H		6VN1T		2SQ8W		9A5E			
	{ BV4Q3		KS9A2		OX7D1		E5Y0T		F6I0M	
	{ L3R6N		W8H5Z		G4P9C		J1U7			
	{ 9W2IF		3Q7UB		5L4NV		8D6MV		R5P1S	
	{ Y0TK8		J1X09		A3EH7		C2ZG			
	{ 4DS7M		6EF3Q		0IZ8U		9L5PH		C2V7T	
	{ 0A5X1		GY0M4		WJ6B2		R3N1			

Working at a speed of 6 w.p.m. the tests in plain language given on pp. 18, 22, 27, 31 and 37, can now be used without the listeners writing them down; instead, they should train themselves to memorize them as they interpret them. They can be used for sound or light signals.

SET 7, WORKING AT 7 WORDS PER MINUTE

77 (a). **LETTER GROUPS.** One-minute tests at 7 w.p.m.—29 letters. Tests can be used horizontally, or vertically (using three columns, omitting the last letter). Allow 10 seconds for a group of 5 letters + the separation sign.

VSGBI	....	RWMXU	....	DFPKA	....	NCYFJ	....	XTLQH	....	OGZD
WAXSJ		OZUBR		VGCLT		HMIKQ		PDEYN		FJAX
YCLUD		NARQI		XMJEF		VBHOZ		TGSWK		PDUG
IFPKL		QJVEC		YOMGZ		DRSXA		HUBXW		TZRL
KOBFV		EYCSW		HTUID		ALPGM		ZRNJX		IQGB
UDJGA		THPNB		ELQVS		FKOCW		IMZAR		YSPC
NZTXC		YDFOS		PJWHR		GQELB		SIVKA		MUJFF
HREPM		WLLGQ		ZKXNO		UJTYD		VKFCW		BNSQ
VMQRH		ZTKJA		NDGYB		XSWRU		FOIPC		LEKY
XIYDQ		GRZCO		WHFUE		SKZNJ		ALTBP		VMXH

7 (b). **FIGURE GROUPS. One-minute tests at 7 w.p.m.**—23 figures. These tests can be used horizontally, or vertically using two columns. It can also be noticed now that it is often the practice to send a short form for 0 in figure groups, using a single dash (or dah) instead of the five dashes, i.e. using Toc as the signal for 0 in figure groups only. Allow about 12 seconds per group of 5 figures + separation sign.

-----	93605	....	27814	....	38016	....	27545	....	950	.....
	28437		90156		71699		34250		518	
	61570		82493		45271		06698		396	
	57813		46902		60858		71932		814	
	40291		65387		52435		68077		162	
	27910		83645		81033		25946		275	
	36745		29018		23587		94661		980	
	09324		15867		40625		13798		367	
	84508		37192		67194		80233		735	
	15869		72430		59476		08150		624	
	87		691		25		437		4	
	05		254		80		163		0	
	31		729		36		849		4	

7 (c). **MIXED GROUPS. One-minute tests at 7 w.p.m.**—26 letters and figures. Tests can be used horizontally, or vertically using five columns. Allow 11 seconds per group of 5 + the separation sign

(i)

.....	N3L5X	....	F7Q0R	....	U9D4J	....	C8Y2K	....	G1V6P	....	X	.....
	9AWH7		SB2Z5		3T6F0		1MDU0		XN8E4		6	
	C810I		6LY9T		Q7HS2		VB43J		5RG0A		P	
	0EK6P		V34WY		8MR1G		Z9PI5		D2BL7		4	
	UJ2M4		8FNC1		EX0A5		7S6KW		9H3QZ		I	
												
	B		2		9		Q		I			

(ii)

.....	E9W1G	....	P207T	....	C8H5S	....	V6K0M	....	R3Z4I	....	X	.....
	LX6B3		UA4Q9		0N7YF		RD8J1		5C2WP		3	
	0FS2M		5ZY8H		V6BJ3		7LG4X		E10T9		Q	
	I8JU5		S16KD		9GZ4A		W3CQ2		8NF0V		6	
	4C7VY		3FBG0		ZK2X1		9P5SH		QL6J8		R	
												
	D		R		5		W				2	

7 (d). **PLAIN LANGUAGE** (P/L). The following sentences are suitable tests for two minutes, at 7 w.p.m. Remember full stop = AAA, comma = GW, and hyphen, or dash, DÜ.

