The SHORT WAVE Magazine

2/9

VOL. XIX MARCH, 1961 NUMBER 1

TECHNICAL PUBLICATIONS

Available from stock

New and Greater Edition of the

RADIO HANDBOOK (15th Edition)

Published by *Editors & Engineers*, W6-U.S.A. 800 pages, durable binding.
Price 60s. post free, from stock

RADIO AMATEUR CALL BOOK

The CALL BOOK is published in two parts: *American* Section only, appearing quarterly at 41s. 6d. post free; *Foreign* (non-American) Section half-yearly in March and September, at 25s. post free. Includes latest callsign/address listings for all countries, with much DX data. The only complete directory to the radio amateur stations of the world.
American Section, Winter Edition, 41s. 6d.; *Foreign* (non-American) Section, Fall-Winter Edition, 25s.
The two together at 60s. post free

THE RADIO AMATEUR'S HANDBOOK

1961 EDITION

Published by the American Radio Relay League
Price (standard binding) 34s. post free
Bound in Buckram, *de luxe*, 44s.

DX ZONE MAP Latest Revision

Paper Edition, 9s. 3d. post free
Linen Backed (*de luxe*) 11s. 9d. post free

AMATEUR RADIO MAP OF WORLD

(Mercator Projection)
Much DX Information — In Colour, 8s. 6d. post free
(See p.31 for description)

BASIC ELECTRICITY

in 5 Parts 12/6 per Part or 55/- per set

BASIC ELECTRONICS

in 6 Parts 12/6 per Part or 66/- per set

Magazines by subscription

	One Year
73 MAGAZINE	30s. 0d.
AUDIO	40s. 0d.
*CQ, RADIO AMATEUR'S JOURNAL	44s. 0d.
ELECTRONICS (*Trade only*)	160s. 0d.
POPULAR MECHANICS	39s. 0d.
POPULAR SCIENCE	48s. 0d.
QST, *ARRL*	43s. 0d.
HIGH FIDELITY	56s. 0d.
ELECTRONICS WORLD (*formerly "Radio and Television News"*)	48s. 0d.
RADIO ELECTRONICS	40s. 0d.
SERVICE	24s. 0d.
TELEVISION	55s. 0d.

*Binders for CQ 30s. 0d.
Post free, ordinary mail only
Subscription Service for all American Radio and Technical Periodicals

SHORT WAVE MAGAZINE
Publications Department
55 VICTORIA STREET . LONDON . SW1
Abbey 5341

	Post Free
ANTENNA HANDBOOK (*Published by A.R.R.L.*) (9th Edition)	19s. 0d.
A COURSE IN RADIO FUNDAMENTALS (*4th Edition*)	10s. 6d.
AUTOMOBILE ELECTRICAL EQUIPMENT	31s. 0d.
BASIC MATHEMATICS FOR RADIO AND ELECTRONICS	18s. 3d.
BASIC RADIO COURSE	19s. 0d.
BEAM ANTENNA HANDBOOK	22s. 0d.
BETTER SHORT WAVE RECEPTION	24s. 0d.
COMMAND SETS (*Published by CQ.*) Information on conversion of many Command Transmitters and Receivers	12s. 6d.
CQ ANTHOLOGY	16s. 9d.
DXERAMA (*3rd Edition*)	16s. 0d.
DX GUIDE (*New Edition*)	16s. 9d.
FOUNDATIONS OF WIRELESS	15s. 9d.
GUIDE TO BROADCASTING STATIONS (*Twelfth Edition*) pp. 112	3s. 10d.
HAMS INTERPRETER (*Published by OH2SQ*) (*4th Edition*)	7s. 0d.
HINTS AND KINKS, Vol. 6	11s. 0d.
HOW TO BECOME A RADIO AMATEUR★	5s. 0d.
LEARNING MORSE	1s. 9d.
LEARNING THE RADIO TELEGRAPH CODE	4s. 6d.
LOG BOOKS Spiral bound (*Published by A.R.R.L.*)★	7s. 6d.
MOBILE HANDBOOK (*Published by CQ*) (*2nd Edition*)	24s. 0d.
MOBILE MANUAL (*Published by A.R.R.L.*)	23s. 0d.
NEW SIDEBAND HANDBOOK (*Published by CQ, latest issue*)	25s. 6d.
NOVICE HANDBOOK, Tx and Rx	23s. 6d.
OPERATING AN AMATEUR RADIO STATION (*Published by A.R.R.L.*)★	2s. 8d.
QUAD ANTENNAS	23s. 0d.
RADIO DATA CHARTS	11s. 3d.
RADIO DESIGNERS HANDBOOK (*4th Edition*) 1,498 pp. (*F. Langford Smith*)	55s. 0d.
RADIO INTERFERENCE SUPPRESSION	11s. 3d.
RADIO VALVE DATA	6s. 6d.
S—9 SIGNALS	8s. 6d.
SCATTER PROPAGATION THEORY AND PRACTICE (*H. W. Sams*)	25s. 0d.
SURPLUS SCHEMATICS (*Published by CQ*)	21s. 0d.
SHORT WAVE RECEIVERS *For The Beginner*	6s. 6d.
SHORT WAVE & THE IONOSPHERE	11s. 9d.
SINGLE SIDEBAND FOR THE RADIO AMATEUR (*A.R.R.L.*)	14s. 6d.
SURPLUS CONVERSION MANUAL Volume 1	21s. 0d.
Volume 2	21s. 0d.
Volume 3 (New)	21s. 0d.
THE INTERNATIONAL RADIO AMATEUR YEAR BOOK	4s. 0d.
THE OSCILLOSCOPE	18s. 6d.
THE RADIO AMATEUR OPERATOR'S HANDBOOK (*Data Publications*)	3s. 6d.
THE RECORDING AND REPRODUCTION OF SOUND (*H. W. Sams*)	64s. 0d.
TRANSISTORS— THEORY AND PRACTICE (*New Edition*) (*Published by Gernsback*)	23s. 0d.
TRANSISTOR THEORY AND PRACTICE (*Published by World Radio Handbook*)	9s. 6d.
TRANSISTOR TECHNIQUES (*Gernsback*)	12s. 6d.
VHF HANDBOOK	24s. 0d.
WORLD RADIO HANDBOOK, 1961 Edition, 216 pages	17s. 9d.

(★ *Not strictly applicable under U.K. conditions*)

INDEX TO ADVERTISERS

SHORT WAVE MAGAZINE

Vol. XIX MARCH, 1961 No. 209

CONTENTS

Managing Editor: AUSTIN FORSYTH, O.B.E. (G6FO)

Advertisement Manager: M. GREENWOOD

Published on the first Friday of each month at 55 Victoria Street, London, S.W.1. *Telephone: Abbey 5341/2*

Annual Subscription: Home and Overseas 33s. ($5·00 U.S.) post paid

AUTHORS' MSS

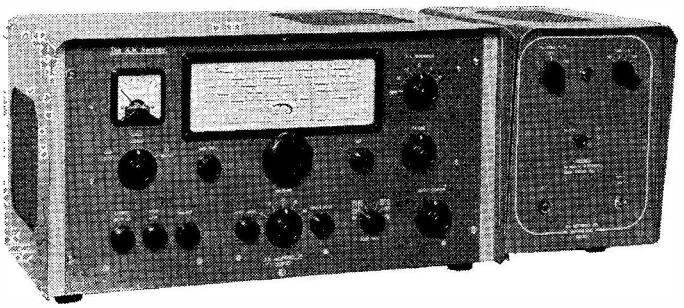
Articles submitted for Editorial consideration must be typed double-spaced with wide margins on one side only of quarto or foolscap sheets, with diagrams shown separately. Photographs should be clearly identified on the back. Payment is made for all material used, and it is a condition of acceptance that full copyright passes to the Short Wave Magazine, Ltd., on publication.

SUPERB EQUIPMENT FOR SSB

FEATURES :

- ★ **180 watts P.E.P. input.**
- ★ **Unwanted Sideband suppression 40 db down at 2 kc or better.**
- ★ **Carrier suppression 45 db down or better.**
- ★ **Crystal Filter exciter.**
- ★ **5 Bands, 10-80 m. Pi Output.**
- ★ **Full TVI precautions taken.**
- ★ **All crystals included.**
- ★ **Automatic linearity control.**
- ★ **Full Voice Control and anti-trip.**
- ★ **Rugged Construction.**
- ★ **Operates A.M. and C.W.**

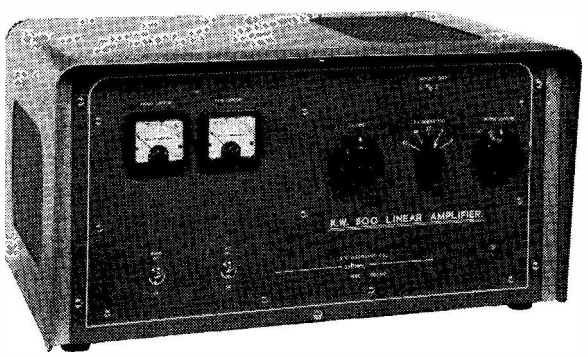
THE
KW "VICEROY" SSB TRANSMITTER & POWER SUPPLY



Transmitter only **£95.** Complete with Power Supply **£125.**
Carriage extra

Talking SSB . . .

Experts generally favour the Filter system of SSB generation compared with the Phasing system. A large majority of U.S.A. manufacturers have changed to the Filter system over the past year or so. Our experience has confirmed that this is the most reliable and efficient system. Three years ago our SSB development started with a phasing rig and over 2 years ago we changed to a crystal filter arrangement. The KW "Viceroy" has now been in Production for more than a year. Development still continues to bring you the best equipment at the right price. When you change to SSB make sure the equipment you buy has the backing of this experience.



THE KW500 LINEAR AMPLIFIER

500 watt P.E.P. input, grounded grid P.A. Suitable for being driven by the KW "Viceroy" or similar transmitter. Including 1750 volt H.T. supply.

£87 . 10 . 0 *plus carriage*

★ ★ ★

THE KW "VICEROY" SSB EXCITER

(awarded the R.H.E. Manufacturers Trophy 1960) Similar in appearance to the KW "Viceroy" but with self contained power supply. 8 watts P.E.P. sufficient to drive Linear 6146's, TT21's, 4/125A, etc. Low impedance output. Full VOX control and anti-trip.

£87 . 10 . 0 *plus carriage*

HAMMARLUND

HQ170

HQ170. Triple Conversion, selectable sidebands, full bandspread 6, 10, 15, 20, 40, 80 and 160 m. 17 tubes 100 kc crystal calibrator. Excellent performance, **£184.**

KW ELECTRONICS FOR **HAMMARLUND** AND **HALLICRAFTERS** EQUIPMENT. ALSO THE KW "VANGUARD," "VALIANT," "VICTOR," KW160, **GELOSO** EQUIPMENT, AERIALS, **MOSLEY** BEAMS AND VERTICALS, **DOW-KEY** RELAYS AND TR SWITCHES, FRONT END CONVERTERS, MICROPHONES, HIGH AND LOW PASS FILTERS, KW MATCH, **CDR** BEAM ROTATORS AND CONTROL UNITS (Now reduced in price), Etc.

EASY TERMS AVAILABLE *TRADE IN YOUR RECEIVER FOR A NEW ONE !*

K. W. ELECTRONICS LTD., VANGUARD WORKS

1 HEATH STREET, DARTFORD, KENT. **Tel. Dartford 25574**

FOR THE RADIO AMATEUR AND AMATEUR RADIO

The SHORT-WAVE Magazine

EDITORIAL

Listeners

Ever since the beginning, new recruits to Amateur Radio have come mainly from the ranks of short wave listeners — they achieve transmitter status after years of listening on the amateur bands; they are steeped in the traditions of Amateur Radio; they understand its language; and they regard themselves as privileged in belonging to its ranks.

There can be no question that among the best of AT station operators are those who have served a long apprenticeship as SWL's. There can be few who, holding callsigns that mean anything today, did not cut their teeth as SWL's. They were introduced to Amateur Radio either by the chance hearing of some local transmitter (usually on Top Band) on a home-built receiver or, in later years, by listening round on the bands marked " amateur " on the short-wave ranges of the family BC receiver. Whatever their introduction, they found that progress in the art and science of Amateur Radio depended largely upon their own efforts.

It is this self-dependence that makes the majority of radio amateurs the unique body they are — able to think for themselves, individualistic and self-reliant, but without being absorbed in Amateur Radio to the exclusion of all other interests.

The SWL's of the present generation are exactly the same sort of people as those who, looking for advice and guidance 30 or more years ago, are among the leading lights in the world of Amateur Radio as it is today.

If an SWL — young or old, shy or self-confident, professional or with only an amateur interest in radio — approaches you for advice about getting on the air, it is not only your duty, but also your privilege, to do all you can to help and encourage him and maintain his enthusiasm.

Austin Forbes G6FO.

WORLD-WIDE COMMUNICATION

An SSB Transceiver for Twenty

CONSTRUCTION — WIRING — SETTING UP AND TESTING — POWER SUPPLY UNIT — RESULTS

J. D. HEYS (G3BDQ)

The first part of this interesting and informative article appeared in the February issue of SHORT WAVE MAGAZINE. *Here, our contributor deals with the final constructional points and the test and setting-up procedure for the Transceiver, with which he is getting very good results on the air.—Editor.*

THE first part of this article, in the February issue, dealt with the circuit details of the Transceiver and also gave detailed descriptions of the VFO and crystal filter. Those thinking of embarking upon the construction of a similar transceiver need not be deterred, for the whole project as described here and in February, including power pack and time spent overcoming teething troubles, took only about three months to complete, working at week-ends and occasional periods on work-a-day evenings. The writer's " workshop facilities " are meagre (as any visitor would realise) and all the work entailed is within the scope of the average amateur using ordinary hand tools.

It is suggested that the VFO, filter, and calibrator be first built and tested. They will always be useful as separate units if any change of plans takes place at a later date. The VFO should be adjusted to cover from 5595 to 5955 kc, and given long " soak " runs to age the components and its valve.

The chassis is a standard 13½ ins. × 9 ins. aluminium type, 2¼ ins. deep. No base plate is used. The cabinet is a contemporary style wrap-round design similar to that used for Collins equipment and was made to order by E. J. Philpotts Metalworks Ltd., of Loughborough. It measures 15 ins. × 7 ins. × 10 ins. deep and is of steel in grey-hammer finish. The panel is of ⅛ in. aluminium and was also supplied by Philpotts. When ordering a similar cabinet specify that no bottom flange is required. This point was overlooked—an unpleasant hour had to be spent with a broken hack-saw blade removing this stubborn strip of metal. (Should this flange be there the chassis will not slide into the cabinet, if the writer's method of construction is followed.)

Front panel layout must be considered both from the point of view of easy handling and from its æsthetic appearance. So many amateur equipments present crowded, unbalanced panel layouts which could have been avoided with a little thought and planning.

An Eddystone dial (Type No. 898) was used, but as only one amateur band was going to be tuned all but the lower section was disregarded and hidden. An 8 in. by 1 in. slot cut in the front panel was sufficient for dial viewing, and as a result the metal escutcheon supplied with the dial was discarded and a new one fabricated (from a Woolworth's black plastic door plate, the window being cut from green plastic supplied as a motorist's sun visor by the same emporium). Small Eddystone knobs are used for the panel controls, with the exception of the tuning dial, which was furnished with a 1½ in. fluted knob with skirt. Greater visibility of the dial face is given by a pair of micro-bulbs (12 volt, Radiospares Ltd.)

Examination of the illustrations—here and in the February issue—and of Fig. 7 should give a good idea of the general layout of the main components and sub-units. The PA compartment measures 7 ins. × 3¼ ins. × 4 ins. high and a piece of expanded aluminium makes a suitably ventilated cover. This cover is held in place by small self-tapping screws at 1½ in. intervals. Behind the PA box the aerial relay is mounted on a vertical strip of thick aluminium.

As the cabinet is 1 in. deeper than the chassis, extension spindles are needed on the rear controls and the two power plugs are mounted on small pillars along the back of the chassis. Suitable holes to accommodate these items must be cut in the rear of the cabinet, circular screw punches being useful for this purpose. Several Int. Octal sized holes are also cut out beneath the cabinet to give ventilation.

Wiring

Because of the rather involved circuit switching in the Transceiver some form of colour coded wiring can prove useful, both during construction and at a later date should a fault develop. After the principal components, valve bases and sub-units are assembled it is best to run in the heater wiring; blue plastic covered wire was used for this. Then tag strips were located at strategic points near each valve base and the HT and relay wiring was run in. Black was used for the 12-volt relay supply and in the case of the HT wires three colours were used: Red for points marked " D " in Fig. 2

(*see* Part 1, p.629, February); green for points marked "A," and yellow for points marked "B." This pattern of coding was extended throughout the construction so far as possible, *e.g.* all the wiring connected with V11 and V11A was coded red, whereas all the wires in the carrier oscillator circuit (V10) were yellow. Some lacing of wire groups can be done at an early stage, to get them tidily out of the way.

From the circuit diagram (Fig. 2, p.629) it will be noticed that several wires are shown as being screened. Thin coax can be used in some cases where it will fit in conveniently. The output lead from the VFO to V6 was made of coax cable. Where a number of sharp bends are necessary it is best to use ordinary flexible screened wire. It is particularly important that the screened leads from the IF relay to V8A and V11A be of equal length and capacity, otherwise the second IF amplifier will be de-tuned in either the "transmit" or "receive" position.

Constructional Details

A grid-dip meter is essential when making the coils and it saves hours of frustrating "cut and try." In the case of L6 and L8, these coils must tune to the required frequency with just the valve and stray capacities across them. Here, a reference to a valve manual is helpful, and the coils can be grid-dipped in position with the associated valves in their sockets but not connected to any power supply.

All the screens across valve bases are shown in Fig. 7. V13 is arranged so that its input circuit cannot "see" V12 grid circuit. This is made easier by mounting RFC8 in a screening can above the chassis. Valve bases are orientated so as to reduce lead length, especially all leads to grids and anodes.

If good carrier suppression is to be achieved, V10 and its circuitry must be shielded from the balanced modulator and IF stages: V10's location on the chassis, the position of the VFO box, and putting the balanced modulator sub-unit above the chassis all contribute towards this shielding. The oscillator crystal is tucked away amongst a number of earthed metal components, and a special shield for it is not required.

The balanced modulator is built in a rectangular aluminium box measuring $3\frac{1}{2}$ ins. × 2 ins. × $1\frac{1}{4}$ ins. As it is a balanced bridge circuit at RF potential, a symmetrical layout of parts and wiring must be the aim. It should not be necessary to remind the reader to use heat sinks when soldering the diodes into position. This applies, of course, to all the semi-

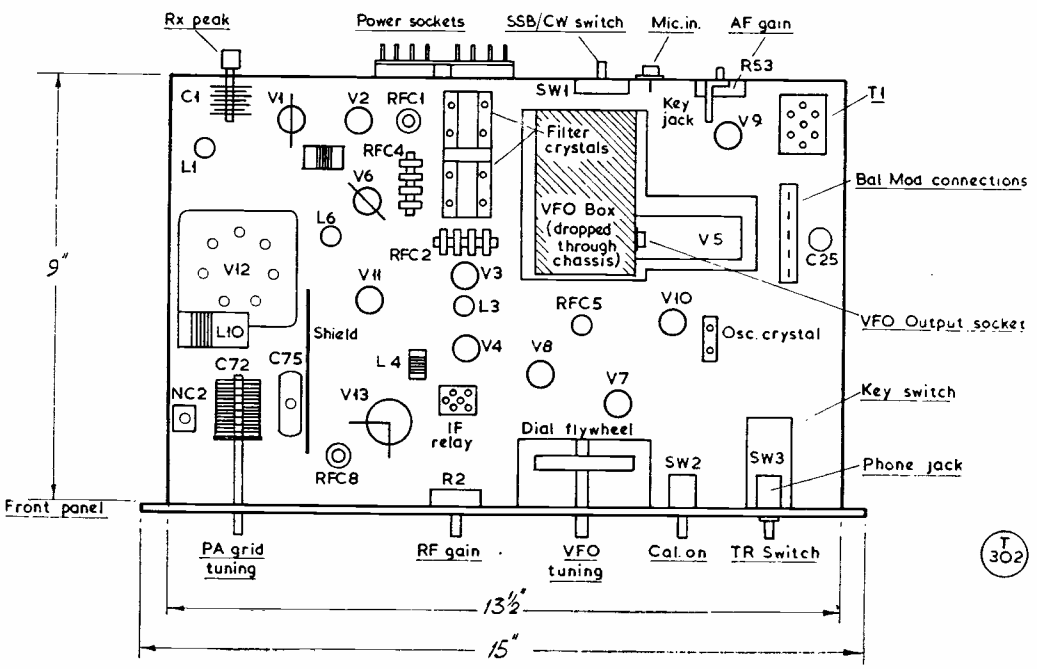


Fig. 7. Sketch showing general chassis layout of the Transceiver — compare with the photograph p.627, February. The transformer T1, the two relays, the balanced modulator and filter unit, with the choke Ch.1, are mounted above the chassis. The VFO box is held rigidly half-way through so that its upper side is below panel level; the filter crystals are in holders mounted upside down against the under-face of the chassis.

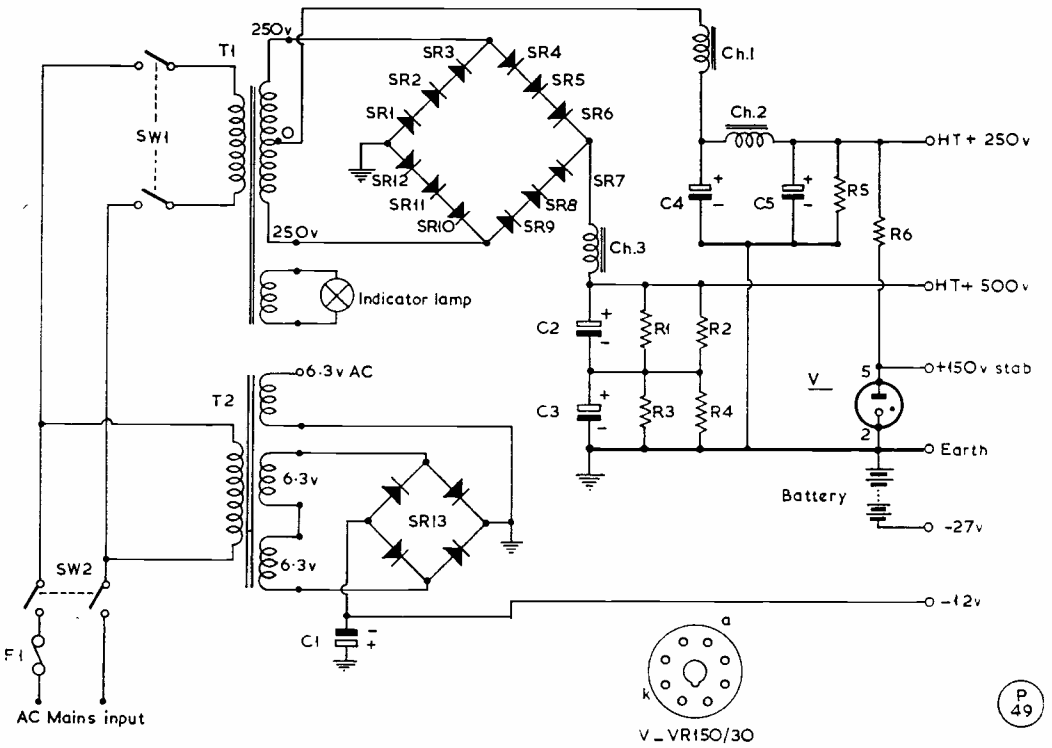


Fig. 8. Circuit of the Transceiver power pack, an external item. The only heat generated comes from the bleeder resistors. The 12v. supply for the relays (and dial lamps) is obtained by rectifying the output from two 6.3v. heater windings connected in series. The tapped bleeder network across the 500v. HT line also ensures proper voltage distribution across the smoothing condensers C2, C3.

conductor diodes in the transceiver. Standard sized RF chokes would not go into the small modulator unit, so instead little single *pi*-chokes from an old R.1355 IF strip were used. These chokes can be obtained as surplus and have an inductance of about 100 μH. Alternatively the midget ferrite cored RF chokes for transistor circuits could be used.

The holder for the PA valve (V12) is mounted about $\frac{5}{8}$-in. below a $2\frac{1}{4}$ in. hole in the chassis. In this way the horizontal screening disc within the valve is brought level with the chassis and the overall screening between input and output circuits is enhanced. A Y-shaped piece of thin brass or copper sheet is used to connect heater and cathode pins together across the base, and an extension of this strip is secured to the chassis for earthing.

The manufacturers of the QQVO6-40 stress that suitable heat dissipating anode connectors be used. Two heavy brass segments from a large terminal block provided ready made connectors, each fitted with screws at either end. Flexible copper braid salvaged from old coaxial cable was connected between the parasitic stoppers (PC1 and PC2) which join directly to the anode connectors, and the junction of C74, C78 and RFC7. Rigid conductors should not be used, for there is then a risk of envelope fracture when thermal movements take place during operation.

The heater wiring of the transceiver is not shown in Fig. 2—p.629, February—but normal practice should be followed. One leg of the 6·3 volt heater supply is earthed and the "live" line is by-passed to earth with ·001 μF disc ceramics at *each* valve holder.

Power Pack Design

From the power pack circuit (Fig. 8) it will be seen that a single transformer T1 is used to obtain both the 250 volt and 500 volt HT supplies. This has been done by using a full-wave bridge circuit, the lower voltage being obtained from the centre tap on the secondary of the transformer. Silicon power rectifiers (SR1 to SR12) represent a considerable saving in power from the transformer as no heater current is required. They are far more efficient than conventional valve rectifiers, and can be tucked away in a very small space below the chassis. The rectifier diodes are Bradley type

DD.006, having a p.i.v. rating of 400 volts each, and when arranged in the full wave bridge circuit can be loaded up to 500 mA—they are only 7s. 10d. each and can be obtained as noted on p.236 of the July 1960 issue of the *Magazine*. Three diodes are used in each arm of the bridge, although for output voltages of 500 volts two in each arm would be sufficient. Using three increases the safety factor greatly, and output voltages up to 750 can be realised if needed.

The short duty-cycle of SSB amplifiers on telephony permits the use of smaller HT transformers than would be necessary for an AM or CW transmitter. T1 is a surplus C-core potted transformer rated at 250 volts, 300 mA, and it runs ice-cold despite the 100 mA or more drain at 250 volts, and voice peaks of 150 mA at 500 volts when transmitting. In amateur transmitting service the total transmitting time is much smaller than that spent receiving and the transformer runs well within its limits.

Choke input is used in both the HT smoothing circuits. This reduces the surges through the rectifiers and provides better voltage regulation. Ch.1 and Ch.2 in the 250-volt line are the two halves of a double-wound choke. Being a believer in long, trouble-free operation, the writer provides generously-rated filter condensers—in the case of C2 and C3 the bleeder chain formed by R1, R2, R3 and R4 ensures correct voltage distribution between the two condensers.

The stabilised 150-volt HT supply for the VFO is obtained from a VR150/30 (VR) neon stabiliser in a conventional circuit.

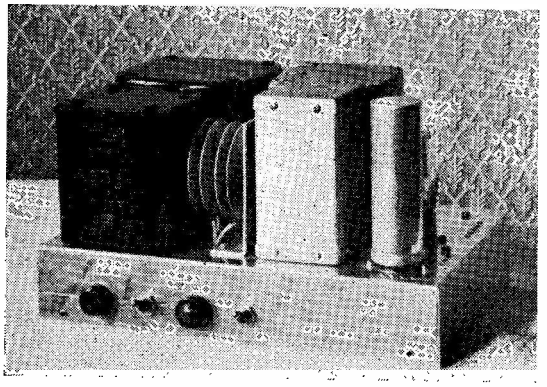
T2 is also a surplus item and, besides supplying about 6 amps for all the valve heaters, has two other 6·3 volt windings which are series-connected to provide 12 volts for the relays and dial lamps. (If connected out of phase the output will be zero !)

The input switching is arranged so that T1 cannot be energised before the relay and heater supplies are switched on. Grid bias for V12 comes from three 9-volt batteries in series.

Table of Values

Fig. 8. Circuit of the Transceiver Power Pack

C1	=	25 μF elec., 50v. wkg.
C2, C3	=	64 μF elec., 450v. wkg.
C4	=	8 μF elec., 450v. wkg.
C5	=	60 μF elec., 450v. wkg.
R1, R2, R3, R4, R5	=	15,000 ohm 12 watt w/wound
R6	=	5,000 ohms 12 watt w/wound
SW1, SW2	=	Double pole toggle switches
SR1, SR2, SR3, SR4, SR5, SR6, SR7, SR8, SR9, SR10, SR11, SR12	=	Silicon rectifiers, Type DD.006 (G. & E. Bradley Ltd.)
SR13	=	Selenium rectifier 12v. 2 amp. bridge
T1	=	C-core surplus transformer ; 250-0-250 volts 300 mA. with 6v. winding for ind. lamp
T2	=	C-core surplus heater transformer ; 6.3 volts at 6 amps., 6.3 volts at 4 amps., 6.3 volts at 1 amp.
Ch.1, Ch.2	=	Dual wound smoothingchoke, 5 Hy. *plus* 5 Hy. at 150 mA.
Ch.3	=	10 Hy. at 250 mA. smoothing choke
VR	=	VR150/30 neon stabilising tube
Battery	=	Three 9 volt "clip-together" batteries
F1	=	2 amp. tubular fuse



The power pack for the Transceiver; the chokes and transformers are all of the potted type, and the tubular condenser C5 is octal-based plug-in. Note the mounting of the 12 volt selenium rectifier and the ventilating holes in the chassis above the resistors.

Power Pack Construction

Before making or buying a chassis for the power pack it is best to arrange the chokes and transformers into a suitable layout on the bench. It is surprising how much space can be saved by a little "juggling." The actual chassis size will depend upon the dimensions of the components to hand. The use of potted chokes and transformers keeps all the wiring beneath the chassis and makes for a tidier piece of equipment.

The twelve silicon rectifiers are mounted in line along a paxolin tag strip, and the usual precautions employed when soldering them into position. C2 and C3 were only available as two 32 + 32 μF units in metal cans, which meant that the casing of C2 had to be suitably insulated from the chassis.

The only heat developed in the power pack comes from the resistors. These are arranged to lie close to the chassis sides, and ventilation holes are drilled through the chassis above them. They should also be kept away from the silicon rectifiers.

SR13, the 12-volt selenium bridge rectifier, is fixed to a metal bracket above the chassis so

that its cooling fins lie in the vertical plane.

The three bias batteries clip together into one 27-volt unit and a pair of small Terry tool clips hold them against the chassis wall.

