

This book, which is intended to help the learning of the Morse Code, has been completely revised in order to conform with changes in the types of tests used in some of the Services. It also contains the Phonetic Alphabet approved for adoption by all British and United States Services on January 1st, 1943.

After an introduction on the Code itself, a progressive series of practice tests are given. These are carefully designed to use all the letters of the alphabet and the simple primary numbers, as equally as possible throughout. The tests cover the learning of the Morse Code symbols, and aim at progressing the speed of reception from two words per minute to twelve words per minute.

The tests cover the usual range of use of the Morse Code letter code, figure code, mixed code groups and plain language (sentences and also collections of words of five letters). 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.

The book was written chiefly for the work of the Air Training Corps. It has also been of use to members of the Services mastering the Morse Code, to those endeavouring to improve their Morse reception while off duty, and to those on "deferred service" desirous of preparing themselves by learning the Code.

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THE MORSE CODE

LEARNING & PRACTICE

R. G. SHACKEL, M.A.

REVISED EDITION

(with 1943 Phonetic Alphabet)

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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 (·), 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 1/24th of a second. Thus, for a speed of 15 words per minute (15 w.p.m.) the length of a dot is 1/12th of a second and of a dash 1/4th 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

MORSE CODE ALPHABET

Morse Code	Phonetic Alphabet
d' dah	(Able)
dah d' d' de	(Baker)
dah d' dah de	(Charlie)
dah d' de	(Dog)
de	(Easy)
d' d' dah de	(Fox)
dah dah de	(George)
d' d' d' de	(How)
d' de	(Item)
d' dah dah dah	(Jig)
dah d' dah	(King)
d' dah d' de	(Love)
dah dah	(Mike)
dah de	(Nan)
dah dah dah	(Oboe)
d' dah dah de	(Peter)
dah dah d' dah	(Queen)
d' dah de	(Roger)
d' d' de	(Sugar)
dah	(Tare)
d' d' dah	(Uncle)
d' d' d' dah	(Victor)
d' dah dah	(William)
dah d' d' dah	(X-Ray)
dah d' dah dah	(Yoke)
dah dah d' de	(Zebra)

Note that to avoid confusion in the tests throughout this book the symbol

O is used for the letter O, θ is used for the numeral 0 (zero)

i " " " " " " " " " " I, 1 " " " " 1 (one)

In taking down Morse Signals in test groups care should be taken to use the above symbols. In plain language, however, ordinary lettering is used.

A help when receiving at speeds is to write a dot (.) for letter E and then to fill in at the end of receiving.

NUMERALS

Morse Code	Figure
d' dah dah dah dah	is 1 (Wun)
d' d' dah dah dah	" 2 (Too)
d' d' d' dah dah	" 3 (Thu-ree)
d' d' d' d' dah	" 4 (Fow-er)
d' d' d' d' d' de	" 5 (Fi-yiv)
dah d' d' d' de	" 6 (Six)
dah dah d' d' de	" 7 (Sev-en)
dah dah dah d' de	" 8 (Ate)
dah dah dah dah de	" 9 (Niner)
dah dah dah dah dah	" 0 (or θ) (Zero)

ABBREVIATED OR SHORT NUMERALS

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

Morse Code	Figure
d' dah	is 1
d' d' dah	" 2
d' d' d' dah	" 3
d' d' d' d' dah	" 4
d' d' d' d' de	" 5
dah d' d' d' de	" 6
dah d' d' de	" 7
dah d' de	" 8
dah de	" 9
dah	" 0 (or θ)

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

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, 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 or four. More tests are given in groups of four, consisting each of three letters and one figure, as the R.A.F. are using them for standard tests.
4. Plain Language (P/L). Various types of plain language tests are given, straight sentences, sentences with words jumbled, and groups of words each of five letters.

The vertical lines divide the columns when necessary in order to help the sender. It is a simple matter to convert one-minute tests into two-minute tests, or vice versa.

It should be noted that all the tests are not exactly equal in a set. This, of course, is impossible, and the only method of determining any exact speed is to use the time intervals for all the dots, dashes, and various groups and intervals as given on p. 1.

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. It should be noted that punctuation symbols are usually counted as two letters.

In the use of code signals in groups a common practice is to use a *separative sign* between each group. This signal is d' de d' de, . . . , I I. It is not shown in the tests in this book, but can be introduced if so desired.

In writing down Messages in Code Groups, Receivers should always write in Block Capitals. Most receivers develop their own method of making the letters to develop speed, but care must always be taken to make the symbols clearly so that the following can be distinguished:

Z and 2 U and V I (i) 1 and 7 Y and 7

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. 4) the following groups of four or five letters each should be sent by buzzer, or the sounds spoken as indicated on page 6. They should be sent or said quickly (p. 2) with long intervals between; about 5 or 6 seconds per letter + interval is suitable on starting, with about 12 seconds between groups.

(i)	AG DF	BF ED	CE GC B	D AB GF
	CF EB	DA GC	FA DB E	G DE CA
	EB AG	CG DF	GC FA D	B FD EC
	FD CA	GE AB	DF EB G	A CG BA
			EB GA F	C BF DG

1 (b). Using H i J K L M N. (Sounds on p. 4.) Tests are to be used as in 1 (a).

(i)	Mi NK	LH JM	HL JN i	M KH iL
	LK JM	iK HN	JN iM L	H JN MK
	HN Mi	KJ ML	NK LH N	K L i NJ
	NJ HL	NM iK	iH NK J	L MK Hi
			HM Ji M	K JN LN

1 (c). Using O P Q R S T. (Sounds on p. 4.) Tests are to be used as in 1 (a).

(i)	OR TP	SR QO	RO TP S	Q OP RS
	PT QS	OQ OR	TS QRO	T QS OP
	TQ PO	RT PS	QP SOR	P TR QT
	QS RP	QS TO	PR OQT	S OP TR
			SQ PT Q	O TR PQ

1 (d). Using U V W X Y Z. (Sounds on p. 4.) Tests are to be used as in 1 (a).

(i)	ZV UW	YZ VX	XU YW V	Z VW YX
	WZ XU	WV YW	VY ZX U	Y XU ZW
	UX VY	UY XZ	WZ VU X	W ZY UV
	YU ZV	XW ZV	YV UZ W	X UV WY
			UX WV Y	V WZ XU

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

(i)	35 24	13 42	41 35 2	3 15 42
	12 35	42 15	32 14 5	1 42 35
	23 41	35 34	15 22 3	4 53 14
	54 13	24 51	24 51 4	2 31 53
			53 43 1	5 24 21

1 (f). Using numerals 6 7 8 9 0. (Sounds on p. 5.) Tests are to be used as in 1 (a).