----- An aeroplane wing, aerofoil, is inclined at an angle to its motion. .-.-.-.

Air pressure causes a reaction on the moving aerofoil.

This produces a vertical lift, and a horizontal drag against motion.

The angle between the wing plane and horizontal is the angle of attack

The greater the speed of the motion, the greater the reaction on the wing.

Also, the greater the angle of attack, the greater the reaction.

In general, the greater the reaction, then the greater is the lift.

The drag, existing while there is lift, is called induced drag.

Friction produces parasitic drag. This is reduced by stream-lining.

It is reduced by the use of the monoplane instead of the biplane.

Reducing the struts and wires, and the smoothing of surfaces helps.

Retractable undercarriages help by reducing the friction with the air.

The Hawker Typhoon, a low-wing monoplane, has a Napier Sabre engine.

This engine is a 24-cylinder, liquid-cooled, H-type motor.

It gives 2,350 h.p. for take-off, and 1800 h.p. at the rated height.

Top speed is more than 400 m.p.h. and rate of climb is very high.

The Typhoon carries multiple machine-guns or fewer shell-firing cannon.

7 (e). **LETTER GROUPS. Two-minute tests at 7 w.p.m.**—58 letters. Tests can be used horizontally as bracketed, or vertically using six columns and omitting two letters in the last column. Allow 10 seconds per group of 5 letters + separation sign.

.....						
{ RLFUH	{ QTIWD	{ CMXAO	{ NBYVE	{ KSPJG	{ ZXULI	
{ ESCAY	{ BPVNX	{ RDFHQ	{ GZKWJ	{ MRNOT	{ FCH	
{ ZMGOK	{ JFWRH	{ TPLUI	{ SMXCN	{ VBIEQ	{ WDSAX	
{ PCNUL	{ XAZQT	{ YBEKR	{ VHDOF	{ GMPZC	{ UIJ	
{ DYKWB	{ MGOIJ	{ SPZJG	{ XCNTU	{ EALQF	{ YHNKW	
{ HQFXE	{ NSZCU	{ VAMWR	{ YLPIB	{ ODJKM	{ RTV	
{ PAMGW	{ RTLYB	{ KNHDO	{ VBQFJ	{ ZWCXG	{ EBIKO	
{ IVDKO	{ EQXDJ	{ BUZTG	{ AXLEW	{ FHLAP	{ SUN	
{ SLNCU	{ HWGFZ	{ YJEPX	{ CMRBK	{ MQDOT	{ YRVFH	
{ RBWJY	{ OPRPM	{ SFQZL	{ THDGN	{ VIUEB	{ XCK	

SET 8. WORKING AT 8 WORDS PER MINUTE

8 (a). **LETTER GROUPS.** One-minute tests at 8 w.p.m.—33 letters. Tests can be used horizontally, or vertically using six columns as indicated. Allow 9 seconds per block of 5 letters + separation sign.

(i)

UKFQI	....	WPBZ	....	TDJRM	....	XAQEY	....	NVGCP	....	LOBFJ	....	SGH
ANXRG	....	CTLYO	....	PHVBF	....	KJWDS	....	RIUZF	....	QGMWR	....	CEP
VBPZS	....	XGDQJ	....	NYEUK	....	COHFT	....	SLAWD	....	ICXUE	....	VMR
YWEMC	....	URFAI	....	XOQZS	....	PLVNG	....	MBJOX	....	HPTDK	....	RYB
DOULT	....	SKUHV	....	WAIGC	....	RNBXM	....	QHYKE	....	YNZVA	....	LWF
	....	H	....	M	....	D	....	X	....	G	....	
	....	B	....	C	....	N	....	F	....	S	....	
	....	Y	....	S	....	T	....	P	....	Q	....	