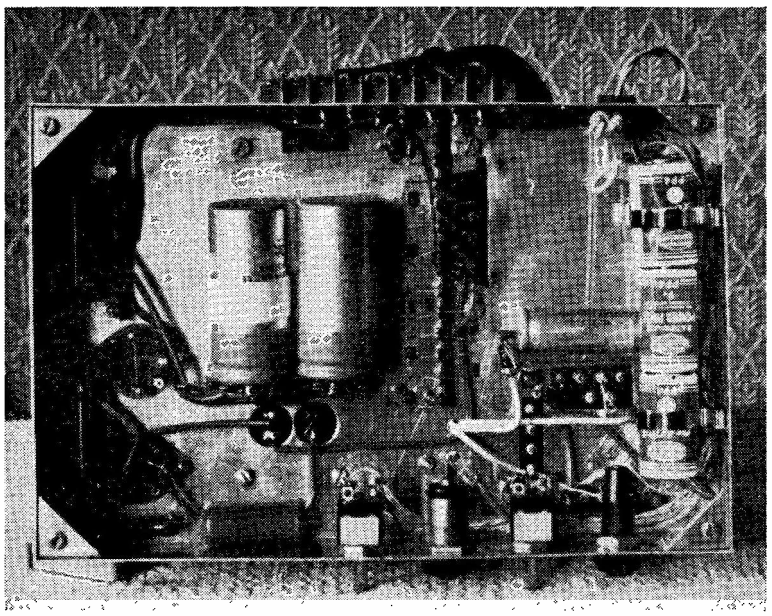
Initial Testing

The receiver section of the transceiver is lined up and tested first, and this also takes care of the common IF strip and the oscillators.

By listening on another receiver first, make sure that the VFO and carrier oscillator* are working. At this stage do not worry about the exact frequency setting of the latter, as this is done with the transmitter section operating.

All the valves connected to the HT supply point " D " and the PA valve should be removed, the phones plugged in and the power pack switched on. Remember that 500 volts is now on the input socket, so take great care when making adjustments beneath the chassis. The AF amplifiers V7 and V7A can be quickly checked by touching their grid pins. A grid-dip meter tuned to 8400 kc can be used as a signal generator for peaking up the IF stages. If the filter is working correctly, there will be a sharp signal cut-off as the GDO tunes out of the 2 kc pass-band. This should take place on both sides of the pass-band. Should any IF instability appear (noticeable by self oscillation, or a high noise-level) V4 can be neutralised in the way described earlier in this article. The GDO can next be put on 14 mc and the RF amplifier (V1) coils set to this frequency. If all is well signals should be heard when the aerial is connected. Final adjustments can be made by peaking on a weak signal, and the calibrator should give healthy markers at 100 kc intervals, the odd harmonics from the calibrator being noticeably stronger than the even ones.

Before the transmitting section is energised the PA must first be neutralised. Again the indispensable grid-dipper can be used, this time in conjunction with a sensitive field-strength indicator. The latter device is used continuously by the writer to monitor carrier level and peak output from the Transceiver.



Under-chassis view of the power pack for the SSB Transmitter; the twelve silicon power rectifiers are mounted off the tag strip across the centre of the chassis; five of them can be picked out to the right of the two tubular condensers, these being C2, C3 (in the power pack diagram). The resistors are grouped on the left, close to the sides of the chassis; the bias batteries are on the opposite chassis wall.

It consists of a tuned circuit with a germanium diode rectifier connected to a 100 μA meter and makes an extremely sensitive " RF sniffer." The GDO is coupled to L9 and the FS meter to L10. Correct neutralisation is indicated when the FS reading falls to a very low level, not forgetting to tune L9 and L10 to resonance whilst adjusting the neutralising condensers. It is best to use an 80-ohm composition resistor as an output " load " at point X whilst performing this operation. Do *not* attempt to run the PA before neutralisation has been achieved as damage to the valve may result.

Assuming that all is now ready for final testing plug in all the valves, connect the aerial, put the key-switch (SW3) to " transmit " and put on the HT. The standing anode current of the QQVO6-40 with the supply voltages suggested and −27 volts bias should be about 40 mA. Tuning the grid or anode circuits should have *no* effect upon the anode current when the valve is *undriven.* If this is not so it means that the neutralisation is incomplete.

There will be enough carrier leakage to be detected if the FS meter is coupled to the ATU, and adjustment of R24, the balance potentiometer, together with trimmers C25 and C28, will bring this down to some low figure. Switch-

ing SW1 to the CW position will allow drive to the PA, and the gain control R53 can be used to control the level. (It will be necessary to remove the FS meter from close proximity to the ATU when this is done or the meter may burn out !) Tuning up the transmitter is more easily done when operating in the CW mode. L8 can be set for maximum output and also L6 in the grounded grid stage. The ATU and its link coil are also best set-up at this stage.

Plugging in the microphone and switching SW1 to the SSB position allows SSB transmission. A monitor receiver in the muted condition may be used to listen to the signal. The gain control R53 is set to the correct level and C62 in the carrier oscillator circuit tuned for the most natural speech output from the Transceiver. This will be when the carrier oscillator frequency is between 20 and 25 dB down the LF slope of the crystal filter. The tuning slug in L7 may also be adjusted for correct carrier output to the balanced modulator. After these operations it may be necessary to re-set the balance control R24.

On speech peaks, when the PA is properly loaded to an aerial, the anode current should kick up to between 120 mA and 150 mA. Too much gain in the microphone amplifier can result in splatter or distortion and should be avoided. Any lengthy periods of tuning up should be carried out on a dummy aerial load otherwise your callsign will not be very popular amongst the SSB fraternity !

Results

Many DX contacts have been made with the Transceiver as described and illustrated here and the reports have been excellent. Tests carried out with other stations indicate that the carrier and unwanted sideband suppression are better than average, and speech quality entirely adequate for amateur communication. The receiver section performs as well as many commercial types in the upper price bracket despite its simplicity, and the slow tuning rate enables SSB stations to be brought " on the nose " as comfortably as AM phone signals on a conventional receiver.

Conclusion

There is no reason why the basic circuit should not be adapted for operation on other amateur bands. Different VFO frequencies or different carrier and filter frequencies can be used to do this. Switched carrier crystals may be used to give sideband switching, and there is no reason why a more complex multi-band version of the circuitry should not be attempted.

The complete Transceiver, excluding power pack, weighs 22 lbs. and it could easily be incorporated into a mobile installation, as in the case of the Collins KWM-2. Loudspeaker operation would be possible by adding a suitable AF output stage and, of course, VOX circuits can be provided.

No TVI on Channel 4 or Channels 10 and 11 has been experienced and the harmonic output is very low. However, in some cases it may be necessary to fit a high-pass filter in the TV receiver aerial lead to prevent direct breakthrough producing swamping effects on speech peaks.

It is to be hoped that this article will help to encourage more amateurs to sample the delights of DX SSB working and to discard those " wasteful, howling carriers."

* In the circuit on p.629, February, R64 should be connected to the screen of V10, the carrier oscillator, and not as shown.

(Concluded)

INDEX TO VOL. XVIII

Every copy of this issue has, as a free Loose Supplement, the Index to the last volume, which closed with the February issue. The contents of this Index show the wide range of amateur interest and activity covered in the last twelve issues of SHORT WAVE MAGAZINE. It also shows that the work of more than 50 outside contributors was used during the year—and we can say that between them they were paid upwards of £700. At the moment of writing, some back-number copies of all issues March 1960 to February 1961 are available, at 2s. 9d., post free. If on looking through the Index you find anything you particularly want, get the copy right away. And if the Index itself somehow missed this copy of the *Magazine*, you can get yours on application with a large stamped, addressed envelope.

AMATEUR LICENCE FIGURES

We are informed by the G.P.O. that as at the end of December, 1960, there were 8,999 amateur transmitting licences in issue in the U.K. Of these, 929 had the extra endorsement for mobile operation, and 78 were for amateur television transmission.

WEATHER SHIP RADIO INSTALLATION

The new ocean weather ship *Weather Adviser* (a conversion of the former R.N. frigate H.M.S. *Amberley Castle)* is fitted with Marconi NT-201 1 kW independent sideband transmitters, each complete with a remote-controlled aerial matching unit for the type of long whip aerial now becoming standard in modern ship installations; the frequency range covered is 1·8-23 mc, in five bands. A second frigate, H.M.S. *Pevensey Castle,* is also being converted for weather-ship duty.

Making a Mobile Whip Aerial

MECHANICAL DESIGN FOR CENTRE LOADING

D. FELL (G3LIQ)

HAVING acquired a mobile licence, the problem of constructing a whip arose. Reading through the literature, and remembering the variegated assemblies seen at mobile rallies, it became clear that coil construction would have to be strong and substantial, as centre-loading was to be used. The mechanical strength and rigidity of the whole aerial would depend mainly on the design of the centre section.

As dural tubing was to be used for the top and bottom sections of the whip, the point to be decided was whether to fill the coil-former with wood or similar material (suitably drilled top and bottom to take each section of aerial), or to plate the upper and lower parts of the coil former and braze on female screw sockets to take the sections of the whip.

The latter method was adopted. Using a 4-in. coil-former, some $\frac{1}{2}$-in. thick fibre was shaped and fitted to the inside of the coil-former ends, the fibre being drilled and tapped

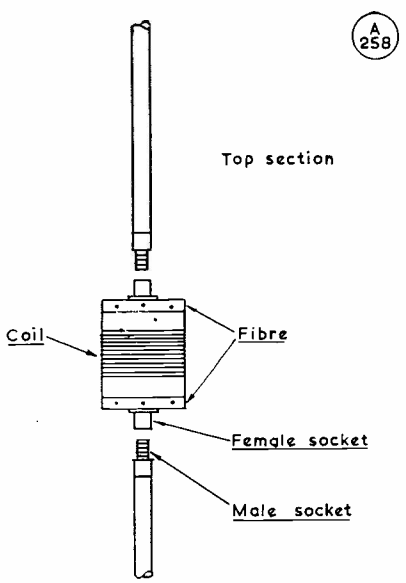


Fig. 1. The general arrangement for one successful method of construction; the screw-in items are as used on domestic brush handles or sweepers. The coil former is "plated" at each end to take the screwed elements.

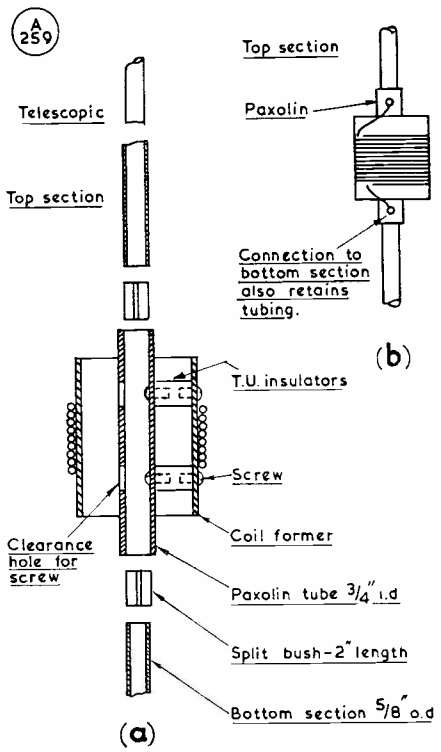


Fig. 2. With the text, this sketch is self-explanatory. The important point to note is that the paxolin tube, not the coil former, takes the element load.

to take the fixing screws. Two female sockets (as used on domestic sweepers and drain brushes) were mounted on the fibre flats at the coil ends—*see* Fig. 1—and male ends were then screwed to the top and bottom sections of the whip. Assembly was simply a matter of screwing the sections into the coil piece, resulting in a strong and easily detachable aerial.

This whip was very successful until a change of vehicle dictated some other form of construction. As single-point bottom-end mounting was to be used (*see* photograph), weight seemed to be the deciding factor; on weighing the original coil—consisting of former, winding, fibre ends and socket mounts—it was found to scale $2\frac{1}{2}$ lbs., which was quite surprising. Even using the alternative method (with a filled former), weight would still be too great. It seemed that to get strength, one had to give weight.

Improving the Design

However, the weight of formers alone, even if moderately thick-walled and of large diameter, is really negligible. The problem was how to preserve this lightness and strength,

General appearance of the G3LIQ/M aerial as fitted. The method of construction, materials used and mounting ensure an assembly that remains steady under all normal travelling conditions.

while at the same time relieving the coil of any top-section strain. In short, the objective was to keep the whip light but mechanically strong.

It has been achieved by the method shown in Fig. 2. The whip was made to the required length, 10 ft. overall, and the centre insulated by paxolin tube, $\frac{1}{8}$-in. thick by $\frac{3}{4}$-in. inside diameter. In the writer's case, the dural used for the top and bottom sections did not fit the paxolin tube, so two collars of dural, 2 ins. long, were split down and slid over the ends of the upper and lower aerial sections, which were then pressed into the paxolin tube, top and bottom, to make a tight, force fit. Those having the correct diameters of dural rod and

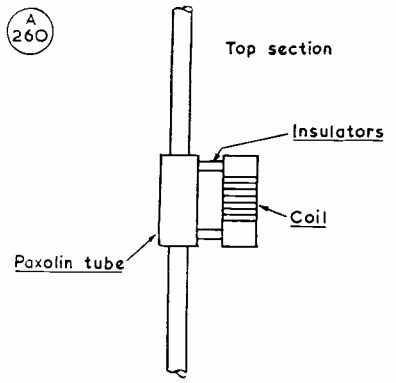
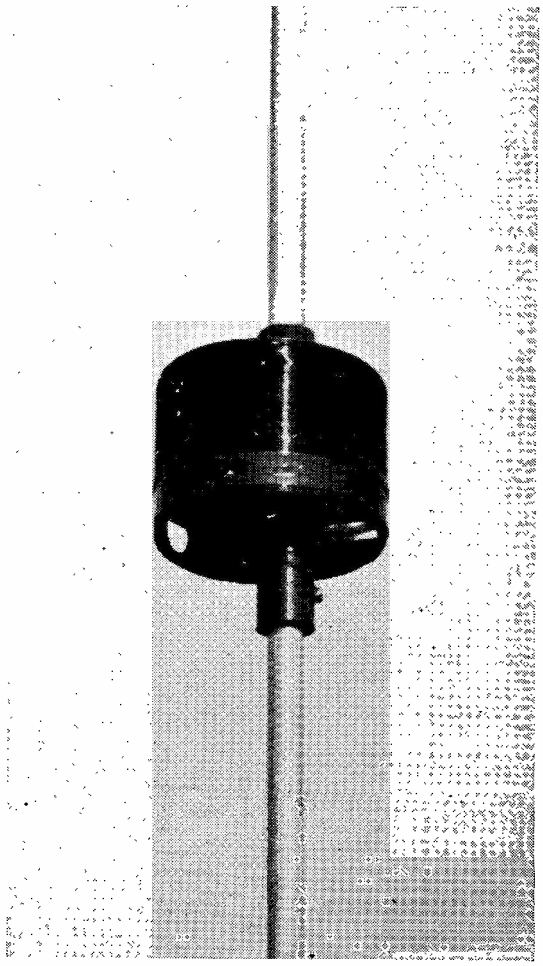


Fig. 3. A suggested form of mounting for small-diameter or HF band plug-in coils. As before, the load is taken by the insulating paxolin tube.



In the G3LIQ/M installation, the coil is supported by an inner paxolin tube which actually carries the whip elements — thus the coil itself is not subjected to any mechanical stress. See text and Fig. 2.

paxolin tubing would not have to pack the ends of the rod, and would find it easy to build up the central section to the general arrangement shown in Fig. 2.

Mounting the coil itself is simple. Short stand-off insulators (as found in TU assemblies) were used: A hole is drilled straight through the paxolin tube to take the small screws which go into the TU insulators, one side-hole being enlarged to clear the head of the screw; the insulator is then securely screwed to the paxolin tube, and all that remains is to drill out the coil-former to register with the insulators and screw it up tight. Fig. 2 shows the details.

Smaller diameter formers, paxolin tubing and dural whip elements could be used, but very small windings would have to be side-mounted, as suggested by Fig. 3 — a method easily adaptable to plug-in coils for band changing.

It will be seen that for this design, as shown in Fig. 2 and the photographs, any diameter former can be used, however thin-walled, as no direct strain is placed on it. Using a 4 in. by 4 in. diameter coil for Top Band, with a whip length of 10 feet, the whole aerial only weighs 20½ ozs., which makes it admirable for single-point mounting—*see* Fig. 4 and photograph. Being so light, the whip remains almost motionless, even on bumpy roads. As to weather, the coil itself only needs cementing; there is no top or bottom plate to the coil-former, so there is no need for elaborate

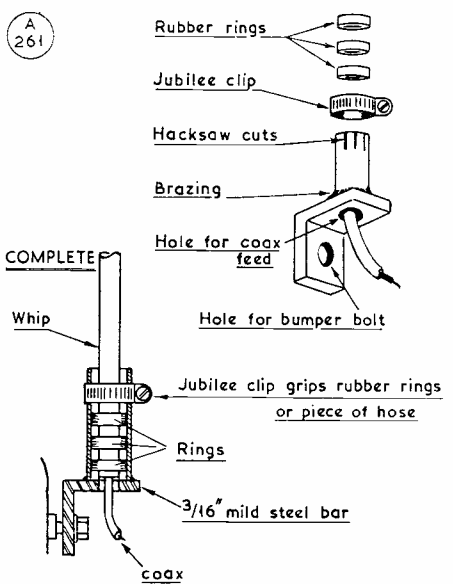
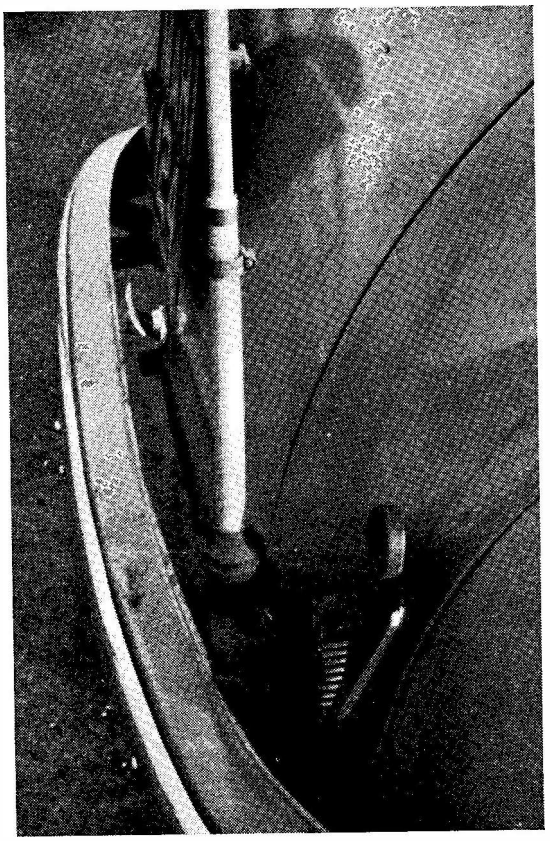


Fig. 4. Sketch to show the butt-end mounting of the whip. By using rubber rings (or hose) clamped by a jubilee clip, a trong, shake-proof but resilient mounting can be obtained.



Close-up of the base mounting of the G3LIQ/M whip aerial — compare with sketch Fig. 4. The jubilee clip ensures a firm but resilient fitting.

weather-proofing. There is also no loss of mechanical strength because of the tight fitting central assembly.

Mounting of the aerial is simple. A length of tubing is brazed to a piece of 3/16-in. mild steel bar bent at right angles, as in Fig. 4, and a hole for the bumper bolt drilled in the other flat. The tubing is then split by being sawn down for about an inch, and a jubilee clip (a screw-up device used for garden hose and obtainable at any ironmonger) dropped over it. Inserting the lower whip section leaves an annular space of about a ¼-in. all round; this is taken up by three rubber rings on the base of the whip, the assembly then being pushed into the split tubing. Tightening up on the jubilee clip completes a solid job, which is still resilient enough to take any normal shock.

(Editorial Note: A detailed discussion on the electrical design of, and feed arrangements for, mobile aerial systems for the 160-metre band will be found in the June 1956 issue of SHORT WAVE MAGAZINE, pp.194-198.)

IMPROVING THE R.107 FOR SSB RECEPTION

MODIFICATIONS TO THE BFO

J. F. Macaulay (G3MQJ)

LARGE quantities of the Army communications receiver type R.107 have been available on the surplus market, either as complete sets or in the form of separate RF, IF/AF, and power units, at very attractive prices.

As originally designed, this receiver is not much use for SSB reception, but, with slight modification to the BFO circuit, it can give a very good account of itself. This is due to the excellent design of the IF stages. With the IF switch in the " narrow " position, the response curve is 3 kc wide at 6 dB down and only about 7 kc wide at the 60 dB point. From this, it will be seen that the skirt selectivity is particularly good—an essential requirement for SSB—and is achieved by the use of under-coupled transformers, and the connection of two of these in cascode between the first and second IF stages. Of course, some loss of gain is inevitable with this arrangement, but this is by no means serious, as the CW sensitivity is quoted, in the handbook, as approximately 1 microvolt for 20 dB signal/noise ratio.

However, it is in the BFO and the method of injection that the R.107 falls down when an attempt is made to receive A3a signals. For this mode of reception, it is, of course, necessary to re-insert the " suppressed carrier," either at the signal frequency or at the intermediate frequency. Both methods are equally satisfactory, but the latter, using the BFO, is obviously more convenient, as, once set correctly, all tuning can be done on the main control, without having to adjust an auxiliary oscillator.

BFO Injection

It is important, however, that the BFO injection voltage be the same or greater than the signal voltage (which is, of course, at IF) appearing at the second detector. If not, the result is precisely similar to gross over-modulation of an AM transmission; namely, severe distortion. This can be overcome by reducing the RF gain and using the audio gain control to bring up the signal to a readable level. At the same time, adequate BFO injection voltage is desirable, otherwise the RF gain has to be turned down so far before the correct relationship between the two voltages is achieved, that the receiver becomes extremely insensitive. A BFO voltage greater than the signal does no harm, being equivalent to under-modulation (high quality AM broadcast transmitters have modulation depths of the order of 30%), but a practical limit to this is the increased possibility of a large BFO voltage finding its way into the RF stages and causing spurious signals.

In the case of the R.107, however, as originally designed, it is well-nigh impossible for this state of affairs to arise, as a glance at the BFO circuit will show (Fig. 1). The BFO voltage is injected into the suppressor grid of the second IF stage (V1D) from a coupling winding on the oscillator coil; the RF gain control is also operative on this stage. Therefore, as the RF gain is reduced, so is the BFO injection voltage. This may have advantages for CW, but definitely not for SSB.

Before doing something about this, it was decided to find out exactly what *was* happening. So a 0-250 microammeter was inserted between the diode load resistor (R12A) and the cathode of the 2nd Detector/1st Audio valve (V2B). With the AVC switched on and a signal, sufficiently strong to saturate the AVC, fed into the aerial terminal (from the station frequency standard) a reading of 40 microamps was obtained. It was felt that this approximately simulated an S9 signal. With no signal applied to the aerial terminal, and the BFO switched on, only 15 microamps was recorded. For these tests, the IF bandwidth was set to " narrow " and the RF gain at maximum. As the diode current due to the BFO was approximately one-third of the minimum acceptable and, as mentioned above, affected by the RF gain control setting, it was obvious that action was needed.

As a first experiment, the blue wire from the BFO coil was disconnected from the suppressor grid pin (No. 5) of V1D, this pin being strapped to a con-

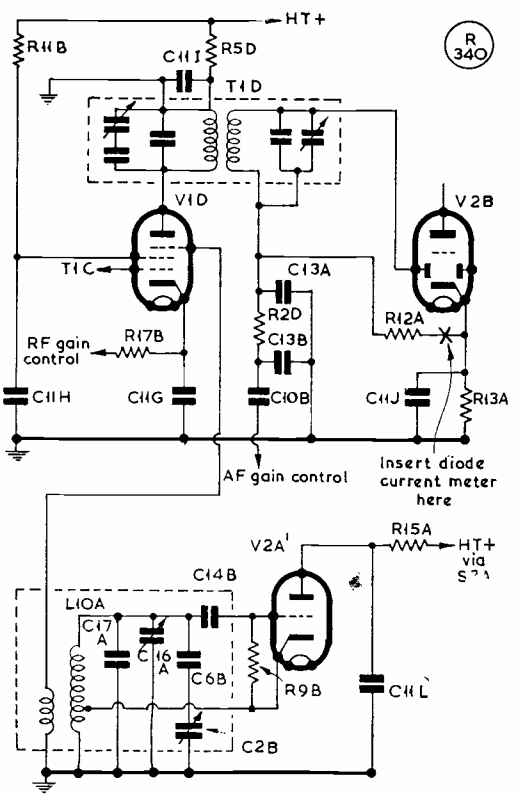


Fig. 1. The original BFO circuit arrangement in the R.107, the component references being as given in the official handbook.

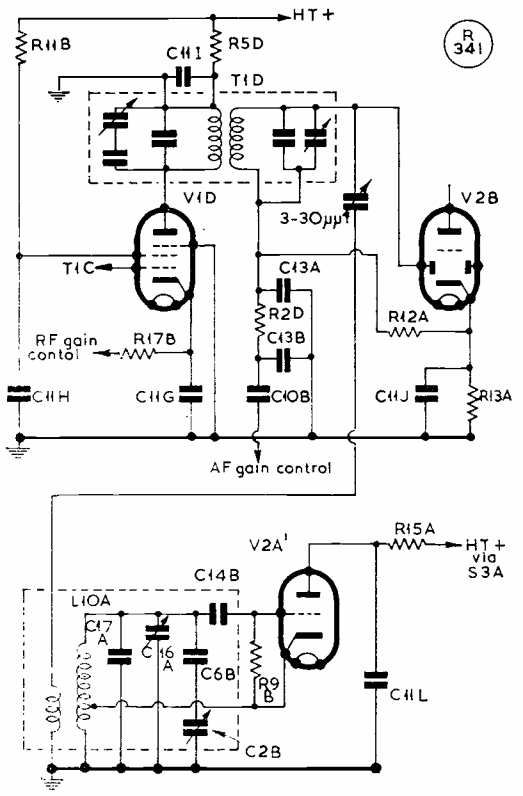


Fig. 2. A first modification to the BFO, which effected considerable improvement — see text.

venient earth point. The blue wire was then connected *via* a Philips 3-30 $\mu\mu$F trimmer to the second detector diode (pin 4 of V2B). This was a marked improvement, giving a diode current of 25 microamps, which was not affected by the RF gain control *(see* Fig 2).

Better Result

However, it was felt that further improvement was possible. Accordingly, the AR21 (EBC33) BFO valve V2A was replaced by an EF39, wired as shown in Fig. 3. An EF39 was chosen because it has a similar heater current (0·2A) to the EBC33 — an important consideration with series-connected heaters. This change brought the diode current due to the BFO up to the target figure of 40 microamps, and it is now possible to resolve SSB signals with the RF gain control well advanced, thus retaining full receiver sensitivity. (For the positions of the components mentioned, *see* Fig. 4.)

A further aid to pleasant operating is to mark the BFO pitch control at the correct positions for resolving upper and lower sideband transmissions. This done, tuning-in an SSB signal is simply a matter of setting the pitch control correctly and tuning slowly across the signal until speech resolves. As most readers will be aware, the convention is that the lower sideband is used for the three lower amateur bands, *viz.*, 160, 80 and 40 metres, and the upper sideband for the higher frequency bands.

Adjustment

The BFO pitch control can be set correctly without any other test gear than one's ears and the B.B.C. Light Programme—although a diode current meter certainly helps. First of all, remove the cover from the BFO tuned circuit, accomplished by taking the three 6BA screws out of the top of the can, and pulling upwards; the cover is a tight fit, and slight urging by a screwdriver blade between the bottom of the cover and the chassis may be necessary. Next, the BFO dial should be provided with an index mark—a scriber line exactly opposite to the " bite " in the edge is adequate. With this mark pointing to " 12 o'clock," slacken the grub screws and set the variable capacitor (C2B) at half-mesh, with the moving vanes facing to the right as viewed from the front. Tighten the grub screws and replace the cover. Switch on and, with the IF bandwidth set at " narrow " (this position should *always* be used for SSB), tune-in the Light Programme (1214 kc) " on the nose." This is where the diode current meter helps. It is advisable to wait for speech (or a pause) and, with the AVC rendered inoperative (by earthing tag 4 on tag board A or B on the rear of the receiver) the RF gain control should be backed off to avoid overloading. The BFO is then switched on, and tuned to zero-beat by adjustment of the BFO trimmer (C16A). The BFO pitch control must be left pointing to " 12 o'clock " during this operation; in fact, owing to the aforesaid " bite " in the dial, it will be impossible for

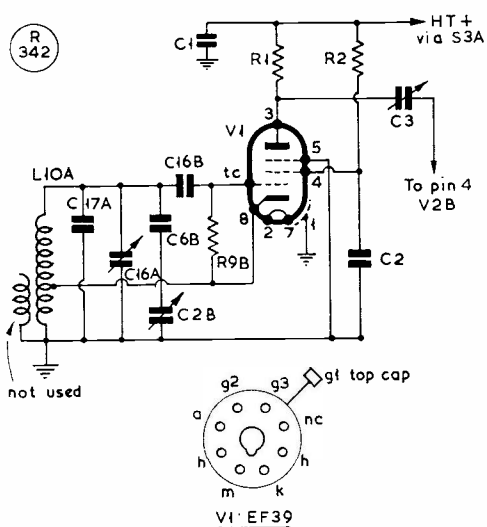


Fig. 3. The improved BFO circuit for the R.107, as finally evolved by G3MQJ. An EF39 is used instead of the EBC33, and the additional circuit values are: C1, C2 0.1 μF, C1 being the " C11L " in the original; C3, 3-30 $\mu\mu$F trimmer; R1, 68,000 ohms; and R2 100,000 ohms. All other components are as in the R.107 handbook circuit.

it to be anywhere else.

Speech will now sound distorted, and the pitch control should be turned slowly to one side, following up with the main tuning control to maintain zero beat. At some point the quacking distortion will vanish and the speech come up clear. This point should be marked on the panel against the BFO dial index, and the whole procedure repeated on the other side of the "12 o'clock" mark. These marks represent the correct BFO settings for the two sidebands; if the condenser C16A has been set as described above, the lower sideband (LSB) will fall about "10 o'clock" and the upper (USB) at "2 o'clock." (The writer is indebted to an article by G3DAF for a description of this method of using the BFO.)

These modifications have made all the difference as far as SSB reception is concerned, although, in common with all general coverage receivers, the R.107 suffers from too fast a tuning rate. An excellent article by G8PG in SHORT WAVE MAGAZINE for October 1958 offers some very practical suggestions for improving this and, indeed, contains some most useful information for the R.107 owner.

