HOME OFFICE

CIVIL DEFENCE

HANDBOOK No. 1

Wireless Instructions for Civil Defence

LONDON: HER MAJESTY'S STATIONERY OFFICE
1952
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TABLE OF CONTENTS

	Page
Practical Limitations of Wireless ...	1
Types of Set	2
Handling of Equipment	3
Method of Working	5
Call Signs	5
Definitions	7
Phonetic Equivalents	9
Test Calls	11
Preliminary Calls	11
Normal Messages	12
Operating Instructions for Walkie Talkies	17

General

1. Radio can be a most valuable means of communication, especially in emergency, but it has its limitations and it is important that these limitations should be appreciated.

Practical Limitations

2. Broadly speaking, the frequencies likely to be employed for Civil Defence and other Emergency purposes provide satisfactory communication up to the optical horizon. For example, using normal mobile equipment in vehicles, communication may well be possible between two hilltops some 20 or even more miles apart, while there may be no communication between two valleys only 1 or 2 miles apart because of the " screening " of the intervening hill.

Similar " screening " is experienced in urban areas from tall buildings especially when they are steel-framed and it may be found that moving a set only a few yards, or even feet, will make all the difference between being in communication and losing touch altogether.

3. As a *very* general guide, communication ranges on the frequencies likely to be employed for civil defence may be expected to be of the following order:—

(*a*) Between two well sited fixed stations, some 30–40 miles.

(*b*) Between a mobile and a well sited fixed station, some 10–20 miles.

(*c*) Between two mobiles in open country, some 3–5 miles.

(*d*) Between two mobiles in a town, some 1–2 miles.

(*e*) Between a walkie talkie and a well sited fixed station in a town, some 1–3 miles.

(*f*) Between a walkie talkie and a mobile in a town, some ½–1 mile.

(*g*) Between two walkie talkies in a town, some 100 yards–¼ mile at street level in built up areas. Greater ranges may well be achieved between the tops of buildings or across open spaces.

4. The " screening " effects referred to in para. 2 may be due either to " shadows " from intervening hills or tall buildings or to local absorption when working inside steel framed buildings or in woods (especially when the trees are in sap or wet).

This question of screening, with the associated phenomenon of reflection, is a wide and complex subject and all we need to know for civil defence purposes is that it exists and causes fluctuating communication conditions. These cannot be foretold, especially in towns, and must be ascertained by actual practical experience.

When moving about in areas where screening is known or is likely to exist it is a good guide to note places at which you get good reception from your control station (for example when they are talking to another station). Later, if you have to send a message and have difficulty in getting through the best plan is to try again from one of the places you have noted.

Similarly, if your control is sending a message to you and its signals are fluctuating as you move, you should stop in a position where his signals are good until you have sent your answer or reply.

Types of Wireless Sets and their Uses

5. Apart from fixed stations, two main classes of wireless equipment are used for police and fire brigade purposes and are likely to be used in civil defence. These are:—

(*a*) sets of 5 to 10 watts output installed in *vehicles;* these are referred to below as " mobile units ".

(*b*) *man-pack* sets of about $\frac{1}{4}$ watt output, referred to below as " walkie talkies ".

Owing to the limited range of walkie talkies working to each other in a built-up area (see para. 3 (*g*)) it will often be necessary to use a mobile unit as their control station; for training purposes, however, where mobile units are not available it will be practicable to use walkie talkies as control stations provided that distances are kept short.

Aerial Height

6. It will be gathered from paragraph 3 it is always best to use an aerial which is as high as possible above the surrounding ground. Though mobile units are normally associated with an aerial mounted on the vehicle, they can be connected by a feeder cable to an entirely separate aerial rod, e.g. on a mast or on the roof of a building. The length of the feeder cables between the aerial and the transmitter must be kept as short as practicable because of the inevitable power losses involved. It is of course ideal if the set itself can be placed reasonably close to an elevated aerial (e.g. on or near the top floor of a building with the aerial on the roof) but normally the best that can be done is to connect an aerial on the roof of a building to a mobile in the street. A Walkie Talkie cannot employ this separate aerial arrangement but communication may be improved by taking the set itself to a higher position.

Handling of Equipment

7. The types of equipment to be supplied are all designed with the minimum number of controls. On walkie talkies these comprise merely an "ON–OFF" switch and a "press to talk" switch on the microphone. In some vehicle sets there may be a volume control knob in addition.

