

# The SHORT WAVE Magazine

VOL. XXII

JUNE, 1964

NUMBER 4

## K. W. ELECTRONICS for all your Amateur Radio Requirements

Consult us at K.W. for all your equipment—we may have it in stock

### WE STOCK:

KEYS—Vibroplex Semi-automatic and G.P.O. type. HKIB keyer.  
 VFO'S—Geloso, Miniphase.  
 TOWERS—G3BXI and S.V.S.  
 PHASE-SHIFT NETWORKS—B and W.  
 ROTATORS—CDR AR22, "HAM-M," and TR44.  
 BEAMS—Mosley, Hy-Gain, IHC 2 metre curtain.  
 AERIALS—K.W. & Mosley, G3FIF & Webster Band-spanner (mobile).  
 MIC'S—Geloso, Shure, Acos.  
 FILTERS SSB—McCoy Crystal and Kokusai Mechanical.  
 FILTERS—High Pass and Low Pass.  
 "WALKIE-TALKIE"—Tokai Transceiver on 28.5 mc/s.  
 AIRDUX COILS. Complete range  $\frac{1}{2}$ " to 2" dia.  
 RELAYS—Dow Key Co-axial type.  
 SIG. GENERATOR—Nombrex Transistorized.  
 CABLE—Co-ax 75 and 52 ohm, 15 s.w.g. enamelled copper.  
 POLYTHENE CORD—280 lb. and 350 lb. strain.  
 SWR INDICATOR—KW Match 75 or 52 ohm.  
 CONVERTER—Front-end KW, Geloso.  
 PLUGS, SOCKETS, Pi COILS. R.F. CHOKES, etc.  
 COLLINS 'S' LINE 3253 & 7553



The KW77 Receiver

### NEW!

### KW TRANSMITTERS

KW "Viceroy" S.S.B. Transmitter MK. IV with built-in Power Supply £156  
 (Additional  $\frac{1}{2}$  lattice filter, £9 extra)  
 KW500 Linear Amp. 500 watts p.e.p., £87 10s.

KW "Vanguard" A.M. and C.W. 10-80m. 63 gns. 10-160m. 67 gns. Kits also available.  
 KW "Vanguard" 2 metre 50 watt transmitter, complete with power supplies and high level modulator QQV03-20A P.A., £63  
 KW160. Top band transmitter with a punch, £29

Send for details.

Carriage extra

Awarded Silver Plaque, Radio Communications Exhibition, Seymour Hall, London, 1963



KW2000 SSB  
 TRANSCIVER AND A.C. POWER SUPPLY  
 10-160 metres, Mobile and Fixed Station

Easy Terms Available NEW! 50/- each  
 6146B tubes 2/6 postage & packing

Importers of U.S.A. Equipment

- ★ Mechanical filter provides pass-band for SSB
- ★ No external antenna switching required
- ★ Independent transmit and receiver frequencies or true transceiver operation
- ★ 90 watt p.e.p. provides effective mobile power whilst not over taxing the car battery
- ★ 12 volt d.c. transistor power supply
- ★ Easy to install in a vehicle for mobile operation
- ★ Lightweight, attractive, robust, efficient
- ★ 100 kc Calibrator built-in

# KW

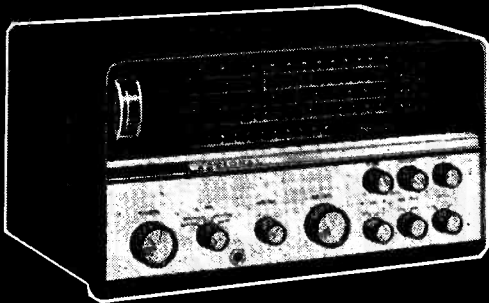
## ELECTRONICS LTD Vanguard Works

1 HEATH STREET, DARTFORD, KENT

Cables: KAYDUBLEW, Dartford Phone: DARTFORD 25574

# National

## NC 121 RECEIVERS!



**For the Novice :** Instead of starting with a second hand or a "cut-price" receiver — the new National NC-121 general coverage receiver has all the features you will need and want for top performance, at a price one would expect to pay for used equipment.

**For the Advanced Amateur :** The NC-121 will act as an exceptional "standby" receiver — as a general coverage receiver for SWL'ing for tunable shooting or checking WWV. The receiver shown on right is just perfect for the living room in its hand-rubbed oiled walnut case — so why confine your listening time to your operations room.

The NC-121 has continuous coverage from 550 kc. to 30 mc. in four bands, strong extruded aluminium panel construction, large illuminated edge-reading

signal strength meter, and peaking Q-multiplier for optimum selectivity. Plus the following : 5" permanent magnet speaker, phone jack in front, bandspread calibration charts for all amateur and foreign bands, separate RF and audio gain controls, separate combination BFO/product detector, full time AGC for SSB/CW signals as well as AM. Price £53 6s. 11d. or in superb walnut case — £61 13s. 7d.

This is just one of the National range, others include the NCX3 Tri-Band SSB Transceiver, a complete SSB/AM/CW station with 200 watts of SSB punch selling at only £148 8s. 4d.

**For full information contact your local distributor or the sole UK importers.**

## Ad. Auriema Ltd.

125 GUNNERSBURY LANE, LONDON, W.3  
Telephone: ACOrn 8762.



## MIDLAND AGENTS FOR

- \* EDDYSTONE RECEIVERS & COMPONENTS
- \* NATIONAL RECEIVERS & TRANSCEIVERS
- \* GREEN & DAVIS CONVERTERS
- \* KW EQUIPMENT
- \* MOSLEY AERIALS

- H.P. FACILITIES AVAILABLE
- PART EXCHANGES

### AERIAL EQUIPMENT

**TWIN FEEDER.** 300 ohm twin ribbon feeder similar K25 6d. per yard. K35B Telecon (round) 1/6 per yard. 75 ohm twin feeder 6d. per yard. Post on above feeders and cable, 1/6 any length.

**COPPER WIRE, 14G, H/D, 140 ft., 17/-; 70 ft., 8/6, post and packing 2/6. Other lengths pro rata.**

**FEEDER SPREADERS.** 6" Ceramic type F.S., 10d. each. Postage 1/6 up to 12.

**CERAMIC CENTRE PIECE** for dipoles, Type AT, 1/6 each. P. & P. 1/-.

**2 METRE BEAM, 5 ELEMENT W.S. YAGI.** Complete in box with 1" to 2 1/2" masthead bracket. Price 49/-, P. & P. 3/6.

**SUPER AERIAL, 70/80 ohm coax, 300 watt very low loss, 1/8 per yard. P. & P. 2/-.**

**TOUGH POLYTHENE LINE,** type MLI (100 lbs.), 2d. per yd. or 12/6 per 100 yds. Type ML2 (220 lbs.), 4d. per yd. or 25/- per 100 yds., ML4 (400 lbs.), 6d. per yd., post free. Ideal for Guys, L.W. Supports, Hal-yards, etc.

**Absorption Wavemeters.** 3.00 to 35.00 Mc/s. in 3 Switched Bands. 3.5, 7, 14, 21 and 28 Mc/s. Ham Bands marked on scale. Complete with indicator bulb. A MUST for any Ham Shack. ONLY 22/6 EACH. Post free.

**BANDCHECKER MONITOR,** 3.00-35.00 Mc/s. in 3 switched Bands. 0-1 mA Indicator. Monitor Socket. Very sensitive. £3.13.6, P. & P. 2/6.

**VARIABLE CONDENSERS.** All brass with ceramic end plates and ball race bearings. 50pf, 5/9, 100-6/6, 160, 7/6, 240, 8/6 and 300pf, 9/6. Extension for ganging, P. & P. 1/-.

**RACK MOUNTING PANELS:** 19" x 5 1/2", 7", 8 1/2", or 10 1/2", black crackle finish, 5/9, 6/6, 7/6, 9/- respectively. P. & P. 2/-.

**GELOSO VFO UNITS.** 4/102 with new dial and escutcheon. Outputs on 80, 40, 20, 15 and 10. For 2-807 or 6146 Tubes. Only £8 15 0. 3 valves to suit, 24/- ALL POST FREE.

**SHADED POLE MOTORS,** 230 v. or 110 v. operation, ideal for fans, blowers or models. Single Unit 12/6 plus 2/- P. & P. or Pair £1 plus 2/6 P. & P.

**PARMEKO TRANS.** 200/200 40 mA. 6.3v., 3A. New, not ex W.D. Only 12/6. P. & P. 2/6.

**CHAS. H. YOUNG LTD.**

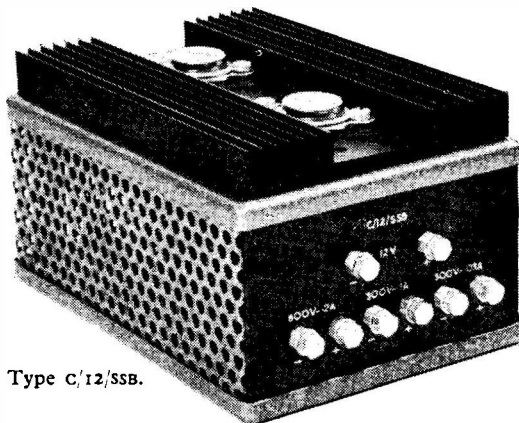
170-172 Corporation St., Birmingham 4.

Please print your address. No C.O.D. under £1. 'phone CEN 1635

**COMPACT POWER**

*FOR MOBILE PEOPLE*

**FOR THE 'COURIER'**



s.s.v.c. Type c/12/ssb.

More than 100 AVEL designs are already in professional use in temperate and tropical countries all over the world.

A SOLID STATE VOLTAGE CHANGER specifically designed for use with the 'COURIER' MOBILE SSB TRANSCEIVER. The greatest possible reliability has been achieved by the use of electronic switching in conjunction with high efficiency toroids.

INPUT:— 12V. DC. Nominal  
 OUTPUT:— (i) 600V. DC @ 200 mA.  
 (ii) 300V. DC @ 30 mA.  
 (iii) 300V. DC @ 120 mA.

SIZE:—5 1/2" x 4" x 3 3/8" overall.  
 WEIGHT:—2 lbs. 10 ozs. Ex Stock £21 5 0.  
 Similar units having power ratings of 60—150w; input voltages of 12 or 24 v. DC and outputs of 250, 300, 350 v. DC are also available. Units available for KW VALIANT, EDDYSTONE Receivers and other Amateur equipment.

**AVELEY ELECTRIC LIMITED**  
**COMPONENT DIVISION**

**SOUTH OCKENDON ESSEX**  
 TELEPHONE: SOUTH OCKENDON 3444  
 TELEX: 24120 AVEL OCKENDON

# TECHNICAL PUBLICATIONS - Available from stock

## Latest Issues



|   | Post Free |
|---|-----------|
| • AMATEUR SINGLE SIDEBAND ( <i>Collins</i> ).....         | 30s. 0d.  |
| • ANTENNA ROUND UP ( <i>by CQ</i> ).....                  | 25s. 0d.  |
| • ANTENNA HANDBOOK ( <i>A.R.R.L., 9th Edn.</i> ).....     | 19s. 0d.  |
| • AUTOMOBILE ELECTRICAL EQUIPMENT                         | 57s. 0d.  |
| • BASIC MATHEMATICS FOR RADIO AND                         | 18s. 3d.  |
| • ELECTRONICS.....  | 28s. 0d.  |
| • BEAM ANTENNA HANDBOOK, New Edition...                   | 24s. 0d.  |
| • BETTER SHORT WAVE RECEPTION.....                        | 5s. 0d.   |
| • CALL BOOK ( <i>U.K. only</i> ), 1964 Edition.....       | 8s. 3d.   |
| • CHART OF INTERNATIONAL FREQUENCY                        | 12s. 6d.  |
| • ALLOCATIONS - GENEVA, 1960 ( <i>Official</i> ),         | 3s. 0d.   |
| • 10 Kc. to 40 Gc, 51" x 34", wall mounting.....          | 3s. 0d.   |
| • COMMAND SETS ( <i>Published by CQ</i> ).....            | 16s. 9d.  |
| • COMMUNICATION RECEIVERS.....                            | 25s. 0d.  |
| • CQ ANTHOLOGY (the Best of CQ 1945 - 1952)               | 10s. 6d.  |
| • CQ ANTHOLOGY (1952 - 59).....                           | 24s. 0d.  |
| • COURSE IN RADIO FUNDAMENTALS.....                       | 22s. 3d.  |
| • ELECTRONIC CIRCUITS HANDBOOK.....                       | 28s. 6d.  |
| • FOUNDATIONS OF WIRELESS.....                            | 4s. 0d.   |
| • GETTING STARTED WITH TRANSISTORS.                       | 8s. 6d.   |
| • GUIDE TO AMATEUR RADIO.....                             | 11s. 0d.  |
| • HAMS INTERPRETER ( <i>4th Edition</i> ).....            | 5s. 0d.   |
| • HINTS AND KINKS Vol. 6.....                             | 14s. 9d.  |
| • HOW TO BECOME A RADIO AMATEUR.....                      | 15s. 0d.  |
| • HOW TO IMPROVE YOUR SHORT WAVE                          | 9s. 1d.   |
| • RECEPTION.....  | 1s. 9d.   |
| • HOW TO LISTEN TO THE WORLD, 1963/4.....                 | 4s. 6d.   |
| • HOW TO GET THE BEST OUT OF YOUR                         | 24s. 0d.  |
| • TAPE RECORDER.....                                      | 24s. 6d.  |
| • LEARNING MORSE.....                                     | 11s. 6d.  |
| • LEARNING THE RADIO TELEGRAPH CODE.....                  | 32s. 0d.  |
| • MOBILE HANDBOOK ( <i>Published by CQ</i> ).....         | 25s. 6d.  |
| • MOBILE MANUAL ( <i>Published by A.R.R.L.</i> ).....     | 23s. 6d.  |
| • NEWS FROM AROUND THE WORLD.....                         | 2s. 8d.   |
| • NEW RTTY HANDBOOK.....                                  | 3s. 0d.   |
| • NEW SIDEBAND HANDBOOK ( <i>Published by</i>             | 23s. 6d.  |
| • <i>CQ, latest issue</i> ).....                          | 2s. 8d.   |
| • NOVICE HANDBOOK, Tx and Rx, 150 pages.....              | 3s. 0d.   |
| • OPERATING AN AMATEUR RADIO STATION                      | 23s. 0d.  |
| • ( <i>Published by A.R.R.L.</i> ).....                   | 5s. 6d.   |
| • PORTABLE TRANSISTOR RECEIVER.....                       | 5s. 0d.   |
| • QUAD ANTENNAS.....                                      | 25s. 0d.  |
| • RADIO AMATEUR EXAMINATION MANUAL.....                   | 16s. 0d.  |
| • RADIO AMATEUR OPERATOR'S HAND-                          | 11s. 3d.  |
| • BOOK ( <i>Data Publications</i> ).....                  | 14s. 0d.  |
| • RADIO CONTROL MANUAL.....                               | 57s. 3d.  |
| • RADIO CONTROL FOR MODELS ( <i>F. C. Judd</i> ).....     | 11s. 3d.  |
| • RADIO DATA CHARTS.....                                  | 7s. 0d.   |
| • RADIO DATA REFERENCE BOOK.....                          | 8s. 6d.   |
| • RADIO AND ELECTRONIC LABORATORY                         | 6s. 6d.   |
| • HANDBOOK ( <i>7th Edition, by Wireless World</i> )..... | 11s. 9d.  |
| • RADIO INTERFERENCE SUPPRESSION.....                     | 18s. 6d.  |
| • RADIO VALVE DATA 4,800 types listed.....                | 11s. 4d.  |
| • S-9 SIGNALS.....  | 21s. 0d.  |
| • SHORT WAVE RECEIVERS <i>For the Beginner</i>            | 24s. 0d.  |
| • SHORT WAVE RADIO AND THE IONO-                          | 24s. 0d.  |
| • SPHERE.....   | 24s. 0d.  |
| • SINGLE SIDEBAND FOR THE RADIO                           | 13s. 6d.  |
| • AMATEUR ( <i>A.R.R.L.</i> ) ( <i>3rd Edition</i> )..... | 23s. 0d.  |
| • STEREO HANDBOOK.....                                    | 9s. 6d.   |
| • SURPLUS SCHEMATICS ( <i>Published by CQ</i> ).....      |           |
| • SURPLUS HANDBOOK.....                                   |           |
| • SURPLUS CONVERSION MANUAL                               |           |
| • Vols. I, II and III, each.....                          |           |
| • TELEVISION EXPLAINED.....                               |           |
| • TRANSISTORS: THEORY AND PRACTICE                        |           |
| • ( <i>Published by Gernsback</i> ).....                  |           |
| • TRANSISTOR THEORY AND PRACTICE                          |           |
| • ( <i>Published by World Radio Handbook</i> ).....       |           |

|   |          |
|---|----------|
| TRANSISTOR TECHNIQUES ( <i>Gernsback</i> )..... | 12s. 6d. |
| • UNDERSTANDING AMATEUR RADIO.....              | 19s. 6d. |
| VHF HANDBOOK ( <i>Orr W6SAI</i> ).....          | 24s. 0d. |
| VHF FOR THE RADIO AMATEUR ( <i>CQ</i> ).....    | 28s. 0d. |
| WORLD RADIO HANDBOOK (1964).....                | 22s. 6d. |
| WORLD RADIO HANDBOOK 1964 ( <i>library</i>      | 34s. 0d. |
| <i>edition</i> ).....                           |          |

## CALL BOOK (Spring Edition)

"DX Listings," 27s. post free. "US Listings," 45s. post free  
The two together, covering the World, 65s. post free

## \* AMATEUR RADIO HANDBOOK

(*by R.S.G.B.*), 550 pp., 36s. 6d.

## RADIO AMATEUR'S HANDBOOK

*by A.R.R.L.* (41st Edition) 37s. 6d. post free  
(Library Binding) 47s. 6d. post free

### MAGAZINES BY SUBSCRIPTION

|                                  | One Year |
|----------------------------------|----------|
| CQ, RADIO AMATEUR'S JOURNAL..... | 44s. 0d. |
| QST, ARRL.....                   | 48s. 0d. |

*Post free, ordinary mail only*

EASIBINDERS for Short Wave Magazines, holds 12 issues  
(*One Volume*) 15s.

LOG BOOKS, spiral bound, by ARRL, 7s. 6d.

LOG BOOKS, by Webbs Radio, GPO Approved, 6s. post free

All publications marked \* were reviewed on pp.  
502-504 November 1963 SHORT WAVE MAGAZINE

\* **RADIO HANDBOOK**—Sixteenth Edition  
86s. post free

\* **DX ZONE MAP** (With Amendment List to Oct. 1963)  
(*Great Circle, centred U.K., size 25ins. by 35ins. A "must" for every DX operator and SWL.*)  
Linen Backed (*de luxe*) 11s. 0d. post free

\* **AMATEUR RADIO MAP OF WORLD**  
Mercator Projection — Much DX Information — In Colour,  
8s. 6d. post free  
*Second Edition*

\* **WORLD SHORT WAVE RADIO MAP**  
(*General SWL and BC coverage, with handbook*)  
8s. 6d. post free

\* **RADIO AMATEUR'S WORLD ATLAS**  
*In booklet form, Mercator projection, for desk use. Gives Zones and Prefixes.* 8s. 3d. post free

# - all these and hundreds more

All valves brand new and fully guaranteed — Obsolete valves a speciality

Quotations given on any type not listed. Send S.A.E.

|                     |                |                   |                    |                |                  |                |                 |                 |
|---------------------|----------------|-------------------|--------------------|----------------|------------------|----------------|-----------------|-----------------|
| AC2/PEN 19/6        | ECC88 ... 12/6 | EY83 ... 12/6     | PCC88 ... 12/6     | U24 ... 21/-   | VMP4G ... 15/-   | 6AT6 ... 6/-   | 65C7 ... 8/6    | 14H7 ... 10/-   |
| AC2/PEN DD ... 19/6 | ECC91 ... 3/-  | EY86 ... 7/-      | PCC89 ... 8/6      | U25 ... 11/-   | VP4 ... 15/-     | 6AU6 ... 9/-   | 65F5 ... 10/-   | 14R7 ... 21/-   |
| AC/TP 29/-          | ECC90 ... 7/6  | EY91 ... 3/-      | PCF80 ... 7/6      | U26 ... 12/6   | VP4A ... 15/-    | 6B8G ... 2/6   | 65G7 ... 7/-    | 19AQ5 ... 8/-   |
| AC/VP1-S-7          | EFC82 ... 8/6  | EZ35 ... 6/-      | PCF82 ... 7/-      | U31 ... 9/-    | VP4B ... 15/-    | 6BA6 ... 9/-   | 65H7 ... 6/6    | 19BG6G ... 15/- |
| AZ1 ... 15/-        | ECH3 ... 21/6  | EZ40 ... 7/-      | PCF84 ... 12/6     | U35 ... 17/6   | VR105/30 ... 7/- | 6BE6 ... 6/-   | 65J7 ... 4/6    | 20D1 ... 10/-   |
| AZ31 ... 13/6       | ECH21 ... 21/- | EZ41 ... 7/-      | PCF86 ... 12/6     | U37 ... 17/6   | VR150/30 ... 7/- | 6BG6G ... 15/- | 65K7 ... 5/6    | 20D2 ... 21/-   |
| B36 ... 9/-         | ECH35 ... 12/6 | EZ80 ... 5/6      | PCL82 ... 7/6      | U47 ... 11/-   | W61 ... 11/-     | 6B16 ... 4/-   | 65L7GT ... 5/-  | 20F2 ... 17/6   |
| B36 ... 13/6        | ECH42 ... 9/6  | EZ81 ... 5/6      | PCL83 ... 9/-      | U50 ... 7/-    | W76 ... 5/-      | 6BQ7A ... 12/6 | 65N7GT ... 5/-  | 20L1 ... 22/6   |
| B36 ... 10/-        | ECH81 ... 7/6  | EZ90 ... 4/6      | PCL84 ... 7/6      | U52 ... 4/-    | W77 ... 4/-      | 6BR7 ... 4/-   | 65O7 ... 8/6    | 20P1 ... 15/-   |
| CIC ... 10/-        | EI148 ... 7/6  | EZ99 ... 4/6      | PCL85 ... 7/6      | U76 ... 7/6    | W81 ... 6/-      | 6BS7 ... 12/6  | 6U4GT ... 12/6  | 20P3 ... 24/-   |
| CCH35 ... 20/-      | ECL80 ... 6/6  | FC2 ... 15/-      | PCL86 ... 12/6     | U78 ... 4/6    | W81M ... 6/-     | 6BWE ... 9/-   | 6U5G ... 7/6    | 20P4 ... 20/-   |
| CL33 ... 12/6       | ECL81 ... 10/6 | FC2A ... 17/6     | PENA4 ... 19/6     | U145 ... 10/6  | X41 ... 22/6     | 6BW7 ... 10/6  | 6V6GT ... 4/-   | 20R5 ... 8/-    |
| CY1 ... 15/-        | ECL82 ... 9/6  | FC4 ... 15/-      | PEN4DD ... 22/6    | U191 ... 13/6  | X61M ... 10/-    | 6C4 ... 3/6    | 6V6GT ... 8/-   | 25A6 ... 20/-   |
| CY1 ... 12/6        | ECL83 ... 10/6 | FW4/500 ... 9/-   | PEN36C ... 20/-    | U251 ... 15/6  | X65 ... 12/6     | 6C5GT ... 10/6 | 6X4 ... 4/6     | 25L6 ... 8/-    |
| CY1 ... 12/6        | ECL86 ... 9/6  | FW4/800 ... 9/6   | PEN45 ... 10/-     | U281 ... 15/-  | X76 ... 12/6     | 6C6 ... 6/6    | 6X5G ... 5/6    | 25Y5 ... 8/-    |
| D77 ... 4/-         | EP6 ... 21/-   | GZ30 ... 10/6     | PEN45DD ... 21/-   | U301 ... 18/6  | X78 ... 28/-     | 6CD6G ... 12/6 | 6X5GT ... 8/6   | 25Y5G ... 8/-   |
| DAC32 ... 9/6       | EP9 ... 21/-   | GZ32 ... 10/6     | PEN453DD ... 5/-   | U319 ... 15/-  | X79 ... 40/-     | 6CH4 ... 10/6  | 6Y85 ... 12/6   | 25Z4 ... 7/6    |
| DAF91 ... 9/6       | EP22 ... 14/-  | GZ33 ... 19/3     | U329 ... 13/6      | U339 ... 13/6  | Y61 ... 10/-     | 6CWA ... 16/-  | 7B7 ... 8/6     | 25Z6 ... 8/6    |
| DAF96 ... 6/6       | EP36 ... 4/-   | GZ34 ... 13/6     | U339 ... 13/6      | U403 ... 10/-  | Y63 ... 10/-     | 6D2 ... 4/6    | 7C5 ... 8/6     | 27SU ... 19/6   |
| DCC90 ... 12/6      | EP37 ... 8/-   | GZ37 ... 19/3     | PENDD4020 ... 20/- | U404 ... 10/-  | Z63 ... 7/6      | 6D6 ... 3/6    | 7C6 ... 8/6     | 30C1 ... 9/-    |
| DF33 ... 9/6        | EP37A ... 8/-  | HABC80 ... 10/-   | PL33 ... 20/-      | U404 ... 10/-  | Z66 ... 10/-     | 6E5 ... 10/6   | 7D5 ... 15/-    | 30C15 ... 12/6  |
| DF91 ... 3/6        | EP39 ... 7/6   | HL41 ... 8/6      | PL36 ... 12/6      | UABC80 ... 5/6 | Z77 ... 4/-      | 6F1 ... 10/6   | 7D6 ... 15/-    | 30F5 ... 10/6   |
| DF96 ... 6/6        | EP40 ... 15/-  | HL41DD ... 8/6    | PL38 ... 18/-      | UAF42 ... 8/6  | Z152 ... 5/-     | 6F6 ... 6/9    | 7D8 ... 15/-    | 30FL1 ... 12/6  |
| DM63 ... 6/6        | EP41 ... 8/-   | HL92 ... 8/6      | PL81 ... 7/6       | UB41 ... 7/6   | OZ4 ... 5/-      | 6F12 ... 4/-   | 7H7 ... 7/6     | 30L1 ... 8/6    |
| DM63 ... 11/-       | EP42 ... 10/6  | HL133DD ... 25/6  | HN309 ... 25/6     | UBC41 ... 8/6  | IA7 ... 11/-     | 6F13 ... 10/6  | 7S7 ... 17/6    | 30L15 ... 11/6  |
| DK32 ... 7/6        | EP50A ... 3/6  | IW4/350 ... 10/-  | PL83 ... 7/6       | UBC81 ... 10/6 | IC5 ... 10/6     | 6F14 ... 10/6  | 7Y4 ... 6/6     | 30P15 ... 11/6  |
| DK91 ... 5/6        | EP50E ... 3/6  | IW4/500 ... 10/-  | PL84 ... 7/6       | UBF80 ... 7/6  | ID5 ... 12/6     | 6F15 ... 10/6  | 8D3 ... 4/6     | 30P4 ... 18/-   |
| DK96 ... 7/6        | EP85 ... 5/6   | KT33C ... 8/-     | PL820 ... 18/-     | UBF89 ... 7/6  | ID6 ... 9/6      | 6F19 ... 12/6  | 9BWW ... 12/6   | 30P12 ... 10/6  |
| DL33 ... 8/6        | EP86 ... 7/6   | KT36 ... 17/6     | PM24M ... 13/6     | UBL21 ... 20/- | IH5 ... 10/6     | 6F23 ... 10/6  | 10C2 ... 12/6   | 30P16 ... 9/-   |
| DL35 ... 10/6       | EP89 ... 8/-   | KT61 ... 9/6      | PX4 ... 15/-       | UCC84 ... 11/6 | IL4 ... 5/-      | 6F25 ... 16/6  | 10C2 ... 12/6   | 30P19 ... 17/6  |
| DL91 ... 7/6        | EP91 ... 4/6   | KT66 ... 17/6     | PX25 ... 25/-      | UCC85 ... 7/6  | IN5 ... 9/6      | 6F26 ... 13/6  | 10F1 ... 10/6   | 30PL1 ... 15/-  |
| DL92 ... 7/6        | EP92 ... 4/6   | KT76 ... 10/6     | PY31 ... 15/-      | UCF80 ... 12/6 | IR5 ... 5/6      | 6F33 ... 5/6   | 10F9 ... 12/6   | 30PL13 ... 12/6 |
| DL93 ... 7/6        | EP95 ... 4/6   | KT81 ... 8/6      | PY32 ... 10/6      | UCH21 ... 20/- | IS4 ... 7/6      | 6H6 ... 2/6    | 10ID11 ... 15/- | 30PL14 ... 12/6 |
| DL94 ... 7/6        | EP98 ... 10/6  | KTW61 ... 8/6     | PY33 ... 10/6      | UCH42 ... 8/6  | ISS ... 5/6      | 6J5 ... 5/6    | 10P13 ... 15/-  | 30PL14 ... 12/6 |
| DL96 ... 6/6        | EP98 ... 10/6  | L63 ... 5/6       | PY80 ... 7/6       | UCH81 ... 7/6  | IT4 ... 3/6      | 6J5G ... 4/6   | 10P14 ... 19/-  | 35A5 ... 15/-   |
| EASO ... 2/6        | EF183 ... 8/-  | LN152 ... 5/6     | PY81 ... 6/6       | UCL82 ... 9/6  | IU5 ... 5/9      | 6J5GT ... 5/-  | 11D5 ... 23/6   | 35L6GT ... 8/6  |
| EAS0 ... 5/6        | EF184 ... 8/6  | LN309 ... 9/6     | PY82 ... 5/6       | UCL83 ... 11/6 | 2P ... 22/6      | 6J7 ... 7/6    | 12A6 ... 6/6    | 35W4 ... 6/6    |
| EABC80 ... 2/6      | EK32 ... 8/6   | LZ319 ... 12/6    | PY83 ... 8/-       | UF41 ... 7/6   | 3A4 ... 5/-      | 6J7GT ... 5/6  | 12A7 ... 11/6   | 35Z3 ... 15/-   |
| EAC91 ... 4/6       | EL3 ... 21/6   | MKT4 ... 17/6     | PY88 ... 10/6      | UF42 ... 7/6   | 3A5 ... 10/6     | 6J7GT ... 5/6  | 12AT6 ... 7/6   | 35Z4 ... 6/6    |
| EAF42 ... 2/6       | EL32 ... 4/6   | MS48 ... 17/6     | PY80 ... 10/6      | UF80 ... 7/6   | 3O4 ... 4/6      | 6K7 ... 10/6   | 12AT7 ... 5/6   | 35Z5 ... 15/-   |
| EB34 ... 9/6        | EL33 ... 12/6  | M54B ... 17/6     | PZ30 ... 15/-      | UF85 ... 7/6   | 3O5 ... 9/6      | 6K7G ... 2/6   | 12AU6 ... 7/6   | 35Z5 ... 6/6    |
| EB41 ... 5/6        | EL34 ... 14/-  | MVS/PENB ... 17/6 | Q595/10 ... 10/6   | UF86 ... 12/6  | 3S4 ... 5/6      | 6K7GT ... 7/6  | 12AU7 ... 5/6   | 35Z5 ... 8/6    |
| EB91 ... 4/6        | EL35 ... 10/6  | MU14 ... 17/6     | QS150/15 ... 10/6  | UF89 ... 6/-   | 3V4 ... 7/6      | 6K8 ... 9/6    | 12AX7 ... 7/6   | 41STH ... 22/6  |
| EBC3 ... 21/6       | EL37 ... 17/6  | R2 ... 8/-        | R2 ... 8/-         | UL41 ... 8/-   | SU4 ... 4/6      | 6K8G ... 4/6   | 12BA6 ... 5/6   | 42 ... 12/6     |
| EBC33 ... 5/6       | EL38 ... 17/6  | R16 ... 15/6      | R16 ... 15/6       | UL44 ... 20/-  | SV4G ... 7/9     | 6K8GT ... 9/6  | 12BE6 ... 7/6   | 50C5 ... 10/6   |
| EBC41 ... 8/6       | EL41 ... 9/6   | R19 ... 16/6      | R19 ... 16/6       | UL46 ... 14/6  | SY3G ... 5/6     | 6K25 ... 17/6  | 12BH7 ... 10/6  | 50CD6G ... 30/- |
| EBC81 ... 10/6      | EL42 ... 9/6   | R20 ... 16/6      | R20 ... 16/6       | UL84 ... 6/-   | SY3GT ... 5/6    | 6L ... 10/6    | 12ISGT ... 8/6  | 50L6 ... 8/6    |
| EBF80 ... 7/6       | EL81 ... 12/6  | SP1 ... 3/6       | SP1 ... 3/6        | UL85 ... 7/6   | SZ4G ... 7/6     | 6L7 ... 10/6   | 12J7GT ... 8/6  | 75 ... 8/-      |
| EBF83 ... 8/6       | EL84 ... 6/9   | SP61 ... 3/6      | SP61 ... 3/6       | UM80 ... 10/6  | SZ4GT ... 8/6    | 6L8 ... 10/6   | 12K7GT ... 10/6 | 78 ... 7/6      |
| EBF89 ... 7/6       | EL85 ... 10/6  | T4 ... 15/-       | T4 ... 15/-        | UR16 ... 15/-  | 6A7 ... 9/6      | 6L9 ... 10/6   | 12K8GT ... 10/6 | 80 ... 7/6      |
| EBL1 ... 21/6       | EL90 ... 8/6   | TDD4 ... 12/6     | TDD4 ... 12/6      | U06 ... 17/6   | 6ABG ... 8/6     | 6L19 ... 15/-  | 12Q7GT ... 6/6  | 85A2 ... 12/6   |
| EBL21 ... 21/6      | EL91 ... 4/6   | TD13C ... 17/6    | TD13C ... 17/6     | U08 ... 15/-   | 6ABGT ... 13/6   | 6N7GT ... 9/6  | 12SA7 ... 8/6   | 185BT ... 30/-  |
| ECC35 ... 8/6       | EL95 ... 7/6   | TY86F ... 12/6    | TY86F ... 12/6     | UY9 ... 7/6    | 6AC7 ... 6/-     | 6P25 ... 10/6  | 12S7 ... 8/6    | 807A ... 9/6    |
| ECC40 ... 15/6      | EM80 ... 8/6   | U10 ... 9/6       | U10 ... 9/6        | UY21 ... 15/6  | 6AK5 ... 5/6     | 6P28 ... 12/6  | 12SK7 ... 6/6   | 807B ... 9/6    |
| ECC81 ... 4/6       | EM81 ... 8/6   | U12 ... 9/6       | U12 ... 9/6        | UY41 ... 7/6   | 6AL5 ... 4/6     | 6Q7 ... 9/6    | 12SL7 ... 8/6   |                 |
| ECC82 ... 5/6       | EM84 ... 8/6   | U14 ... 9/6       | U14 ... 9/6        | UY85 ... 6/-   | 6AM5 ... 5/6     | 6Q7G ... 6/6   | 12SN7 ... 10/6  |                 |
| ECC83 ... 7/6       | EM85 ... 10/6  | U22 ... 8/-       | U22 ... 8/-        | VM24B ... 12/6 | 6AM6 ... 4/6     | 6G7GT ... 8/6  | 12SQ7 ... 12/6  |                 |
| ECC84 ... 6/6       | EY51 ... 7/6   | PCC85 ... 9/6     | PCC85 ... 9/6      |                | 6AQ5 ... 6/6     | 6SA7 ... 7/6   |                 |                 |
| ECC85 ... 7/6       | EY81 ... 8/6   |                   |                    |                |                  |                |                 |                 |

## COMPLETE VALVE LIST FREE WITH ORDER

### METAL RECTIFIERS

|          |              |              |               |              |
|----------|--------------|--------------|---------------|--------------|
| RM1 7/6  | 14A86        | 23/-         | 16RD 2-2-8-1  | 12/- (FC142) |
| RM2 8/-  | 14A97        | 26/-         | 16RE 2-1-8-1  | 10/- (FC150) |
| RM3 10/- | 14A100       | 28/-         | 18RA 1-1-8-1  | 5/- (FC118)  |
| RM4 17/6 | 14RA 1-2-8-2 | 21/- (FC301) | 18RA 1-1-16-1 | 7/- (FC116)  |
| RM5 19/6 | 14RA 1-2-8-3 | 25/- (FC31)  | 18RD 2-2-8-1  | 16/- (FC124) |

TERMS OF BUSINESS C.W.O. or C.O.D.

4s. 2d. PACKING CHARGE ON ALL C.O.D.

ORDERS. POSTAGE 6d. per VALVE

### BRAND NEW TRANSISTORS

|               |              |                  |
|---------------|--------------|------------------|
| OC35 ... 10/- | OC72 ... 8/- | OC81D ... 5/-    |
| OC42 ... 6/-  | OC74 ... 8/- | OC82 ... 6/-     |
| OC44 ... 5/-  | OC75 ... 8/- | OC82D ... 6/-    |
| OC45 ... 5/-  | OC77 ... 8/- | OC81 m.p.r. 12/6 |
| OC71 ... 5/-  | OC81 ... 5/- | OC130 ... 8/-    |

### SILICON RECTIFIERS

400 volts 350 mA ..... 7/6 each

### SETS OF VALVES

|                              |                |
|------------------------------|----------------|
| IR5, IS5, IT4, 3S4, 3V4      | Set of 4, 19/- |
| DAF91, DF91, DK91, D92, DL94 | Set of 4, 19/- |
| DAF96, DF96, DK96, DL96      | Set of 4, 25/6 |

# R.S.T. VALVE MAIL ORDER CO.

211a STREATHAM ROAD MITCHAM SURREY

Tel: MITcham 6202

Open Daily to Callers

# NEW Mosley A-203-C for 20 metre operation

## SPECIFICATIONS AND PERFORMANCE DATA:

- GAIN 8 db. (F1B 24 db.)
- HANDLES MAXIMUM LEGAL POWER
- BOOM LENGTH 24 ft.
- MAXIMUM ELEMENT LENGTH 37 ft.
- TURNING RADIUS 82 ft.
- WIND LOAD (80 mph wind) - 140 lbs.
- ASSEMBLED WEIGHT 40 lbs.
- SHIPPING WEIGHT 49 1/2 lbs.

Mosley has designed the most outstanding three element array for 20 metres on the market today. This clear-line aerial will give you that DX punch that will override QRM. This aerial has a new anti-flutter design which virtually eliminates element flutter and boom vibration. The A-203-C is a wide spaced, gamma matched, full size beam, built with swaged tubing elements for extra durability. This antenna will approach the performance of many four to six element beams without the headaches of large size and weight necessary for these large beams.

for SHORT WAVE LISTENERS



## SWL-7 DIPOLE KIT for 11, 13, 16, 19, 25, 31, and 49 metres.

Here's an inexpensive 7-band receiving dipole that uses little space yet offers real "DX-Ability" for adding more hard-to-get stations to your log. The SWL-7 is a complete aerial... just attach the wires to trap assemblies, strain-relief center connector and end insulators. Tie the end insulators to any convenient supports. You're on the air in minutes! The SWL-7 trap assemblies are fully enclosed in High-Impact Styrene for stable performance in all weather. The SWL-7 is resonant over the full width of each of the 7 bands yet measures just 40 feet in length! Made of No. 16 tinned copper wire with glazed porcelain insulators. The SWL-7 is fed with 75 ohm twin-lead transmission line, supplied. This dipole aerial is intended for receiving purposes only.

Model RD-5 for 10, 15, 20, 40 and 75/80 metres.

**Mosley Electronics Ltd**

40, Valley Road, New Costesseyes Norwich, Norfolk, Nor. 26K

# PETER SEYMOUR LTD

## COMMUNICATION EQUIPMENT SPECIALISTS

ALL ITEMS IN STOCK AT TIME OF GOING TO PRESS. Three months guarantee on all equipment over £25

|   | £   | s. | d. |   | £   | s. | d. |
|---|-----|----|----|---|-----|----|----|
| G.E.C. BRT400K. In new condition. 150-380 Kc. and 540 Kc.-32 Mc/s. ....   | 100 | 0  | 0  | MARCONI GUARDIAN D.F. RECEIVER. 190 Kc.-4.5 Mc/s. 240 AC input, built-in speaker, noise limiter, BFO, etc. Miniature valves ... | 8   | 10 | 0  |
| EDDYSTONE S740. 500 Kc.-30 Mc/s. 110-240 AC input ...   | 25  | 0  | 0  | MARCONI CR100. 60 Kc.-30 Mc/s. 240 AC input ... (P/P £1)  | 15  | 0  | 0  |
| EDDYSTONE S640. 1.8-30 Mc/s. in new condition. 240 AC input ...   | 30  | 0  | 0  | EDDYSTONE 840a. 480 Kc.-30 Mc/s. 110-240 AC/DC AS NEW ...   | 35  | 0  | 0  |
| GONSET GSB100. Al 90W, A3a 90W p.e.p. Also A3 and P.M. ....   | 115 | 0  | 0  | EDDYSTONE 840a. 480 Kc.-30 Mc/s., soiled chassis, electrically 100% ...   | 29  | 0  | 0  |
| COLLINS 75A3 with 8 and 3.1 filters, 100 Kc. cal. 160/10 mtrs. ....   | 170 | 0  | 0  | "HAMBANDER." 1.8-30 Mc/s. 240 AC input ...  | 12  | 10 | 0  |
| EDDYSTONE 358X with all coils and power unit ...  | 17  | 10 | 0  | H.R.O. WITH ALL BANDSPREAD COILS AND POWER UNIT. Miniaturised ...   | 20  | 0  | 0  |
| HEATHKIT seneca 2 Mtr. TX VFO or Xtal. with Auto transformer. 2 6146 in P.A. ....   | 50  | 0  | 0  | BRAND NEW PYE MARINE EQUIPMENT BELOW LIST PRICE   |     |    |    |
| MOSLEY "COMMANDO" Mk. 2. NEW. 180W p.e.p. ....  | 140 | 0  | 0  | "HAMBLE." 25W Tx/Rx. Part transistor ...  | 145 | 0  | 0  |
| HE30. 550 Kc.-30 Mc/s. Q Multiplier, etc., slightly used  | 35  | 0  | 0  | "FORELAND" DF RECEIVER. All transistor ...  | 40  | 0  | 0  |
| VALVES : 5B254M 15/-, 2E24 5/-, TCS BFO units with can and capacitor 3/6 ; SSB diodes matched fours 5/- pack                              |     |    |    | "MEDWAY" ECHO SOUNDER ...   | 30  | 0  | 0  |
| R.S.G.B. publications : CALL BOOK, latest edition 4/6, manual 34/- ; Radio amateur examination manual 5/6 ; A GUIDE TO AMATEUR RADIO 4/-. |     |    |    | SOLENT DF. All transistor ...   | 40  | 0  | 0  |
| BC 1147A. 1.5-30 Mc/s. Variable selectivity built-in spkr. electrically similar to AR88 ...   | 25  | 0  | 0  | ONE ONLY EDDYSTONE EC10 ...   | 48  | 0  | 0  |
| HAMMARLUND SP600JX/6. 540 Kc.-54 Mc/s. 100-240 AC input ... Price on application  |     |    |    | NATIONAL NC188. 540 Kc.-30 Mc/s....   | 30  | 0  | 0  |
| R208. 10-60 Mc/s. built-in speaker and mains unit for 240 AC ...  | 8   | 10 | 0  | TAYLOR 61A. AM/FM Signal generator 4-120 Mc/s. with manual ...  | 15  | 0  | 0  |
|   |     |    |    | EDDYSTONE "S" Meter and Mounting Blocks ...   | 4   | 10 | 0  |
|   |     |    |    | KW77. 160-10 mtrs. ....   | 95  | 0  | 0  |
|   |     |    |    | NATIONAL NCX3 TRANSCEIVER. Immediate delivery. 80/40/20. 100W. A3, 200W. A1, 200W. p.e.p. A3A ...                               | 148 | 8  | 4  |
|   |     |    |    | MATCHING POWER UNIT. Speaker, cable, AC input ...   | 46  | 7  | 1  |

WANTED URGENTLY THE FOLLOWING RECEIVERS — HALICRAFTERS SX101 (with 160) EDDYSTONE 640, AR88D/LF. DRAKE 2B. Please state your price Hire Purchase Terms on equipment over £35

410 BEVERLEY ROAD - HULL - YORKSHIRE

Telephone: Hull 41938 (43353 after 7.30 p.m.)

Handsome Styling  
Functional Design  
Four-Colour Etchings

★ GALAXY OF FEATURES  
★ IN SSB - CW - TRANSCEIVERS

★ Brushed Aluminium Panel  
★ Perforated Steel Cabinet  
★ With Hinged Top

### 200W P.E.P. OUTPUT

Full coverage 80-40-20

★ GALAXY III

£145

U.K. carriage extra

Suppression better than :—  
unwanted SB 55 dB., carrier 45 dB.

Both Transceivers  
only  
6" x 10 1/4" x 11 1/4"

MOBILE OR FIXED

Panel selection of VOX/PTT

Full coverage 80 to 10

★ GALAXY V ★

(Available July)

£175

U.K. carriage extra

Highest receiver sensitivity :  
1/2 µv. (at 10 dB. S/N)

### GALAXY III & V ACCESSORIES

De luxe Accessory Console  
Speaker-phone patch, SWR bridge,  
vu meter ... .. £45  
A.C. Supply ... .. £35

Transistorised D.C. Supply  
+ Earth, £85. —ve Earth, £52  
Speaker Console. Houses A.C.  
supply ... .. £8/10/-

100 kc Calibrator £7/10/-  
Vest Pocket VOX ... £9  
Remote VFO. Mobile/fixd  
£27/10/-

Prices outside U.K. on request. Direct delivery arranged Factory to "Shack." Enquiries from H.M. Forces overseas welcomed.

A product of GALAXY ELECTRONICS — U.S.A.