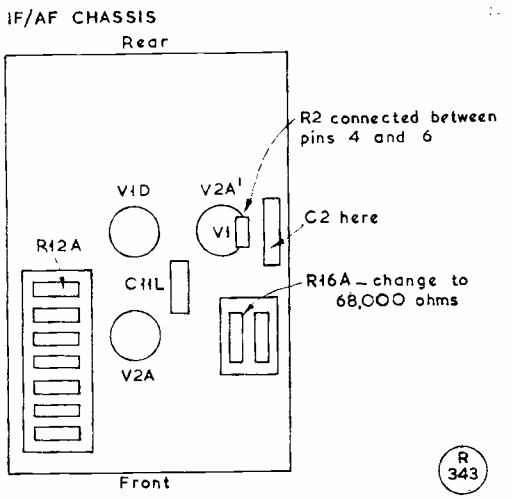


Fig. 4. To assist in carrying out the modification suggested by G3MQJ, the parts of the circuit involved are located in this diagram.

Interference Suppression in Cars

FILTER UNIT TO IMPROVE MOBILE RECEPTION

J. N. WALKER (G5JU)

WHEN a broadcast receiver is installed in a car, the manufacturers usually supply a filter unit which cuts down locally produced electrical noise to a low level — generally inaudible except perhaps when the incoming signal is weak.

Without a proper filter, the amateur installing either a broadcast receiver or short wave equipment in a car will find the noise level troublesome and this article describes a unit which has been found most efficient in eliminating or at least drastically reducing noise.

It is assumed that normal interference suppressors (resistors of about 20,000 ohms) are in use, fitted directly to the plug terminals, and, with these, noise from the high-tension side of the ignition system should be low. If, after the filter unit to be described has been installed, ignition noise is still noticeable, a further suppressor of the usual type—a 4,000 or 5,000 ohm carbon resistor—should be fitted in series with the high tension lead running from the coil to the distributor.

It has been found that most of the interfering noise in a car comes from the low-tension electrics and is carried along the wiring into the receiving equipment. Although one would expect the accumulator to act as practically a dead short to these noise voltages, in practice this is not the case. These "electrics" include the contact-breaker, the fuel pump (if it is not mechanical), the dynamo, windscreen wiper motor, and heater fan motor. Where power for the radio equipment is obtained from a rotary converter, "hash" is likely to be created at both the high- and low-tension commutators.

To treat all these items individually is a tall order and is in most cases unnecessary anyway. One or two will be found particularly difficult to suppress, an example being the petrol pump, which gives rise to pulses as the contacts open.

The first thing to do is to fit a filter preventing the noise interference being carried along the *power leads to the radio gear*, and only after this has been done is it necessary perhaps to pay more attention to the various electrical items separately.

To be effective, the filter should be close to the source of power. In the writer's case, a rotary generator is installed semi-permanently under the bonnet, in a spot where engine heat does not reach it, and where also ventilation is adequate to allow dissipation of the heat generated by the converter itself. A multi-way

cable terminated in an octal socket and clipped to the metal work is taken into the "cockpit," where it is readily available for connection to a variety of equipment. Hence, the filter unit is fitted near to this rotary converter, being bolted to the side wall of the wing. If one wishes to be particularly fussy, it is well to adopt aircraft wiring practice and use screened cable, with the outer screen firmly bonded down at as many points as convenient, between the rotary converter and the battery.

Filter Unit Construction

The circuit of the filter is shown in the diagram but, as is often the case, there is rather more to it than just the circuit. To start with, the whole must be well screened and an Eddystone 650 diecast box is ideal for the purpose. The components need to be fairly small to get them all comfortably into the box but otherwise the choice of parts is not critical.

Insulated condensers are to be preferred for C1 and C2 instead of the type with the metal can connected to the negative pole, since in the case of most automobile installations, the positive side will be earthed, as is assumed and indicated in the diagram. This does not apply of course to the HT condenser, which may be of the metal can type bolted directly to one side of the box.

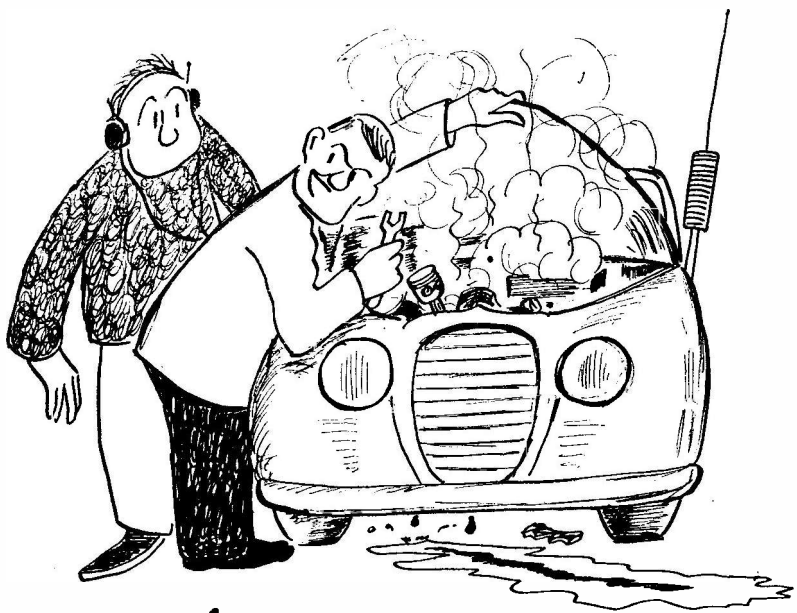
Choke 1 is the only really tricky component. It must have a low resistance, yet offer as much impedance as possible to "noise" voltages. A small surplus choke (iron-cored) which shows a low DC resistance is worth trying but, failing success in this direction, the choke will have to be made up. Any available bobbin of convenient size—say up to 1 in. or 1½ in. across the maximum dimension—and an iron core to go with it, the whole to be of a size which can be fitted into the available space, can be pressed into service. For a drain of up to two amperes, representing heater current only (and often much less than two amperes where valves with 0·1 or 0·15 amp. heaters are used), 20 gauge enamelled wire is suitable. With six volt heaters and higher currents, it may be desirable to go one gauge thicker, to 18g., to reduce voltage drop as much as to carry the current. The bobbin is simply filled with the wire, the ends being taken to well-anchored terminations.

The choke in the HT side is a normal component, again chosen to fit in conveniently but bearing in mind the current which has to be carried. The inductance should be as high as these other factors will permit.

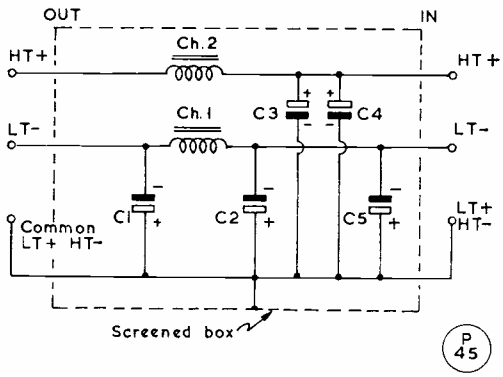
All components should be firmly fixed, using shakeproof washers under all nuts. Leads are brought out to small terminal blocks, one on each side of the box, clearly marking them "In" and "Out." The box itself is firmly mounted in direct contact with the metalwork of the car, the lid fitted in place, and leads run from the terminal blocks as required.

Subsequent Attention

Depending on the degree of freedom from noise achieved by the installation of the filter, attention can be given elsewhere. One major offender is the dynamo and from the armature side to frame can be fitted suppressor condensers. A single 0·5 μF may suffice but, to make sure, it is better to take a piece of resin-bonded board (Paxolin) and on it fit three condensers alongside each other—one of ·002 μF moulded mica; one of 0·5 μF paper; and



". . . . Cor, lucky it's not the generator — only a piston through the block . . . ."



Circuit of the unit described by G5JU. Values are: C1, C2 25 μF, 25v. electrolytic; C3, 8 or 16 μF elect., 350v. working; C4, C5 .005 μF disc ceramic. The chokes Ch.1/2 are discussed in the text. The unit is built into an Eddystone screening box type 650, and is completed by two three-way connectors for input and output leads.

one an 8 μF electrolytic, observing correct polarity with the latter. The ends are paralleled, one side going to earth (the car chassis), and the other to the dynamo output terminal. Care should be taken to see that insulation is adequate under all conditions.

Small suppressors in the form of disc ceramic condensers of ·003 or ·005 μF, fitted across the terminals of other electrical items will help to reduce any noise produced when these are in operation. On no account should suppression of the voltage regulator be attempted since external fittings are likely to disturb its operation.

AN UNUSUAL SOURCE OF NOISE

The writer recently came across a somewhat puzzling case where considerable noise, not to be accounted for in the ordinary way, became evident when some receiving equipment was switched on. The equipment formed part of a mobile installation, the performance of which was obviously suffering. Tests with an AC mains power unit again caused the noise to show up, indicating that the source was not peculiar to the mobile set-up, for example a defective power unit.

The fault was eventually traced to one of the leads in an interconnecting cable. As the reader will probably have found for himself, the quality both of the copper and of the tinning in strands of flexible cable varies enormously. Some wires take solder readily and easily, but other samples resist and are difficult to solder properly.

In the case quoted, the wire was of the latter variety and some strands at each end of the cable had not taken solder evenly, leaving some strands more or less free. Further, the free strands at one end were not the same as those at the other end and, with the poor contact between strands along the length of the cable, a resistance having a random variable characteristic had been formed. Since this particular lead was carrying an ampere or two of low tension current, it proved to be a vigorous source of noise! Also, of course, the voltage drop along the wire was greater than it should have been and it was this factor which led to the falling-off in performance.

The moral is evident: When dealing with flexible multi-strand leads, the ends should be well cleaned, firmly twisted together and thoroughly tinned before soldering to a tag, socket or other part.

For Mobile Rally Calendar — see p.44

THE ENCOURAGING NOTE

The following is from a recent letter to the Editorial Dept.: "... I have been a very devoted reader of *Short Wave Magazine* ever since I learned what Amateur Radio was. I came to regard licensed amateurs as the gods of the radio world, who stood in a seemingly unattainable position . . . now, four years later, thanks to the sound knowledge obtained by reading *Short Wave Magazine* and listening to the experienced radio amateurs in this district, I am very happy to tell you that I have succeeded in gaining the necessary qualifications and have just received my transmitting licence, the callsign of which I am sending for the New QTH section . . . thank you very much." The reader concerned will not mind us adding that he was only 14 years of age when he first started taking the *Magazine*.

G.E.C. HIGH FREQUENCY SEMI-CONDUCTORS

At the recent Physical Society Exhibition, the G.E.C. Semi-conductor Division showed a number of interesting items, including the SVC-11 transistor as a multiplier to a frequency of 2·6 kilomegacycles; an 8 mc 2-watt crystal controlled transmitter; a 4-transistor HF receiver; and an experimental ring counter circuit using a tunnel diode.

IN REPLY TO MANY REQUESTS—

The only authority for the issue of U.K. radio amateur transmitting licences is: The Radio Services Dept., G.P.O. Headquarters, St. Martin's-le-Grand, London, E.C.1. The conditions under which licences are granted, and the requirements for a licence, can be obtained on application. The examining authority is the City and Guilds of London Institute, 76 Portland Place, London, W.1, by whom past question papers (6d. each for the last three years) and the syllabus for the Examination ("Subject No. 55," which must be quoted) can be supplied.

QSL CARDS OF YOUR OWN

PHOTOGRAPHIC REPRODUCTION OF PERSONAL DESIGNS

W. E. Bramham (G3OPI)

The writer having recently acquired his "ticket," immediately became interested in having a QSL card, and it was soon apparent that a good QSL card could be expensive to have done professionally—so it was decided to explore the possibility of producing the cards easily and quickly by some photographic means.

A close look at Amateur Radio reveals that here is a hobby embracing many hobbies, with the participant extracting full enjoyment from each and every phase—whether it be construction, actual transmitting, listening, designing mechanical and electrical installations, or taking part in social activities.

One facet of the hobby which gives pleasure to most (there are exceptions, of course) is the arrival of QSL cards; here indeed is actual and interesting proof of stations worked, or, to the SWL, that rare DX confirmation. Of course, these cards are most necessary when striving for an award. Most amateurs and SWL's are extremely proud of their cards and visitors are at once attracted to the display on the shack wall, the rare and the unusual card being given prominence. Apart from the various call-signs, the most noticeable feature is, that with very few exceptions, the designs vary considerably and it is quite evident that some original thought has gone into many of the cards. Most amateurs are likewise aware of the kind of card they would prefer, but may have been deterred by the expense. It is surprising how many radio amateurs are also adept at photography to a varying degree. To them the writer suggests investigating the possibility of making their own QSL's to their own original designs, and printing them off in hundreds or even thousands by photographic means.

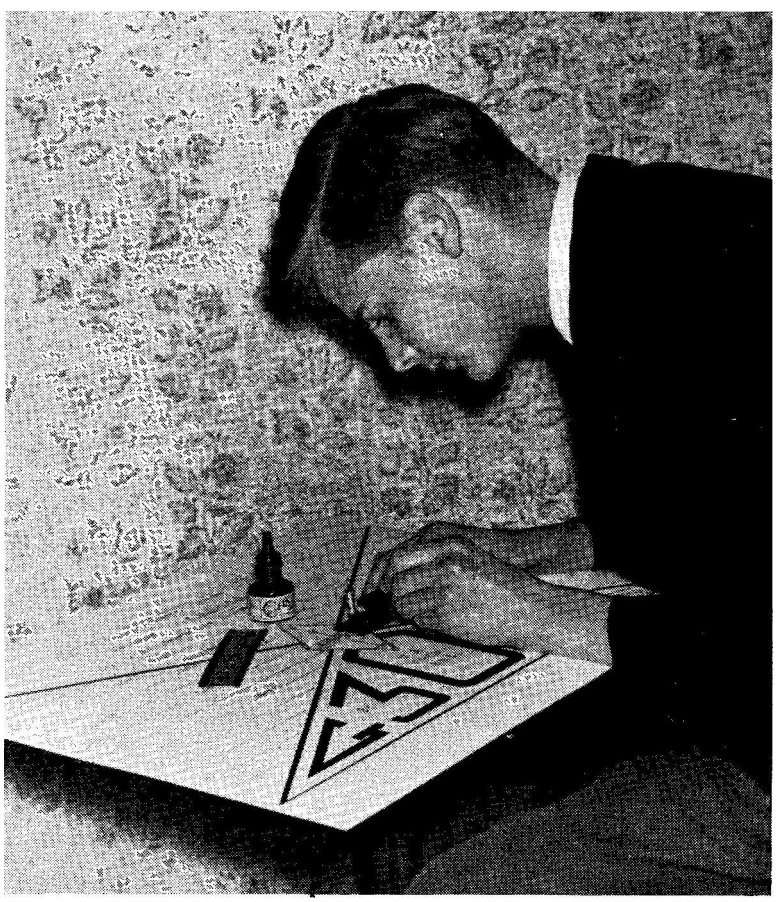
The Method

The main requirements are a camera, preferably 3½ in. x 2½ in. format, capable of focussing to at least 5 feet, and an enlarger capable of enlarging the resultant negative to postcard size; it will be seen, however, that the latter is not strictly necessary.

Before getting down to design and layout, the actual size of the card must be determined. A brief study of various QSL's reveals that the king-size card is undesirable for many reasons, whilst the smaller card is rather compressed and inconspicuous! It would appear, therefore, that 3½ ins. x 5½ ins. or slightly less would be ideal, and, as this is postcard size, material is readily available.

After some preliminary work on a scrap pad the design will emerge and work may be started on the layout; for good clear photography this should be of large format—the writer found that a suitable white card 25 ins. x 20 ins., as used by poster artists, could be purchased from most printers at about one shilling each. The illustrations herewith should be self-explanatory, but it should be mentioned that unless you are rather good at script or handprinting, a most useful tool is the *UNO* stencil; this is capable of producing real professional-looking printing. (*UNO* stencil sets in various sizes are obtainable from good stationers, artists' material suppliers, and drawing-office stockists.)

The design chosen may include a photograph or a cartoon; these reproduce very well indeed in the final

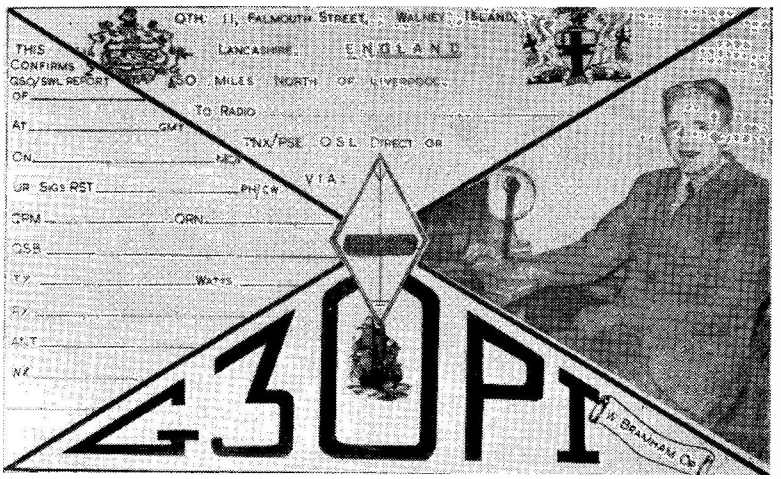


Preparation of the design for the QSL. Indian ink and stencils are used, working on stiff white card. This is then photographed down and any required number of copies of the conventional QSL card size can be taken off the negative, using an enlarger.

print provided attention has been paid to correct relative size. It should be mentioned that the lay-out should be proportional to the final size of QSL card required.

Photography

Having prepared the layout, it is ready for photographing; the card should be set up and the camera focussed to the exact distance. It will be found that the camera position should be well back in order to include a little background; this ensures compensation for any parallax error. Shadowless lighting is important, unless it is desired to obtain a plastic effect. The writer prefers a flash held near the camera lens, but if the camera has a steady support there is no reason why a brief time-exposure without flash should not be given.



The finished product, as described in the article by G3OPI. A simple photographic method of reproduction is practicable. The actual design can be to taste — see text.

Printing Off

After making the master negative and finding it clear and sharp, the printing of the actual cards can be undertaken. For this purpose, the writer prefers to use an enlarger, but for the amateur without this facility, a postcard size negative could be made professionally; a simple printing-box could then be used. The master negative should always be carefully stored away after printing batches of QSL's. The writer buys surplus material—there is a large quantity of this on the photographic market, too! It is quite possible to print 100 cards of excellent quality at less than ten shillings. Normal glossy bromide card can be used and is easily written on with a fountain pen; however, for a ball-point pen, it will be necessary to have a matt card.

Having made the master negative, one evening per month will keep the most active amateur well supplied with cards. It is the writer's firm belief that a good card attracts the card one wants! Here then is your opportunity to design your own personal QSL card, and at a considerable saving.

UA3GM, Moscow, is an actor and his QSL card has a touch of originality about it — portraying some of the characters he has played. After the theatre closes, UA3GM can be worked on 80m. CW; he runs 40 watts to a dipole.

ELECTRICAL ENGINEERS EXHIBITION

This will be opened at Earl's Court on March 21, by the Rt. Hon. F. J. Erroll, P.C., M.A., M.P., Minister of State, Board of Trade, who is himself a chartered engineer. More than 470 companies are exhibiting products to a total value of over £2 million. The Communications Feature will include a large British Railways working model, covering signalling and control equipment, and the G.P.O. will have exhibits and demonstrations covering the latest communications techniques. What is described as the "world's largest moving-coil meter," made by the famous electrical engineering firm of Nalder Bros. & Thompson, Ltd., will show the total electrical demand, expected to be in the region of 4 megawatts, during the Exhibition. This meter has a scale 20 ft. long, with a 5-ft. "needle," and it weighs more than 3 cwt. The Exhibition is open from March 21 until the 25th.

DX COMMENTARY

L. H. THOMAS, M.B.E. (G6QB)

QUITE a month, it's been, with interesting happenings of all kinds, from the Top Band DX down to the surprise openings on Ten. This is the time when the really versatile DX-chaser begins to enjoy himself. You will only hear talk of "poor conditions" from those who voluntarily restrict themselves to one mode of transmission and one band—or perhaps two.

The chief charm of Amateur Radio is its tremendous variety and the way in which it offers several hobbies within one hobby. We have the technicians and the communicators; there are few who would admit to being one or the other, and, of course, they overlap—but at the two extremes there *are*, without doubt, the non-communicating technicians and the non-technical communicators. The balanced types in the centre are those who enjoy life!

We have the HF-band specialists who despise listening to any signals from within a 2000-mile radius; and we have the happy-go-lucky LF-band types who work themselves up to a surprising pitch of efficiency in making semi-local contacts which the HF-band DX boys would find it very hard to emulate without a lot of experience.

We have the old-timers and the young-starters; some who dislike all kinds of phone; some who still refer to Morse as "that up-and-down stuff"; and, more lately, SSB fanatics who see red at the mention of a carrier-wave—to say nothing of their counterparts who have always used AM, always will use it, and think that SSB is responsible for all the splashy noises they ever hear.

9M2GW

CALLS HEARD, WORKED and QSL'd

All this does not include the very sizeable army of Mobileers, VHF specialists, RTTY experimenters, amateur TV devotees and, we doubt not, some who follow various esoteric pursuits that are not even comprehensible to the rest of us.

What makes it more difficult for your conductor is that they are *all*, at some time or another, readers of this Commentary; and those who find nothing to interest them herein will moan (even if silently) about "waste of space." This is not an attempt at an idle boast — we know from letters received that numerous amateurs to whom DX means absolutely nothing read these columns regularly, "just to find out what the other chaps have been doing."

All this adds up to one cogent reason why this feature cannot be limited to DX in the sense of "rare ones," "top scores" and expeditions to exotic places. It is a feature primarily for *communicators* of all shapes and sizes, all ages from 15 to 95, and with all powers from the milliwatt transistorites to the kilowatt commercial rig-users. We hear from them all at *some* time or another, and very little of it can be dismissed as of no importance. So — long live variety . . . not the theatrical or TV type (which, in these days, is just about as unvaried as anything could possibly be), but the variety within our own hobby. Whatever you are interested in doing, let us hear about it . . . with the solitary exception of the VHF types, who have their own feature elsewhere in the *Magazine*.

DX All Over

And so from the general subject of variety to the particular comments on this very varied month. *One-Sixty* has emerged as a good DX band for those who have the aerials (and the power), starting with a wonderful week-end at the beginning of the period (January 14/15). More detailed comment appears under the usual heading, but it may be mentioned here that UB5WF scored a " first " by working W1ME ; a whole bunch of W's worked ZC4AK for their first Asian contacts ; 5A2CV and OD5LX were also making their presence felt. Other " firsts " made this season go to the credit of HH2V/W1BB (both phone and CW) : KH6IJ/K6HXT for the first SSB contact over that path ; and, on January 29, EL4A/W1BB for the first contact between those two countries.

Coming down to *Eighty*, we have records of numerous DX contacts on CW, mostly between Europe and W/VE stations on CW at the LF end (late nights) and between Europe and ZL (early mornings). At the HF end the SSB fraternity have been doing equally well, with VO and VE joining in the G-nets as early as 2300 GMT, and quite a number of DX W's being worked in the mornings (0700-0800). W4, 5, 9 and WØ have been there as late as 0815, with the peak apparently around 0800. W6 and 7, KH6 and VE7 have been heard and probably worked by now. ZL/G contacts have also been quite frequent on *Eighty* SSB, and YV5ANS has been worked by many.

Forty has continued to give up plenty of DX in the small hours, when some of the " noises off " have died down ; *Twenty* has been an all-round DX band for the whole month with the exception of the " off days " (rather more frequent than at this time last year) ; *Fifteen* has hardly ever been devoid of good DX at the hours when one would expect it ; and even *Ten* has been wide open on the North-South path on many days, and on the East-West haul more often than one would have expected.

What more could anyone ask? If there's no DX on one band, you'll find it on another—and at almost any time of day, and on most days of the month. True, if you want the most interesting stuff of all, you probably have to give up your sleep either late or early —but that's always been one of the little troubles we have to bear. Midnight on Eighty or Top Band ; small hours on Eighty or Forty ; and early mornings on any one of the three . . . all worth while except on the particular mornings your conductor gets up, which invariably prove to be spoilt by *(a)* An aurora the night before ; *(b)* A sudden fade-out five minutes before the alarm went off ; or *(c)* A monumental power-leak due to incessant wet weather, blanketing out the weakest signals and even some of the stronger ones. Ah, well!

DX Gossip

Zone 23 showed up in a big way on SSB, thanks chiefly to UA3FE/Ø, who operated from Tannu Tuva. UAØKYA was also on, and there is a strong move in W-land to get Tannu Tuva reinstituted as a " country." A " touring rig " (SSB again) is said to be ready to go on the rounds of UM, UJ, UI, UH and suchlike. Franz Josef Land is active once again, the calls emanating thence being UA1ZEA and 1ZEC.

F9QV/FC also showed up on SSB and turned the band into a madhouse for quite a while. Europeans never stopped calling him, even when skip was such that they couldn't really hear him . . . KH6DEL and 6EHC were on from Kure Island, which is nearer to Midway than to Hawaii ; they were supposed to have been allocated the call KK6USN, but some of the operation was just plain KH6DEL, unless we are mistaken . . . VE7ZM and MP4BBW are due to be on from British Phœnix Is., SSB, starting on or about March 25 ; calls will be VR1W and VR1Z . . . VK8TB still hopes to operate from Timor, CR10 . . . VP9L is said to have another trip cooking, somewhere in the Caribbean.

Laccadive Islands DX-pedition, VU2NRM—this one is first on, then off, then on again. We can't cope! If their latest date of February 10 was successful, well, fine . . . if not, you may find them in March.

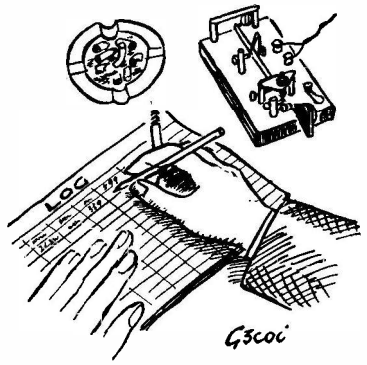
It is said that Sir Edmund Hillary's next expedition in the Himalayas will be equipped with a KWM-2 and will be using the call 9N3PM, keeping skeds with the 9N1 boys . . . G6ZY duly showed up on SSB from ZB2I towards the end of January, and was in great demand ; he promises another trip—perhaps next month.

5N2GUP is looking for contacts on 7 mc, around 0630 GMT . . . 5N2PJB is on CW and SSB, 14 mc . . . KG4 remains a rare spot for most, but there are at least eight active stations there, all covering 14 and 21 mc, and some 7 and 3·5 mc as well . . . VR6AD has been active from Pitcairn, and is believed to be ex-ZL1JT . . . LAØB, said to be on Bouvet Island, was dismissed last month as a phoney ; it now appears just possible that he might be genuine. No reliable info as yet.

W6AM (Long Beach) is right back on top of the DXCC list with 304 " mixed," various cards having turned up . . . and his score on Phone is now 291.

5A2CV tells us that he *is* active on Top Band, but only with 10 watts . . . 6O2AB (ex-VQ6AB) writes to say that he is leaving for the Trucial Oman States and will be an MP4T for perhaps as long as eighteen months. 6O2GM will be keeping the flag flying in the Somaliland Protectorate.

G3NOF (Yeovil) reports that the prefix for Senegal has been changed from FF8 to 6W8—but we haven't heard it on the bands as yet. However, SWL C. N.



SSB DX WORKED

14 mc Band

G3NWT: CT2AH, EP5X, ZE6JK, ZS3AD, 5N2PJB.

G3NOF: CN8HX, EA8CT, PI1LS, SV1AB, VE7ZM, ZS3E.

MP4BBW: KM6BU, 6BV, KW6CV, KR6MD, OY7ML, CE5EF, CX2AX, CP5EA, TI2HP, KC4USV, KG6AJT, 9N1SM, 9M2GA, 5N2PJB, VQ9JER, K6CQV/KS6, FB8CM, ZS7P, HS2A, CR9AH, DU1SA, TG9AD, UA3FE/Ø, YS1MS, YN1TAT, KC6AQ, 6BH, 6UZ, VKØRT, ØVK.

G3BID: W4PSU/VO1, CX2CO, HV1CN, EA8CT, ZB2I, UR2AT, PY2CK, 4AS, UA1DZ, MP4BBW.

21 mc Band

G3NOF: CE3RC, EA8CT, KP4ATU, OA4BR, VQ2WM, 5A3TX.

G3BID: VE's, W's, KG1FS.

CW DX WORKED

14 mc Band

G3LPS: JA8AH, F9UC/FC, KH6DGL UAØAZ, SM2AZR/9Q5, 5N2GUP, VQ8HO, KW6DG, VQ5IG.

G5BZ: YV4AX, 5AHS, 5ANT, KL7's, VEØMC, HK7ZT, SM5KV/9Q5, SM5BUG/Katanga 5N2IND, 2PJB, KH6's, UAØKYA, TI2PZ, VR2DK.

G3HZL: PX1AI, FB8XX, KW6DG, VK9XK, EP1AD, UAØ, KL7, ET2, 9Q5, TI, UL7.

G2BLA: HZ1HZ, UL7FA, UAØAG, ZC4.

G2DC: ZD2KHK/NC, UW9AC, EP1AP, JA1-7, VU2BK, 2KT, 2XG, 2RM, 2JA, ZS1-9, ZD9AM.

G3OQK: OY1R, TF5TP, VS9AAC, UAØKAR.

21 mc Band

G2BLA: VK5LZ, 5N2GUP, KP4, VE, ZS.

G3HZL: VQ1B, 7G1A, EP2AF, FF8CW, ZA1AB, HKØHCA, ET2, VK6, YV UL7.

G5BZ: 5N2GUP, W5, 6, 7.

G3LPS: UAØKAR, KW6DF.

G2DC: CE1AD, HK5CR, 7ZT, HM1AD, KR6RM, KZ5MQ, UI8AD, UL7FA, XE1VP, VU2BK, 5N2DCP.

AM PHONE DX WORKED

21 mc Band

G3NOF: HC1KA, KG4AT, KP4AVQ, VS9AAC, 9U5VS.

G3BHJ: EA6AR, 6AY, HZ1AB, KG4AO, KP4AKB, VP3RW, 6WR, 9AK, VQ9AM, YV5AGM, ZD2BRG, 9G1CC.

G3NWT: KR6DO, VP6JK, VK6YL, ZL3UY, AP2MR, ZS3R, VS9MB, FQ8HL.

G3NAC: VS9MB, VS9AAC, 9APH, MP4BBA, 4BDC, 4BCZ, VQ8BM, PY, VQ2, ZE7JD, FF8AA (Tchad), 6W8CE (Senegal), VU2BK, 9G1CC, 5N2BRG, 2ATU, 9K2AD, 2AZ.

G3BID: FF4AH, K1AVC/MM, EL1I, PY5GA, ZS1AB.

Rafarel (Poole) reports hearing 6W8CU and 6W8AP, the former FF8CU and 8AP; and he warns that when the calls are spoken in French it's mighty easy, unless you are prepared, to imagine you are hearing XW8's.