All sets are fixed tuned to a specific frequency and cannot be adjusted to any other except in a workshop.

8. When first switched on, sets take some seconds to "warm up" to their operating condition. The fact that this has been reached is indicated by a "hissing" noise in the earpiece or loudspeaker. Once this condition has been reached, the receiver is working and, with walkie talkies, the transmitter is also ready for operation; the latter can then be used immediately the "press to talk" switch is operated, without the need for any further pause.

9. Do not forget that these sets are battery driven and that batteries inevitably run down. Conserve battery life by ensuring that sets are switched "off" when

they are not actually in use, and by keeping actual transmissions as short as possible (consumption when transmitting is about double that when receiving).

10. When using the sets and wishing to say something, do *not* switch to transmit (i.e. press to talk) and then wait while you think what you want to say. Not only does this run the battery down unnecessarily but some other station may start sending and you will cause interference to his message although you are not actually talking.

First decide what you want to say then go " on the air " and say it, and finally get off the air again as soon as you can.

11. This does not mean that your handling of the set should be hurried; for example, do not release " the press to talk " switch just as you are saying the last word of your transmission or that word will not be transmitted.

Also do not attempt to gabble your transmissions: speak reasonably slowly and as clearly and distinctly as you can. The actual speed at which you talk will of course depend on whether what you say has to be written down at the receiving end. When it has try to imagine that you are writing the message yourself and adjust your speed of talking accordingly.

A clear transmission at a reasonable speed always pays in the end, as it avoids time being wasted in portions of the message having to be repeated afterwards.

12. Above all do not turn your head away from the microphone while you are speaking. If you want to turn your head to look at something make sure the microphone moves too and remains upright and close to your mouth. A useful tip is to keep in contact with your chin the thumb or one finger of the hand holding the microphone; this will assist in keeping the microphone steady in relation to your mouth, even when you move your head. You will find that results are best if you speak slightly across the face of the microphone rather than directly into it (except of course when using a combined handset).

Never hold a hand microphone flat (i.e. horizontal).

Method of Working

13. In order to achieve maximum flexibility and simplicity all emergency radio systems will employ "simplex working". This means that the same frequency is used for sending and receiving and it involves the "Over" procedure at the end of transmissions.

14. This is really quite simple after a little experience, and the important points to remember are:—

(1) You cannot break-in while another station is talking to you, but must wait until you receive the word "Over".

(2) No other station should transmit once you have started (no matter how urgent its message may be) and you must therefore finish what you have to say as speedily as possible, thus freeing the channel for other users.

(3) The station you are talking to will not reply until you say "Over" (except in "Controlling procedure", see para. 28).

Need for Procedure

15. This use of the word "Over" and the other simple procedure details set out in this pamphlet are designed solely to facilitate the smooth and efficient operation of the scheme. They are not invented just to make things more difficult and while they may appear to be superfluous they are in fact based on long experience and should be followed.

When all operators are well experienced and communication conditions are good some further abbreviations in procedure may be possible.

Use of Call Signs

16. It is not always easy in local training to appreciate the need for call signs since usually only a few stations are involved and there is little or no interference which might cause confusion.

It is in these circumstances that such practices as referring to the main station as "Control" and the out-stations as "No. 1", "No. 2", etc., creep in, but when the time comes for the channel to be fully

occupied there may well be two or three so-called "Control" stations operating, as well as several out-stations calling themselves "No. 1", etc., on the same channel.