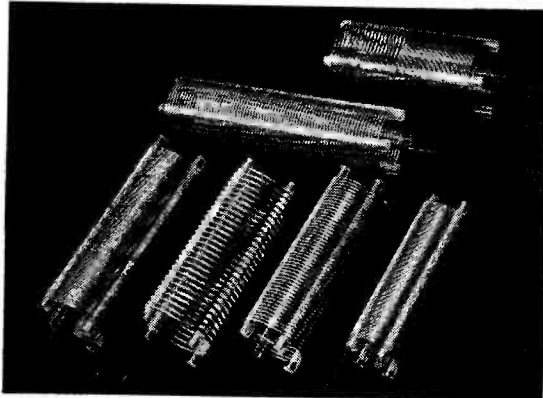
European Agent:

H. JORDAN . France Lynch . Stroud . Glos. G3GEW

TOP QUALITY—LOW COST



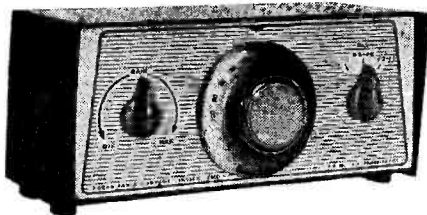
AMATEUR RADIO EQUIPMENT



## ★ CODAR-QOILS ★

### AIR SPACED INDUCTORS

CODAR have developed a complete range of low loss air spaced inductors suitable for all types of circuit application. There are over 40 different sizes from  $\frac{3}{4}$ " to 3" diameter and if you need a coil for a V.F.O., P.A. Tank, Pi-network, A.T.U., aerial loading, etc., there's a CODAR-QOIL that's just right for the job. Full data giving inductance values, Frequency/Capacity figures, "Q," etc., and prices free on request.



## ★ P.R. 30. R.F. PRESELECTOR ★

Frequency range 1.5–30 Mc/s.

The P.R.30 R.F. Preselector is used in commercial and amateur stations throughout the world, and it will substantially improve the performance of any superhet receiver whatever its age or make. It provides up to 20 dB gain using EF 183 Frame Grid Amplifier, and outstanding features include precision vernier tuning, gain control, selector switch for either dipole or end fed antenna, silver plated H.F. coils, etc.

Cat No. P.R.30. For external power supplies (obtainable from receiver) £4. 17. 6. Carr. 3/-.

Cat No. P.R.30X. Self powered model for 200/250 volts A.C. Fitted with accessory socket to provide up to 25 M/a at 200 volts H.T. and 6.3 volts 1 amp for other accessories. £7. 2. 0. Carr. 3/-.

Both models complete, ready for use with all plugs, cables.

## CODAR A.T.5. 12 watt 2 BAND MINIATURE TRANSMITTER

"The tiny Tx with the BIG voice"

The CODAR A.T.5. is the newest, most compact, 160/80 metre Tx for fixed and mobile use.

Check these outstanding features—

High stability new type calibrated V.F.O. 1.8–2.0 Mc/s. and 3.5–3.8 Mc/s. (up to 4 Mc/s. export).

Low loss air-spaced CODAR-QOIL Pi-net output.

P.A. Plate current meter, plus neon indicator.

Plate/screen modulation.

AM/CW switch and Panel key jack.

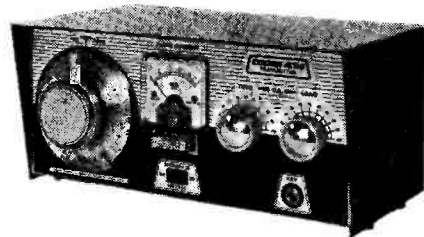
Plug changeover for 6 or 12 watt heater supply.

Small and smart for XYL appeal! Grey cabinet only  $8\frac{1}{2}$ " x 5" x 4". Base area is just over half this page! Front panel black and satin silver, grey and chrome control knobs. Delivery July. £16. 10. 0. Carriage 4/-.

Matching P.S.U. for 200-250 A.C. with Standby/Net/Transmit and aerial changeover switching, stabilised V.F.O. supply, neon H.T. standby/on indicator. Cat. No. 250/S. £8. 0. 0. Carriage 5/-.

12 volt P.S.U. available shortly.

Illustrated leaflets on request.



G3IRE

# CODAR RADIO COMPANY

G3HGQ

BANK HOUSE, SOUTHWICK SQUARE, SOUTHWICK, SUSSEX

CANADA: CODAR RADIO OF CANADA, TWEED, ONTARIO

Codar-Coil U.K. Distributors: ELECTRONIQUES LTD., BRIDGE ROAD, FELIXSTOWE, SUFFOLK



# IMPROVED

Modern styling in light grey with legible black engraving.

Constructed to withstand adverse climatic conditions.

Ever ready case, including leads, prods and clips.

Improved internal assemblies.

Re-styled scale plate for easy rapid reading. 2 basic scales, each 2.5 inches in length.

New standards of accuracy, using an individually calibrated scale plate: d.c. ranges 2.25% of full scale deflection. a.c. ranges 2.75% of full scale deflection.

Available accessories include a 2500V d.c. multiplier and 5, 10 and 25A shunts for d.c. current measurement.

STANDARDS OF

# ACCURACY AND RELIABILITY



Mk4

# MULTIMINOR

The Mk.4 MULTIMINOR is an entirely new version of this famous Avo instrument and supersedes all previous models. It is styled on modern lines, with new high standards of accuracy, improved internal assemblies, and incorporating panclimatic properties.

The instrument is supplied in an attractive black carrying case, which also houses a pair of leads with interchangeable prods and clips, and an instruction booklet. It is packed in an attractive display carton. Robust real leather cases are available, if required, in two sizes, one to take the instrument with leads, clips and prods, and the other to house these and also a high voltage multiplier and a d.c. shunt.

D.C. Current : 100 $\mu$ A f.s.d. — 1A f.s.d. in 5 ranges.     **RESISTANCE** : 0-2M  $\Omega$  in ranges, using 1.5V cell.  
 A.C. Voltage : 10V f.s.d. — 1,000 f.s.d. in 5 ranges.     **SENSITIVITY** : 10,000  $\Omega/V$  on d.c. Voltage ranges.  
 D.C. Voltage : 2.5V f.s.d. — 1,000 f.s.d. in 6 ranges.     1,000  $\Omega/V$  on a.c. Voltage ranges.  
 D.C. Millivolt range : 0 — 100mV. f.s.d.

Weight (including case) :—  
 1½ lbs. (0.675 kg.) approx.

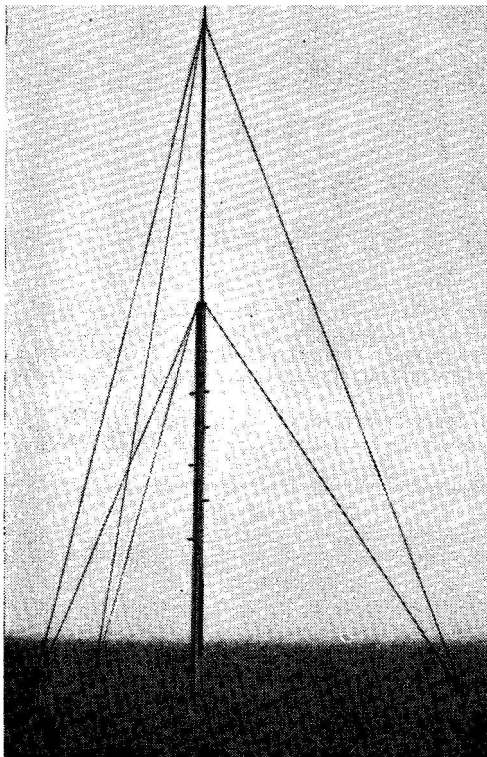
Dimensions (including case) :—  
 7½ x 4 x 1½ ins. (197 x 102 x 41 mm.) approx.

● For full details of this great new pocket size instrument, write for descriptive leaflet.

**AVO LTD** AVOCET HOUSE, 92-96 VAUXHALL BRIDGE RD, LONDON, SW1 Tel: VICtoria 3404 (12 lines)



MM17



# C·A·L·L·I·N·G A·L·L A·M·A·T·E·U·R·S

At last a telescopic mast at a price you can afford

Check the Vital Features of this New JOHN SMITH 30' Steel Mast

- \* Made of oval steel tube for maximum strength and easy telescoping
- \* Hinged to extra strong groundplate for easy erection
- \* Simple locking device
- \* Will take rotator unit or pulley
- \* Strong welded steps for easy climbing
- \* Steel pickets and two sets of Courlene rot-proof and shrink-proof guys included
- \* Delivered free within 25 miles of London

**PRICE COMPLETE only £25** Write for full particulars and specification to :

**JOHN SMITH & CO. (LONDON) LTD.**  
 Hainault Works, Chadwell Heath, Romford, Essex  
 Telephone: Seven Kings 6070 (10 lines)

# TODAY'S MEN OF ACTION



## A CAREER WITH THE ROYAL SIGNALS

Would you like a really well-paid career that will bring you adventure, travel and a skill you'll value all your life? This is what life in the Royal Signals adds up to —so, if you're keen and fit, this could be the life for you. The Royal Signals is the nerve system of today's Army and in it you would always be at the centre of things. Whenever there are vital messages to be relayed or orders to get through, it's a job for the Royal Signals. You may be a Technician or Operator employed on radio, radio relay or line systems. Or you may be a member of the famous Signals Despatch Service, carrying urgent despatches by *road and helicopter*. As a member of this highly skilled Corps you could work in almost any part of the world. In fact, if you wish it, you are assured of an overseas posting. And, in the Royal Signals, you can work not only throughout the Army, including the Parachute Regiment, but with the Royal Navy and the Royal Air Force.

Whichever Signals trade you choose, opportunities for promotion are excellent—you could be a Sergeant by the time you are 25, earning as much as £16.2.0 per week

as a single man. And, of course, your pay is there to spend or save as you please. Again, as a single man, food, clothing and housing are all free, as are the facilities for the many sports you can choose in your spare time.

For further details, post off this coupon for a free booklet, or go to your local Army Information Office.

|   |                  |
|---|------------------|
| <i>Please reply to:—</i>  |                  |
| The Army Careers Department, MP6(A),<br>Lansdowne House, Berkeley Square, London W.1. |                  |
| NAME  | .....            |
| ADDRESS   | .....            |
| DATE OF BIRTH   | ..... (VOC/68/A) |

INDEX TO  
ADVERTISERS

|  | PAGE             |
|--|------------------|
| Abel Radio, Ltd. ... ..                            | 202              |
| Ad. Auriema, Ltd. ... ..                           | <i>cover ii</i>  |
| Anglin ... ..                                      | 248              |
| Aveley Electric, Ltd. ... ..                       | 193              |
| Avo, Ltd. ... ..                                   | 199              |
| British National Radio<br>School ... ..            | 248              |
| Busfield's Astro-Marine ... ..                     | 248              |
| Cathodeon Crystals, Ltd. ... ..                    | 250              |
| Charles H. Young ... ..                            | 193              |
| Codar Radio Co. ... ..                             | 198              |
| Daystrom ... ..                                    | <i>cover iv</i>  |
| G3HSC (Morse Records) ... ..                       | 256              |
| Green & Davis ... ..                               | 202              |
| G.W.M. Radio ... ..                                | 254              |
| Henry's Radio ... ..                               | 253              |
| Home Radio ... ..                                  | 256              |
| John Smith & Co.<br>(London), Ltd. ... ..          | 199              |
| Jordan ... ..                                      | 197              |
| K.W. Electronics<br><i>front cover, cover iii,</i> | <i>249</i>       |
| Minimitter ... ..                                  | 249              |
| Mosley Electronics ... ..                          | 196              |
| Partridge Electronics, Ltd.<br>250 & 255           |                  |
| Peter Seymour ... ..                               | 197              |
| Quartz Crystals ... ..                             | <i>cover iii</i> |
| Rollet ... ..                                      | 256              |
| Royal Signals ... ..                               | 200              |
| R.S.C. (Derby) Ltd. ... ..                         | 202              |
| R.S.T. Valve Mail Order<br>Co. ... ..              | 195              |
| Service Trading Co. ... ..                         | 202              |
| Short Wave (Hull) ... ..                           | 253              |
| Small Advertisements ... ..                        | 247-256          |
| Smith & Co., Ltd. ... ..                           | 252              |
| Stern-Clyne Electronics ... ..                     | 251              |
| S.W.M. Publications ... ..                         | 194              |
| Withers ... ..                                     | 254              |

# SHORT WAVE MAGAZINE

(GB3SWM)

Vol. XXII

JUNE, 1964

No. 248

## CONTENTS

|   | Page |
|---|------|
| <b>Editorial</b> ... ..   | 203  |
| <b>SSB Transceiver for Top Band and 80 Metres</b> , by M. Mason (G6VX)  | 204  |
| <b>Verticals, Ground Planes and Radials</b> , by L. H. Thomas, M.B.E. (G6QB)                                      | 208  |
| <b>The Practical Applications of Semiconductors, Part III, Test Equipment (II)</b> , by M. I. Davis, B.Sc. ... .. | 212  |
| <b>Do You Know That</b> ... ..  | 216  |
| <b>HF-Band Transmitter, Part I</b> , by A. J. Shepherd (G3RKK) ... ..   | 217  |
| <b>Miscellany — Comment on the Times</b> ... ..   | 223  |
| <b>Communication and DX News</b> , by L. H. Thomas, M.B.E. (G6QB) ... ..  | 225  |
| <b>The Mobile Scene</b> ... ..  | 231  |
| <b>Specially on the Air</b> ... ..  | 235  |
| <b>Amplified Audio Oscillator</b> , by J. F. E. Grogan (G3PJG/T) ... ..   | 236  |
| <b>VHF Bands</b> , by A. J. Devon ... ..  | 237  |
| <b>The Other Man's Station — ZE3JJ</b> ... ..   | 241  |
| <b>New QTH'S</b> ... ..   | 242  |
| <b>The Month with The Clubs — From Reports</b> ... ..   | 243  |
| <b>Old Timers Celebrate</b> ... ..  | 247  |

**Managing Editor:** AUSTIN FORSYTH, O.B.E. (G6FO/G3SWM)

*Advertising:* MARIA GREENWOOD

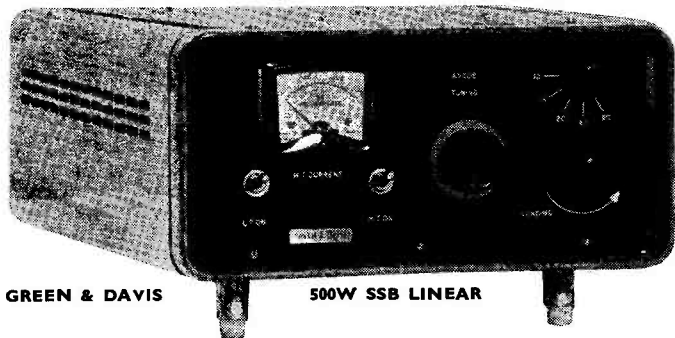
*Published on the first Friday of each month at 55 Victoria Street, London, S.W.1. Telephone: Abbey 5341/2*

*Annual Subscription: Home and Overseas 42s. (\$6.00 U.S.) post paid*

© **Short Wave Magazine Ltd.**

### 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. E. & O.E.*



**GREEN & DAVIS 500W SSB LINEAR**

operates on 80-40-25-15 and 10m. With high efficiency on ALL Bands. Completely self-contained including P.S.U. R.C.A. 7094 Beam Tetrode.

Light in weight—only 38 lbs. Absolutely reliable—12 months guarantee. Internal Ant. Changeover relay matches into ALL SSB TX or transceivers.

**The PGLAI-£87 . 10 . Od. (Ex Stock)**

- 2 and 4 metre **NUVISTOR CONVERTER**  
Mk. II ... .. £8. 19. 6  
Mk. IV ... .. 14 gns.
- 2 and 4 metre **NUVISTOR Pre-Amp.** £5. 0. 0
- 2 and 4 metre **18 watt CW TX.**
- CTX2 and CTX4** ... .. £10. 0. 0
- 2 and 4 metre **20 watt TX.** The 2M15-20A and 4M15-20 inc. MOD + 230v. AC and 12v. DC PSUs ... .. 48 gns.
- 2M1000. Latest 150w. AM and CW TX. 96 gns.
- 70CM1000 40-90 watt. Tripler-Amplifier (T.B.A.) 70cm, 3 NUVISTOR CONVERTER 3N70 16 gns.
- CTR-70 8-10 watt Tripler-Amplifier for 70 cms ... .. £20. 0. 0
- NEW !!! 60w. DC-DC Converter.** 12v. d.c. 1/P 300v. 60w. O/P ... .. £7. 19. 6

**GREEN & DAVIS ACCESSORIES**

- 2 and 4m. Mobile Whip Antenna £3. 0. 0
  - 2m. 5 ele. Beam £2. 5. 0
  - All Band R.F. Chokes — 1 kW rating for PA's, Linear's, etc. £1. 0. 0
  - CO-AX. CABLE** 1/8 per yard. Super Aerial cable 75 ohms. Very low loss. OK at 450 Mc/s. 100C. XTAL Microphone 48/- inc. Base.
  - RF40 FIELD strength indicator, 69/6.
- The following manufacturers products are also available: Acos, Amphenol, Cambion, Eagle Products, National Radio, Nutronics, Partridge Electronic Products. Just write or phone for further information.

# GREEN & DAVIS

(OFFICE) 5 WEIR HALL GDS, LONDON, N.18  
(WORKS) 104 HORNSEY ROAD, LONDON, N.7  
Telephone: NORTH 6871

**THE NATIONAL RADIO NCX-3 TRI-BAND SSB TRANSCEIVER**

Complete SSB/AM/CM station with full coverage of the 80, 40 and 20 metre bands. 200 watts P.E.P. on SSB, 200 watts cw, 100 watts AM. High Frequency crystal filter giving 40 dB sideband suppression. VOX or push-to-talk on phone, break-in keying on CW. Available from stock: NCX-3 Transceiver £148. 8. 4. NCX-A Mains power supply and speaker console £46. 7. 1. NCX-D 12v. DC Mobile power supply £50. 8. 11. Easy terms available; NCX-3 plus NCX-A (power supply) deposit £24. 15. 3. Full details on request from Green & Davis, Main London Agents of the National Range.

**ABEL RADIO LTD.**

283 EDGWARE ROAD, LONDON, W.2. Tel. AMB 8614

| QUARTZ XTALS in Kc/s. |                      |                      |                  |
|-----------------------|----------------------|----------------------|------------------|
| <b>Octal at</b>       | 4200                 | <b>STC 4046 1/2"</b> | 15333.3          |
| 15/- each             | 4350                 | 6/- each             | 18247.5          |
| 23.089                | 4500                 | 11350                | 18372.5          |
| 2100                  |                      | 11400                | 18622.5          |
|                       |                      | 11450                | 18747.5          |
| <b>B7G at</b>         | <b>10X</b>           | 11500                | 18872.5          |
| 10/- each             | 1/2" Spacing         | 11550                | 18997.5          |
| 20.228                | 5/- each             | 11600                | 19122.5          |
| 33                    | 2900                 | 11650                | 19247.5          |
| 33.333                | 6010                 | 11750                | 19372.5          |
| 41.666                | 6021.1               | 11800                | 19497.5          |
| 41.7                  | 6076.7               | 13540                | 19622.5          |
| 105.3                 | 6110                 | 13640                | 19747.5          |
| 108.05                | 6243.7               | 13740                | 19872.5          |
| 110.6                 |                      | 13840                |                  |
| 111.6                 | <b>10X</b>           | 13940                |                  |
| 270.5                 | 1/2" Spacing         | 14640.5              | QQV03/20A60/-    |
| 271.5                 | 5/- each             | 14666.6              | 4X/150A 100/-    |
| 306                   | 33.333               | 14833.3              | 6870 17/6        |
| 308                   | 34300                | 14848.5              | Over 5000 valves |
| 340                   | 35800                | 14898.5              | in stock.        |
| 364                   | 37050                | 14948.5              | Cathodeon Mini-  |
| 2000                  |                      | 15048.5              | ature Xtal ovens |
| 2300                  | <b>STC 4044 1/2"</b> | 15148.5              | 6/12 volt AC/DC  |
| 2450                  | 7/6 each             | 15166.6              | for STC type     |
| 2600                  | 2100                 | 15248.5              | 4046 Xtals 1/2"  |
| 2750                  | 5930                 | 15298.5              | Spacing 22/6 ea. |
| 3750                  | 6076.7               | 15333.3              | 2 or 6 volt      |
| 3900                  | 6276.7               | 15448.5              | (Synch.) Vibra-  |
| 4050                  | 6310                 | 15666.6              | tors, 5/- ea.    |

Ribbed Ceramic Coil Formers. 1 1/4", 5/- each; 3/4", 2/6 each. Miniature I.F.T.'s. 465 Kc/s, 6/- pair; 5 Megs, 5/- pair. New Thermo-couple 3/4" diameter Meters. 2 Amp., 25/- each. Xtal Mic Inserts, 7/6 each. 3" Speakers, 12/6 each. Relays. Type 3000, S.T.C., etc. Resistors and Capacitors, Switches.

Large stock of Air-spaced Trimmers and Tuners, i.e., 25pf tuners, 2/3 each.

Manufacturers inquiries welcome. Generous discount for quantity.

**THE SPOT R.S.C. DERBY 41361**

- 2 METRE.** 5 element Yagi and super mast bracket, 39/6; 8 element, 59/-; add on 3 element, makes 5 into 8, 19/6, all plus 5/6 carr. each.
- S.S.B. COMPONENTS.** 1K, and 2K, carbon lin. controls, 5/- each P. and P. 6d.
- 1" S.F.6. Ferrite Rings, 3/9 each. P. and P. 6d.
- MATCHED PAIR.** OA79 Diodes, 6/-, P. and P. 6d.
- VIBRATOR UNITS.** 12v. 1/P D.C. 300v. 100 mA O/P with spare vibrator, etc., 19/6 each. Carr. 8/6.
- EDDYSTONE RX's.**
- BRAND NEW.** 24v. 20 amp F.W. (Bridge) Selenium Rectifiers, 49/9 each. P. and P. 2/6.
- B.40 RX.** 640 kc/s.-30.5 mc/s., £35. Carr. 12/6.
- 2" CAST MAST COUPLERS.** 9/- each. P. and P. 2/6.

**R.S.C. (DERBY) LTD**

THE SPOT, 26 OSMASTON ROAD, DERBY

**SEMI-AUTOMATIC "BUG" SUPER-SPEED MORSE KEY.** Seven adjustments; precision toolled; speed adjustable 10 w.p.m. to as high as desired. Wt. 2 1/2 lbs. Price £4. 12. 6 post paid.



**KEYING LEVER.** Especially designed for use with all types of electronic keyers. Fully adjustable, micro switch action, no contact bounce, precision made, finely polished parts, screw down base. £4. 4. 0 post paid.

**TRANSISTORISED FULLY AUTOMATIC ELECTRONIC KEYS.** 230v. AC or battery operated. Incorporates built-in monitor oscillator, speaker, and keying lever. Adjustable speeds, giving either auto, semi-auto, or hold. Seven transistors, 4 diodes. Price £16. 10. 0 + 4/6 p. and p.

**HIGH FREQUENCY TRANSISTORISED MORSE OSCILLATOR.** Fitted 2 1/2" moving coil speaker. Uses type PP3 or equiv. 9v. battery. Complete with latest design morse key. 22/6 + 1/6 p. and p.

All mail orders, also callers, to:—  
**SERVICE TRADING CO.**  
47, HIGH STREET, KINGSTON-ON-THAMES, SURREY  
Personal callers only at KIN 9450  
9, Little Newport Street, London, W.C.2 GER 0576

# The SHORT-WAVE Magazine

## EDITORIAL

**Cards** *The subject of QSL'ing in the SWL context has been touched upon often enough over the years — but there are always some things that need saying again, and again.*

*The lure of DX makes heavy demands upon its devotees — and not least is that of obtaining firm confirmation of what is entered in the log. To most operators (transmitting and SWL) seriously interested in DX, the QSL card is an essential factor in the scheme of things, crowning results with the proof of ability.*

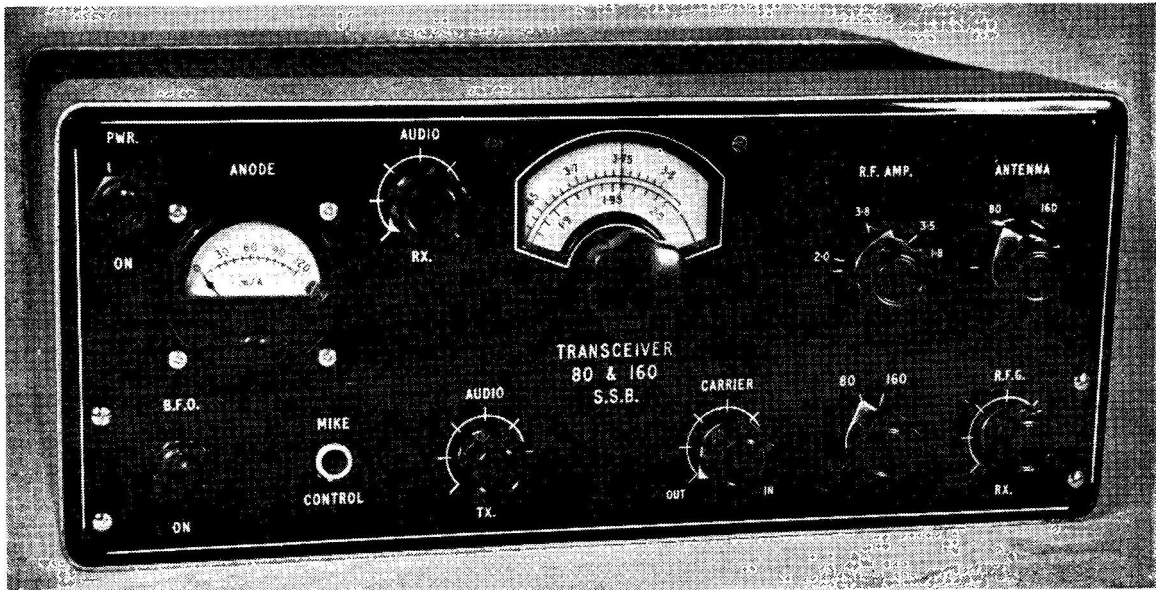
*From the point of view of the transmitting operator putting in a good deal of time working the DX bands, things have become very difficult. Cards are often just as important and interesting to him as they are to the SWL, but with quite a different emphasis. He sends, and hopes to receive, QSL's to confirm contacts. And with the volume of traffic on the amateur bands today, this is about as far as he can cope. SWL reports are of little interest to him unless he wants them for a coverage survey (which, incidentally, few transmitters appear to attempt these days), or they tell him something that he could not otherwise know. For instance: That he is being heard in an unexpected direction at an unusual time; or that his CQ was answered by some exotic DX station, unheard; or, that in comparison with other stations in his neighbourhood, he was stronger, or weaker; or that, though he called, and called, and called without result he was being heard by an SWL able to give a detailed report.*

*The operator behind a call DX for his country of origin is not only burdened with the task of QSL'ing the stations he has worked, but is also (if a regular phone station) flooded with SWL report cards — many of which originate in the U.K. even where G operators are concerned!*

*In such a case, there can these days be no obligation to QSL, even if an s.a.e., a stamp or an IRC is enclosed. The point is that no AT-station operator can be expected to QSL all and sundry merely for the asking, because time for him is just as important a factor as postage. But the good amateur will always respond to an SWL report which is of real use to him, even if no return postage has been offered.*

*Austin Forster,  
G6FO.*

---



The Sideband Transceiver for 80-160m., designed by G6VX. It is a single-conversion arrangement, using a Kokasai mechanical filter, doubling for the transmitter and receiver sections. The PA is a 5B/254M, giving a p.e.p. in the region of 40 watts and, being intended primarily for mobile working, change-over is by microphone-controlled switching. Economy in the circuitry is achieved by making certain sections of the circuit common to both Tx and Rx sides — see Fig. 1 and the diagram at Fig. 2. This rig, an extremely interesting and effective design for its intended purposes, performs very well and at the moment is being operated by G3JFH/M, Cheltenham. A photograph of the Transceiver as installed appeared on p.169 of the May issue of "Short Wave Magazine."

## SSB TRANSCEIVER FOR TOP BAND AND 80 METRES

EXPERIMENTAL DESIGN,  
USING SINGLE CONVERSION  
AND MECHANICAL FILTER

M. MASON (G6VX)

**T**HE circuit of this transceiver is being published for its interest value only and to demonstrate one or two useful principles that are quite common to many commercial and amateur-built equipments.

In the first place the transceiver was built to gain more first-hand experience of working SSB under mobile conditions, and to determine what sort of difficulties might be encountered. Simplicity was of prime importance, therefore single conversion was adopted, for operation on the 160- and 80-metre bands only.

Secondly, information was required on the Kokasai mechanical filter, so it seemed a good idea to build one combined transmitter and receiver to evaluate the filter for both methods of operation.

The third point of interest was to find out how well a receiver would work that was based on the now common transceiver practice of using the same RF signal circuits for both the transmitter and receiver.

This equipment has been used quite successfully for some months as a home-based transceiver operating from an AC power supply, and as a mobile installation powered from a 12v. battery and a simple transistor DC-to-DC converter. The results obtained when either transmitting or receiving have been equally good on both 160 and 80 metres. A 3.4 kc wide filter was used for the tests, but a worthwhile improvement in selectivity would be had by using the 2.1 kc wide filter. When only one filter is to be used, tests indicate that the 2.1 kc is the better compromise between receiver performance and transmitter quality.

### Design Considerations

The main design points of interest in this experimental transceiver are:—

- (1) The very simple and effective audio-derived AVC circuit, which could be used in other types of receivers with

- equally good results for both SSB and CW operation,
- (2) The method of coupling the output of the ring-modulator into the mechanical filter is simple and effective without upsetting the filter performance on reception,
  - (3) The detector feed, from a low-impedance winding, works very well and delivers a clean, high audio output,
  - (4) The ring-modulator is worth using in any transmitter because of its high output and good carrier suppression for long periods at a time,
  - (5) The low-impedance audio load in the VFO works very well when coupled into high impedance grids. There is no detectable pulling on the VFO and adequate injection voltage is easily obtained.
  - (6) The zener diodes are very useful for ensuring a "stiff" negative bias supply for the power amplifier, especially when a 5B/254M is used as it gives a lot more output for a few milliamps of grid current,
  - (7) The simple muting arrangement for the transmitter or receiver is accomplished by a single change-over relay. It is effective and silent. A second

*This article is presented in response to many requests for some details of the mobile Sideband transceiver which has attracted so much attention at recent Mobile Rallies — shown by G3JFH/M, the details are by G6VX, who will be known to many of our older readers as an outstanding designer of amateur-band equipment. This article does not purport to be "fully constructional" in the accepted sense, and is by way of notes for the information and guidance of those who already have practical knowledge and experience of SSB techniques.—Editor.*

pair of contacts on this relay are used to remove the BFO from the balanced modulator, because the full gain of the IF stages tend to amplify the slight BFO leak through the balanced modulator and provided a second receiver BFO injection in the wrong part of the Rx circuit.

The first time this receiver was built it had no grid tuning control, but used bandpass coupling for the 160- and 80-metre bands. It was hoped to operate on 40m. as well but the VFO signal, which is only 455 kc away from the desired frequency, could not be adequately suppressed with a single-ended mixer. Even on 160 and 80m. the VFO was only about 20 dB down with the bandpass couplers. By the substitution of sharply tuned circuits, the VFO radiation on 160 and 80 can be kept down to 40 dB. Even this is not enough when the trans-

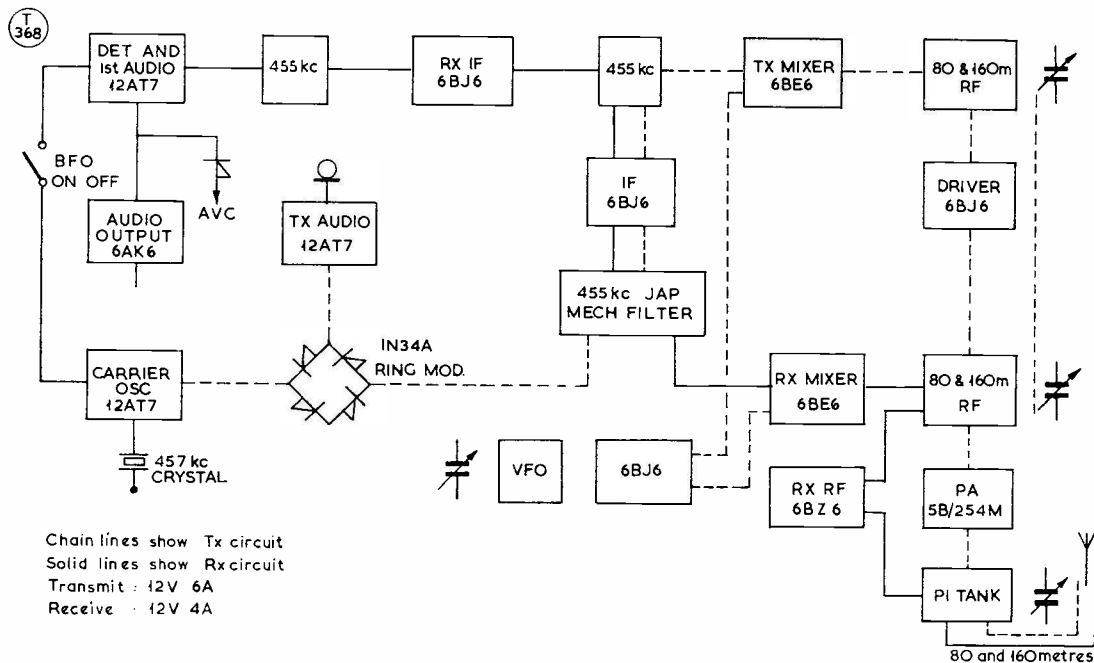


Fig. 1. Block diagram of the LF-band SSB Transceiver design by G6VX, in which certain parts of the circuit are common to both receiver and transmitter sections, as shown by the full and dotted lines. The mechanical filter is the Japanese "Kokasai" type, for 455 kc, with 3.4 kc bandwidth. This functions for both duties; the aerial tuning network is also commoned. The size overall is only 11 ins. by 4 ins. deep, with a chassis width of 8 ins.

ceiver is used on a large aerial, but as the prime use is for *mobile* operation a sharply tuned whip gives adequate protection. A better design would be to use a balanced mixer for the transmitter section, then three-band operation could be attempted.

The physical size of the transceiver is quite small. The front panel is 11in. x 4in. and the chassis is 8in. deep. The weight is about 8 lbs.

The power requirements are quite modest; operating off a 12-volt battery the total drain was 4 amps on receive and 6.5 amps on transmit, with a power input to the PA of 50 watts on 80 metres. The audio gain is sufficient for a dynamic microphone and more than enough for most crystal types. The aerial circuit has been designed for 50 ohms matching only.

Fig. 2. Circuit complete of the SSB Transceiver for Top Band and 80 metres, which is giving excellent results in mobile service. As the PSU is external, it can also be used as a fixed-station transmitter/receiver, the rated p.e.p. being about 40 watts. The receiver has audio-derived AVC, and is single-conversion. All values are given in the table and the Transceiver can be seen at any Rally at which G3JFH/M is present.

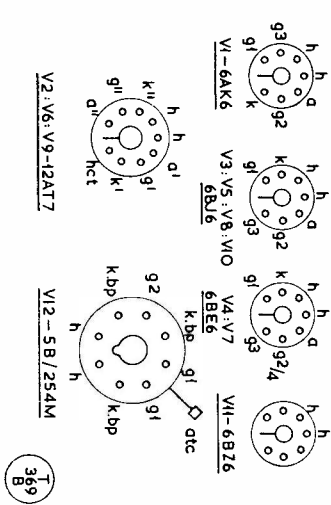
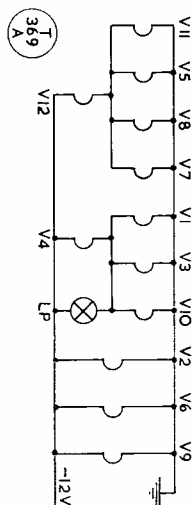
**Table of Values**

Circuit of the G6VX Transceiver

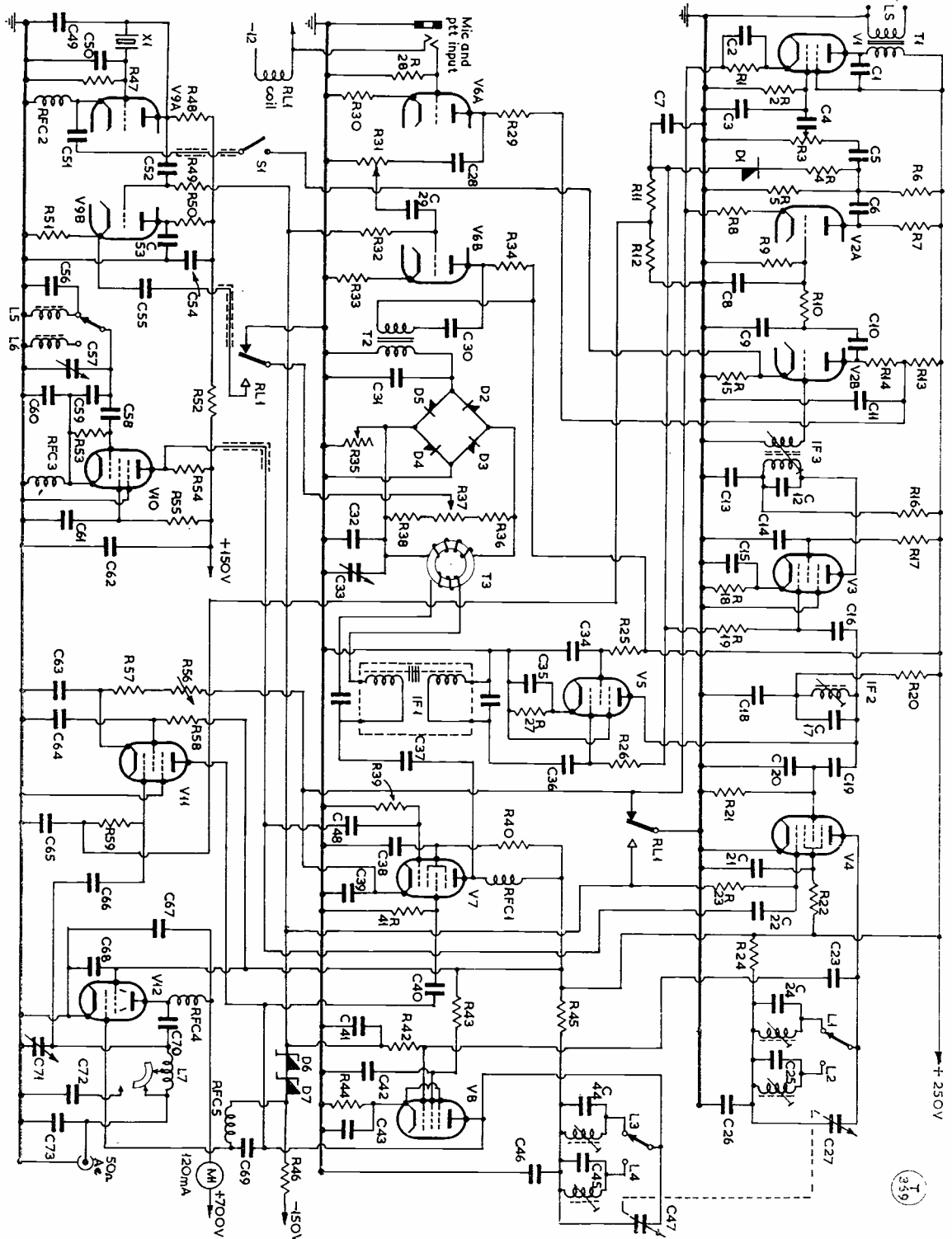
|  |   |
|--|---|
| C1, C5, C6, C10, C29 = .01 $\mu$ F   | R6, R59 = 1 megohm  |
| C2 = 12 $\mu$ F, elect.  | R8, R15, R16, R20, R24, R33, R45, R51, R54, R55 = 2,200 ohms  |
| C3, C4, C9, C28, C37, C55, C70 = .001 $\mu$ F  | R11, R12, R28, R47 = 2.2 megohm   |
| C4 = 1.0 $\mu$ F, paper  | R13, R17, R22, R23, R25, R39, R40, R43, R52, R58 = 27,000 ohms  |
| C11 = 2 $\mu$ F, elect.  | R15 = 4,700 ohms  |
| C12, C17, C20, C23, C58, C69 = 100 $\mu$ F   | R18 = 1,000 ohms  |
| C13, C14, C15, C18, C21, C24, C30, C34, C35, C38, C39, C41, C42, C43, C46, C53, C54, C61, C62, C63, C64 = 0.1 $\mu$ F, poly. (Radiospares) | R27 = 250 ohms  |
| C16, C19, C36, C40, C52 = 47 $\mu$ F   | R30 = 3,300 ohms  |
| C22, C24, C44, C48, C56 = 150 $\mu$ F  | R32, R49 = 470,000 ohms   |
| C25, C45 = 68 $\mu$ F  | R34 = 47,000 ohms   |
| C27, C47 = 10-50 $\mu$ F, type 551 Eddystone   | R35, R56 = 10,000 ohms, w/wound pots.   |
| C31 = .005 $\mu$ F   | R36, R38 = 330 ohms   |
| C32 = 82 $\mu$ F   | R37 = 2.50-ohm 11n. potentiometer   |
| C33 = 3-30 $\mu$ F, Philips  | R44, R57 = 100 ohms   |
| C42, C65, C68 = .05 $\mu$ F  | RFC1-5 = 2.5 mH RF chokes   |
| C49, C50, C66 = 10 $\mu$ F, s/m  | IF1 = Mech. filter, type MF-455-15K, Kokasol  |
| C51 = 270 $\mu$ F  | IF2 = Pri. 1.2 mH, Q = 100  |
| C57 = 7-93 $\mu$ F, var.   | IF3 = Pri. 1.2 mH, Q = 100, Sec. 12 mH, 10 : 1 turns ratio  |
| C60, C72 = 330 $\mu$ F   | T1 = Spkr. o/p  |
| C73 = .0012 $\mu$ F  | T2 = Midget, pri. 10K, sec. 600 ohms  |
| C67 = .002 $\mu$ F   | T3 = Use Mullard toroid FX-1594, 4-in. dia. ring; pri./sec. 11 turns each, 38g., for 50 $\mu$ H induct. |
| C71 = 13-392 $\mu$ F, var.   | Ry = Type 11 or 21, Radiospares   |
| R1 = 470 ohms, 1/4w.   | D1 = 0A200  |
| R2, R9, R19, R25, R29 = 220,000 ohms   | D2, D3 = IN34A, or equiv.   |
| R3, R31 = 470,000 ohms, log. pots.   | D4, D5 = 15v. zenar   |
| R4, R46, R50 = 10,000 ohms   | V1 = 6AK6   |
| R5, R7, R10, R14, R21, R41, R42, R53 = 100,000 ohms  | V2, V6 = 12AT7  |
|  | V3, V5 = 6B16   |
|  | V4, V7 = 6BE6   |
|  | V8, V10 = 6BZ6  |
|  | V9 = 5B/254M  |
|  | V12 = 5B/254M   |

**TABLE OF COIL DATA**

- L1, L3 — 40  $\mu$ H, 70 turns 5/45 Litz, layer wound, on Neoside TV formers, 5/16-in. dia., dust-free core tuning.
- L2, L4 — 20  $\mu$ H, 45 turns 5/45 Litz, layer wound, with L1, L2 at one end of former and L3, L4 at opposite ends of second former.
- L5 — 70 turns 36g. close-wound on Aladdin 3-in. dia. former, slug tune.
- L6 — 23 turns 24g. close-wound on former as for L5.
- L7 — 50 turns of 22g. on 1-in. dia. paxolin former 2 1/2 in. long; tap at 16th turn from bottom end.







## VERTICALS, GROUND-PLANES AND RADIALS

### PRACTICAL CONSIDERATIONS CONCERNING LAYOUT AND INSTALLATION—RESULTS COMPARED WITH A LONG-WIRE

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

EVERYONE who has studied the standard textbooks and handbooks knows quite a lot about the ground-plane aerial. It is a quarter-wave vertical; it needs horizontal (or buried) radials of a length a quarter-wave (or more); it is usually fed with 50-ohm coax (or something else); and it works in any location (or nearly any location)—and so on.

It's fine to know all this about it on paper, but what happens when one first puts one up? Does everything always go according to theory, or do those notorious hidden snags add up to troubles and frustration? And how about all those alternatives in brackets?

Obviously the only thing to do is to try one out, as exhaustively as possible, and to find out as much as possible about it; not only in the matter of results, but in the general way it goes.

#### Some Do, Some Don't

Every now and then one comes across an outstanding signal which bears all the hallmarks of a good beam, but turns out to emanate from a humble ground-plane or vertical. Many of the DX-peditions of the last few years have achieved thousands of contacts without using anything more ambitious.

On the other hand, spread all over are disgruntled types who "tried a ground-plane but the darn' thing was no good." You can hear them on the air almost every day. Why all this discrepancy?

The answer seems to be the obvious one: the QTH. If you are in a city location, thoroughly hemmed in by buildings, don't expect good results from a ground-plane in the back yard, with radials at ground level. The whole thing, from bottom to top, will be severely screened; especially if it is for use on, say, 14 mc, which means that its total height is only about 17ft.

On the other hand, in the same neighbourhood a ground-plane mounted high up on a roof, or even on top of a pole, might well give excellent results. A flat roof will permit horizontal radials; a pole or a sloping roof will mean drooping radials; but something effective can usually be arranged.

#### The Main Advantage

Except for the obvious point that a vertical aerial doesn't take up much space, the main advantage one expects to derive is low-angle radiation. Again, all

the text-books will make this clear. A vertical quarter-wave, over perfectly-conducting ground, does give a better spread of radiation at low angles than the average horizontal aerial, which, in the amateur sphere, is rarely as high as it ought to be.