(i)	79 78	96 07	96 80 7	6 97 80
	07 60	80 79	07 69 8	0 68 97
	98 06	78 96	89 77 0	9 06 68
	86 97	09 68	70 98 6	7 80 96
			68 06 9	8 79 07

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

1 (g). Using letters A to H inclusive. (Sounds on p. 4).
Tests are to be used as in 1 (a).

(i)	DA EG	CE HA B	D FC GB
	CF BH	FH DB E	G DE CA
	HG AD	GD AE C	F BA HC
	EB FC	EF CH G	A HB EF
	DH GA	AB GF D	H CF DG

1 (h). Using letters i to Q inclusive. (Sounds on p. 4).
Tests are to be used as in 1 (a).

(i)	OL NK	Ki OM P	J LN KQ
	MK JQ	LP JQ M	Q KO iN
	LJ OM	OM KJ N	L i Q PO
	Qi LP	JQ Ni O	K MP LJ
		QN PL i	Q JK OM

1 (i). Using letters R to Z inclusive. (Sounds on p. 4).
Tests are to be used as in 1 (a).

(i)	WZ UY	RT VX Z	Y UW SV
	RX WT	QU SY W	R VT ZX
	VT RX	ZW YT U	S ZR XW
	SU VZ	XS UZ V	W TY RZ
		VY RW T	Z SX UY

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

(i)	7594	0283	64830	(ii)	17295
	1853	6927	59261		48037
	4026	8591	91645		83720
	3769	4015	28074		61953
			05497		32186
	8230	7461	10752		96348
	2605	3849	83529		04671
	6172	9358	37108		25469
	5948	1702	46983		70502
			72316		59804

1 (k). Using all the alphabet.

Send or say very slowly, allowing approximately 6 or 5
seconds per letter and 12 seconds between groups.

(i)	PWRA	KQGZ	DBRMK	(ii)	NGSLU
	CEYH	XDLi	ZQHWT		YFXPV
	FUNO	VBtJ	COAJi		EBWfY
	MSJC	UGRP	SiPVH		OMAGN
			KXLZC		JUDQR
	XVKF	WYEA	FEYBL		XAHCM
	HLTM	OZNQ	NVTPG		ZQJiD
	DBiS	JAHc	UWOSR		KVBHE
	GZAL	RPFx	JGAQF		CRKZO
			MYDUX		PTWST

In future, the general beginning sign \overline{VE} is not shown with the tests; it is, however, always used.

2 (e). **MIXED GROUPS.** Two-minute tests at 2 w.p.m., useful for sending practice. Four groups of 3 letters and 1 figure each. Allow approximately $6\frac{1}{2}$ seconds per letter or figure.

-----	NG7W	X2LA	9PRY	J4HV
	8CSZ	ODK3	EMQ5	FUB1	
	T0B1	AW5V	Z6NH	7LDX	
	QEF3	8JPU	i03S	GC2K	

2 (f). **PLAIN LANGUAGE (P/L).** The following groups of four words are suitable for two-minute tests at 2 w.p.m. (or two words for one-minute tests). Allow approximately 5 seconds per letter and a longer break between groups. Note that the beginning sign for P/L is \overline{AAA} , or d' dah d' dah, after \overline{VE} . In taking down plain language write in ordinary handwriting, joining up letters to complete words.

.....	MUCKY	PRINT	GOADS	VELOX
	BLACK	NIGHT	FOWEY	JUMPS	
	DUMPY	JOINT	WHELK	CRABS	
	YOUNG	ZEBRA	FOULS	WITCH	
	ZEROS	FIGHT	USHER	YAWNS	
	BLIND	CARES	JUMPY	LAUGH	
	XYLON	VENTS	WIDTH	CRAZY	
	VELDT	SQUIB	PORKY	WHANG	
	BUNCH	ZLOTY	WAXED	PRISM	
	CHIVY	BRAWL	STUMP	ZONED	
	CANDY	LUMPS	BOWER	FIGHT	
	WALTZ	JOKED	MUNCH	GRIPS	

SET 3. WORKING AT 3 WORDS PER MINUTE

3 (a). **LETTER GROUPS.** One-minute tests at 3 w.p.m.—15 letters. Tests to be used horizontally or vertically. Allow approximately 7 seconds per two letters.

RDYG	EXTU	LAWP	MZFE	NGDOY	DZEXM	K0ARJ
NHQB	ZJOF	V1SC	KAU	UHGI	WBLSV	TXRPO
TAPK	DRWN	ZBJL	VGM	XYEON	ZMKDJ	LTWBU
CIGU	YMHX	SQFO	EDA	RAIGV	SCOHP	FDMFW
UBJW	FBDG	KXRY	ASQ	1VQTX	BJYLZ	NKFGS
SYOE	NTZQ	1CHM	LBD	MWGAU	HPROE	DZKLC
XLRF	URKJF	ADPG	BYS	QTRFI	JXSVN	YCDZM
FGCR	HB1O	SMEH	QKV	PKWUH	EQABL	ROUFN
VOAT	LWEK	JYXD	UGB	ZBURW	FEQNH	XL1YT
ZEMC	GSVH	NRQB	1FW	SPVMG	AOCKR	1JHWD
FQID	AVJW	XTAK	YOR	EZXBM	LUFYQ	WNVTR
JWSZ	1QGM	PHUN	RUX	GSJHA	OD1PC	BKXQL
DEVN	OCAL	YFBT	XWM	YEMZR	VUNFW	JPTOK
ANBY	JFCZ	UPKR	GDL	CXDLB	QAH1X	PSJGQ
QMH	UNRS	BVY1	ZLC			

For two-minute tests use two columns.

PLAIN LANGUAGE (P/L).

3 (d) (ii). One-minute tests at 3 w.p.m. (For two-minute tests use two columns across, or one set of words vertically.)

WALTZ	YORKS	BEGIN
GROWS	QUALM	TEPID
EPHOR	VAULT	FINDS
GRABS	DOWER	PAUSE
MOIST	REALM	LIGHT
PRUDE	WOULD	FORTE

GLUMP	SANDY
MANGY	CHEWS
WAXEN	GHOST
PRISM	DECKS
YOKES	MONEY
WELCH	READS

MODEL	PAPER	UNITS
SPACE	MERCY	AREAS
PROUD	RUFEE	WORLD
ENEMY	STOCK	FEWER
MAJOR	CLAIM	DIVID
POINT	EVERY	LOCAL

HASTE	KNOTS
ADMIT	SCALE
FORGE	SEVEN
ATLAS	PROSE
CLAIM	AGREE
PEACE	ISSUE
ALONE	

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3 (e). LETTER GROUPS. Two-minute tests at 3 w.p.m.—30 letters. Useful for sending practice. Tests can be used horizontally or vertically, as indicated. Allow $3\frac{1}{2}$ seconds per letter.