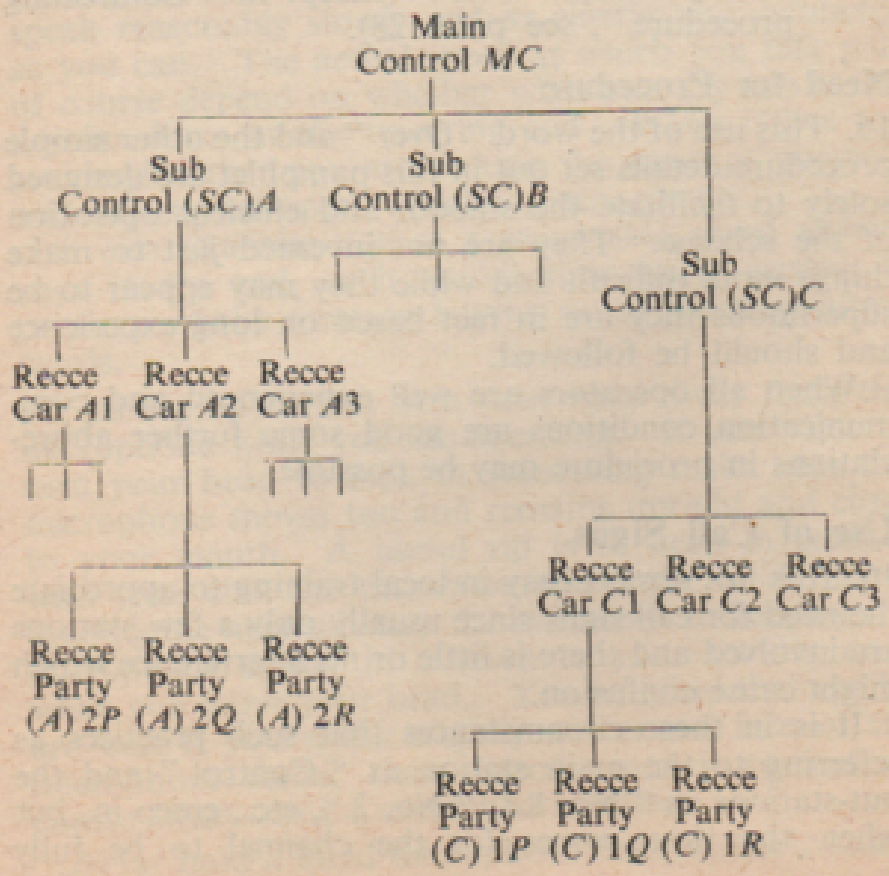
It should therefore be accepted that proper call signs, as laid down, should be used from the outset. These have been made as simple as possible while reducing any risk of confusion to the minimum.

Standard Call Signs

17. Particulars of all call signs for a typical Civil Defence Corps Division and Mobile Column will be promulgated later.

For the purposes of Headquarters Section training in reconnaissance work the following should be used as standard (see line diagram of Organisation):—

LINE DIAGRAM OF ORGANISATION



Main C.D. Control:	Letters " MC "—(Mary Charlie).
C.D. Sub-Controls:	Single letters A, B, C, etc., preceded when necessary by letters " SC ", e.g. (Sugar Charlie) Andrew.
Recce vehicles:	Figures 1, 2, 3, etc., preceded when necessary by the letter of the sub-control to which they work, e.g. Andrew Wun, Charlie Two, etc.
Recce Parties:	Letters P, Q and R preceded when necessary by the figure of their recce vehicle, e.g. Wun Peter, Three Queenie. The letter of the Sub-control can also be included if desirable, e.g. " Charlie Wun Peter ".
Collective Call Signs:	To call all stations in a group simultaneously those with "letter" call signs will be addressed by Zebra and those with figure call sings by Zero. E.g. All Sub-Controls (SCA, B and C)=Sugar Charlie Zebra. All Recce Vehicles (A 1, 2 and 3) =Andrew Zero. All Recce Parties (2 P, Q and R) =Two Zebra.

Definitions

18. There are a few basic definitions which must be understood by all concerned:—

ANSWER and REPLY — An *Answer* (" Roger ") signifies that a transmission has been received, and it must not be confused with a *Reply* which is a new message replying to matters raised in an earlier message.

NOTE 1.—It is impossible to over-estimate the value to the smooth working of any wireless scheme of an immediate " answer " to every transmission, and one should never be withheld because a full " reply " may be available in a few minutes.

NOTE 2.—It must be clearly understood that an Answer means that the message itself has been received by the party addressed. It does *not* signify that the purport of the message is understood by the Senior Officer of that party; neither does it signify that the action required will be taken. In the great majority of cases it can safely be assumed that if the message has reached its destination it will be complied with unless a report to the contrary is received. In very exceptional cases however specific confirmation on this point may be necessary, in which case the word " Acknowledge " should be inserted in the text (usually as the first or last word). Such messages will be *answered* (Roger) by the receiving station in the normal manner (i.e. immediately on receipt), and the acknowledgment will be sent subsequently in the following form:—

" Hallo ——. Your —— Acknowledged. —— over ".