Thus on the LF bands (take *Eighty*, for example) a quarter-wave vertical will give far better low-angle radiation, for DX purposes, than anything short of a dipole 100 feet high. The ubiquitous dipole at a height of about 30ft. will give virtually no useful low-angle output and will put out lots of power just where it isn't wanted for DX—vertically.

Not many of us can even manage a 67ft. vertical (for *Eighty*) but the half-size is quite practicable. Thus there are many scores of 40-metre ground-planes about—roughly 33ft. high and with radials of 34ft. or thereabouts. Many a suburban back-garden has been converted into a series of trip-wire booby-traps for this very purpose!

So the type, in theory, is well worth considering and will give good results if properly attacked. What is wanted is some insight into the practical considerations.

#### Choice of Equipment

A wide variety of whips, as used by the mobile types, can be mated with rigid lengths of tubing to make self-supporting verticals, although really tall ones will need some sort of guys. But one of the best and easiest ways of making an effective ground-plane is to use the excellent "Aerial, Vertical 32 No. 1" kit which came on the surplus market some few months ago. This consists, basically, of a 32ft. mast surmounted by a 14ft. whip and these kits were, in fact, advertised as "aerial masts." Many of them have probably been used simply as supports for some kind of horizontal wire. But they are very versatile, and the complete kit consists of ten 3ft. sections which screw together, a two-foot spike, a large insulator with the same screw fittings (so that it can be inserted between any two sections) and an adaptor, still with the same fittings, to take the 14ft. whip. Together with these pieces come two complete sets of guys, pegs to which they may be attached, hammer (purpose obvious!) and even a reamer for cleaning out the joints between sections.

Fig. 1 shows various ways of assembling some or all of these component parts. At (a) a 14-mc vertical 17ft. in total height stands at ground level; at (b) you have the same thing, but with the base 15ft. off the deck—a very useful arrangement. At (c) the 14ft. whip and 18ft. of the mast proper are combined to make a 7-mc ground-plane. (The extra 18in. which the keen-eyed readers will have discovered to be missing are supplied simply by soldering that amount of stout wire to the top of the whip section.)

Since this 7-mc aerial has only involved six of the ten 3ft. sections, the remainder can be used, to put the base of your 40m. GP 12ft. up in the air. The full guying system supplied must now be used, but with the shorter versions the radials can serve as guys.

All sorts of other combinations are available for other bands, especially if you are making a permanent

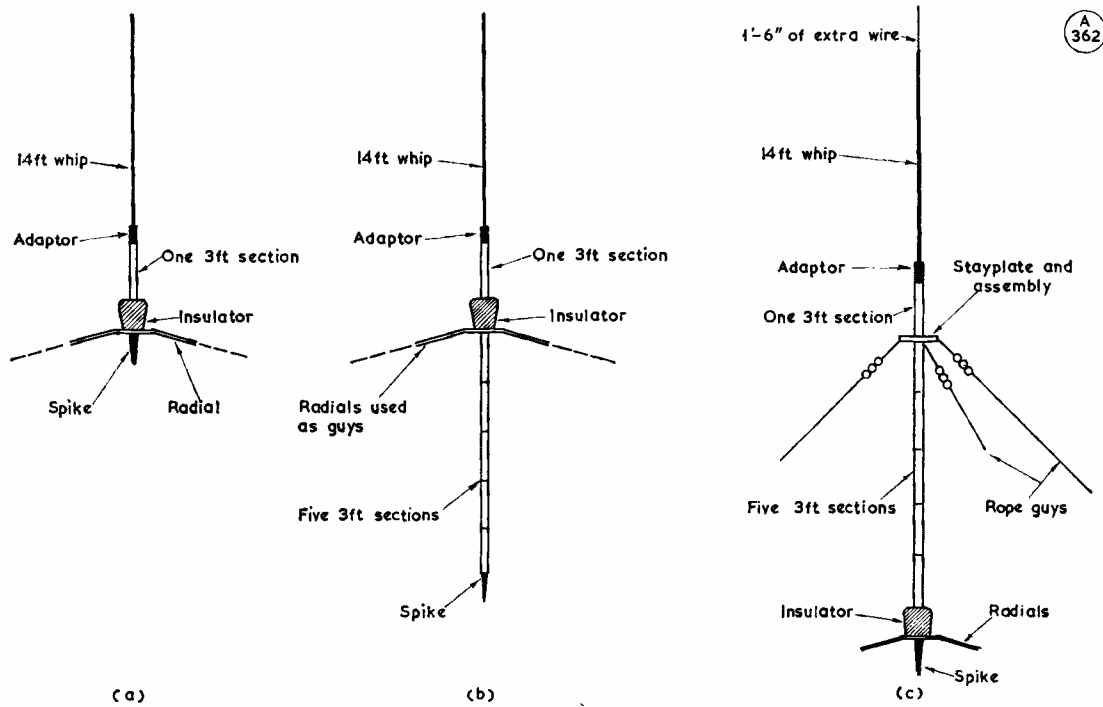


Fig. 1

Fig. 1. Three different methods of using the "Aerial, Vertical 32 No. 1" kit. At (A) only one 3-ft. mast section is involved, to make a simple 14-mc ground-plane at ground level. At (B), four more of the 3-ft. lengths have been put in under the insulator, to push up the base, and make the GP more effective in screened locations; in this arrangement, it should often be possible to arrange the radials horizontally, serving also as guys. The layout at (C) is a 40m. GP, with the radials at ground level. A set of guys will now be needed, and a short extra length of wire must be added to lengthen the whip. The result is a highly effective DX system, provided local screening is not too severe.

job of it and don't mind cutting a foot or two off the whip. (For instance, for a 21-mc ground-plane you will need only about 11ft., and the top 3ft. of the whip must be sacrificed . . . but you can get the *base* of such an aerial up to a height of 30ft. and use drooping radials, which helps to overcome the local screening hazard, or "backyard effect.")

When the insulator is inserted in whatever position you choose, a robust terminal is available for connecting the inner of the coax feeder, and all that has to be done is to provide a circular anchorage for the radials, to which the outer is connected. This is best done with a ring of No. 10 gauge wire: about 2in. in diameter.

**Radials**

During the course of a long series of tests, all sorts of radials have been tried—buried, surface, just above ground, horizontal at a good height, and drooping. Likewise cut-to-length (quarter-wave), random lengths (much longer), carefully insulated or "just lying about."

In the end it was obvious that the best matching, and the best results, came from quarter-wave radials, carefully insulated and run as nearly horizontal as possible. (Theoretically the radials should be very slightly longer than the physical quarter-wave. For

14 mc the vertical section was 16ft. 6in. and the radials 17ft.)

Now back to the text-books again, and readers will know that the impedance at the centre of a vertical dipole does not vary much from 72 ohms; likewise that if you cut the wire in half and tune the quarter-wave length against our old friend "the perfect ground" you will have an impedance of 36 ohms to deal with.

Now imagine a ground-plane mounted at a reasonable height. The radials, if horizontal, give the best available simulation of "perfect ground," and the impedance at the base of the vertical is still very near 36 ohms. If you drop the radials into a *vertical* position you will have reverted to an ordinary vertical dipole, and the impedance will be around 72 ohms. Therefore, somewhere in between, with the radials drooping (as they probably would be with a chimney-mounted vertical) the figure of 50 ohms won't be far out. In such a case the 50-ohm coax freely available will do the job nicely.

But how about the case with horizontal radials? Generally the pundits suggest a quarter-wave matching section of 50-ohm line, between the 36-ohm impedance at the base of the ground-plane and the 72 ohms of the main feeder. Probably this is a good idea, but if the aerial is reasonably near the shack, why not use

two lengths of ordinary 72-ohm coax in parallel? This was the plan adopted for the type with the horizontal radials, and it worked perfectly. Four radials were used; the insulator separating the vertical radiator from its vertical support was just 12ft. off the ground; and the four radials were respectively taken to a garage roof, some guttering, a tree and a short pole specially fixed on the other side of the garden. Each was properly insulated at a point 17ft. from the centre, the remainder of the run being

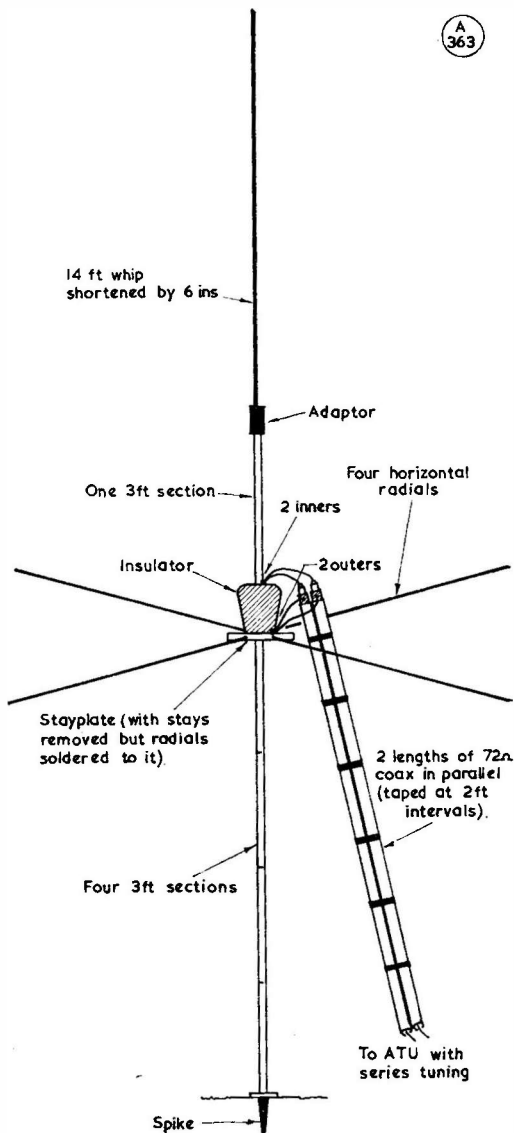


Fig. 2

Fig. 2. Fuller details of a 14 mc GP, showing the feed arrangement. One of the stay plates supplied (with the Bradford kit) has had the guy-ropes removed, so that it can be used as the anchor point for four radials. If these are nearly horizontal, a very good match into the system is obtained by using two lengths of 72-ohm coax in parallel.

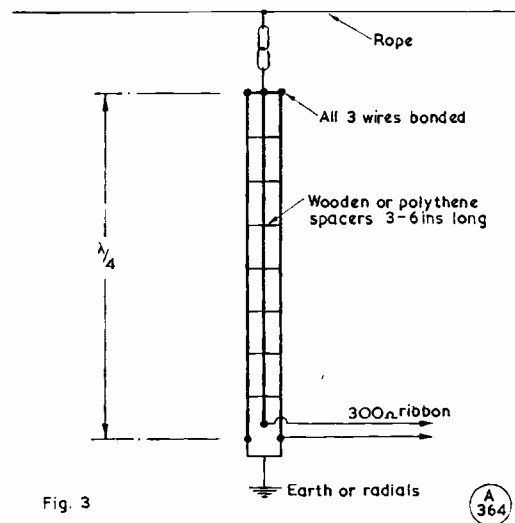


Fig. 3

Fig. 3. A suspended ground-plane, or vertical quarter-wave system, using three parallel wires for the radiator — and this is not, repeat not, what has come to be called a "tripole." With a base connection as shown here, 300-ohm ribbon should give an almost perfect match.

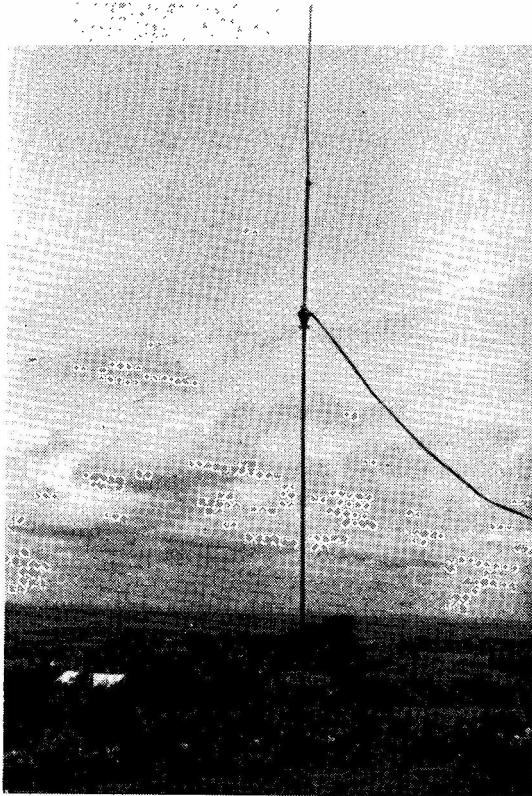
made with polythene cord. And the pair of 72-ohm coax cables gave a perfect match, using an ATU with series tuning at the home end. (Fig. 2).

Not only was there an SWR of 1:1 on the 72-ohm line between the transmitter and the ATU, but there was a similar state on the external line. The known output of the transmitter was 100 watts, which, translated in terms of our old friend  $I^2R$ , meant roughly 1.7 amps into 36 ohms. Great was the rejoicing when a thermoammeter indicated 1.6 amps going out of the window from ATU to feeder, and also 1.6 amps from feeder into the base of the vertical. (The length of the feeder happened to be about 20ft., so a standing-wave of any magnitude on it would have shown up in the form of a big variation between the current readings at the two ends.)

### Results

This 20m. ground-plane, with the base 12ft. high and four horizontal radials of 17ft. each, was made the main subject of the testing on the air, although many checks were also made with a 7-mc ground-plane and radials almost at ground level. The 14-mc aerial was consistently better, in *all* directions, than a folded dipole 33ft. high. It held its own with a 275ft. long-wire, also 33ft. high, in all directions except those of the long-wire's major lobe, and it showed up where the long-wire's nulls and poor spots were, by producing surprising reports from DX localities that were very difficult going on the long-wire.

It picked up a little more local QRN than the horizontal wires, and probably, for the same reason, could have caused a little more TVI. On the other hand it gave the benefit of producing slightly weaker signals from short and medium distances than either



An impression of the ground-plane assembly, as installed at G6QB, with the base of the system at the elevated position—see drawings and text. This arrangement has been found to give remarkably good and consistent DX results when compared with a long-wire, which previously seemed very adequate.

of the horizontal wires (which, incidentally, were taken completely down while the ground-plane was first being tested, to avoid the suspicion of reception or transmission by re-radiation).

A specimen logging looks like this: 14020 kc—on long-wire, W6EBG 579, UB5FG 589, UC2AA 599; on ground-plane, W6EBG 56/79, UB5FG 569, UC2AA 559. (These three stations were being received simultaneously, not with a time interval between them.) 14070 kc—on long-wire, VP8HJ 559, OH6WY 579; on ground-plane, VP8HJ 589, OH6WY 569.

The same pattern was repeated many times; in fact it soon became obvious that if a station was actually weaker on the GP than on the long-wire, then it was in a direction in which the long-wire was giving considerable gain. And once it was found that keeping both aerials up showed no sign of interaction between them, many scores of such tests were made. The ground-plane nearly always compared favourably with the 275ft. wire; on some occasions it was better in all directions, while on others (though fewer) it seemed to be worse all round. Propagation conditions have a considerable bearing on it.

All types of vertical aerial can, of course, be made

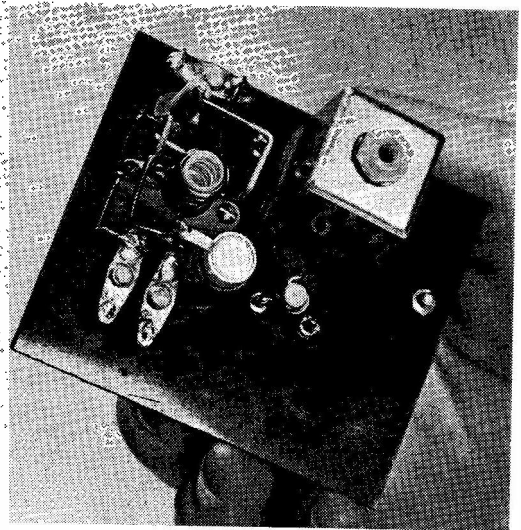
of wire and suspended, instead of being rigid, to stand up. If you have two masts—or one mast and a suitable chimney-stack—you can use a length of polythene or nylon cord between them to hoist up a vertical. But *don't* expect too much from the idea of supporting a vertical aerial from an existing horizontal one—results become pretty confused owing to interaction, even if it is only slight.

Wire verticals can, of course, be half-wave dipoles or quarter-wave ground-planes, and one of their advantages is that you can use two or more parallel wires to give a more convenient impedance at the feed point. A vertical dipole can take the form of a two-wire folded dipole, in which case the centre impedance is multiplied by four and gives a very good match to 300-ohm ribbon.

But the vertical quarter-wave (whether tuned against direct earth or in ground-plane fashion) can be made of *three* wires, which gives an impedance at the feed point of *nine* times the normal figure. Nine times 36 is not very far from 300, so the convenient 300-ohm ribbon can be used for this one also (see Fig. 3).

Incidentally, a dreadful habit has come into fashion of calling a three-wire folded dipole a "tripole." This is quite ridiculous, and if carried to its logical conclusion would imply that only a two-wire dipole can really be called a *dipole*, and the common-organ single-wire variety ought to be a *unipole*! A "tripole" suggests a bit of wire with three ends instead of two . . .

(A later article will deal with practical points concerning ordinary verticals, semi-verticals and "inverted V's"—Editor.)



An experimental parametric amplifier developed by PERA (Production Engineering Research Association of Great Britain) for use on the 130-180 mc band. This is a low-cost prototype which has given excellent results—on 145 mc the internal NF does not exceed 1 dB over a 2 mc band-width, with a gain factor of no less than 17 dB. It is of particular interest to note that this new amplifier is largely the work of C. L. Wright, G3CCA, who lectured on the subject at last year's London VHF/UHF Convention.

# THE PRACTICAL APPLICATIONS OF SEMICONDUCTORS

IN THE AMATEUR STATION

## Part III

### TEST EQUIPMENT (II)

M. I. DAVIS, B.Sc.

*This article continues the discussion on transistorised test gear of various kinds, with a number of practical circuits, including some applications for low-power tunnel diodes—to appear next time. The first two parts in the series covered power supply units (April) and that in May dealt with a number of test instruments in the category of measuring apparatus.—Editor.*

**T**HE simplest and most frequently used system for generating a continuous train of square-waves is the astable multivibrator, and this is the circuit we now consider. Square-wave generators are often used for tracing a fault through the stages of a receiver, by sequentially injecting the signal at points nearer to the RF end, and finding where the signal is no longer audible at the output. The whole receiver can be checked in this way, even the RF section, since it can be shown (by Fourier analysis, which it is not proposed to go into here) that a square-wave in the audio range contains a large number of harmonics up to very high frequencies.

This type of test is quite useful as a preliminary check on a "dead" piece of equipment, and will indicate roughly where such faults as dud valves, open circuits, and such are likely to be found.

The great thing about the multivibrator is that it always works, provided that the transistors are OK, and that the base bias resistors are less than  $\beta$  times the value of the collector loads, otherwise the transistors will not saturate. No "frigs." are needed if these conditions are adhered to. The frequency of

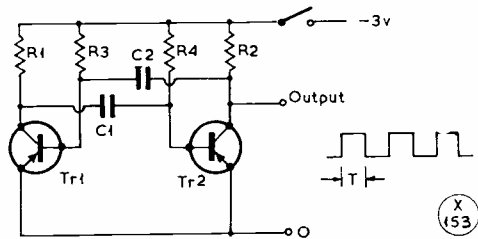


Fig. 1. The simple transistorised multivibrator circuit, for which the values are: C1, C2, 0.2  $\mu$ F; R1, R2, 820 ohms; R3, R4, 8.2K; TR1, TR2, OC71. These values are right for a frequency of about 1000 c/s. For higher frequencies, C1 and C2 would have to be reduced, and OC44's or OC45's used for the transistors.

oscillation can be shown to be approximately:

$$f = \frac{1}{2 \times 0.69 \text{ C R}}$$

or the period T is given by:

$$T = 0.69 \text{ C R}$$

with T in seconds, R in ohms, and C in farads.

If the circuit is to be used for this sort of testing, it might be worthwhile to make up the whole thing in the form of a test prod. If the components are mounted on a piece of printed circuit board — such as Veroboard, or pierced bakelite — which has been shaped to fit inside the case, say, of an old fountain pen, the device complete can go inside, along with a mercury cell to power it. The output may be connected to the nib, which functions as a useful prod, and a short length of wire terminated

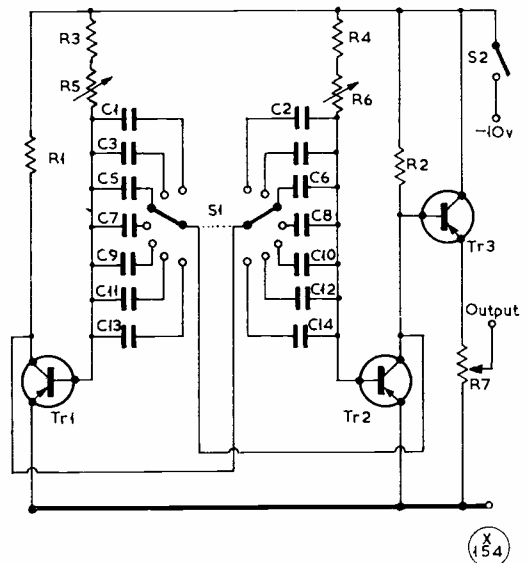


Fig. 2. A transistorised pulse generator. This is a modification of the Fig. 1 circuit, and it can be shown that it is possible to arrive at values to produce an RYRYRY sequence as a test signal for RTTY purposes — see text.

### Table of Values

Fig. 2. Transistorised Pulse Generator

- |                         |  |
|-------------------------|--|
| C1, C2 = 50 $\mu$ F     | R5, R6 = 10,000-ohm gang potentiometer |
| C3, C4 = 8 $\mu$ F      | R7 = 100-ohm potentiometer             |
| C5, C6 = 1 $\mu$ F      |  |
| C7, C8 = 0.1 $\mu$ F    |  |
| C9, C10 = .01 $\mu$ F   | TR1,                                   |
| C11, C12 = .001 $\mu$ F | TR2 = OC42                             |
| C13, C14 = 220 $\mu$ F  | TR3 = OC24, or OC36 for HF             |
| R1, R2 = 1,000 ohms     | S1 = 2-p., 7-w. wafer                  |
| R3, R4 = 1,000 ohms     | S2 = SPST toggle                       |

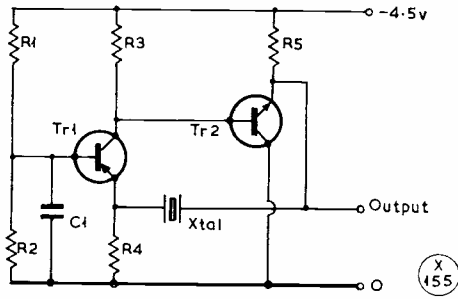


Fig. 3. A complementary DC-coupled amplifier, with the crystal in a feed-back loop — a simple type of signal generator. Values are: C1, 0.1  $\mu$ F; R1, 47K; R2, 6.8K; R3, 3.3K; R4, 1.2K; R5, 2.2K; TR1, p.n.p. type, such as NKT-223; TR2, n.p.n. type NKT-707 or similar; Xtal, 100 kc.

in a croc. clip can be used for the earth connection. Certainly, no originality is claimed for this idea, but readers might find it useful.

When using the generator to test equipment which has high voltages associated with it (compared to the  $V_{ce\ max}$  of the transistors) isolating capacitors of about  $.01\ \mu$ F at 1,000v. DC working, should be connected in series with the output leads.

**Square-Wave Multivibrator**

A typical circuit is shown in Fig. 1. The transistors can be OC71's for audio applications but, of course, it will be necessary to replace these with transistors of a higher cut-off frequency if operation at radio frequencies is required. For some applications, it is desirable that the output should be variable in frequency and amplitude. This virtually amounts to the construction of a simple pulse generator, and a suitable circuit is given in Fig. 2 for this.

This will be seen to be a modification of the circuit of Fig. 1, the main changes being to make the frequency-determining capacitors and resistors variable. The condensers are switched, and the resistors replaced by a two-gang variable resistor. Furthermore, to reduce the output impedance and to minimise the effects of loading on frequency and waveform, an emitter-follower buffer amplifier is

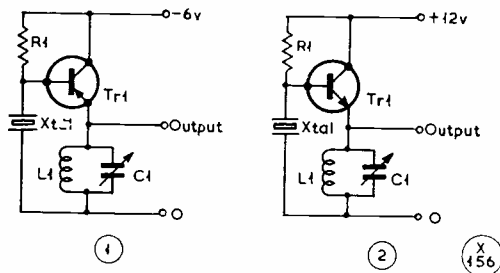


Fig. 4. A negative-resistance oscillator, in two versions, LF and HF. In Circuit 1, for a frequency of 1000 kc, values are: C1, 150  $\mu$ F variable; L1, 300  $\mu$ H; R1, 470K; TR1, can be OC44, OC45, OC170 or OC171. The crystal is a 1 mc bar. In Circuit 2, C1 should be not more than 100  $\mu$ F; L1, 3  $\mu$ H; R1, 47K; Xtal, 10 mc fundamentally; and TR1 a 2N697 or similar HF type.

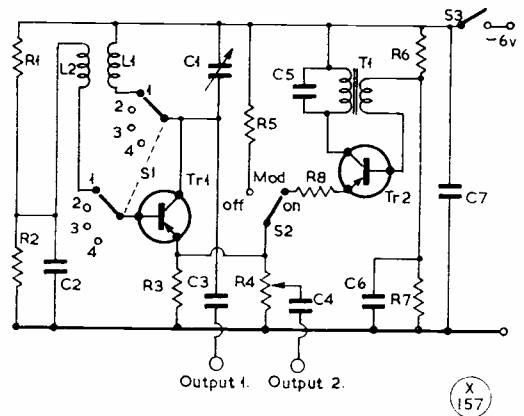


Fig. 5. The basic circuit for a transistor signal generator, some notes on which are given in the text. For clarity, only one set of coils is shown in the diagram. R5 should be adjusted until making S2 causes the least difference to the oscillator frequency. An improved circuit is suggested in Fig. 5(B)—see p.215 for discussion.

**Table of Values**

Fig. 5A. Signal Generator, basic circuit

|                        |                         |
|------------------------|-------------------------|
| C1 = 500 $\mu$ F       | R4 = 5,000-ohm          |
| C2, C5 = .001 $\mu$ F  | potentiometer           |
| C3, C4 = 680 $\mu$ F   | R5 = 10,000 ohms*       |
| C6 = 0.1 $\mu$ F       | T1 = xformer, 4 : 1     |
| C7 = 100 $\mu$ F, 12v. | S1 = 2-p., 4-way wafer  |
| R1, R6 = 47,000 ohms   | S2 = SPDT toggle        |
| R2, R7 = 10,000 ohms   | S3 = SPST toggle        |
| R3, R8 = 1,000 ohms    | TR1 = OC44, OC170, etc. |
|                        | TR2 = OC71, etc.        |

\* Subject to adjustment — see text.

used. Systems for generating pulses form a whole field of electronics by themselves, and since the applications of a pulse generator in the amateur station are somewhat limited, nothing further will be said on the subject—except to point out to the RTTY boys that pulse-forming systems, together with a network of diode gates, can be used as a most convenient source of copy with the correct m/s ratio, and correct timing. For instance the signal RYRYRYRY can be repeated continuously, using only four transistors, and a few diodes and resistors.

**Signal Generators**

The next logical step is to consider the generation of RF signals, both modulated and unmodulated. We consider first the simplest and most stable arrangement — the crystal oscillator. Two circuits are given (Figs. 3 and 4), one being a complementary DC-coupled amplifier, with the crystal as part of the feedback loop, and the other operating on the negative resistance principle. In this configuration, if the load impedance has a reactive part which is negative, then the input resistance is negative, and, under suitable conditions, oscillation will occur. To revert to the circuit of Fig. 3, it will be noted that, due to the presence of C1, the transistor Tr1 operates in common-base mode for

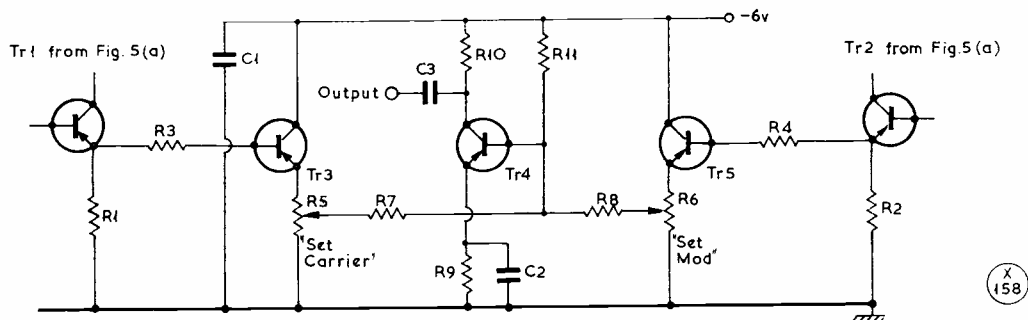


Fig. 5(B). An improved transistorised signal generator, based on the circuit of Fig. 5, and explained in the text. An instrument of this kind, in the AT-station, is one of those items the need of which is hardly appreciated until it has been built, calibrated — and used.

AC signals, even though where DC is concerned, the transistor is in the common-emitter configuration. The output from this stage is directly-coupled to the base of the *n.p.n.* transistor Tr2, which can be seen to be in the common-collector, or emitter-follower, mode. The crystal is connected between these two amplifier stages, as a frequency-selective feedback network, and the output is taken from the emitter of Tr2—Fig. 3, p.213.

This circuit is reprinted from the wide range of suggested circuits put forward by Newmarket Transistors Ltd., in their booklet on the use of *p.n.p.-n.p.n.* complementary pairs of transistors, to which readers are referred. It might seem a bit unnatural to suggest a circuit such as this for a crystal oscillator, when everybody knows the arrangement using an everyday *p.n.p.* transistor, and another tuned circuit which you then peak up to the crystal frequency. The reason for the introduction of this circuit at Fig. 3 is twofold: The first is that *n.p.n.* transistors will soon become part of the amateur's repertoire anyway, since most manufacturers are producing vast quantities of silicon planar epitaxial *n.p.n.* transistors, with a really excellent performance, at quite low prices. Secondly, this series is, as has been pointed out *ad nauseam*, predominantly aimed at the mentally lazy but demanding reader who wants good results with the minimum of think trouble! Well, there is no tuned circuit in this set-up. Take out one crystal and put in another, and it works at the new frequency just as well, with no adjustment. Further, you don't have to build the tuned circuit in the first place. One word of warning, however: The designers have stated that the circuit is suitable for lowish frequencies only, and it would be necessary to use a pair of "faster" transistors for many amateur applications; the other components would probably not need modification. The reason for the somewhat strange arrangement of the circuit is to ensure that the crystal "sees" the right impedance, a paramount point in transistor oscillator design. Suitable HF transistors for a higher frequency version of this idea are made by Mullard, Texas Instruments, SGS Fairchild, and other manufacturers.

The circuit of Fig. 4, although incorporating a

### Table of Values

Fig. 5B. Improved Signal Generator, transistor

|                        |                   |
|------------------------|-------------------|
| C1 = 100 $\mu$ F, 12v. | R9 = 390 ohms     |
| C2 = 0.25 $\mu$ F      | R10 = 2,200 ohms  |
| C3 = .01 $\mu$ F       | R11 = 62,000 ohms |
| R1, R2 = 1,000 ohms    | TR1,              |
| R3, R4 = 3,000 ohms    | TR2 = as Fig. 5A  |
| R5, R6 = 500 ohms,     | TR3,              |
| potentiometer          | TR4,              |
| R7, R8 = 4,700 ohms    | TR5 = OC44, OC170 |

tuned circuit, is also an "every-timer." The author has used this set-up on many occasions, and if the right transistor and a value of R1 allowing a meaty current to flow are selected, the output will be surprising. The author has often found it necessary hastily to dump the circuit in a diecast box, since he does not hold a transmitting licence! Although values are given for a standard of 1 mc, other L1/C1 combinations and crystals will produce outputs of much higher frequencies, if good quality transistors are used. Version 2, for instance, shows a 10 mc oscillator using an *n.p.n.* transistor; again, by inverting the connections *p.n.p.* could be used. If a high-value resistor, e.g. 470K, is used for R1, then the output will be small, since the biasing will have been arranged so that only small collector currents can flow. Under these conditions, the circuit is suitable for such applications as crystal calibrators and standard frequency sources; it might then be advisable to think about some form of temperature maintenance for the system. On the other hand, the circuit, when biased for high RF outputs, could be used as a high-power oscillator, or as the basis for a transistor transmitter.

In this case a suitable high-power, high-frequency transistor will be required, and one which is available quite cheaply, is the SGS Fairchild 2N697. Higher values of collector supply voltage can be used, and it is necessary to decouple the power supply leads with mica capacitors and RF chokes, or ferrite beads threaded on to the wires. The tuned circuit should have a low DC resistance, which implies a high Q-factor, and air-cored, spaced windings of thick wire are preferable for L1, although, for miniaturization, this coil could be



wound on a small ferrite former. Power outputs in the region of 750 mW can be achieved in this way.

The author apologises for the fact that the foregoing notes are vague and sketchy in the extreme, but it is virtually impossible, without either entering into a complex general mathematical analysis, or producing one particular circuit which must slavishly be followed, to enable readers to produce immediately an oscillator of this type to their own requirements. Since most readers have cultivated "green fingers" anyway, it is felt that the discussion may be a help in the design of spot-frequency crystal oscillators as test equipment.

### Modulated RF Sig. Gen.

Of more general value is the modulated RF signal generator. Indeed, for the constructor a signal generator is, next to the multimeter, the most important piece of test gear. Since standard or sub-standard signal generators are, in general beyond the pocket, ability and needs of most of us, a circuit is described which will fulfil the basic requirements without being too complex. If it is used in conjunction with one of the spot-frequency crystal oscillators already mentioned, and one or more crystals of useful values are available, then, using the station receiver as a zero-beat detector, quite good accuracy can be achieved.

The RF oscillator (Fig. 5) is of the tuned-collector type with a winding to provide feedback to the base. This transistor has an undecoupled emitter resistor which is shared by the LF oscillator; thus, the RF is amplitude-modulated. The modulating oscillator is, again, of the tuned-collector type, the frequency being adjusted to 400 or 1,000 cycles by alteration of the parallel condenser. In general, of course, this very simple system is not to be recommended, since the two oscillators mutually upset each other, and affect the DC working points. Buffer amplifiers should be placed in series with each oscillator, thus rendering them mutually independent, and the outputs then mixed in another stage. This would, however, mean the use of five transistors instead of two; a version with this refinement is included for those who are interested (Fig. 5B). As a rough guide to the winding of the coils, thirty turns of 22 gauge wire on an Aladdin  $\frac{1}{2}$ in. former with a ferrite core for L1, and ten turns for L2, will cover 7 and 14 mc with the tuning capacitor shown. If the unit is required to operate on amateur bands only, then C1 may be replaced by a good quality fixed capacity, and a variable condenser of much smaller value. It is good policy to choose two capacitors of opposite temperature coefficients to make up this fixed value.

To change ranges the coils L1 and L2 are switched, a blank position on this switch permitting audio only, with no RF present, to be used. The modulation may also be switched off, S2 in this case connecting the emitter of Tr1 to a source of DC current similar in magnitude to that passed by Tr2, in order to minimise this shift of DC conditions mentioned earlier. If the sort of transformer used

is not available, one of the audio oscillator circuits discussed in the May article may well be used. Variable-amplitude signals are available from a potentiometer in the emitter of Tr1, and there is a facility for a larger, fixed-amplitude signal from the collector, although loading of this point should be kept to a minimum.

As mentioned previously, calibration may be carried out using the crystal oscillator, or the standard-frequency transmissions can be used. A calibration curve can then be plotted, and the dial marked accordingly. The whole unit fits conveniently into a standard diecast box, and the battery will also go in, making the instrument quite self-contained. A good-quality slow-motion drive for C1, with a wide dial to take the calibration, can be mounted on the front panel of the box, together with a coax socket for the output.

### Transistor GDO

Readers will need no list of the applications of the next piece of equipment—the grid-dip oscillator. Suffice it to say, that in its transistorised form, its small size and weight, and absence of trailing leads merely enhance its usefulness.

As is clear from Fig. 6, the layout follows the standard pattern of a tuned-collector oscillator Tr1, followed by a detector and amplifier stage, which permits the use of a fairly cheap and robust meter, with sensitivity as normal. The circuit is best constructed in a small metal box with a socket for the various coils on one of the smallest faces, so that the best coupling can be achieved, when required, by poking the coil close in to the tuned circuit under investigation. Of course, such close coupling should not be used unless absolutely necessary, since this pulls the oscillator frequency, and readings of frequency become inaccurate. As in the previous piece of equipment, the tuning capacitor should be reduced in value if amateur-band-operation only is envisaged, and a range of plug-in coils will be

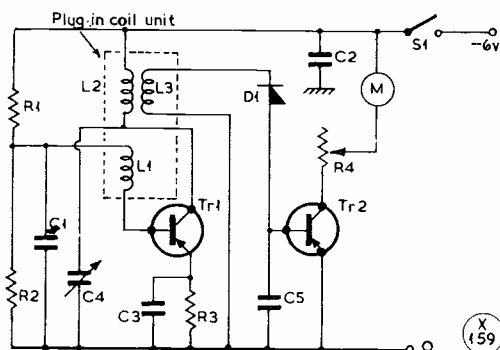


Fig. 6. A transistorised grid-dip oscillator (GDO), one of the most essential tools in the AT station. For full amateur band coverage, the values are: C1, C2, C3, .01  $\mu$ F; C4, 100  $\mu$ F, tune; C5, .02  $\mu$ F; R1, 18K; R2, 3.9K; R3, 560 ohms; R4, 2K potentiometer; L1, L2, L3, see text; TR1, OC170; TR2, OC71; D1, any HF diode, such as OA81; and M, 0-1 mA m/c meter. A GDO of this type can be accurately calibrated and will be much more sensitive than the conventional single-valve version of the grid-dip oscillator.

required. The ratio of L1:L2:L3 should be about 2:6:3, and if plug-in formers are not to hand, a miniature valve base can be mounted on the case, and ordinary formers glued to matching plugs with *Araldite* or an adhesive of equal properties. Apart from this, details of construction are not critical; the prototype was made on an odd piece of *Veroboard*, but tagstrips would do just as well.

Calibration can be in the same way as the signal

generator already described. One word of warning: Grid-dip oscillators are frequently used as absorption wavemeters. Great care must be taken not to subject the circuit to too large a signal, whether the supply is switched on or not. Failure to observe this precaution will lead to damage to the active elements of the circuit.

(To be continued)

## Do You Know That—

— Quartz crystals can be checked for activity, and roughly for frequency, by using a GDO. A 6-turn coil,  $\frac{1}{2}$ in. or so in diameter, is connected across the xtal pins. When the GDO probe is coupled to this coil, a sharp dip will occur at crystal resonance—the better the xtal, the greater the dip. (G3PHG).

— The household disinfectant and bleaching fluid known as *Domestos* now comes in a semi-rigid polystyrene container. By cutting off the top and bottom shaping (easily done by the flick of a bread knife) you are left with an insulated former 3in. long by  $2\frac{1}{2}$ in. in diameter, of excellent RF characteristics, light, and easily worked. In addition to normal coil purposes, these formers are particularly suitable for use on trap dipoles and for making the loading coil for a  $\frac{1}{M}$  aerial. Total cost: 2d., being the refund on the empty container (payable, of course, to the XYL!). (G3GGL).

— Further to the foregoing, certain other domestic fluids come in types of plastic container but, being thinner and of polythene (to enable the contents to be squeezed out) they are floppy and of far less use for radio purposes than the rigid *Domestos* pour-out bottle. Wash it out carefully before cutting.

— A standard mains transformer, provided it has a good selection of primary tapings, can be used as a temporary auto-transformer by taking the required voltage off one of the taps, e.g. with the mains across 0-240v., an output of 200v. can be obtained by connecting to 0-200v.—and, of course, if the mains are 230v. nominal, and the transformer is tapped up to 250v., the higher voltage will be given by taking mains to 0-230v. and the load across 0-250v. Remember, however, that the *current* rating of the primary winding must not be exceeded and that it is advisable to put a high-value resistor across the xformer *secondary* to prevent HV transients being developed. (G3RDC).

— An insulated wire wrapped round the anode lead of the last IF stage of a receiver tuned to a strong signal will produce a local beat at the IF, useful for test purposes in the absence of a signal generator, i.e., if the Rx IF is 465 kc, this signal will be at 465 kc, suitable for the alignment of a second Rx or IF/AF strip if the loose lead is coupled as for a sig.gen. (SWL R. Adams, Steyning).

— Empty, transparent ball-point pen cases (of the 9d./1s. variety) can be used as feeder spreaders by trimming off the writing end to the required feeder

separation, 4in. being a usual size. The spreaders can either be drilled to take the feeder wire, and fixed with a hot iron, or the wire can be pressed into the spreader ends and, likewise, sealed in with the iron. (SWL T. Cook, Failsforth, M'cr).

— The ex-Service mess tins (made of aluminium) now being sold at 6s. or less at many surplus stores make ideal chassis for the smaller equipment items. (SWL J. Cawkwell, Newark).

— For the protection of bolts and screw-threads on the fittings of outside beam aerial assemblies, it is better to use fruit-tree dressing rather than paint, which can make screws impossible to move. This dressing is like a thick black grease, will remain effective for years, and yet leaves the nuts and bolts free to turn. It should be obtainable at any shop stocking gardeners' sundries. (G3KH).

— In the absence of a suitable condenser-securing clip, large electrolytics and similar components can be firmly fixed to a chassis by bedding them on a strip, or "worm," squeezed from a tube of model makers' cement, and allowing it to set. (G3JSK).

— Transformers for transistorised PSU's can be made from the ferrite cores of discarded TV EHT units. The core-shape is ideal for the purpose, and it is easy to get the unwanted wire off and to separate the core sections by boiling the whole thing in water for half-an-hour or so. The new windings are put on a cardboard bobbin slipped over the ferrite core. (G3OUC).

(Half-a-guinea is being paid for each of these ideas. If you have one, send it in to the Editor, on a separate sheet headed "Do You Know That." No drawings or circuits, however.—Editor.)

## GENERAL RADIO Co. ESTABLISHED IN U.K.

For nearly 50 years, the General Radio Company of West Concord, Mass. has been manufacturing high-grade electronic test gear, and for much of this period their representatives in this country have been the well-known radio importing firm of Claude Lyons, Ltd., Liverpool. With the general expansion of the GR business, and the ever-increasing complexity and sophistication of their products, calling for closer contact between user and manufacturer, a U.K. subsidiary has been formed, in co-operation with Claude Lyons, Ltd. The new firm is The General Radio Company (U.K.) Ltd., Marlow Road, Bourne End, Bucks.

## HF-BAND TRANSMITTER

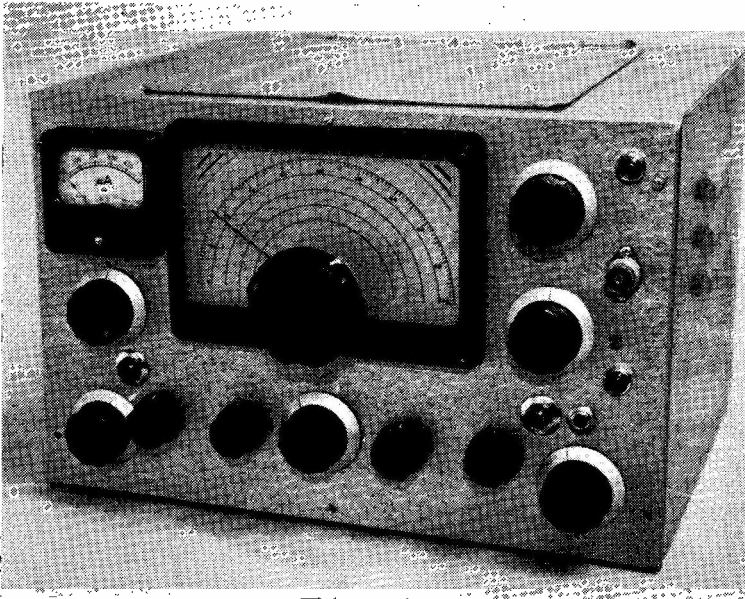
FOR 10-80 METRES, AM/CW,  
RUNNING 50 WATTS — COMPACT  
DESIGN — CIRCUITRY AND  
CONSTRUCTIONAL DETAILS

### Part I

A. J. SHEPHERD (G3RKK)

*This is the sort of Tx that would be very suitable for the recently-licensed AT operator looking for something to build, or a beginner (with some experience of constructional work), and will equally be of interest to those requiring a transmitter for general fixed-station or portable*

**T**HE transmitter described in this article was designed to meet the need for a simple, compact AM/CW design that would give reliable results in fixed or portable use. The PA can be run plate-and-screen modulated to an input of about 50 watts on all bands 10-80 metres; 160 metres can quite easily be added if required. In order to reduce weight and ease mechanical problems with the metalwork, the unit does not have a built-in power supply, but may



General appearance of the 10-80m. Transmitter for AM/CW, designed and described by G3RKK. It is a neat and compact job, suitable for fixed-station or portable use, and runs up to 50w. input on all bands. The design includes TVI precautions, and the PSU is external.

*work, on CW and AM phone. In the circuitry and construction, all possible TVI-proofing has been incorporated and, with an LPF on the output side, this Tx might well be found safe to use even in the most delicate fringe-area situation — at least on its two lower-frequency bands.—Editor.*

be run from a mains PSU or from such portable supplies as may be available.