ZD2KHK/NC (North Cameroons) thinks he will be operating until July 1, as the U.N. plebiscite will not be ratified until then; and he asks stations to call either 5 kc up or down—*not* on frequency, please; 1600 - 2000 GMT. 14 mc only.

PX1EP should be on during the first week in May, operated by an EA2 . . . FF8AU says his new call will be 6V8AU *(not* 6W8) and that he will be on SSB shortly . . . Fernando do Noronha, the home of PY7LJ, will also be represented by PY7SA and '7YS for about ten days (but that may be all over by publication date).

Cayman Islands are now "re-admitted" for DXCC claims, and will be there during March in a big way with the call VP5BH.

Danny Weil and *Yasme III* are still in San Diego, future movements uncertain . . . Baja Nuevo (HKØ), whence he worked as HKØAA, is now accepted for DXCC . . . Malpelo and Laccadive expeditions still "on" but no dates . . . HC1ARE expects to work from the "interior jungle" of Ecuador, perhaps with a special prefix for WPX hunters . . . LAØB—that Bouvet Island doubtful—is said to beam from the North-East! . . . FF4AL (Box 1712, Abidjan) is on 14 mc—he is the former EL3A . . . KH6ECD has been on from Kure Island . . . ZD9AM (Gough Island) showed up recently, with ZD1RM as M.C., but the frequency was immediately overrun with W's and apparently he didn't make a single QSO. (For all the gen. in this paragraph, thanks to G2DC.)

G3LPS says he heard 9V2AA on 14 mc. giving name as Basil and QTH as New Republic of Vesteras ?? The W's were going flat out for him. Anyone know any more about this one?

Top Band DX

The more exciting goings-on in the way of real DX have already been summarised. January 15 was undoubtedly the best morning this year; January 22 was very poor, with the 29th a little better and February 5 and 12 rather down again.

EL4A, UB5WF, OD5LX and 5A2CV are four calls guaranteed to make the band interesting even if the East-West path is poor. Add HH2V and KH6IJ, with a W6 or two, and the thing is really getting big—but, unfortunately, not for us in the U.K.

Among the G's known to have got across on the big morning (January 15) are G3CHN, 3ERN, 3MBN, 3NFV, 3PU, 6BQ and 6HB, all of whom worked either W1BB, W1ME or W1PPN.

G3NFV (Ashtead), one of the lucky ones, heard five W/VE stations that morning, but only W1BB for a few minutes the following week-end. G3ISG (Bristol) heard three of them on January 29, and asks us to appeal to all operators not to call CQ at the bottom of the band—the W's wouldn't hear them, anyway. *Call* from 1825 to 1835 kc, *listen 1800-1825.*

SWL Peter Day (Sheffield) heard eleven W/VE stations on January 15, one only on the 22nd and eight on the 29th. On February 5 he was pleased to log EL4A working G3MBN and, later, on 1981 kc working G3NEO and peaking at 589! This one gave Peter his 20th country on the band.

SWL P. G. Martin (Durham) logged UB5WF, EL4A, HB9QA, W1, W2 and W8 on February 5. DL1FF was S9 plus, stronger than any of the locals!

Late Flash: February 12—very poor conditions on the East-West path, but UB5WF, with 578 signals, raising nearly every G on the band during the time he was on . . . and G3FGT (Birmingham) has worked UI8KAB on this band! He also gathers that EP5X will be on, 1992 kc. With ZC4, OD5 and such, G3FGT has now worked 34 countries on Top Band, but still needs a ZL!

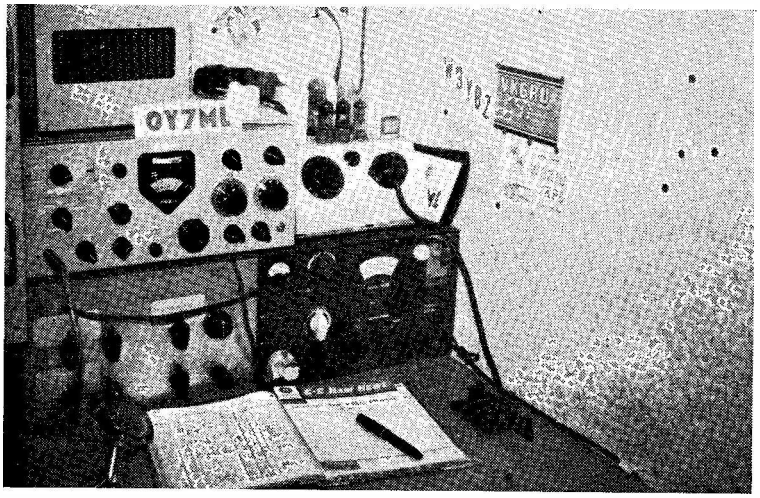
Top Band Routine

The long-haul stuff is very exciting, but can only be indulged in by those with *(a)* Very good aerials, and *(b)* Either heaps of enthusiasm or chronic insomnia,

so the mainstay of the band remains the enormous traffic in medium-distance contacts — GDX and inter-European stuff. When the WABC Certificate was introduced, in May 1952, it gave quite an unexpected fillip to GDX, which never seems to have died off since that time. Surprising numbers of people are now county-conscious!

G3LIG (Canterbury) and G3FUN (Faversham) are visiting Scotland from April 1-8, and will operate from Fort William (Inverness). They will actually be on all bands, but the major source of interest to our readers is probably the fact that One-Sixty will take its turn—they have a long wire for the job.

GI3KYP and GI3HXV are also planning a sortie, to put the sought-after counties of Northern Ireland on the map. They wrote to ask which counties would be most appreciated, but this we found it hard to say. Their expedition will take place over a week-end, from a different county each evening from Friday to Sunday. Operation will be CW, either /A or /P.



OY7ML, at Thorshavn in the Faeroes, runs a Collins KWM-1 and can be worked on 40 and 80 metres.

P & Z TABLE

STATION	PREFIXES WORKED	ZONES WORKED
	CW Only	
G2DC	435	40
GI3NPP	382	40
G3HZL	366	40
G3WP	362	36
G3ABG	336	40
G2BLA	322	39
GW3CBY	255	23
G3IDG	230	28
G2BP	206	30
G3LZF	187	29
GW3MLU	176	30
G3OQK	105	12
	Phone Only	
G3DO	621	40
MP4BBW	439	40
GB2SM	370	37
G3LKJ	347	38
G3MCN	324	38
G3NWT	306	38
G3BHJ	306	37
G3NFV	291	37
G3ABG	261	32
G3HZL	138	26
G2BLA	106	21
GW3MLU	103	19
G2FQW	99	6
G3WP	80	25

Yet another Top Band expedition is planned: G3MDR/G6UW, with the Cambridge University Wireless Society trip to the Isle of Man, will be signing the rare GD3 prefix during April 5-12; 160m. schedules can be arranged through G3MDR, M. Hallett, Emmanuel College, Cambridge.

G3NVO (Middlesbrough) worked HB9X and UB5WF for new ones; he heard some of the W's, and was pleased to get his card from ZC4AK.

G2CZU (Bath) joins the ladder again with high scores both for "mixed" and Phone Only. On CW he has raised two new Scottish counties—not yet confirmed—but he still badly needs a GM4 and GM5 for his WAGM award.

G3NNO (Leeds), still using a 19 Set, raised GM3OM, GM3NUU and OK3EK. He has been hearing the real DX (W1BB, ZC4AK and so on) but hasn't yet worked any.

Grafton Radio Society's annual Top Band Contest will be run this year on April 8 (CW) and 15 (Phone), from 2230 to 0100 BST in each case. There is an Open Section for all U.K. amateurs; the scoring is simply by one point per contact, total being the sum of the CW and Phone scores. Exchange RST (or RS) plus serial number starting anywhere between 001 and 100. Logs to G2CJN, 145 Uxendon Hill, Wembley Park, Middx., not later than April 26, with the usual signed declaration. Certificates are awarded to the top three scorers.

G3ISG (Bristol) worked GM3KDT (Glasgow) and GI3MCZ (Fermanagh) to boost his score (phone only) to 72/74, making him the highest phone scorer at present on the ladder, which he has just joined.

Eighty Metres

We little thought that the phone DX on Eighty would overshadow the CW, but that is what is happening right now, thanks to the SSB gang in the 3780-3800 kc sector. DX stations worked up there include the following: VE1, 2 and 3; W1, 2, 3, 4, 5, 8, 9, Ø; YV5ANS and 5HC; KH6; ZL1 and 2; EA8BA, 4X4DK, KG4AP, OY7ML, ZC4AK. W6 and 7 have been heard, and so have a gaggle of VE7's all trying to raise Europe but not quite coming up to intelligibility.

G3FPQ (Elstead) has been one

of the star turns at this end, using a 62-ft. vertical for the purpose. He has had 87 contacts outside Europe, on Eighty SSB! Other regulars have included G2HX, G6LX, G6VX, G6QB; but many G's have come up on the odd occasion and worked some of the DX without much trouble. At 2330 one night two VE1's were on 3795 kc and practically every G who showed his nose on the frequency got "5 & 7."

G3NOF (Yeovil) reports working VO1, W1, 2, 3 and 4, and ZC4AK —all SSB. SWL Peter Day logged TI2ES on AM (S9 on 3795 kc at 0330); and, down at the other end, his CW catch included PY7LJ, VP7BP and KV4CI, all between 0700 and 0730.

G3FGT, sticking to CW, has raised UM8FZ, UI8AP, KV4CI, VP2AY, ZL4AW and all districts U.S.A., amounting to 30 States. This was by spasmodic operation only, and he says that all you need is good selectivity and 1000-cycle ears!

G2DC (Ringwood) can raise W and VE as early as 2200, and they don't go out until the ZL's arrive, around 0800. He also worked HZ1HZ, PY7AN, UA9DN, PY, ZL, VE's and W's.

Forty Metres

The DX on Eighty has almost overshadowed *Forty* this month, but there's no lack of interest here, either. G3LPS (Blackburn) raised UAØKSB, LA8FG/P (Spitzbergen), PY1LV, VK5LZ, HZ1AB, OD5LX, UF6, UO5, UA9 and W, all on CW.

G5BZ (Woldingham) collected TF3AB, PY4ADC and 4AXN, UAØAZ, KV4CI, VE's and W's. G3NAC (Bourton-on-the-Water) made it with YS2ADE, UAØSL, PY7JO, VE1YF. G3HZL (Isleworth) lists ST2AR, FA, KP4, HZ1HZ, 5N2 and VQ4, while G2BLA (Welwyn) mentions FA3DU, UT5CC, W2 and PY4.

SWL Peter Day was logging W6's over the long path at 1500-1600 GMT; later in the evenings he heard VK5LQ, UA1KAE (Antarctica), FA9UO, OX3WE, VK3ADB and OA4FM.

VK5JE (Somerton Park) writes to say that he has been almost exclusively on Forty for the last ten years, and is most anxious to work Europeans at 2000-2130, also at 0800-0830 GMT. He runs 50 watts and has a curious aerial—a folded dipole with the centre 33-ft. vertical and the two ends horizontal. VK5JE used to be '5JC in pre-war times, and earlier still (1926) was A2JC.

G2DC has put up a ground-plane for Forty, and the time spent on the band has paid off well. Worked: HK3AH, all W districts including KH6 and KL7, VE/VO, OX3NK, HZ1HZ, UF6ZO, PY, LU, VK, ZL—yes, 40 metres!

The HF Bands

All the excitement on *Eighty* and *Forty* need not lead one to think that the HF bands are dying on us. *Twenty*, as usual, has carried the bulk of the CW and SSB traffic, and although its opening hours have resembled those of the shops, they are now lengthening nicely.

Fifteen, as always, has been the most popular band for AM phone, but SSB and CW have been quite excellent at times. G3NAC comments on the queer changes of path noticeable to those with rotaries; for half an hour during the ARRL phone contest the East Coast W's were only audible with the beam South-East! On one occasion 9G1CC was only S2 with G3NAC's beam looking South, but S9 looking West. Then one day he worked VQ8BM, and within 3 kc all the following were audible: 4S7SW, 9G1BQ, HI2JSM, OD5AB. Finally, PY7VGN was worked at 2000 GMT with the beam North-East—completely inaudible when looking South-West.

Ten certainly merits a paragraph on its own. If you want a nice quiet DX QSO, it's still the band. G3NFV logged W6HDN and W5JTB on phone with heavy flutter, at 2215 on February 4; next day the band was quite dead. G3BHJ (Norwich) worked HC2DB, KG4AK, VP6PV and XE3AF, all on AM. G3NOF raised LU6DJS and VP6AM on AM, KP4ATU on SSB. G3BID worked ZE1JQ on AM, W's on SSB. G3NWT raised ZE2JA, ZC4MO and VS9MB for his first G contact.

The DX on 14 and 21 mc is summarised in the accompanying lists, on p.26.

Miscellany

G3DO (Sutton Coldfield) has at last made his 40 Zones on phone (he collected his CW WAZ back in 1947). UA3FE/Ø (Tannu Tuva) filled the gap—on 14 mc SSB.

G3OGO (Croydon) harks back to the debate concerning Prefixes *versus* Countries. He points out that the Prefix scheme does help those who are not in the super-DX-working class to compete; while the QRO man is winkling out his VR3, the patient QRP

TOP BAND COUNTIES LADDER

(Starting Jan. 1, 1952)

Station	Confirmed	Worked
G2NJ	98	98
G6VC	96	96
G3APA	85	90
G2CZU	83	85
G3NFV	75	78
G2DF	75	77
G3ISG (Phone)	72	74
G3NNO	70	82
G3FS (Phone)	69	72
G2CZU (Phone)	69	69
GM2HIK	68	74
G3NVO	67	79
G3NBT (Phone)	61	65
G3NMZ (Phone)	55	58
G3NJQ	55	56
G3NNF	54	59
G3OGY	53	63
G3NPB (Phone)	52	58
G3NNF (Phone)	47	49
G3NAA (Phone)	46	59
G3LZF	42	61
G3NXQ	42	52
G3DRN	42	50
G3IDG	41	45
G3OHX	40	59
G3NNO (Phone)	38	55
G3NOW (Phone)	35	41
G3OIK (Phone)	27	41
G4JA	22	29

(Failure to report for three months entails removal from this Table. New claims can be made at any time.)

chap can possibly find himself a DL5 or an SP7 that the other fellow has overlooked.

G3NWT (Sandiacre) is putting up a 30-ft. tower, one side of which is made re-entrant, so that a rotating mast can be hauled up into it with a Quad attached, at minimum height; then, once in the bearing blocks which open to admit it, the mast can be hauled upwards with tackle to any desired height. He says: "This is a beautiful idea and I will let you know next month what went wrong." We hope nothing does!

SWL D. Evans (London, N.2) tells us he is the first winner of the "Heard Lion's Head Radio Club" award, issued by a number of ZS1 stations who are members of the club; details from Box 1167, Cape Town.

SWL D. Shucksmith (Barton-on-Humber) decided to listen on *Eighty* with his R.1155, expecting to hear little or nothing, but was amazed to log ZL1AAX, ZC4AK, 4X4DK, OY7ML and W's—all on sideband (with an R.1155!)

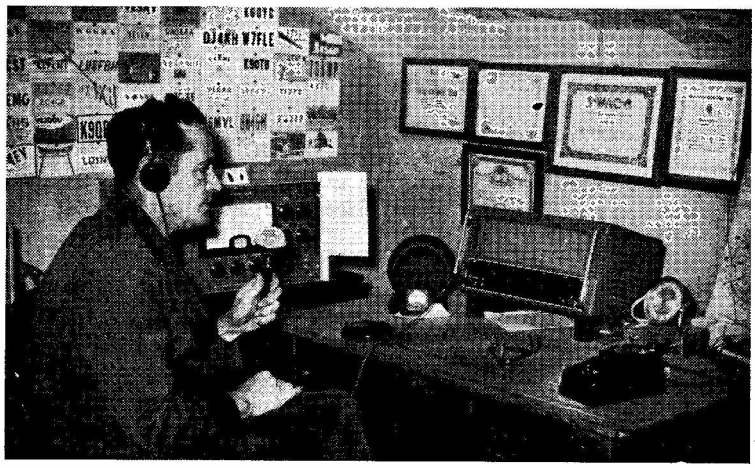
Back on the prefix theme, G3HZL remarks: "Doesn't anyone realise that these UW's, UT's, DJ5's and the like are new boys and very grateful when some of the more experienced hands give them a QSO? We were all at that stage once."

AP2MR asks *(via* G3LGL) that his QTH be shown here, as he has great difficulty in getting it over the air. It is: AP2MR, Pandik, Haripur Hazara, Pakistan. And AP2MR would particularly welcome QSO's with Nottingham.

L F BANDS TABLE
(Countries Worked)

Station	*3.5 mc*	*7 mc*	*1.8 mc*
G2DC	91	125	12
G3IGW	51	95	19
G2BLA	39	68	9
G4JA	38	56	6
GW3CBY	26	44	13
G3NNO	22	20	10
G3IDG	15	20	9
G3DRN	13	40	9
G3NFV	12	26	11
G3NPB	8	21	9
G2FQW	4	33	1
G3OQK	4	20	7

This Table derives from Countries Worked. Order is based on band in first column, changed monthly.



Now landlord of the "New Inn," Baschurch, Nr. Shrewsbury, Salop, G4JA was so busy attending to his customers during the Christmas-New Year holiday period that he had no time to get on the air. Licensed originally as G2JA (1929-'36), he started up again in May 1959, since when he has worked 128 countries with 110C confirmed, using a K.W. Vanguard transmitter, Eddystone S.750 receiver and an end-fed long-wire; with this equipment he is active on all bands Top to Ten, and is a keen CW man.

Expedition to GD

Members of the Cambridge University Wireless Society will be operating GD6UW from Douglas, I.o.M., during April 5-12, on all bands 80-10m., AM/CW, using a Labgear LG.300 and an Eddystone S.680X, loaned by the firms concerned. Operators will be G3MDR (who is handling the Top Band assignment, as already mentioned), G3NHL, G3OBT and G3OSU; they may also use their own call-signs, prefixed GD. All QSL'ing will be through G6UW—*QTHR.*

Heading Photograph *(p.24)*

9M2GW, Cpl. E. J. Booth, 2 Det. R.E.M.E. Tech. Servs., Johore, Malaya, says he has always been able to get the *Magazine* through a local bookshop. He started up there in June of last year with a K.W. Vanguard which was "shipped out in A1 condition." After having had a CR-100 acquired in the bazaar, the receiver is now an Eddystone S.680X, which 9M2GW describes as a first-class job. His aerials are a G8KW trap-dipole, and a Cubical Quad. With this equipment, 83 countries have been accounted for in about 9 months, with many U.K. stations worked. 9M2GW expects to be DL2GW later this year, after a spell of home leave. And SWL readers may like to know that he welcomes their reports, which are promptly QSL'd.

The Ex-G Net

More and more VO, VE and W stations are being recruited into the Ex-G Net *(see* p.641, January issue). For the certificate which they offer (six contacts with members, spread over four different call areas of U.S.A. or Canada), forward cards to G8KS, who is the European representative. The regular net meetings are on 21445 kc, every Sunday at 2100 GMT. Membership is open only to licensed amateurs born in the British Isles and at present domiciled within the U.S.A. or Canada. And it is surprising how many there are.

Non-Cubical Quads

Having studied as many aspects of this suggestion as we could round up, we have come to the conclusion that it is *not* worth pursuing. The chief objection, and a very formidable one, is the near-impossibility of finding out, in certain cases, which "Quad" a

station is in, without recourse to an excellent atlas, a gazetteer and a specially marked-up map.

Even then, as G4JA remarks, there must be some people with a geographical position of, say, 30 deg. N., 30 deg. E. *exactly* (on the scale to which we work). With four different aerials, such a chap could put himself in four different Quads. This, of course, is not to be taken too seriously—but unless there is a great volume of demand for this scheme (which at present there is *not)* we feel like declaring the debate closed.

Personal Column

Thanks to the many readers who have sent in details of their gear, their likes and dislikes, and their chief interests on the air. Here is a selection, some being held over for future instalments:

We start with one of the very newest! Andrew Fairgrieve, of Eccles, Lancs., was recently licensed as G3OQK, and he is already on all bands from Fifteen to One-Sixty, trying to work all and sundry. He has a completely home-built Tx (doesn't count bought VFO's as playing fair) and runs 40/50 watts CW and phone, with an 807 PA. Aerials are 132-ft. end-fed for Top Band and Eighty; Forty-metre dipole for Forty and Fifteen; Twenty-metre dipole. No rare DX yet, but 45 countries worked, and 15 counties on Top Band. QSL's only just beginning to arrive. More interested in CW than phone.

G3BHJ (O. J. Russell, of Norwich) has a home-brewed Tx running 75 watts to a pair of 807's, using Labgear wide-band couplers and a pi-tank for 80-10 metres. The receiver is an SX-11 (1936 vintage) with a crystal converter for 10, 15 and 20 metres. Main aerial is a Mosley TA33-Jr, backed up by a "faithful Zepp-fed 136-ft. wire for the LF bands and general reception."

G3NAA (Chelmsford) has a completely home-built station, starting with a 15-valve double-conversion superhet. The Top Band transmitter runs a 6AC7 VFO, 6AG7 buffer and TT11 PA, plate and screen modulated. A home-built 1-in. monitor 'scope is available, and the aerial is 160 ft. long and 30 ft. high with an A-frame mast. Activity is almost entirely on Top Band, with an all-phone WABC as the objective.

Robin Sykes (G3NFV), of Ashtead, uses a home-built ten-watter and a CR-100 with a half-wave aerial on Top Band; for the HF bands he has a DX-100U, an AR88 and a beam, or the long wire; his main interests are contests and "DX in any form," but he enjoys ragchews as well.

Don Walmsley (Isleworth) is G3HZL, and he runs a 1957 Minimitter, slightly modified, but also has a B.2 and a very small Tx/Rx for 7 mc only, using a 6AQ5 CO, receiver being a four-valve superhet with RF stage. Other receivers are a much-modified HRO plus BC-453, the B.2 Rx and a CR-300. An El-Bug and a straight key point to the fact that the main interest is CW. Aerials are a 68-ft. end-fed wire for bands from 28 to 7 mc; for 3·5 mc a further 60 ft. is connected in series. Chief interests are DX-chasing and ragchewing, also "tearing equipment to pieces and building it up again." Don is still "carrying 7 lb. of plaster around," so all-night sessions are too tiring—normal hours are 0930-1300 and 1500-1700.

E. G. Allen (Wimbledon) is G3DRN, and he uses a Bendix TA-12B for the LF bands and a Sender 36 for the HF. The receiver is a CR-100, and the aerial "90 ft. of wire." He is mainly interested in CW working, but does have a plate-and-screen modulator and even uses it sometimes! Starting this month, G3DRN has climbed on to both the LF Bands and Top Band ladders.

G3BID (London, N.W.3) is a Viceroy owner, but he also uses it as an exciter to drive his old 813 final with plate-and-screen modulation when AM is wanted. He has a beam for 28 and 21 mc, a "ZL Special" for 14 mc and a vertical coaxial dipole for 7 mc—nothing in the way of a "real antenna" yet available for 3·5 mc.

Prefixes Again

Various queries from the WPX-chasers include the following: "Do MP4M, MP4B, MP4T and so on count as different prefixes, since they are different countries?" Answer: *No.* The prefix is MP4. "Does VE6XYZ/SU count as a VE6 or an SU? And, if an SU, is he different from an SU1?" Answer: *He really counts as an SU/VE6!* In other words, an SU, but different from any other SU's with different prefixes or suffixes.

"How about /MM's? Does their *prefix* also count?" Answer: *Yes*—for *our* purposes, whether or not the official WPX Certificate takes it this way, a W6/MM, an LA/MM and an SM/MM are all different.

VP3AD, of International Aeradio Ltd., British Guiana, visited W1BB recently to discuss plans for Top Band operation from VP3.

Photo W1BB

Thanks and acknowledgments for much of the news contained herein to the WGDXC *Bulletins*, W4KVX's *DX*, the *Western Radio Amateur* and, of course, for Top Band DX news, to W1BB. And thanks also to our many correspondents, who supply all the confirmation of rumours heard from afar, along with the personal touch.

Next month's deadline is **Friday, March 17,** first post; but as we have more time this month, it would be appreciated if you would try to make it *Wednesday, the 15th,* treating Friday strictly as the very last minute! (For overseas readers who correspond by air-mail, the following date will be *April 14.)* All addressed, as ever, to "DX Commentary," *Short Wave Magazine,* 55 Victoria Street, London, S.W.1. 73, BCNU.

NEW AMATEUR RADIO WORLD MAP

We are now able to offer a new map of the world on Mercator's Projection (as used in ordinary atlases), and drawn specially for the requirements of the AT station operator.

This map gives the following at-a-glance information: Zone Areas (1-40); Prefix Areas (each country has its prefix marked in); List of Prefixes alphabetically, with Countries; List of Countries alphabetically, with Prefix; Time Scale in GMT; and Distance Scale referred to latitudes.

As the projection is Mercator (unlike our *DX Zone Map,* which is Great Circle), this new *International Radio Amateur Map* does not give beam headings, nor can distances from the U.K. be obtained as accurately as with the *Zone Map.* (It is, of course, not possible to produce a single world map which will give, without calculation, both bearing and distance between *any* two points on the earth's surface.)

However, with the new *International Radio Amateur Map,* all essential information is clearly displayed, and bearings for beam headings can either be worked out from lat./long. or (for the U.K.) taken off the *DX Zone Map.*

The *International Radio Amateur Map* requires a wall-space of 29 ins. deep by 42 ins. wide. It is well printed in bold colours, on good paper, and will undoubtedly meet the large demand for a map of this nature. Published by the Radio Amateur Call Book, Inc., of Chicago, U.S.A., it is available from us at 8s. 6d. post free, from stock. Orders, with remittance, to the Publications Department, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOREST MOOR ADMIRALTY STATION

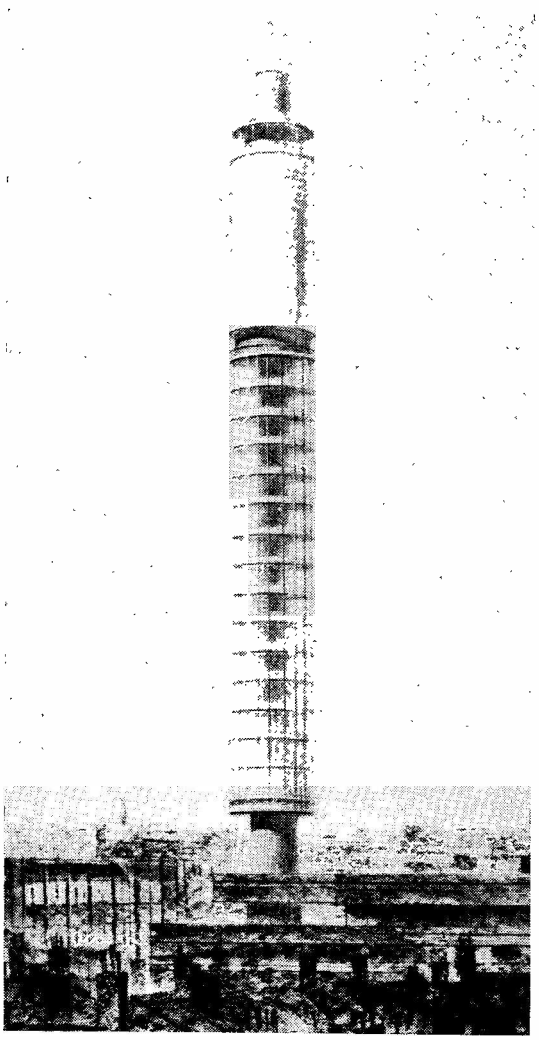
The Admiralty W/T Station at Forest Moor, near Harrogate, Yorks., is a receiving installation, the major part of the equipment being of Marconi manufacture. The receivers include the HR-13, for HF triple-diversity reception; the HR-23, an HF triple-diversity SSB type; double-diversity receivers Type HR-11; electronic aerial switching units and CW recording receivers.

NEW G.P.O. RADIO TOWER

The edifice in the picture here is an artist's impression of the new Radio Tower to be built by the G.P.O. at Museum Exchange, Howland Street, London, W.1. The mast at present on that building gives an effective height of 180 ft., and is becoming dwarfed by surrounding erections, going up or projected—the new Tower will be 500 ft., and is required to give clearance over high buildings for the microwave links now being increasingly used by the Post Office for point-to-point working, such as trunk telephone services and radio/TV channels for the BBC and ITA. The six aerial galleries will be in the upper part of the structure; this is to be 50 ft. in diameter, cased in opaque plastic material to ensure free radiation; the radio/TV and line terminating apparatus will be in bays at the lower levels. The Tower is to be open to the public, with a viewing platform at the 460 ft. level, reached by high-speed lift. In terms of circuit capacity, the Tower is expected to take care not only of present G.P.O. requirements, but also of the foreseeable expansion during the next 40 years.

TRANSISTORISED 20-WATT AMPLIFIER

The firm of R.E.E. Telecommunications, Ltd., Crewkerne, Somerset, now offer a new audio amplifier, type TA/2, fully transistorised, capable of 20 watts peak output from a moving-coil microphone (supplied), using a 12v. battery supply; the no-speech load is 0·25 amps. The microphone is fitted with a press-to-talk switch, with a gain control on the instrument panel; five transistors and one protective diode are used in the circuit. The size overall is 8 ins. by 6 ins. by 3 ins. deep, the weight is 6 lb. 10 oz., and the TA/2 is constructed and intended for mobile and portable use.



SWL • • • • • •

QUERIES, NEWS ITEMS, OPINIONS, HINTS AND TIPS — HPX LADDER — MORE SWL STATION DETAILS

GOING back to the January correspondence, *D. Evans (Denton)* started something when he referred to the net around 5·4 mc in which no one seemed to have a proper call-sign! Several readers hasten to assure him that this is not a "bunch of pirates," but a legal, organised Net for the ACF/CCF signals units in schools. *J. S. Alderton (Faversham)* was one of the first to suggest that it was to this that D.E. must be referring. *G. J. McNeill (Edinburgh)* is actually one of the operators and naturally hastens to "defend the cause." *A. H. Jubb (Bangor)* remarks that the call-signs consist of one or two numerals, in some cases followed by a letter *(e.g.* 31C, 42A). The main frequencies for the phone nets are 6910, 5205, 4030 and 2275 kc, with several others reserved for CW.

Next we come to two SWL's with what a certain broadcast programme might call "transmitting connections." *D. A. Newman (Ashford, Kent)* used to be G3DUX, but he joined the Police seven years ago and let his licence drop; he is still a keen listener, with a CR-100 into which he has introduced IF regeneration for improved selectivity; in case others want to try it, just solder short insulated leads to the grid and anode pins of the first IF and twist them together until the required amount of feedback is obtained, but be careful; you can go too far!

