Bargains in Ex-Services Radio and Electronic Equipment

**INFRA-RED IMAGE CONVERTER CELL**

Sniperscope Snooperscope

The famous war-time “Cat’s-eye” tube used in “Tabby” for night-sniping and observation.

Provides a Silver Cesium Oxide Screen for the conversion of infra-red rays to visible rays, using an infra-red source. Data provided.

Dimensions overall: dia. 2" x 11".

Screen dia.: 1 1/2".

Clydesdale’s 12/6 each Post paid

**Ex-Royal Navy SOUND-POWERED TELEPHONE**

NO batteries required, gives long service without attention. Complete with warning indicator lamp and generator, giving a high-pitched note, which can be heard through any noise. Where a number of units are used the lamp would indicate which one is being called. Dim.: 7 1/2" x 9" x 7 1/2", overall, for wall-mounting. Designed for ships’ use, but suitable for the Home, Office and Factory.

Clydesdale’s 27 6/6 each Carriage paid

**STILL AVAILABLE**

Wireless Set No. 48 ... £14/10/-
TI154 Transmitter Unit 4 range ... £10/10/-
TI154 Transmitter Unit 3 range ... £7/18/6
R1155 Receiver Unit, ... £12/12/-
Bridge Megger 100 mgs. at 1,000v ... £3.5
Wee Megger 20 mgs. at 250v ... £5/19/6.
A.C. Power Unit type 3... £3/19/6.
Crystal Multiplier type MI-19468 ... £1/19/6.
BC-456 “Command” Modulator Unit ... 19/6.
Battery Amplifier A.1369, 11/6.
Reflector Aerial (MX-1) 5/6.

As previously advertised, prices include carriage.

**SHAD ED POLE MOTORS**

Rugged and highly efficient motors, giving an amazing performance at an economical price. Will stand heavy overloads, and for intermittent ratings are capable of giving up to twice the rated power.

Carefully tested for balance, and individually put through a Silent Room test, these motors are ideal for Gramophone Motors, Wire and Tape Recorders, fans, Motion displays, Switch Movements, Timing Mechanisms, and many other applications.

**SPECIFICATION**


<table>
<thead>
<tr>
<th>Type</th>
<th>SR2</th>
<th>SR1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stack Thickness</td>
<td>0.675&quot;</td>
<td>0.875&quot;</td>
</tr>
<tr>
<td>Watts (Light)</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>R.P.M. (Light)</td>
<td>2,750</td>
<td>2,750</td>
</tr>
<tr>
<td>Starting Torque (in./oz.)</td>
<td>1.7</td>
<td>2.3</td>
</tr>
<tr>
<td>Full Load Torque (in./oz.)</td>
<td>2.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Full Load R.P.M.</td>
<td>2,000</td>
<td>2,000</td>
</tr>
<tr>
<td>Weight</td>
<td>17 lb.</td>
<td>23 lb.</td>
</tr>
</tbody>
</table>

Shaft Dia.: 0.1875" Steel Centreless Ground.

Bearings: Graphite Bronze Oilless type, Self Aligning.

Rigid Diecast Bearing Brackets.

Vacuum Impregnated Layer Wound Coil.

Clydesdale’s Model SR2 25/6 Post paid

Clydesdale’s Model SR1 32/6

**VIEWMASTER TELEVISION CIRCUIT AND DATA**

State whether London (A) or Sutton Coldfield (B). All Components available.

**READY JUNE**

Complete Illustrated List of No. 7 of Ex-Services Bargains. PLUS

List of Radio and Television Components by foremost manufacturers, fully illustrated, also containing useful valve, coil, and other data. Send 6d. to cover distribution cost. Please print name and address.

**POWER UNIT 247**

For 230v, A.C. 50 cycles. Output 600v at 200 ma. smoothed D.C. 6-3v, A.C. 3A.

Complete power pack, with SU4G rectifier, etc., built on metal tray 10 1/2" x 9" x 13" with grey finish metal cover 11" x 9 1/2" x 7 1/2", 2 chromium handles, red indicator and inspection door, giving access to rect. and pilot bulb.