GWPN	TSBR	LDJV	F1KE	AUSJ	QVHC	MZGR	OF
ZEMI	AHT1	URQN	WKOH	FTGN	ESPX	WYAD	KV
DRY1	RQNO	GZMH	TGLP	WXBZ	TQJE	FUKL	SA
BFOG	JLYK	ASPE	CZQG	M1VY	WNRD	LTRK	XH

X	V	X	1	D	H
---	---	---	---	---	---

3 (f). MIXED GROUPS. Two-minute tests at 3 w.p.m.—6 groups, each of 3 letters and one figure. Useful for sending practice. Use horizontally, or vertically as indicated. Allow approximately 4 seconds per symbol. For two-minute tests use 12 groups.

P1HS	KQ9F	KQ9F	X M3U	CYDR	MY8F	B G2J
4VMU	F5ZL	W0BY	6QEN	2AKO	7PZC	H5SM
ZG7B	CZP5	4VKA	SWL8	R0XY	E RV3	
JNY6	0WQD	S G02	B G1X	P F L9		

LX3R	AZH5	Q1VY	KW8C	0JEN	17MF
7BH V	1F YA	6TGS	U4OX	DN9W	LKA0
P4SD	TU80	RJF2	9YBM	G1VZ	61QH
1GL9	J3DX	F P7K	ZRT2	SAB8	G U1O

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4 (d). PLAIN LANGUAGE (P/L). (i) 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 reported to be deteriorating rapidly.-----

(Commando operation successfully completed
 Enemy infantry massing in rear of the copse
 German raider now attacking escorted convoy
 Send out reconnoitring patrol into desert
 Barometer reported to be falling very rapidly
 Please give some artillery support immediately
 You will proceed to relieve the centre section
 Send lorry with rations ammunition and tools
 Protect patrolling artillery control machine
 Fairey Swordfish Torpedo Carrier machine
 Short Sunderland Flying Boat observed ahead
 Avro Manchester heavy bombers left target area
 Junkers 87 Dive Bombing Stuka down in flames
 Please show correct very lights when demanded
 Armoured columns reached chosen objectives
 Infantry held up by intense sniping from flanks
 Patrol to starboard of course taken by convoy
 Enemy submarine reported to be in the vicinity
 Mines located in western channel at daybreak
 Sweepers proceeded at once to the area stated
 Work has been completed and passage quite clear

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

(ii) These are standard two-minute tests—8 words of 5 letters each.

DINGY	POKER	SCALP	THUMB	WINGS	CLEFT	PHLOX	QUASI
EMPTY	CHORD	WINKS	QUALM	TICKY	FLOPS	QUERN	VAPID
GREYS	FLICK	QUODS	CHIRP	KAURI	GECKO	QUILT	CYNIC
NYLON	GHAZI	GREST	VERST	GNOME	YOKEL	WHELP	FICHD
QUACK	LOWER	GYVES	WHIPS	FAWNS	QUERY	VAUNT	CHITS
URBAN	QUASH	MERIT	HANKY	VALSE	DIZZY	EPHOD	BOUND
LAKHS	FRONT	EXULT	DIGHT	CIDER	CLEBK	DOUGH	YAWNS
DORMY	KILTS	BUDGE	CZARS	DHOMS	BATCH	CHIVE	LYSOL

(iii). Two-minute tests at 4 w.p.m., consisting of sentences, totalling 40 letters, with words disarranged. Allow about 2½ seconds per letter.

The new Spitfire has rolls a royce engine 61 merlin.
 The airscrew now four is bladed not three bladed.
 Two cannon four and machine guns now carried are.
 This armament wholly is installed the in wings.
 The carry wings distinctive underslung radiators.

SET 5. WORKING AT 5 WORDS PER MINUTE

5 (a). **LETTER GROUPS.** One-minute tests at 5 w.p.m.—
Part I, 25 letters in five groups of 5 letters each. Tests can be used horizontally, or vertically using five columns. Allow approximately 2 seconds per letter.

-----	(i)	-----
RWJLS	ETXXM	BZKPU
i QXHF	OKLAG	VCYTJ
KMGPN	ciBFH	RQALD
VADCO	URJNQ	SGWFH
BTUYE	WPVDS	OiXMN
-----	(ii)	-----
BQELG	SYZiJ	HDPOC
FKJTC	LNXDU	YEWQG
PZAMV	BEROC	iJNLX
XDRWO	QVGTH	KSFMU
SHYUN	FMWKA	VZBTR
-----	(iii)	-----
GPNDV	XREQY	BZiFH
COAYS	MTWDG	JLRUP
TQiBR	UFJAH	WNSXK
HXWUL	KCNZV	GTMDQ
FKJME	LBPSi	OCYAV
		HNTUG
		RXDWQ
		TMUKA
		FiZNV
		OLPGC
		EYSJb
		RXDWQ

Part II, 24 letters in 6 groups of 4 letters each. Use horizontally, or vertically as shown.

-----	(iv)	-----
HYsB	NV GK	CiROM
AJKS	DU FW	LiGT
REdY	JiMT	BXNC
BNP A	FZ JD	YQYS
QioG	XE ZP	R DBJ
UXLR	TQ VH	NZYW
GZWK	PC EU	QHFA
MTFL	WH OX	A UKP
		VSUM
		NY CT
		GA DK
		OL NS
		JG RV
		i EBY
		F WAH
		J MES
		M JXV
		i EBY

4 (e). **LETTER GROUPS.** Two-minute tests at 4 w.p.m., suitable for sending practice. Use horizontally as shown (use in either direction also), or for vertical tests, use four columns. Allow nearly 3 seconds per letter.

(i)	-----	-----
{ YNCKE	RGQit	BVLZA
{ KJWMF	YTN DX	GCQFW
{ GXDBW	CPV SZ	MR YiJ
{ RQTHO	LBM JV	PN DXK
{ UALPD	HFJ QE	WKR VB
One minute test		
(ii)	-----	-----
{ RNPUV	KiXAL	GE QDM
{ HTFOJ	ZNWYS	KRMNX
{ BLYSQ	UOT XD	MJ AVR
{ XALCR	NCF QM	PH BOD
{ DGZEH	AYLUB	ZWKCP
One minute test		
		B SCYK
		U GEQF
		E WKPZ
		J GUVi
		F RTJO

4 (f). **MIXED GROUPS.** Two-minute tests at 4 w.p.m., suitable for receiving or sending practice. Use 8 groups, i.e. two rows horizontally or four rows vertically and in either direction. Allow nearly 3 seconds per symbol.