(ii)

GXBPE	NSFZA	RLVCU	DJQTY	HWOKR	MIPXL	UJDD
TCHMJ	DQUOY	XKBEF	GZIRF	NAVSY	EWLCO	XTN
YFOKZ	SGJVT	PCWXL	RAVDC	BGIMZ	GHUNJ	KER
RAWXV	LEDHB	NITOF	MSYPL	UEJXD	FVKG	ZQO
UDPXG	ELCMS	RWJHN	KBUSO	QRVFA	CTBIY	NKG
						
	C	Z	V	B	F	
	K	G	W	N	X	
	Y	U	P	J	A	

8 (b). **FIGURE GROUPS. One-minute tests at 8 w.p.m.—26 figures.** Tests can be used horizontally, or vertically using the five columns as indicated. Allow 11 seconds per block of 5 figures + separation sign.

(i)

-----	08359	....	17264	....	56380	....	29741	....	85530	....	9.-----
	61127		04481		39956		65773		22861		0
	72614		85039		74192		35068		00275		4
	45083		29176		82047		16395		14398		2
	17296		48350		19563		08274		89546		3
											
	0		2		5		6		7		

(ii)

-----	64715	....	90823	....	18362	....	48503	....	71859	....	6.-----
	38308		17654		02299		71463		35584		7
	92572		63108		76854		37119		82606		3
	01839		92754		34015		22698		27163		0
	27564		08397		14732		46055		93423		8
											
	2		1		8		4		7		

(d). **PLAIN LANGUAGE** (P/L). The following sentences, etc., are suitable for two-minutes tests at 8 w.p.m. In addition to the full stop, comma and short break (see p. 37) we will introduce the symbols for:

Block letters

UK, .----., d' d' dah dah d' dah.

Inverted commas

RR, .----., d' dah d' d' dah de.

These signals are sent at the beginning and at the end of the relevant portion.

In these tests allow about 1½ seconds per letter, the rest of the time for the breaks between words.

----- The cry of the German pilots heard on the radio was "Achtung Schpitfeuer." ----

BRISTOL BEAUFORT, 310 m.p.h. top speed, has two BRISTOL TAURUS engines.

BEAUFORT, with sleeve-valve engines, gross weight six and a half tons.

THE FAIREY FULMAR is fitted with a 1,145 h.p. Rolls-Royce MERLIN X engine.

Top speed near 300 m.p.h., it is a two-seater eight-gun fighter.

The FAIREY FULMAR is an all-metal, stressed-skin, low-wing monoplane.

One tank hit by A.T. gun at road junction. Infantry are far behind.

"Patrol returned with 32 prisoners and 3 light machine-guns."

Field guns often give a whitish flash with a decided kick forward.

Medium guns and small howitzers, larger yellow flash, less forward throw.

Larger howitzers have a large round red flash with little forward throw.

However, note that flash reducers are often used to disguise the guns.

(And finally, we will end with a memorable quotation from the speech of the Prime Minister when speaking of the mixing of the affairs of America and Great Britain, and thinking of the Mississippi. It will make a three minutes' test at 8 w.p.m.)

"Let it roll on full flood, inexorable, irresistible, benignant, to broader lands and better days."

8 (e). **MIXED GROUPS. Two-minute tests at 8 w.p.m.** and useful for sending practice. The tests can be used horizontally, or vertically using six columns. Allow 10 seconds per group of 5 symbols + separation sign.

.....					
{ Z8E0N	 P6W3B	 R9K1X	 U2Q7G	 S4O5L	 Y2I7M
{ 6V1AC	7J2TD	4F5MH	0L8BX	3R9WZ	9E0KP
{ G9TS5	Y7CN0	06RF3	D4AV2	Z1WQ8	U6BD4
{ 4UF2J	3QL1M	8AG9N	7TP8I	6EK00	3CH5X
{ DH0X7	BV5E9	ZG6C1	IW2J4	AY8H3	NQ1F8
{ L6R20	I0K7S	U3B8Y	E4J9M	C1P5T	W2V9S
{ CQ1M8	WH5V2	PY0S9	OV3D6	TL7F4	RA5G1
{ 9NY4B	3EX8K	1IQ7Z	5WC0H	2GSR6	0JZU7
{ A2PV5	F4JD9	M0IC8	X1TN7	K3O6E	Q5U6H
{ 0R3HL	1Q7ZG	5F6JD	4A2BS	9L8VY	7P4KC

SET 9. WORKING AT 9 WORDS PER MINUTE

9 (a). **LETTER GROUPS. One-minute tests at 9 w.p.m.**—38 letters.