The second one is *J. A. Share (Plymouth),* who is actually licensed now as G3OKA, but is in college far from home and therefore considers himself an SWL except at alternate week-ends! In fact, his transmitter has not yet taken the air, but he has access to G6LV in Penryn, the home town. J.A.S. passes on the following tips to SWL's learning Morse: "Learn the alphabet straight through, in correct order, not by groups and opposites; *do not* print in block letters but try to write properly and continuously from the start . . . also, do not *send* Morse until you can receive at least 12 w.p.m., and don't go for your test until you are sure you can do it." All very sound advice, we may add.

Old Timers

P. J. Weyell (Richmond, Surrey) has been a listener since 1928, amateur bands only, and thinks it's pretty hard work these days, thanks to local "household noises," vacuum cleaners, hair driers and all. He says "Oh, for the old days, when on a Sunday morning with my 0-V-1 the G's would roll in with no QRM, crystal clear on 40 metres . . . and on 10 metres in 1947 when the band was open to the whole wide world." He now uses an AR88 and, being a shift worker, is able to listen at unusual times.

Almost qualifying as an old-timer is *Mrs. Chris Kiddell (London, S.E.6),* who has been chasing DX since 1952. Unfortunately, she is now crippled by illness but, with much encouragement from the R.A.I.B.C., she has actually become "an ardent Tx licence swotter." Like reader P. J. Weyell, Mrs. Kiddell finds the QRM situation pretty difficult, and marvels at the tolerance and patience of those who brave it and survive.

Yet another reader who dates back to before the war is *R. Patrick (Derby),* who started as an SWL in 1937, at the tender age of fifteen. He now has an SX-24 and an R.1155, and hopes to get some reasonable aerials up in the spring. He is equally interested in amateur bands and SW broadcast, as well as having a stretch of medium-wave DX listening during the winter.

Countries and Prefixes

J. L. Marshall (Gomersal) is amused at the "country-chasing and country-creating antics of the transmitting fraternity" and thinks it quite ludicrous that people will break their necks over, say, an HE a few hundred miles away while neglecting a ZL who represents the ultimate in distance. J.L.M. recommends 80-metre CW for a few thrills, and also remains very active on One-Sixty and Two Metres; he is "appalled" at the lack of CW interest among the SWL's and says "Come on, lads, get to the LF ends of those bands, put the crystal in and the cans on, and dig deep. You never know what you'll find, and it will be useful when you come to get that G3... call."

On the subject of QSL's, J.L.M. has been getting a return of about 53 per cent, but has now designed one which he thinks will be more helpful and may well bring even better results. And he particularly asks us to start an HABC Ladder for Top Band and possibly for VHF. If there's any further demand for it — we will!

K. Pietron (Wednesfield) asks how to go about logging stations, and how to send the information to them. Well, the basic details required are as follows: Station heard, station he was calling or working, Date, Time, Frequency, Signal Strength. To get beyond the "basics" and make a really helpful report of it, one might add details of other stations coming in at

the same time (from the same part of the world) and their comparative signal-strengths. Also, of course, if you hear stations calling the one concerned, but apparently not heard by him, give details. K.P. adds a complaint about the many stations who whizz through their call-signs at great speed so that "starters" like himself have no chance of identifying them.

R. Lawson (Solihull) finds that inter-G QSO's are the most interesting to listen to (especially on Top Band) because one can gather and learn a great deal from them. He also listens to DX phone and SSB, but finds that One-Sixty, Eighty and Forty satisfy his needs and listening times.

Home-Brew

A long letter from *N.C. Dove (Luton)* starts with a comment that very few of the home-built receivers listed in our occasional tables appear to be of the larger type. He himself has nearly completed a 20-valve triple-conversion superhet, and he gets a lot of enjoyment from working out the design and altering it to suit himself as he goes along. His method of construction has been to remove the top from an old chassis, leaving a half-inch border all round, and bolting a new plate in position. Then the old chassis has been cut into bits to take the various sub-units, some being bolted on as vertical screening pieces, not only sub-dividing the new chassis but also strengthening it.

He would like to see some articles on circuitry, meaning "circuits which, though correctly wired and with all the correct components, still fail to do the job they were designed for." That, of course, is a major problem. We all know that things like that happen in practice—but if they *don't* do the job they were designed for, then they are either not properly wired up, or some of the components are *not* of correct value!

HPX LADDER

(Starting January 1, 1960)

Qualifying Score now 150

SWL	PREFIXES
PHONE ONLY	
Bob Griffiths (Ventnor)	512
H. G. Shaw (Heswall)	486
J. Wooden (Kingston)	446
J. A. Share (Plymouth)	409
C. N. Rafarel (Poole)	408
D. Evans (Denton)	401
J. E. Kennedy (Widnes)	392
A. W. Neilson (Glasgow)	391
G. V. Moss (Greenhithe)	374
J. H. Roskell (Harrogate)	363
G. Brown (Bishop Auckland)	353
C. D. Barr (Harrow Weald)	305
M. T. Bland (Oakham)	300
G. E. Myers (Felixstowe)	296
R. M. Nixon (Liverpool)	293
P. Wooding (Ewell)	285
N. D. Gordon (Swansea)	255
M. Phillips (Theydon Bois)	241
W. J. Atherfold (Southwick)	241
A. Warburton (Aldershot)	235
I. K. Gurney (Chalfont St. Peter)	235

SWL	PREFIXES
PHONE ONLY	
A. Griffiths (Solihull)	232
D. Hanson (Whitehaven)	207
H. M. Davison (Ashstead)	201
M. Higgens (Sutton Coldfield)	198
A. J. Frey (Cambridge)	198
P. J. Weyell (Richmond)	192
M. J. Cunningham (Luton)	180
D. Bell (Woodthorne)	180
K. Scott (Birkenhead)	169
C. J. Smith (Huddersfield)	160
D. F. Catherwood (Huyton)	155
CW ONLY	
R. B. Headland (Liverpool)	323
J. Wooden (Kingston)	302
J. A. Share (Plymouth)	287
H. Warburton (Aldershot)	277
P. Day (Sheffield) *7 mc*	208
M. Phillips (Theydon Bois)	184
P. J. Weyell (Richmond)	181
H. M. Davison (Ashtead)	151

(NOTE: *Listing includes only those who reported for this issue or the January issue. Failure to report for two issues will mean removal from the list. Next list — May issue, continuing as above from January*, 1960).

Alan Martin-Baker, 18 Tomline Road, Felixstowe, Suffolk, is one of our junior SWL's — he has a nice receiving station, and says he is looking forward to the time when he can transmit (he has a little while to wait, as he is only 12!). Gear shown here includes an R.1155B with a 10-15-20 metre converter; another receiver is an R.1224A and aerials are a dipole and a long-wire.

Maritime Mobiles

At the request of quite a few listeners, we are making a slight change in the rules for the HPX Table. This concerns Maritime Mobiles, which make such fascinating listening to those who specialise in them. Instead of all /MM's just counting as one prefix, they will in future count separately, according to their national prefix. Thus, W2ZXM/MM and W6EAQ/MM will count as two separate prefixes, as will the SM's, LA's, OH's and so on. (We did start off like this, originally, but changed it recently . . . from now on we go back to the original idea). One listener who queried this was *H. M. Davison (Ashtead)*, whose score goes up accordingly; he has been chasing the DX on One-Sixty and has logged W1ME, W2UWD and UB5WF; H.M.D. queries the latter, but he is quite legit. and has been working W's in the early hours of Sunday mornings—which is very good for 160m.

H. Warburton (Aldershot) used to operate with the call DL2TA, but is now an SWL with a Geloso G.209 and a CR-100; his listening has been done from many different places, and he is still a serving soldier.

M. Davies (Llanelly) sends details of his gear (*see* Table) and tells us that he has been interested in the short waves since pre-war days, but only in the last four years has he become a really keen SWL. He now finds that "Fings ain't what they used t'be" —but occasionally they brighten up and make life worth while. In passing, he remarks that there's some good DX to be heard on the broadcast bands—are many others interested in this?

[over

SWL • • • • • •

continued

B. Jones (Bridgend) is in favour of CW listening with one- or two-valve receivers, and has been amazed at their capabilities. What pleased him most was the reception of K3EKO, VE1JD, K2RBT and some W1's and 2's on Eighty CW.

DX Briefs

It is *not* intended to turn this feature into a series of lists of call-signs heard, but where our SWL's do log something unusual it is always worth mentioning. For instance, *M. Phillips (Theydon Bois)* comments on the new 5N2 prefix for Nigeria, and on the HKØTU expedition, which has been postponed again but should now take place between March 15 and 30.

A. W. Nielson (Glasgow) asks whether LA2DE/P in Spitzbergen counts for HPX; he certainly does; the /P suffix for Norway does not mean "portable," but applies to various countries outside Norway proper, such as Jan Mayen and Spitzbergen. Another unusual one for A.W.N. was OAØHIA, heard on Fifteen SSB with a pile-up.

N. Bethune (London, N.14) queries "HCX2TH," heard calling CQ, but we wonder whether it might not have been XZ2TH, very active these days. *C. N. Rafarel (Poole)* also notes the new 5N2 calls, and then digresses from the amateur bands to comment on what interesting stuff can be heard on short-wave broadcast these days; he says that Radio Elizabethville (Katanga) on the 11 mc band gives news in English from 2000 onwards, a very good signal with lots of interesting gen.—and, for him, the VOA broadcast of President Kennedy's inauguration was another high spot.

J. Wooden (Kingston) has "promoted" himself to an AR88 and continues to cover both phone and CW, now with a preference for the latter . . . *D. Evans (Denton)* does things the hard way and concentrates on *Forty* CW, having logged JA, VE4, ZC4, KV4 and a lot of the less common "U" prefixes . . . *R. M. Nixon (Liverpool)* has now an R.208-R.107 combination and finds the latter quite good on SSB. One of his more interesting finds was W9ADB/*AM*, in a US Navy plane between Naples and Istanbul; after hearing some good stuff on Ten last month (XE3AF, VP5RD and suchlike) he finds it has dropped off badly; and he comments on UW9 (he has a card from UW9CR); we understood these UW and UT stations to be "overflow prefixes," but this UW9CR appears to be the old UA9CR, so we don't know what's happening. At any rate, it's another for HPX!

P. L. Ashley (South Croydon) asks us to mention the ISWL's Tape Section, which organises "round robins" and has tapes circulating among its members,

SWL STATION DETAILS

QTH	RECEIVER(s)	AERIAL (s)	OTHER EQUIPMENT
N. C. Dove (Luton)	Converter, 14-100 mc 11-valve, 1.8-26 mc 11-valve, 2-29.5 mc 2-valve preselector BC-624, RF-26	28 mc dipole 15 mc dipole 85-ft. Windom 144 mc g/p	Crystal calibrator Signal generator
R. Patrick (Derby)	SX-24, R.1155	60-ft. wire	Tape recorder, Test meter
N. Bethune (London, N.14)	R.1155, home-built Top Band receiver, RF-24, 25, 26	28, 21 and 14 mc dipoles, 7 mc Windom, 50 mc beam	
R. M. Nixon (Liverpool)	R.208	14, 21 and 28 mc folded dipoles	
J. L. Marshall (Gomersal)	HRO, RF-27, 144 mc converter, Q-Fiver, Philco A.3782	264-ft. wire, 66-ft. Windom, 5-el. 144 mc beam, 70-mc dipole	Crystal calibrator, Tape recorder
K. Pietron (Wednesfield)	Collins TCS, R.107		
J. S. Alderton (Faversham)	R.107, RF-24	133-ft. wire	
R. Lawson (Solihull)	R.107, Globe King	75-ft. wire	4-valve amplifier
G. J. McNeil (Edinburgh)	19 Set, Q-multiplier, R.1155, home-built superhet and RF-24	7 and 14 mc dipoles, 12-ft. whip	8-watt amplifier, tape recorder
A. H. Jubb (Gainsborough)	Minimitter MC8 converter, BC-454, R.1355, RF-27	66-ft. wire	
D. F. Catherwood (Huyton)	Wembley broadcast receiver (unmod.)	50-ft. wire, 33-ft. wire	
J. Forsyth (Alvaston)	R.107 2-valve home-built mobile	7 and 14 mc dipoles	Audio amplifier
B. McCagherty (Co. Antrim)	CR.100, RF-24, BC-454, 78 Set	132-ft. wire, doublet	BC-221, Tape recorder, ATU, GDO, Mullard 5/10 amplifier
K. Scott (Birkenhead)	R.1155, 46 Set	67-ft. wire	
M. Phillips (Theydon Bois)	AR88LF, No. 9 Mk I	21 and 28 mc dipoles, 80-ft. wire	
M. Davies (Llanelly)	HRO, R.107, B/C receiver	115-ft. wire, 14 and 21 mc dipoles, 8-ft. whip, indoor dipoles	

Note: This list is additional to those previously published — *see* Index. Further such lists will appear from time to time.

many of them overseas. If you are interested, get in touch with M. J. Witt, 12 Bruce Avenue, Shepperton, Middx.—or with P. L. Ashley, 119 Sundale Avenue, Selsdon, South Croydon.

DO IT YOURSELF — BUT TAKE IT EASY!

This short article is intended both as an encouragement and as a warning: an encouragement to listeners who would like to hot-up their own receivers but a warning to them to go slowly and to make sure that they know what they are doing before they start.

Receiver alignment is looked upon by some as a magical and highly technical process which can only be indulged in by wizards with signal generators, wobbulators and output meters. This is true only if one wishes to set up a receiver in strict accordance with the makers' specification regarding band-width, degrees of selectivity and evenness of response throughout the whole of each wave-band.

Many a receiver which has one wave-range covering, say, 5 to 11 mc, and another covering perhaps 10 to 20 mc, will only be used for serious listening on the 7 and 14 mc bands. Therefore, it may well be possible to peak its performance up on those two narrow portions of its coverage by the simple method of aligning the RF stages on actual signals in each of those bands.

The SWL who wants peak performance on all short-wave broadcast bands as well as the amateur bands is in a different category, but it may well be that even he would prefer his receiver to be really "hot" chiefly on the latter, where the signals he listens to are far weaker and more difficult to resolve than those of most SW broadcast stations.

At the moment we are not talking about IF performance at all—simply the accuracy of tuning of the RF stage or stages. A receiver such as the AR88, with two RF stages, will have three tuned circuits, which must all be "on the nose" for optimum performance. If you have the manual (and don't do anything at this stage if you haven't) you can identify each of the many trimmers and find those associated with the band you propose to deal with first.

Tune in to a signal on, say, the 14 mc band; if it is a phone station, try to find a steady one. Make quite sure which is the trimmer for the first RF stage (the aerial trimmer will probably be on the front panel, anyway, and you will always have this properly tuned). Gently rock the first RF trimmer one way and then the other, watching the S-meter or listening to the signal. A very slight movement of the trimmer should clearly indicate whether the signal is getting stronger or weaker. If the latter, go back and try a little in the other direction. And if rotation in either direction takes the signal down, *leave it alone.* You were obviously "on the nose" before you started.

Perhaps you will be lucky; maybe someone changed a valve and didn't re-trim at some time. You may find a new peak. Leave that stage alone and proceed to the second RF, if there is one. Repeat the performance, not expecting any spectacular rise in signal strength, and being thankful if there is *any!* If you have a frequency meter such as a BC-221, use that to provide your test signal—at least it will be steady in frequency and constant in strength. If you haven't, use any suitable signal on or very near the band, not disdaining the commercials (who *can* be useful to us sometimes!)

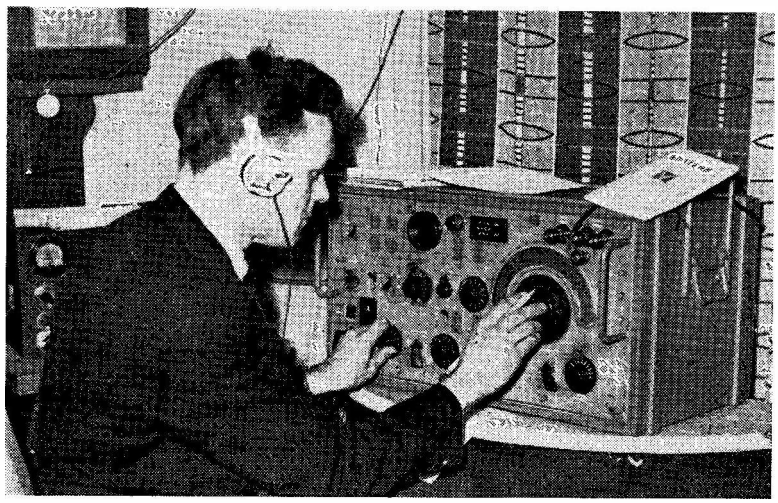
The main point is this: Don't make any large or clumsy movements of any trimmers, and remember where they were before you started. Make a mental note of your movements all the time—quarter-turn clockwise, or anti-clockwise, and so on. If you have no S-meter, the best method is usually to switch on the BFO, turn the RF gain down fairly low, and work on the combination of steady carrier and noise which you will hear on a moderately weak signal.

Having completed the operation for one band, turn to the next, make quite sure which trimmers are which, and go ahead once more. If you have no manual and no key to the various trimmers, this is not for you — leave them alone. It's no use trying to peak up a receiver on 7 mc by vaguely twiddling the 14 mc trimmers and finding, too late, that you have put *that* band hopelessly out of adjustment.

[over

S W L • • • • • • •

continued



SWL M. Davies, 79 Pwll Road, Pwll, Llanelly, Carms. runs an R.107, which he is seen operating, and an HRO (behind his left shoulder); not visible are a BC receiver, on which 20-metre phone DX has been logged, and two tape recorders; he also goes /M, with a battery-operated tape recorder working from the receiver! M.D. has been at it since before the war, and has an extensive aerial system, totalling six arrays in all, outdoor and indoor. As well as the amateur bands, he is interested in S/W BC reception from DX.

Generally speaking, *leave the oscillator trimmers alone.* If your set is badly off calibration, you *can* get it back by re-setting the oscillator on a signal of known frequency, but this is best done with a signal generator or frequency meter, and remember—the oscillator trimming must be done *first.* If you carefully adjust the others and then shift the frequency of your oscillator, you have undone all the good you did before. So you have to set the oscillator dead right, then peak the first RF and then the second. And, always—if in doubt, leave them alone.

SWL H. Hogg, 35 Glen Avenue, Logan Cumnock, Ayrshire, Scotland, has an R.107 as main receiver, with an RF-24 Unit to cover the 10-15 metre bands. He has a variety of aerials, including a two-band Cubical Quad for the HF ranges. Also interested in mobile listening, H.H. runs a 19 Set with a loaded whip for /M working. Naturally, he is going for his ticket and is already up to 15's with his Morse.

IF Performance

Aligning the IF's is a more tricky business and is a professional job if you wish to reproduce the exact shape of response curve that the makers first thought of; on the other hand, your receiver may have the IF's carefully set to a band-width of, say, 5 or 3 kc for the purpose of giving good reproduction on telephony. You, as a DX-chaser, may well appreciate a much narrower band-width and the extra gain that will go with it. So, if you have quite decided to take the risk, you can once more tune in a signal (any band, this time) and gingerly shift one of the IF trimmers to see what happens, carefully noting the original setting so that you can get back to where you started if the attempt is not a success.

If you have a crystal in the receiver, beware. It is essential that the IF stages be peaked *at the crystal frequency* and not somewhere just off it (as, only too often, they are). So start with the selectivity switch in the sharpest position, observe a weak signal, and see if its strength increases with any *slight* touching-up of any of the IF trimmers.

To produce the family of IF curves that the original specification of the receiver provided for, you would obviously need a signal generator and a wobbulator (the latter, for the uninitiated, is an oscillator which sweeps across the intermediate frequency and shows the resultant curve directly on an oscilloscope screen). But if you are content with a set of IF's as selective as you can get them—provided that they don't break into oscillation—then you *can* Do It Yourself.

Don't rush into anything you will regret; make sure you know what circuit each trimmer is associated with; make all movements very slight at first, and greater only if you are sure you know how to get back where you started; and the chances are that your receiver performance will be improved. In some cases the improvement will be quite spectacular—but only if the whole thing was very badly out of line when you started.

We have tried to warn you of the pitfalls—so don't be cross with *us* if your efforts don't bear fruit! But, at the same time, don't assume that you are incapable of making quite an improvement in your own results.

Correspondence from short wave listeners is welcomed for this feature, the next appearance of which is in the May issue. The closing date is March 30 and all mail should be addressed: "SWL," c/o The Editor, Short Wave Magazine, 55 Victoria Street, London, S.W.1.

SELLING CAR RADIO

In announcing the appointment of R. E. J. Staples as their car radio representative for the north-west region, Philips mention that he is "a keen radio amateur operator, callsign G3MMD" with a special interest in mobile working.

MULTI-TIERED VHF TRANSMITTING AERIALS

In their *Monograph No. 31* of July, 1960, the BBC Engineering Division discuss the power gain of VHF transmitting aerials consisting of a number of similar groups or tiers of radiating elements disposed along a supporting mast. The power gain of such a system depends on *(a)* the number of tiers, *(b)* spacing between tiers, and *(c)* vertical radiation pattern of each individual tier. The treatment is essentially mathematical. From the method of calculating the gain, tables have been worked out showing the relative mutual resistance and aerial gain per tier, from which transmitting systems can be designed. BBC Engineering *Monograph No. 31* costs 5s. post free and is obtainable from BBC Publications, 35 Marylebone High Street, London, W.1.

VHF BANDS

A. J. DEVON

Auroral and Tropospheric Openings—

EDX and GDX Worked—

Period of Interesting Conditions—

Station News and Comment—

THE period has shown a remarkable pattern of conditions, from flat early on to very good tropospheric starting around February 12 and continuing while this piece is being put through, with an excellent Aurora opening on February 4. Another interesting effect was the development of DX conditions on Band III/TV during February 14-16, and many European BC stations coming through on Band II/FM.

Until February 11, the barograph was showing violent day-to-day variations; then from February 11 the trace began to climb steadily and has remained flat at about 30·4 ins. as this is being written; steady anticyclonic conditions had developed, affecting almost the whole European area from Northern France round to Scandinavia; the combination of mild weather, a high glass and cold evenings was what we wanted for the emergence of good tropospheric conditions. But it cannot be until next time that we can discuss in detail what results were obtained, as it is all going on while we write—with the near EU's strong in the London area.

Contest Note

Going right back to January 29, though conditions have been described as "average winter" (they were certainly no better than that where your A.J.D. is located), activity was quite good for the contest held on that date. Both G3FZL and G3HBW made more than 70 contacts, the scoring rate towards the end being about six QSO's an hour. G3CCH and G3MED were being worked from the London area, and quite a number of "dormant call-signs" were re-activated round the country generally. G3BLP and G3KEQ, from the south side of London, were both very good signals into the Midlands; one of the stations active during the contest was G6LI, who had not been heard for some time. GW2HIY was on and mentions hearing G3FZL as GDX, with seven other stations worked.

During this contest, which was a CW affair, it was very noticeable that the stations with the good-sounding signals were also the best operated (this has nothing to do with *strength* of signal), while the people with hesitant procedure or uncertain Morse usually had poor-quality notes. The steady, rhythmic sending of a good operator behind a clean signal, and using correct procedure, is always a pleasure to hear—and, incidentally, they are always the ones who get through.

Some Aurora Results

The *Ar* manifestation during the evening of February 4 developed in two distinct phases, between 1830 and 2015 for the first, and 2300-2335 for the second—and it is interesting to note that GW2HIY (Anglesey) and G3EHY (Banwell, Som.) check each other on these time periods to within a few minutes, the second period also being confirmed by G6XA (Leamington Spa). On the other hand, G2CIW (Birmingham) gives the sessions as 1800-2000 and 2245-2359.

Louis, G3EHY, brings out another interesting point: That, coincident with the *Ar* appearances, tropospheric conditions were good during the evening of February 4; he was receiving distant G's like G3CCH and G5YV with T9 notes, off the backs of their beams, while they were working GM's and EU's *via* Aurora! (This has, in fact, happened before, but only very rarely. —*Ed.*) About ten GM's were heard in Banwell, and two were worked by *Ar*. Though G5YV raised SM6PU, very few EU's appear to have been heard *via* Aurora by other U.K. stations.

GW2HIY worked GI5AJ and two GM's, and heard four more, including GM2FHH (Aberdeen). This *Ar* opening gave G8VZ (Princes Risborough) his first GM contact after *10 years* of trying! Jack has never run more than 12w., so when he got GM2FHH back with a 57A report, naturally he was pretty pleased; other GDX heard by G8VZ over the two *Ar*

TWO METRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1960

Starting Figure, 14

From Home QTH Only

Worked	Station
50	G3HBW
45	G6XA
44	G2CIW
42	G3JWQ
40	G6GN, G8VZ
35	G3KPT
31	GW3ATM
30	GW3MFY
28	G3MPS, G3NAE
27	G5QA
26	G3KQF
25	G3HS, G3OBD
23	G2CVV
22	G3OBB
21	G3HWR
20	G3GSO, G3OJY, G5UM
15	G3NNK

This Annual Counties Worked Table opened on September 1st, 1960, and will close on August 31st, 1961. All operators who work 14 or more Counties on Two Metres are eligible for entry in the Table. QSL cards or other proofs are not required when making claims. The first claim should be a list of counties with the stations worked for them. Thereafter, counties may be claimed as they accrue.

sessions included GM3DIQ, GM3GUI, GM4HR and GI5AJ—mostly good, hefty signals.

For G6XA, contacts by *Ar* were GM2FHH, GM3GUI and GM3KYI, with GI5AJ and three more GM's heard; other stations logged with *Ar* notes were G3EGK, G3ILD and G3JYP (Westmorland), also GW2HIY and GW3ATM.

G2CIW worked GM2FHH and GM4HR, and heard five more GM's, GI5AJ and G3JYP; the last-named is reported as the strongest *Ar* signal he heard by GW3ATM (Portskewett, Mon.); GM3DIQ and GW2HIY were other stations being well received by GW3ATM.

The Bournemouth/Poole boys had bad luck on February 4—they were getting "big, fat signals" from GM2FHH, GM3GUI and GM4HR, but, says G3OBB, they could not be raised.

Tropospheric Opening

On the reports so far received—there was hardly time for much to come in—it seems that this started on February 12 and conditions remained good, mainly over the southern part of the country and Northern Europe, until at least the 16th. The nearer EU's were getting into the London and Home Counties area—but not as far as the Midlands—and G's in the South Coast districts had a fine time working French stations. For instance, G5ZT (Plymouth), who has been hammering away at this two-metre business for a long time without much joy in the way of QSO's, raised no less than seven F's between 8.00 and 11.00 in the evening, with three more heard; he also logged ON4VN. Altogether, during a session from roughly mid-day to midnight on February 12, G5ZT worked more than 20 different stations—which made it a field-day for him!

G3NAE (Bournemouth) raised F8MW and F9NW. By February 14, G3EHY was getting PAØ and F stations and he could hear many being worked from the eastern part of the country. G3OBB (Christchurch) got his first French QSO of the year with F9NW. G2CIW heard F8MW and ON4VN, but the other EU's being

TWO METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 14

From Fixed QTH Only

Worked	Station
79	G5YV (787)
77	G6NB
76	G3CCH
74	EI2W
72	G6XM
70	G5MA
69	G3HBW
68	G3BW, G3GHO
67	G3KEQ
66	G3BLP (840), G3IUD (302), *G5BD*
65	G3EHY, GM3EGW (276)
63	G2FJR (542)
62	G3FAN (760)
60	G2OI (402), G3IOO, G3DMU
59	G2CIW (267), G4SA
58	G8OU
57	G8SB, G3HAZ (535)
56	G3WW (770), G5DS (654), G6XA, G8VZ
55	G2HDZ (495), G2HIF, G3JWQ (517), G5BM, GW5MQ
53	G2AJ (519), G3LHA (387), G4CI
52	G2NH, G3FZL, G6RH, G6XX, GW2ADZ
51	G5ML
50	G3ABA, G3GSE (518)
48	G3FIH, G3KPT*, G6TA (487)
47	G3DKF, G5WP
46	G4HT (476), G5BY, *G6YU*
45	G2AHP (647), G2DVD (362), G2XC, G3BJQ, G3GFD, G5JU, G6GN
44	G3BK, G3DVK (282), G3NBQ (218), G8DA
43	G2DDD, G2FCL (322), G3BA, G3BNC, G3COJ, G3DLU*, G3HWJ, G3KHA (262), G3KQF, *G3KUH*, G3WS, G4RO, G5DF
42	G2HOP, G3DO, G3IER, G6CI (220)
41	G2CZS (282), G2FQP, G3GSO
40	G3AYC, G3CGQ, G3MPS, G5MR (366), G8KL, GW3ATM
39	G2IQ, G3CO, G3GBO (434), G3LTF, G3VM, G8IL (325) GW3MFY
38	G3APY, G3CKQ, G3HTY, G8VN (190)
37	G3FNW, G2FZU (180), G3DLU, G3LAR (435), G3MAX, GC3EBK (260)
36	G2DCI (155), G3CXD, G3DLU*, G3IIT, G6CB (312), G8DR (354), G8IP
35	G3FYY (235), G3HCU (224), G4LX
34	G3AEP, G5UM (703), G8IC, GM3DIQ
33	G3JAM (349), G3LTN, G3FUR, G3HHY (125)
32	G3HIL, G8QY, G8VR, GC2FZC
31	G3HXO, G3KPT (180), G5RP
30	G2AHY, G3FRY, G3GOP (208), G3GVF (129), G3IOE, G3IRA, G3KEF (110), G5NF, GW8UH
29	G2CVV, G3AGS, G3AKU G3FIJ (194), G3HWR (315), G3OBD
28	G3ICO, G3ITF, G4JJ/A, G8DL, GM3BDA
27	G3CVO (231), G3DAH, G3ISA (160), G3JGY, G3LTF/A, G6GR, G8NM, GI3GQB, GW3GWA
26	G2BRR, G3CFR (125), G3MED, G3SM (211), G3YH, G4MR (189)
25	G3JHM, G3JMA, G3JXN (220), G3OBB, G5SK, G6PJ
24	G3FD, G3FEX (226), G3FXG, G3FXR
23	G3CWW (260), G3HSD, G3NNK, G5PY
22	G2DRA, G3AGR (135), G3ASG (150), G3BPM, G5AM
21	G2AOL (110), G3BDQ, G3DVQ, G3IWJ, G6XY
20	G3EYV
19	G2DHV, G2HDR, G3GCX, G5LQ (176)
18	G3DBP, GC2CNC
17	G3EGG, G3MHD (195)
16	G3FRE, G3MLS
15	G3IWA
14	G3CYY

Note: Figures in brackets after call are number of different stations worked on Two Metres. Starting figure for this classification, 100 stations worked. QSL cards are not required to verify for entry into this Table. On working 14C or more, a list showing stations and counties should be sent, and thereafter added to as more counties accrue.