-----	-----
{ Z8AJ	3PDG
{ 7HFX	U6RM
{ BY4i	FVX2
{ ONW1	ZH5J
{ QV6S	AN8B
{ 0GKC	1WiL
{ P3ES	T0CK
{ RU9D	YFS7
	CiV0
	9WSK
	G3DL
	MR7T
	2UEY
	XZ6H
	ONQ8
	J4iB
	LQ5N
	1EOG
	P9UK
	CSi4
	JFR7
	D3BM
	XV6H
	2AZW

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 and interval.

-----	17 56	20 39	48 57	26 17	-----
	82 63	59 01	74 38	05 42	
	36 18	74 90	25 16	47 90	
	40 92	61 57	83 42	13 65	
	59 40	38 62	17 70	89 38	
	71 28	53 34	90 65	71 42	
	62 37	95 80	31 94	26 59	
	03 91	47 74	29 01	35 86	

5 (c). **MIXED GROUPS. One-minute tests at 5 w.p.m.**—
 (i) Five groups, each of 3 letters and one figure. Allow 12
 seconds per group + interval between groups. Tests can
 be used horizontally, or vertically (using 5 groups).

-----	K5 BL	1V SJ	FP 9X	Ri M0	UN 2Z
	6G YE	HQ T3	7W CA	8D OK	Q4 XL
	ZD 9V	N4 OB	JL RF	WS 7G	AH T8
	CME3	Pi 6U	YG S2	M0 CA	5P KD
	VL 5R	T9 QX	SZ OH	2N UJ	E7 iY
	0W FJ	BK V4	LS Q8	YG R1	XT 6M
	P4 CD	6U ZH	V0 B1	F9 AE	80 NP
	SZ G1	XL 7W	RB 3K	VE 2H	CF A5
	7U iM	OY C2	A9 JV	D3 LS	BZ 1E
	J8 XS	R5 KL	QT G0	4F iP	Y6 HW
	0A N6	GC 8P	5U ML	QJ 9B	VS R3
	iY 0K	ZZ GF	XD 7E	CH N4	1M OU

For Two-Minute Tests use 10 groups.

5 (c). (ii) Four groups of 5 symbols each, mixed letters
 and figures. Tests can be used horizontally, or vertically
 (using two columns). Allow 2½ seconds per symbol.

-----	K5 BL	V9 S3J	F4 P8X	R0 i D2	-----
	6G 7YE	2H 4QT	3W 2CA	5U Q9Z	
	Z9 DN3	08 NB7	J0 FK1	Z6 WA5	
	3V L9R	1PG 6S	2Y i7D	MC 94U	
	TQ 0X5	Z0 2A8	HN 6U3	9EL C7	
	W1 F4J	B5 R7V	K8 Q0S	G2 Y5i	
	0P C6D	7U 3Zi	5M 9HT	4NX E2	
	S2 GZ8	X1 V H4	L6 RW7	K8 B3Y	
	4U H5F	6C J0Y	9T A3N	Pi 7W8	
	JX 3Q9	KB 7F2	VS 4G5	L1 HRN	

5 (d). **PLAIN LANGUAGE (P/L).**

(i) Two-minute tests at 5 w.p.m.—10 words. Use two
 rows horizontally, or one row vertically, and allow 2
 seconds per letter.

-----	BLEND	PORCH	STAGE	FUSTY	ACIDS
	FAKIR	GYBES	INVAR	GHANT	CLUBS
	QUITS	CRAWL	DERBY	CHOPS	FINER
	WRECK	HANKY	JACOB	LURID	STRAW
	NYMPH	MERCY	DIZEN	GLAZE	PLUMB
	OBEAH	DOUGH	PSALM	MITRE	DELTA
	KAROB	FAWNS	COLKS	DENIM	PILAW
	MPRET	REALM	PIQUE	LATHY	HOKUM
	UNIFY	RYOTS	WEALD	IMAGO	NAZAL
	PULSE	LEMUR	JOIST	MYALL	ICHOR

5 (d). PLAIN LANGUAGE (P/L). (iii). The following sentences and phrases are suitable for two-minute tests at 5 w.p.m. Allow approximately 2 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*, ----- For a comma we use **III**, *d' de d' de*,

The full stop sign is the same as the beginning sign for plain language. ----- Full orders for night intruder operations have just arrived.

Prepare Wellington bombers, all fully loaded for tonight. Conditions bad, ice rapidly coating planes, coming down. Returning to base immediately owing to fuel tank leakage. Enemy formation sighted at 18,000 feet, flight attacking. Raider hit and going down out of control, pilot baled out. Proceed to starboard of convoy and patrol at high speed. Watch for my usual signal, by very light, when to reform. Infantry, unbroken, advancing behind creeping barrage. Heavy tank support urgently required on your left flank. Armstrong Siddleley Cheetah engines satisfactory in use. Westland Lysander, now fitted with Bristol Perseus XII. Troopcarrier Junkers J.U. 52, with B.M.W. engines. North American N.A. 73, with Allison liquid cooled engine. Hampden bomber, has Bristol Pegasus 1,000 H.P. engine.

It should be noted that signs used for commercial wireless, according to the Cairo Convention, 1938, are **AAA** for a full stop, and **GW**, i.e. *dah dah d' d' dah dah*, -----, for a comma.

5 (e). LETTER GROUPS. Two-minute tests at 5 w.p.m. Tests can be used horizontally as shown, or vertically, using five columns; they are useful for sending or receiving practice. Allow approximately 2 seconds per letter.

-----	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	KCWXX
{	XNKAM	OZCPH	JVFSL	DHRTG	UQYiV
{	FOWiR	LTUGM	PKYZX	NQWAC	DJESG

5 (f). MIXED GROUPS. Two-minute tests at 5 w.p.m. Use two rows horizontally, or five rows vertically, as indicated. Allow approximately 2 seconds per symbol.

-----	JØPR	AZQ8	3VIBH	TS7IO	X4GU
{	DKW5	P2iF	MC6L	Y1EN	AVZ9
{	YN4B	9GCW	OEK1	VAX6	5iRD
{	7FHQ	L33M	P8ZD	2KUT	NJ6W
-----	ALX2	NDU6	FGØJ	P9ZH	3MSY
{	i7CT	K1EV	5WQR	MGB4	OU8L
{	3SOV	BH5X	A9T1	ØLCF	P1KC
{	GM6Z	4RYJ	UXN7	DW8Q	BEH2

SET 6. WORKING AT 6 WORDS PER MINUTE

6 (a). LETTER GROUPS. One-minute tests at 6 w.p.m.—Tests can be used horizontally, or vertically (using three columns). Allow 10 seconds per group and interval.