Great care has been taken to ensure that there is a good margin of stability, screening and decoupling being extremely thorough, and the reliability of the design makes it extremely suitable as a beginner's first all-band transmitter. TVI precautions are reasonably effective, and equal to those in many commercial designs described as "TVI proof." With a low-pass filter fitted, this Tx should be suitable for use in most localities. In fringe areas, where the TVI problem is particularly acute, a very carefully designed mixer VFO system in conjunction with a Class-B PA may be the only answer. Some notes on alternative mixer-VFO systems appear later in this article.

### The Exciter

The VFO uses a Clapp Circuit with large grid swamp capacities C6, C7 (see p.218). The VFO is always on the 80-metre band, so that for all bands the working conditions of this stage are such that the EF184 is only just oscillating. Under these conditions the highest order of stability can be achieved.

To obtain good bandspread, there are two VFO ranges—3.5-3.8 mc, or 3.5-3.6 mc, selected by the bandswitch wafer S1a. The final output, by frequency multiplication, is: 80m., 3.5-3.8; 40m., 7.0-7.2; 20m., 14.0-14.4; 15m., 21.0-21.6; 10m., 28.0-30.2. A perfectly adequate tuning rate is given by a dial with a 10:1 reduction ratio. The oscillator units are specially produced by *Electroniques (Felixstowe) Ltd.*, and allow excellent stability to be obtained.

A small amount of temperature compensation is provided externally by C1 and C4, and for best results their values should be adjusted experimentally for minimum drift. C3 (C3A, C3B, C3C) is a silver-plated 3-gang component; two sections in parallel are used on 80 and 10 metres, the remaining section being for 40, 20 and 15 metres.

Great care has been taken to minimise pulling of the oscillator frequency by subsequent stages—especially the PA. This has been fully achieved on all bands except 80 metres, when all the

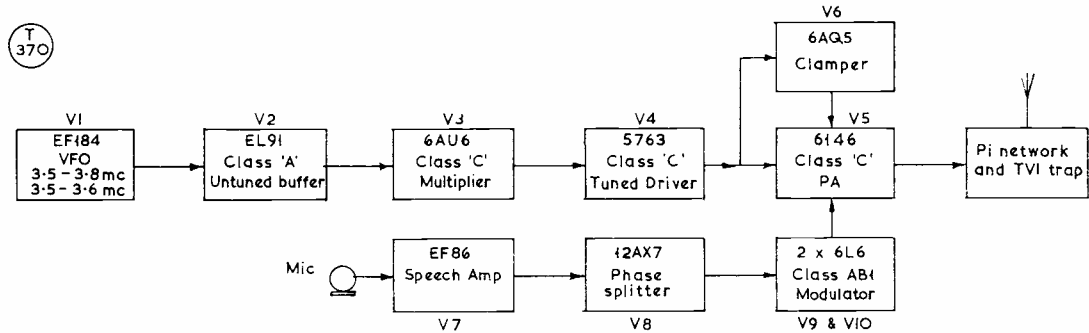


Fig. 1. Block diagram of the AM/CW transmitter designed and described by G3RKK. It runs about 50 watts input in the 5B/254M PA, and covers all bands from 10 to 80 metres. Commercial coils are used throughout and the circuit arrangement is such that level drive is obtained through the whole range. Circuit details are given Figs. 2, 3 and 4.

amplifiers are operating straight through, and some pulling does occur on this band as the PA is tuned through resonance. Even this could probably be avoided by using an ECF804 or ECF82 instead of the EF184, and wiring the triode section as a cathode follower isolation stage. R2 and C59 would then have to be adjusted to maintain the correct oscillator conditions.

The oscillator output circuit, which is of the electron-coupled type, has a resistance load on 80, 40 and 20 metres, but is operated as a doubler on 15 and 10 metres. It has been found that this is less detrimental to stability than driving the buffer into grid current and doubling there.

Output is taken from V1 anode via C12, which is variable for optimum coupling, to V2, an untuned Class-A buffer amplifier. This stage provides good isolation between the VFO and the frequency multiplying stages, whilst affording a reasonable amount of gain. In the prototype, the HT supply to this stage is stabilised. However, this is not strictly necessary, and both arrangements are shown in the PSU circuit. If the stabilised version is not used,

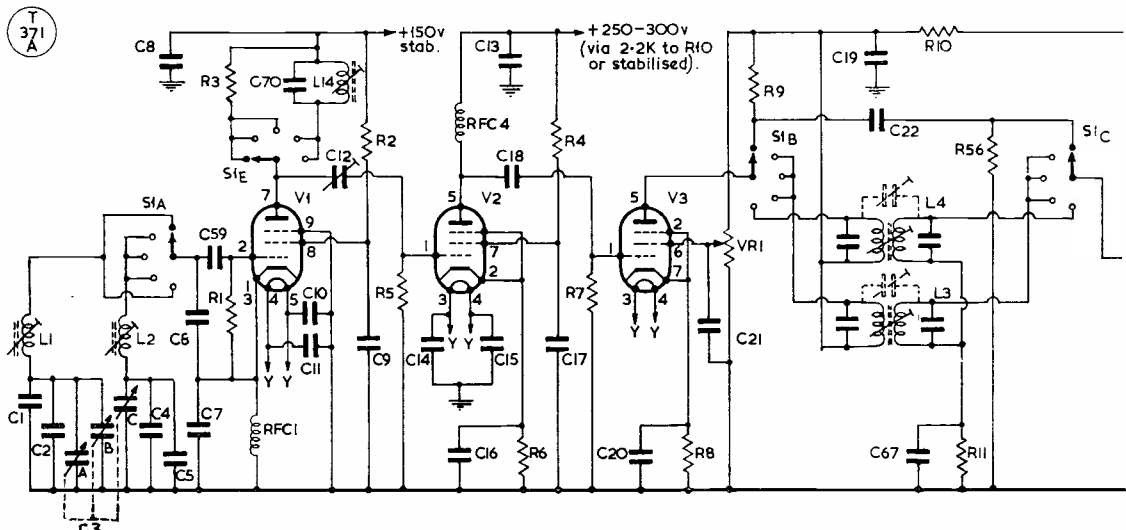
then the HT for the stage can be taken from the junction of R10 and R14 via a 2.2K resistor.

The netting switch S2 enables the exciter to operate when the remainder of the transmitter is switched off.

V3 (6AU6) is an untuned buffer on 80m., a doubler on 40, 20 and 10m. and a tuned buffer on 15m. Wideband couplers L3 and L4 are used to reduce the number of front-panel controls. The output of V3 is controlled by varying the screen voltage to this stage by VR1. In order that unwanted harmonic production may be kept to a minimum, it is desirable that V3 and V4 should operate as near to the Class-B condition as possible, whilst providing sufficient drive to the next stage.

V4 (5763) is the driver stage, working as a tuned buffer on 80m., and 40m., a doubler on 20m. and 10m., and a tripler on 15m. The anode circuit is accurately tuned on all bands by a front panel trimmer C28, to keep harmonic production to a minimum. The appropriate tuning coil (L5-L9) for the band in use is selected by S1d.

This exciter has given most satisfactory service,



with good stability and no trouble from TVI. With careful construction the VFO drift can be reduced to less than 50 c/s per hour. Even when multiplied to 30 mc this only amounts to 400 c/s per hour, which is hardly excessive.

**Mixer VFO's**

However, those living on TV fringe areas, or who require better stability on the higher-frequency bands, may like to experiment with mixer VFO's.

In these, the VFO is tuned over a fixed range and mixed with the output from a crystal oscillator to provide the required output frequency. In this way, frequency multiplication is avoided and so there is likely to be less trouble from harmonic output. Also, as there is no frequency multiplication, the stability of the final output is that of the VFO and crystal oscillator—about 80 c/s per hour on all bands.

Details of various types of mixer-VFO's have been published from time to time, and there is no reason why such an arrangement should not be incorporated in this design instead of the frequency multipliers. In addition to the increased stability, a worthwhile reduction in harmonic output may be obtained, provided that the mixing frequencies are carefully selected, the mixers are run at low level, all subsequent stages are in Class-A, and adequate filtering is included to reject spurious products of the mixing process. However, these notes are only intended for the more experienced constructor. The beginner is advised to keep to the frequency multiplier unit used in the prototype, which is perfectly satisfactory unless the TVI problem is very difficult indeed.

**Power Amplifier (see p.221)**

The PA uses a single 6146 (V5) operating in Class-C. The 6146 is very suitable for this purpose, combining small size with high efficiency. As grid current bias is used, it is protected by a triode-

connected 6AQ5 (V6) acting as a clamp valve. Normally, this valve is cut off by the bias on the PA. If the excitation is removed, the bias is lost and V6 conducts heavily, reducing the voltage on the screen

**Table of Values**

Fig. 2. Exciter Section, HF-band Transmitter

|   |   |
|---|---|
| C1 = 3 $\mu\mu\text{F}$ , cer. N750<br>neg. temp.   | R9 = 15,000 ohms  |
| C2 = 87 $\mu\mu\text{F}$ , poly.  | R10 = 2,700 ohms, 2w.   |
| C3 = 7-18 $\mu\mu\text{F}$ , 3-gang<br><i>Electroniques</i>                               | R12 = see text  |
| C4 = 5 $\mu\mu\text{F}$ , cer. N750<br>neg. temp.   | R13 = 330 ohms, 2w.   |
| C5 = 134 $\mu\mu\text{F}$ , poly.   | R14 = 470 ohms, 2w.   |
| C6, C7 = .0011 $\mu\text{F}$ , poly.  | R54 = 47 ohms   |
| C8, C13,<br>C16, C17,<br>C20, C21,<br>C26 = .005 $\mu\text{F}$ , 500v.<br>wkng, disc cer. | R55 = 470 ohms  |
| C9 = .01 $\mu\text{F}$ , 500v.<br>wkng, disc cer.   | R58 = 15,000 ohms   |
| C10, C11,<br>C14, C15,<br>C24, C25 = .001 $\mu\text{F}$ , 500v.<br>wkng, disc cer.        | VR1 = 100,000 ohm<br>potentiometer,<br>drive control                          |
| C12 = 1-10 $\mu\mu\text{F}$ , air<br>trimmer  | L1 = 3.5-3.6 mc, type<br>DLM ( <i>Electroni-<br/>ques</i> )                   |
| C18, C70 = 50 $\mu\mu\text{F}$ , silver<br>mica   | L2 = 3.5-3.8, type DLM<br>( <i>Electroniques</i> )                            |
| C19, C23,<br>C67 = .002 $\mu\text{F}$ , 500v.<br>wkng, disc cer.                          | L3 = 14 mc W/B<br>coupler<br>( <i>Electroniques</i> )                         |
| C22, C27 = 100 $\mu\mu\text{F}$ , cer.  | L4 = 7 mc W/B coupler<br>( <i>Electroniques</i> )                             |
| C28 = 25 $\mu\mu\text{F}$ , 10 $\mu\mu\text{F}$ in<br>par. ( <i>J. B. C804</i> )          | L5 = Type BP80  |
| C29* = 400 $\mu\mu\text{F}$ , 500v.<br>wkng   | L6, L14 = Type BP40   |
| C59 = 20 $\mu\mu\text{F}$ , s/mica  | L7 = Type BP20  |
| R1, R2,<br>R11, R56 = 47,000 ohms   | L8 = Type BP15  |
| R3, R4 = 10,000 ohms  | L9 = Type BP10  |
| R5 = 100,000 ohms   | RFC1,<br>RFC4 = RF chokes, type<br>FCC5<br>( <i>Electroniques</i> )           |
| R6 = 220 ohms   | S1A-<br>S1E = Trolex cer., 4-<br>wafer, 2-p, 6-w.<br>( <i>Electroniques</i> ) |
| R7, R57 = 22,000 ohms   | S2 = SPST rotary  |
| R8 = 150 ohms   | V1 = EF184  |
|   | V2 = EL91   |
|   | V3 = 6AU6   |
|   | V4 = 5763   |

Notes: C29\* can be .002  $\mu\text{F}$  if neut. not required. All resistors are  $\frac{1}{2}$ -w. carbon unless otherwise stated. Coils L5-L9 are *Electroniques* standard types. Slow-motion drive for C3 can be *Eddystone* type 898 or *Electroniques* type SMD. VFO construction in *Eddystone* box type 650.

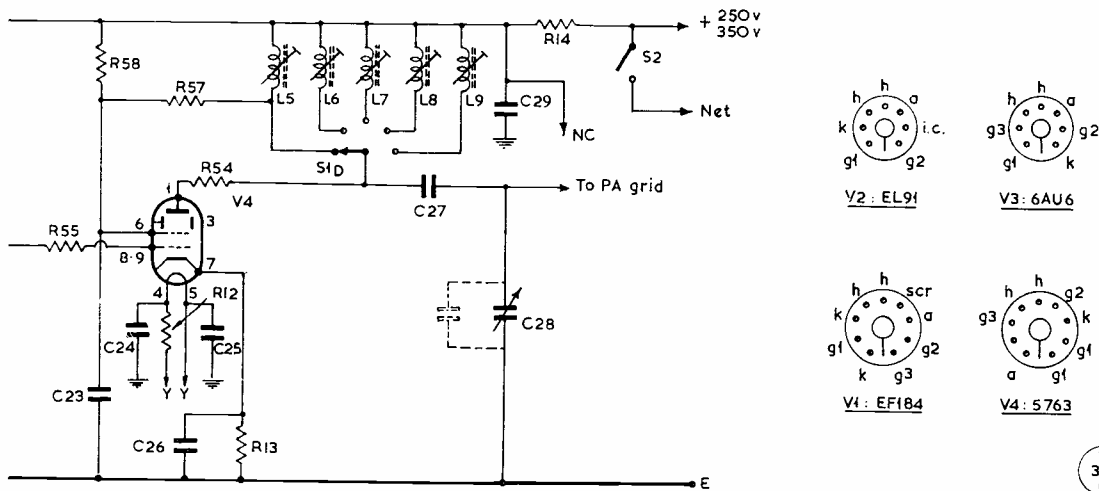


Fig. 2. The exciter section, V1-V4, of the G3RKK transmitter has its VFO, V1, covering two ranges, for reasons explained in the text. V4, the driver stage, is a 5763, giving ample drive into the PA on all bands 28-3.5 mc. The circuitry could be adapted for 160m. if required. Note: Read this circuit as including (T371A) opposite.

of V5. This reduces the anode current of V5 and ensures that the maximum anode dissipation of 20 watts is not exceeded.

The inclusion of the capacitor C33, in the V6 HT line, is rather unusual. It has been found that it improves the modulating characteristics of the stage by permitting the screen to follow the modulating voltage more closely. It should be noted that, in order to obtain linear modulation, it is necessary to ensure that the PA is operating under the conditions recommended by the valve manufacturer. The correct voltages at various points are given in Table 2 for an HT voltage of 450, which is the best for general use. The correct drive must also be maintained, and the aerial loading is fairly critical. Unlike linear amplifiers, anode modulated Class-C amplifiers are best loaded lightly in the absence of an oscilloscope to examine the modulated waveform.

Full precautions against parasitic oscillations and other forms of instability are taken, as it is generally easier to include full protection in the design than to attempt to cure the trouble once it arises. Parasitic stoppers L10, R19 and L11, R20 are included in the grid and anode circuits, and multiple by-pass condensers are used on the anode and screen HT supplies, ensuring that effective by-passing is obtained at all frequencies.

The output is tuned by a conventional band-switched  $\pi$ -network, and a TVI trap L13, C49 tuned to the local BBC TV channel is fitted across the output. In some areas a low-pass filter, in the coax feeder into the ATU or aerial, may also be required. As both the grid and anode circuits are on the same frequency, careful screening is required if instability is to be avoided. Nevertheless, if the layout diagrams are carefully followed, neutralisation should not be necessary, although it is provided for in the circuitry and some may like to include it to increase the margin of stability.

A single meter is fitted, which is switched across shunt resistors R16, R17, R46 and R49, R50 to check PA grid and cathode currents, modulator cathode and PA HT voltage. Cathode current is the sum of anode, grid and screen currents, and is measured in preference to anode current to avoid bringing high voltages to the front panel. The meter switch S5 should be of the break-before-make type. All metering circuits are fully decoupled.

Panel lights are provided to show when the PA and modulator HT and LT supplies are on. This is both a safety measure and an operating convenience.

The phone/CW switch S3 (S3A, S3B, S3C) disconnects the HT supply from the modulator and shorts the secondary of the modulation transformer to prevent keying transients which may break down the insulation—apart from putting a chirp on the note. Further details of keying arrangements are not shown in the circuit diagram as it is felt that most readers will wish to incorporate their own to work in with the existing station switching arrangements. For those who do not have a pet system, there are several to be recommended for this design.

The simplest, and in some ways the most satisfactory is cathode keying of the PA (Fig. 6). The

## Table of Values

Fig. 3. RF Power Amplifier for HF Tx

|                                |                                |
|--------------------------------|--------------------------------|
| C30, C31,                      | R15 = 18,000 ohms, 2w.         |
| C32, C34 = .002 $\mu$ F, 500w. | R16, R17 = <i>see text</i>     |
| wkng, disc cer.                | R18 = 82 ohms, 2w.             |
| C33 = .003 $\mu$ F, 500w.      | R19 = 500 ohms                 |
| wkng, disc cer.                | R20 = 100 ohms                 |
| C35, C36,                      | R21 = 3/68K in parallel        |
| C39, C36,                      | R22 = 20,000 ohms, 10w.        |
| C69 = .001 $\mu$ F, 500w.      | R23 = 220,000 ohms             |
| wkng, disc cer.                | R49 = <i>see text</i>          |
| C37 = .01 $\mu$ F, 500v.       | R50 = 10,000 ohms              |
| wkng, disc cer.                | RFC2 = 2.5 mH RF choke         |
| C38, C40 = 15 $\mu$ F, 500v.   | type FCC5                      |
| wkng, cer.                     | (see <i>Electroniques</i> )    |
| C41 = .001 $\mu$ F, rated      | RFC3 = RF choke, PA            |
| 3 kV                           | type (So-Rad or                |
| C42 = .01 $\mu$ F, cer., rated | K.W.)                          |
| C43 = 100 $\mu$ F, rated       | S3 = 3-p., 2-w., cer.          |
| C44 = .001 $\mu$ F, cer. rated | Ph/CW                          |
| 1 kV                           | S4 = 1-p., 6-w. cer.,          |
| C45 = 15 $\mu$ F, cer. or      | with shunting                  |
| mica, rated 1 kV               | plate ( <i>see text</i> )      |
| C47 = 250 $\mu$ F var.,        | S5 = 2-p., 4-w., meter         |
| type 817 Eddy-                 | M1 = 0.5 mA, m/c               |
| stone                          | L10, L11 = APC's on R19,       |
| C48 = 500 + 500 $\mu$ F, BC    | R20 ( <i>see text</i> )        |
| type twin-gang,                | L12 = $\pi$ -network tank      |
| sections in                    | coil ( <i>see text</i> )       |
| parallel (.001 $\mu$ F)        | L13 = 9 t. 18g., 1/4-in. dia., |
| C49 = 3-30 $\mu$ F, Philips    | self-supporting,               |
| trimmer                        | turns spaced.                  |
| C68* = 1-10 $\mu$ F, neut.,    | (Local TV Ch.)                 |
| rated 1 kV                     | PL4 = 250v. neon               |
| C69* = 47 $\mu$ F, rated 2 kV  | V5 = 6146                      |
|                                | V6 = 6AQ5                      |

Notes: All resistors rated 1/2w., carbon, unless otherwise stated. C68\* and C69\* optional if neutralising required—otherwise, use C29\* .002  $\mu$ F as given with Fig. 2. Data for tank coil L12 given in text.

disadvantage is that the choke Ch. must pass the full PA cathode current, and will thus be a rather bulky component. For this reason, it may be considered preferable to key V4 in the same way. This is permissible as V5 is protected by the clamp valve V6. The circuit is the same as that given in Fig. 6, but the component values are different. Ch. now has only to pass about 30 mA, and a "softer" keying characteristic is required as it will be hardened by any following Class-C amplifier—in this case the PA. The values given for the click filter components are only approximate and in practice are best found by experiment. As it is generally inconvenient to try different inductors, a 500 ohm, 2K variable resistor of suitable wattage may be connected in series with Ch. and adjusted to give the required "make" effect. Similarly, R51 can be set to give the required "break" characteristic. For those who wish to try a break-in system, V1 and V4 must be keyed in sequence, the order being V1 on, V4 on, V4 off, V1 off. This may be achieved mechanically by suitably adjusted relays or electronically by flip-flop circuits. Many articles about various systems of keying have been published from time to time, and the reader is referred to one of these for further details.

### The Modulator (*see p.222*)

This is shown in Fig. 4 and has been designed to give good speech quality without undue elaboration. The speech amplifier (V7) is an EF86 audio pentode, with its input circuit arranged for a high impedance crystal microphone. This valve is especially suitable

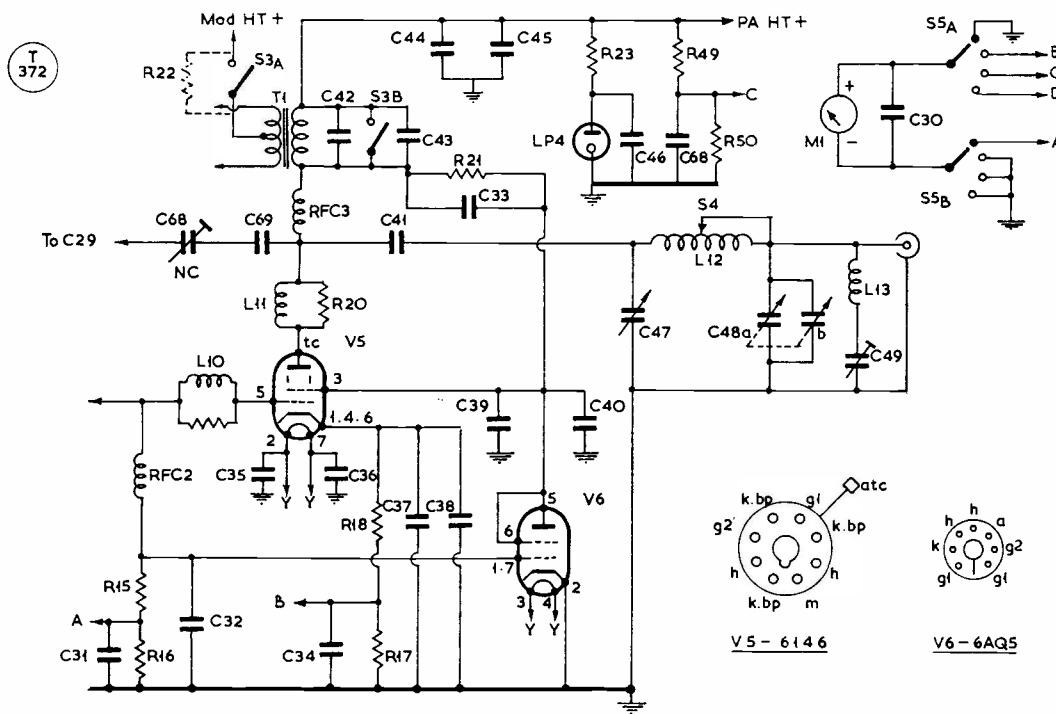


Fig. 3. Circuit of the PA and its clamper stage. In some layouts, neutralisation may be necessary and this is provided for by the C68, C69 connection. C33 is explained in the text — it improves the PA action under modulation. Data for the construction of the PA tank coil, L12, are given separately. C49, L13 comprise a harmonic-rejection circuit, tunable to the local TV channel. Alternative methods of keying and clamping will be shown in Figs. 6 and 7 in Part II. (Note: The resistor body for L10 should be marked R19.)

for low-noise audio amplifier service; it has a specially wound heater and ample internal screening and bracing to prevent hum and microphony. The HT supply is decoupled by C56, R28, while C51, R24 provide a low-pass filter to prevent RF pick-up at the microphone socket, which could cause trouble in the modulator.

The phase splitter circuit is of the paraphase type, chosen mainly because of its high gain. It is not the automatic self-balancing circuit, hence the balance must be adjusted by means of VR3. This is not necessarily a disadvantage, as self-balancing circuits are not always very happy with the fluctuating load presented by the PA. The circuit shown here should have sufficient gain for most microphones normally used by amateurs. If more gain is required, to enable a low output microphone or a self balancing phase-splitter to be used, the EF86 speech amplifier could be replaced by one using an ECC83 double triode. A suitable circuit is that incorporated in the G3BDQ transmitter, described in the October 1963 SHORT WAVE MAGAZINE. The coupling time constants in the speech amplifier are chosen to reduce the response below 500 c/s, allowing a significant increase in the average modulating depth.

In the prototype the output valves used are metal 6L6's operating in Class-AB1, providing an audio power of about 25 watts. Alternative valves are the

6L6GT, 6L6G, KT66, 807, 5B255M, etc. The necessary changes of component values with these valves are in Table I, p.222. Ample ventilation in accordance with the valve manufacturer's recommendations must be provided.

Parasitic stopper resistors are fitted in the anodes, control grids, and screens of the modulator valves, and all supplies are decoupled for both RF and AF. C42 is connected across the secondary of the modulation transformer to reduce the response at high frequencies, and a small amount of negative feedback is applied over this stage via R33, R36. If microphones of the high-fidelity type are to be used, a further low-pass filter between the phase-splitter and speech amplifier may be needed to prevent the signal from occupying an excessive bandwidth. Separate cathode resistors are provided for each valve, but they are taken to earth via the common shunt R46 to enable the combined cathode currents to be monitored on the meter.

The heaters are wired in two balanced systems which may be connected in series or parallel to allow 6.3 or 12.6 volt supplies to be used. All power supplies are taken to an octal and a 3-pin socket at the back of the transmitter to allow the greatest flexibility. This also permits the modulator heater supplies to be disconnected when operating portable CW. [over

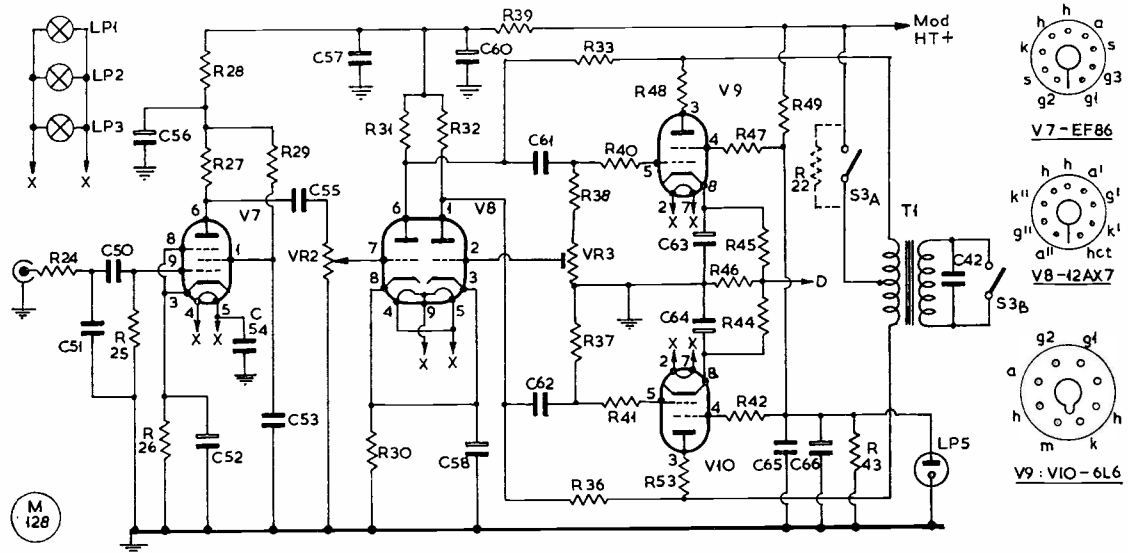


Fig. 4. The speech amplifier/modulator for the G3RKK AM/CW transmitter. V8 is a phase-splitter to drive the push-pull 6L6's; these are carefully balanced (see text) and other valve types may be used instead of the 6L6's — such as EL84's for less audio power in a QRP version of the Tx. The switching protects the modulation transformer against transients when on CW, an important point too often overlooked in some commercial designs; there should be no rise-and-fall on keying across any iron-cored component in the PA circuit, with the possible exception of the thump-filter across the key itself. The modulation transformer specified for this design is that sold by K.W. Electronics with their "Vanguard" transmitter. Whatever transformer is used, it must be rated for at least 25 watts of audio.

**Table of Values**

Fig. 4. Speech Amplifier/Modulator for HF-Band Tx

- C42 = .01  $\mu$ F, cer. 1 kV
- C50, C55, C61, C62 = .001  $\mu$ F, s/mica
- C51 = 200  $\mu$ F
- C52 = 50  $\mu$ F, 25v. elect.
- C53 = 0.1  $\mu$ F, 500v.
- C54, C57 = .005  $\mu$ F, cer.
- C56, C60 = 8  $\mu$ F, 450v.
- C58 = 25  $\mu$ F, 25v. elect.
- C63, C64 = 25  $\mu$ F, 50v.
- C65 = .01  $\mu$ F, 500v.
- C66 = 8  $\mu$ F, 500v. elect.
- R24, R28 = 47,000 ohms
- R25, R29 = 1 megohm
- R26 = 2,200 ohms
- R27, R31, R32 = 220,000 ohms, 5% high-stab.
- R30 = 1,500 ohms
- R33, R36 = 2.2 meg., 5% high-stab.
- R34 = 22,000 ohms
- R37, R38 = 680,000 ohms, 5% high-stab.
- R39 = 22,000 ohms, 1w.

- R40, R41 = 10,000 ohms
- R42, R47, R48, R53 = 100 ohms, 2w.
- R43 = 10,000 ohms, 10w.
- R44, R45 = 470 ohms, 2w.
- R46 = see text
- R49 = 4,700 ohms, 10w.
- VR2 = 500,000 ohms, AF gain
- VR3 = 25,000 ohms, bal. phase-split
- S3A-B = 3-p., 2-w., Ph/CW
- T1 = Mod xformer, Woden UM1 or similar (see text)
- PL1 = 6.3v. heaters-on indic.
- PL2, PL3\* = 6.3v. 300 mA dial lights
- PL5 = 250v. red neon
- V7 = EF86
- V8 = 12AX7 (ECC83)
- V9, V10 = 6L6 (see text)

Notes: All resistors  $\frac{1}{2}$ w. carbon unless stated otherwise. \*Lamps PL2, PL3 must be fitted when equipment used on 12v. supply. For QRP working o/p valves can be EL84 (see text). Alternative modulator valve types given in Table I below.

TABLE 1. Modulator Valves

| VALVE            | R44, R45 (ohms) | R39 (K) | R <sub>L</sub> (K) a—a | HEATER Current 6.3v. (each valve) | HT Voltage | CLEARANCE (min.) above chassis | SPACING (centre to centre) | COMMENTS                                       |
|------------------|-----------------|---------|------------------------|-----------------------------------|------------|--------------------------------|----------------------------|--|
| 6L6 or 6L6GT     | 500             | 4.2     | 9                      | 0.9A                              | 400        | 4 ins.                         | 3 ins.                     |  |
| 6L6G             | 500             | 4.2     | 9                      | 0.9A                              | 400        | 5½ ins.                        | 3½ ins.                    | This version has a larger bulb than the above. |
| KT66             | 500             | 3.9     | 8                      | 1.3A                              | 400        | 5½ ins.                        | 3½ ins.                    |  |
| 807              | 400             | 4.2     | 8.5                    | 0.9A                              | 450        | 5½ ins.                        | 3½ ins.                    | Top cap anode.                                 |
| 5B255M<br>5B254M | 400             | 4.2     | 8.5                    | 0.9A                              | 450        | 3½ ins.                        | 2½ ins.                    | 5B254M has top cap anode                       |
| EL84             | 130             | 0.5     | 8                      | 0.76A                             | 300        | 3 ins.                         | 2 ins.                     | Output 17w. audio for low power version.       |

Part II of this article to appear next month.



## Miscellany

### MORE GLEANINGS, AND ITEMS OF INCIDENTAL INFORMATION

That note about the Single-Band Man (p.111, April) has brought forth a vigorous come-back from G4AH, East Barnet, who is one of them (on Twenty). "We don't miss the fun," he says. "Not for us the rat-race of contests or the strain of chasing elusive DX." A dipole, yes—but three other types as well. A single-band home-built Tx, yes—but a commercial rig as a stand-by. No constant flitting from band to band, time-consuming and futile. "We, in our own way, get as much enjoyment from our hobby as the all-band, all-mode man who spends so much time working on his gear that he has little left to operate—and communication is, after all, the ultimate object of Amateur Radio."

— • • • —

Strange occurrence up North, where two amateurs live next door to each other. "A," hearing a tapping noise late at night, got up to investigate, as there had been many local burglaries. Finding nothing, and returning to his bedroom-cum-shack, he found the noise to be his PA millimeter needle banging against the stop as his neighbour, "B," worked CW! Theories about the precise cause of this phenomenon would be welcomed. But we have been asked not to mention callsigns, as "A" has been ribbed about this quite enough for his good temper; we are assured, though, that it is perfectly authentic.

— • • • —

"Nothing is more stupid in the shop-talk of ham radio than the ridiculous use of 'we.' The only ones permitted to use 'we' are those who have a Siamese twin, are pregnant, or have a tape-worm."

(W9FNX, in April "QST")

— • • • —

"May I make an appeal that SSB be barred from 160 metres? This mode is suited to DX and has much to recommend it, but should it not be restricted to 20, 15 and 10? One-Sixty is essentially a local and mobile band and much loved by beginners finding their feet, and Old Timers who can't be bothered to try this new 'Donald Duck' language."

(Letter in Wolverhampton "Newsletter")

— • • • —

Sign of the Times? In the American magazines the National Radio Co. are now advertising their 2000-watt linear amplifier, the NCL-2000, which they describe as "A real brute of a desk-top amplifier." It takes 15 amps. (peak) at 230 volts, which should dim the bedroom lights when the owner raises his voice . . .

— • • • —

Increasing source of QRM in the States—inter-

ference from *garage doors* (the automatically-operated variety). FCC will check on these cases—when they can find time. In reverse, some garage-door owners are complaining that commercial signals take control and cause them to flap all night!

— • • • —

"Slow, but perfect code will convey intelligence faster than a sloppy 35 words per minute off an uneducated bug."

WASBEZ, in May "QST"

— • • • —

A new generation of CW operators seems to object to the use of Q-signals and abbreviations. A recent listening session yielded the following, sent immaculately at about 12 w.p.m.: "Well, old man, I had better pass it back to you and see whether you have been copying all this. So over it comes to you." Fair translation would be "QRK? K." In contrast, though, we still hear the phone types saying "There's some Queen Roger Mary on your signal and a bit of Queen Sugar Baltimore." Truly it's a strange world we live in . . . We rush around all the time, yet brevity is out!

— • • • —

A prize of £7,500 awaits the first person to "communicate with the inhabitants of one of the heavenly bodies." The money was left to the French Academy of Science for this purpose by Mme. Marc Guzman—in 1908!

"Electronics Weekly"

— • • • —

Famous last words: (1) "I often get on top of my rotary beam—it's surprising the weight it will carry." (2) "I never switch the HT off my final when making adjustments." (3) "Just feel this transformer."

(Midland News Letter)

— • • • —

If you have averaged eight QSO's a day for the past five years (a fairly normal figure) you have spent slightly more than three months of your life on the air—non-stop, 24 hours a day, seven days a week. You have spent roughly five days telling people that your name is Jack (or whatever), ten days in saying goodbye, 73 and so on, and you have been speaking or sending your own callsign for just about one week.

— • • • —

A local amateur, confronted with the above, reckoned that he had averaged twenty contacts a day for eighteen years, and is now very worried. The fact that he has spent nearly two months telling people his name has convinced him that they must all know it by now—so no more of *that*. And four

months of saying goodbye, with all the trimmings, has reduced his valediction to a single "Bye." An automatic CQ-caller has been vamped up from a tape-recorder, and the next project is probably a complete QSO-machine. This should occupy all the months he would otherwise have wasted.

— • • • —

Many months ago "Miscellany" reported on a Scandinavian gentleman who was using "a Wickeroy with no boots on." Since then a British amateur has been heard complaining that he "just bought a pair of boots that set me back £85." Meanwhile, his poorer relations continue to go about barefoot, as in the Wicked Old Days.

— • • • —

Perhaps it was one of these who was recently heard trying to get into a QSO on 14 mc. One of the big boys had repeatedly said "No breakers, please," and this poor soul said "I'm not a breaker—I just want a QSO!"

— • • • —

"My first valve was a Ford motor lamp, double-filament type. One filament was used as the heater, the other as a grid; silver paper was wrapped round the outside of the bulb to act as a plate. Results were equal to a good bornite crystal detector. Applied HT was 90 volts, and incidentally there was no need for room lighting."

(G6NU, in *MARTS "Newsletter"*)

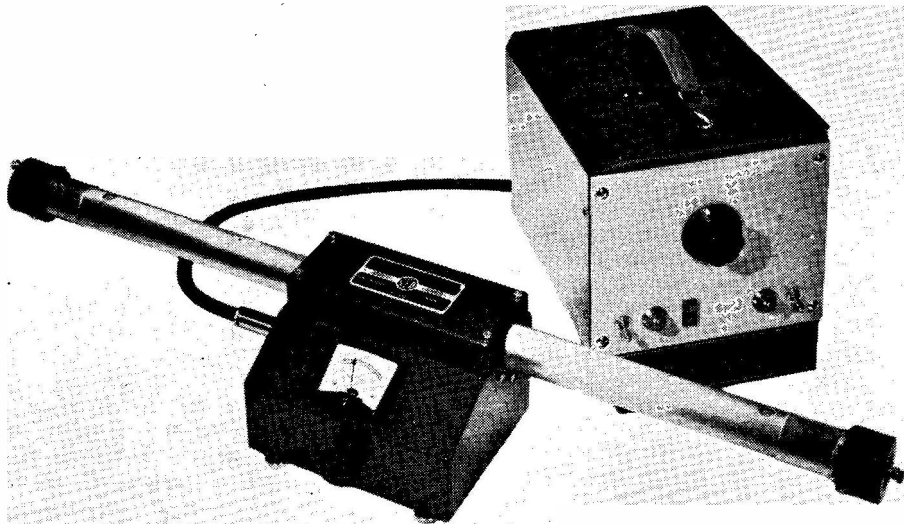
The first towers of the new 400 kV super-grid starting at the nuclear power station at Dungeness and eventually finishing over in the West Country, are beginning to stride across hitherto unspoilt tracts of pleasant countryside. Visually they are beastly, but for radio amateurs they are an even greater potential menace. (We personally know one G3 who will have one literally in his back-garden.) Just how far will the "hash" spread? Everyone is asking that—and, of course, there is no one to reply. But it is worth noting that every "improvement" can only add to the general noise level . . . one can think of absolutely *nothing* going on in the world which will ever diminish it.

— • • • —

G2BOZ, whose two sons are G3HCT and G3HDA (all three are active on SSB) recently became a grandfather for the ninth time.

— • • • —

Research students at Standard Telephones Ltd. have been finding out just how little of what we say on the 'phone is necessary for intelligible conversation. By taking only tiny samples of speech at frequent intervals, and throwing away the rest, they have found so much time left that they can pack twenty-two other conversations into the same circuit. There's a moral here, when you hear talk of "our crowded bands" . . .



This interesting device is the Gas Laser Type 601 manufactured by G. & E. Bradley, Ltd. It has a continuous high flux output of extreme spectral purity and is of particular value and importance in a wide range of research applications, including communication. The laser head gives an output power of 1 mW at a wavelength of 6328 Angstroms (which is a very high frequency indeed). The RF drive unit for the laser runs 60w. on 27.12 mc. The beam divergence from the instrument is 3 milliradians, the gas used is a helium-neon combination, and the light emission is reddish in hue. The beam can be externally modulated.

# COMMUNICATION and DX NEWS

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

**A**FTER more than eighteen years of "DX Commentary," a new title appears. Tradition dies hard, but change is sometimes good for the soul, and this new heading describes more accurately the contents of this monthly feature. From time to time letters from readers have contained remarks like this: "I always read 'DX Commentary' but I skip all those boring lists of call signs;" or "Enjoy the *comment* part of it, but the DX leaves me cold."

Fair enough, and we have been preaching for many years that DX is not the main aim of Amateur Radio, but only one facet of the game. And also that the really obsessive DX-chasers (seriously, though, they're doing a grand job!) only constitute a very small percentage of those who use the bands.

This feature, then, with its new title, will deal with—and be at the disposal of—all whose main interest is communication, whether with the chap across town; with a friend somewhere or other with whom they run skeds; with such DX as happens to come their way; or by way of the super-DX race to astronomical scores of countries, counties, prefixes or stations worked.

*Communication* is what counts . . . and equally important is the means by which it is carried out. Your conductor would therefore like to know even more about what goes on inside the shack and in the air above it. The accent will, we hope, be shifted from the exotic DX contact to the technique which makes it possible. It would be wonderful if all our correspondents would, in future, give plenty of details about their gear, their aerial system, their future plans for modifications and improvements and their general goings-on . . . *whether over twelve miles or twelve thousand.* (The VHF side will continue to be dealt with separately for the time being,

in A.J.D.'s "VHF Bands.")

In short—if you operate and communicate on the HF bands, this is now your open forum. Not too much airing of the writer's personal opinions (although we realise that they can't be kept out of it!) but the ventilation of the thoughts of all those who use our bands and are interested enough to make comments thereon.

The DX angle will not be neglected, but it will never be allowed to take complete charge. DX news is always welcome, but long lists of call signs are not required. Those who are inveterate DX-chasers and have little other interest in the bands are invited to send in news of their "best six" during the month, or something like that; but even more than that we would like a little gen. on "the machine that did it." Likewise movements of DXpeditions, special portable sorties, and new stations on the air from unusual places—all these will have their share of attention, but with (we hope) a sense of proportion.

## Ten-Metre Activity Sunday

Probably the most interesting event of the month was the intense activity on *Ten Metres* during our organised period on Sunday, May 10. It was a little unfortunate that the bulk of the real DX, which started appearing at 1600 GMT, came outside the period.

However, a sufficient number of people were "with it"—and, of course, they stayed with it, since this was not a contest in any sense of the word.

Three different kinds of propagation were involved—ground-wave, which led to QSO's between more than 200 U.K. stations; tropospheric, which caused signals from many European countries to arrive in selected spots; and ionospheric, which, from about 1600 GMT onwards, brought in many African and Middle East countries and even a few South Americans.

More than fifty logs were received, and after these had been put through the computer (human, unfortunately) the following facts emerged:—*Ionospheric Propagation*, roughly from 1600 onwards, enabled the following to be worked by G's: 5A4TI, 5B4AK, 5N2KOB, 5X5JK, 5Z4AA, 4X4DK, 9G1DM, 9G1EC, 9Q5AB, PY7AN, VQ2AB and ZS1AB. *Tropospheric Propagation* throughout the period ensured that all the following were heard or worked by someone in the U.K.: DJ8NW, DL7EA, EA3NI, I1EVK, I1LCT, LA4Y, SM4AEE, SL5AB, SP8AJK, OH1SH, OH2SI and SV1AE.

The freakishness of "tropo" was well shown by the fact that GM3OGJ (Glasgow) worked two OZ's, not mentioned by a single other operator, at roughly the

## TEN-METRE ACTIVITY SUNDAY—JULY 12

To try out once again the possibilities of the Ten-Metre Band under the present propagation conditions, a special Test Period is being arranged for Sunday, July 12. To make this Test worth while, it is hoped that as many operators as possible will come up on 28.0-28.5 mc during the period 0900-1700 GMT on July 12. No formalities—just come on Ten and see what you can work—local or DX, Phone or CW. SWL's, too, are asked to co-operate, with reports of what they hear. Please notify all results by July 17 latest, preferably earlier, as it is intended that this Test should be the subject of a separate report. Overseas readers are asked to note this date, and join the party. Wherever you are, overseas or in the U.K., note July 12 as Activity Sunday on the 10-metre band. Even if you cannot hear anything, call CQ, on CW or Phone. A report will appear in the August "Short Wave Magazine."

same time that GM3GNR (Fort William) was hearing or working a large bunch of DL/DJ stations not reported by anyone else! One single SWL (M. Harrison of Manchester) logged 6W8AE; and F3II (Lille) worked UA6FQ and UA6FU. None of these figured in any other logs.

5X5JK (Kampala) sent in an airmail log showing that he, too, had some individual "scoops" such as EI7E, CT1PN and HK1ZU. He, of course, didn't have to wait until 1600 before the band really opened—he was working someone or other from 1330 onwards. 5X5JK thanks us for organising this activity and fervently hopes for more—so we can doubtless count on him for July 12.

Regarding ground-wave working . . . this was going on all day, on CW, AM and SSB alike. More than 200 U.K. stations worked each other, so it is impossible to give details. In general the longest contacts were over about 100 miles and the most numerous were over 45 miles or less. The most successful U.K. stations with the DX were G3CAZ, G3NOF, G3OAD and GW3FSP.

A few personal comments: G3OAD (Dudley) has had 170 QSO's on the band since July 1963 . . . G8LY (Lee-on-Solent) says this was her first appearance on Ten since January 1961 . . . G3NOF (Yeovil) found that even most of the DX stations knew all about the Test beforehand, either because they read the *Magazine* or because they have friends who do.

G5CG (Nottingham) says this "cures the myth that the band is dead" . . . G3SOP (Huddersfield) found it "much better than 160 for locals" . . . G3AME (Reigate), who is active every Sunday on Ten, wishes stations would give their QTH more often . . . G3HCU (Peaslake) hopes we will ask SWL's, next time, to report by QSL to stations more than 50 miles distant . . . G3CAZ (Burnham, Bucks.) says that 9Q5AB worked 25 G's and had 45 QSO's altogether (G3IDG, Basingstoke, was still hearing him at 2024 GMT).