It must always be remembered that an Acknowledgment cannot be sent without the express authority of the Senior Officer of the party to whom the original message was addressed.

COMMENCING SIGN	An indication that a transmission is commencing. It consists of the word " Hallo " followed by the call sign of the station called. *Note.*—Not used in Controlling Procedure (see para. 28).
CONTROL STATION	The senior station working on any scheme or frequency. All other stations on the frequency must conform to its instructions.
SIGN OFF ...	The indication that a station has completed its transmission. It consists of the word " Over " or " Out " preceded by the call sign of the sending station. *Note.*—Not used in Controlling Procedure (see para. 28).

TIME OF ORIGIN...	The time at which a message was authorised by the originator. It forms the main means of identifying the message and must never be altered even if the message has to be relayed. It is transmitted as "Origin ——— (time by the 24-hour clock)".
TIME OF DESPATCH OR RECEIPT.	The time at which transmission or reception of a message was completed. Normally only used by control stations and then for the benefit of mobile stations who may note this as the time of origin of their message if one is not already appended. It is transmitted as "Time now ——— (time by the 24-hour clock)".

Reports on Signals

19. When reports on signals are required they should be kept short and to the point as in the following examples:—

"Loud and Clear".
"Clear and readable".
"Weak but readable".
"Good strength but poor quality, just readable".
"Fluctuating and difficult to read".
"Unreadable".

Phonetic Equivalents for Letters and Figures

20. Phonetic equivalents should always be used in call signs and when spelling words in the text of messages.

G.P.O.	*British and U.S.A. Armed Forces*
A — Andrew	A — Able
B — Benjamin	B — Baker
C — Charlie	C — Charlie
D — David	D — Dog
E — Edward	E — Easy
F — Frederick	F — Fox
G — George	G — George

	G.P.O.	*British and U.S.A. Armed Forces*
H	Harry	How
I	Isaac	Item
J	Jack	Jig
K	King	King
L	Lucy	Love
M	Mary	Mike
N	Nellie	Nan
O	Oliver	Oboe
P	Peter	Peter
Q	Queenie	Queen
R	Robert	Roger
S	Sugar	Sugar
T	Tommy	Tare
U	Uncle	Uncle
V	Victory	Victor
W	William	William
X	Xmas	X-ray
Y	Yellow	Yoke
Z	Zebra	Zebra

When spelling words the whole word is spoken first, followed by the expression " I spell " and the phonetic equivalents of the individual letters; e.g. " Rendezvous in Thorn Place ———" would be transmitted as " Rendezvous in THORN—I spell—Tommy Harry Oliver Robert Nellie—Place ———".

Figures

1 — Wun	6 — Six
2 — Two	7 — Sev-en
3 — Three	8 — Ate
4 — Four	9 — Niner
5 — Fife	0 — Zero

When figures occur in the text of a message their transmission is preceded by the word " figures ", e.g. " Casualties 12 dead 50 injured " would be transmitted as:—

" Casualties figures Wun Two dead figures Fife Zero injured ".

This procedure is however *not* used when transmitting figures in Times or Map References.

STANDARD PROCEDURE

Form of transmission

21. All transmissions should begin with the word " Hallo " followed by the call sign of the station being called; likewise all should end with the call sign of the station which has made the transmission followed by the sign-off. The only exception is when Controlling Procedure is in use, see para. 28.

Test Calls

22. These are made when sets are first switched on to prove satisfactory operation.

E.g. A Recce party walkie talkie testing with its vehicle—

" Hallo Andrew Wun. Testing—Testing. Wun Peter over ".

Vehicle replies:

" Hallo Wun Peter. Clear and Readable. Andrew Wun Out ".

Note.—The sign off " Over " is used when an answer or reply is expected. " Out " is used instead when no further immediate communication is expected.

Preliminary Call

23. Do not transmit if you can hear another transmission in progress on your frequency.

Exceptionally, where two different groups of stations are sharing a frequency (e.g. Recce parties working to different recce vehicles), simultaneous use of the channel may be attempted if the other signals are weak, but in such cases what is known as a Preliminary Call must always be made.