OGZDN	FJAXV	PDUGL	TZRLI	IQGB0	YS PCT	MUJFN	BNSQE	LEKYM	VMXHW
X TLQH	P DEYN	TGSWK	HUBXW	ZRNJX	I MZAR	S I VKA	VKFCW	F O I P C	A L T B P
NCYEJ	H M I K Q	VBHOZ	DRSXA	ALP GM	F K O C W	G Q E L B	U J T Y D	X S W R U	S K Z N J
DF PKA	V G C L T	X M J E F	Y O M G Z	H T U I D	E L Q V S	P J W H R	Z K X N O	N D G Y B	W H F U E
R W M X U	O Z U B R	N A R Q I	Q J V E C	E Y C S W	T H P N B	Y D F O S	W L I G Q	Z T K J A	G R Z C O
V S G B I	W A X S J	Y C L U D	I F P K L	K O B F V	U D J G A	N Z T X C	H R E P M	V M Q R H	X I Y D Q

6 (b). FIGURE GROUPS. One-minute tests at 6 w.p.m.—20 figures.

(i) Tests can be used horizontally, or vertically using two columns. Allow 15 seconds per group of five figures and interval between groups.

-----	84	71	0	2	63	95	78	23	0	1	94	56	-----
	39	26	5	7	78	01	46	59	8	4	23	10	
	05	83	9	6	43	15	20	97	1	6	72	48	
	71	49	2	0	85	46	38	05	2	7	63	19	
	26	50	4	1	19	23	97	68	4	3	08	75	
	98	76	5	0	12	34	86	32	0	1	47	95	
	45	20	3	6	94	71	02	58	9	7	63	81	
	14	39	7	2	58	96	58	60	1	3	04	27	
	83	67	0	9	61	20	37	94	5	2	58	19	
	20	51	4	8	37	59	41	48	6	7	30	62	

(ii) Tests can be used horizontally, or vertically using five groups. Allow 12 seconds per group of four figures and interval between groups.

-----	6092	5814	3762	9140	5738
	1837	0296	5148	3765	2094
	5164	7823	0995	8203	1647
	9705	1463	8204	1697	2583
	4251	3907	6839	0816	7425
	7245	6398	1052	7389	4160
	3476	9081	2576	2954	8301
	5824	7130	9613	6528	0974

6 (c). MIXED GROUPS. One-minute tests at 6 w.p.m.—Six groups, each of 3 letters and 1 figure. Allow 10 seconds per group + interval between groups. Tests can be used horizontally or vertically, (using 2 columns).

H4BW	2NDP	AJZ7	KS6C	3IQG	F9OR
8FUL	QVΘG	X5ER	YM04	TB6P	HAK
CGP3	F7RK	IQHU	W9IB	VDX2	5YIJ
YM6E	WJZ9	ND8I	ΘXAV	GNNS	ZML3
Z2XV	E8SO	FBTΘ	RH7I	IAUJ	N4QD
KHT7	3YCB	OG6M	FP E5	LR9W	VS8X
1SJA	UIM5	Y4WK	8DQΝ	Z7OH	PTGΘ
DO5R	AL4T	VS2P	J1GZ	KEFΘ	7UBE
N9FQ	1DHX	3IAO	TCU2	PYM8	WJ6C
WYMΘ	G6QA	EUF9	LV3K	4JIB	R2ZH
PB3S	TZNI	MΘKX	C7RF	QH5V	DOA9
6EYC	KP8J	UH4D	3BWM	G2AR	5LVT

These tests can also be used as two-minute tests using 12 groups.

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

 Target located—bombing successfully completed, returning home.
 Road blocked by bombed transports. Send assistance as soon as possible.
 Trench mortars active on right, all silent in centre, not much on left.
 Gun flashes observed from canal bank at southern end during afternoon.
 Our mechanized forces are in touch with the enemy. Situation favourable.
 Transmit your regular signals for position finding as soon as allowed.
 Line broken—send linesmen out immediately. Urgent messages held up.
 Stand by for an ammunition 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.
 The Bell Airacobra P—400 Interceptor Pursuit aeroplane.
 Consolidated PPV 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.—60 letters. Tests can be used horizontally or bracketed, or vertically using six columns and omitting two letters in the last column. Allow 10 seconds per group of 5 letters + interval between groups.

RTFUH	QTWD	GMXAO	NBYVE	KSPJG	ZXULI
ESGAY	BPVNX	RD FHQ	GZK WJ	MRNOT	FCHZB
ZMGOK	JFWRH	TP LUI	SMXCN	VBYEQ	WDSAX
PCNUL	XAZQT	YBEKR	VHD OF	GMPZC	UIJWL
DYKWB	MGOIJ	SPZJG	XCN TU	EALQF	YHNKW
HQFXE	NSZCU	VAMWR	YLP IB	ODJKM	RTVQN
PAMGW	R TLYB	KNHDO	VBQ FJ	ZWCXG	EBIKO
VDKO	E QXDJ	BUTZG	AXLEW	FHLAP	SUNDJ
SINCU	HWGFZ	YJ EPX	CMR BK	MQDOT	YRVFH
RBWJY	OPRPM	SF QZL	THD GN	VIUEB	XCKPA

6 (f). MIXED GROUPS. Two-minute tests at 6 w.p.m.
 (i) 12 groups, each of 3 letters and 1 figure. Tests can be used horizontally as indicated, or vertically using 4 columns. Allow 10 seconds per group + interval.

DILT7	BA9U	6ZNH	X8OK	4CYW	EQ5M
9SVF	PRH3	GALB	2JTG	MLB5	0IAK
EB6J	F00V	W9US	HZ7A	N8T1	M2YG
03KX	4QDM	RLP7	YGN5	EFF2J	HJ51
8GNP	J5WC	KF2A	BUD0	X7ZO	9TLW
RM0H	TYS6	V4IQ	3LWE	GDIA	GNF7
Z005	BXIL	8YDJ	V9PS	KHUS	Z6RV
A2UW	7KEG	MV0	RF4C	6F1Q	P88D
JFLA	N12P	3UWG	Q6VJ	0TSM	KOX4
LVC9	E8ZR	BS5X	KD1L	PYN9	W3UM
4HYM	3UAQ	NFC9	0T8H	W5FR	GL2E
K6SD	GCF0	01ZE	7AMX	VB4L	3R1Q

6 (h). **PLAIN LANGUAGE**, consisting of sentences with words totalling 60 letters, the words being so disarranged to prevent guessing. Allow nearly 2 seconds per letter.

1. Time is and precious those who it are misspend greatest all of prodigals
2. A really man great has an always idea of greater something himself than
3. Gladly gifts the accept of present the hours and vexing ignore thoughts
4. Let have us faith right that makes and might and faith that in us do let our duty
5. There is nothing this in world so contagious irresistibly laughter as
6. Our glory greatest is in not never falling but every in rising time fall we
7. Happiness a is roadside growing flower upon the of highways usefulness
8. The is world upheld the by veracity of good they men make earth the wholesome
9. Every day a is vessel into much which may poured be if fill it we to brim the
10. Our great and thoughts affections the truths our of lives never us leave
11. Swift wrote good that sense is principal the foundation good of manners
12. No price on set is the lavish summer June be may had by poorest the corner

SET 7. WORKING AT 7 WORDS PER MINUTE

7 (a). **LETTER GROUPS**. One-minute tests at 7 w.p.m.—55 letters. Tests can be used horizontally, or vertically (using 7 groups). Allow approximately 8 seconds per group.