* New QTH

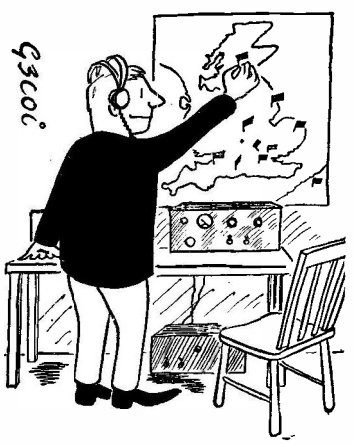
worked from London were very weak with him. GW3ATM raised F8MW on the evening of the 13th, and for GDX he worked G3BNL, G3CCH and G3NAE, with PAØCML heard.

G6XA chose Feb. 12 to test a 4w. QRP job just completed (for /P, we would suppose) running EL91's in push-pull modulated by a single 6V6, and was very satisfied to get with it solid S8-9 QSO's with G3EHY and G5TZ.

Notes and News

Many followers of this piece have been good enough to send in the "statistical evidence" asked for in the December issue—but we would like to have a lot more yet. Some of the data being adduced are very interesting, and it is already quite clear that the great majority of operators spend a large part of their time just listening round—of course, this is what everyone has always suspected, but it's nice to have it confirmed!

G5ZT and G3CZZ/M have more or less teamed up, VHF-wise, as generally speaking they only have one another to work! So they particularly ask that beams be shined their way—from the London area and the South of England generally the heading for Land's End will cover them both—and that the 144·00-144·05 mc part of the band be carefully searched, because that is where they are; and both will also be very glad to arrange schedules. G5ZT says that his results during the contest on January 29—when, under poor conditions, he worked 11S from



London round to Bristol and South Wales—show that his gear is up to scratch.

G5QA (Exeter), who keeps a regular schedule on both bands with GW3ATM, away up across the hills towards Chepstow, finds that though the two-metre signals are always S9+ and no trouble (in fact, they've had upwards of 300 QSO's on that band) things are not so easy on 70 cm.; whereas GW3ATM receives G5QA well, there is no joy the other way; so Herbert set about the converter, and having succeeded in making it much worse, uses what we can only say is very unparliamentary language to describe the whole situation!

The evening of Feb. 13 gave G2XV (Cambridge) his 34th county on 70 centimetres, when he worked G3KBS/P near Ledbury; and after midnight that evening he heard SM7BAE calling G3HBW, for what could have been a new record on 430 mc, if any QSO resulted—but not having heard from Arnold, we don't know.

G5UM (Knebworth, Herts.), in forwarding his statistical data, puts in claims for the Tables, which we are glad to accept—his figures for the All-Time are particularly interesting; with relatively few counties booked in (34), he yet has a total of stations worked through those counties of no less than 703, putting him into the upper bracket in that category; of course, G5UM has been on two metres since the beginning, 'way back in 1948. At G3JAM (Woodford, Essex) the total of different stations worked now stands at 366—he found 17 new ones in the three months to Feb. 12.

A welcome to G3OSA (Wimborne, Dorset), who has just started on two metres, and is still in process of getting the gear tee'd up. And the same to G3OJY (Churt, Sy.), who has accounted for 20C since he came on—he is planning to run radio T/P on two metres, as an RTTY link for G3IIR and G3ION between London and Southampton. G3OJY has started up with a Heathkit rig (Seneca VHF-1) running 120w. with a pair of 6146's in the PA; he is building a new 2m.-only receiver, and is also working up

TWO METRES

COUNTRIES WORKED

Starting Figure, 8

20	G3HBW (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, LX, OE, OH, OK, ON, OZ, PA, SM, SP)
19	G3CCH (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, LX, OE, OH, ON, OZ, PA, SM, SP)
18	G5YV, G6NB (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, LX, OK, ON, OZ, PA, SM, SP)
17	ON4BZ
16	G3GHO, G3KEQ, G5MA, G6XM, PAØFB
15	G2XV, G3FZL, G4MW, GM3EGW
14	G2FJR, G2HDZ, G3AYC, G3FAN, G3HAZ, G3IOO, G3JWQ, G3WS, *G5BD*, G6LI, G8OU, OK2VCG
13	G3BLP, G3DMU, G3DVK, *G3GPT*, G3KPT, G5DS, G6XX, G8VZ
12	EI2W, F8MX, G2HIF, G3EHY, G3GFD, G3GHI, G3LTF, G3WW, G5CP, G5ML, G6RH, GW2HIY
11	G2AJ, G2CIW, G2CZS, G3ABA, G3CO, G3JZN, *G3KUH*, G3LHA, G4RO, G4SA, G5UD, G6XA, OK1VR
10	G2AHP, G2FQP, G2HOP, G3BDQ, G3BK, G3BNC, G3DLU, G3GSE, G3GSO, G3JAM, G3KQF, G3MED, G5MR, G8IC, GW5MQ
9	G2DVD, G2FCL, G3DKF, G3FIJ, G3FUR, G3IUD, G4LX, G8DR, G8GP, GC3EBK, GM3DIQ, GW3ATM
8	G2DDD, G2XC, G3AEP, G3AGS, G3BOC, G3EKX, G3GBO, G3HCU, G3HWJ, G3KHA, G3MPS, G3VM, G5BM, G5BY, G8SB, GC2FZC

the design for a transistorised transceiver for two metres.

G3HWR (London, N.W.3) claims VHFCCC and forwards interesting statistical evidence. He also block-diagrams his new lay-out for the 70-144-430 mc bands, the two-metre transmitter having VXO drive, giving a frequency swing of about 15 kc on two metres. The 2m. PA is a QQVO6-40 modulated by a pair of 807's; this is driven by a QRP stage, a QQVO3-10, which can itself be modulated by a pair of N709's.

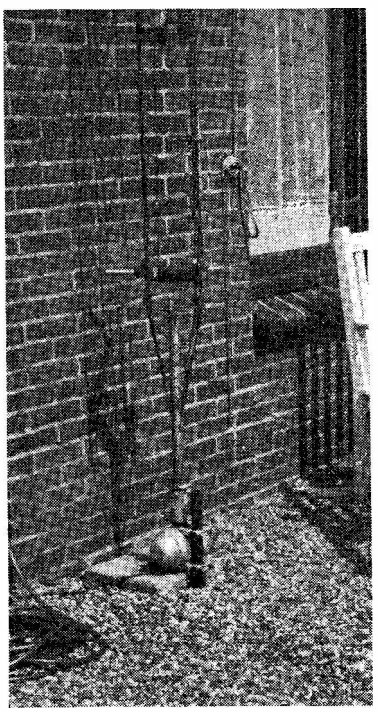
Expedition to GD

We are asked to announce that GD6UW should be on during April 5-12, frequency probably 144·87 mc, with both CW and phone available, and calling CQ at 2000Z every evening. This station will be operated by members of the Cambridge University Wireless Society, who are making

a foray to the I.o.M. just after Easter—as they are also involved on other bands as well, two metres will not have all the attention. If conditions give them a break, it will be a wonderful chance for GD—we hope ON4BZ is listening!

Comments out of Context

"When working in the shack, it it my usual practice to leave a receiver on each of the two prominent locals so that I don't miss anything" (G3HWR) . . . "The aerial is going to be pushed up even further one dark night to try to overcome the difficulties at this sea-level QTH" (G3OBB)... "Don't forget to tell the boys that I'm very consistently looking for QSO's" (G5ZT) . . . "I did not hear any fantastic DX during the opening, but I had a good time working the G's around Southern England" (G3NAE)... "Though HB, LA, SM and SP have been heard here, they are most elusive for QSO; GC not even heard yet" (GW2HIY) . . . "Have decided to finish building for 70 cm., and to retain my QRP on two metres; the sked with G3JWQ has now gone to over 1170 QSO's" (G8VZ) . . . "It would be very interesting to know if anyone south of me got any *Ar* reflection of my signals on Feb. 4" (G3EHY) . . . "Although I can copy GB3VHF most of the time, I did not hear him by *Ar*" (GW3ATM) . . . "May I QSY from the LF bands and sign-in as a 144 mc SWL?" (G3IGW) . . . "Please apologise to any stations who called to no avail on 12/2—we had troubles" (G3OSA).



The VHF aerial system at PAØFB is supported by two towers of light alloy, which are extendable and rotatable; the base of each mast stands on a reversible motor, as can be seen in this photograph, which also shows the extension winch.

Reflections from Space

The return frequency being used by the Russians on their Venus probe is 922·8 mc—when Jodrell Bank heard about this, they quickly knocked up a piece of appropriate gear, but at the moment of writing the Russians had not responded to Sir Bernard Lovell's suggestion that he be given the operating schedule.

And in case you were wondering what frequency Prof. Martin Ryle was using on *his* radio telescope at Cambridge when (as it is reported) he discovered the origin of the Universe, it was 178 mc—it seems a bit too near Band III to us! In fact, the radio astronomers are having a little difficulty in finding clear receiving channels at the metre wavelengths they wish to use.

Dinner Date in GM

As stated here last month, the Scottish VHF Group will be holding their annual dinner next Saturday evening, March 11—details from GM3DIQ, and as given on p.655 of the February issue.

The Tabular Matter

This has been brought right up-to-date and we trust that all claimants will find themselves in their proper places—to keep the Tables live and current, claims should be made regularly, at least every other month. And, once again, it helps your A.J.D. enormously if all tabular matter is kept to *separate* sheets, and *not* run in with the gossip in the letter. (It is only fair to say that most correspondents are very good about this.)

SEVENTY CENTIMETRES

ALL-TIME COUNTIES WORKED

Starting Figure, 4

Worked	Station
34	G2XV
28	G3HBW
27	G3JWQ, G3KEQ, G5YV
26	G6NF, GW2ADZ
23	G3BKQ, G6NB
21	G3IOO
20	G3HAZ
19	G2CIW
17	G3KPT
16	G2DDD, G3LHA, G3MED
15	G4RO
14	G2HDZ, G3FAN
13	G3MPS
12	*G5BD*
11	G3AYC, G3LTF
10	G2OI, G3IRW, G6XA
9	G5DS
7	G2HDY, G3JHM
6	G3JMA, G3KHA, G3WW
5	G3FUL, G3IRA, G3IUD, G5ML
4	G3JGY

On working four Counties or more on the 70-Centimetre band, a list showing stations and counties should be sent in for this Table, and thereafter new counties worked notified as they accrue

In Conclusion ——

We have, mercifully, a little more time this month — and it could well be that by next deadline there have been more good openings; the date is **Wednesday, March 22,** with everything addressed, as usual, to: A. J. Devon, "VHF Bands," *Short Wave Magazine,* 55 Victoria Street, London, S.W.1—till April 7, then, when we meet here again, *73.* Have a good Easter, and Go Carefully.

MAKING THE MOST OF METERS—5

RESISTANCE MEASUREMENTS—OHMMETER CIRCUIT DESIGN—THE MEGGER

J. R. Bradshaw

THERE are various methods of resistance measurement, ranging from continuity tests to the absolute determination of resistor values and thence to insulation tests involving thousands of megohms. This article, the last of the series—previous parts appeared in the August, September, November, 1960, and January, 1961, issues of SHORT WAVE MAGAZINE—considers the instruments and techniques necessary for determining the resistance values which the amateur is likely to encounter.

Calculations

The total resistance of a number of resistors in series is

$$R_{total} = R_1 + R_2 + R_3 + \ . \ . \ .$$

The current through all resistors is the same, being determined by the value of the total resistance, but the voltage *drop* across each resistor depends upon the value of the resistor.

The total resistance of a number of resistors connected in parallel is

$$\frac{1}{R_{total}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ . \ . \ .$$

and in this case the voltage drop across them is uniform, whilst the individual *currents* depend on the value of each resistor. The above equation may also be written, for two resistors in parallel, as follows:

$$R_{total} = \frac{R_1 \cdot R_2}{R_1 + R_2}$$

and this equation can be employed for several resistors in parallel, but it becomes rather cumbersome when more than two are involved, and it is easier to use the unit of Conductance ($G = 1/R$) because Conductances *in parallel* may be written

$$G_{total} = G_1 + G_2 + G_3 + \ . \ . \ .$$

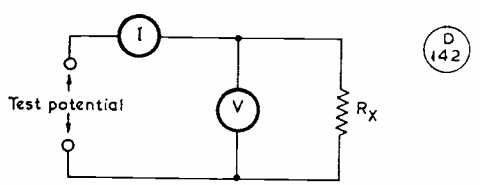


Fig. 1. The measurement of resistance under working conditions.

A conductance/resistance conversion table is invaluable when dealing with parallel resistors, conductance being converted back to resistance by:

$$R_{total} = \frac{1}{G_{total}}$$

Resistance Measurement

Using a voltmeter in conjunction with a milliameter as in Fig. 1, and applying a DC voltage to the resultant circuit, as shown, the resistance of a component or circuit such as an electric light bulb or a thermistor can be found under working conditions.

Similarly, this method can be used to find the value of a resistor, although the system of measurement is rather cumbersome; a high degree of accuracy is only attained by determining the current taken by the voltmeter and deducting this current from the observed milliameter reading, the remainder being the current actually flowing through the resistor

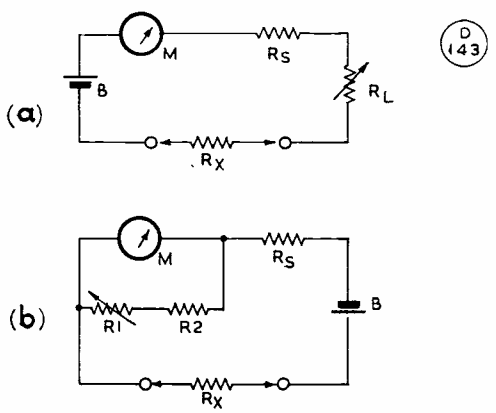


Fig. 2. The arrangement of series-type ohmmeters, discussed in the text.

alone—the value of the resistor being found from the Ohm's Law relationship $R = V/I$.

This is the basic system of measuring resistance, the important parameters being the current passing through the resistor and the voltage applied to it.

The Ohmmeter

The ohmmeter is normally incorporated in a multi-range meter and provides the necessary facilities for resistance measurement—which are a source of voltage, a series limiting resistor to keep the current within prescribed limits at all times, and a milliameter to measure the current through the circuit.

Two basic ohmmeter circuits are shown in Fig. 2. Both circuits are similar, and their measurement technique is identical. Each uses a dry battery; *Rs* is a current-limiting series resistor to prevent an excessive deflecting current through the meter M when the terminals are shorted or when the unknown resistor *Rx* has a very low value. R1 is the "adjust zero" potentiometer, being in series with the meter

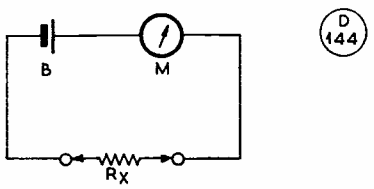


Fig. 3. Basic method of resistance measurement using a milliammeter and a known potential B.

in Fig 2A and shunted across it in Fig. 2B. and R2 is a resistor peculiar to the latter circuit which prevents R1 from completely shorting the meter movement M at its minimum setting.

To set up the ohmmeter, the terminals are shorted together and R1 is adjusted to compensate for any voltage variation in battery B, so that the meter current is maximum. corresponding to zero resistance on the meter scale.

When the short is replaced by a resistance, the hitherto maximum current (with no resistance) will be reduced in proportion to the value of the unknown resistance, and if the meter is calibrated in ohms. this reduced current will indicate the actual value of the unknown resistance *Rx*. The higher the value of *Rx*, the less will be the current through the meter—the highest values passing a very minute current. So the resistance scale is reversed to that of current or voltage, with the highest values of resistance approximating to zero current on the meter.

The circuit of Fig. 2A operates on the assumption that battery B generates a constant voltage throughout its life, but that its internal resistance increases with age ; the circuit of Fig. 2B assumes that the battery voltage falls with age but the internal resistance remains constant.

Although the latter circuit gives the greater accuracy, in practice neither assumption is correct. because both the battery voltage and its internal resistance change with age. and the greatest accuracy is achieved by a combination of both Fig. 2A and 2B. The accuracy of both circuits. however. increases as the battery potential is raised.

It must be remembered that the polarity of the terminals of a multi-range meter is usually reversed when the meter is used to measure resistance. the negative terminal actually carrying the positive polarity of the battery and *vice versa*. So far as pure resistance is concerned. this is of little consequence. but neglecting this fact can be definitely misleading when checking the internal resistance of an electrolytic capacitor or a germanium or metal rectifier. which depends on a positive polarity for correct operation.

Ohmmeter Construction

Given the 0-1 mA meter that has already been mentioned in previous articles. the method of turning the milliameter into an ohmmeter is based on Ohm's Law. and is best demonstrated by a numerical example.

If the FSD of the meter is 1 mA. and the ohmmeter potential is obtained from a 1·5-volt battery, then, when the terminals are shorted, the current flowing through the circuit of Fig. 3 will be far greater than 1 mA and will result in damage to the meter. So the first requirement is a series resistor *Rs* (which includes the meter resistance, incidentally, when *Rs* is comparable to it) of such value that when the terminals are shorted together, the current through the meter M and resistance *Rs* from the battery B will be 1 mA:

$$Rs = \frac{V}{I} = \frac{1{\cdot}5}{0{\cdot}001} = 1500 \text{ ohms.}$$

Additionally, allowance must be made for the potential of the battery to vary slightly through its life and, to counter this variation, *Rs* must be less than its calculated value of 1500 ohms ; its value is therefore " padded out " by a variable resistor R1 in series with it and, to permit a battery potential variation of between 1·2 and 1·6 volts, the total series resistance must be variable from 1200 to 1600 ohms. So the value of *Rs* should be 1200 ohms, with R1 = 400 ohms. R1 is, of course, the " adjust zero " potentiometer, and it will be appreciated that the additions to the basic circuit of Fig. 3 have now built it out into the ohmmeter circuit of Fig. 2A, p.41.

If the minimum readable current on the meter is 10 microamps (an approximation used here merely for the sake of example) then the value of resistance which will reduce the meter current to this value with a battery potential of 1·5 volts will be

$$R = \frac{1{\cdot}5}{0{\cdot}00001} = 150{,}000 \text{ ohms.}$$

so that using a 0-1 mA meter in conjunction with a 1·5 volt battery, a definite ohmmeter range of 0-150 kilohms can be obtained, the upper values being cramped whilst the lower resistance values will be spread out at the lower end of the resistance scale.

Improving the meter sensitivity to 100 microamps, or increasing the battery voltage to 15 volts with the 1 mA meter (with a series resistance of 15 kilohms) will extend the range to 1·5 megohms ; sensitivity for lower resistance values is reduced by the multiplication.

The resistance range can also be reduced by shunting the meter to make it less sensitive, since it is impracticable to reduce the battery potential below 1·5 volts. In this way, and by increasing the FSD current to 10 mA, a resistance range of 0-15 kilohms

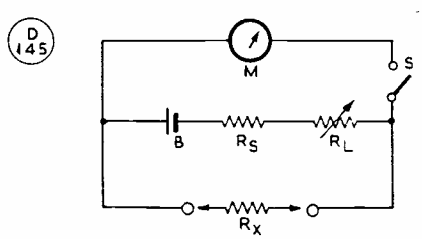


Fig. 4. The shunt-type ohmmeter, the features of which are explained in the article.

would be obtained, which is valuable for the measurement of lower values of resistance.

Calibration can be put on by marking the scale against deflections obtained when measuring known, highly-accurate resistors. The gaps between the markings can be interpolated to obtain intermediate points for other resistance values.

Checking Ohmmeter Accuracy

The accuracy of an ohmmeter should be checked regularly, because an ageing battery will seriously impair accuracy. The simplest method is by using 1% tolerance resistors which can be used to check the calibration.

The Shunt Ohmmeter

This instrument has been developed for the measurement of low resistance, and offers a greater accuracy at low values than the normal ohmmeter.

The circuit is as shown in Fig. 4.and consists of a switched meter shunted across a battery and resistances *Rs* and R1, which serve the same purpose as in the conventional instrument.

For zeroing adjustments, the terminals are left open ; then the switch S is closed and R1 is adjusted for full meter deflection. When an unknown resistor is connected to the instrument, it shunts the meter movement and, if of very low resistance, the meter current will be reduced almost to zero, whilst if it has a larger value, the meter current will read proportionately.

In contrast to the normal ohmmeter, the resistance scale therefore reads from left to right, with the greatest accuracy at the low-resistance end of the scale and the familiar cramping at the top end.

The lower limit of resistance can be extended by shunting the meter with a resistance related to the meter movement in the normal way, the scale being suitably interpolated if a decimal extension is made.

Mains Operated Ohmmeters

These ohmmeters are characterised by high accuracy, because the potential is supplied from a stabilised power unit with a very low internal resistance which, unlike a battery, remains constant after calibration. Provision of different potentials is also far easier, and the resistance and insulation range of these instruments can be made very wide as a result. However, they are usually bulkier than a Universal meter (needing a mains supply to operate them), so they are not completely portable — a disadvantage for certain purposes.

The Megohmmeter

This is an insulation tester using the circuit shown in Fig. 5, and is included in this article for the sake of completeness, because it is a self-contained instrument which cannot be adapted for any other use.

The " Megger " is fitted with a hand-driven generator G, which provides a constant voltage of between 100 and 2000 volts, according to the particular model. The meter movement itself comprises two coils which are fixed in relation to each other, but capable of rotation in a magnetic field.

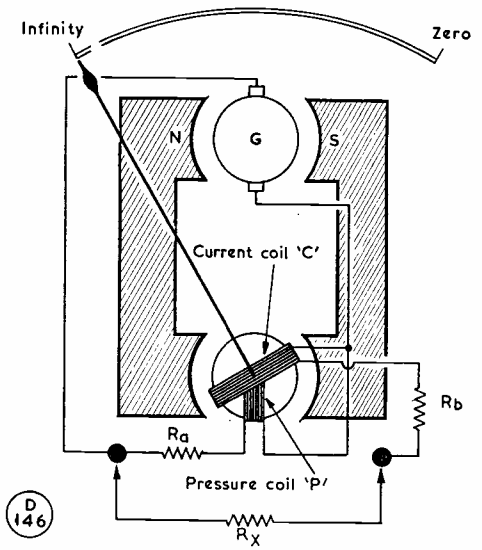


Fig. 5. The Megger, a high-range resistance measuring instrument which generates its own energising voltage. Widely used in the testing of outdoor and line electrical systems, the standard megger is a simple, robust and very reliable instrument.

The " pressure coil " P is shunted across the generator, whilst the " current coil " C is in series with the generator and the terminals. With the terminals open, no current flows through the current coil, and the pressure coil torque rotates the pointer to " infinity," but when a resistance *Rx* is connected to the terminals as shown, the current coil produces an opposing torque to that in the pressure coil, and the level of this opposing torque depends on the value of the resistor (or insulator) *Rx*. The resistors *Ra* and *Rb* connected in series with the terminals limit the maximum current through coil C in the same way as *Rs* in the ohmmeter, thus preventing damage to the movement in the event of a short being placed across the terminals.

Accuracy is good, and low-voltage Meggers known as Continuity Testers are obtainable for measuring low resistance. A Bridge Megger is also available, consisting of a sub-standard decade resistance box which can be used in a bridge circuit in conjunction with the Megger ; it is highly accurate and very effective over a wide resistance range.

(Concluded.)

BRITISH RAILWAYS ELECTRIFICATION

Further to the Editorial comment in the January issue of SHORT WAVE MAGAZINE, the Minister of Transport announced on January 30 that, after four months' reconsideration of the whole programme, it had been decided to go ahead with the electrification of the Euston-Crewe main line section. A note on the 25,000 volt AC system, overhead collection, appeared on p.483 of our November issue.

SIMPLE NETTING SYSTEM

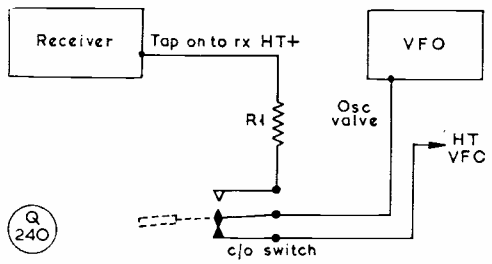
SECONDARY HT ON THE VFO

To be able to net quickly and accurately on to a given frequency—usually that of a station being received—without fully energising the transmitter, is a facility practically essential to any AT station operator, and various methods are used to achieve it.

Sometimes there is difficulty in switching on one of the transmitter HT supplies without at the same time disabling the receiver. This note describes a way in which it can often be done quite conveniently.

It is necessary to break the normal HT supply connection to the VFO and take leads, as shown in the sketch, to a switch, preferably of the key type (also known as a "Dewar switch"), although any other change-over switch will serve. A connection is then taken from the receiver HT supply to the normally open contact on the switch, the latter being mounted in any convenient operating position.

It is not desirable to allow the VFO to develop any more output power than will give, by stray pick-up, a reasonable signal beat into the receiver, nor again to take much current from the receiver supply. Hence the inclusion of R1 which, in the writer's case, has a value of 7,500 ohms but which may need to be varied above or below this value. Also, energising only the actual oscillator valve in the VFO may not be sufficient, especially where several multipliers are in use to reach a high frequency, and it may be necessary to energise one or more of the following stages. It will be better to do this than to reduce R1 to a low value.



Circuit of the independent quick-netting arrangement. If a spring loaded-on key switch is used on the "HT VFO" side, pressing the key against the spring will bring the low voltage (receiver) HT on to the VFO. This switch can be mounted somewhere handy for quick operating.

Energising the VFO in this way can also be of assistance in receiving sideband signals, by allowing the weak signal from the VFO to replace the missing carrier at the input to the receiver instead of re-inserting it at a later stage. The receiver tuning is simply adjusted for maximum volume of the sideband signal, and then careful adjustment of the VFO dial around the appropriate frequency will result in the speech becoming intelligible. Any drift in the receiver oscillator will have little effect and, providing the VFO is designed to be free from drift (as ought to be the case!) it should be possible to hold the signal for some considerable time without the need for retuning the VFO.

J.N.W.

MOBILE RALLY PROGRAMME

The latest G.P.O. count (1st January '61) gives it that there are 929 /M's licensed in the U.K.—so by any time now the number will have topped the 1,000 mark. Amateur mobile licences are issued (on application to the Radio Services Dept., Hq. G.P.O., St. Martin's-le-Grand, London, E.C.1) only to those who hold current U.K. call-signs, and there is a small fee payable for the privilege. An amateur mobile licence can also be used on canal and river craft within certain prescribed limitations. A good example of such a restriction is that on the Thames one can only operate /M from a river craft when upstream of Teddington Lock. So far as the Thames is concerned, this gives plenty of scope, and it is hard to imagine a more pleasant holiday (for a keen Top Band type) than a cruiser equipped with portable-mobile gear; with a 12 ft. base-loaded whip on a hinge mounting (so that the aerial can be lowered quickly when necessary) and an earth plate fixed below the water-line, it should be possible to get some pretty impressive results on 160 metres.

Turning back to landward, the first big event of the Mobile Season is the North Midlands Rally at Trentham Gardens, nr. Stoke-on-Trent, Staffs., on **Sunday, April 30.** The 160m. talk-in will be the responsibility of the Stoke-on-Trent Amateur Radio Society, operating G3GBU/A as the Trentham control, assisted by G3OGD at Talke for the northerly approaches and G2AMN (Stone) on the southerly side.

After Trentham, the programme already fixed is as follows:

May 7: Cheltenham Mobile Rally, Montpelier Gardens, Cheltenham, with G5BK operating as Top Band talk-in station; there will also be a local channel (G3IER) for two-metre mobiles. A prize-ticket draw is being arranged and the mobile contest will take the form of an "initiative test."

involving map-reading on a drive round the Cotswolds. An established feature of this Rally is the dinner held the night before, to which any mobileer who is going to be in Cheltenham on the Saturday is invited. Application for dinner tickets and further details of the Rally itself should be made to: T. A. Russell, G3JFH, 10 Dale Walk, Bishops Cleeve, Cheltenham, Glos.

May 7: Thanet Radio Society Mobile Rally at Hugin Site, Pegwell Bay, Ramsgate, Kent. The control station on Top Band will be G3DOE/P, and further details can be obtained from: J. Barnes, G3BKT, 18 Grange Road, Ramsgate.

May 14: Rally and Hamfest at Cleethorpes, Lincs., organised by the Grimsby Amateur Radio Society. Full details and tickets from: P. Mason, G3NNN, 213 Clee Road, Cleethorpes, Lincs.

May 14: Mobile Rally at the Atomic Energy Research Establishment, Harwell, nr. Abingdon. *(Details later.)*

May 28: Northern Mobile Rally at Harewood House, nr. Leeds, organised by the Spen Valley Amateur Radio Society, with J. Charlesworth, G3IJC, 23 Craven Lane, Gomersal, nr. Leeds, as hon. secretary.

May 28: Southern Counties Mobile Rally at Beaulieu, Hants., organised by the Southampton Amateur Radio Club. *(Details later.)*

June 18: Amateur Radio Mobile Society's Rally at the Barford St. John U.S. Air Base, nr. Deddington, Oxon. Details from N. A. S. Fitch, G3FPK, 79 Murchison Road, Leyton, London, E.10.

June 25: West of England Mobile Rally, at Longleat House, nr. Warminster, Wilts. *(Details later.)*

July 8/9: South Birmingham Mobile Rally. *(Details later.)*

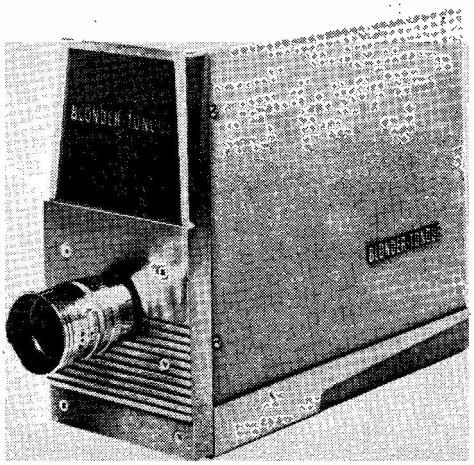
It will be seen that there is a clash of events on May 7, 14 and 28! However, they should be far enough apart for attendances not to be affected unduly. Rally organisers are asked to note what was said on p.635 of the February issue of SHORT WAVE MAGAZINE, regarding advance information. So far as we know at the moment of writing, all dates from July are still open. And, of course, we shall, as usual, be very glad to have Rally reports and photographs as soon as possible after the event, for publication in this space.