Assuming that Wun Peter has a message for Andrew Wun and can just hear that Two Queenie is already working with Andrew Two, Wun Peter may proceed as follows:—

" Hallo Andrew Wun. Message for you. Wun Peter Over ".

If Andrew Wun considers reception satisfactory it will reply:—

" Hallo Wun Peter. Go ahead. Andrew Wun Over "

Otherwise it will reply:—

" Hallo Wun Peter—Wait—Wait. Andrew Wun Out ".

If no reply is received to a Preliminary Call the calling station must assume that simultaneous use of the channel is not practicable and no further attempt should be made until the channel appears to be free.

Strictly speaking in the conditions likely to apply in Civil Defence Reconnaissance (where Recce parties while in communication with their base vehicles cannot hear each other), a preliminary call should be sent before each message. Provided all messages are kept short however the risk of interference due to simultaneous transmission is unlikely to be great enough to justify the additional traffic load (and hence delay) entailed by Preliminary Calls.

This policy may of course require modification in the light of experience.

If a station finds it necessary at any time to send a *long* message (say one taking more than a minute to transmit—or one of more than about 20 words), a Preliminary Call should always be sent both to check that the channel is in fact free and to ensure that reception is likely to be satisfactory.

Form of Message

24. A normal message consists of three main portions:

The Heading—which comprises:

The Commencing Sign and the Call Sign of the station addressed ...	" Hallo Wun Peter.

The Text—which consists of:

The Text itself ...	Return to Base.
and the Time of Origin (if any).	[Origin Zero Niner Two Six].

The Ending—which comprises:

The Time of Despatch (if any).		[Time Now Zero Niner Three Zero].
and The Sign Off	...	Charlie Wun Over ".

Form of Answer

25.—(*a*) A normal answer also consists of the same three portions:

The Heading	...	...	" Hallo [Charlie] Wun.
The Text ...	...	...	Roger.
The Ending	...	...	[Wun] Peter Out ".

Note.—" Over " is used in the sign off when an answer is expected. " Out " is used instead when no further immediate communication is anticipated.

(*b*) If the station answering has a message waiting for transmission to the station being answered the Text and Ending are amended as follows:—

" Hallo [Charlie] Wun. Roger. *Message for you* [Wun] Peter *Over* ".

In effect the answer then includes a Preliminary Call (see para. 23).

Repetitions

26. When there is any doubt as to the accuracy of reception of a part of a message a repetition should be asked for, using one of the standard terms:—

" All before ——— "
" Word before ——— "
" Word after ——— "
" All after ——— "
" From ——— to ——— "

The blanks are of course filled by the words needed to identify the portion required, and care must be taken to avoid ambiguity.

Assuming the following message had been sent—

" Hallo Andrew. Two *casualties* among rescue *parties*.
Two rescue *vehicles feared* crushed. Andrew Wun Over ".

and that repetition of the words in italics was required.

Requests for " Word after ' Two ' ".
" Word after ' Rescue ' ".
" From ' Rescue ' to ' crushed ' "

would all be ambiguous as the words " two " and " rescue " both appear twice in the text.

In such cases other or fuller identities must be given such as:—

" Word before ' among ' ".
" Word after ' among rescue ' ".
" From ' two rescue ' to ' crushed ' ".

Replies to these requests include the identifying word or words as well as the portions requested, e.g.

" Hallo Andrew Wun { Casualties *among*. / Among rescue *parties*. / Two rescue *vehicles feared* crushed. } Andrew Over."

Note.—The important word or words (as in italics above) are emphasised during transmission.

Corrections

27. Occasions may arise when corrections are required to messages which have been transmitted and the procedure to be used will depend on whether the mistake is noticed while transmission is still in progress or not.

(*a*) If the message—

" Hallo Andrew Wun. Proceed to Gordon Street and report to D.C.O. Origin Wun Sev-en Four Six. Andrew over " was being sent and, before transmission of the text was completed, it was realised that Gordon Street should have been Gordon Square, the operator would complete his transmission as follows:—

"——— report to D.C.O. Origin Wun Sev-en Four Six. Correction. For Gordon Street read Gordon Square. Andrew over ".

(*b*) If the same error had been made but not noticed until transmission had been completed a fresh message must be sent: " Hallo Andrew Wun. My Wun Sev-en Four Six. For Gordon Street read Gordon Square. Andrew over ".