SWL Dave Gray (Croydon) logged 74 different G's, but

wonders why there need be comparative bedlam around 28300 kc, with all that lovely 1700 kc to choose from. But he feels that the real test is to come: Will all those stations logged continue to use the band regularly, or must they be constantly prodded into doing so?

Altogether a highly successful session, thanks to the following, who sent in logs and comments: G2XW, 3AG, 3AME, 3BTC, 3CAZ, 3CWC, 3HCU, 3IDG, 3LED, 3MEW, 3MTB, 3NPB, 3NLY, 3NOF, 3NTP, 3OAD, 3OMK, 3OZT, 3PGA, 3PDW, 3PGS, 3PZP, 3SFZ, 3SM, 3SOP, 3SPY, 5CG, 5IC, 8LY, 8QM, GM3GNR, GM3OGJ, GW3FSP, GW4CG, F3II, 5X5JK and SWL's Pemberton, Blake, Gray, Hembrey, Watts, Gosling, Margolis, Cayless, Stears, Harrison, Pond, Mercer, Whitaker, Baxter and Heaton. Jolly good show all round! Now for July 12 . . .

Before we leave Ten, a few more snippets: SWL M. Fisher (Halifax) has logged openings nearly every afternoon since May 6, and has heard 9G1DM, EA7LL, 11CID and a crowd of DJ's; F. Blake (Beaconsfield) scanned the band on May 11 (1720 GMT) and logged 5H3JI, 5Z4AA, 9Q5AB and 11SF; and, on the 12th, 5H3JI again at 1700.

G3IDG heard SM7BNL calling, and apparently working JTICA on CW (May 9 at 1727); and also reports that DM3IGY is on again with a new and rather poor auto-transmission on Wednesdays at 0001-0100, 0600-0700, 1200-1300 and 1800-1900 GMT, inviting reports and promising QSL's.

On May 16 and 17 there were good European openings; one of the freak tropospheric paths was in evidence, since SWL Blake (Beaconsfield) found six OE's on AM phone on the 16th. G3NPB, on the same day, heard 4X4DK and 4S7SW, between 1030 and 1100, and says that the band seems so interesting that he intends to get on it as soon as possible. May many more do the same. G5IC

(Shrewsbury) reports plenty of local and semi-local activity on Ten. He can come on at almost any time by arrangement.

### Fifteen Metres

Sad to relate, *Fifteen* has been suffering from almost the same degree of neglect as *Ten*. True, it isn't exactly teeming with DX at all hours of the day, but if you like comfortable contacts with unpredictable places, this should be your band. Why suffer all the discomforts and overcrowding of *Twenty*? With the really rabid DX-perts one can understand it, because it is the only area where one is likely to find a "new one." But for full-size QSO's that mean something, *Fifteen* usually has more to offer.

A few comments from some of the enlightened ones: "As far as I am concerned, *Fifteen* and *Ten* are the interesting bands. AM does not come through well on *Twenty*, though some SSB is to be heard" (5X5JK) . . . "Many signals on AM were heard from Africa and South America; on SSB a few from the same areas, with 6O2BW very consistent" (G3NOF) . . . "On May 9 (1756 GMT) I worked ZP7FF while mobile. (He asked for QSL via K1RZW). Hoping for more DX as *Ten* and *Fifteen* improve." (G5CP.)

"My principal band is *Fifteen*—mainly because there is plenty of elbow-room, and Boris and Ivan don't seem around so much. My one 'exotic' was with FB8XX at 579 both ways—using a homebrew 10 watts to an 807 final, under-loaded! Started with this QRP on April 9 and am very pleased at the fun I'm getting." (5B4SS) . . . "Since everyone keeps saying the band is dead, I decided to stay on it for one month, at odd times when work permitted. Definitely *not* dead—it's very patchy, and exotic DX may be up at 599 for perhaps only ten minutes. Best time seems to be

---

## Reporting the HF Bands

---

between 1700 and 2000, but some nights the W's have been heard and worked up to midnight." (G2VV) . . . "Worked on CW—VP8GQ, VQ2's, 5H3HZ, 9G1FE, 9L1TL, 9Q5TJ. Hardly dead, is it?" (G3IGW.)

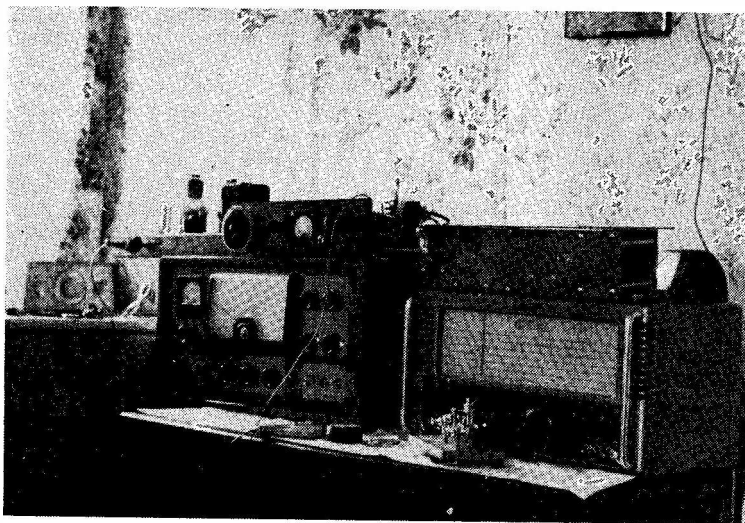
So there you have it . . . if your one and only interest is winking out new ones, stay away. But if you enjoy a QSO with *any* DX, and appreciate a complete one without hysterical "breakers" dancing around, get on Fifteen and help to swell the activity there.

### Manners !

The appalling displays of clottishness, liddery and just plain bad manners that are attracted by "rare" DX stations make the so-called dead bands seem even more attractive. But thank goodness there are some operators who simply won't stand for it. Angus Murray-Stone, for example . . . he left the comparatively safety of HZ2AMS to operate in two of the Neutral Zones, signing /8Z4 and /8Z5 respectively. In the current fashion, these two sandy hot-spots were promptly proclaimed to be "new countries," so everyone had to suffer. (They were new prefixes, too.) The results, as expected, were appalling. G3NWT enjoyed "the spirited operation of Angus":—"There are breakers again. If we get breakers, I can QRT. I did so this morning and I can easily do so again." Three minutes later: "That does it!"—and he did.

Later: "The South American station. I have a note of your call. HZ2AMS/8Z5 was saying 'I've had an absolute gut-full—never heard such shocking manners.' And he promptly went QRT and read a Perry Mason for an hour or so. Incidentally, Angus is grateful to the Hammarlund Co. for relieving him of the QSL burden, but regrets that the power to refuse cards to some of these menaces is now no longer his.

SWL Dave Gray (Croydon) heard the same sort of thing. HZ2AMS/8Z5 was saying "I've had an absolute gut-full—never heard such shocking manners." And he promptly went QRT and read a Perry Mason for an hour or so. Incidentally, Angus is grateful to the Hammarlund Co. for relieving him of the QSL burden, but regrets that the power to refuse cards to some of these menaces is now no longer his.



During the period March 27 to April 7, Sark was visited by an expedition consisting of G3NQF, G3RFS and G3RPB, operating on 160m. CW. Though conditions were poor, 11 countries were worked, including a near-miss with W1BB/1. An interesting experience was to find that QSO's with stations up to 80 miles distant could be made every lunch-time. Gear consisted of an Eddystone 888A with a Codar PR-30X pre-selector, a home-built 1.8 mc Ph/CW Tx, with a 264 ft. end-fed aerial. For the HF bands, on which some operating was also done, the Tx was a Geloso 30-watt job. For those interested, the QSL address is G3RFS (QTHR), or via bureaux.

Another, quite different form of bad manners is displayed by some of the tiny pundits (not the real ones, whose ability is known and whose views are respected). Once more, G3NWT leads off on the subject, having had "an invitation to an arsenic and broken-glass party on Eighty." One of these types, as he says, can knock hell out of your transmission with a string of unsolicited technical advice, and, because a steadfast rejection of the urge to advise "getting stuffed" is one of the polite conventions of Amateur Radio, one has to lap it up and look a mug into the bargain.

G3NWT sums up the common-sense point of view: "Once inside the shack, the thirst for enlightenment leaves me. I should, I know, constantly ask myself—is the lower sideband shorn to within 0.5 dB of the pundit-approved figure? All I actually ask myself is—will the upper sideband raise Canton Island? Retarded, I must be." Not so retarded, we should say, as the little-Caesar types who appoint themselves as critics of all and sundry. Hobbies and dictators don't go together. (End of prickly interlude.)

### Top Band Topics

DX is out, and mobiles are in, or so it would seem. And a good thing for everyone; a pause in the DX scramble will add an exciting edge to next season's goings-on.

G3IDG comments that some of the Europeans whose only frequency allocation falls within what we generally term "the CW part of the band" are creating a bit of embarrassment by going on phone. This, in itself, is all right—they can't do otherwise—but then the wolf-pack gets loose and causes chaos. There's not much to be done about this, but to ask whether phone contacts are really necessary in these circumstances except for pure "status-value."

Grafton Radio Society's recent Top Band contest was, we gather, a little down on last year, but successful all the same. Top three in the members' section were G3RPB, 3PRK and 3RJN; in the Open Section, G3RJH, 3ERN and 3IGW.

G3NYQ came on very late in the DX season, enthused by the possession of a 4ft. balloon. It worked—and he raised W1BB around midnight, followed by other W's and 6YACZ (now 6Y5CZ, by the way). He was also

reported by G3PLQ, off Liberia, and by SWL Rolf Rasp in Brazil. G3NYQ is going to EA6-land for two weeks in July, and thinks there is just an off-chance of Top-Band operation thence.

G3REA heard SP6XR working OK's on the band—genuine? G3PLQ, not sure of his next sea-going trip, has been working again from home—plenty of Europeans including OH@NH. On his next trip he will again check the band at 2100 and 0001 GMT; week-ends 2100 and 0400. And every day a check will be made between 1200 and 1600 for daylight DX, which seems to be possible up to 1,500 miles.

A friend who, despite many years on the air, has never in his

life used One-Sixty, recently asked "What makes these Top-Band people tick?" On being pressed, he added "Well, there's so much else on the band I can't see where anyone finds a hole." And he produced a list that someone had compiled, showing our friends the coastal stations, occupying spot frequencies 7 kc apart from 1799 kc right down to 1995 kc; the "bleepers" on 1900 and now also around 1830 kc; a bunch of strong carriers with light AC modulation, on 1980, 1940 and other frequencies; fish-fone liable to come up almost anywhere; jingle-bells on 1800 kc and sometimes elsewhere.

When he was told that the QRM caused by all this lot, who, thank goodness, are never likely to be all on the air at the same time, was as nothing compared with the QRM of our own making on 14 mc, he was still pretty sceptical. Still, the fact remains that people actually *operate* on One-Sixty—and a small number of them even persist in working DX that is obviously impossible!

Consider the problem, next season, of the Japanese, who, W1BB tells us, are going to be licensed for 200 watts on a *spot frequency* of 1880 kc for all stations. They have been working for 13 years for permission to use the band; and now what have they got? A prime recipe for Instant QRM, we should say. It will be interesting to see how they solve the puzzle . . . rationing of operating time for each station would seem to be the only answer. (But how wide is a "spot" frequency? That must depend upon the number and the efficiency of the monitoring stations, surely.)

G2VV reports working OH and PA with an *indoor aerial*, but says he hasn't yet plucked up the courage to try for the W's . . . G3IGW thinks the North/South path may still be wide open, since VP8GQ quite recently reported hearing DHJ . . . G3SXW is the latest recruit to the Counties Ladder, with 43 worked already. Incidentally, the "ladder activity" has been very high this month, with more changes than we remember for a long time. A substitute for the DX, perhaps?

## Eighty Metres

What *can* one say about Eighty? Of all the peculiar mixtures one can imagine, this band is the strangest. Someone casually flipping through the spectrum on a general-coverage receiver would never recognise it for an amateur band at all.

All through the day (weekdays and all) there are plenty of phone nets going—more on AM than SSB—but after dark they seem to disappear into the general clutter, with the exception of the high-powered sideband boys, who continue. *ad infinitum*, the particular brand of chat that seems to be all their own. (Someone was heard to remark that if one listened to them every evening for a week, one would not, perhaps, have learnt much about radio—but certainly a whole lot about the human species!) It all adds to the gaiety of life, and gives one something entertaining to listen to on a bad TV night . . .

Through the daylight hours, for some reason, most of the SSB stations one hears are PA's, ON's or DL's. No lack of G activity, but they're all on AM—or nearly all of them. If there's a reason for this, it eludes us.

As for the CW—there's no lack of that at week-ends and late at nights, but it seems very scarce on weekdays until quite late. For some reason more real DX seems to be worked on Eighty by the SSB types than by the brass-pounders. Here again there seems to be no obvious reason—it's just the way things have turned out.

Probably this *is* the very best band for inter-G net working, since Forty doesn't seem to have much room for phone, anyway, and the daylight range on Top Band is so limited. Hence the enthusiastic use of Eighty by the RAIBC net and many others, which hold their own with the commercial QRM by choosing the right time and frequency.

As a DX band, Eighty is quite intriguing for those who can manage a decent-sized aerial system, but relatively an unimportant one for that purpose. For local-natter it is indispensable.

### TOP BAND COUNTIES LADDER

| Station             | Confirmed | Worked |
|---------------------|-----------|--------|
| <i>CW and Phone</i> |           |        |
| G2NJ                | 98        | 98     |
| G3GGS               | 98        | 98     |
| G6VC                | 98        | 98     |
| G3NPB               | 96        | 98     |
| G3LWQ               | 95        | 96     |
| GM3KLA              | 95        | 96     |
| G3PLQ               | 92        | 94     |
| G3OLN               | 86        | 92     |
| GM3PPJ              | 86        | 88     |
| GM3IKD              | 83        | 87     |
| G3PHO               | 76        | 92     |
| G3RJH               | 76        | 83     |
| G3NTI               | 76        | 79     |
| G3RHM               | 72        | 75     |
| G3REP               | 65        | 77     |
| G3NOW               | 65        | 69     |
| G2BP                | 57        | 64     |
| G3PPE               | 56        | 73     |
| G3IDG               | 50        | 54     |
| GW3ITZ              | 35        | 61     |
| G3SNU               | 26        | 59     |
| G3SXW               | 12        | 43     |
| <i>Phone only</i>   |           |        |
| G3FS                | 88        | 89     |
| G3NPB               | 86        | 86     |
| G3RHM               | 64        | 67     |
| G2NJ                | 51        | 51     |
| G3REA               | 46        | 59     |
| G3RJH               | 33        | 54     |

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

### Stray Comment

"Those who have Worked It All aren't necessarily a damper on the proceedings, where young enthusiasm is to be aroused and sustained. Some of them are mad keen on Working It All Again. What's the alternative? Vacancies in the High Priesthood occur but seldom. The declamation 'I hereby resign from all active DX participation' has a splendid sound, but it is not complete—it does not tell us whether we are to send flowers or not." (G3NWT.)

"Very interesting picture of Gus in the May issue, but is my prefix list out of date? Where was 'WW1N6'?" (G3JDG.) Yes, that one bothered us for a few minutes, until we realised that Gus was wearing his 9N1MM card upside down!

"Surprised but pleased to see that most W amateurs are opposed to CQ's idea of increasing power to 2 kW. I'd like to see the whole world limited to 100 watts, and I'll bet my best PM2 valve that we'd all work more stuff with a much greater percentage of readability. As with most things in life, brute force isn't the answer." (G2VV.)

G2CYN quotes one of these long-odds coincidences that seem so much a part of Amateur Radio . . . he was recently working G3SVK/A on 80-metre phone, when he had some strong QRM from another phone and had to move frequency. The other station proved to be "G3SVK"—but a pirate, since G3SVK/A was the genuine one, and rather annoyed . . .

G3EBU, who has just started up from Chelmsford after an absence of 14 years, is the former GC3EBU. At present he is on Top Band and Eighty with a good aerial, 50ft. high and supported between two tubular steel poles. Other gear is under way for the HF bands and also, perhaps, for VHF . . . and the missing threads of the last 14 years are being picked up.

G5CP/M now has the enviable combination of a KW-2000 and a VW-1500 . . . and, talking of mobiles, a whole gaggle of VK/M stations, parked outside an exhibition hall, were recently heard

working G's on *Forty*—one after the other!

The I.R.T.S. are running an expedition to Valentia Island, off the Kerry Coast, July 4-6. All bands, One-Sixty to Two, all modes, with a DX-100U for CW and AM, and a Central Electronics rig for SSB. Callsign will be EI0AC, QSL manager EI5AB (thanks to EI5AJ for the info.).

G3NMH, on behalf of the Ex-G Club, reports that conditions to the States have now improved for the net on 14345 kc at 1900 GMT on Sundays. Sometimes even the West Coast members have good signals. There is also a CW net, run by K5WZA, on Saturdays at 2100 GMT; and one controlled by VE3EPL at 2300.

GM3JDR, who must be one of the most northerly stations in the U.K. (perhaps the most northerly on the mainland) says he can hear the G's working KM6, KH6, KS6, W6 and 7 most mornings around 0700-0800 GMT, but none of the DX is audible up there. Notwithstanding that, he puts in his usual mouth-watering list of DX worked on Twenty CW and SSB. Don uses a "ZL Special" and a homebrew SSB transmitter, but a new rig with a mechanical filter is on

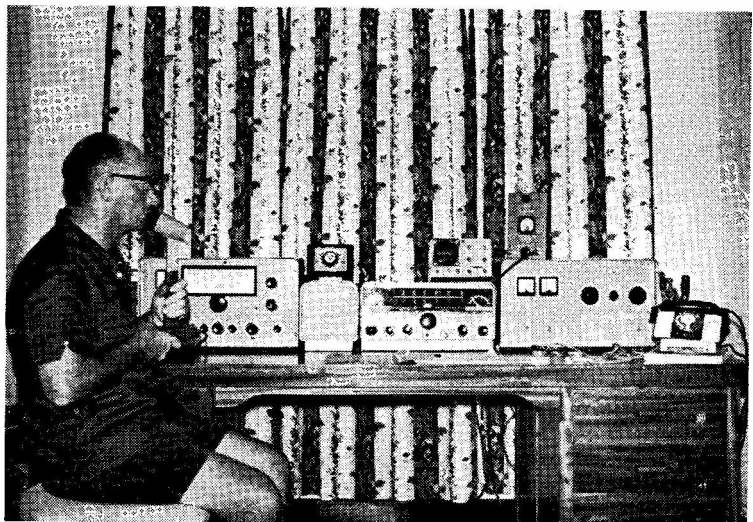
the way. Judging from the list, his lack of Pacific signals is more than made up for by a profusion of Far East, African and Caribbean stations. All the rare ones are there, including VS5MH, ZC5AJ, VQ8BFC and 9HJB, PJ5SA, HZ2AMS/8Z4 and /8Z5.

### Who's There?

G3NGD (Stretford) works G3SMU, duplex on One-Sixty, every evening. After hearing someone say that there are eight SWL's listening to every QSO on the band, he decided to put it to the test. One evening the two stations started up at 2300 and continued until 0345; and at 0200 they asked the SWL's to report. Within twenty minutes they had six phone calls and three stations breaking in. Next day three more SWL reports were received. *Twelve* listeners to one QSO . . . be careful what you say; you are not alone!

### DX News

Total number of DXCC "countries" now available, including the obsolete ones, appears to be 335 (W6AM has 333 of them on Phone and CW, 325 on Phone only). Never mind, Northern



Bob Tanner, 5Z4AA (Box 5121, Docks, Mombasa, Kenya) is ex-VQ3AA, VQ4AA, and in the U.K. is licensed as G3LRM. The gear consists of a K.W. Viceroy Mk. IIIA, with a K.W. 500 Linear and a K.W.-77 Mk. IV receiver; the beam is a Hygain TH4 3-Band, well in the clear. 5Z4AA is on most evenings around 14150, 21390 or 28590 kc, and in the first three months of this year had more than 30 DX contacts on the 10-metre band (G's pse note!). When in QSO on either of the other bands, he is always ready to QSY to give 28 mc a try - so you know what to do if you work him.

Rhodesia is to become Zambia (new prefix), Southern Rhodesia will become something else, the wind-of-change will keep on blowing, and lots of *new new* ones will appear. Carry on chasing!

PJ2AE will QRT for good on July 1, when he "retires" to WIHTE . . . Pacific DX reported by G3NOF:—FO8BJ (0800), KS6BA (0700), WØPI/KM6 (0600 onwards), WB6BZS/KJ6 (0745) . . . all 14 mc SSB.

UAØKIF on 14 mc SSB (0715 and 1420) . . . 9L1HX has applied for Top Band permit . . . WA2USA on 14285 kc SSB from the Venezuelan Pavilion at New York World's Fair . . . KJ6CC (14345) and KB6EPN (142600) are two of the strongest SSB signals from the Pacific . . . VQ9HJB left the Seychelles on May 20 . . . HB9TL attempts skeds with CR4AD, 2030 Wednesdays and Sundays, SSB around 14110 . . . 4WID (HB9AAW) still active on 14 mc SSB, but 4W1B (HB9YZ) has returned to Switzerland. (SWL *Dave Gray*.)

Some of the more interesting DX known to be around—if you can find it:—FB8ZZ (New Amsterdam) 14125 kc SSB; FB8XA (said to be St. Paul Island), 14 mc CW and AM; JT1CA (14090 CW, 14110 SSB); OR4VN (Antarctica) 14050 CW (1700-1800), 7 mc CW (worked by G3SXW at 2250), and 3500 kc CW (2300 onwards).

VQ8BFC: Should have left Chagos and opened up from Rodriguez by now . . . VR1B (British Phoenix Is.) worked by several EU's on 14100 CW, 14260 kc SSB . . . ZD3A soon has to return the rig he is now using to its owner; he requests the loan of gear, so that he can keep the one and only ZD3 on the air.

A VU5 (Nicobar Is.) trip has been announced by four VS1's—ten days of round-the-clock operation with a KWM-2. On the other hand, VU2NR, who was expected to make such an expedition, says No—even Indian nationals can't get a permit . . . CR6BX, 6DX and others hope to make a trip to EAØ (Annabon Is.) early in July.

ARRL/DXCC said to be "considering it seriously" . . . VK4JQ (Willis Is.) has new batteries and is active on 14300 kc SSB (0800).

The Collins equipment used by Gus (W4BPD) on his famous travels has been *preserved in plastic* and will be on display at Houston, Texas, during his visit to that city! (Gus is now seeing as much of the U.S.A., on his lecture tour, as he saw of the world during his two years of DX-ing. Two weeks in May took in Seattle, San Francisco, Los Angeles, San Diego, Houston and Dallas.)

Incidentally our phenomenal friend was rushed into hospital for an appendix operation, very soon after returning from all the outlandish spots that he activated. He was reported as "bouncing like a Sherpa falling off the Himalayas," and it is said that, at the hospital, they had to "shoot the Sherpa twice" to make him keep still for the op. and prevent the nurses from dying of laughter . . . what a man!

#### Contests and Awards

Dates for the Tenth European (WAE) Contest are as follows: August 8, 0001 GMT-August 9, 2359 GMT (CW); same times a week later (Phone). Rules as before—valid QSO's are between European and non-European stations only. Multiplier based on countries worked, *plus* all different call areas in W/K, VE, PY, CE, VK, ZL, ZS, VO and JA. Full rules available from DARC DX Bureau (DL7EN, Chlodwigstr. 5, 1 Berlin 42).

The VK/ZL/Oceania DX Contest is also announced. Dates are: 1000 GMT, October 3 to 1000 GMT, October 4 (Phone), and same times one week later for CW. Scoring: Two points per contact per band with VK or ZL stations; one point per QSO per band with other Oceania stations. Final score, total points multiplied by the sum of VK/ZL call areas worked on all bands. Logs this year to NZART, Box 489, Wellington, N.Z., on or before January 16, 1965.

The information sheet from NZART includes these words: "Because of erratic conditions,

some scores may be low, but a sincere appeal is made for as many logs as possible to be posted to NZART. Most attractive coloured pictorial certificates will be awarded."

And a new sheepskin: DRB, or "Diploma Radio Barcelona," which will commemorate the 40th anniversary of the first Spanish broadcasting station (Radio Barcelona, EAJ-1). The prize is a silk pennant, suitably inscribed; to win it you need 20 contacts with EA3 stations, to be made between June 1 and November 30, 1964. QSL's to these stations must be forwarded, with a check list, to URE, P.O. Box 5041, Barcelona, from whom further details are obtainable.

#### Sign-Off

And so ends this, the first of the new-style offerings. To help us, please let us know whether you like it; what you would like to see in future instalments; and, most of all, what you are up to yourselves. To keep to the new type of commentary, we want (a) more details of your gear and aerial system; (b) notes on any proposed changes and improvements in the shack; (c) particulars of interesting QSO's, whether rare DX, ordinary DX or just plain local. Don't imagine that DX, as such, is being excluded . . . it will just be treated as one of the many pursuits that we all indulge in. The idea is simply this: More interesting comment, and fewer lists of stations.

Deadline for the July issue is **first post on Monday, June 15**. From now on, please address letters to "Communication and DX News," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. And it would be appreciated if, when you write on a variety of different subjects, you could sort them out a bit under headings. Anything of interest, on any band from One-Sixty to Ten, is the raw material, and you can leave the processing thereof to your conductor. So, until next month, we say *Good Operating*, 73 and—BCNU.



## • • • *The Mobile Scene* • • •

GOOD ATTENDANCES IN FINE WEATHER AT ROCHESTER AND  
PEGWELL BAY — MORE RALLY PICTURES — MOBILE RALLY  
CALENDAR

**B**EFORE dealing with the events since, we should first complete the **Trentham** story, only touched upon last time because we were right on the deadline. Though the **Wx**, as promised and experienced, was dead against them, the official attendance for the day is given as 2,548 persons, in 725 cars, being 45 more vehicles than last year—of course, these figures include a large proportion of public, who would probably have been at Trentham for the day, anyhow. But the hard fact is that some 350 of these vehicles were fitted mobile, and probably accounted for over 1,000 people, at least, who had come for the Rally, and not just to see the beauties of Trentham.

Of the mobiles, about 150 were on Top Band, a number had all-band mobile rigs, and there were 50 or so on two metres. The 2m. talk-in station, **G3MAR/A**, was set up in the new mobile caravan now being operated by J-Beam Aerials, Ltd., and likely to be seen round more of the Rallies this season. The 160m. talk-in station on the ground, **G3GBU/A**, was kept extremely busy, but had the aid of six strategically placed out-stations (an idea worth considering where large /M attendances are expected). Similarly, out-stations were available for the VHF mobiles, including **G3OHH/A** on 4m.

Fortunately for all concerned, in view of the

weather, a very good under-cover exhibition had been arranged—the total of 60 exhibitors covered between them not only the Amateur Radio and mobile side, but also the feminine interest and entertainment for the numerous harmonics always in evidence on these occasions. With almost everyone forced under cover for most of the time, the Trentham Gardens catering organisation was a bit strained, but coped nevertheless, and two bars were kept fully staffed—and occupied! More than 2,000 tickets were sold for the raffle for 100 prizes, of which 25 per cent were for the friends-and-relations. As well as the large number of G callsigns registered (400 lapel badges were distributed!), there were visitors from EI, GM and GW. The competition prize-winners included **G3AOS/M**, best 2m. commercial rig; **G3STM/M**, 160m. scooter outfit; **G3AYJ/M**, for his home-constructed Top Band installation; and **G4HK/M** and **G3KYU/M** for their mobile rigs.

Once again, it was a highly successful "Trentham"—the sort of Rally that gives a big fillip to amateur /M interest and activity—and the organisers, the Midland Amateur Radio Society in co-operation with the Stoke-on-Trent Amateur Radio Society (among whom we should mention **G3JPN**, **G3NCX** and **G3UD**) can rest content with a good job well done.

[over

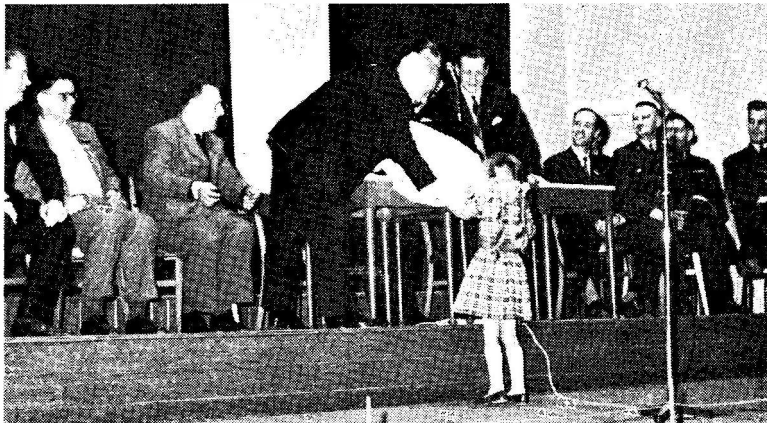


At the Thanet Mobile Rally on May 10, held in brilliant sunshine, about 50 cars were counted in the park, of which 35 were fitted /M. Of these, at least two were on 4 metres. Some 22 mobiles were worked on 160m. by **G3DOE**, on Top Band talk-in. The attendance overall is given as "greater than last year."

The pictures in these pages tell some of the rest of the story.

\* \* \*

For the Medway Group, their event at **Rochester** on May 3 was a first effort. They had the hospitality of British Uralite, Ltd. (who are in the asbestos business) and the facilities for the holding of a Rally were excellent. On a bright and sunny afternoon, the attendance came to an estimated 350, and of the 70 or so cars in the park, 50 were fitted /M for 160m. and ten had two-metre mobile rigs. The Top Band talk-in station G2FJA/A worked 41 /M's; G3OHP/A logged five 2m. /M's; and G3LID/A found four mobiles to work on 4m.—which makes a nice change from the usual. The main competition is described as a “four-in-hand chase,” an ingenious motoring contest which attracted 10 entrants and was won by G4XF/M, with G3RFY/M (who also got the prize for the longest distance travelled) and G3PWW/M as runners-up. Two of the most enthusiastic visitors were G3SOZ and G3STX—16-year-old schoolboys who left home at 4.15 a.m. and hitch-hiked to Rochester from Hayes, Middlesex, a distance of 45 miles; needless to say, transport back home was arranged for them. For the organisers—G3CHD, G3KSL and G3RQA of M.A.R.T.S.—it was a successful affair, with £30 made for their Club building fund (a project for which members are working hard). More than that, the Rally is described as “very enjoyable” by those who were there, and that is what matters. The Group would like to acknowledge the fact that their visitors left no litter, and the site was restored to its usual trim condition within about half-an-hour of the last



At the opening of the highly successful Trentham Gardens Mobile Rally, by the Mayor of Stoke-on-Trent, a presentation was made by little Susan West, a harmonic of G3JPN's, he being on the platform as president of the Birmingham A.R.S. Others of the platform party included G3UD and G3EJF, with committee members of the sponsoring radio amateur groups. *A G3GMN print*

mobile leaving. This is probably one of the reasons why British Uralite, Ltd., have agreed to the M.A.R.T.S. boys having the site again for their next Rally event.

\* \* \*

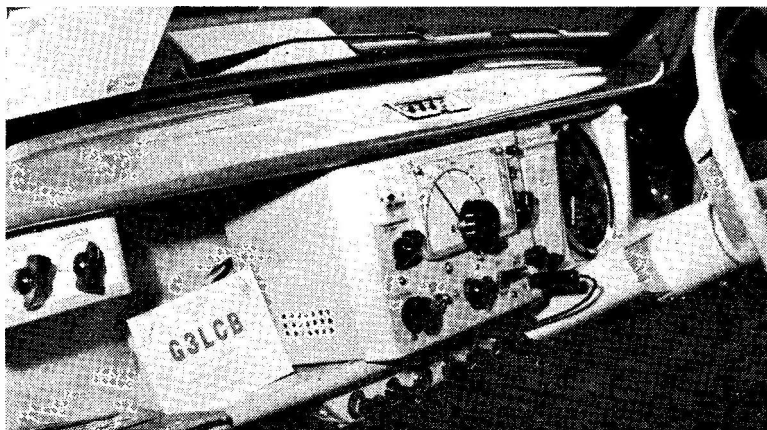
The Thanet Radio Society describes itself as “a very small club,” so their Rally at **Pegwell Bay**, near Ramsgate, on May 10, was not laid on in any large or ambitious way. But at this extreme south-east end of the country, on a day of brilliant sunshine with the sea glinting in the background, they had 35 mobiles booking in, which was better than last year's total. G3DOE worked 22 /M's on Top Band; G3REZ had two on 4m. talk-in (this band is livening up!); and G3BAC logged three 2m. /M's. All the Clubs in the district were represented and the prize-winners were: G3LCB/M, best /M Tx; G3NKS/M, best mobile Rx; G3OGB/M, safest rig; G3JEQ/M, longest distance worked; and G3SXX. valve identification competition. The local Civil Defence unit turned out to show their signals equipment, and an unexpected event was a rescue operation off the beach by an R.A.F. helicopter. The organisers for this Rally were G3BAC, G3BKT, G3RAD and G3REZ of the Thanet Radio Society—who tell us their only attraction for visitors can be the sea. And who could want more than that.

\* \* \*

#### Mobile Notes and News

G2AUD (Little Horwood, Bucks.) reports that the Dept. of Posts & Telegraphs, Dublin, will issue mobile permits, for a

[cont'd. p.234



Mobile installation by G3LCB in his Standard Estate, seen at Rochester on May 3. The rig consists of an 8-transistor Rx, and the Tx has a 6BW6 in the PA, frequency selection being by six switched crystals in the driver unit. He radiates off a 5 ft. base-loaded whip. *A G3GMN print*



Prize-winners in the Rochester competitive events on May 3. Left to right: G3JEQ/M, G4XF/M, G3PWW/M, G3RFY/M and G3PED/M. G3RFY/M did particularly well in the trophy stakes — he also won the lucky-programme prize!  
A G3GMN print



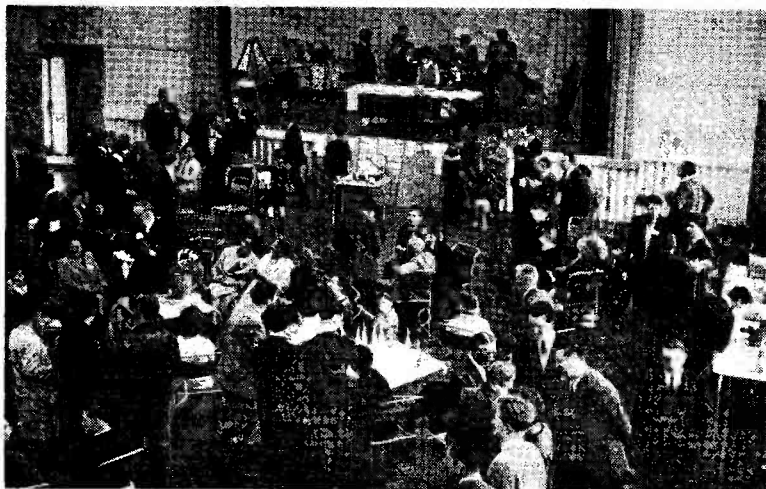
One of the several Club stands at the Trentham Mobile Rally was that of the Midland A.R.S. It was always busy, and doing his stint when this photograph was taken was Bob Palmer, G5PP, well known under the /P and /M suffixes.  
A G3GMN print



Busy at the 160m. talk-in station G3GBU/A for Trentham were, left to right, G3SLX, G3EHM and xyl/G3SLX logging. They worked a large number of the 300-plus cars fitted for Top Band mobile.  
A G3GMN print



Two well-known personalities at Trentham — left, G3NM, with Tom Douglas, G3BA, the VHF SSB/Transverter king! He puts out a very nice signal using a K.W. SSB exciter as the heart-beat of his system.  
A G3GMN print



On the occasion of the Rochester Mobile Rally on May 3, at the works of British Uralite, here is a general view of the canteen with the raffle in full swing.  
A G3GMN print

Rally photographs from Trentham and Rochester

stipulated holiday period in Eire, to U.K. amateurs on production simply of their current fixed-station and mobile licences—and there is no charge. G2AUD asked for an A3 permit over August 3-16 for the 80m. band, and has been issued with EI9AS/M accordingly—and we are sure he will find his experience interesting, as it is the right band to use for /M working into the U.K. from Eire, especially during daylight hours.

G2DHV/M (Sidcup, Kent), who also holds DJØLJ/M and gets about a good deal, was at the recent D.A.R.C. Rally at Niederrheim, where he noted 29 mobiles on 80m. AM; 13 /M's on 80m. SSB; and 22 vehicles fitted mobile on two metres. They do not have the use of 160m. at all, which has tended to produce more efficient rigs on the HF bands. (That figure of thirteen mobiles on Sideband is a bit of a shaker.)

#### A.R.M.S. Change of Date

Previously slated for June 7, the Amateur Radio Mobile Society has decided to change its Barford date to July 5—which is a little unfortunate, as there are two other big Rallies already fixed for that day. The reason given for the change is the clash there would have been with the RSGB's NFD event over June 6-7. But this is a week-end camp, in effect, and a CW-only affair at that, so it is not very likely that, except in a few individual cases, there would have been any serious clash with a mobile rally on the same day. However, there it is, and as matters now are the North Midlands group of mobiles will have to choose between Barford and South Shields, and those in the south-western parts of the country between Weston-s-Mare and Barford. It can only mean that with the "available effort" so divided, attendances at all three are likely to suffer—never mind, it will be interesting to see what does happen. (It is beginning to look as if the bookings for next year's dates should start being arranged about now!)

#### MOBILE RALLY CALENDAR

As at the deadline, the programme for the next few months is as follows:

**June 14:** Hunstanton Mobile Rally, meeting in the car park at the pier, with talk-in by G3ANM on 1980 kc and G3RED on 145.2 mc. This is an all-day affair, with amateur TV as one of the attractions (look out for the ATV camera on the approach to Hunstanton). Charge 2s. 6d. for admission and parking, and any further information from G3KPO, *QTHR*.

**June 21:** Seventh Mobile Rally at Longleat House, near Warminster, Wilts., with many attractions based on the experience of the previous six events, held at one of the loveliest sites in the southern part of the country. The talk-in stations—G3JMY/A on about 1885 kc, and G3SJI/A on a Zone 2 frequency—will open at 10.0 a.m. and there is a charge for admission, since Longleat is one of the show places of England. The Rally Organiser is E. C. Halliday, G3JMY, 4 Parkside Avenue, Winterbourne, Bristol, who can supply a leaflet on request with an s.a.e.

**June 21:** Mobile Picnic, South Shields & District A.R.C., at Finchale Abbey, Co. Durham—off the A1 north of Pity-Me, Durham.

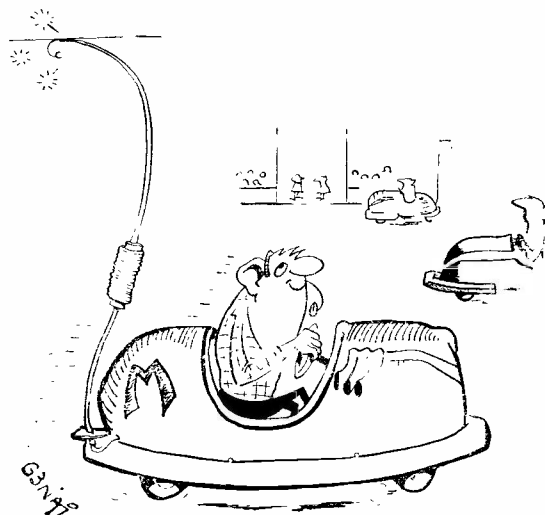
**June 28:** RSGB Mobile Rally at U.S.A.F. Station, Wethersfield, Essex.

**July 5:** Mobile Rally at Weston-s-Mare, organised by R.A.F. Amateur Radio Society, on the sports field adjacent to R.A.F. Station, Locking (just outside Weston), opening at 2.00 p.m. The mobile competition will involve a 15-mile drive, with the /M radio on Top Band. The car park will be a hard standing (no risk of bogging) and several features are being arranged to keep the non-radio faction entertained. This Rally will be preceded by a dinner on the Saturday evening (25s. a head) and full details are available from G3GNS, *QTHR*.

**July 5:** Mobile Rally arranged by the South Shields & District Amateur Radio Club, at Bents Park Recreation Ground, Coast Road, South Shields. The talk-in stations will be G3DDI on Top Band and G3OLW/M available on the ground to work two-metre mobiles. Prizes will be awarded to the /M travelling the greatest distance to the Rally on the day; and to the /M working control at the longest distance. In addition, there will be a *concours d'elegance*, a driving competition and a transmitter test. Light refreshment will be available on site, and the Rally starts at 2.00 p.m. Contact G3KZZ, *QTHR*, for any further details.

**July 5:** A.R.M.S. annual mobile meeting at R.A.F. Station, Barford St. John, near Deddington, Oxon. There will be a tombola, a comprehensive trade show, and a military band concert. The talk-in will be on 160m. and two metres, under call-signs G3NMS and G3NMR, with an additional SSB station working the DX bands. Details from: N. A. S. Fitch, G3FPK, hon. sec., A.R.M.S., 79 Murchison Road, Leyton, London, E.10.

**July 12:** Mobile Picnic arranged by the Reading Amateur Radio Club in conjunction with the Mortimer & District Motor Cycle Club Scramble,



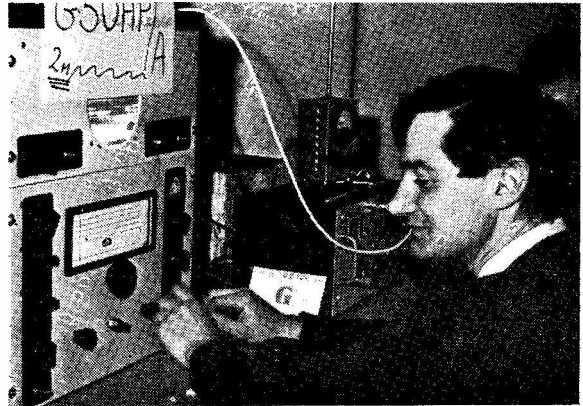
at Padworth Common, just off the A4 near Aldermaston, Berks. Police will control the entrances, there will be a charge for admission, talk-in is being arranged, and screen stickers are available for those who intend coming, to ease the parking problem. For details, and stickers, apply: R. G. Nash, G3EJA, 9 Holybrook Road, Reading.

**July 26:** Mobile Rally organised by the Cornish Amateur Radio Club, at Pentire Headland, Newquay. Cornwall—a magnificent site, overlooking fine stretches of sand. Talk-in stations, all signing GB3CRC, will operate on 160, 80 and 2m., opening at 11.0 a.m. As well as the usual raffle and lucky-programme prizes, some new and unusual events will be staged; there will also be a display of equipment constructed by the locals, including gear recently described by G3OCB in the *Magazine*. Refreshments will be obtainable on the Headland. For further information, write: W. J. Colclough, G3XC, Highview, Indian Queens, St. Columb, Cornwall.

**August 9:** Mobile Rally at the Royal Naval College, Dartmouth, Devon, arranged by the local Amateur Radio groups. *Full details later.*

**August 16:** The annual Derby Mobile Rally, at Rykneld Schools, Bedford Street, Derby, with all the usual facilities and attractions. *Further details later.*

**August 30:** The U.B.A. (Belgian) Rally, near Namur, in the Ardennes. *Details later.*



The two-metre talk-in station, signing G3OHP/A, for the Rochester Mobile Rally. When this picture was taken, the operator was G3RFY. *A G3GMN print*

**September 13:** RSGB Mobile Rally at Woburn Abbey, Beds.

The next issue of *SHORT WAVE MAGAZINE* will contain further Rally reports and pictures under "The Mobile Scene" heading. Apart altogether from the attractions offered by their hard-working organisers, whose only reward can be the success of their event, Mobile Rallies have become important social occasions in the Amateur Radio context.

### SPECIALLY ON THE AIR

At this time of year, we regularly publicise the plans of those readers and Club groups who are laying on an amateur station, often under a special call sign, to operate in collaboration with, or in support of, some local event or gala occasion. These undertakings usually involve a great deal of enthusiastic effort, and are of much value in promoting public interest in Amateur Radio—and we cannot have too much of that.

Events now scheduled are as follows:

**GB3NRC, June 10-13:** Operated by the Magnuss Grammar School Radio Society, Newark-on-Trent, in connection with the local Hobbies Exhibition sponsored by the Newark Rotary Club. Bands used will be 20-40-80m. and GB3NRC will be on the air afternoons and evenings and all day on Saturday, 13th. QSL to G3PAW, *QTHR*.

**GB3GP, June 13-14:** From the Scout Camp site at Gilwell Park, Chingford, Essex, when there will be many Scouts from overseas in camp. A K.W. "Vanguard" and trapped dipole will be used on 20-80m. and the station is being organised by G2CAJ and members of the Baden-House Scout Group. QSL address: G3FXC, i/c BPH Scout A.R.S., 8 Thorneycroft Road, Kew Road, Richmond, Surrey.

**GB3RCS, June 26-28:** On the occasion of the Royal Signals celebration and annual reunion, from

their Hq. at Catterick Camp, Yorks., with continuous operation on 14 mc, except when 21 mc is open, using AM/CW/SSB. Additional transmitters will be up on other bands whenever possible, all under GB3RCS. Contacts with ex-members of Royal Signals and personnel of Commonwealth Signals Corps will be specially welcomed. Address for QSL's: J. E. Hodgkins, Royal Signals A.R.S., 2 Sqdn., 8th Signal Regt., Catterick Camp, Yorks.

**GB3WYE, June 27-July 3:** For the Wye College Cricket Week, from Wye Coll. (Univ. of London), Ashford, Kent, with activity on all bands 10-80m., but mainly on Eighty; contacts with other University and School stations are particularly in demand on this occasion. Operation by G3LZZ and members of East Kent A.R.S., with a special QSL card for all stations worked and SWL reports received. *QTH:* G3LZZ, at the College.