USE OF BCM/QSL

The address of the QSL Bureau we operate for the convenience of direct subscribers (only) is: *BCM/QSL, London, W.C.1.* This is a full and sufficient address. The usual Bureau service is given: Acceptance of cards for delivery outwards to any part of the world, and clearance to subscribers (who have only to deposit s.a.e.'s) of cards received for them. We are in full exchange-relations with QSL bureaux throughout the world. The both-way service is confined strictly to direct subscribers, *i.e.*, those who obtain SHORT WAVE MAGAZINE by annual subscription of 33s. paid to us in advance. But the *one-way* service (delivery of any cards received *for* them at BCM/QSL) is available to all who care to send in stamped addressed envelopes, with name and callsign. A large number of casual readers make use of this leg of our Bureau service, which is free. Our Bureau is not intended to be competitive or to conflict with any other QSL organisation—it is complementary to other QSL Bureau facilities available in the U.K., playing its part in ensuring the smooth flow of QSL cards to and from British amateurs (and those of many other countries who use BCM/QSL).

GETTING YOUR CALL IN

The world directory of AT stations—as distinct from the single-country listings coming out annually, such as the *Australian Call Book* and similar purely national efforts—is the international *Radio Amateur Call Book* which, published from the U.S.A., has been appearing regularly for nearly 40 years (the current volumes are No. 38 in the series). The American *Call Book* covers all countries and as such is sold throughout the world. The U.K. amateur station listings appear, together with all other countries outside the United States, in the "Foreign Section," published twice a year (in March and September); these listings therefore comprise the most up-to-date available. To be in the international *Call Book* means that you are known all over the world. To get into it, send us your callsign/address as soon as you are licensed (or any change of address if you are already in) as we are U.K. and European agents for the *Radio Amateur Call Book*. All new callsign/addresses sent to us are also published in the regular "New QTH" feature in SHORT WAVE MAGAZINE.



This is a completely transistorised TV camera, weighing less than 15 lbs. and having a maximum dimension of only 11 ins. Yet the camera is extremely versatile, being fully automatic in operation, with provision for manual or remote-control of lens, lens turret, pan-and-tilt, and optical focus. The picture resolution is 600-line and the video output 1.4v. It is made by the Blonder-Tongue Labs., of Newark, N.J. and handled by the Morhan Export Corpn. of New York.

NEW QTH's

This space is available for the publication of the addresses of all holders of new U.K. callsigns, as issued, or changes of address of transmitters already licensed. All addresses published here are reprinted in the U.K. section of the "RADIO AMATEUR CALL BOOK" in preparation. QTH's are inserted as they are received, up to the limit of the space allowance each month. Please write clearly and address on a separate slip to QTH Section.

G2CRG, F. G. Waterhouse, 25 West Grove, Doncaster, Yorkshire. *(Tel.: Doncaster 65094.)*

GM3NKY, J. T. Christie, 32 Thomson Street, Kilmarnock, Ayrshire.

GM3NLB, F. Inglis, 39 Melville Street, Kilmarnock, Ayrshire. *(Tel.: Kilmarnock 22499.)*

G3NOE, P. A. Dennison, 11 Briarfield Close, Highfield Road, Idle, Bradford, Yorkshire.

G3OBV/A, P. H. Harris, 83 High Street, Hillmorton, Rugby, Warks.

G3OPR, J. E. Robson, B.Sc., A.M.I.E.E., Midwinter, Clapper's Meadow, Alfold Crossways, Cranleigh, Surrey.

G3OPW, J. Cook, 38 Lower Somercotes, Derby, Derbyshire. *(Tel.: Leabrooks 574.)*

G3OQB, J. J. Pink, 13 Prideaux Road, Stockwell, London, S.W.9.

G3OQQ, J. Bennell, Mill House, Spurlands End, Cryers Hill, High Wycombe, Bucks.

G3ORE, P. Burson, 53 Foxon Lane, Caterham, Surrey.

G3ORL, D. A. G. Williams, 20 Warwick Road, Keynsham, Bristol.

G3ORS, A. McKenzie, Radio Society of Olympic Sound, Carton Street, *off* George Street, London, W.1.

G3OSC, S. R. Chapple, 7 Rutherwyke Close, Stoneleigh, Epsom, Surrey. *(Tel.: Ewell 4182.)*

G3OSF, H. King, 6 Grange Crescent, Rubery, Rednal, Birmingham.

G3OSQ, D. J. Beakhurst, 8 Walton Avenue, North Cheam, Sutton, Surrey. *(Tel.: Fairlands 4643.)*

G3OSS, A. McKenzie, 27 Fitzalan Road, Finchley, London, N.3.

G3OST, D. E. J. Wilson, 48 Godstone Road, Purley, Surrey. *(Tel.: BYWood 1640.)*

G3OSY, R. H. Joll, 25 Herrick Road, Woodhouse Eaves, Loughborough, Leics.

G3OTH, C. A. R. Cook, Y.M.C.A., 184 Tottenham Lane, Hornsey, London, N.8.

G3OTH/A, C. A. R. Cook, 1 Windsor Terrace, Great Lumley, Chester-le-Street, Co. Durham.

G3OTO, E. G. Barker, 63 Woodcot Avenue, Baildon, Shipley, Yorkshire.

G3OTQ, R. Fogden, 27 North Street, Havant, Hants. *(Tel.: Havant 558.)*

G3OTT, L. R. Northway, 2 The Hollands, Thatcham, Berks.

GI3OTV, P. O'Kane, 15 Shandon Park, Knock, Belfast, 5.

G3OTZ, P. G. Gregson, 64 Harbour Road, Wibsey, Bradford 6, Yorkshire.

G3OUF, D. A. Evans, 6 Sutherland Road, Ealing, London, W.13. *(Tel.: PER 7210.)*

G3OUK, M. J. P. Blake, 163 Bath Road, Brislington, Bristol, 4.

G3OUX, G. C. Reid, 11 Coombe Close, Langley Green, Crawley, Sussex. *(Tel.: Crawley 2890.)*

CHANGE OF ADDRESS

G2AOH, R. Cook, 172 Lunt's Heath Road, Widnes, Lancs.

G2HHV, J. Spivey, 46 Knowles Hill Road, Dewsbury, Yorkshire.

G3CSZ, C. L. Hubbard, 8 Archer's Way, Arrowe Park Estate, Woodchurch, Birkenhead, Cheshire.

G3FNZ, J. A. Lambert, 31 Lloyd Road, Worcester Park, Surrey.

G3GCX, M. G. Linfoot, 1 Chantry Avenue, Upper Poppleton, York.

G3GEW, H. Jordan, 57 Lancaster Drive, R.A.F. Station, Scampton, Lincoln.

GW3GNT, P. A. C. Wood, Minffrwd, Bryn Teg, Anglesey.

GW3HEA, J. U. Burke, Cefn Collfryn, Criccieth, Caerns.

G3HIS, G. Berrisford, Kelvin, Rakeway, Cheadle, Stoke-on-Trent, Staffs.

G3HRY, K. D. Halsall *(ex-VK5BS/VS6DE),* c/o Sgts' Mess, R.A.F. Station, Locking, Weston-super-Mare, Somerset.

G3HYR, B. V. Lockey, 19 Faversham Close, Alvaston, Derby.

G3IIW, M. Sands, No. 3 Flat, 15 Ferndale, Tunbridge Wells, Kent.

G3IJX, E. B. Irving *(ex-ZC4IX),* Lindene, Wattsfield Road, Kendal, Westmorland.

G3LAS, J. B. Butcher, 101 Austen Paths, Elm Green, Stevenage, Herts.

G3LEJ, M. G. Hudson *(ex-ZB1LEJ),* c/o Sgts' Mess, R.A.F. Station, Topcliffe, Thirsk, Yorkshire.

G3LMR, J. K. Eley, 112 Groby Road, Glenfield, Leicester, Leics.

G3LWS, E. H. Ross *(ex-VP8CZ/ZC4FB),* Scurragh Lane, Skeeby, Richmond, Yorkshire.

G3MCY, G. C. Moore, c/o Officers' Mess, R.A.F. Station, Topcliffe, Thirsk, Yorkshire.

G3MWO, D. A. Beales, 83 Abbot Road, Bury St. Edmunds, Suffolk.

G3NGC, M. Bell *(ex-GM3NGC),* 20 South Street, Barrow-on-Soar, Loughborough, Leics.

G3NOH, G. D. Eddowes, 25 Knyveton Road, Bournemouth, Hants.

G3NQU, A. W. Dick, 82 Oaken Grange Drive, Southend-on-Sea, Essex.

GW3OCD, V. A. Davies, 12 Plasdraw Road, Aberdare, Glam.

G6QB, L. H. Thomas, 186 Winchelsea Road, Hastings, Sussex.

GI6WG, R. Carlisle, 43 Strand Road, Londonderry, Co. Derry. *(Tel.: Londonderry 2143.)*

AMENDMENTS

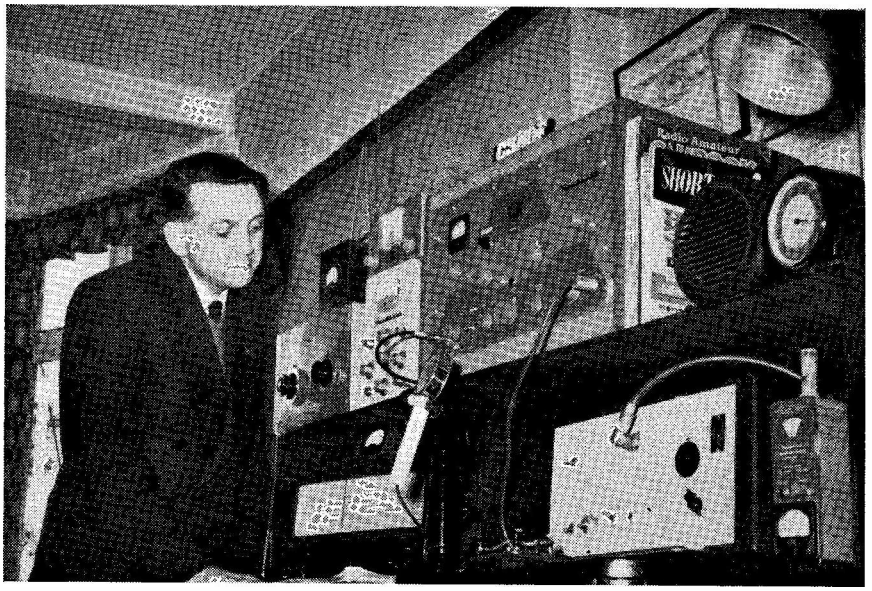
G3DNZ, J. K. Robinson, Brooklyn, Station Road, Wombourn, Wolverhampton, Staffs.

G3NQX, W. H. Brown, 1 Gib Lane, Hoghton, Preston, Lancs.

G6KR, E. R. Westlake, 177 Wenlock Road, Shrewsbury, Salop.

THE OTHER MAN'S STATION

G3NOF



THE station shown this month is that of G3NOF, D. L. McLean, 9 Cedar Grove, Yeovil, Somerset. In the photograph, from left to right at top, can be seen a Z-Match aerial tuning unit; standing on this is a radiation meter, as described some time ago in SHORT WAVE MAGAZINE. Next to this is a Heathkit SB-10 single sideband exciter, with a Heathkit Reflected Power and SWR Meter on top of it. Then follows an American Heathkit DX-100U transmitter, which has been modified to allow operation on SSB with the SB-10.

At bottom left is the Eddystone 888 receiver, and behind the D.104 microphone is the beam control and direction indicator. The unit at bottom right is a home-made frequency meter covering all amateur bands from 3·5 to 28 mc, the design being based on the BC-221, with a Heathkit Grid Dip Oscillator next to it.

Aerials in use are a G8KW trap dipole, used on the 3·5 and 7 mc bands, and a Minibeam for the 14, 21, and 28 mc bands. The beam is rotated by a modified cowling motor, controlled from the operating position by the unit previously mentioned.

Operation is on all bands from 3·5 to 28 mc, mostly on AM and SSB, with 21 and 28 mc as the favourite bands. All types of QSO are equally enjoyed—DX or local, chasing DX, or just talking to friends as a member of the ARRL "Rag Chewers Club." G3NOF first became interested in Amateur Radio after hearing amateur stations on an all-wave receiver in 1936, and he remained an SWL until getting his call in August 1959. One advantage of such a long period of indoctrination is to be able to remind stations worked of hearing them, many years before, and perhaps to thank them for having sent a QSL! He has been a reader of SHORT WAVE MAGAZINE since the first issue, also of every issue of the *Short Wave Listener* until it ceased publication in March 1953, when the B.S.W.L. was wound up. Since 1948 G3NOF has been secretary of the Yeovil Amateur Radio Club (G3CMH).

"THE OTHER MAN'S STATION"

This has been a regular, and popular, feature of SHORT WAVE MAGAZINE since pre-war days. If you can get a good photograph of your station, describe it in some detail in your own words, with such personal information as you care to give, results achieved and main interests in Amateur Radio. Send it all in to us and, if the photograph is good enough and the story sufficiently complete, we shall be glad to use it in the series, and payment will be made on publication.

AMERICAN MAGAZINE SUBSCRIPTIONS

Readers who subscribe to either *CQ* or *QST*, the well-known American radio amateur periodicals, are reminded that their subscriptions can be renewed, in sterling, through our office. The cost, either for a renewal or a new subscription, is 44s. for *CQ* and 43s. for *QST*, covering delivery by surface mail from the American publisher of twelve monthly issues. On the average *QST* runs 170 pages an issue, with a large volume of advertising, and *CQ* about 130 pages; both are essentially radio amateur magazines. Orders, with remittance, should be sent to: Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1. In the case of a *renewal*, please send also the renewal notice.

AID FOR SHORT-WAVE LISTENERS

A handy little book for SWL's starting out on the HF broadcast bands is *How to Listen to The World*; its title explains its contents, and it is obtainable from our Publications Dept. at 7s. post free.

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for April Issue : March 17)

(Address all reports for this feature to "Club Secretary")

LAST month's hint at a change in the scoring system for the **Magazine Club Contest** has brought forth a number of interesting suggestions, most of which, we feel, are far too complicated to put into practice.

One of the simplest, and at first sight the most practicable, comes from *Wolverton,* where they suggest a scoring method based on three points per Club contact except where the other Club is in your own county or an adjoining one. In such cases the points value would be reduced to two.

This seems eminently sensible to us, the only possible snag being the difficulty of ascertaining just which county any particular Club was in—especially if it was a late entry and was one of the many Clubs whose names do not give a clue to their geographical situation.

A combination of this scheme with the one quoted last month would also be interesting, with the U.K. divided into regions and the scoring on the basis of three points for any inter-regional contact, but only one for contacts within a region—a simpler scheme than the graded points-values originally mooted.

There is still ample time for discussion ; please let us have your views and suggestions. And now, activity reports again being pretty numerous, on with the news :

Barnet have now fixed their programme for some time ahead, the immediate fixtures being March 28— Aerials (G3HRH) ; and April 28— D-F Gear (G3HT). Meetings at the Red Lion Hotel, Barnet, 8 p.m.

Bradford will have a Display of Members' Gear on March 14, and their AGM on the 28th. **Bridlington** will be showing a film on Ultrasonics on March 6 ; on the 13th G3GBH will talk on Safety in the Shack ; on the 20th Beam Rotating Gear will be described by G3HFW ; and on the 27th the subject is Reading Circuit Diagrams and Using Radio Vocabulary.

The **I.H.H.C.** held a most successful AGM on January 14, when the programme included a display of colour films of Amateur Radio interest. It was decided that a monthly duplicated Newsletter be circulated to members and produced in this country *(Ham-Hop News,* originally produced by WØGDH. has been undergoing certain difficulties). "Ham-Hop" holidays, we notice, are now arranged on an inter-Continental basis, in addition to the many European tours which grow in number each year.

Leeds will be holding a Ragchew on March 8 and a Transmitting Evening on March 15. On the 22nd the subject will be Radar Systems Illustrated (M. Scargill). **Plymouth** do not mention a March meeting, but are booked for judging their Hillyard Trophy contest on April 18. **Slade** are holding a Mullard Film meeting on March 10, at the Bennett Hall, YMCA, Snow Hill, Birmingham. Two films to be shown are "The Manufacture of Frame-Grid Valves" and "The Invisible Force" ; admission by ticket, 7.45 p.m. On the 24th, member D. Wilson will talk about his recent visit to Moscow, and will show slides. They also have an extensive Direction Finding programme, supplementary to the monthly events. There are seven D-F tests between now and October, starting on March 26.

South Birmingham are visiting their Police Headquarters on March 16, and are already getting busy on organising their Mobile Rally (July 8/9), which they hope to make into a major event on a national scale.

South Yorkshire held their AGM and elected G3HNJ chairman, G2BOJ treasurer and E. Brailsford secretary *(see* panel for QTH). Future talks (no dates given as yet) will cover Pre-Selectors and Q-Multipliers, BFO's for Domestic Receivers, VHF and Microwave Equipment. A Club Tx will be set up shortly, and a library service for members is being organised. The new Clubroom is at the Palace Buffet, Silver Street, and meetings are at 7.30 for 8 p.m.

Spen Valley meet on March 15 to hear about Electronics in the Carpet Industry, and on the 29th

they will visit the R.N.R. Headquarters in Bradford. **Sutton Coldfield** have a Club Station Night on March 9, and on the 23rd a talk on Some Commercial and Industrial Uses of Tape Recorders. The Club runs a Top Band net on 1980 kc most Mondays and Fridays.

South Manchester announce that they are moving to new headquarters, and their address henceforth will be: Fallowfield Bowling and Tennis Club, Wellington Road, Fallowfield, Manchester. The pavilion in use as a shack is in the centre of very spacious grounds. **Paddington**, newly formed Club, is proceeding nicely and the shack is becoming habitable, with members working at the decoration. Two W1's resident in London have been welcomed as members.

The Club station of Bradford Grammar School, operated by G3NEK (seen here) and G3KEP, signed G3MHB/A during MCC, turned in a score of 400 points and gained 27th place.

Burslem is a new Club, only just formed, and members will be welcomed. The hon. secretary's name and address appears in the list elsewhere in this feature.

Cardiff report that they normally meet at the T.A. Headquarters, Park Street, on the second Monday of the month. On March 14 they will be hearing a tape lecture by Bob Ford (AC3SS and AC4RF) on his experiences in Tibet. **East Kent** held their AGM and elected G3NFS chairman and G3MDO secretary; members recently visited the Thanet Club, where they heard GM3CQT/A lecture on the Hallicrafters SX-111 and SX-101a.

Flintshire also had their AGM, electing GW2CCU president, GW3NQP chairman and L. W. Barnes secretary; they meet on the last Monday of the month, at the Bee Hotel, Rhyl, next being March 27, when GW3GWA will talk about Transistors. **Greenford** will have a closed-circuit amateur TV demonstration by G3MMQ on March 17; they meet fortnightly (Fridays) in Room 1, Greenford Community Centre, Oldfield Lane, at 8 p.m., with Morse classes at 7 p.m. On the alternate Fridays, between meetings, they run a Top Band net.

Harrow held their AGM in January and elected G3HBW president for 1961; he was also the winner of their "Enthusiasts' Contest" for 1960. The new Club Tx is being built on their practical nights, which have been increased in number for the purpose; Slow Morse classes are held the same evenings. The meetings are every Friday, 8 p.m., at Roxeth Manor Secondary School, Eastcote Lane, South Harrow. **Ilminster Grammar School** have their own Club, with the call G3IGS; during the last year four members have obtained licences, three of them passing the R.A.E. at the age of 15! They run a Top Band net late on Saturday nights, to which old boys of the school will be particularly welcomed.

Peterborough meet on the first Friday, 7 p.m., at the Technical College. They held a successful Junk Sale in February, with some TV sets selling at a shilling a time! On March 3 there is a Film Show, and on April 7 a talk on Aerials. Visitors always welcome.

Stoke-on-Trent will be holding a Junk Sale on March 23 at 8 p.m. They have taken on the responsibility for Top-Band talk-in for the Trentham Mobile Rally, and members recently tried out the coverage of the stations which will be in action. G3GBU/A will be in control for the last ten miles, with outstations to the North and South.

Wolverhampton meet on March 6 for their third Two-Metre Constructional Class, and on the 20th for a talk on VHF Technique, by G3KPT. Morse classes are being arranged if sufficient interest develops. **Bedford** hold regular meetings on the fourth Thursday, the next being on March 23, when the subject will be Transistors in Communication Equipment. This will take place in the Town Hall Committee Room, but the weekly "Noggin and Natter Nights" are held every Friday at the TA Centre, Ashburnham Road.

Cornish had their February meeting in Redruth, attended by 35 members, with a special welcome for two new ones and for G2JL after a long absence. After the business meeting, G3NVJ gave a talk on the S.W. Electricity Board's transmission line system in West Cornwall.

Reigate held their AGM and re-elected all retiring officials. In addition to their monthly meetings at The Tower, Redhill, they will now hold informal meetings on the first Thursday; the juniors will also be welcomed at the homes of the transmitting members, in rotation, on the first Saturday. March 4 is the first of these evenings, at 14 Rushetts Road, Woodhatch. On March 18, at the Clubroom, G4ZU will be the speaker.

Aberdeen announce the following talks: March 3,

Names and Addresses of Club Secretaries reporting in this issue:

ABERDEEN: W. K. Heggie, GM3NHW, 80 Leslie Terrace, Aberdeen.
ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, London, W.3.
BEDFORD: B. E. Gee, G3LDG, 12 West Grove, Bedford.
BELFAST: W. A. R. Bell, 78 Orangefield Avenue, Bloomfield, Belfast 5.
BRADFORD: M. Powell, G3NNO, 28 Gledhow Avenue, Roundhay, Leeds 8.
BRIDLINGTON: H. H. Mills, G3AJB, c/o 28 East Road, Bridlington.
BURSLEM: L. R. Beeson, G3IVB, 9 Woodside Avenue, Brown Edge, Stoke-on-Trent.
CAITHNESS: W. Hardie, GM3NQB, 24 Brownhill Road, Thurso.
CARDIFF: R. A. Stevens, GW3GQM, 65 Dan-y-graig, Whitchurch, Cardiff.
CHELTENHAM: J. H. Moxey, G3MOE, 11 Westbury Road, Leckhampton, Cheltenham.
CIVIL SERVICE: G. Lloyd-Dalton, 2 Honister Heights, Purley.
CLIFTON: C. H. Bullivant, G3DIC, 25 St. Fillan's Road, London, S. E.6.
CORNISH: W. J. Gilbert, 7 Poltair Road, Penryn.
CRYSTAL PALACE: G. M. C. Stone, G3FZL, 10 Liphook Crescent, London, S.E.23.
EAST KENT: D. Williams, G3MDO, Llandogo, Bridge, Canterbury.
EDGWARE: D. L. Lisney, G3MNO, 17 Pickett Croft, Stanmore, Middx.
ENFIELD: V. Croucher, G3AFY, 15 Nelson Road, London, N.15.
FLINTSHIRE: J. T. Lawrence, GW3JGA, Perran Porth, East Avenue, Prestatyn.
G.E.C. (Research): H. W. Rees, G3HWR, G. E. C. Social and Athletic Club, Wembley.
GRAFTON: A. W. H. Wennell, G2CJN, 145 Uxendon Hill, Wembley Park, Middx.
GREENFORD: E. Gray, G3CPS, 111 Ravenor Park Road, Greenford.
HALIFAX: A. Robinson, G3MDW, 7 Upper Brockholes, Ogden, Halifax.
HARROW: S. C. J. Phillips, 131 Belmont Road, Harrow Weald.
HASTINGS: W. E. Thompson, G3MQT, 8 Coventry Road, St. Leonards-on-Sea.
HULL: G. G. Wray, G3MVO, 93 Wolfreton Lane, Willerby, Hull.
ILMINSTER GRAMMAR SCHOOL: R. W. Sawyer, G3DTB, The Grammar School, Ilminster, Somerset.
I.H.H.C.: M. Allenden, G3LTZ, 16 Grovefields Avenue, Frimley, Aldershot.
LEEDS: D. Dinsdale, 69 Spen Lane, Leeds 16.
LICHFIELD: T. L. Painter, G3NEU, 98 Gaia Lane, Lichfield.
LOTHIANS: L. Lumsden, 33 Hillview Drive, Edinburgh 12.
NOTTINGHAM: E. C. Weatherall, 16 Avebury Close, Clifton, Nottingham.
PADDINGTON: N. Lambert, G3LVK, 22 Sunderland Terrace, London, W.2.
PETERBOROUGH: D. Byrne, G3KPO, Jersey House, Eye, Peterborough.
PLYMOUTH: R. Hooper, 2 Chestnut Road, Peverell, Plymouth,
PURLEY: E. R. Honeywood, G3GKF, 105 Whytecliffe Road, Purley.
R.A.I.B.C.: W. E. Harris, G3DPH, 4 Glanville Place, Kesgrave, Ipswich.
REIGATE: F. D. Thom, G3NKT, 12 Willow Road, Redhill.
ROTHERHAM: S. J. Scarbrough, 25 Crawshaw Avenue, Sheffield 8.
SLADE: C. N. Smart, 110 Woolmore Road, Birmingham 23.
SOUTH BIRMINGHAM: T. W. Legg, Flat 3, 80 Alcester Road, Birmingham 13.
SOUTHGATE: R. Pedder, G3NEE, 6 Greenall Close, Cheshunt, Herts.
SOUTH MANCHESTER: F. Nichols, G3MAX, 29 Rectory Road, Manchester 18.
SOUTH YORKSHIRE: E. Brailsford, 15 Ayrsome Walk, Cantley 4, Doncaster.
SPEN VALLEY: N. Pride, 100 Raikes Lane, Birstall, Leeds.
SURREY (CROYDON): S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, Croydon.
SUTTON & CHEAM: F. J. Harris, G2BOF, 143 Collingwood Road, Sutton, Surrey.
SUTTON COLDFIELD: L. E. R. Hall, G3IGI, 24 Calthorpe Road, Walsall.
THAMES VALLEY: K. A. H. Rogers, G3AIU, 21 Links Road, Epsom.
THANET: J. Barnes, G3BKT, 18 Grange Road, Ramsgate.
WIRRAL: A. Seed, G3FOO, 31 Withert Avenue, Bebington.
WOLVERHAMPTON: J. Rickwood, 738 Stafford Road, Fordhouses, Wolverhampton.
YORK: M. Watson, G3JME, 36 The Paddock, Boroughbridge Road, York.

Panoramic Reception; March 17, Economic Modulation; April 7, Electronics in Oceanography. March 10 is booked for a ragchew, March 31 for a Junk Sale. Nothing is yet arranged for the 24th. **Caithness** is a newly-formed Club with four licensed members and a prospect of more to be added. They will meet monthly from February 21 onwards, and tuition in code and theory will be laid on for beginners; details from GM3COV, '3MYJ, '3GUJ or '3NQB.

Cheltenham have some members who are very keen on Top Band DX, and have been loaned a site by the War Office for a half-wave aerial 100 ft. high and 850 ft. a.s.l.! They have not yet "got across," but are hoping to do so before the season is out. May 7 is fixed for the Cheltenham Rally, at which a new "surprise package" contest is promised.

Clifton recently had a lecture on the Racal RA-17 receiver, which was demonstrated and also shown in dismantled form. On March 10 there is a quiz in preparation for an inter-Club event later on. It is hoped that G8KW will give a talk on March 24. **Edgware** will in future be meeting on the second and fourth Wednesdays at the Community Centre, Merrion Avenue, Stanmore, 8 p.m. On March 8 there will be a Film Show and on April 12 a Junk Sale. Visitors always welcome.

Grafton will be running their popular open Top Band Contest again this year, on April 8 (CW) and April 15 (Phone). For details *see* Top Band section of "DX Commentary." **Halifax** announce their April programme, with a talk on Efficiency Modulation on the 4th and an informal meeting on the 18th. May 2 is the date of the AGM.

Hastings have arranged a Tape Lecture for March 14 and a Film Show for the 28th. April 11 is the date for their quarterly "News Review," when members with access to technical publications give a brief description of the more interesting contents.

Lothians have a Bring-and-Buy Sale on March 9, and a talk by GM3BDA on Auroral Effects on Two Metres on the 23rd. **Thames Valley** meet on March 8 for a talk on The Geneva Radio Conference; they are arranging a Mobile Rally with a rendezvous in mid-Surrey for May 7—two other Rallies are fixed for that date, incidentally!—and also a trip from Richmond to Greenwich by boat on Sunday, June 18.

CLUB PUBLICATIONS RECEIVED

We acknowledge, with thanks, the receipt of the following Club publications: **Crystal Palace** (*Newsletters* 58, 59 and 60); **Enfield** (*Lea Valley Reflector*, Vol. 12, Nos. 9 and 10); **Grimsby** (*GARS News Sheet*, Vol. 1, Nos. 1 and 2); **Hastings** (*Natter-Net Notes*, Nos. 14, 15 and 16); **I.H.H.C.** (*Circular Letter*, 1960); **Mitcham** (*Newsletter*, Dec. and Jan.); **Newbury** (*NADARS Newsletter*, No. 24); **North Kent** (*Newsletter*, Nos. 40 and 41); **Purley** (*Newsletter*, Nov., Jan. and Feb.); **R.A.I.B.C.** (*Radial*, Vol. 6, Nos. 9, 10, 11 and 12); **Reigate** (*Feedback*, Nos. 8, 9 and 10); **South Birmingham** (*QSP*, Vol. 2, No. 2); **Southgate** (*Newsletter*, Dec., Jan. and Feb.); **Wolverhampton** (*News Letter*, Dec., Jan. and Feb.); **Guildford** (*Monthly Natter*, Nos. 2 and 3); **I.R.T.S.** (*News*, Vol. 12, No. 6); **Lothians** (*The Lothians Radio Amateur*, Vol. 1, No. 4); **Surrey** (*S.R.C.C. Monthly News*, Feb.); **Wirral** (*Newsletter*, Dec.); **Slade** (*Contact*, No. 17); and **A.R.M.S.** (*Mobile News*, Jan.).

Nottingham recently suffered a burglary, when their S.640 and microphone were stolen from the Clubroom; fortunately the transmitter weighs 7 cwt. and was therefore left behind! Anyone with a suitable receiver for disposal is asked to get in touch. The March lectures are on Transistors—Part III on the 14th, and Tape Recording on the 28th. An SSB transmitter for Top Band is being built. **Acton, Brentford & Chiswick** gather on March 21 for a tape lecture on Receivers. The Club Tx is now available again, CW and phone, and will be in use on the first Tuesday of each month, when Morse practice will also be held (A.E.U. Club, 66 High Road, W.4).

Belfast (City of Belfast Y.M.C.A. Radio Club), with headquarters at Wellington Place, is reported as thriving, with constructional and Morse classes every Friday, and a new transmitting room recently opened for GI6YM by the secretary of the YMCA; membership totals 60—*see* panel for secretary's QTH.

Rotherham have fixed their programme for the first quarter, with a practical and R.A.E. night once a month, and lectures covering Regulations, Test Gear and RTTY. Recent talks have been on Two Metres and on G3NXZ's prize-winning Top Band transmitter. **Surrey** met in February for a lecture by G4ZU on the Birdcage aerial. On March 14 the traditional Junk Sale will be held—at the usual venue, The Blacksmith's Arms, South End, Croydon.