(*c*) If the situation was as in (*b*) above but the original message had carried a Time of Despatch (" Time Now Wun Sev-en Fife Wun ") in place of a Time of Origin, the reference in the subsequent message would be " My message sent at Wun Sev-en Fife Wun ".

(*d*) In the same circumstances as (*b*) but if the message had carried no means of identification the correcting message would have to be on the following lines:—

" Hallo Andrew Wun. Report to D.C.O. in Gordon Square not Gordon Street. Andrew over ".

CONTROLLING PROCEDURE

28. When a message has been sent to a number of stations simultaneously (e.g. by the use of a collective call sign) the individual stations concerned must not attempt to answer until instructed to do so or confusion will arise.

The use of standard procedure when collecting these answers would be unduly lengthy and an abbreviated method is used instead, the instruction " Come in " being given to each station in turn without any Heading or sign off. Stations reply in the normal way.

EXAMPLE:—

Station

C1: " Hallo Wun Zebra. Return to vehicle. *Come in Peter* Charlie Wun Over ".

1P: " Hallo Wun. Roger. Peter Out ".

C1: " *Come in Queenie* ".

1Q: " Hallo Wun. Roger. Queenie Out ".

C1: " *Come in Robert* ".

1R: " Hallo Wun. Roger. Robert Out ".

Notes.—(1) It will be seen that the most abbreviated form of call signs is employed in this procedure. It

saves time and should not cause any confusion in the special circumstances to which the procedure is confined.

(2) Should one of the stations addressed fail to answer within a few seconds of being controlled to do so, the controlling station should proceed to collect answers from the other stations concerned before attempting to clear the outstanding station.

LONG MESSAGE PROCEDURE

29. Messages of more than say 20 words should always be preceded by a preliminary call as stated in para. 23. In addition they should be transmitted in definite portions each of not more than about one minute's duration as shown below. The reasons for this are (*a*) to avoid undue delay to another station having a vital message to transmit, and (*b*) to ensure that reception continues to be satisfactory, thus obviating possible lengthy repetitions.

Station

3R: " Hallo Charlie Three. Message for you. Three Robert over ".

C3: " Hallo Three Robert. Go ahead, Charlie Three over ".

3R: " Hallo Charlie Three. Situation Number 4 Post area serious—(approx. 10 words)—figures Two four trapped. End of portion. Three Robert over ".

C3: " Hallo Three Robert. Wait. Charlie Three over ".

After a pause of 5 seconds, and if no other call is heard in the meantime, the receiving station would then proceed—

C3: " Hallo Three Robert. Go ahead. Charlie Three over ".

Notes.—(1) Any repetitions required would have been obtained before " Wait " was ordered.

(2) " Roger " is *not* used for a portion of a message.

3R: " Hallo Charlie Three. Trapped. Nearest road access junction of Monk Street and John Street.
Origin Wun Sev-en Three Six. Three Robert over ".

Note.—The second (and any subsequent) portion starts with the last word of the preceding portion so as to ensure continuity.

C3: " Hallo Three Robert. Roger. Charlie Three out ".

OPERATING INSTRUCTIONS

To operate a Walkie Talkie

30. Adjust headphone to comfortable position on ear. See that the aerial connection and the plugs in microphone and headphone leads are firmly in position.

Switch set " ON ".

You should then receive satisfactorily.

To transmit, press the switch on top of the microphone down firmly and speak close to, but slightly across, the face of the microphone which should be vertical. Keep the Talk switch down firmly while you are talking. When answering a call do not press the Talk switch (or start talking) until you have heard the sign-off from the other station.

When transmission is completed give the sign-off and then release the Talk switch.

When ceasing to use the set make sure it is switched OFF. If another station reports your signals as being strong at the start of a transmission but weakening during the transmission your batteries probably need attention.

(17368) Wt. 3478—297 K80 12/52 D.L.

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PRINTED AND PUBLISHED BY HER MAJESTY'S STATIONERY OFFICE

To be purchased from

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39 King Street, MANCHESTER, 2 Tower Lane, BRISTOL, 1
2 Edmund Street, BIRMINGHAM, 3 80 Chichester Street, BELFAST
or from any Bookseller

1952

Price 6*d*. net

PRINTED IN GREAT BRITAIN

S.O. Code No. 34-359-1