**GB3SOU, July 10-11:** Exhibition station in the grounds of the annual Southampton Show, with operation on all bands two metres to 160m., and additional talk-in facilities on Top Band and 2m. for /M's visiting the Show. This covers all the activities and sports of Southampton and its countryside, and offers a very full programme of events. GB3SOU is laid on by the local radio amateur group, and visitors will be very welcome. Address for information and QSL's: C. Asher, G3IBJ, 81 Green Lane, Maybush, Southampton.

## AMPLIFIED AUDIO OSCILLATOR

FOR MORSE INSTRUCTION —  
TWO-TONE TRANSMITTER  
TESTING — MCW OPERATION  
WITH AM RIGS

J. F. E. GROGAN (G3PJG/T)

FOR some time, the writer has been thinking about getting round to learning Morse—which is not a requirement for the UHF-only /T licence. The circuit shown here has the virtues of simplicity, chirp-free operation with good waveform, ample audio output and a useful application for Tx testing or MCW operation.

V1 is a triode, which can be a normal audio amplifying stage, switched to become an audio oscillator by S1A-B. Oscillation occurs due to the 180° phase-change taking place through Ch.; the frequency of oscillation is determined by the values of Ch., C1 and C2. With those suggested, a note of about 1,000 c.p.s. should be obtained. To lower this frequency, increase the value of C1, C2 and vice-versa.

The choke Ch. may be either a regular audio component of reasonable inductance or the primary winding of a standard speaker transformer. J is the key socket, with the resistor R2 biasing V1 to the point of cut-off when the key is open; it is this that ensures clean, sharp keying. The value of R2 is a nominal 22K but its precise value can be found (during the setting-up process) by replacing it with a 50K potentiometer; with the key in but not pressed, this pot. is adjusted to the point at which oscillation

just ceases.

Output is from the anode of V1 to the gain control R5 of a normal audio output stage, V2. In the writer's version, this is a 6AQ5, capable of giving about 4½ watts of audio—ample to fill a class-room or small hall for class tuition. Some NFB is provided by the connection of C6. While power supply in the writer's case is obtained from the PSU for his ADO (described in the October, 1962, issue of SHORT WAVE MAGAZINE) any PU giving about 250v. at 40 mA and 6·3v. 0·6A will do.

Those running an SSB transmitter will recognise the possibility of incorporating the Ch., C1, C2 items and switching in an existing speech-amplifier, to provide two-tone test facilities, and an input signal for tuning up. In an AM transmitter, the same circuit device would enable MCW to be used.

### Table of Values

Audio Oscillator/Amplifier

|                           |                       |
|---------------------------|-----------------------|
| C1, C2,                   | R6 = 270 ohms, 1-w.   |
| C3, C5 = .01 $\mu$ F      | Ch = LFC (see text)   |
| C4, C6 = 15 $\mu$ F, 25v. | T = O/p xformer, pri. |
| R1 = 470,000 ohms, ½-w.   | 5K for V2             |
| R2 = 22,000 ohms, ½-w.    | J = Key jack          |
| R3 = 1,000 ohms, 1-w.     | V1 = 6C4, ½-12AU7 or  |
| R4 = 47,000 ohms, 1-w.    | similar               |
| R5 = ½-megohm carbon      | V2 = 6AQ5, 6BW6, 6V6  |
| potentiometer             | or similar            |

### "INVERTED VEE DX ARRAYS"

In the review of this book by G3IAD of Vee Beams (Communications), Ltd., on p.182 of the May issue of SHORT WAVE MAGAZINE, it should have been stated that the price for overseas distribution is 11s. 6d. or \$2.00 U.S., remitted by international money order.

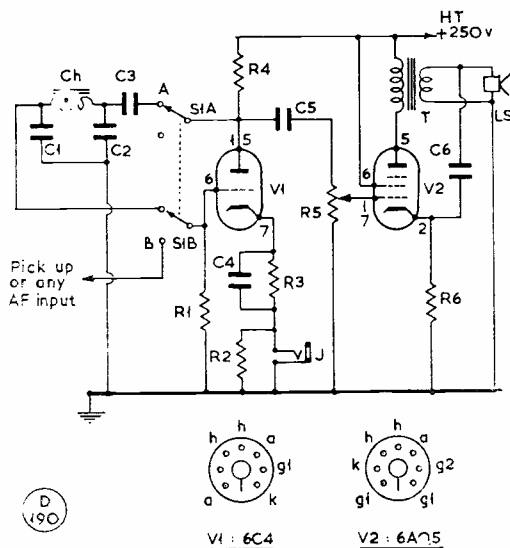
### "STOP PRESS" — Closed 27 May

— Reported May 22 that U.S. Reciprocal Amateur Licensing Bill has passed American House of Representatives and awaiting President Johnson's signature. This means U.K. amateurs will be able to get U.S. facilities when visiting the States, including local licence and callsign. Presumed that same will apply in reverse direction (for W's in the U.K.) when formalities over here have been completed. Who is going to be first G/W—or W/G?

— Hammarlund's report: That HZ2AMS/8Z4, Saudi-Iraq Neutral Zone, accepted as new one for DXCC. That all VP8HF cards, Tx and SWL, have now been despatched. That YV8AJ will be re-activated again in near future; cards for recent contacts should start going out by June 15. That VP7NY cards are also being despatched as logs are received.

— New 7Z and 8Z prefixes will appear for non-nationals in Saudi-Arabia—calls will be in 7Z1, 7Z2, 7Z3 sequence. Existing 8Z's will remain as now. G5KW will start up during July, signing either HZ1KE or 7Z1KE (may be 2KE).

— G3NIR expected to appear as VS9MH from Chan (Gan), Maldive Is., and VS1LX from Nicobar Is. He will also sign VS9MG from the Maldives.



# VHF BANDS

A. J. DEVON

NOT a great deal to report in the way of DX during the period, though the band did start to open a bit on May 14, producing quite a good DX spell over Whitsun—when, of course, many people were either away, or working in the garden, or busy getting the two-metre /M gear tee'd up. And it is very interesting to find what an upsurge there is in mobile activity on VHF, on 2m. and four metres. It has not yet become a runaway phenomenon—the Top Band /M boys still far outnumber the mobiles on all other bands put together, in the U.K.—but the signs are there that more and more people are finding that VHF/M has much to commend it. In fact, with the generally high level of local two-metre activity, almost wherever you are in the country, having a two-metre mobile rig on the car is well worth while.

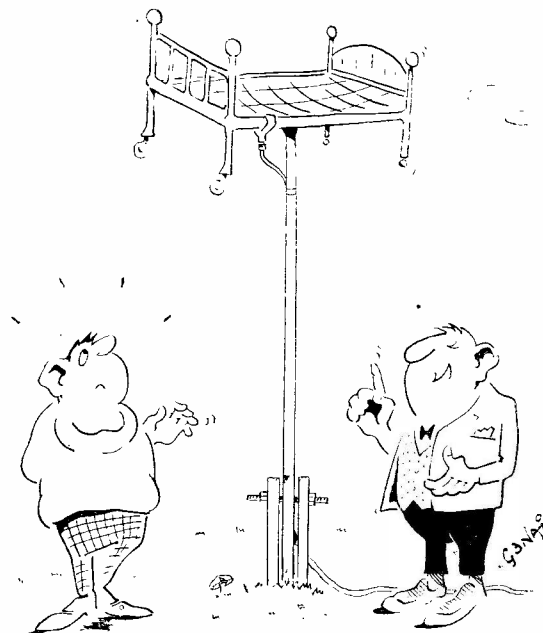
Getting back to what we were saying: A typical anti-cyclonic development in the Channel area, starting on May 14, was giving warm days followed by cool,

cloudless evenings—the ideal met. situation for good tropospheric conditions. By the evening of Whit-Monday, the anti-cyclone had dissipated, and the VHF bands reverted to “normal” (which means pretty dull). The barograph trace shows the picture very well: A steady rise towards a high reading of about 30·8in. on Friday 15th, with a slow fall over the next few days until the collapse on Monday 18th.

In view of the met. picture, checked with the BBC's Wx chart at 6.30 p.m., your A.J.D. was tooling round the VHF bands on the evening of Friday 15th and came upon a station not a hundred miles from Kenley, Surrey, with a chum on the side called Frank, who was giving a VHF-conditions forecast for the Whitsun period. This “Frank” was apparently a met. man and, as it happened, he was about right in his forecast. In making it, he was modulating the Tx rather more heavily than the G3—who was laying on the programme. Nobody need mind about this sort of thing (it could even be helpful if the met. gen is reliable) but what A.J.D.

wondered was whether “Frank” was licensed to modulate at all. (You never know who is listening!)

Going back a bit, to May 3, when the RSGB had a /P contest on, it seems that conditions were about as bad as they could have been, even the portables (usually well placed on high ground) having difficulty in getting out beyond 100 miles or so. This did not quite apply to the enterprising GW3RUF/P party from the Midlands Radio Contest Club, who made the pilgrimage to the summit of Snowdon, and gave a fairly easy Caernarvonshire contact to a large number of keen types. It is very interesting to see how, over the years, Snowdon has been used as a VHF transmitting point, amateur and commercial. It started 'way back before Hitler's War, when our VHF band was “five metres” and the gear strictly squish—meaning heavily modulated self-excited oscillator transmitters, tuned roughly into the band by getting maximum glow in a bulb at the exact centre of a half-wave aerial (carefully cut to precisely the right length for a nominal frequency of 58 mc).



“... Unorthodox, you may say — but it works FB when there's an Aurora...”

working to super-regenerative receivers producing almost unbearable *sharsh* till a signal was tuned in capable of overcoming the chop noise. In other words, you were either S9+ +, or you could not be heard at all. Extraordinary DX results were obtained with this simple apparatus, which depended

upon the fact (still as true now as it was then) that a super regenerative demodulator (whether valve or transistor) is by far the most efficient detector device known in radio communication.

But you never get anything for nothing. There are serious disadvantages inherent in the whole "squish" system, and it is not the purpose of this note to advocate super-regen. as an acceptable mode for VHF working under present-day conditions. It is just that it is an interesting relic of the past, and all we are trying to say is that GW3RUF/P and party are unlikely to have obtained better GDX results from Snowdon than the squish boys who went up there 30 years ago, also with the idea of working DX.

As it happened, your A.J.D. could not be in on this /P contest—he was having a few days of recuperation in the GC area—and so never heard the Snowdon party. But as already mentioned conditions were poor and few of the /P's out for the day were able to work more than local portables.

#### Balloon Goes Up

It is understood that on May 24 the OZ group put up a large balloon carrying a transistor Tx radiating on 144.05 mc. If you heard noises on this frequency which could be attributed to a balloon-borne transmitter (signal characteristic not clearly stated) report what you got direct to OZ4UB (*QTHR*). Unfortunately, no advance information was forthcoming about what could have been an interesting exercise, and the amateur-band broadcast announcing it was, as usual, drowned out in noise and QSB.

On this particular topic, it is a matter for regret that the only GB2RS transmission from the London area that anyone can really hear on two metres is that put out by G3FZL.

#### Four-Metre Band Widening

The G.P.O. announces that with immediate effect the 4-metre band is widened to 70.1-70.7 mc, with certain minor restrictions that will not affect the majority of operators. Broadly, these amount to

non-interference with other services using the HF portion of this frequency range. It is a very useful, and most acceptable, dispensation which should help to increase activity on what could be a most interesting band for U.K. working—as those already on it have discovered.

#### DX-Pedition News

On p.174 of the May issue of the *Magazine*, full details were given of the projected expedition to Andorra during **June 12-21**, when PX1QX will be on two metres, looking for all comers—and the probability is that, with a fallout area dominated from a site at 8,000ft. a.s.l., he will be kept pretty busy.

Another difficult, but almost as interesting, a prospect is offered by the EI expedition to Valentia (of blessed radio memory) off the Kerry coast, during **July 4-6**. They will sign EIØAC, using CW/AM. and as they also will be working other bands (under the same call-sign) sked contacts might be arranged. So far as VHF is concerned, this effort is dependent even more on conditions than are the PX1QX boys, as regards just making QSO's. The QSL manager is EI5AB (*QTHR*) and needless to say any reports of the hearing of EIØAC on two metres will be gladly received.

For those interested in the rare county of Kincardine, GM3SIG will be on irregularly during July 12-24, with a positive appearance on Sunday, **July 19**, 1200-1800 clock, on a frequency between 145.8 and 146 mc, and using CW mainly. Those wanting schedules are invited to get in touch with G3LOV, *QTHR*.

And from **July 26** until **August 1** that team of hardened explorers G3BA/G4LU (who will take any risks for VHF) will be adventuring in the darker fastnesses of Wales, taking in seven of the counties regarded as "rare" by most G operators—we won't list them here, as some at least already have an indigenous VHF population, and susceptibilities might be offended! But if you are short of Welsh counties, look out for GW3BA/P or GW4LU/P

### TWO METRES

COUNTIES WORKED SINCE  
SEPTEMBER 1, 1963

Starting Figure, 14

From Home QTH only

| Worked | Station             |
|--------|---------------------|
| 60     | G3BA                |
| 55     | G3GWL, G3LRP        |
| 52     | G3NUE               |
| 49     | G3CO                |
| 46     | G3SAR               |
| 44     | G3AHB, G4LU         |
| 42     | G3PTM               |
| 41     | G3LAS               |
| 40     | G3HRH               |
| 38     | G2AXI               |
| 35     | G3DVQ               |
| 34     | GM3LDU              |
| 33     | G2BJY, G2CDX, G3PSL |
| 32     | G3SML, G5JU         |
| 30     | G3CKQ               |
| 29     | G3CCA               |
| 28     | G3PKT, G5UM         |
| 26     | G3GSO, GW3PWH       |
| 25     | G3KQF, G8VN         |
| 24     | G2BDX, G3ONB        |
| 22     | G3IOE               |
| 20     | G3EKP               |
| 19     | G3KPT               |
| 17     | GW3CBY              |
| 16     | G3HWR, G3OJY        |
| 15     | G2DHV/P             |
| 14     | G3OZF, G5FK, G5ZT   |

*This annual Counties Worked Table will run till August 31, 1964. All two-metre operators who work 14 or more Counties on the band are eligible for entry. QSL cards or other proofs are not required. After the first 14 worked, simply claim from time to time with counties as they accrue, giving callsign and date for the county worked. To keep the Table up-to-date, claims should be made at intervals of not more than two months.*



(both calls will be used) working from good sites, starting at 7.0 p.m. each evening and holding on till midnight, with an operating session every morning from 8.0 to 9.0 a.m. (this will be while Stan fixes their breakfast). It will be a camping trip involving, so far as one can see from the itinerary, a terrific week of motoring. Well, they've done it before, and highly successfully too, so given a break with conditions, they should make many interesting QSO's. Operation will be on all modes—Tom says they will even copy SSB, if offered!—and QSL's will be despatched *instantly*, with a special card being printed for the purpose. (If their previous GW expeditions are anything to go by, these boys will send off your card same-day so that it bears the post-mark of the county in which you worked them.)

#### Another MS Record

On May 3, G3LTF (Galleywood, Essex) worked UA1DZ in Leningrad by meteor-scatter, the contact taking from 0500 until 0740 GMT, with S23/S49 reports. The most sustained burst was one of 40 secs. at 0704, when UA1DZ was S8 (this was also heard by G5YV). In addition to putting Peter up to 23C and the lead position in Countries, the path-length of 1,280 miles makes it a new European record on VHF. A very fine effort, on which G3LTF will have many congratulations. He runs 400w., the beam is an 11-element Yagi at 50ft., and the Rx a 417A cascode into an R.1475 tuning 4-6 mc.

According to the IQSY data, forwarded by G2DHV, meteor shower activity during the next couple of months can be expected around June 4-8, July 28-29 and August 9-13. There are other dates for later this year (and next) which we shall give in due course.

#### London VHF Convention

In spite of the fact that it was a fine and warm Whitsun Saturday, with the two-metre band showing every sign of opening, there was no noticeable falling off in either attendance or enthusiasm

at the VHF/UHF Convention held on May 16. As usual, the afternoon session was taken up with lectures—and extremely good they were, too. At any rate, with the sun shining brightly outside, a full audience was held from 2.0 p.m. till after 6.0 p.m. G3CCH/G3LTF talked on E-M-E working, proving that in the amateur context it is a great deal more difficult than one might think, even given the power; they both have fine dish arrays and are determined to get results by moon reflection.

Then G3BPT ran a film dealing with the radar and radio communication set-up for the Port of London Authority, with some good action shots of ships and equipment. This was followed by G3BA/G3MED discussing SSB on VHF, which provoked a lively question-and-answer period with the protagonists of AM—for this, the knives were out (though in the nicest possible way, of course).

Finally, the B.A.T.C. group put on a most enterprising live amateur TV demonstration, with pictures received direct from G3OUO/T and G3NDT/T in the London area. These transmissions were with sound, and such technical hitches as there were, being essentially amateur in flavour, merely heightened the interest and amusement of the audience. Before the live demonstration started, G3NDT/T gave a very competent talk on the general progress of amateur TV in the U.K.

The evening concluded with a well-attended dinner, for which the chairman was G3FZL, with G3HRH as toastmaster, and it was well after 10.30 p.m. when the last of the visitors went to catch a late train home. Speaking for himself, A.J.D. would say that this was one of the most successful VHF conventions yet.

#### Six-Metre Beacon

As a matter of interest, we note here that there is now a continuous beacon signal on 50.046 mc, situated near Salisbury, Southern Rhodesia, and sending "QRA de ZE1AZC" by FSK with a 200-

### TWO METRES

#### COUNTRIES WORKED

Starting Figure, 8

- |    |  |
|----|--|
| 23 | G3LTF (DL, EI, F, G, GC, GD, GI, GM, GW, HB, HG, LA, LX, OE, OH, OK, ON, OZ, PA, SM, SP, UA, UR)   |
| 22 | ON4FG (DL, EI, F, G, GI, GM, GW, HB, HG, LA, LX, OE, OH, OK, ON, OZ, PA, SM, SP, UA, UR, YU)   |
| 21 | G3HBW, G5YV (DL, EI, F, G, GC, GD, GI, GM, GW, HB, HG, LA, LX, OE, OH, OK, ON, OZ, PA, SM, SP)   |
| 19 | G3CCH  |
| 18 | G6NB, ON4BZ, OK2WCG  |
| 16 | G3BA, G3BLP, G3CO, G3GHO, G3KEQ, G5MA, G6RH, G6XM, PA0FB   |
| 15 | G2CIW, G2XV, G3AYC, G3DKF, G3FZL, G3RMB, G4MW, GM3EGW  |
| 14 | G2FJR, G2HDZ, G3AQX, G3FAN, G3HAZ, G3HRH, G3IOO, G3JWQ, G3KPT, G3PBV, G3WS, G5BD, G5DS, G6LI, G8OU   |
| 13 | G2HIF, G2HOP, G3AOS, G3DMU, G3DVK, G3EHY, G3GPT, G3IIT, G3NNG, G3NUE, G3OHD, G4LU, G6XX, G8VZ  |
| 12 | EI2A, EI2W, F8MX, G2BJY, G2CDX, G3BNC, G3GFD, G3GHI, G3GWL, G3JAM, G3JLA, G3JXN, G3LAS, G3OBD, G3WW, G5CP, G5JU, G5ML, G8RA, GW2HIY                |
| 11 | G2AJ, G2CZS, G3ABA, G3BDQ, G3BOC, G3GSO, G3IUD, G3JYP, G3JZN, G3KUH, G3LHA, G4RO, G4SA, G5UD, G6XA, GC2FZC, OK1VR, PA0VDZ                          |
| 10 | G2AHP, G2AXI, G2FQP, G3BK, G3DLU, G3GSE, G3JHM/A, G3KQF, G3LAR, G3LRP, G3LTN, G3MED, G3OSA, G3OXD/A, G5MR, G5TN, G5UM, G8IC, GW3ATM, GW3MIF, GW5MQ |
| 9  | G2BHN, G2DHV, G2DVD, G2FCL, G3BOC, G3BY, G3FIJ, G3FUR, G3OJY, G3PSL, G3PTM, G4LX, G8GP, GC3EBK, G1ONF, GM3DIQ                                      |
| 8  | G2BDX, G2DDD, G2XC, G3AEP, G3AGS, G3AHB, G3CCA, G3EKX, G3GBO, G3HCU, G3HWJ, G3KHA, G3PKT, G3MPS, G3VM, G5BM, G5BY, G8SB, GM3JFG, GM3LDU            |

cycle shift for mark. The aerial is a ground-plane and the Tx output is 40 watts. It is not at all impossible that this signal (which is there 24 hours a day) could be heard in the U.K. The project, which is strictly amateur in concept, has been laid on for propagation research under the prevailing quiet-sun conditions. We would be very glad to have any reports on the reception of ZE1AZC for mention in this space and passing on to the right quarter, from which they will be

acknowledged.

Regarding *Oscar III*, the latest information, dated May 8 and via W6ASH/SM5CCE, was to the effect that "normal progress is being made on construction"—which could mean anything.

### Reports and Gossip

Writing in after a long absence, G3KWH (Welwyn Garden City) says that in his two years on the 2m. band he has worked 214S in 29C, recent improvements to the rig being a nuvistor pre-amp. and a slot-fed 4/4. On the evening of May 17 (Whit Sunday) stations in Yorkshire were coming in well at G3KWH.

G3SML (Earl Shilton, Leics.) who has been making steady progress in the Annual, was among those who gained GW3RUF/P. Snowdon, for Caernarvonshire. The beam at G3SML is now a

7-ele Yagi at 40ft., giving much improved results. G3NLR (Wilmslow, Ches.) is a newcomer to these pages, and checks in with 37C for the All-Time. (There is now a considerable back-log of amendments for that Table, which will be shown just as soon as an extra page of space looks like being available.)

For G3SAR (Sevenoaks) the Whitsun spell produced some good GDX, including G2BHW and G3OCB for Cornwall; he says Devon would have been workable had anyone in that county been on. G3SAR also had GW3RUP/P and mentions that their signal was good and steady all over the week-end May 2/3. G3AHH (Slough) is now at 44C in the Annual, and G3HWR makes a first two-metre claim for their club station G5FK (G.E.C., Wembley).

G5FK is also getting going on 70 cm., for which the Rx side is settled and, with a 16-ele stack available, it only remains to finish off the Tx, which will have a DET-24 in the PA, running 20w. The group is also regularly active on 4m., under G5FK, the Tx being a 50-watt job with a 6146 PA.

From Belfast, G13HXV, also on four metres, reports a new station and county worked in the shape of GM3GDU, putting him to 16C in the 4m. all-time. It seems that several of the G1's intend to use 70 mc for /P, /M working, and they plan to make it a common frequency, 70-26 mc.

G8VN (Leicester) is already /M on 4m., and reports some interesting tests with G3BNL—in spite of opposite polarisation they were able to maintain contact with good signals at up to 15 miles. In his two-metre report, G8VN lists 16 stations worked and another dozen heard during the first three weeks of May, in spite of not having been able to spend much time on the band himself. And G8VN/M would be pleased to have 4-metre reports from any quarter.

Yet another 4-metre claim—from G3OHH (Macclesfield) who was very glad to work G3OUF (London) on 70 mc, for a new

county and a bit of GDX. During the early part of May, G3OHH worked nearly a dozen different stations on four metres.

G3DVQ (Purley) claims for the Annual, as does G3LAS (Berkhamsted). G3GWL (Bletchley) says "not much to report due to holidays" though he was getting good signals from GW2HIY in Anglesey and GW3OXO in Brecon on Whit Sunday evening. For G3IOE (West Denton, Newcastle) it has been hard going during the last couple of months—though the sked with G3BA still gives, and G5MA has been added to the programme; so far, QSO's have been 100 per cent, in spite of the distance. G3IOE is still trying for GM3GZA and—in referring to some remarks in this space recently about the Air Ministry guard frequencies in the two-metre band—G3IOE says he has heard them being used quite frequently, in particular 144-36 mc. Locally, G2FO is a potent signal, doing well on CW. G3LHA (Coventry) comments on the really rock-bottom state of the two-metre band during the /P contest in May—though G3LHA/P did work 93 stations in the contest from a site in Northamptonshire. He has /M in the caravan and during a recent holiday in the Bournemouth area was able to meet some of the locals; he also worked G3OCB in Cornwall and remarks that the VHF activity in the vicinity of Southampton is excellent. Progress is being made on 23 cm. by the Coventry group, where they now have G3KEF, G3RYB/T and G3NBQ with 2C39 transmitters tripling from 430 mc, and G3NBQ and G3RYB/T possess converters that work. Regular contacts are being made with G2CIW, G3KFD and G3KPT, in the neighbourhood of Birmingham.

### To Conclude—

Deadline for the next issue is **Friday, June 19**, for which your A.J.D. looks forward to a heavy mail. Send it all to: A. J. Devon, "VHF Bands," *Short Wave Magazine*, 55 Victoria Street, London. S.W.1. So, till July 3, when we meet again, *73 de A.J.D.*

### FOUR METRES

#### ALL-TIME COUNTIES WORKED LIST

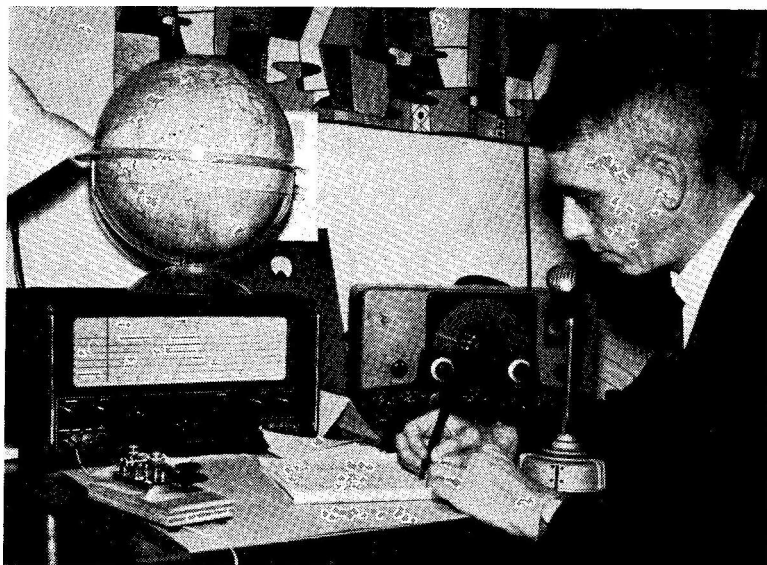
Starting Figure, 8  
From Home QTH Only.

| Worked | Station                     |
|--------|-----------------------------|
| 41     | G3EHY                       |
| 37     | G3IUD, G3OHH, G3PJK         |
| 34     | EI2W                        |
| 33     | G5JU                        |
| 30     | G2OI, G3JHM/A               |
| 29     | G3NUE                       |
| 26     | G3PMJ, G5FK                 |
| 21     | G3AYT                       |
| 20     | G3LZN                       |
| 19     | G3BNL                       |
| 16     | G3BJR, G3FDW, G3OWA, G13HXV |
| 14     | G3OKJ                       |
| 12     | G2AXI, G3LQR, G5DS          |
| 11     | G3HWR, G3SNA                |
| 10     | G2BDX                       |
| 8      | G3PRQ                       |

*This Table records Counties Worked on Four Metres, on an all-time basis. Claims can be made as for the other Tables, e.g. a list of counties with the stations worked for them, added to from time to time as more counties accrue. QSL cards or other confirmations are not required.*

# THE OTHER MAN'S STATION

**ZE3JJ**



ONE of the problems at ZE3JJ — owned and operated by Ivan Wood near Salisbury, Southern Rhodesia (c/o E.S.C., P.O. Box 377) — is that of raising his antennæ above the tree-line of a pine-plantation, this having been established by himself, with his house built in the thick of it.

Though for many years home-built equipment was used, the gear consists now of a Viking Ranger running about 50 watts, and the receiver is an Eddystone 888—much modified, as described in the March '64 issue of *SHORT WAVE MAGAZINE*.

At the moment, his aerials include a two-element rotary for 10 and 15 metres, and what is described as a "vertical structure" for the 7 and 14 mc bands, this being fed with open-wire line.

Operating activity is mainly CW on the DX bands and it will be remembered that, in partnership with ZE3JO, DX-peditions have been made to several countries of the African Continent, in-

cluding VQ1, VQ2, ZD6, ZS8 and ZS9. Ivan remarks that, being a bachelor, he has "so far obviated one possible source of QRM"! Before going out to Southern Rhodesia, in 1949, he was G3CHP, a callsign which has not been re-issued.

*Editorial Note:* Readers in any part of the world operating active amateur stations are invited to contribute to this feature, which appears monthly. A good, clear print should be accompanied by adequate descriptive notes, together with such personal details as are agreed for publication — such as age, whether married, occupation, and personal history in the radio amateur context. We write the story from the information given, and payment is made at the usual space-rate for all material used.

## UHF SIGNAL PRE-AMPLIFIERS

Belling-Lee now offer a broad-band (88 mc) single transistor pre-amp. powered by a 12v. DC supply fed along the coax cable to the aerial, with the output signal carried on the same cable. A higher gain two-transistor amplifier is also available (primarily for community TV distribution systems) run from a 7½v. DC supply fed along the line. Both these pre-amps. have a very low noise level, negligible power consumption, are weather-proofed and supplied with a clamp for mast-head fitting, though, in many cases, they can be used at the Rx input instead of up the mast. The idea is, of course, to boost the TV signal into the receiver in areas of low or variable signal level. In most cases, they give a startling improvement in picture reception.

## BAD LUCK—BUT IT OFTEN HAPPENS!

"Practically every time I see, in the small adverts., a transmitter, receiver or something else of interest to me, and even when I get to my news-agent at 7.0 a.m. on the Friday when the *Magazine* is first available to us here, and then contact or call on the seller the same day, I am always informed that the item has already been sold." So writes G2ANB, Hockley, Essex. While one can sympathise with him and the many others to which the same sort of thing happens, it shows that any attractive item offered at a fair price through Readers' Small Advertisement in *SHORT WAVE MAGAZINE* is assured of quick disposal. And for those interested in good gear, there is another very fine spread offered on pp.247-256 of this issue.

# NEW QTH's

This space is available for the publication of the addresses of all holders of new U.K. call signs, 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.

- G3HAA**, J. R. Morgan, 85 Ashlea Road, Pensby, Wirral, Cheshire. (*Re-issue*).
- G3HTT**, W. T. Cheeseworth, 6 Brendon Road, Bridgwater, Somerset. (*Re-issue*).
- G3HTT/A**, W. T. Cheeseworth, 65 (Bridgwater) Sqdn. A.T.C., T.A. Centre, New Road, Bridgwater, Somerset.
- G3JAP**, E. J. Andrews (*ex-VU2EA*), The Firs, Dickley Lane, Lenham, Maidstone, Kent. (*Re-issue*).
- G3MKX/A**, Amateur Radio Club, Garendon Secondary School, Thorpe Hill, Loughborough, Leics.
- G3SRW**, G. McGimpsey, 114 Hillfield Avenue, Hornsey, London, N.8.
- G3STT**, W. Haynes, 37 Hawthorne Grove, Meols Cop, Southport, Lancs.
- G3SUM**, J. Gould, 5 Sunningdale Park, Bangor, Co. Down.
- G3SVM**, A. N. Wales, 6 Carrington Road, High Wycombe, Bucks. (*Tel. High Wycombe 2188*).
- G3SVZ**, P. Laxton, 3C Cornwall Street, Devonport, Plymouth, Devon.
- GW3SWQ**, A. Hemming, Glyn Borthyn, Crugybar, Llanwrda, Carm. s.
- G3SWR**, J. J. Loudon, 155 Southfield Road, Middlesbrough, Yorkshire.
- G3SYS**, D. T. Emerson, 50 Hurst Road, Hassocks, Sussex. (*Tel. Hassocks 3857*).
- G3SYT**, L. Lawler, 135 Chadwick Road, London, S.E.15.
- G3SYV**, N. Q. Leworthy, 28 Chudleigh Road, Lipson Vale, Plymouth, Devon.
- G3SZG**, J. I. Wright, 1 The Avenue, Laleham, Staines, Middlesex.
- G3SZU**, K. Radford, 6 Pickard Street, Ravensdale, Mansfield, Notts.
- G3SZV**, B. C. Ward, 79 Norwood Road, Southport, Lancs.
- G3SZY**, G. J. Douglas, 8 Beechwood Road, Camp Hill Estate, Nuneaton, Warks.
- G3SZZ**, A. R. Clarke, 33 Church Walk, Old Brinsley, Notts.
- G3TAD**, Bristol Amateur Radio Club, c/o 43 Ducie Road, Barton Hill, Bristol.
- G3TAE**, K. P. Galligan, 10 Manor Road, Sundridge, Sevenoaks, Kent.
- G3TAF**, D. A. Cassere, 9 Southlands, Town Street, Horsforth, Nr. Leeds, Yorkshire.
- G3TAH**, E. Marsters, 75 Evans Way, Sawston, Cambs.
- G3TAR**, R. E. Roberts, 34 Stanley Street, Bloxwich, Walsall, Staffs.
- G3TAS**, W. Smith, 45 Trinity Walk, Stowupland, Stowmarket, Suffolk.
- G3TAU/T**, I. A. Chapman, 2 Fornals Green Lane, Meols, Hoylake, Wirral, Cheshire. (*Tel. Hoylake 2049*).
- G3TAW**, C. Wood, 22 Habberley Road, Kidderminster, Worcs. (*Tel. Kidderminster 5628*).
- G3TAX**, J. C. Boydell, 3 North Grove Drive, Leeds 8, Yorkshire.
- G3TAZ**, R. Davies, 14 Manston Road, Sheldon, Birmingham, 26.
- G3TBG**, G. Goulbourn, 8 Moss Lane, Prenton, Birkenhead, Cheshire.
- G3TBH**, F. M. Gray, 32 Portobello, Rugeley, Staffs.
- G3TBU**, F. J. Gibbons, 12 Steeple Close, Cleobury Mortimer, Nr. Kidderminster, Worcs.
- G3TCA**, M. J. C. Burns, 21 Tewkesbury Drive, Sedgley Park, Prestwich, Manchester. (*Tel. PRE 3358*).
- G3TCB**, Amateur Radio Club, Brighton Technical College, Richmond Terrace, Brighton 7, Sussex.
- G3TCC**, K. Wooff, 31 Holme Lacey Road, Lee, London, S.E.12.
- G3TCF**, M. A. Reece, 68 Roydene Crescent, Anstey Lane, Leicester.
- G3TCG**, M. A. Trundle, 7 Gaynes Park Road, Upminster, Essex. (*Tel. Upminster 2851*).
- G3TCH**, R. Harrod, o/b/o Heanor and District Radio Society, Heanor Technical College, Ilkeston Road, Heanor, Derbyshire.
- G3TCJ**, J. Barlow, The Pippins, Lake Lane, Liskeard, Cornwall.
- G3TCU**, P. Guttridge, 16 Sheepfold Road, Guildford, Surrey.
- G3TDA**, B. C. Herring, 25 The Causeway, Horsham, Sussex. (*Tel. Horsham 4743*).

## CHANGE OF ADDRESS

- G3CQE**, W. M. Brennan, Sea Kiwi, Tower Hill, Williton, Somerset.
- G3EPU**, K. M. Bailey, 32 Strathearn Road, Wimbledon, London, S.W.19.
- G3FRO**, M. H. Hudson, 35 Greenside Road, Erdington, Birmingham, 24. (*Tel. Erdington 1356*).
- G3HOH**, F. J. Longman, 53 Dunstall Road, Barton-le-Cley, Beds.
- G3KFV**, P. Davis, 1 Cross, Ilminster, Somerset. (*Tel. Ilminster 2756*).
- G3LBJ**, T. J. Stacey, 11 Hill Road, Watchfield, Shrivenham, Nr. Swindon, Wilts.
- G3LEI**, D. E. Mills, 13 Primrose Terrace, Gravesend, Kent.
- GM3MXN**, T. Sorbie, Bellfield Cottage, 49 Muir Street, Larkhall, Lanarks.
- G3PDS**, W. R. Lawrence, 9 Dunslade Road, Perry Common, Birmingham.
- G3RB**, K. N. Smith, 15 Malcolm Court, Earsdon Road, West Monkseaton, Whitley Bay, Northumberland.
- GM3RHK**, C. W. Forret, 1 Bellevue Park, Lerwick, Shetland.
- G3RIO**, J. E. Wade, Green Oaks, 28 Belvedere Street, Ryde, Isle of Wight.

## AMENDMENTS

- G3POQ**, P. D. Hayes, Coppers, 78 Hawthylands Road, Hailsham, Sussex. (*Correction May*).
- G3SWC**, B. Tinton, Pineclose, 10 Glynville Road, Colehill, Wimborne, Dorset. (*Correction May*).

# THE MONTH WITH THE CLUBS

By "*Club Secretary*"

(Deadline for July Issue: June 12)

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

THE short preamble below is a quotation from W3HQO's editorial in the Monthly Bulletin of the "Ex-G Radio Club," that association of radio amateurs born in the U.K. and now domiciled abroad. It is interesting and makes sound sense.

"Just what does one look for in joining a club or society? Is it because of prestige, to become 'one of the lads'? To participate in politics, to play golf in peace and quiet, a place to take the family and friends for meals and get away from it all? A rendezvous to meet the boys for a game of billiards or snooker? What *do* we look for when joining? There has to be a reason. Usually the cost is high and the only thing free is the water.

"A radio club or society is vastly different in what it offers. Most have meeting-places and base the fundamental requirements for membership on friendly get-togethers, hamfests and technical discussions. Usually a monthly news-letter is published, and is available to all members. The club, more often than not, is headed by several dedicated hams who shoulder all the work and headaches, and ask in return just a good showing at the meetings—to show some appreciation and encouragement."

W3HQO goes on to mention the seamy side, sometimes caused by a few individuals who feel that the organisation belongs to them and should accommodate them to the exclusion of all other members. They offer nothing to forward the progress of the group, but appear on the side-lines demanding to know what they get out of it.

Fortunately, such individuals are pretty rare in

this country, and club members of the decent type, who are in the vast majority, should know how to deal, gently but firmly, with the occasional black sheep.

## ACTIVITY REPORTS

At **Wolverhampton** (April/May Newsletter) they will be running Morse practice and R.A.E. instruction on June 8, and an Inter-Club Quiz on May 15—both 8 p.m. at the Hq., Neachells Cottage, Stockwell Road, Tettenhall.

The monthly meeting at **Barnet** takes the form of a Junk Sale on June 30. **Derby** will have a D/F Practice Run on June 17, and the Qualifying Event on June 28. On the 24th there is an Open Evening and Juniors' Discussion Night. July 1 is booked for a Surplus Sale.

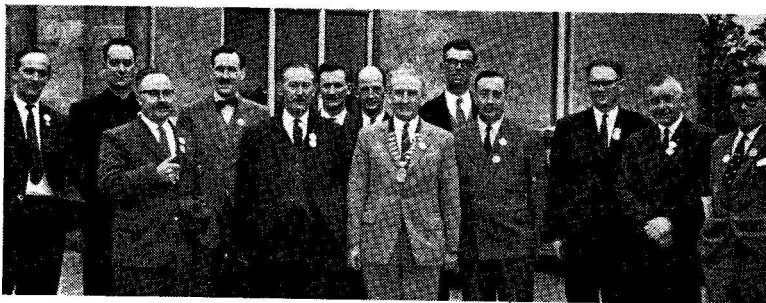
A newcomer to these columns is **Heanor** (Notts.), who meet in the Technical College, Ilkeston Road, every Tuesday. On June 9 they have a Surplus Sale; on the 16th a visit to the TV Transmitter at Hints, near Tamworth; on the 23rd, Films, and on the 30th a Tape Lecture. All meetings at 7.30 p.m.

**Ipswich** have decided to carry on during the summer, meeting at the Ipswich Civic College at 7.30 on the last Wednesday of the month. To quote their letter: "Lectures have been arranged with the 'common herd' in view, and are guaranteed not to baffle with science."

A move to new headquarters is notified by **South Yorkshire**, who will in future be meeting at the Stag Hotel, Dockin Hill, Doncaster, every Thursday at 7.30 p.m. **Spenn Valley** will hold their Open and Final Meeting on June 11, and the AGM on the 25th.

**Stevenage** have now brought out a newsletter—*The Stevenage Beam*—with a useful large-scale map of the town, showing the headquarters, on the front cover. They report an encouraging number of SWL's among the membership. At a recent meeting, G3RFG gave a talk on "The Development of Radio since 1922," and exhibited an old Marconi spark outfit, combining receiver and transmitter—a real relic of the past.

**South London Mobile Club** meet at Clapham Manor Baths,



Some of the distinguished visitors at the first EI/GI convention, held on April 18, at Dundalk, practically on the border between the two countries. The affair was a great success, with a dinner attendance of over 200, including leading personalities from the commercial field. Here we see, at centre, EI6A, the president of I.R.T.S., with (in the back row, bow tie) Mr. J. D. McEwan, the BBC's chief engineer in GI, with G13GAL second from right and G13IWD third from left.

Courtesy "*Coleraine Chronicle*"

S.W.4, on alternate Saturdays; May meetings included a Film Show by G3EPU, and a talk on Two Metres by Green and Davis Ltd.

The June meeting of **Midland**, on the 16th, will be held in the Concert Room of the Midland Institute, when Mr. H. V. Sims, of the BBC, will give a lecture-demonstration on Aerials—a subject which ought to produce a full house.

**Magnus Grammar School** is putting the emphasis on outdoor activities during the summer. They take part in NFD for the first time, and are also organising D/F instruction and events. The school station, G3PAW, is on the air most lunch-times, looking especially for contacts with other school societies on 80 metres.

**Civil Service** will hold one of their informal meetings at the Science Museum on June 15, and will run the tape lecture on Mobile Operations, made by the late G8TL. **Midland Radio Contact Club** (MRCC) will have no June meeting, but July 8, G2RO will be giving them an account of his recent experiences in the Middle East.

**Cray Valley** announce a change of secretary, G3KYV having taken over from G3JJC (who now becomes chairman) after a long and much-appreciated run. They hope to arrange a Sunday trip to Boulogne or Ostend during the summer, probably including a

meeting with a continental club—a very good idea, this. Two more members are now on "full status" with the calls G3TAA and G3TCC.

On June 10, **Northern Heights** will pay their annual visit to the Manchester Radio Society, and on the 17th will visit Moorside Edge BBC station. The 24th will see them at the Wharfedale works in Bradford, and July 1 at the Bradford Fire Brigade Hq. Apart from all these visits, they will be operating G3OMM/A from the Halifax Charity Gala (June 6), and from the Forest Cottage Gala (June 27).

**Plymouth** (QUA, May) held their AGM and elected G5ZT president, G3BRJ and G3WL vice-presidents, G3SGV chairman and G3SCW secretary. Both membership and enthusiasm have increased, and their financial side is sound after the purchase of both Tx and Rx gear for the club station. A special point will be made, this summer, of contacting visiting mobile amateurs.

**Acton, Brentford & Chiswick** will be holding an NFD Inquest on June 9, at the AEU Club, 66 High Street, Chiswick. **Enfield** ask us to note a change of secretary—see panel for new QTH.

**Reigate** (Feedback, April) have found their change of meeting-place a popular move. At the recent Film Show much assistance was received from the chairman and another member of the North Downs Cine

#### Names and Addresses of Club Secretaries reporting in this issue :

ABERDEEN: J. McCall, GM3HGA, 1 Pinewood Place, Aberdeen.  
 ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, W.3.  
 A.E.R.E. (Harwell): C. Sharpe, G2HIF, Building 347B, A.E.R.E., Harwell, Berks.  
 A.R.M.S.: N. A. S. Fitch, G3FPK, 79 Murchison Road, London, E.10.  
 BARNET: F. Green, G3GMY, 48 Borough Way, Potters Bar.  
 BRISTOL: E. J. Davis, G3SKY, 72 North View, Westbury Park, Bristol 6.  
 BURSLEM: W. Luscott, 36 Rothsay Avenue, Sneyd Green, Hanley-on-Trent.  
 CAMBRIDGE: S. Clarke, 47 Hurst Park Avenue, Cambridge.  
 CHESTER: R. Trickey, G3DRB, 31 Penzby Avenue, Chester.  
 CIVIL SERVICE: G. Lloyd-Dalton, 2 Honister Heights, Purley.  
 CRAWLEY: R. G. B. Vaughan, G3FRV, 9 Hawkins Road, Tilgate, Crawley.  
 CRAY VALLEY: S. W. H. Harrison, G3KYV, 30 Plaistow Grove, Bromley.  
 CRYSTAL PALACE: G. M. C. Stone, G3FZL, 10 Liphook Crescent, London, S.E.23.  
 DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby.  
 DURHAM: E. Watson, G3SHE, 5 Park House Road, Neville's Cross, Durham City.  
 EAST WORCS.: M. J. Nicholas, 12 Crabtree Close, Lodge Park Estate, Redditch.  
 ENFIELD: J. R. Gazeley, 192 Hazelbury Road, London, N 9.  
 GRAFTON: A. E. Bristow, 37 Tyndale Mansions, Upper Street, London, N.1.  
 HALIFAX: J. Ingham, G3RMQ, Lambert House, Greetland, Halifax.  
 HEANOR: R. Harrod, G3RWN, 36 Lodge Road, Newthorpe, Notts.  
 HOUNSLOW: D. F. J. Walmsley, G3HZL, 153 Worple Road, Isleworth.  
 IPSWICH: R. J. Wells, 43 Clench Road, Holbrook, Ipswich.  
 LOTHIAN: L. R. Richardson, GM3AKM, 39 Silverknowes Grove, Edinburgh 4.  
 LOUGHTON: A. W. Sheppard, G3JBS, 11 Barfields, Loughton.  
 MAGNUS GRAMMAR SCHOOL: J. E. Baxter, 79 Newton Street, Newark.  
 MEDWAY: P. J. Pickering, G3ORP, 101 Chatham Road, Maidstone.  
 MIDLAND: C. J. Haycock, G3JDI, 360 Portland Road, Birmingham 17.  
 M.R.C.C.: J. Lockyer, G3OVA, 233 Beechwood Road, Birmingham 14.