Clydesdale’s 59/6 Carriage paid

Clydesdale’s Viewmaster 5/6 Carriage paid with transit box

View of thebring with the title "CLYDESDALE: Bargains in Ex-Services Radio and Electronic Equipment." The text contains various advertisements for electronic equipment, including infra-red image converter cells, sound-powered telephones, shaded pole motors, and Viewmaster television circuit and data. A power unit is also advertised, and a list of Ex-Services bargains is available.*
A dependably accurate instrument for testing and fault location is indispensable to the amateur who builds or services his own set. Stocks are now available of these two famous “Avo” Instruments. If you have any difficulty in obtaining one locally, please send us the name and address of your nearest Radio Dealer.

**The Universal AvoMinor**

A small but highly accurate instrument for measuring A.C. and D.C. voltage, D.C. current, and also resistance. It provides 22 ranges of readings on a 3-inch scale, the required range being selected by plugging the leads supplied into appropriately marked sockets. An accurate moving-coil movement is employed, and the total resistance of the meter is 200,000 ohms. The instrument is self-contained for resistance measurements up to 20,000 ohms and, by using an external source of voltage, the resistance ranges can be extended up to 10 megohms. The ohms compensator for incorrect voltage works on all ranges. The instrument is suitable for use as an output meter when the A.C. voltage ranges are being used.

**The D.C. AvoMinor**

A conveniently compact 2⅛-inch moving coil precision meter for making D.C. measurements of milliamps, volts, and ohms. The total resistance of the meter is 100,000 ohms, and full scale deflection of 300 v. or 600 v. is obtained for a current consumption of 3mA. or 6mA. respectively.

---

**Guarantee**

The registered TradeMark "Avo" is in itself a guarantee of high accuracy and superiority of design and craftsmanship. Every new Avo Minor is guaranteed by the Manufacturers against the remote possibility of defective materials or workmanship.
A NEW COMMUNICATIONS RECEIVER
THE EDDYSTONE MODEL '750'
(A British Product)

A Double Superheterodyne possessing High Selectivity and excellent Signal-to-Noise Ratio

Four wavebands covering 32 mc/s to 460 kc/s continuous except for a small gap around 1,600 kc/s. Eleven valves. Separate oscillator, supplied with stabilized H.T. independent R.F., I.F. and A.F. gain controls. Linear frequency scales, directly calibrated. Mechanical bandspread. With high reduction ratio geared tuning mechanism.

Price £49 10 0 (Exempt from Purchase Tax)

A user writes: "The '750' Receiver is a real pleasure to handle, and the DX simply rolls in. Signals on 10, 20, 40 and 80 metres are quite exceptional, and I have never before experienced the joy of sitting down with such a 'Distance Eater'!"

Full specification available from any Eddystone Registered Dealer or from the Manufacturers:

STRATTON & CO. LTD.
EDDYSTONE WORKS, ALVECHURCH ROAD, BIRMINGHAM, 31
Telephone: Priory 2231/4
Telegrams: Stratnoid, Birmingham

A Few "PANDA" Specials

New U.H.F. Osc. units, complete. 6" x 5" x 3", steel unit chassis with supporting feet. High quality 50mmfd. variable condenser, high frequency inductance, fil. choke, 5k.w.w. pot, Philip's concentric trimmer, CERAMIC EF50v. holder, and 4-pin English type, together with sundry resistors and condensers. BRAND NEW and ready wired. Ideal for T.V. Booster conversion.

VARICAPS. 230v 50c. varicaps, output 0-230v 1.3 amps. £5/10/-. post 1/4.

813v HOLDERS, new ceramic, 5/9; Jumbo lock-in, 3/6; 866 type lock-in, 3/6; int. octals, 7d.


RECTIFIERS. 230v 20/30 m/a H.W. (3" x 1"). NEW, 3/6. 24v 3amp. bridge type, complete with mounting brackets, 12/6.

RESISTANCES. Most values in half, one and two watts; huge stocks also condensers, all types, bledders, etc. WE CAN SAVE YOU POUNDS, let us have your lists and enquiries and we will gladly quote by return. We still have a few B.C.221's and we will quote you.

SPECIAL 5kv and 7.5kv Western Electric Vacuum capacitors for T.V.I. suppression at THE LOWEST PRICE 5/6.

PANDA RADIO CO., 58 SCHOOL LANE, ROCHDALE
EDDYSTONE LOUDSPEAKER. A special 5" high flux unit with special baffle giving an excellent frequency response for communications purposes. 7" diameter. Chromium feet. Available in either black, brown or grey ripple finish, $2/19/6.