Use the tests 5 (a). Horizontally, use two rows, omitting the last two letters; vertically, use four columns, omitting the last two letters.

The tests of 5 (e) can also be used, sending the two-minute tests in one minute, but omitting the last two letters in each case.

54 9 (b). **FIGURE GROUPS. One-minute tests at 9 w.p.m.**—30 figures.

Use the tests 5 (b). Horizontally, use two rows, omitting the last two letters; vertically, use the four columns, omitting the last two letters.

9 (c). **MIXED GROUPS. One-minute tests at 9 w.p.m.**—34 letters and figures.

Use the tests 5 (c). Horizontally, use two rows, sending the six blocks of five each and ending with four symbols from the end blocks; vertically, use three columns + four letters.

Also tests 5 (f) can be used, sending the two-minute tests in one minute but omitting the last two symbols in each case.

SET 10. WORKING AT 10 WORDS PER MINUTE

10 (a). **LETTER GROUPS. One-minute tests at 10 w.p.m.**—42 letters. Tests can be used for sending or receiving practice, horizontally, using two rows; vertically, using four columns + two letters. Allow 7 seconds per group + separation sign.

-----	{ LFOJE ...	XPGRI ...	CWYAN ...	BVDUH ...	OL	----
	{ KTZSM	QAVDW	XEKRP	NCGYQ		
	{ BHUCV	TFLMJ	SZIOD	REKWA	WN	
	{ IXDNG	BKUYZ	VHMQ L	FJTSP		
	{ RAPQW	EC SHN	BJGTF	OXLIZ		
	{ ZJLEK	POFGV	NUCIY	HNQBD	XT	
	{ MSFHD	RIJTB	XOLWE	GKPN C	RC	
	{ GUNOX	LYMQE	AZUSB	VTFJY		
	{ AVBGP	ZNWKC	FDJHQ	ILXER	BJ	
	{ CRQYT	HSDXO	KZEVG	UAWZM		
	X	Y	Q	D	V	
	P	Z	Y	C	X	

10 (c). **MIXED GROUPS. One-minute tests at 10 w.p.m.**—38 letters and figures. Tests can be used horizontally, or vertically using four columns and omitting the last two symbols. Allow 8 seconds per group + separation sign.

L3X7F...	H0G8M...	Y1R9N...	E2P5D...	U6Z4J...	C8I2V...	B9T4Q...	W7A
BC1K5	0Y6H3	NF5I0	JC9G1	KA3P6	MV4D5	8Z7LE	2X0
6QT9U	8AL5V	0RW2S	40Z3J	7FX1P	9HN3G	C6KD8	M1Y
F2JE4	C7RX6	D9AP1	Z8YK0	N5HV3	L2GI0	7MS5U	6T4
0W5CQ	3V9B0	2J7DG	6S4XA	8M2LF	1Y5UK	TH9G3	N6P
Y8E4B	I1Z2T	K7C3L	Q6N5W	D0S9A	U7R4X	F1P0V	J5H
HR3M2	PT9E1	4U8BX	0I7VL	OC6W5	ZD9A6	YJ1N8	0G3
2ND7S	5JX0Q	G6FV4	U9RH1	3EB80	6WT2P	5LZ7A	I2K
A0PN7	K2MW9	8ZH1Y	3EB6M	R5TG4	Q8X09	S3FC5	2V9
6Z9UD	3W0AP	L5K01	MT0F8	7Y4JE	2S3QR	1N9XH	B6C

SET 11. WORKING AT 11 WORDS PER MINUTE

11 (a). **LETTER GROUPS.** One-minute tests at 11 w.p.m.—46 letters.

Use the tests 7 (a). Horizontally, from two rows send nine groups of five letters + one letter; vertically, use four columns + six letters.

The tests 7 (e) can also be used similarly.

11 (b). **FIGURE GROUPS.** One-minute tests at 11 w.p.m.—37 letters.

Use the tests 7 (b). Horizontally, use two rows without the right-hand groups, omitting the last three figures.

11 (c). **MIXED GROUPS.** One-minute tests at 11 w.p.m.—42 letters and figures.