NORFOLK: A. W. Preece, G3TCO, School of Biological Sciences, Wilberforce Road, Norwich, NOR.54.H  
 NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax.  
 NORTH KENT: B. J. Reynolds, G3ONR, 49 Station Road, Crayford.  
 PETERBOROUGH: D. Byrne, G3KPO, Jersey House, Eye, Peterborough.  
 PLYMOUTH: R. Hooper, G3SCW, 2 Chestnut Road, Peverell, Plymouth.  
 R.A.I.B.C.: Mrs. F. E. Woolley, G3LWY, 10 Sturton Road, Saxilby, Lincoln.  
 REIGATE: F. D. Thom, G3NKT, 12 Willow Road, Redhill.  
 RODING BOYS: R. J. Phipps, 51 James Lane, Leytonstone, London, E.11.  
 SCARBOROUGH: P. Briscoombe, G8KU, Roseacre, Irton, Scarborough.  
 SOUTH BIRMINGHAM: A. E. Bishop, 40 Cecil Road, Birmingham, 29.  
 SOUTHGATE: Q. Wilkinson, 33 Amberley Road, London, N.13.  
 SOUTHAMPTON: C. Asher, G3IBJ, 81 Green Lane, Maybush, Southampton.  
 SOUTH HANTS: G. J. Meikle, G3NIM, 34 Victoria Road, Netley Abbey.  
 SOUTH LONDON MOBILE: B. Negri, G3LXN, 17 Voltaire Road, London, S.W.4.  
 SOUTH YORKS: J. M. Heath, 235 Thorne Road, Wheatley Hills, Doncaster.  
 SPEN VALLEY: N. Pride, 100 Raikes Lane, Birstall, Leeds.  
 STEVENAGE: G. R. Henderson, G3RTJ, 76 Austen Paths, Stevenage.  
 STOKE-ON-TRENT: K. H. Parkes, G3EHM, 28 Grove Road, Heron Cross, Stoke-on-Trent.  
 SURREY (CROYDON): S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.  
 TORBAY: Mrs. G. Western, G3NQD, 118 Salisbury Avenue, Barton, Torquay.  
 W.A.M.R.A.C.: Rev. A. Shepherd, G3NGF, 121 Main Street, Asfordby, Melton Mowbray.  
 WEST KENT: H. F. Richards, 17 Reynolds Lane, Tunbridge Wells.  
 WIMBLEDON: E. N. Hurlie, G3RZN, 156 Monkleigh Road, Morden, Surrey.  
 WIRRAL: A. Seed, G3FOO, 31 Withert Avenue, Bebington, Wirral.  
 WOLVERHAMPTON: J. Rickwood, G3JJR, 852 Stafford Road, Fordhouses, Wolverhampton.  
 WORCESTER: G. W. Tibbets, G3NUE, 108 Old Hills, Callow End, Worcester.

Society, and ideas on club organisation were also exchanged. G3TDT is a new call within the club, and three members await R.A.E. results. Next meeting—June 20 at the George and Dragon, 7.30 p.m.

**Medway** (*MARTS Newsletter*, May) are now back in the re-decorated clubroom at Nelson Road, Gillingham, and meet on alternate Mondays at 8 p.m. (Next meeting after publication, June 15.) **Peterborough** had a talk, with slides, on Fifty Years of Radio (G2CVV) on May 1; summer meetings will be held at intervals at the Riverside Site at Alwalton on Sunday afternoons. Free punting and boating—oars provided! And they are also involved with the Hunstanton Mobile Rally and Bucket-and-spade Party, on June 14, when Amateur TV will be one of the attractions.

The club formed at **Durham** in January has been very successful, with attendances up to 30. Lectures have covered many subjects, a Junk Sale produced a load of gear, and various contests have been arranged. The first AGM will be on June 18; normal meetings are on alternate Thursdays, 7.30 at the Bridge Hotel, North Road, where new members and visitors are always welcome.

**Chester** will meet on June 9 (NFD Inquest); June 16 (Recorded Lecture); June 23 (Receiver Alignment, by P. White) and June 30 (Surplus Equipment Sale). **Surrey (Croydon)** recently held their AGM and elected G8TB chairman, G3GHI vice-chairman and G3FWR secretary. They had an interesting visit to the observatory of Mr. Frank Hyde, the well-known radio astronomer, near Clacton. The annual Treasure Hunt will take place on June 24.

Weekly meetings continue at **Scarborough**, usually with an attendance of around 30. On June 11 there will be the usual NFD *post-mortem*; on the 18th, a talk by G8KU on preselectors; and on the 25th a talk on Amateur Radio in Austria.

**Stoke-on-Trent** have had their AGM and elected G3DML president, G3UD chairman and G3EHM secretary. They meet every Thursday, 8 p.m. at the rear of the Cottage Inn, Oakhill. Future events include a visit to an ITA station and a lecture-demonstration on the KW-2000 transceiver, by G3DML.

A traditional event for **Grafton** is the annual field day at Parliament Hill Fields. This year it will be held on June 14, and Paddington have been invited to join them, so that the combined exercise can keep two stations in operation. Visitors have to park their vehicles and proceed on foot to the site (LCC regulations), but detailed maps are available from the secretary on receipt of an S.A.E.

**Loughton** will meet on June 19 to make arrange-



For the Chester & District Amateur Radio Society's annual construction competition, entries ranged from a 50-watt audio amplifier, through HF and VHF converters and a two-metre transmitter, to an electronic organ. Here we have, left to right: SWL A. Warne (1st and 3rd junior prizes); SWL D. Grieg (2nd junior); G3EWZ (2nd senior); and G3JAZ (1st senior). On the extreme right is G2FOS, who was this year's judge.

ments for their GB3LOU installation, to be operated on all bands during Debden Fair Week, July 11-18. Other features will include a display of members' equipment and the wired TV installation of G3MJZ/T. On July 18 the club's first Mobile Rally will be held (*N.G.R.* TQ.438965) with talk-in on Top Band and Two.

**Torbay** ask us to state that their monthly meetings will in future take place on the last Saturday of the month. **Southgate** meet for a talk and demonstration of Amateur TV (by the BATC) on June 11. The 25th will be one of their "second meetings"—informal and including slow Morse and SWL items.

The monthly meetings at **Wimbledon** have included a Constructional Contest (won by G6QN) and a Decca lecture and film show. Both were well attended. Next meeting is on June 12 at the Community Centre, 28 St. George's Road, S.W.19, when G3JJG will give a talk on SSB.

**West Kent** have their annual Competition Night on June 12, during which the constructional contest results will be made known. On the 26th there will be a tape-recorded lecture on Aerials, and on July 5 a visit to a Decca Navigator transmitting station.

**Worcester** (*Newsletter* No. 8) are putting on exhibition stations at two local shows—the Archdales Sports Club Gala on June 6, and the St. John's, Worcester, "A" Boy Scout Group Fête on the 20th. Their Constructional Contest was very successful and brought them good publicity in the local paper.

A record number of 46 turned up at **Crawley** for the Stereo Reproduction demonstration by G3FZL and G3IIR. Their June meeting will be the customary Members' Evening. VHF interest is strong, and a

good number of club members are operating on 4 metres.

**Norfolk** have now settled down in their new QTH at 140 Oak Street, Norwich, and membership includes 18 licensed amateurs and several "fighting for their tickets." The club station G3PXT runs a well-supported net on Sundays, mid-day on 1980 kc. Forthcoming—a visit to Anglia TV and to the G.P.O. sorting office in Norwich. G3RQY is now president and G3TCO secretary (*see* panel for QTH).

The report on **Hounslow**, at their recent AGM, showed that activity has grown but membership has remained static—a growth in the coming year is hoped for. The club now holds the call G3TDD, which will be duly activated shortly. On June 15 there will be a Certificate and QSL Exhibition, and on the 29th a Get-Together with Greenford.

**Halifax** had an interesting talk by G3LHQ on "First Impressions of Two Metres," and hope to be better represented on that band before long. On June 30, G3OGV will be talking to them on Mobile Transceivers. Meeting place, The Beehive and Cross-keys, 7 p.m. onwards.

Two interesting talks at **Burslem** have been "Getting Started on Two Metres" (G3LLJ), and "19-Set Modifications" (G3AQW). They supported Stoke-on-Trent at the Trentham Gardens Mobile Rally, by providing two Top-Band stations. Club members are very active on Top Band most evenings. The club will shortly be moving to new headquarters at the Moorland Junior High School, Burslem.

**Aberdeen** have four meetings in June; the first two are concerned with NFD (before and after), on June 5 and 12; then on the 19th there is a Junk Sale, and on the 26th "Technical Tit-Bits." All at 6 Blenheim Lane, Aberdeen.

**Bristol** (now G3TAD) meets every Monday and Thursday, with Morse practice encouraged now that the R.A.E. tension is over. They hope to have the station on the air by late June. On the 8th there will be a lecture (no subject announced) and on the 22nd a VHF discussion.

**Derby** (*Newsletter* No. 2) have a large membership, a full programme and are in a very strong financial position (with over £250 in the bank). Membership stands at 128, including 53 licensed amateurs. On June 10 they will have a two-hour Film Show; on the 17th the third D/F Practice Event; on the 24th a Juniors' Discussion Night; and on July 1 a Junk Sale. Visitors always welcome, at Room No. 4, 119 Green Lane, Derby.

The recent mobile outing at **Wirral** was very successful—the mobile prize was won by G3HAC and the D/F section by G3EGX. Next meeting, June 17 (Junior Section and NFD Inquest).

**East Worcs.** will be meeting on June 11, also for an NFD Inquest, at the Old People's Centre, Redditch.

Over at **Cambridge**, they have a pretty full programme for the next couple of months—from this we pick out their visit to the Luton A.R.C. on June 16,



Group picture taken at the EI/GI convention at Dundalk, where there was a large gathering from all parts of Ireland, with several visitors from over the water, on April 18: Left to right, EI5Q, G13GPG, G13GRY, G3IIR, G14RY, G12DHB and G13KDS. The event is reported as having been an unqualified success. *Courtesy "Coleraine Chronicle"*

for a quiz contest, with two good prizes offered, and a picnic rally at Houghton Mill, Hunts., on June 21, in which they will be joined by other Clubs—all they need for a good day out is fine Wx.

The very active **Roding Boys** group held a fund-raising sale recently, and plan a field-day and camp (for which a tent is to be purchased). They have got their Tx, signing G3SRE, on the air but we gather there are a few teething troubles yet to be overcome; anyway, they have been in QSO, which is the main thing. The lecture series covers the subjects of Semiconductors and Maths. in Radio.

At **Crystal Palace**, they continue as usual with a good programme of activities, and also publish a very useful single-sheet newsletter, which covers all the Club's current goings-on in a very readable fashion.

**A.E.R.E. (Harwell)** also publish a regular newsletter, often containing very useful and interesting technical information, as well as activity reports. But G2HIF, its editor, who also writes most of it (very well, too) makes it clear that he could do with a lot more support from members in keeping *QAV* going—this is a not uncommon complaint by those responsible for the production of local club bulletins.

The **South Birmingham** group report another SWL success, G3TDL having acquired his ticket. A couple of exhibition stations are being planned for the August period, and more recently an inter-Club contest was held with Sutton Coldfield, reported as being very successful. The next meeting is on June 18, and will include the showing of three of Mullard's excellent technical films.

On each second Saturday of the month, the **Southampton Group** meets in the Engineering Lecture Theatre, The University, promptly at 7.0 p.m. and visitors are welcomed at these meetings. The Group will again be in action in connection with the Southampton Show—the big local event over July 10-11—with an exhibition station operating on all bands from 160m. to two metres, including talk-in on Top Band and 2m. All on-the-air activities will be under the Club's own call sign G3SOU.

---

*Regular readers of "Short Wave Magazine" are in touch with all the latest trends, developments and ideas in Amateur Radio*

---



Apart from those mentioned in the text, Club publications have been received from the following: **WAMRAC** (*Circular Letter* No. 42); **Wirral** (*Newsletter* Vol. 17, No. 4); **RAIBC** (*Radial*, May); **South Hants.** (*QUA*, May); **Southgate** (*Newsletter*, May); **North Kent** (*Newsletter*, May); **Loughton** (*Newsletter*, May); **ARMS** (*Mobile News*, April); **Radio Society of East Africa** (*QTC*, Jan./March); **South African Relay League** (*Radio ZS*, January); and **Swiss Union of Short Wave Amateurs** (*Old Man*, May).

### OLD TIMERS CELEBRATE

**T**HE Sixth Reunion of RAOTA (Radio Amateur Old Timers' Association), which was also the Eighth Old Timers' Dinner, was held at the Horse Shoe Hotel on May 8, and attended by some 80 amateurs who could claim to have been licensed for 25 years or more. The total number of years of Amateur Radio represented, in fact, amounted to well over 2,500.

The Guest of Honour was Lord Fraser of Lonsdale, C.H., C.B.E., who, as Capt. Ian Fraser, signed 5SU from 1920 onwards. In the chair was Kenneth Alford, G2DX, who was TXK in 1912, and also at the top table were Hugh Pocock (Editor of *Wireless World* for many years), the Rev. H. A. M. Whyte (VE3BWY and formerly G6WY), Mrs. Whyte, Miss Nelly Corry (G2YL), G6CJ, G2MI, G6CL, and Miss May Gadsden.

Lord Fraser, who was made an Honorary Member

of the Association, recalled the early days in his very interesting speech, starting with his schooldays at Marlborough in 1913, when he built a crystal set and received the Eiffel Tower time signals, and covering the whole wide field of the pioneer days. He has, of course, always had a special interest in the blind (it is hardly necessary to say that he is sightless himself and has done tremendous work for the fraternity, both at St. Dunstan's and in connection with the Talking Book scheme).

Several other Old Timers spoke, recalling nostalgic memories of what many still regard as the "good old days" when, though technical efficiency was very low, the small number of stations on the air made the hobby rather more of a pleasure and less of a demanding occupation than it is for some of them today.

Many tributes were paid to G6CL, recently retired after 34 years' service as General Secretary of RSGB, who was likewise made an Honorary Member of the Society.

Praise was also bestowed on many of the young amateurs of today, whose enthusiasm and technical proficiency was doing so much to maintain the standard of Amateur Radio. But it was noted that the Old Timers themselves, far from being decrepit grey-beards, were remarkably young in heart, in outlook and even in appearance—which says much for the therapeutic qualities of Amateur Radio.

L. H. T.

### 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, London, S.W.1.

#### SITUATIONS

**L**ABGEAR LIMITED have vacancies for both junior and senior communications engineers for designing and building transmitting and receiving equipment. Excellent working conditions in a modern laboratory, with really attractive prospects for sound, practical men. Applications, which will be treated confidentially, should give full details of previous experience, whether professional or amateur.—Labgear Limited, Cromwell Road, Cambridge.

#### TRADE

**M**ETAL Supplies. Aluminium, Brass, Copper, Steel—in sheets, tubes, rods and sections. Write for free price list.—Senmor Metals, Dept. R/5, 35 St. Johns Road, Isleworth, Middlesex. (Tel. ISLeworth 6017.)

**C**ATALOGUE No. 15 Government Surplus Electrical and Radio Equipment. Hundreds of items at bargain prices for the experimenter and research engineer, 2s. 6d. post free; catalogue cost refunded on purchase of 50s.—Arthur Sallis Radio Control Ltd., 93 North Road, Brighton.

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

**W**EBB'S LOG BOOK for recording signals heard and worked; 112 pages 9½ in. x 8 in. approved format, semi-stiff covers. Excellent value; 6s: 0d. post free, or callers, 5s. 4d.—Webb's Radio, 14 Soho Street, London, W.1.

**C**ASES, chassis, panels. ANYTHING in metal; send your drawings for quote. Stove enamelled, hammertone, or plain, in any colour.—Moss Watson, 40 Mount Pleasant Street, Oldham, Lancs. (Main 9400.)

**P**ILOT Pal, Corvette, Sailor, in stock as mentioned in April *Short Wave Magazine*. Also B44 with meter, £8 each.—The Yachtman's Shop (G3AFN), 119 High St., Teddington, Mddx. Closed Mondays. (TEDdington Lock 1664.)

**S**CANDINAVIAN AMATEURS: Readers ask why there were two apparently conflicting advertisements in the May "Short Wave Magazine." Answer: Equipment is constantly required for Scandinavian amateurs but in response to many requests some of this equipment (after reconditioning) is also being made available to U.K. amateurs. WANTED: (working or not): AR88D, CR-100, BRT-400, HRO, BC-348, BC-221, LM-14, second-hand Eddystone and Hammarlund receivers, etc. Collected 200 miles London. FOR SALE: Most of the above types and many others, all in excellent condition. New address: Brian J. Ayres, 2 Fairfield Road, Kingston, Surrey. (KINGston 8433 or LOWer Hook 2000.)

## G4GZ's BARGAINS

**VALVES:** EA50, EF50, 12SC7M, 1/6 each. 6K7G, 2X2, 6B8G, 6C4, EL32, EB91, 6AM6, EF91, 616, 2/- each, 18/- doz. 12A6, ARP12, AR8, 1626, TT11, VP23, 2/6 each, 24/- doz. 6J7G, 12K7G, 12Q7G, 35Z4G, 959, EF85, EF89, EF80, EZ40, 6X4, 6SL7GT, 80, 12C8M, 12AU6, 12AU7, 12AT7, 42, 6AU6, 6BH6, 6BJ6, 6X5, 1R5, 1S5, 6K8G, PCC85, PY83, EZ80, PY82, UABC80, UY41, 4/6 each, 48/- doz. 3A5, 446A, EM80, PL82, EZ81, EABC80, EBFB80, EBC41, ECC84, EF41, EAF42, UBC41, UAF42, DAF96, DK96, PL81, EF89, 50L6GT, 6/- each, 54/- doz. 6L7M, 6L6M, UCH81, ECH42, ECC85, 7B7, 7C5, 7/6 each. 5R4GY, GZ32, 9/6. 4E27, 40/-

Skirted B9A Valveholders, moulded, 5/- doz., £2 gross. Micalex ditto 6/6 doz., 55/- gross. Cans 5/- doz. extra.

ET4336 Trans. 190-250v. input, 2½v. 10A CT twice, 10v. 10A CT., 35/- plus 7/6 carr.

Gunfire Electric Time Switches. 200-250v. A.C. 20A. contacts, offered brand new and boxed. Unrepeatable at only 47/6, plus 2/6 P/P.

## JOHN ANGLIN

385, CLEETHORPE ROAD, GRIMSBY, LINCS. Tel. 56315

## RADIO AMATEURS LICENCE

We supply a special course of home study prepared specifically for the Radio Amateurs sound and TV Licence as issued by the G.P.O. It covers every aspect of the syllabus—starting right from the beginning—so that no previous knowledge is necessary. The fullest details of the licence requirements, itself, are included and the method of sitting the examination and applying for the licence is fully described. At the end of the Course, a complete series of specimen exam. questions with fully worked model solutions are provided—giving invaluable revision before students take the exam. We also provide full training for the Morse Code—including morse key, transistor audio oscillator and 12 in. L.P. practice record. This latter equipment is available separately from the Course if required. Our record of successes by our students for the Exam, is unsurpassed by any other institute. Established 23 years. COURSES ALSO AVAILABLE for all subjects in Radio, TV and Electronics and for the City & Guilds Technicians Certificates, etc. Write NOW for full details without any obligation, to:—

Dept. 20, BRITISH NATIONAL RADIO SCHOOL,  
RADIO HOUSE, RUSSELL STREET, READING, BERKS.

## BUSFIELD'S ASTRO-MARINE

EAGLE RX60. NEW. .55 to 30 mc/s. £24/15/-, carriage paid

HE30 SUPER. NEW. .55 to 30 mc/s. £42, carriage paid

HE80 14 VALVE. NEW. .55 to 30 mc/s. and 2 metre band.  
59 gns., carriage paid

MOHICAN. .6 to 30 mc/s., transistors, very good, with manual ... .. £30, carriage 10/-

NATIONAL H.R.O. Very good condition with mains and battery P.S.U.s. ... .. £22/10/-, carriage 30/-

H.P. — PART EXCHANGE — WANTED GOOD RECEIVERS

45/47 Eastborough, Scarborough, Yorks.

BARGAIN owing to ill health

## Wiltshire LIGHT INDUSTRIAL BUILDING

3,300 square feet

and 4 bedroom house on 1 acre plot

Suitable for warehouse or mail order purposes, etc.

Full details, photos, apply Box No. 3003, Short Wave Magazine Ltd., 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS, TRADE—continued

**M**ULTIBAND Antenna traps, 80-10m., high efficiency, superbly finished, only 45s. pair. Silicon diodes, 1000 p.i.v. at 500 mA, 9s. OC44, 45, 81, 81D, 3s. 6d. OC170, 4s. OC171, 4s. 6d. BM3 xtal mic., 37s. HE30 and HE40 communications Rx. All plus p. & p.—Wakeley, 70 Arnold Road, Binstead, I.O.W. (Ryde 3231.)

## READERS' ADVERTISEMENTS

3d. per word, min. charge 5/-, payable with order. Add 25% for Bold Face (Heavy Type). 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, London, S.W.1.

**L**USTRAPHONE LFV 59 microphone with S2B base—unused—£4 10s. (list £10). Vitavox B50, unused, hand mic., £2 10s. (list £6). TR.1520 Transceiver modified to two metres, complete, working, £3 10s. Mullard UHF tuner, with valves, brand new, 45s. FT-243 crystals 7050, 7075, 7100, 7125, 7150, 8100 kc, 4s. 6d. each. Post extra.—V. Cedar, 2A Convent Hill, London, S.E.19. (LIVINGSTONE 8489 after 7.30 p.m.)

**C**OMMAND Rx's: 5-1.5 mc, 1.5-3.0 mc, 3-6 mc, brand new, in original cartons, £17 10s. the lot. AR88D manual, new, 21s., Brown's Type "F" phones, new, 25s. WANTED: LM14 and AVO-8 in mint condition.—Box No. 3028, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**W**ANTED: 70-centimetre amateur-band transmitter, capable 20w. RF carrier output on AM phone, preferably with power supply, metering, etc. Either commercial or well-constructed amateur equipment considered. Good price and immediate cash for the right job. Offers and enquiries to—Box No. 2941, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**S**ALE: Bendix RA10 Rx, 150 kc to 10 mc, internal PSU, v.g.c., £5, P104/1392, working OK, var. tuning, £3. Police Tx with 500v, 150 mA p/pack, 35s. Matching Rx, mod. to 4m., OK, 35s. New 19-in. rack, 21in. deep, 10s. FT-243 crystals 3720, 8050 kc, 7s. 6d. All plus carriage.—R. Sellers, Mill Road, Eastington, Goole, Yorkshire.

**F**OR SALE: Late model DX-100U, good condition, F owner going SSB, £55.—Dickenson, 46 Lichfield Drive, Warden Hill, Cheltenham. (Phone 21992), Glos.

**A**MERICAN Self-Contained 60w. Tx (Eico-723), 80-10 metres, TVI-proof, neat! Cost £35, accept £25, complete with handbook and auto transformer. Eddystone S.640, £18. American Heath Q-Mult., QF-1, 70s. Jap Bug, cost 92s. 6d., accept 72s. 6d. Crystal Calibrator No. 7, 1000/100/10 kc, 70s. HRO Coils, 3-5-7.3 mc, 180-460 kc, 100-200 kc, 10s. each. Carriage extra.—Stone, 1 Emperor's Gate, London, S.W.7.

**W**ANTED: Control box and information on the AN/APA-17 Radar. Also buy, or have loan of, Dec. '63 CQ, May '63 Short Wave Magazine.—Wright, 13 Worts Causeway, Cambridge.

**S**ALE: Minimitter Top 2-7 Tx, unused. As new MC-64 all-band converter. Grampian DP4 dynamic mic. Nombrex Signal Generator. The lot for £40.—Bowden, 4 Poplar Cotts, Farnborough Common, Orpington, Kent.

## SMALL ADVERTISEMENTS, READERS—continued

**38FT.** commercial, galvanized, steel tower, 8ft. base, top working platform, side ladder; photograph available; offers? Valves, brand new and boxed, E180F, 12s. 6d.; KT66, 12s. 6d.; 832, 30s.; CV-129, 35s.; 931A, 30s. Transistors: 2G302 (OC44), three for 10s. Offers for TY2-125, QV20, P18B. Send for list.—Box No. 3015, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**SALE:** CR100/8 in mint, as new, condition; one owner from brand new; very little use; complete with manual and plugs; bargain, £22 10s. plus carriage. Class-D Wavemeter, modified for AC mains, complete with instruction book, 50s. plus carriage.—Osborne, G4OV, Pucksknoll, Lamberts Castle, Marshwood, Nr. Bridport, Dorset. (Tel. Hawkchurch 392.)

**SALE:** R.208, perfect condition, 4 spare valves, circuit, metal container, £7 incl. carr. RSGB Bulletin and Short Wave Magazine, 35 copies, Mar. '62 to Apr. '64, 21s., incl. carr. RSGB Amateur Radio Handbook plus Foundations of Wireless (Scroggie), perfect, for 33s., incl. post.—Thomas, 46 Cholmondeley Road, Salford 6, Lancs. (Tel. PEN 3176.)

**WANTED:** HRO-MX Manual, Also 80- and 40-metre bandsread coils. Must be in good condition.—Box No. 3017, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**TX** 150w., Mercury Minimitter, FB cond., £55. Rx AR88D, no case, £29. Delivered 50 miles London area.—G5WG (BUCKhurst 5499), 19 Beresford Drive, Woodford Green, Essex.

**T** WITHERS 2-metre TW-2 10w. Tx for sale, excellent condition, £18 o.n.o., to inspect.—Box No. 3016, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**RTTY:** FB ATM Model FSR.1.1X (AP.66862) Terminal Unit, complete with plugs, circuits, etc., offered in exchange for commercial oscilloscope, tape recorder, or TDMS.—Owen, G2FUD, 184 Hale Road, Hale, Cheshire. (Tel. ALTrincham 1321.)

**FOR SALE:** Minimitter Amateur Bands Converter, good condition, £10 o.n.o.? **WANTED:** Oscilloscope, home-built or commercial.—Atkinson, Brada, Beadnell, Chathill, Northumberland.

**BRAND NEW** Olympic loaded Z-Match, 75 watts, £6. R.1224A, excellent condition, £3 10s. Both carriage extra.—G13NZZ, Copeland, Dunaman Park, Kilkeel, Co. Down, N. Ireland.

**FOR SALE:** Type 3 Teleprinter, with T.U. ZA.39384 and matching power supply ZA.39385, in good condition, £25. Delivered 50 miles.—Townsend, 33 High Street, Datchet, Bucks.

**HALLICRAFTERS** SX-110, perfect condition, complete with Woden 240-110 volt transformer and handbook, £70 o.n.o.?—G. Gordon, 72 Evan Drive, Giffnock, Glasgow.

**BC-312** Rx, 230/12v., as new, £20 o.n.o.? 2/813; meters; transformers; H and LV power supplies, etc. List.—GW3FZV, Dolwerdd, Bwl Road, Nelson, Treharris, Glam. (Tel. Nelson 316.)

**5T-HRO's**, new condition, metal valves, S-meter. One table model with six coils, £15; one enclosed rack model with five coils, £12—or would exchange for a G4ZU 10/20m. beam.—Box No. 3018, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**FOR SALE:** NCX-3 with AC power supply. Complete with crystal mike, auto-transformer and carrying case; nearest £160.—Robbins, 35 Sunlight Street, Liverpool, 6.

**K.W. Corner** No. 1

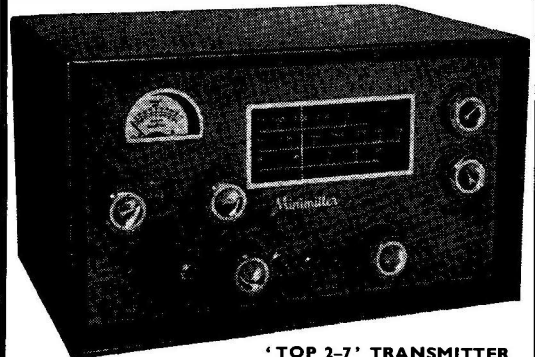
(A monthly review of news, views and advice)

**KW 2000 AND EXPORTS.** The KW 2000 SSB TRANSMITTER is to date in use in 23 different countries. A long way to go to catch up with the KW Viceroy SSB transmitter's "50-plus" countries, but then the Viceroy has been in production for four years. We feel confident that the KW 2000 will soon exceed this number. Proof of the success of the KW 2000 is in the fact that it is to be manufactured in the U.S.A. In the past your support for KW enterprises has helped us to keep ahead in this business of Amateur Radio—in the future we plan to keep ahead by producing equipment to an even further degree of technological development and reliability. Watch out for the KW-2000 500 watt Linear Amplifier for home station and mobile use and the KW-2000 2 metre SSB Transverter all in matching cabinets. When you decide to buy, also plan for the future. Put your trust in, and invest in equipment from a firm of repute which has been long established to serve you, the radio amateur. Consult K.W. for all your amateur radio requirements.

**6146B VALVES.** A new valve by R.C.A. which the manufacturers claim will give 33½% more output than the conventional 6146. Many transmitters use the 6146, singly or in pairs, but it is not just a case of plugging in the 6146B and "hey- presto" 33½% more output. Certain technical requirements have to be met, involving the H.T. supply and the screen supply.

It is possible, however, to replace the 6146 directly with a 6146B without circuit change, and because of the increased rating of the new valve, it would have a longer life. For further information write to the K.W. Technical Advice Department. 6146B's are available from K.W., price 50/- each, plus 2/6 for postage.

**K.W. ELECTRONICS LIMITED**  
VANGUARD WORKS,  
1 HEATH STREET, DARTFORD, KENT

**MINIMITTER**

'TOP 2-7' TRANSMITTER

Britain's most popular 'Compact Rig'

24 Watts Input. Completely Self-contained

Price: £33. 10. 0

|   |            |
|---|------------|
| MR44/2. All Band Communications Receiver ...      | £68. 0. 0  |
| NEW MC64. All Band Converter ...                  | £20. 10. 0 |
| Mobile Transmitter. 20 Watt. Compact. Efficient   | £18. 15. 0 |
| TR7. All Transistor 1.8 Mc/s. Mobile Receiver ... | £13. 0. 0  |
| Minimitter 'Multi-Q' Unit. 465 Kc/s. ...          | £5. 10. 0  |
| 'X 20' 20 Metre Rotary Beam Array ...             | £12. 10. 0 |
| 'FB5' All Band Aerial. High Power ...             | £5. 2. 6   |

H.P. Terms Available

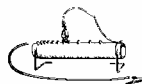
For full details of any of the above, please send S.A.E. to:—

**THE MINIMITTER Co. Ltd. ALBION MEWS, KILBURN**  
HIGH ROAD, LONDON, N.W.6. Tel. MAIda Vale 5588

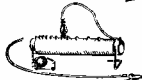
# Goy Match

COMPACT HIGH EFFICIENCY TUNERS  
— FOR ALL RX'S AND TX'S !

A range of special units will "match anything to anything!" Peak up your R.F. performance by many 'S' points



\*Type 1. General purpose tuner for receiving and transmitting + 1/6 P/P. **10/-**



\*Type 2. Medium wave tuner for receiving, also peaks up over H.F. range. + 2/- P/P. **45/-**



Type 3. H.F. band tuner for receiving — a MUST for the serious short wave operator; covers 1.4 to 30 mc/s. + 1/6 P/P. **39/6**

\*Type 4. As type 1 but with built-in series var. capacitor, for receiving. + 1/6 P/P. **15/-**

Type 5. As type 1 but with built-in series var. capacitor for transmitting. + 2/- P/P. **20/-**

\*These Units are illustrated

SEND FOR  
FULL DETAILS

Only the PRICE is low!

Use the RF40 Field Indicator/phone monitor, 69/6, post free

PARTRIDGE  
ELECTRONICS  
LTD.

7, Sowell Street,  
Broadstairs, Kent  
Thanet 62535

SMALL ADVERTISEMENTS, READERS—continued

**FOR SALE:** K.W. One-Sixty Tx; HRO Rx, with nine GC coils; p/pack home made. Complete station, £20. Buyer collects.—Box No. 3019, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**METERS** 0-300v. DC, moving coil, 6-in. scale, flush round, brand new sealed instrument by "Record," 55s. each, post 4s. 50  $\mu$ A, 2½-in. flush round, brand new, boxed, 35s., post 1s. 6d. Valves at 4s. each: ECF80, ECH81, EF80, EF85, EM80, EZ80, EL84, ECC85.—J. Cooper, 13 Churchfield Road, Outwell, Wisbech, Cambs.

**FOR SALE:** Eddystone 840C Receiver, 1963 model, in immaculate condition, £45. Prefer buyer collects.—G. Wynes, 14 Brook Road, Bath, Somerset.

**SSB Tx.** Exciter mechanical filter; 2/813 PA; 2.5 kV 200 mA PSU; delay HT switching; rack mounted, 19in. by 12½in. floor space, 6ft. 6in. high; 3-in. dia. meters in A.S.C and grid; 2-in. dia. meter in exciter; 3½-in. dia. meter 3.5 kV, in PSU; FB reports, £40. AR88D, matching speaker, ½-lattice xtal filter, manual, FB for SSB, £25. HRO-MX, 11 coils covering 15 kc-30 mc, bandspread on amateur bands, manual, £25. Hallicrafters S.27, 27.8-143 mc in 3 bands, AM/FM, manual, £30 o.n.o.? Moving into smaller shack.—G2JZ, Whitehall, Swindon Road, Kingswinford, Staffs. (K.3231.)

**SALE:** S.640 Rx, S-meter, spare valves, manual £25. K.W. Geloso converter, 10-80m., brand new condition, £16.—J. H. Jones, 3 Bryn Clyd, Leeswood, Mold, Flint.

**WELWYN GARDEN CITY:** Licensed amateur requires lodgings in W.G.C. from early September 1964. Would prefer small space for operating and construction.—Box No. 3020, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**SALE:** Mobile Minimitter complete: 160, 80, 40m., S24w. Tx; control unit; 12v. plus transistor PSU; transistor TR-7 160m. Rx; mobile whip base section and 160m. top; cables; mint., £40 o.n.o.? Will deliver Birmingham.—Mitchell, G3MQY, 44 Yardley Wood Road, Moseley, Birmingham, 13.

**SALE:** Complete 70-watt station, 160-80-40m., AM or break-in CW; TCS-6 receiver; TCS-13 transmitter; both in excellent condition. Transmitter modified for *pi*-output, and with built-in microphone pre-amp. Fully metered power supply in crackle case with connecting leads for above, giving 200v. and 400v. HT, 12v. heater and DC relay supplies. Offers, or EXCHANGE good general-coverage receiver.—T. N. Ayscough, G3KAD, 59 Malvern Road, Gorse Hill, Swindon, Wilts.

**SALE:** Heathkit RA-1 Rx as new, £35. BC-348N Rx, built-in PSU, good condition, £12. PSU, rect. 43B, 230v. AC input, 115v. 7A DC out, 30s. SCR-522 Tx/Rx with 24v. DC PSU and valves, £2 10s. Sorenson PSU, 28v. DC in, 28v. 400 c/s 3ph. AC out, £2. Please include carriage.—G3NJJ, 16 Clyde Street, Grimsby, Lincs.

**FOR SALE:** Minimitter Top 2-7, £20. WANTED: DX-40U, or similar.—G3RVX, Glenhaven, School Lane, Batheaston, Bath, Somerset.

**MOVING QTH:** Snip for 2-metre enthusiasts, BC-640B, £30, with manual. Eight-over-eight slot-fed J-Beam, £5. Cascode converter, working into 18-20 mc, £2 10s. 0d., collection only.—Wright, Brooklyns, Thaxted, Essex.

## QUARTZ CRYSTAL UNITS

Hermetically sealed, Gold or Silver Electroded Crystals, post free at the following prices: each

Fundamental 3 Mc/s. to 15 Mc/s. at **£1 5s. 0d.**

Fundamental 15 Mc/s. to 20 Mc/s. at **£1 10s. 0d.**

Overtone 20 Mc/s. to 30 Mc/s. at **£1 10s. 0d.**

State holder type preferred — HC-6/U or FT243

## PROFESSIONALLY MADE FOR THE AMATEUR

Other frequencies available on request. Send cash with order stating your exact requirements.

These crystals are made to your order and are not Government surplus stock.

**CATHODEON CRYSTALS LTD.** Linton, Cambridge

SMALL ADVERTISEMENTS, READERS—continued

**S**WL GOING Transistorised has for sale very reasonably: Canadian 52 receiver, built-in mains PSU, xtal calibrator, etc.; R.109A modified with internal mains and 6v. transistor PSU's—both receivers in FB condition. ZC1 re-built with Denco coils and mains PSU, fully operative 160 and 80m. RF-47B VHF receiver, tunable about 80-100 mc, 12v. dynamotor. Also rather smart W.S 19 Mk. III. Prefer buyer collects, but could help with car.—P. J. Annis, 21 Hough Side Close, Pudsey, Yorkshire.

**W**ANTED: Manual for Eddystone S.750; buy, barter or borrow, condition unimportant, provided readable.—D. West, Schoolhouse, Plowden Road, Woodhouse Park, Manchester, 22.

**E**DDYSTONE 740 Rx, £20; 358X, all coils and p/pack, £7 10s. Oscilloscopes: Cossor 339A, £8; Du Mont 208, £20. Audio Gen. BSR L050A, £6. Avomitor, £3 10s. Weston 785 Multi-meter, 20,000 o.p.v., £8 10s. Dawe Bridge 314A, £20. Cossor HF Sig. Gen., £3. Pye VHF Tx, push/pull 6V6's, mod. QQV03-20A, includes PSU, £4 10s.; matching Rx, £3. Wilcox-Gay VFO, £4. Decca Radar masthead RF amp, £3. S.G. Brown phones Type F, £1. Eddystone VHF Tx, 7AL, 100w., 5ft. 9in. high, 7 panels at 19in., handbook, £17. Power packs 200v. to 1,500v., £2-£4. Stabilised supply 150-200v., £3 10s. Valves, new and ex-equipment: QQV06-40, QQV03-20A, TY2-125, QY3-125, DET18, DA41, U19, 4304CB. Meters 500 µA, 1 mA, 5 mA, 300v. min. Matching PSU for FSK Rx.—Bremner, 58 South Trinity Road, Edinburgh, 5. (Phone GRA 5475.)

**W**ANTED: Rx 888A, MR44/II or similar, reasonable. Mosley Tri-Band rotary beam, telescopic mast, motor and remote indicator. Tiger antenna coupler 75-300 ohms or similar. Scope. Tunable LP Filter. Wavemeter.—Box No. 3021, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**S**ALE: Eddystone 840C, first-class general coverage receiver, immaculate condition, working as new, £40—or EXCHANGE G2DAF Rx or Tx, or anything similar, W.H.Y.?—Power, Chapel Green, Fillongley, Nr. Coventry, Warks.

**R**107 Rx, perfect, £10. Single R220 4-metre Rx, AC mains, manual, £4. Double unit in cabinet, £7 10s. New RT34/APS13 70 cm. Trans/Receiver, less valves, £3 new. Quantity 10 and 3 cm. equipment, includes 3/723A-B klystrons, many others, £5 the lot. Couple desirable potted C-core xformers, chokes, details.

**W**ANTED: Purchase AM-913/TRC, AM-914/TRC, TN16, AN/APR5 converters.—Phone Trevlyan 8141. Write: Briscoe, 335 Eton Road, Ilford, Essex.

**W**ANTED: Z-match Coupler suitable up to 300 watts. Top-Band mobile Tx/Rx. Short Wave Magazines and RSGB Bulletins, 1959 and previous—Offers to Box No. 3022, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

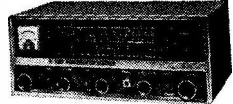
**W**ANTED: I will pay £2 for dynamotor base belonging to Command modulator, either type MD7/ARC5 or BC-456. SALE: 75-watt Class-B modulator unit: 1/6N7, 1/6F6, 2/807, complete with Dynamotor, ex-TA12 Bendix, 50s.—G3RDG, 40 The Vale, N.W.11, (SPEEdwell 8831), London.

**B**RAND new RCA 2000-0-2000v. 500 mA, £3. Two brand new RCA 813 heater transformers, £1 each. Eddystone 898 dial unmarked, 25s. J36 bug, £2. Brand new Vibroplex bug de luxe chromed model, £7. Woden 250 mA choke, £1. Excellent BC-453 with p/pack, £3. TE149 Wavemeter, with manual, as new, £3. Labgear LPF, 30s. Or £20 the lot. Buyer collects.—G2CNN, Mount Pleasant, Dawlish Warren, Devon.

**STERN-CLYNE**  
Electronics Centres throughout Great Britain

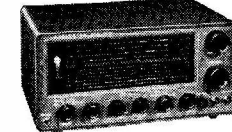
**THE HE-40 4-BAND COMMUNICATION RECEIVER**

Completely built and ready to go. High sensitivity Superhet receiver covering 550 kc/s.-1,600 kc/s., 1.6 Mc/s.-4.4 Mc/s., 4.4 Mc/s.-11 Mc/s., 11 Mc/s.-30 Mc/s. Electrical bandspread tuning. Slide-rule type tuning dial. Internal ferrite rod aerial for Medium waveband reception and a 59in. 10-section chromium plated telescopic whip aerial for the Short wave bands. Sockets for optional outdoor aerial. Internal monitor loudspeaker. Latest modern miniature 87G base valves. Headphone socket (may also be used for external loudspeaker). ANL, BFO, Receive/Stand-by switch. Built-in "S" meter 220/240 volt A.C. mains, 50-60 cycle operation. Handsomely styled cabinet with grey crackle finish and hinged front panel, with chrome and satin chrome fittings. Size 13½ x 8½ x 5½in. Weight 11½ lbs. A comprehensive instruction manual is supplied. An ideal receiver for the radio amateur and Short wave listeners of all ages. Send S.A.E. for leaflet. Carriage Paid. Price **£24. 15. 0**



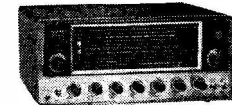
**THE HE-30 4-BAND COMMUNICATION RECEIVER**

One of the finest general coverage bandspread Receivers available at this price. Covering 550 kc/s.-1,600 kc/s., 4.8 Mc/s.-14.5 Mc/s., 1.6 Mc/s.-4.8 Mc/s., 10.5 Mc/s.-30 Mc/s. Illuminated slide rule dial calibrated every 5 kc/s. on 80 and 40 metres. Edgewise meter, 0-100 logging scale coverage from 0.55-30 Mc/s. 8 valve plus Rectifier Superhet circuit, RF stage with an Aerial Trimmer, 2 IF stages, BFO control. Q-multiplier. Controls: Function Switch, Frequency (BFO), Band Selector, IF gain, Trimmer AVC-MCV Switch, ANL Switch, Main Tuning, Bandspread Tuning and Headphone Jack. Selectivity—60 dB at 10 kc/s., 0.8 kc/s. at 6 dB (with Q-multiplier), IF—455 kc/s. External P.M. Speaker reqd. 4 or 8 ohms impedance. Output 1.5 watts, 8 modern Miniature 87G Base Valves and 5Y3 Rectifier. Size 15 x 10 x 7½in. Grey crackle finish. For operation on A.C. mains 220/240v. 50/60 cycles. Full instructions and circuit diagram supplied. Send S.A.E. for leaflet. Carriage Paid. Price **40 Gns.**



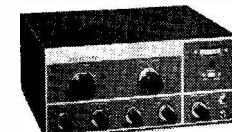
**THE NEW HE-80 COMMUNICATIONS RECEIVER**

The HE-80 has outstanding sensitivity, 0-100 logging scale for instant re-set, built-in "S" meter, special recording Jack, remote control socket, allowing simultaneous control with transmitter, 100 kc/s. crystal oscillator circuit providing accurate harmonic signals of either 4 or 8 ohms impedance. Two headphone sockets, one high, one low. Technical Specifications: Frequency Coverage: Band I, 540-1,605 kc/s.; Band II, 1.6-4.8 kc/s.; Band III, 4.8-14.5 Mc/s.; Band IV, 10.5-30 Mc/s.; Band V, 144-146 Mc/s. Bandspread (Ham Band directly read): 80 Metre Band; 40 Metre Band; 20 Metre Band; 15 Metre Band; 10 Metre Band. Sensitivity: 1 microvolt for 10 dB signal to noise ratio. Selectivity: Normal 10 kc/s. at -75 dB, 1.25 kc/s. at -6 dB. With Q-Multi: variable to 70 db, at 6 dB. Operation: AM, SSB, CW and FM. AM diode detector. SSB/CW product detector (BFO). FM gated beat detector. Power Source: 240 volts 50/60 cycles A.C. Power consumption: 60 watts. Audio Output: 1.5 watts, 8 or 500 ohms impedance. Auxiliary Circuits: Electrical Bandspread, Q-Multiplier, ANL, AVC-MVC, BFO, 100 kc/s. crystal calibrator. Valve line-up: 4-6AQ8, 6BL8, 3-6BA6, 2-6BE6, 6AL5, 6AQ5, OA2, 6CA4. Dimensions: 17in. wide, 6½in. high, 10in. deep. Carriage Paid. Price **59 Gns.**



**STARFLITE TRANSMITTER**

Single-knob Bandswitching, front panel switch to select any of five crystal positions with provision for an external VFO. Controlled carrier modulator permits almost 100% of the CW input to be used on AM peaks. Grid-block keying provides chirp-free operation. A full wave silicon diode power supply effects extremely low output ripple for cleaner CW transmission, electron-coupled Pierce Oscillator, capacitance bridge neutralization of the final and a three-stage lowpass filter. An illuminated edgewise D'Arsonval panel meter. Pi-network output provides the correct impedance match between the plate circuit and any 50-72 ohm coaxial feeder. Easy to follow point-to-point instructions supplied with each set of components. When constructed the Unit is housed in a heavy gauge steel Cabinet finished in grey crackle. Specifications: Power Input: 30 watts peak. Operation: CW, AM Phone—crystal or VFO Control. Band coverage: 80-10 metres. Coupling: Pi-Network. Valve line-up: 6146, (2) 6CL6, 12AX7, 6DE7, Low Pass Filter. Size 13½in. wide x 12in. deep (inc. knobs) x 6½in. high (inc. rubber feet). Weight 28 lbs. Power requirements: 200/240v. 50-60 cps, 225 watts. Carriage and Insurance 15/-. **MAY BE BUILT FOR 35 Gns.**



Call at Your Nearest

**STERN-CLYNE ELECTRONICS CENTRE**

- LONDON:** 18, Tottenham Ct. Rd., W.1. MUSEum 5929/0095 (Premier Radio) 22, Tottenham Ct. Rd., W.1. MUSEum 5911/2. (Premier Radio) 309, Edgware Rd., W.2. PADDINGTON 6963. 109, Fleet St., E.C.4. FLEEt St. 5812/3. 162, Holloway Rd., N.7. NORTH 7941. 9, Camberwell Church St., S.E.5. RODney 2875.
- CROYDON:** 12, Suffolk House, George St., MUNICIPAL 3250.
- Bristol:** 36, Marchant St., Bristol 1. BRISTOL 2024.
- MANCHESTER:** 20/22, Withy Grove, Manchester 4. BLACKfriars 5379.