SGHUC	CEPAL	VMRSN	RYBUI	LWFDO	BRVEW	WQKXF	ZIJTR	EJGMV	XDZQH
LOBFJ	QGMWR	IGXUE	HPTDK	YNZVA	KQLTQ	TXRNG	ASGHP	IVOLTZ	RFUSM
NVGC P	R I U Z F	SLAWD	MBJ O X	QHYK E	GUPZ W	O I V E J	E X Q N M	Y F A D B	K T Z W N
X A Q E Y	K J W D S	C O H F T	P L V N G	R N B X M	B R C L D	X S N K Z	Y I T O U	N R J E Q	L Y G P J
T D J F M	P H V B F	N Y E U K	X O Q Z S	W A I G C	E P T M H	D U S A F	L V R J D	G X B W U	K I X O C
W P E B Z	C T L Y O	X G D Q J	U R F A I	S K U H V	A I J Z S	L K M P R	Q W K F C	Z H P C M	V D U H B
U K F Q I	A N X R G	V B P Z S	Y W E M G	D O U L T	F X V N Y	C E Y H O	I J G A B	K R S I N	W N Q M E

7 (c). MIXED GROUPS. One-minute tests at 7 w.p.m.—7 groups, each of 3 letters and 1 figure. Tests can be used horizontally, or vertically using 7 groups. Allow approximately 2 seconds per symbol.

7FQR	UD9J	CYKZ	GV6P	X4AH	8EWF
SBZZ	6TFO	1MDU	X8NE	RK07	GP13
LYT9	QZHS	VB4J	RGA0	PE6D	U5KF
V3WY	MRG1	Z9P1	ZDBL	5HFN	OX7C
EH8N	41CL	TF6G	K1JM	V90Q	3AYD
1ADJ	XW5K	3OHB	F1Q7	LSG2	RZN9
M61L	A0PE	S9NR	WZ3C	TY8J	G2QH
KGC3	NBY7	LQF5	9SH0	11RU	BV6M
RB55					
4QDU					
FJ0Z					

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 + interval.

27814	90156	82493	46902	65387	83645	29018	15867	37192	72430	691	254	72	2	7
38016	71699	45271	60858	52453	81035	23587	40625	67194	59476	25	80	3	3	6
27545	34250	06698	71932	68077	25946	94661	13798	80233	08150	4	1	4	4	8
518	396	814	162	275	089	367	735	624		4	0	4		4
950	518	396	814	162	275	089	367	735	624					

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 = III, and hyphen, or dash, or short break, DU.

An aeroplane wing, called an aerofoil, is inclined at an angle to its movement. The pressure due to the air causes a reaction perpendicular to the moving aerofoil. This produces a vertical lift, and in addition a horizontal drag against motion. The angle between the wing plane and the horizontal is called the angle of attack. The greater the speed of the motion, the greater is the reaction on the aerofoil. Also, it is found that the greater the angle of attack, the greater is the reaction. In general, the greater the reaction, then the greater is the lift on the wing. The drag, existing while there is a lift produced, is called the induced drag. Friction produces a drag said to be parasitic. This is reduced by stream-lining. Parasitic drag can be reduced by the use of the monoplane instead of the biplane. Retractable undercarriages were devised to help by reducing friction with the air. The Hawker Typhoon aeroplane, a low-wing monoplane, has a Napier-Sabre engine. This remarkable engine is a 24-cylinder, liquid-cooled, H-type motor. It gives about 2,350 h.p. for the take-off, and 1,800 h.p. at the rated height. Its top speed is said to be more than 400 m.p.h. and its rate of climb is very high. The Typhoon carries multiple machine-guns or else fewer shell-firing cannon.

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

7 (e). LETTER GROUPS. Two-minute tests at 7 w.p.m.—70 letters. Tests can be used horizontally as bracketed, or vertically using 7 columns. Allow 8 seconds per group.

SET 8. WORKING AT 8 WORDS PER MINUTE

8 (a). LETTER GROUPS. One-minute tests at 8 w.p.m.—40 letters. Allow $7\frac{1}{2}$ seconds per group + interval. Tests can be used horizontally, or vertically using 4 columns. Allow $7\frac{1}{2}$ seconds per group + interval.

.....

LFOJ E	XPQ R	CWYAN	SVDUH	KTZSM	QAVDW	XEKRP	NCGYQ
BHUC V	TFIMJ	SZIOD	REKWA	IXDNG	BKUYZ	VHMQL	FJTSP
RAPQ W	ECSHN	BJGTF	OXLIZ	JLZEK	POFGV	NUCIY	HNBBD
MSFHD	RJJTB	XOLWE	GKPNG	GUNOX	LYMQE	AZUSB	VTFJY
AVGB P	ZNWKC	FDJHQ	ILXER	CRQYT	HSDXO	ZKEVQ	UAWZM
WJEXA	GMUYL	VPKDS	VQFOB	AHKWC	GNZLR	PTAJI	KDSVO
DIYKO	QCHAW	UGBPM	XSZLJ	FVTDY	EQRCI	NDGVP	GLQAT
NRZTY	BKNQE	LHGU	WYTG	EPALH	JOWSZ	EGFDX	NHROV
GGLU W	ADRSV	EFXIZ	GNHPK	QBMSD	VALJF	PC TOW	RUKIN
PFIDH	CSVTK	BDNFR	LVIDC	ORJWF	FAGUHB	MYZAL	CQEXG

.....

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 + interval.

.....	08359	17264	56380	29741	85530	9
(i)	0	2	5	6	7	
.....	17296	48350	19563	08274	89546	3
	45083	29176	82047	16395	14398	2
	72614	85039	74192	35068	00275	4
	61127	04481	39956	65773	22861	0
.....	17264	17264	56380	29741	85530	9
(ii)	2	2	5	6	7	
.....	90823	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	

8 (c). MIXED GROUPS. One-minute tests at 8 w.p.m.—Eight groups, each of 8 letters and 1 figure. Tests can be used horizontally, or vertically using four columns.