Use the tests 7 (c), (i) and (ii). Horizontally, use from two rows eight groups of five + two symbols; vertically, use eight columns + two symbols.

The tests 7 (f) can also be adapted for use.

SET 12. WORKING AT 12 WORDS PER MINUTE

12 (a). **LETTER GROUPS.** One-minute tests at 12 w.p.m.—50 letters. These tests can be used horizontally (using two rows) or vertically (using five columns). Allow 6 seconds per group + separation sign.

-----	{PIBYM	DZTJN	OFRXH	KGVSC	EWQLU	
	{DSVTI	ULWCA	YQKNB	EXMZJ	HRGOF	.....
	{JXACW	PEOMQ	IDGZU	FHBRT	YKVNS	
	{ENLKG	VYHBF	JTWSP	UIODQ	AXMZC	
	{OHFUZ	GKRSX	LCEVM	NYPWA	JIBDT	
	{BQEWO	YINFR	SAJMG	XLCHZ	VDKPU	
	{NTCFK	LQZUH	VPIYD	ARSMW	BXOEJ	
	{GXSHU	DJECW	TRZNF	VKBYP	MIQLA	
	{DMJYP	XAOVS	HLKBE	IUQNF	ZRWGC	
	{ZVRLA	BKGTP	UQWXC	JDTOE	SFHNY	

12 (b). **FIGURE GROUPS. One-minute tests at 12 w.p.m.**—40 figures. Tests can be used horizontally or vertically (using eight columns). Allow 15 seconds for two groups + separation signs.

(i)

82391	57406	20973	16485	38491	60725	19375	40628
60527	81934	86519	42703	71608	24359	70812	64593
36270	49185	37240	85169	29053	71684	26459	87310
74836	10529	61095	37824	63715	49208	83920	15647
06584	93271	45628	71093	45287	06391	54386	90271

(ii)

01748	03287	59362	65491	59768	40312	59741	02368
56293	89564	10877	01324	30254	17496	18367	98520
93850	17902	51346	84276	79341	69852	72403	10685
29417	25083	64580	93167	07638	02169	91852	54973
40562	48679	32911	57803	41502	95738	26037	68414

12 (c). **MIXED GROUPS. One-minute tests at 12 w.p.m.**—45 letters and figures. Tests can be used horizontally (using two rows from left or right as bracketed) or vertically (using three columns). Allow practically 7 seconds per group + separation sign.

-----	{ N6L1Z	F9Y2K	R3B7W	G8A4P	X5S0M	
	{ 20CU8	DV7J0	6H4EQ	1I5TL		
	{ B3W9M	4AH5P	F7S1K	Q2D8C	R2V9I	
	{ 7G4OE	J8TL5	1UZZ6	3XVK0		
	{ X9IV2	7K1RZ	GW3H0	LB6M5	D4P8Y	
	{ A5S3Q	C0F6E	Y8P2U	N9J1T		
	{ PD1X6	KU4Q9	LS8G5	ZM0O2	H7T3X	
	{ 8JY5B	0IM3C	2VA9R	7WTF6E		
	{ D0RW9	P6XE7	N4LC1	S5YA8	U3I2M	
	{ 9K3GT	8Z5BJ	6M0F0	4U2QH		
	{ F6ER1	Y9S0O	B3D7V	H8T5Z	N2W4Q	
	{ 7U2AL	3G8CQ	9F5MX	0K6JW		
	{ T8H0N	S4D7A	I5YW2	E3PF6	U9G1J	
	{ 0MZW5	70LV1	8XK4B	9RG2Q		
	{ QV12H	IP3M0	DS9T6	OC7B5	J3U6F	

THE "Q" CODE

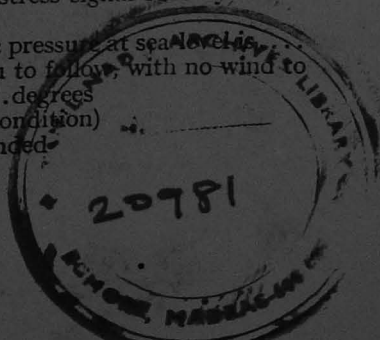
This is an internationally agreed code of abbreviations arranged to meet the principal needs in radio communication. The abbreviations used in messages have the meaning given them in the adjacent column, but become a question when followed by an interrogation mark.