Mail Orders and enquiries to Dept. SWM.

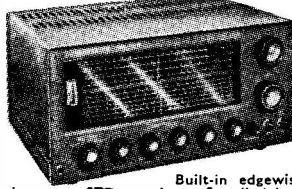
3/5, EDEN GROVE, LONDON, N.7. North 8161/5

**NEW MINISTRY RELEASE!!**

**MODERN ARMY R.216 AM/FM V.H.F. RECEIVER**

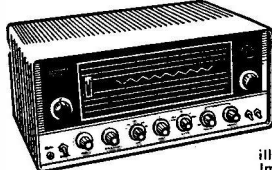
BRAND NEW 5 BAND—16 VALVE RECEIVER COVERING 19-157 mc/s. CONTINUOUS. An extremely well made receiver using miniature valves and components, pan-climatic and hermetically sealed. Special features include—8ft. film dial on each band, 2 R.F. and 4 I.F. stages (4.88 mc/s.), B.F.O. N.L. crystal calibrator at 1 mc/s. and 5 mc/s., bandwidth 50 kc/s. or 120 kc/s., I.F. output, 600 ohm output or 150 ohms phone output. Size: 12½" x 9" x 8½". Supplied complete with separate power unit and connecting cable for operation on 0/110/200/250 volt A.C. Price £29/10/- complete. Carriage 30/- S.A.E. for details. Circuit diagram supplied.

**HE-30 SUPER AMATEUR COMMUNICATION RECEIVER**



Four bands covering 550 kc/s. to 30 mc/s. continuous. Operation 200/240 volt A.C. Special features include: Easy to read illuminated slide rule dial, Built-in Q multiplier, Aerial trimmer, Calibrated electrical bandspread on amateur bands, 0-100 logging scale, noise limiter, AVC/MVC selector, Stable oscillator and B.F.O. for clear CW and SSB reception. "S" meter. Output for phones or STD. speaker. Supplied brand new and guaranteed with manual, £42 carriage paid. S.A.E. for full details. PART EXCHANGES WELCOME

**HE-80 14 VALVE AMATEUR COMMUNICATION RECEIVER**



550 kc/s. to 30 mc/s. + 2 metre band, 144 to 146 mc/s. Two receivers in one. Continuous coverage from 550 kc/s. to 30 mc/s. and 144 to 146 mc/s. Dual conversion on 2 metres, with extra RF and Mix. stage. Special features include "S" meter, Crystal calibrator "Q" multiplier, B.F.O., Bandspread on all amateur bands, large illuminated dial with logging scale. Improved A.N.L. regulated power pack. Output for phones or speaker (8 or 500 ohms). Operation 200/250 volt A.C. Valve line-up 4 x 6AQ8, 3 x 6BA6, 2 x 6BE6, 1 x 6BL8, 6AL5, 6AQ5, 6CA4, and OA2. Attractive grey steel cabinet, 17 x 7½ x 10in. Supplied brand new and guaranteed complete with instruction manual, 59 gns., carriage paid. S.A.E. for full details. Part exchanges welcome.

**CLEAR PLASTIC PANEL METERS**

First grade quality. Moving Coil panel meters, available ex-stock. S.A.E. for illustrated leaflet. Discounts for quantity. Available as follows. Type MR. 38P. 1 21/32" square fronts.

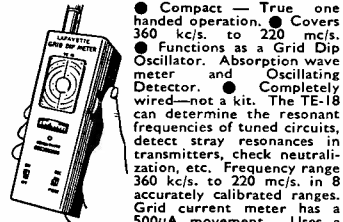


|             |      |       |      |       |         |      |         |      |         |
|-------------|------|-------|------|-------|---------|------|---------|------|---------|
| 50µA        | 32/6 | 1mA   | 22/6 | 300mA | 22/6    | 10V  | DC 22/6 | 750v | DC 22/6 |
| 100µA       | 29/6 | 5mA   | 22/6 | 500mA | 22/6    | 50V  | DC 22/6 | 15v  | AC 22/6 |
| 200µA       | 27/6 | 10mA  | 22/6 | 750mA | 22/6    | 100V | DC 22/6 | 50v  | AC 22/6 |
| 500µA       | 25/- | 50mA  | 22/6 | 1A    | DC 22/6 | 150V | DC 22/6 | 150v | AC 22/6 |
| 50-0-50µA   | 29/6 | 100mA | 22/6 | 5A    | DC 22/6 | 300V | DC 22/6 | 300v | AC 22/6 |
| 100-0-100µA | 27/6 | 200mA | 22/6 | 3v    | DC 22/6 | 500V | DC 22/6 | 500v | AC 22/6 |

**ILLUMINATED "S" METER.** 1 21/32" sq. front. Cal. in 5 units, 6v. lamp, 29/6, P.P. 1/-; 2 5/16" square, 39/6, P.P. 1/-.

**MODEL TE-18 GRID DIP METER**

Complete with all coils for all Frequency ranges from 360 kc/s. to 220 mc/s.



6AF4A valve powered by a built-in transformer-operated power supply with selenium rectifier. For 220/240V, AC 50-60c/s. Size 7½" H. x 2½" W. x 2" D. £12/10/- Carr. 3/6.

**TRANSISTORISED FIELD STRENGTH METER**



3 bands 2.5 to 57 mc/s., permits easy tune up for max. transmitter output. Earphone jack to monitor audio. 200µA meter cal. 0-10. Supplied complete with battery, telescopic aerial, £7/7/- each. P.P. 2/6.

**R.C.A. AR88D RECEIVER FOR THE CONNOISSEUR**

Few only released by the Ministry in genuine brand new condition, complete with spare valves, aerial and headset, £85 each. Carriage 30s.

**G. W. SMITH & CO. (RADIO) LTD.**  
3-34 LISLE STREET, LONDON, W.C.2

Phone: GERRARD 8204/9155 Cables: SMITHEX LESQUARE  
OPEN 9 a.m.—6 p.m. EVERY DAY MONDAY TO SATURDAY

**SMALL ADVERTISEMENTS, READERS—continued**

**EXCHANGE:** A complete mobile Station: DX-40U with high-level plate-modulation, with single switch control, silver and front blue, external 30 watt modulator with pair of KT77's and also the VF-1U VFO, all done by Tiger Ltd., never been used. Also the RA-1 receiver 10-160 metres, with Q-multiplier and crystal calibrator and speaker, all factory built. In EXCHANGE for good SSB Receiver. Best offer secures.—James Ash, 9 Craigpark Street, Faifley, Clydebank, Scotland.

**COMPLETE Station:** K.W. Vanguard, 80-10 metres, factory built, perfect. HRO, miniature valves throughout, product detector, 13 coil packs including 5 bandspread 80-10, LS and PSU; exceptionally good. Olympic ATU. Class-D wavemeter. £75 the lot. Buyer collects, or will deliver about 50 miles.—G3EWP, 26 Greenway, Trentham, Stoke-on-Trent. (Stoke 58004.)

**BARGAIN:** BC-375 Tx with 4/211 valves (220w. triodes). Excellent condition, £5 o.n.o.? Write, collect.—Newman, Betsons, Westerham, Kent.

**PROP-PITCH** motor, new, with mast coupler, £5. Set of Valves for HRO-MX, 30s. WANTED: CDR Rotator and Indicator.—G3JBU, 31 Beverley Crescent, Northampton. (Tel. Northampton 33944.)

**SALE:** New Heathkit RA-1 with CL-1, £40. Eico Model 720 CW 90-watt Tx, 117 volts, all valves except 6146, £20. Both with manuals.—J. Struthers, 16 Lyndhurst Gardens, N.W.3, (HAMstead 3465 evenings), London.

**RA-1** Heathkit amateur-band receiver, aligned and tested by Daystrom, mint condition, £39 carriage paid.—G13OTV, Paul O'Kane, 15 Shandon Park, Belfast, 5, Northern Ireland.

**MOBILE** Transistor PSU by REE Telecommunications. 12-volt input. 300-plus output at 150 mA, £4. De-luxe "Joystick" antenna with ATU, £3.—G3KNB (QTHR).

**GELOSO** R.209, AM, USB/LSB, £40. 813 with base, £1 10s. Taylor Audio Gen. 191A, new, £22 10s.—Smith, 44 Broadway Caravan Park, Lancing, Sussex.

**MOHICAN** GC-1U communications Rx, factory aligned, tested, immaculate condition, with batteries and manual, £21.

**EDDYSTONE** 840A communications Rx, recently overhauled, new valves, etc., and realigned, £20.—Box No. 3024, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**WANTED:** June-July 1962 issues of *Short Wave Magazine*. Urgent.—D. Pitcher, 193 Hatfield Ave., Fleetwood, Lancs.

**FOR SALE:** Nagard double-beam Oscilloscope, Type DS103, in excellent condition and recently overhauled by maker, £48 o.n.o.? — Clinical Pulmonary Physiology Research Unit, King's College Hospital Medical School, Denmark Hill, London, S.E.5.

**AR-88D**, re-resistored and re-capacitored, with high stability close-tolerance components. New set of valves fitted a year ago and thoroughly "run-in" before final careful and accurate re-alignment and calibration. S-meter and tape monitor fitted, otherwise no mods. This receiver is in excellent electrical condition and is finished in grey with chrome handles. New manual, spare valves, RCA headset, £75, no offers. Inspection invited. Buyer collects. QTH Morden, Surrey.—Box No. 3025, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**SMALL ADVERTISEMENTS, READERS—continued**

**T**V Diplexers, brand new, waterproof, Bands I and III, twenty-five for £5. Singles, 5s. 6d. post free.—Box No. 3023, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**T**IGER TR60B, TT21 PA, with Tiger Z-Match, £60. Minimitter, LP filter. Carriage extra on above. Also 'scopes, test gear, keys, meter, etc., as per May '64 Short Wave Magazine. S.a.e. your requirements.—G3MOE, QTHR. (Cheltenham 24217.)

**T**ELEPRINTER 3X, commutator skimmed, rewired; spare ink rollers, paper. Perfect working order; motor and relay switches, cover. Delivered central Scotland. Elsewhere carriage extra, £12 o.n.o.—GM3OGJ QTHR. (Tel. 041 BEA 3629.)

**F**OR SALE: K.W. Valiant Tx 10-80m., without power supply, good condition, £20.—F. Buckley, 37 Howson Road, London, S.E.4.

**W**ANTED: RF-24, must be in good working condition. Other soundly constructed converters considered if suitable.—Write: Beddow, 93 Mount Pleasant, Bilston, Staffs.

**C**R-150, 1-8 to 60 mc, excellent condition, £35. Valve voltmeter, Marconi Type 2, requires micro-amp. meter, £5.—Hodgson, Hundleby, Spilsby, Lincs.

**E**XCHANGE: S.640 in mint condition, elect. and mech. Also G2DAF Rx, two-thirds complete, with *Electroniques* IF's, coils switches, etc. Eddystone 898 dial; Jap S-meter; all new resist. and cond., etc. Total cost G2DAF £30. For RCA AR88D in good condition, or any comparable Rx. Carr. arranged, replies answered.—SWL Borer, 37 Broadway, Ripley, Derbyshire.

**M**OBILE 160m. receiver, Minimitter TR7, internal 9v. battery and LS, virtually unused, 10 gns. o.n.o.—Palk, 18 Everest Drive, Seaton, Devon.

**G**C-1U, Mohican, serviced and aligned April; Minimitter transistor Top Band Rx TR7 with matching whip, £30 o.n.o.—Write C. Smedley, 20 Coltman House, Greenwich, London, S.E.10.

**W**ANTED: unmodified Panda Cub transmitter, must be in good condition, would collect, North of England preferred.—Riley, 11 Southgate, Halifax, Yorkshire.

**R**TTY For Sale. Mod. 7B Printer and six rolls of paper, £10. AP6862 and AP66863 T.U. and PSU, £12. Receiver Adaptor Field ZA.39384, £5. 80 + 80v. PSU, £2 10s. 7B PSU, £2 10s. HRO Rx with four coils, £15. TW-2 mobile Rx, £22. T.W. ten-watt 2-metre Tx, both as new, £18.—Apply Bass, 32 Whitmore Avenue, Grays, Essex. (Phone Grays Thurrock 2349.)

**S**ALE: Eddystone 840C, £40. Cwt. gear, chassis including R.1155, valves, transformers, etc., £10 o.n.o.? Buyer collects.—Chamberlain, 6 Longfield Road, Winchester, Hants.

**V**IRTUALLY brand new Creed 6S5, auto-head. AC mains, hammer grey finish, press-button start and automatic stop, £80.—Box No. 3027, Short Wave Magazine, 55 Victoria Street, London, S.W.1.

**S**ALE: HRO-MX, Class-D (AC), muting/relay unit S (all together), £18. 60-watt AM/CW Tx, 80-10m. Xtal/VFO, 12in. x 7in. x 5in., manual, £12. Meter, £4. Transistor Bug Key, £4. All my spares, £10 (lot).—G3SJM, 4 St. Stephen's Close, Bath. (Tel. 4108.)

**H**EATHKIT SB-10U Single Sideband unit, new, unused, latest model, £35. OS-1 Oscilloscope ditto, mumetal screen, £16. Spotless condition with manuals.—G8BD, 19 Alsford Road, Purbrook, Perts-mouth, Hants.

**WORLD WIDE COVERAGE COMMUNICATION RECEIVERS**



**9 valves 4-waveband**

MODEL HE-30 **40 gns.** BRAND NEW

Delivery from stock also SR40 £24. 15. 0

Send for full details.

**QUARTZ CRYSTALS**

for TRANSMITTING, RECEIVING, RADIO CONTROL, Etc. SEND FOR LIST OF OVER 600 FREQUENCIES

'S' Meters 1 1/2" square. Model SR-2P. Brand New 35/-.

**VALVES**

Receiving, Transmitting. Over 800 types at new low prices.

SEND FOR NEW LIST

NEW 9-TRANSISTOR CRYSTAL CONTROLLED TRANS/RECEIVERS

Complete with leather case, Telescopic aerial, internal batteries, full speaker output, excellent range up to 5 miles.

Size: 9" x 3" x 2" PRICE £25 pair

Also—Lower power version. Complete at £9/19/6 pair Full details on request

**TRANSISTORS**

Brand New 1st Grade MULLARD

|        |      |         |      |
|--------|------|---------|------|
| AC107  | 14/6 | OC75*   | 6/-  |
| AF114  | 10/- | OC76*   | 6/-  |
| AF115  | 9/6  | OC81*   | 6/6  |
| AF116  | 9/-  | OC82*   | 9/-  |
| AF117  | 8/6  | GET114* | 6/6  |
| AF118  | 17/6 | GET115  | 9/6  |
| ADT140 | 13/- | GET116* | 13/- |
| OC44   | 6/-  | OC83*   | 6/-  |
| OC45   | 5/-  | OC84*   | 8/6  |
| OC71*  | 4/-  | OC170   | 8/6  |
| OC72*  | 6/6  | OC171   | 9/6  |

POWER TRANSISTORS

|       |      |        |      |
|-------|------|--------|------|
| OC25  | 12/- | OC35*  | 15/- |
| OC28* | 17/6 | OC36*  | 15/- |
| OC29* | 17/6 | AD140* | 25/- |

\*Matched Pairs available

Send for New List

**NEW 86 PAGE 2/6 P.P. ILLUSTRATED CATALOGUE**

VALVE, TRANSISTOR and CRYSTAL LIST I/-

**HENRY'S RADIO Ltd.** PAD 1008/9  
303 EDGWARE ROAD, LONDON, W.2 Mon.-Sat. 9-6 p.m. Thurs. 9-1 p.m.

**SHORT WAVE (HULL)**

**65GX**

**Second-hand Receivers**

|   | £  | s. | d. |
|---|----|----|----|
| <b>NATIONAL NC105.</b> 550 kcs. to 30 mcs. bandsread ... .. | 44 | 0  | 0  |
| <b>EDDYSTONE 670.</b> Marine ... ..                         | 17 | 10 | 0  |
| <b>EDDYSTONE 740.</b> 550 kcs. to 30 mcs. ... ..            | 25 | 0  | 0  |
| <b>HALLICRAFTERS SX140.</b> 80 to 10 ... ..                 | 30 | 0  | 0  |

**Second-hand Transmitters**

|  |     |   |   |
|--|-----|---|---|
| <b>GREEN &amp; DAVIS.</b> 2 metre Falcon, 12 volt DC | 29  | 0 | 0 |
| <b>PANDA PR120.</b> In excellent order ... ..        | 49  | 0 | 0 |
| <b>HALLICRAFTERS HT32A.</b> SSB 80 to 10             | 160 | 0 | 0 |

**New Equipment**

|   |     |   |    |
|---|-----|---|----|
| <b>NATIONAL NCX3.</b> SSB transceiver, 80, 40, 20 — 200 watts ... ..  | 148 | 8 | 4  |
| <b>NATIONAL NCX/A.</b> AC Speaker Console P.S.U. ... ..               | 46  | 7 | 1  |
| <b>NATIONAL NCX/D.</b> DC P.S.U. ... ..                               | 50  | 8 | 11 |
| <b>EDDYSTONE 870A</b> ... ..  | 34  | 5 | 8  |
| <b>EDDYSTONE 840C</b> ... ..  | 62  | 0 | 0  |
| <b>EDDYSTONE 960.</b> Transistor ... ..                               | 135 | 0 | 0  |
| <b>EDDYSTONE EC 10.</b> New transistor receiver early delivery ... .. | 48  | 0 | 0  |
| <b>EDDYSTONE EA 12.</b> New Amateur bands receiver, ex-stock ... ..   | 185 | 0 | 0  |
| <b>MOSLEY CM 1.</b> Amateur bands ... ..                              | 86  | 0 | 0  |

Carriage extra on all the above

£65 allowed on your Eddystone 888A against a new EA 12

Wanted — your modern receivers, SSB gear, etc.

**24a NEWLAND AVENUE, HULL**  
Telephone: 408953

## FIXED OR MOBILE GET WITH IT!

WHATEVER YOUR INTEREST, TW EQUIPMENT IS DESIGNED TO GIVE YOU OUTSTANDING PERFORMANCE AND RELIABILITY

- 70 cms. **A2521 TROUGH LINE CONVERTER.** 6DS4 nuvistor G.G. mixer, 6BQ7A cascade I.F. 12-16 mc/s. or to order 616 xtal osc. 60S4 multiplier. £18
- 2 m. **TW-2 10w. TX.** Complete with modulator. 23 gns.  
**TW NUVISTOR CONVERTER (6DS4)** any I.F. (With built-in mains supply £15). 11 gns.  
**TW TWOMOBILE.** All transistor RX. 144-146 mc/s. Self-contained. £30  
**TW TRANSISTOR CONVERTER.** 1" x 1" x 3". Philco transistors. I.F.s 4-6, 14-16, 24-26 mc/s. Suits any RX. 9 gns.
- 4 m. **TW NUVISTOR CONVERTER.** Any I.F. Same price as 2m. models.  
**TW4 10w. TX.** Complete with modulator. Same price as 2m. model. £30  
**TW TRANSISTOR RX.** 70.2-70.4. £30  
**TW TRANSISTOR CONVERTER.** 1" x 1" x 3". 9 gns.
- 160 m. **TW TOPBANDER.** 10w. TX. Complete with modulator. High stability V.F.O. £23  
**TW TOPMOBILE.** All transistor RX. 19 gns.

Mains and Mobile P.S.U.s for the above transmitters, complete with aerial switching, £15

For full details, write to:—

### T. WITHERS (Electronics)

15b GILBERT STREET, ENFIELD, MIDDX.  
G3HGE Tel. Waltham Cross 26638 G3HGE

## G. W. M. RADIO LTD.

**V.H.F. RECEIVERS P104.** Similar to R1132 but crystal controlled. Supplied with instructions for easy conversion to tunable set to cover 100 to 150 mc/s. In good clean condition, £3/10/-, carriage, 15/-. Matching power unit for 230 volts A.C., £2/5/-, carriage 10/-.

**METERS.** 2" Round, 500 microamp, 8/6, post 1/6; 3½" Round, 100 microamp, 25/-, post 1/6. Ex-equipment tested and guaranteed.

**RECEIVERS, MARCONI CR100.** 60 kc/s. to 30 mc/s. Crystal filter, B.F.O., etc. Good condition and working order, £18/10/-, carriage £1.

**WALKIE-TALKIE TYPE 88.** Set only, in good clean condition. Valves: 1 3A4, 6 1L4, 4 1T4, 1 1S5, 2 1A3. Crystal controlled, 4 channels, range 38-40/40-42 mc/s. 90 volts H.T. 1.5 volts L.T. Price £2 each, post 7/6.

**THERMOSTATS.** 4" rod type. 10 amps. 250 volts. 25 to 105 degrees centigrade. Differential 4 degrees. Brand new, 12/6, post 1/6. The range of these can be altered within wide limits.

**TRANSISTORS, Type MAS20, 5/-.** Post 6d.

**RECEIVER SECTION OF WALKIE-TALKIE.** 18, 6 to 9 mc/s., or 63T, 3 to 6 mc/s. Complete with 3 ARP12 and 1 AR8 valves, 25/- post paid. Either type.

**KITS for 18 or 68T.** Comprising: headphones, microphone, key, box of spare valves and wire aerial, 20/-, post 2/6.

All equipment offered is complete but not tested unless otherwise stated. Carriage charges are for Mainland only.

Terms: Cash with order. Early closing Wednesday.

40-42 PORTLAND RD., WORTHING, SUSSEX

SMALL ADVERTISEMENTS, READERS—continued

**VICEROY transmitter, £75. Linear amplifier, £35. DX-100U, £55. Eddystone 888A, £60. Heathkit GDO, £10. New 813's, 30s. No callers. Appointment only.—Westleigh, Fore Street, Beer, Devon.**

**GELOSO Tx, 130-watt, and pack, £9. G3BDQ Rx, £25.—Worthington, 43 Mount Road, Penn, Wolverhampton.**

**WANTED: 70-centimetre amateur-band transmitter, capable 20w. RF carrier output on AM phone, preferably with power supply, metering, etc. Either commercial or well-constructed amateur equipment considered. Good price and immediate cash for the right job. Offers and enquiries to—Box No. 2941, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.**

**VICEROY late Mk. I with Mk. III control switching, £78. Eddystone 750 with spare valves, £33. Heathkit Mohican, £23. Two 813's, 13s. each. UM3, 30s. 1500v. 200 mA xformer, 30s. Short Wave Magazine and RSGB Bulletin 1951-1961, offers? Carriage extra.—G3HDQ, 390 Chester Road, Woodford, Cheshire.**

**HI-FI FM Tuner, brand new, cost £16, sell £10. Laboratory PSU, stabilised to 500v. (variable) with LT taps, £15 o.n.o.? Sundays only.—Gorrill, 4A Southgate Parade, Crawley, Sussex.**

**WANTED: Suitcase Tx/Rx Type A, Mk. II, other types considered. Good price paid for unmodified set.—Box No. 3026, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.**

**SALE: CR-100, good condition, £12 o.n.o.? Mint S.K.W. Geloso converter, £14. Buyer collects CR-100.—Gardner, 5 Wellington Street. Southbank, Middlesbrough, Yorks.**

**HRO Senior (table model Rx), good condition, with 16 coils, including all amateur bands 10m. to 160m., complete with HRO PSU 100 to 250v. AC input, £15.—G3OPI, 11 Falmouth Street. Walney Island, Lancs.**

**MINIMITTER Tx for sale, 150w., superb condition, low-pass filter. Seen working.—Cole, "Silver Plough," Pitton, Salisbury. (Tel. Farley 266.)**

**AR88, manual, etc., £31. Also CR-100, £12. Both in excellent condition and working order.—L. Coomber, 14 Hardenhuish Road, Bristol, 4.**

**DO YOU BUILD YOUR EQUIPMENT? 50 assorted bakelite and plastic control knobs, ¼in., 1in., 1½in. 2in., black, walnut and ivory: 30s. the lot or nearest offer.—Watts, 62 Belmore Road, Thorpe, Norwich, Norfolk.**

**MASTER Mobile Antenna, all-band coil, bumper mount, £6.—G3JDP, 111 Canfield Gardens, London, N.W.6.**

**52 RECEIVER FB, PSU, spares kit, accept first reasonable offer. Buyer collects. — Perrins, G3EDX. (Godalming 448.)**

**EDDYSTONE 840A, Codar Preselector, phones and speaker, prefer buyer collects, £25 o.n.o.?—Stampton, 67 Park Place, Gravesend, Kent.**

**L.G.300 transmitter, complete with modulator and power supplies, perfect. Hallicrafters SX-24 Receiver, Hallicrafters SX-27 VHF Receiver. SSB transmitter with linear PA, T21/300w. p.e.p. R.208 Receiver. Ekco Car Radio, model CR60. Offers?—Box No. 3029, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.**

**FOR SALE: Canadian VRL Rx, Geloso front-end, both in good condition. Offers, please?—G. M. Grant, Cairnfield Lodge, Buckie, Banffshire.**



SMALL ADVERTISEMENTS, READERS—continued

**SALE:** 3X Teleprinter, in very good condition, Scover, baseboard and keyboard surround have all been hammer-grey enamelled, also many parts have been chromium plated. Power pack, together with another printer Type 3A (for spares), plus 40 reels of tape, £25. Tape perforator with paper, £3 10s. AP.66863 power pack, £8. Receiver type Canadian Marconi No. 9, Top Band and Eighty, £5. Double 6ft. rack, ideal for Club or Lab., with swing doors, £6. Complete four-metre station, Pye Rx and Tx, rack mounting, £10. Pye four-metre Rx, xtal controlled, easily converted, £4.—B. Davies, 16 Mulkern Road, Holloway, London, N.19.

**19 SETS** £1 + 10s. p. & p. B44 Mk. III Tx/Rx complete, case, circuit, etc., £6 10s. + 10s. Meters: 500 mA 2½in., basic 5 mA, 10s. + 2s. 6d. 30-0-30 mA, 2in. basic 3 mA, 10s. + 2s. 6d. 100 Microamp. 2½in., in 5in. x 5in. x 3in. case, 22s. 6d. + 2s. 6d. OC201, 10s. Pair OC35's on heat sink, 12s. 6d.—Tynan, 29 Elm Walk, Stevenage, Herts.

**MINI-BEAM**, tri-band, twin boom, Panda, with feeder, £13 s.a.e.—G3LEB (QTHR).

**CLEARING SHACK.** *Basic Electronics* by Technical Press, 7 vols. (never opened), £2. ARRL *Handbooks*, other technical books. Gelson Audio Oscillator switched 800, 1,000 and 1,200 cycles, portable, 110/230v. internal PSU, ideal group code practice, £5. Various mains transformers, PSU. J38 Morse key, parts for ATU. Write for full list.—Crabtree, 138 Hawley Road, Wilmington, Kent. (Dartford 22845.)

**WANTED** own use, Labgear Triband Quad, or castings only. Also Labgear aerial switching, SWR meter or coax units.—Box No. 3030, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**HRO**, Six coils, 160-10m. 6BA6 RF's, good condition, must clear, £10 if buyer collects.—GW3LSB, Holcombe, Vicarage Avenue, Llandudno, Caerns.

**SALE:** Eddystone S.640 with S-meter, speaker, Shandbook and some spare valves, excellent condition, £25. H.M.V. car radio, works fine but needs PSU, 50s. Carriage paid.—Belcher, 7 Savill Road, Lindfield, Sussex. (Lindfield 2050.)

**SALE:** Table top Tx, 50 watts, Gelson VFO to 807 SPA. Coils for 80, 20m.; six-pin coils can easily be wound for other bands; separate internal PSU's for bias, PA, Osc. VR150 stabilised, numerous TV decouplers. Offers? Buyer collects.—G3JJU, 7 The Laurels, Burnside, Fleet, Hants.

**MINIMITTER** Top 2-7, £18. TR7 160m. transistor Rx, £8. Both mint condx.—W. H. Brown, 1 Gib Lane, Hoghton, Nr. Preston, Lancs.

**TWO** 1540 Tx's covering 144 mc, 832 final, complete power and mod., £10 each. BC-221, as new, £10. Two wavemeters type 1185A, 20 to 100 mc, £4 each. Hallicrafters R-19 Rx's, 70 to 100 mc. 115v., £3 10s. each. Ex-GPO detector meters, make ideal field strength meters, 10s. each. Also FM-AM modulated generator. Buyers collect Tx's and BC-211, carriage extra.—J. Sharratt, 12 Clocks Close, Edlesborough, Dunstable, Beds. (Tel. Eaton Bray 297.)

**WANTED** to buy, Manual or circuit Hallicrafters SX-42.—Replies to G4IV, Mount Hawke, Truro, Cornwall, (ZS5US, J118, Mufulira, Northern Rhodesia.)

**FOR SALE:** CR-100 with NL, £15. Minimitter 5-band converter, £8 10s. Buyer collects.—Brown, 25 Heol-yr-Efali, Rhiwbina, Cardiff. (Tel. 68166.)

THE UNIQUE

# Joystick

**VARIABLE  
FREQUENCY ANTENNA**

The DX aerial for  
any QTH!

Hear and work that spicy DX with the Joystick—lift yourself out of the frustration of "lump of wire" local contacts—pump out a real beefy signal—yes even from inside a flat or bungalow.

ONLY  
**£3'10'0**  
COMPLETE

A life time of experience and aerial "know-how" has gone into the development of this revolutionary principle of a Variable Frequency Antenna on which World Patents are now pending. Possessing the unique property of an even performance over all frequencies between 1.5 : 30 mcs. the Joystick's special matching facilities and associated A.T.U. ensures efficiency on any frequency. Peak performance for transmission and maximum voltage for reception—the Joystick is a major break-through for ardent SWLs and all licensed stations. Over 1,000 stations all over the world are already equipped with the Joystick—Testimonials pour in, e.g.—

GW3MMU, with indoor "Joystick" and 8ft. feeder, standing on the ground, crystal controlled 15w. TX and only 1 crystal on 14 mcs.—reports contacts with 7 "W" States, 1 "PY" and "countless European and Asiatic Russians."

A poor QTH is now no excuse for a weak signal — act . . .

**ORDER YOUR JOYSTICK NOW**

Full "money-back" **GUARANTEE** if you're not completely satisfied. Not convinced? Still complete the coupon below for a detailed brochure and showers of testimonials!

**PARTRIDGE ELECTRONICS LTD.,**  
7, Sowell Street, Broadstairs, Kent  
Thanet 62535

Please supply "JOYSTICK" (tick appropriate box)

Standard make, £3 10s.  
 De luxe make (all copper RF elements) £4 10s.  
 "JOYMATCH" A.T.U. 10s.  
 (+ 1s. P/P unless ordered with Joystick)

Enclosed is cheque/M.O./P.O. value £.....  
 Please send brochures and testimonials

NAME..... Callsign.....  
 ADDRESS.....  
 Town..... County..... 51

## HOME RADIO 187, LONDON RD. MITCHAM, SURREY

### Some Unrepeatable Bargains!!

Some exceptionally well made S.W. Tuning Condensers, silver plated and split end vanes.  $\frac{1}{4}$ " spindle with extension for coupling two or more together.

Single gang size  $1\frac{1}{2} \times 1\frac{1}{2} \times 1\frac{1}{2}$ ". Cap. 50 Pf. **4/6** Worth 10/-

Single gang size  $1\frac{1}{2} \times 1\frac{1}{2} \times 1\frac{1}{2}$ ". Cap. 60 Pf. **5/6** Worth 11/6

Twin gang size  $2\frac{1}{2} \times 1\frac{1}{2} \times 1\frac{1}{2}$ ". Cap. 50 Pf. **8/6** Worth 15/-

Air trimmer size  $1\frac{1}{2} \times 1\frac{1}{2} \times 1$ ". Cap. 100 Pf. **2/6** for 3  
Worth 21/-

Also for S.W. Work

Air Tuner Condensers  $1\frac{1}{2} \times 1\frac{1}{2} \times 1$ ". Cap. 20 Pf. **3/9**  
Worth 6/9

Air dielectric high frequency tuning condensers with widely spaced, log shaped plates  $2 \times 2 \times 1\frac{1}{2}$ ". 20 Pf. **4/6**  
Worth 10/6

Similar condenser to above, but plates not so widely spaced  $2 \times 1\frac{1}{2} \times 1\frac{1}{2}$ ". 160 Pf. **4/-** Worth 7/6

2 Gang 500 Pf, Tuning Condenser **3/6**

Please add 1/6 for postage and packing on all the above

**Our Catalogue is still available !**

Price **2/6**, plus 1/6 postage and packing

## Short Wave Magazine

### Advertising

gives

## World-Wide Coverage

in the

## Amateur Radio Field

For Space Rates apply:

ADVERTISEMENT MANAGER,  
SHORT WAVE MAGAZINE LTD.,  
55 Victoria Street, London, S.W.1.  
(Tel.: Abbey 5341)

### SMALL ADVERTISEMENTS, READERS—continued

**WANTED** by amateur assembling Station, home-made (G2DAF, etc.) or commercial amateur-band receiver and transmitter; Command Receiver; Morse training record; surplus components. Only very reasonable prices.—Box No. 3031, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**SALE:** Pye 25-watt mobile Tx/Rx, complete shock mounts, control box, handset, circuits, working 2m., £6. TCS-12 Rx/Tx (less some valves), aerial unit, handbook, £8. Panadaptor, 30 mc input, circuit, £5. UHF Rx, 130-520 mc (local oscillator valve u/s), with PSU, £3. 100 kc xtal filter, 300 c/s bandpass, £2.—Storey, 10 Avon Road, Sunbury-on-Thames, Middlesex. (Phone 4422.)

**SALE:** 358X Receiver with PSU and 10 coils, £14 o.n.o.? Prefer buyer collects (Essex).—Box No. 3013, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**EDDYSTONE 840C**, little used, as new, £45 o.n.o.?—Howes, 12 Greenhow Close, Newton, Lancaster. (Phone 64881.)

**WANTED:** "Wide" xtal filter from R.206, or any 465 kc filter suitable for SSB. Also Toroidal Core for 50-60 watt transistor converter.—Thirlwell, 55 The Wells House, Well Walk, London, N.W.3.

**HRO**, five GC coils, excellent, £10. Geloso 4/102V VFO, with valves and dial, £4. UM2, £2. W.1191A wavemeter, new, £5. Carriage extra.—Gray, 10 Hoymans Quay, Stromness, Orkney, Scotland.

**G2DAF** design SSB Transmitter fitted with two 6146's, for sale. Well-built and in *de-luxe* cabinet, £45 o.n.o.? Prefer buyer views, tests and collects (North Lincs).—Box No. 3032, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

## MORSE MADE EASY !!!

The famous RHYTHM RECORDED COURSE cuts practice time down to an absolute minimum!

One student, aged 20, took only 13 DAYS, and another, aged 71, took 6 WEEKS to obtain a G.P.O. pass certificate. If you wish to read Morse easily and naturally, enclose 6d. stamp for full explanatory booklet to:

RECEIVING SPEED CHECK RECORD 15s., or FREE with Course  
**G3HSC, 45 GREEN LANE, PURLEY, SURREY**

## NYLON • P.T.F.E.

ROD, BAR, SHEET, TUBE, STRIP, WIRE  
No Quantity too Small List on application

**BRASS, COPPER, BRONZE,  
ALUMINIUM, LIGHT ALLOYS,  
STAINLESS STEEL**

## H. ROLLET & CO. LTD.

HOWIE STREET, S.W.11

BATerseae 7872

Works: 36 ROSEBERY AVENUE, LONDON, E.C.1  
Branches at LIVERPOOL, MANCHESTER, BIRMINGHAM, LEEDS,  
GLASGOW.

## G3SJ QUARTZ CRYSTAL RESONATORS LIMITED

APPROVED PRODUCTION E.I.D. and A.R.B.

### CRYSTAL UNITS

**Range :**

1,500 kc/s. – 21,000 kc/s. Fundamental  
15,000 kc/s. – 100,000 kc/s. 3rd and 5th Overtones

**Specifications :**

1. A.R.B. and E.I.D. Standards. DEF 5271-A
2. U.S.A. Jan/MIL SPECIFICATIONS (CRI(A)AR — CR79U)
3. To customers own requirements.

Units are all metal. No glass envelope types are produced.

Note :— Where designation in Specification 1 or 2 is not known or listed state :—

- (a) Nominal Frequency (Crystal fundamental)
- (b) Channel Frequency (Where applicable)
- (c) Input Capacity (Where not stated units made to 30pf.)
- (d) Holder type (or send sample)
- (e) Equipment

As many of these as are known must be given, though in many cases equipments are known to us and in these cases crystals may be made from either (a) and (e), or (b) and (e) only.

**Stonehouse Street - Plymouth - S. Devon - Tel. 61876**

# HAMMARLUND

(Established 1910)

A Member of the Gianinni Scientific Group of Companies

### Reliable Equipment of Distinction available from stock

Top left:  
**HQ145X.** Double conversion super. General coverage and Bandsread, 11 tubes, £115.

Top right:  
**HX-50.** SSB Transmitter. 130 watts p.e.p., crystal filter, self-contained power supply, as used on many DX-peditions, £175.

Bottom left:  
**HQ170A.** Triple-conversion super. Amateur bands only. 17 tubes, £140.

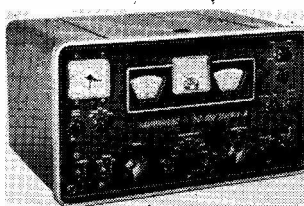
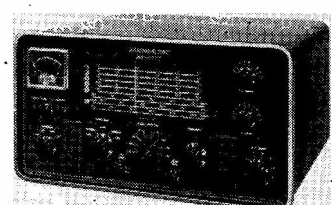
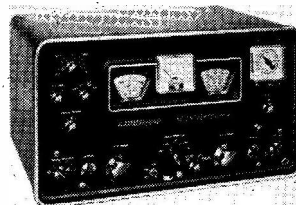
Bottom right:  
**HQ100A.** General coverage and Bandsread. "Q" Multiplier. 10 tubes, £80 (clocks extra).

**HQ180A.** General coverage and Bandsread, 18 tube triple conversion superhet, £177.

**HQ110A.** Amateur bands only, 12 tube double conversion superhet, £100.

**NEW! HXL-1 Linear Amplifier.** Two 752A tubes in the final. Max. 1500 watts p.e.p. 1200 watts c.w. Can be driven by HX50, Viceroy, 3253 etc. We are taking orders for delivery early May. Reserve Now Price £165

Sole U.K. Distributors **Easy terms available**  
Trade Enquiries Invited



# KW

## ELECTRONICS LTD Vanguard Works

1 HEATH STREET, DARTFORD, KENT Cables : KAYDOUBLEW, Dartford Phone: DARTFORD 25574



## Save money building any Heathkit model

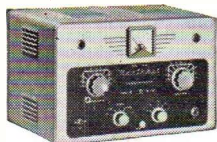
A wide range of over 50 British models to choose from

### Radio-Amateur Equipment - Test Instruments - Hi-Fi Equipment

(All models are available either in kit form or assembled. Kit prices given below. Assembled prices on request)



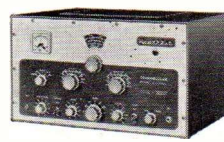
SB-10U



DX-40U



RA-1



DX-100U



OS-1



IO-12U



V-7A



GD-1U



RG-1



QPM-1



CM-1U



VF-1U

**NEW! HIGH SENSITIVITY GENERAL COVERAGE RECEIVER, Model RG-1.** A high performance, low cost receiver for the discriminating Short-wave listener. Frequency coverage from 600 Kc/s. to 1.5 Mc/s. and 1.7 Mc/s. to 32 Mc/s. Send for details **£39 16 0**

**AMATEUR 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. **£33 19 0**

**SINGLE SIDEBAND ADAPTOR, Model SB-10U.** May be used with most A.M. transmitters. Less than 3 W. R.F. input power required for 10 W. output. Operation on 80, 30, 20, 15 and 10 m. bands on U.S.B., L.B.S. or D.S.B. **£39 5 0**

**THE "MOHICAN" GENERAL COVERAGE RECEIVER, Model GC-1U.** In the forefront of design with 4 piezo-electric transistors, 10 transistors, variable tuned B.F.O. and Zener diode stabiliser. An excellent fully transistorised receiver for both Amateurs and Short-wave listeners. See specification Sheet. **£37 17 6**  
Suitable Battery Eliminator. Model UBE-1. **£2 17 6**

**AMATEUR BANDS RECEIVER, Model RA-1.** Covers all amateur bands 10-160 metres. Half-lattice crystal filter at 1.6 Mc/s. I.F. Provision for fixed, portable or mobile uses. Switched USB and LSB for SSB. Send for full details. **£39 6 6**

**OPTIONAL EXTRAS.** Crystal Calibrator CL-1 **£4 12 0**. Matching Loudspeaker Cabinet SG-4 **£1 9 6**. Loudspeaker **£1 4 5** incl. P.T

**AMATEUR TRANSMITTER, Model DX-100U.** Covers all amateur bands from 160-10 metres, 150 watts D.C. Input. Self-contained incl. power supply, modulator and V.F.O. **£79 10 0**

**2½in. 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 lb. **£21 18 0**

**Q MULTIPLIER KIT, Model QPM-1.** May be used with receivers having 450-470 kc/s. I.F. provides either additional selectivity or signal rejection. Self powered. **£8 10 0**  
Model QPM-16 for 1.6 Mc/s. I.F. **£8 10 0**

## Easy-to-build kit-sets of highest quality at lowest possible prices

**NEW! SELF-SUPPORTING. HEATHKIT AERIAL TOWER, Model HT-1.** The ideal tower for "Amateur" or TV use. Height 32ft., square tapering section 3ft. by 3ft. at base. No stays required. Accessories available for fitting fixed or rotatable tube ext.:

HT-1G kit (galvanized finish) .....  
HT-1 kit (Red oxide finish) .....

### PLEASE SEND FOR FREE BRITISH CATALOGUE

(Comprehensive American Heathkit Catalogue—over 200 Models—1/- post paid)

£35 15 0  
£29 15 0

**GRID DIP METER, Model GD-1U.** Continuous coverage 1.8 to 250 Mc/s. Self-contained. 5 plug-in coils supplied. **£10 19 6**

**VAR. FREQ. OSCILLATOR, VF-1U.** Calibrated 160-10 m. Fund. outputs on 160 and 40 m. Ideal for our DX-40U and similar transmitters. **£10 17 6**

**HI-FI FM TUNER.** 88-108 Mc/s. Tuning unit (£2 15 0 incl. P.T.) with 10.7 Mc/s. I.F. output and I.F. amplifier (£13 3 0) complete with cabinet and valves; self powered. **Total £15 18 0**

**HI-FI AM/FM TUNER.** FM: 88-108 Mc/s.; AM: 16-50, 200-550, 900-2000 m. Tuning heart (£4 13 6, incl. P.T.) and I.F. amplifier (£21 16 6) complete with cabinet and valves; self powered. **Total £26 10 0**

**CAPACITANCE METER, CM-1U.** Direct-reading 4½in. scale. Full-scale ranges, 0-100 μF, 0-1,000 μF, 0-0.01 μF and 0-0.1 μF. **£15 15 0**

**VALVE VOLTMETER, Model V-7A.** 7 D.C., A.C., r.m.s. and pk to pk. voltage ranges 0-1.5 to 1,500 v. **£13 18 6**

**5in. OSCILLOSCOPE, Model IO-12U.** Has wide-band amplifiers, essential for TV servicing, F.M. alignment, etc. Vertical freq. response 3 c/s. to 4.5 Mc/s. T/B covers 10 c/s. to 500 Kc/s. in 5 ranges. **NEW LOW PRICE. £32 12 6**

**"OXFORD" TRANSISTOR PORTABLE Model UXR-2.** A luxury two waveband receiver, ideal for use in the home or out of doors. **£14 18 0**

**SHORT WAVE TRANSISTOR PORTABLE, Model RSW-1.** Four bands (2 short, Trawler and Medium). **£19 17 6**



GC-1U

*All prices include free delivery U.K.  
Deferred terms on orders above £10*

**DUAL-WAVE TRANSISTOR PORTABLE, Model UXR-1.** Medium and long wavebands. Real hide case. **£12 11 0**

Please send me **FREE CATALOGUE** (Yes/No)  
Full details of model(s) .....

**NAME** .....,  
(BLOCK CAPITALS)  
**ADDRESS** .....

SW6

## DAYSTROM LTD

DEPT. SW6, GLOUCESTER, ENGLAND

A member of the Daystrom Group  
manufacturers of the

**WORLD'S LARGEST SELLING ELECTRONIC KITS**