Q2MF	XE8P	ΘALS	YGN9	VR4B	ZHCW	D3JT	K6ZU
ZD9K	G1JM	GB8R	ZTHO	6EAF	J1P3	NV17	Q8OX
3OAS	9HYD	W2UX	BK7C	1NJ5	Z0VT	1ELP	DRF8
GPJ7	QNF2	OMK5	D3RL	G9WS	U16X	AH4Z	1YVB
UE41	A0TV	B9SN	XJ6Z	CYLD	K8GM	F02Q	HP7L
1BVX	7D1C	GHP3	5IAM	Z0TH	YN4E	9SRK	J2W0
R5LC	Z03K	6DTZ	J5F1	7XP0	2QDB	YWM8	AGE9
NHW8	WB09	YF1J	V0ZE	QTK2	RAS5	X3CG	4MT1

8 (d) (i). PLAIN LANGUAGE (P/L). Two-minute tests at 8 w.p.m. Tests can be used horizontally, or vertically using one column. Allow 7 seconds per word.

GLOGS	MAV6	DEISM	WORLD	FUSIL	XERUS	DYKES	OP1UM
CANOE	IDYLL	NEXUM	QUAIR	ISTLE	HOVAS	GREBE	TAXIN
NEWTS	DRANK	CYNIC	KIOSK	YARDS	EGR6T	AULIC	MODEL
RAZON	FROWN	GUANO	MURAL	OZONE	PIVOT	DWALE	PHIAL
SYNOD	GAYAL	GEORI	AXIOM	DUCAT	COBRA	VESTA	ROWDY
PHASE	IVORY	JULAP	CRYP7	EPOCH	HERON	TOPAZ	NEWLY
BONUS	CHEST	MANGE	WITGH	PLEAT	CODEX	GAMUT	SWIFT
HYDRA	FOCUS	FIDIA	DHOLE	PAWKY	REDIF	CASTE	GROAT

8 (d) (ii). PLAIN LANGUAGE (P/L). The following sentences, etc., are suitable for two-minute tests at 8 w.p.m. In addition to the full stop, comma, and short break (see p. 44) we will introduce the symbols for:

Block letters UK, 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 1 1/2 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 Schpitteuer."
BRISTOL BEAUFORT, with a top speed of 310 m.p.h., has two BRISTOL TAVRUS engines.
The FAIRVEY FULMAR aeroplane is fitted with a 1,145 h.p. Rolls-Royce Merlin X engine. Its top speed is near 300 m.p.h., and it is a two-seater eight-gun fighter machine.
The FAIRVEY FULMAR is described as an all-metal, stressed-skin, low-wing monoplane. One tank hit by A.T. gun at road junction. Infantry are far behind. Send reinforcements. "Patrol returned with 32 prisoners, 3 light machine-guns and much information."
It is observed that field guns often give a whitish flash with a very decided kick forward. Medium guns and small howitzers give a much larger yellow flash but with less forward throw. Larger howitzers produce a large round red flash but this has an extremely small forward throw. However, it should be appreciated that flash reducers are sometimes 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 2 1/4 minutes' test at 8 w.p.m.)
"Let it roll on full flood, inexorable, irresistible, benignant, to broader lands and better days."

9 (a). LETTER GROUPS. One-minute tests at 9 w.p.m.—45 letters. Use the tests 5 (a), (i), (ii), and (iii). Horizontally, use two rows, omitting the last group; vertically, use nine columns. The tests of 5 (e) can also be used, sending the two-minute tests in one minute, but omitting the last group in each case.

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 figures; vertically, use the four columns, omitting the last two figures.

9 (c). MIXED GROUPS. One-minute tests at 9 w.p.m.—9 groups, each of 3 letters and 1 figure. Use the tests 5 (c). Horizontally, use two rows, omitting one group; vertically, use three columns. Also tests 5 (f) can be used, sending the two-minute tests in one minute but omitting the last group in each case. For two-minute tests use eighteen groups.

9 (d). PLAIN LANGUAGE (P/L). Use the tests 5 (d), for one-minute tests sending nine words and for two-minute tests sending eighteen words.

SET 9. WORKING AT 9 WORDS PER MINUTE

Z8EN	PW3B	9RXX	UQG2	S5OL	Y61M	ALFJ	CH7V
1VAC	7JTD	FMH4	8LBX	RWZ3	9EKP	2NPC	GY10
GTS9	YGN0	06JF	DASV	8QM1	UB4D	RWZ7	4JEF
UF2J	Q8IM	AG0N	T7P1	EK1B	CHX5	L09B	N6SB
D6HX	BV5E	Z7WC	F11J	A9YH	NQF2	G8XM	UZ03
LR30	16KS	UB2Y	E9JM	CP4T	8WVS	U10Q	7KMA
9CQM	GHU2	PES8	4ONK	NXD7	RA0G	6VHY	D1LT
NYB1	9XOF	31QZ	RCH6	2GFJ	J7ZU	KDS4	LW8R

8 (c). MIXED GROUPS. Two-minute tests at 8 w.p.m. and useful for sending practice. The tests can be used horizontally as indicated, or vertically using two blocks. Allow 7½ seconds per block + interval.

SET 11. WORKING AT 11 WORDS PER MINUTE

11 (a). LETTER GROUPS. One-minute tests at 11 w.p.m.—55 letters.

Use the tests 6 (a). Horizontally, from two rows, omitting one group; vertically, use six columns, omitting one group.

The tests 6 (e) can also be used similarly.

11 (b). FIGURE GROUPS. One-minute tests at 11 w.p.m.—36 letters.

Use the tests 6 (b), (i). Horizontally, use two rows; vertically, use four rows, in each case omitting the last four figures. With 6 (b), (ii), use nine groups.

11 (c). MIXED GROUPS. One-minute tests at 11 w.p.m.—11 groups, each of 3 letters and 1 figure.

Use the tests 6 (c). Horizontally, use two rows omitting one group; vertically, use four columns, omitting one group.

The tests 6 (f) can also be adapted for use.

11 (d). PLAIN LANGUAGE. One-minute tests at 11 w.p.m.—55 letters.

Use the tests 6 (g), using eleven words.

Two-minute tests can be given by doubling the above quantities.

(ii) Consisting of sentences, totalling 100 letters (or equivalent) with words disarranged. Allow about 1 second per letter.

The earth by surrounded is a layer of composed air chiefly of mixture a of four volumes nitrogen of and one of volume oxygen.

The atmosphere the of earth divides into naturally quite two distinct layers, troposphere the tropopause the and.

The former is layer the lower and is by characterized its of property of decreasing with temperature in height increasing.

The latter upper is layer in which is there little or no fall temperature of height with increasing.

---SATIN ACUTE TENOR QUOAD CORKS FILMS ENDOW ANNEX QUILTS AVERT
SPOIL CRUMB GAUGE CLOSE AGILE SAMBO LIVID QURAN PILOT PUPIL.---

(i) Consisting of 20 words of 5 letters each. Tests can be used horizontally as shown bracketed, or vertically using 2 blocks. Allow 6 seconds per word + interval.