Abbrevia- tion	Meaning
QRA	The name of my station is.....
QRB	The distance between our stations is.....
QRC	My station is controlled by.....
QRD	I am bound for....from.....
QRG	Your exact frequency (wave-length) is.....
QRH	Your frequency (wave-length) varies
QRI	Your note varies
QRJ	Your signals are too weak to read
QRK	The readability of your signals is.....
QRL	I am busy; please do not interfere
QRM	Interference is bad
QRN	Atmospherics are bad
QRO	Increase power
QRP	Decrease power
QRQ	Send faster....words per minute
QRS	Send more slowly....words per minute
QRT	Stop sending
QRU	I have nothing for you
QRV	I am ready
QRW	Please tell....that I am calling him on.....
QRX	Wait until I call you
QRY	Your turn is No.....
QRZ	You are being called by.....
QSA	The strength of your signals is.....
QSB	The strength of your signals varies
QSD	Your signals are bad
QSG	Send one telegram at a time
QSJ	The charge per word is.....
QSK	Continue transmitting
QSL	I have received your message

Abbrevia- tion	Meaning
QSM	Repeat the last message
QSO	I can communicate with.....
QLP	I will retransmit the message to.....
QSR	The distress call received from....has been cleared
QSU	Send on kilocycles
QSV	Send a series of VVV.....
QSW	I am going to send on....kilocycles
QSX	I am listening for.....on.....
QSY	Change to.....kc/s
QSZ	Send each word or group twice
QTA	Cancel message
QTB	I do not agree with your number of words
QTC	I have.....telegrams for you
QTE	Your true bearing in relation to me is....degrees
QTF	The position of your station is.....
QTG	I will send signals in order that you may take my bearing
QTH	My position is.....
QTI	My true course is.....degrees
QTJ	My speed is.....knots (or kilometres per hour)
QTM	I will send radio signals and submarine sound signals
QTO	I have just left dock (or port)
QTP	I am going to enter dock (or port)
QTT	I am going to communicate with your station by means of the International Code of Signals
QTR	The exact time is.....
QTU	My station is open from....to....
QUA	Here is some news of.....
QUB	Here is the information requested.....
QUC	The last message received by me from....is....
QUD	I have received the urgency signal sent by.....
QUF	I have received the distress signal sent by.....
QUG	I am forced to land
QUH	The present barometric pressure at sea level is.....
QUJ	The true course for you to follow, with no wind to make for me is.....degrees
QUK	The sea at....is....(condition)
QUM	The distress traffic is ended

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OTHER SIGNS

The following signs are commonly used. Only the more important ones have been introduced in the exercises in this book.

Full stop	<u>AAA</u>	-----	d' dah d' dah d' dah
Comma	<u>GW</u>	-----	dah dah d' d' dah dah
Inverted commas	<u>RR</u>	-----	d' dah d' d' dah de
Block letters (or underline)	<u>UK</u>	-----	d' d' dah dah d' dah
Short break	<u>II</u>	....	d' de d' de
Dash or hyphen	<u>DU</u>	-----	dah d' d' d' d' dah
Long break (or two dashes)	<u>BT</u>	-----	dah d' d' d' dah
Question mark (interrogation)	<u>IMI</u>	....	d' d' dah dah d' de
Oblique stroke (fraction bar)	<u>XE</u>	-----	dah d' d' dah de
Colon	<u>MB</u>	-----	dah dah dah d' d' de
Semi-colon	<u>CN</u>	-----	dah d' dah d' dah de
Brackets	<u>KK</u>	-----	dah d' dah dah d' dah
Apostrophe	<u>JN</u>	-----	d' dah dah dah dah de
Rub			d' d' d' d' d' de
-6 or more dots			
	<u>I</u> (.....) is used for full stop, and <u>AAA</u> (.....) for a comma.		

In the same series

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A short manual of close order Drill for Air Training Corps and the Home Guard.

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The tests cover the usual range of use of the Morse Code—letter code, figure code, mixed groups code and plain language. Certain other symbols of punctuation, etc., are also introduced but only a limited number for in this matter, as in the case of general procedure in communication, there is not exact uniformity of method throughout all the Services.

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