Thanet will be active from the Broadstairs Hobbies Exhibition, April 5-8, exhibiting and operating GB2SB. Contacts on Top Band and Eighty will be very welcome. After that they will be preparing for their Mobile Rally, on May 7.

Civil Service gather at the Science Museum on March 7 to hear a G.P.O. talk on Ship-to-Shore Circuits, with film illustrations. March 21 will be an informal night, with a tape lecture on Mobile Operation; visitors for either event please notify G3JUL first at *KEN 6371;* meetings begin at 6.30 p.m.

Crystal Palace are holding a Quiz Contest *versus* the Clifton Club on March 18, at Windermere House Annexe, Westow Street, London, S.E.19. The meetings there are on the third Saturday, but they also meet on the first Tuesday at the QTH of either G3FZL or G3IIR.

An Amateur Radio club has been formed at the G.E.C.'s Hirst Research Centre, **Wembley,** for which they have the call G5FK. The next meeting for **Wirral** is on March 15, with a film on Transistors; they now have a more settled meeting place at the Castle Hotel, Birkenhead, on the first and third Wednesday of the month.

York have their meetings every Thursday, 8 p.m., at the Clubroom, Fether Lane, where they have a transmitter nearing completion; one of their members is G3IDC, well-known in R.A.F.A.R.S. circles.

Sutton & Cheam, normally meeting every third Tuesday in the month, have their next on March 7, for the annual construction contest; that following is on March 21, and all meetings are at "The Harrow," High Street, Cheam.

SMALL ADVERTISEMENTS

(" SITUATIONS " AND " TRADE ")

9d. per word, minimum charge 12/-. No series discount: all charges payable with order. Insertions of radio interest only accepted. Add 25% for Bold Face (Heavy Type). No responsibility accepted for errors. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, S.W.1.

SITUATIONS VACANT

AIR MINISTRY have vacancies for civilian RADIO TECHNICIANS at Royal Air Force, Sealand, Cheshire ; R.A.F. Manston, Kent ; R.A.F. Aldergrove, N. Ireland ; and a few other R.A.F. Stations throughout the United Kingdom, for the servicing, repair, modification and testing of air and ground radio and radar equipment. Commencing salary (National) (according to age) is £525-£670 p.a. Max. salary, £795 p.a. Rates are subject to small deduction at certain provincial stations. Annual leave, 3 weeks and 3 days, increasing to 4 weeks 2 days after 10 years' service ; 5 weeks after 20 years' service, and 6 weeks after 30 years' service. A limited number of houses may be available for renting at Sealand. These houses are at West Kirby, some 15 miles distant.—Apply, giving details of quals. and exp., and mentioning this advertisement, direct to Commanding Officer No. 30 Maintenance Unit, Royal Air Force, Sealand, Cheshire (for Sealand vacancies) ; Commanding Officer R.A.F. Manston, Kent (for Manston vacancies) ; Commanding Officer, R.A.F. Aldergrove, Nr. Crumlin, N. Ireland (for Aldergrove vacancies) ; or to Air Ministry, C.E.3g, Princes House Kingsway, London, W.C.2 for vacancies in other areas, or apply any Employment Exchange, quoting City O/N 3057.

MAN WANTED to take charge of shop selling Government Surplus and Amateur Radio Equipment.—Please apply by letter to: Universal Electronics, 22 Lisle Street, London, W.C.2, or phone *GERrard 8410.*

TRADE

K. W. TESTED LG.300 with Labgear Mod/PSU, £75. Geloso G209-R, £60. G209, £47. Eddystone 750, £50. 888, £60. Special HRO with PSU & B/S Coils, £30. AR77E, £27. K.W. Valiant, 10-80m., £25. K.W. Vanguard, 10-60m., £45. AR88D, £50.—K.W. Electronics Ltd., Vanguard Works, Dartford, Kent.

SMALL ADVERTISEMENTS, TRADE—*continued*

SPECIAL OFFER: Professional Recording Tape (P.V.C.). brand-new, original seal, 1200 ft. (7 in. spool). Surplus to requirements, 21s. per reel ; P. & P., 1s. 6d. per reel extra, or £6 for six, post free. —Apply Olympic Sound Studios, Carton Street, W.1.

NEW from " Telecomm " for the 1961 Mobileer: 2-metre 30-watt Tx. extensively transistorised. 27 gns.; 2-metre all-transistor double-super Rx. £50. Terms. Shortly available: All-transistor 2-metre converter.—R.E.E. Telecommunications, Ltd., Telecomm Works, Crewkerne, Somerset.

WANTED FOR CASH: Good clean communication receivers and SSB equipment. Please state price. — Short Wave (Hull) Radio, 30/32 Princes Avenue, Hull. *(Tel. 18953.)*

TRI-BAND QUAD AERIALS. Optimum spacing for EACH Band, £17 each. 80 dB 70-80 ohm TVI LOW PASS FILTERS, handle 1 kw correctly terminated, £6 each. SWR METERS, Co-ax unit, 30s., Indicator £6 15s. PLUG-IN AIR WOUND 250-WATT INDUCTORS with swinging links, complete set 10-80m., with base, £12 19s., or sold separately. MULTI-TAPPED INDUCTANCE, ideal for aerial tuning units, 42s. each. THE EXCLUSIVE LAB-GEAR WIDE-BAND MULTIPLIER UNIT, 7 gns. each. 5-BAND COIL TURRETS, 50-watt rating, single-ended, 55s.; Push-pull 60s.; Pi 50s. PARALLEL FEED RF CHOKES for 10-160m. Amateur Bands, 250 mA, ceramic former, 10s. 6d. each. S.a.e. for leaflets. Terms, c.w.o.; carriage paid over £5. All items *ex*-stock.—LABGEAR LIMITED, WILLOW PLACE, CAMBRIDGE. *(Tel.: Cambridge 88022 — 4 lines.)*

QSL's and Logs by Minerva. The best there are.—Samples from Minerva Press, 2 New Road, Brentwood, Essex.

QSL CARDS AND LOG BOOKS, G.P.O. APPROVED. CHEAPEST, BEST. PROMPT DELIVERY. SAMPLES. — ATKINSON BROS., PRINTERS, LOOE, CORNWALL.

" TELECOMM " 9-valve 90-215 mc Receiver. built-in LS. AC power supply, £50. 20-watt all-transistor mobile amplifiers, 30 gns. — R.E.E. Telecommunications, Ltd., Telecomm Works, Crewkerne, Somerset. *(Phone 662.)*

WEBB'S LOG BOOK for recording signals heard and worked ; 112 pages 9¾in. x 8in., approved format, semi-stiff covers. Excellent value ; 6s., post free, or callers 5s. 3d.—Webb's Radio, 14 Soho Street, London, W.1.

READERS' ADVERTISEMENTS

3d. per word, min. charge 5/-, payable with order. Please write clearly, using full punctuation and recognised abbreviations. No responsibility accepted for transcription errors. Box Numbers 1/6 extra. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, S.W.1.

WANTED: Suitcase for B2 transmitter-receiver. Professionally made mobile rig, Top Band or Two-metre.—Box No. 2418, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Mod. Transformer UM1, and ex-A.M. Power Unit 247, or similar enclosed 500 to 600v. 200 mA Unit.—GM3KAJ, Fortrose, Ross-shire.

SMALL ADVERTISEMENTS, READERS—*continued*

WANTED: CR100/B28 Manual; your price paid. Urgent!—W. L. Fraser, 278 Stonelaw Road, Rutherglen, Glasgow.

FOR SALE: Teleprinter. Creed model. Type 3, mint condition; can be seen working (on DX if required); bargain, £6.—G3BXI, 49 Mount Pleasant Road, Chigwell, Essex. *(Hai 4546.)*

R. 107, excellent appearance, good working order; first offer over £10. 18 Set with batteries and extras, works well, 70s. o.n.o.? Buyer collect or pay carriage.—Talbert, Mere Hall, Oxton, Birkenhead, Cheshire.

FOR SALE: BRT-400; Minimitter Mercury, and LPF; all mint; obtained DXCC, WAS, WBE, etc. Offers invited.—G3CIM, 52 Keswick Road, Cringleford, Norwich.

ADVANCE E-2 Signal Generator, 100 kc to 100 mc; perfect working order; with accessories; £12. Marconi TF-340 output meter, good condition, £4.—J. O'Shea, 306 Utting Ave. East, Norris Green, Liverpool 11, Lancs.

WANTED: Manual for SX-28 Rx.—G3JJU, 9 Wimborne Road, Walford, Wimborne, Dorset.

SCHOOL for Disabled Boys, hoping to set up an Amateur Station. Gifts (or bargains) of equipment greatly appreciated.—Please write: The Principal, Hephaistos School, Farley Castle, Farley Hill, Nr. Reading, Berkshire.

EDDYSTONE 750, good condition, £40 o.n.o.? 38 Set Tx/Rx, spare valves, aerial rod, etc., new, £2. R.1147B, 25s.; all with circuits. No. 19 Set, 50s., unused.—Butler, Deva Edina, Whitchurch Road, Christleton, Chester.

HEATHKIT DX-40U, £22. SSB Exciter, self-powered, complete with Barker-Williamson phase-shift network, £18. 100w. Linear amplifier, self-powered, £9. K.W. low-pass filter, £2 10s. 2 x ½-Lattice 460 kc filter with 5 (FT241) spare crystals, £2. Vibroplex Key, £3. — Box No. 2419, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

MOBILE 12v. Marconi H16 Transmitter/Receiver, also extra mains Receiver, 36 to 170 mc, £10 each.—*Phone Billericay 948 (Essex.)*

SALE: Amateur has large selection of units, chassis, valves and components at low prices; s.a.e. for list, please.—Box No. 2420, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

TOP BAND Tx, complete, modulator and PSU, in case 6 x 9 x 10½ inches; offers about £10. Teleprinter 7B, recond. by experts; 250v. motor and complete handbook; £25. Speech Amp.-Modulator, 60w. audio p/p parallel KT66; commercial item; £8. Class-C Wavemeter, with built-in power unit; ideal for Sig. Gen.; offers about £2 10s.. Klystrons, KRn2A (CV12), 723AB, CV36; offers? Power Unit for "Valiant" or similar Tx, 500v. 250 mA twice, 6·3v. 4A., £5. Complete power unit for 120w. Tx and 4ft. rack for Tx; send s.a.e. for details.—G3NDC, 3 Orchard Road, Farnborough, Kent.

WANTED URGENTLY, at reasonable cost: DX-100U, K.W. Vanguard, PR120V, or similar commercial Tx for Club station.—Details to Radio Society, University of Nottingham.

SMALL ADVERTISEMENTS, READERS—*continued*

FOR SALE: 2-metre Converter, T. Withers, complete with AC mains stabilised power pack, IF output 28-30 mc, £9 10s. New pair variable condensers for Z-Match (Johnson), 30s. AC mains power pack output stage for R.1155 Rx, 35s. AC mains power pack for R.1392 Rx, 25s.; RF 26 unit, 15s. 'Scope tubes VCR97, 5BP1, 10s. each. HRO dial and gearbox, 20s.; other items, s.a.e.—Write or call: Briscoe, 311 Eton Road, Ilford, Essex.

SALE: Minimitter Converter, 10/80 metres (6 mc IF), FB condition, £10 o.n.o.? — Warnett, 34a Fountain Road, London, S.W.17.

ELMAC Mobile Receiver, complete with handbook, £55. New American Gonset 43 Receiver, handbook, £55. Heathkit VFO, calibrated ready for use, handbook, £7. Brand-new unused American series-gate modulator, capable mod. 1 kW, £17. American 250w. speech amplifier, with steel carrying case, £25. —Thompson, West Knoyle, Warminster, Wilts.

SALE: Collins Tx and Rx, excellent condition, £15 or nearest offer?—Haggarty, 2 Lower Green, Tewin, Welwyn, Herts.

EXCHANGE: Contax 111 with 1·5 Sonnar, Contax Cassette, hood, and ERC; all in good condition; for AR88D, FB job; with manual and delivered (Derbys.). — Box No. 2421, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: R.208, £6 10s. or offers? Also Sound 777 Tape Recorder, originally £47; £35 or offers? Both good condition and carriage paid.—Townson, 3 Beaumont Street, Lancaster.

WANTED: Tri-Band beam or vertical; also tape-deck or complete recorder.—G3HCM, 321 Tile Hill Lane, Coventry, Warwickshire.

62 SET, Minimitter 1·9 mc Whip, 12v. battery, £12. Mosley TA-32Jr., £9. Buyer collects.—G3COI, 43 Mount Road, Penn, Wolverhampton.

SALE: Receivers—Hallicrafters SX-24, 550 kc-43 mc, in good condition, £12. R.1155, modified for 160m. and fitted with new front panel, built-in power supply, OP stage, speaker and S-meter, £10.—Cook, Y.M.C.A., 184 Tottenham Lane, Hornsey, London, N.8.

SALE: "Clarion" Transistor Battery Recorder with mike, 4 tapes and instruction booklet; cost 25 gns.; sell £16 o.n.o.? — R. Craib, Duff House Gardens, Banff, Scotland.

DISABLED AMATEUR wishes buy home-made or modified transmitter, Collins TCS-12, Elizabethan, or similar; good condition, working order, reasonable.—Box No. 2409, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Medium-wave coil-pack for Command Rx, or coil re-winding data. Also copy *Short Wave Magazine*, September 1948. Also 1st IF can for BC-653, 2830 kc.—Box No. 2410, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

AR88D Receiver, manual, tuning tool, etc., very good condition, real bargain, £45 (buyer collects).—Please ring *RIP. 6691.*

FOR SALE: Collins high-quality modulator, push-pull 6J5, 6F6's, 807's, internal 1 kc oscillator with power pack, £15. Also 829B's, 15s. each.—Steele, 57 Clitherow Avenue, London, W.7.

SALE: AR88D, just aligned, re-valved; speaker, spares, re-sprayed cabinet, £50. — Holland, 42 Selwyn Road, New Malden, Surrey. *(MAL 4242.)*

SMALL ADVERTISEMENTS, READERS—*continued*

FOR SALE: BC-348, very good condition, just been aligned, crystal filter checked, BFO checked, internal AC power supply.—Phone evenings: *Ealing 4988.* £12 10s.

WANTED: Collins 51J4 or 75A4. SALE (all good condition): AR88D, £43; Hallicrafters SX-28, £27; Marconi CR-100, £15; Collins 51J2—offers?—G3NNT, 23 Southport Road, Ormskirk *(Tel. 3209),* Lancs.

MINIMITTER, absolute bargain, excellent condition, complete with low-pass filter and microphone, £45. ZC1 Mk. II, modified for crystal microphone, £4. Buyers to inspect and collect, please. —G3JYO, 27 Arundel Crescent, Solihull, *ACO 1253,* Warks.

SALE: HRO/M rack mounting, 9 coil sets, B/S 20 and 10 metres, £19. Valradio converter, 200/240v. DC in, 240v. AC out, £5. *Radio and TV Servicing,* 6 vols., £6. *Practical Radio and TV,* 4 vols., £3. Rotary converter, 14v. DC/1200v. DC 75 mA out, £1. SX-28 cabinet, new panel, brackets and chassis undrilled £5. 813 (new) with base, 30s.—*(Ring HOUnslow 1220 Saturdays after 10 o'c.)*

SALE: R.208, good condition with manual, £6 10s. o.n.o.? (equipment swap?) WANTED urgently: Woden DT3; s.a.e. details to: G3NGU, 69 Montrose Avenue, Luton, Beds.

FOR SALE: Vidicon, Type 10667, good picture, complete with base, £12. Marconi TF428 Valve Voltmeter, excellent condition, £6 o.n.o.? London area.—Box No. 2411, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

EDDYSTONE 840 8-valve s'het. 500 kc-30 mc, internal speaker. NL, AVC, BFO, etc., rechecked and calibrated, perfect condition, ex-laboratory use, £45 o.n.o.?—Metals Research, Ltd., 91 King Street, Cambridge.

WANTED: VLF Rx, minimum range 100 kc-15 kc.—Box No. 2412, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

NFD, Nife Battery, 3 banks of 4 cells, 15v. 150 AH, list £140-£12 (buyer collects). Hallicrafters SX-28, mint, manual, £40. Taylor Sig. Gen. E.2, 100 kc-100 mc, mint, £12. Cossor Ganging Oscillator (Wobbulator), manual, £7. CNY-1 Rx, manual, £2. Pye strip, 45 mc, 30s. Manual for 38 Set, 5s. Tx and PSU, 300-watt phone, VOX, 2-12 mc. PA 2/813, ideal conversion all bands, manual, £40. Air compressor set, 2·5 c.f.m., 120 p.s.i., ½ h.p., £10. Host other gear. State wants.—G3IWR, 108 Old Oak Road, Acton, London, W.3.

WANTED: Z-Match tuning unit, standing-wave ratio meter, and G4ZU Minibeam for operation with Panda PR120V.—All details to: Hudson, 37 Marlborough Road, Shipley, Yorkshire.

TX 100w. 2/807, RCA exciter, switched 3·5-28 mc, modulator and power packs, all in RCA steel cabinet, £35. Callers only, any time. — Rowe, 33 Motspur Park, New Malden, Surrey.

SALE: 1-UM3, 1-DT2, 2-KT88, 1 mod. trans ex-TCS12. *QST,* all copies Nov. '58-Dec. '60. Offers?—Box No. 2413, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Crystals, channels 47-48-49. Your price paid.—G3LCC, 78 Valley View Road, Rochester, Kent.

SMALL ADVERTISEMENTS, READERS—*continued*

BRT400E, excellent condition, realigned and over-hauled Feb., xtal cal., FSK, S-meter, etc., spare valves, manual, £75. — Hall, 15 McArthur House, Greenways, Bethnal Green, London, E.2.

G3GCO requires gen. on ex-RAF receiver R.1392. All letters answered; K someone, please.—Bowen, 31 The Crescent, Donnington, Wellington, Shrops.

SALE: Eddystone 640, very good condition, £18 10s. WANTED: 40-metre xtals. No reasonable price refused.—Box No. 2414, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELL: 75w. Elizabethan, £5; 150w. Elizabethan, with clamp mod., £7; both without PSU; buyer collects (B'ham). 350-0-350v. 200 mA xfmr.; 20 Hy., ⅓ amp. choke; the pair, £1 (carriage extra).—Box No. 2415, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

G2NS, raising money buy *Encyclopædia Britannica*, offers little-used LG.300 with Labgear PU and modulator; £100 to callers only with cash.—Spooner, 31 Cranleigh Gardens, Southbourne, Bournemouth *(46334)*, Hants.

SSB EXCITER "Kendon." all bands 80-10 including Class-A Amplifier, £20. Victoria Test Meter, AC/DC Volt/Ohm/Amps, 13 ranges with Resistance/Capacity Bridge. 10 $\mu\mu$F-10 μF and 10 ohms-10 megohms, £5. Home-built all-purpose test instrument, including valve voltmeter with diode probe, signal generator, grid dip meter, audio oscillator, 100 kc oscillator, 70s. B.P.L. Signal Generator, 100 kc-30 mc, rough but OK, 70s. Geloso, Type 401 Desk Mike, £2.—Olver, Spinney, Moor Hall Drive, Sutton Coldfield.

GEC MINISCOPE and case, £9; Bendix TA-12B Transmitter, all valves, unmodified, £5. New 805 valves (4), 30s. each. Bridges drill stand TPLI/SA, 30s.—Box No. 2416, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

CR-100 NOISE LIMITER, S-meter, manual, £17. K.W. 10/80 converter, self-powered, £15. Crystal Calibrator, 1000/100/10 kc, fitted mains unit, £4.—G3NRZ, 20 Sunbury Avenue, Mill Hill, London, N.W.7. *(MIL 3161.)*

PANDA PR120V, little used, excellent condition, £40. Demonstration by appointment. Deliver reasonable distance. — G3KEF, 86 Halford Lane, Coventry.

WANTED: Minimitter Converter, 6 volt and 1·5 mc output.—G2SB, 13 Castle Drive, Heswall, Cheshire. *(Tel. 1364.)*

LABGEAR TOPBANDER, few hours' use only, £18, plus carriage. Inspection/Test invited.—G3ADZ. 3 Norris Gardens, Havant, Hants.

FOR SALE: "Telecomm" 40-watt 2-metre Tx, complete with built-in mod. and power supplies; cost £85 as new; accept £60. Urgently required: U.S.A. VHF Converter-type AM913/TRC, 95-220 mc.—Box No. 2417, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

EXCHANGE 80 Radio/Tape Magazines, etc., value when new £14. WANTED: S.W. Receiver covering at least 3·5 to 15 mc. Send for details and offers. — G6933, 13 York Road, Upper Ventnor, I.o.W.

36 SENDER, 50 watts, 10-15-20 metres, as new, £10. Creed 3A Teleprinter with PU, £15. Buyer collects.—Walker, 38 Ash Close, Peterborough.

SMALL ADVERTISEMENTS, READERS—*continued*

MOBILE STATION Gonset Commander, 160-6m., 6146 PA, plate and screen mod., push-to-talk mike, external tubeless VFO, rotary power unit; Morrow 5BR2 5-band converter; Mosley MA3 Mobile Triband aerial, with Master Mobile heavy-duty spring mount and co-ax relay. All handbooks. Has WAC Mobile. Price £50.—GI3CDF, 63 Church Street, Portadown, N. Ireland.

VHF RECEIVER, 26-135 mc, £14; Geloso Converter, valves and meter, £10; two-metre crystal converter, IF 27-29, £6; CN-348 VHF Transceiver, £5; TF.390G, OK, no charts, £4; R.107 RF and IF/AF, £4. R.107 PSU, £2; 62A Indicator, 30s.; AM913/TRC Converter with valves, 90-215 mc, £7; home-built Rx units R.209, £10; receiver cabinet, four-gang condenser, HRO dial and drive, 35s. GR Wavemeter 758A, 55-400 mc, new, £3. Collect only. London.—*(Phone SYD 3217 after 7 p.m.)*

FOR SALE: Genuine AR88 S-meter, brand-new, complete with detailed fitting instructions. 57s. 6d., postage 1s. 6d. Other items available for AR88 (send s.a.e. for list). Hallicrafter S-38, £14. G.E.C. Miniscope, £14; Wobbulator attachment, £4 (both units new, unused); buyer collects. WANTED: Manuals for AR88D and AR88LF.—A. J. Reynolds, 139 Waller Road, New Cross, London, S.E.14. *(Telephone New Cross 1443 after 7 p.m.).*

NATIONAL Velvet Vernier Dial, new, 12s. 6d.; Meters 0-1 mA, scaled 0-100, 7s.; 0-200, 0-250, 0-300 mA, 7s. 6d.; 0-500 mA, 8s. 358X valve check meter, 5s. 6d.; all plus postage, s.a.e. enquiries.—G8UO, 12 Cartmel Road, Keighley.

WANTED: ATU for Panda PR120V; also CNY1 Receiver, 12v.—Price to: GI3EPI, 23 Harding Street, Londonderry.

SALE: Eddystone S.740 with 8-in. spkr., £30. Buyer collects.—Searle, 1 Manor Court, Grange Park Road, Leyton, London, E.10.

SHORT WAVE MAGAZINE, May 1952 to February 1961, complete; sell or W.H.Y.?—Offers to: G3KCV, 26 Helena Road, Yeovil, Somerset.

EXCHANGE: Two R.1155A's with one p/pack and an R.208 needing slight attention, for Receiver-type DST-100.—Carr. 44 Churchill Road, Cheadle, Staffs.

POWER PACKS. 19-in. panels, Woden 500v., £3; 600v., £3; 1000v. and 500v., £5; all LT's. 100-watt modulator, Woden driver, UM3 output, £7. 6ft. Rack, £1. CAY Tuning Unit, 1·5 to 3 mc, new, £2. 814, £1; TZ40, 15s. Buyer collects.—Panter, 23 Cecilia Road, Blackburn.

SALE: K.W. Vanguard, £40. Would swop mint AR88, etc. Going QRO. WANTED: Spares AR77E, dials, etc.—Box No. 2422, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

INTRODUCING TO YOU THE WORLD-FAMOUS Heathkit DAYSTROM

Easy-to-build kit-sets of highest quality at lower cost

AMATEUR TRANSMITTER. Model DX-100U. Covers all amateur bands from 160-10 metres. Self-contained including power supply, modulator and V.F.O. ... **£78 10 0**

" HAM " TRANSMITTER. Model DX-40U. Compact and self-contained. From 80-10 m. Power input 75 w. C.W., 60 w. peak, C.C. phone. Output 40 w. to aerial. Provision for V.F.O. **£29 10 0**

VAR. FREQ. OSCILLATOR VF-1U. From 160-10 m. Ideal for our DX-40U and similar transmitters. (Price less valves £8/19/6) **£10 12 0**

GRID DIP METER. Model GD-1U. Continuous coverage 1.8 to 250 Mc/s. Self-contained. 5 plug-in coils supplied **£9 19 6**

TRANSISTORISED G.D. METER £9 18 6

R.F. SIGNAL GENERATOR. Model RF-1U. Provides extended frequency coverage in 6 bands from 100 Kc/s. to 100 Mc/s. and up to 200 Mc/s. on calibrated harmonics. Up to 100 mV output on all bands ... **£11 11 0**

RES.-CAP. BRIDGE. Model C-3U. Measures capacity 10 pF to 1,000 μF., resistance 100Ω to 5 MΩ and power factor. 5-450 v. test voltages. With safety switch **£7 19 6**

AUDIO SIGNAL GENERATOR. Model AG-9U. 10 c/s to 100 kc/s, switch selected. Distortion less than 0·1%. 10 v. sine wave output metered in volts and dB's **£19 3 0**

VALVE VOLTMETER. Model V-7A. Measures volts to 1,500 (D.C. and RMS) and 4,000 pk. to pk. Res. 0·1Ω to 1,000 MΩ. D.C. input imped. 11 MΩ. Complete with test prods, leads and standardising battery ... **£13 0 0**

R.F. PROBE. Model 309-CU. Extends the frequency range of our V-7A to 100 Mc/s and enables useful voltage indication to be obtained up to 300 Mc/s **£1 5 6**

5 in. OSCILLOSCOPE. Model O-12U. Has wide-band amplifiers, essential for TV servicing, F.M. alignment, etc. Vertical freq. response 3 c/s to over 5 Mc/s without extra switching. T/B covers 10 c/s to 500 kc/s in 5 ranges **£34 15 0**

ELECTRONIC SWITCH S-3U (Oscilloscope Trace Doubler). Enables a single beam oscilloscope to give simultaneous traces of two separate and independent signals. Switching rates approx. 150, 500, 1,500, 5,000 and 15,000 c/s. **£9 18 6**

CAPACITANCE METER CM-1U. Direct-reading 4½ in. scale. Full-scale ranges, 0-100μμF, 0-1,000μμF, 0-0·01μF and 0-0·1μF ... **£14 10 0**

AUDIO WATTMETER. Model AW-1U. Up to 25 w. continuous, 50 w. intermittent ... **£13 18 6**

S-33

UXR - 1

S-88

FM TUNER

VF-1U

DX-40U

DX-100U

THE " GLOUCESTER " EQUIPMENT CABINET

HI-FI F.M. TUNER. Tuning range 88-108 Mc/s. For your convenience this is available in two units sold separately as follows : Tuner Unit (FMT-4U) with 10·7 Mc/s I.F. output (£3/2/- inc. P.T.). I.F. Amp. (FMA-4U) complete with cabinet and valves (£10/10/6). Total **£13 12 6**

TAPE RECORDING/PLAYBACK AMPLIFIER. Thermometer type recording indicators, press-button speed compensation and input selection. Printed Circuit Board. Mono. Model TA-1M, **£16 14 0.** Stereo Model TA-1S **£22 4 0**

HI-FI 16W STEREO AMPLIFIER. Model S-88, 10 mV. basic sensitivity (2 mV. available, 20/- extra). Ganged controls. Stero/Monaural gram., radio and tape recorder inputs. Push-button selection. Two-tone grey metal cab. **£25/5/6**

6-W STEREO AMPLIFIER. Model S-33. 3 watts per channel, 0·3% distortion at 2·5 w/chnl., 20 dB N.F.B. Inputs for Radio (or Tape) and Gram., Stereo or Monaural, ganged controls. Sensitivity 100 mV.... ... **£11 8 0**

TRANSCRIPTION RECORD PLAYER RP-1U. 4-speed A.C. motor. Ronette Stereo/Mono pick-up. Complete with plinth. **£12 10 0**

HI-FI SPEAKER SYSTEM. Model SSU-1. Ducted-port bass reflex cabinet " in the white." Twin speakers. With legs (£11/12/6) **£10 5 6**

HI-FI EQUIPMENT CABINETS. Range now available to suit all needs.
From **£10 10 0** to **£17 8 6**

"COTSWOLD" HI-FI SPEAKER SYSTEM KIT. Acoustically designed enclosure " in the white " 26 in. x 23 in. x 15½ in., housing a 12 in. bass speaker with 2 in. speech coil, elliptical middle speaker and pressure unit to cover the full frequency range of 30-20,000 c/s. Complete with speakers, cross-over unit, level control, etc., ... **£19 18 6**

COMPLETE MATCHED STEREO OUTFIT. Includes RP-1U record player, S33 amplifier and twin SSU-1 speaker systems. (Pedestal speaker legs optional £2/14/- extra)... ... ... **£42 10 0**

SHORT WAVE TRANSISTOR PORTABLE. Model RSW-1. Four bands (2 Short, Trawler and Medium). **£20 18 6**

DUAL-WAVE TRANSISTOR PORTABLE. Model UXR-1. Medium and Long ... **£14 18 6**

2¾" PORTABLE SERVICE 'SCOPE, OS-1. A compact, portable oscilloscope ideal for servicing and general laboratory work. Overall size 5" x 8" x 14½" long, weight 10½ lbs. Y amplifier sensitivity 10 mV/cm, bandwidth 10 c/s, 2.5 Mc/s. Time base 15 c/s—150 Kc/s. Uses printed circuit board & 2¾" c.r.t. **£18 19 6**

All prices include free delivery U.K.
Deferred terms available on orders over £10

Please send me FREE CATALOGUE (Yes/No)
Full details of model(s).....
.....
NAME.....
(BLOCK CAPITALS)
ADDRESS .....
..... SW3

DAYSTROM LIMITED

DEPT. SW3, GLOUCESTER, ENGLAND

A member of the Daystrom Group, manufacturers of the

WORLD'S LARGEST-SELLING ELECTRONIC KITS

Printed by The Courier Printing Co. Ltd., Tunbridge Wells, for the Proprietors and Publishers, The Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1. The *Short Wave Magazine* is obtainable abroad through the following : Continental Publishers & Distributors, Ltd., William Dawson & Son, Ltd. ; AUSTRALIA AND NEW ZEALAND—Gordon & Gotch, Ltd. ; AMERICA—International News Company, 131 Varick Street, NEW YORK. Registered for transmission to Canada by Magazine Post. *March 1961.*