- { WRAPS NOISE BEISA MINUS RANGE CLOTS EDICT DEBTS RUSTY ABUSE
- { CHITS MEALY WORMS LANKY OFTEN DEVIL NAKED PLANT FIRST BOARD
- { ZAMIA NURSE OMITTS DICKY ENTER WAIFS YOUTH URGES STATE WHIST
- { UNITS LAZED ALIEN LIMBS OUTDO MERCY PROSY REACT ROUSE ORGAN
- { ZOCLE GRIST OVERT NOBLE DENTS WHIMS TEARS LIGHT STAND FEIGN
- { GUSTO QUACK NOTED WINDY FLASH OREAD ELBOW DECAY MORON VIGIA
- { ZEINE DECOY EMPTY FLEAD MOULD GARTH CAPEL LORDS ALIAS DEPTH
- { VAGUE REMIT PHLOX RAPID CURLY FALSE WORMY CAMPS DUCKS OUNCE

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

(!!)

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

(i)

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 + interval.

P1BYM	DZTJN	OFRXH	KGVSC	EWQLU	JAPVG
DSVTL	ULWCA	YQKNB	EXMZJ	HRGOF	WDFNK
JXACW	PEOMQ	LDGZU	FHBRT	YKVNS	LEYCZ
ENLKG	VYHBF	JTWSP	UIODQ	AXMZC	RBVHM
OHFUZ	GKRSX	LCFVM	NYPWA	JIBDT	QSYJI
BQWEO	YLNFR	SAMG	XLCHZ	VDKFU	PCHQF
NTCFK	LQZUH	VPDYD	ARSMW	BXOEJ	GULRB
GXSHU	DJECW	TRZNF	VKBYP	MQILA	ODWYN
DMJYP	XAOVS	HLKBE	IUNF	ZRWGC	ZMVPF
ZVRLA	BKGLP	UQWXC	JDTOE	SFHNY	RIGAS

12 (a). LETTER GROUPS. One-minute tests at 12 w.p.m.—60 letters. These tests can be used horizontally (using two rows) or vertically (using six columns). Allow 5 seconds per group + interval.

SET 12. WORKING AT 12 WORDS PER MINUTE

12 (c). MIXED GROUPS. One-minute tests at 12 w.p.m.—12 groups, each of 3 letters and 1 figure. Tests can be used horizontally using two columns as bracketed, or vertically using four columns. Allow 5 seconds per group + interval.

GASH	B7WC	KRA3	9YPM	5ZFS	N6LX
11PL	4EQX	QTHL	VJ7S	UB8D	20CV
Q2DR	SYIK	P4FO	AHG5	L9M1	BW3Z
XVC3	ZJFQ	UD7B	T8LQ	OEJ1	HGR6
L6B0	3HGT	Z4GW	KINR	VA2U	X91F
NJ91	P2UW	EY8X	QFDX	7QCT	5ASM
QZRM	GNE5	9LSH	U0Q4	X1K6	PDG1
WEF7	AR9Q	CKV2	13ML	B5DH	TJ8Y
SYQ5	LCB1	N15A	XE6J	WPM4	DRQH
4UZG	8FOS	J6MP	Z2BY	3GTV	7KNQ
H8TP	D7V1	1OBW	9SWN	R5YK	F6EM
VK6L	PM2X	QFY3	GCR8	ALQJ	ZUW4

For two-minute tests use 24 groups.

12 (d). PLAIN LANGUAGE (P/L). Two-minute tests at 12 w.p.m., (i) consisting of 24 words of 5 letters each. Tests can be used horizontally as shown bracketed, or vertically using 2 blocks. Allow 5 seconds per word + interval.

EIDER	FLOCK	LAMBS	MOATS	STUMP	WAIVE
CULTS	WRATH	IRONY	DIGIT	PROVE	QUILL
NITRE	ZONES	WAIST	ENROL	LAUGH	DEIGN
PIVOT	CLUBS	RABID	FLESH	MILKY	STUMP
ROUGE	PLASH	OREIN	YARNS	NEATH	CIVET
DRIFT	EXCEL	IMPLY	BLAND	WAIVE	NOVEL
YOURS	WAVES	HOPE	DUSKY	CHINA	FOGEY
NASTY	UPSET	BURST	SPACE	OGIVE	WIELD
WRENS	VOCAL	SEVER	QUIPU	EXUDE	ABETS
NITON	RISPS	OLIVE	DJINN	AGLEY	KNUTS
SAULT	REVEL	CHOK	ZAXAT	QUINK	OPERA
TWINE	LUCID	ASKEW	TOADY	WRACK	BLUNT

(ii) consisting of sentences, totalling 120 letters (or equivalent) disarranged. Allow about $\frac{3}{4}$ second per letter.

Clouds are formed condensation when water of takes place appreciable at altitude though very clouds high composed are of crystals minute ice.

The degree of produces the condensation density or opaques clouds of the, giving to the rise colour—white, grey, some-times even black.

One of most the features remarkable of clouds is of number the infinite of shapes and forms they and which assume are used classification cloud in.

The most common of method cloud formation due is to air forced being to rise thus because expanding of the reduced pressure and adiabatically cooling.



BARRED LETTERS

The following accented or modified letters, termed "barred" letters, are used, the Morse symbols being given:

---	d' dah d' dah	is "A barred", written a
----	dah d' d' dah	is "B barred", written b
-----	dah d' dah d' dah	is "C barred", written c
.....	d' d' dah d' de	is "E barred", written e
-----	dah dah d' dah dah	is "N barred", written n
-----	dah dah dah de	is "O barred", written o
-----	d' dah dah d' dah	is "P barred", written p
-----	d' dah dah	is "T barred", written t
-----	dah d' d' dah de	is "X barred", written x

MIXED GROUPS (Svko). The following are one-minute tests at 6 w.p.m., including barred letters--5 groups of 4 each, with 9 letters, 9 figures and 2 barred letters. These are sent without separation signs, intervals between groups being left as in plain language. Allow 12 seconds per group+interval. Tests can be used horizontally, or vertically using 5 columns.

(a)-----19V4	0J7Y	A010	3P8D
Kaz0	2G95	F3U4	5K2V
E8L7	7S1R	W605	LB0S
D6B2	xCP T	29H7	4G7W
Q5H3	8N4P	L1E0	F59U
-----	J305	K665	9Y2V
	72R0	1W5G	uA0M
	N9E4	4H8P	09Q7
	S6B1	7Z3X	6057
	6057	NXP2	41X3
	0J7Y	019V	8U2L
	0J7Y	019V	QNFZ

SEMAPHORE SIGNS AND SIGNIFICATIONS				

Long bars indicate right and left arms (or flags) and these are used as most convenient.
 The small horizontal bar indicates the right-hand side of the sender which is thus on the left to the viewer.
 The numeral sign is used before and after numerals.
 (By permission of the Air Ministry)