ALLOY TUNING DIAL. Three waveband edge-tilt with horizontal pointer and vertical movement. Complete with 500 pf twin- gang condenser and flywheel tuning fitted, 26/-.

BATH TUB CONDENSERS. 0-1 mfd 1000 v.w, 1/3 each. HEADSTONES. Balanced armature, 600 ohms. Ideal for crystal sets, 5/9. BROWN'S type "H" dice with 36/9 per pair. MORSE KEYS. Practice type. All parts in brass on polished wood base, 3/3. CRYSTAL SET COILS. Boxed with circuit, 2/3. CRYSTAL DETECTORS. Semi-permanent type, 3/9. Cat's-whisker type (less crystal), 3/-. Packet containing crystal and spare whisker, 9d.

CRYSTAL DIODES. 4/-.

LABGEAR COMPONENTS. 144 BRIGGATE, LEEDS 1 Tel.: 29428/9

GOODS CAN BE SENT C.W.O. or C.O.D.
INEXPENSIVE TELEVISION

is the title of the latest publication which shows how a variety of ex-Government Radar Units can be converted with the minimum of effort into efficient Television Receivers. A second edition of the booklet carrying the same title, it has been extended to cover more than the R.1335, and is well worth buying. Send only 3/- for your copy (post paid) and a complete price list of the specified equipment. Start accumulating the equipment now, as the low summer prices and be ready for the long winter evenings.

RECEIVERS R.1335. Still in great demand for T.V. Construction. Complete with all valves. ONLY 55/- (carriage, etc., 7/8).

R.F. UNITS TYPE 55. Specified with above for London Area Station. ONLY 17/- (postage, etc., 1/6).

R.F. UNITS TYPE 58. Specified for Birmingham Station now all sold, but we can supply one of the other R.F. Units with full details of modification, which has been fully tested some 70 miles from Sutton Coldfield. BRAND NEW IN CARTONS, ONLY 20/- (postage, etc., 1/6).

THE 104 I.F. STRIP. One of the units specified in the above book. A first class strip containing six valves VR65, and one each VR63 and VR92. Easily converted for vision or sound for both stations and supplied with the necessary instructions. SIZE 6 1/4' x 4'. ONLY 45/- (postage, etc., 2/6).

VALVE 1 METRE SUPERHET RECEIVER. A ground control radar receiver, this will convert into a first-class Television Receiver for the fringe areas. Full details for both stations being supplied. Contains six valves SP61, two of EA50, and one each EL7 and EL16, and six I.F.T.s of 16 m/cs with 4 m/cs bandwidth. BRAND NEW IN MAKER'S CARTONS, ONLY 59/- (carriage, etc., 5/6).

INDICATOR UNITS TYPE 58. As specified for “INEXPENSIVE TELEVISION.” Complete with valves and VCR97 C.R. Tube. BRAND NEW IN CRATES. ONLY 80/- (carriage, etc., 7/6).

INDICATOR UNITS TYPE 62. Contains 16 valves SP61, two of EA23, two of EA50, and VCR97 C.R. Tube. ONLY 75/- (carriage etc., 12/6).

TRANSFORMERS. For “INEXPENSIVE Television” can be supplied, as follows: Time Bases and Vision Transformer, 350-0-350v 50 m/a, 5v 3a, 6v 3a, 8v 2a. ONLY 35/-; Sound Transformer, 250-0-250v, 100 m/a, 5v 3a, 6v 3a, 8v 2a. ONLY 27/6. E.E. Transformer for VCR97 Tube, 2-0-2y, 1-4a, 2-0-2y, 1-4a, 2-0-2y, 1-4a, 8v 3a, 8v 3a, 8v 3a. ONLY 30/6. POSTAGE 1/6 per transformer, please.

COMMUNICATIONS RECEIVERS R.1196. A special Summer offer of these famous 2-waveband R.A.P. Receivers, the specification of which is too well known to repeat. When you own this set, you own the best. Complete with full details of how to adapt it for makes use, or we can supply a power pack and speakers ready to plug on and work immediately for only 25/- extra, to the cost of ONLY 27/6 (carriage, etc., 12/6).

RECEIVER 25/73. The receiver portion of the T.R.1196. Covers 4-5-6, 7, 8, in a single unit. Complete with valve; and VCR97 C.R. Tube. BRAND NEW IN CRATES. ONLY 90/- (carriage, etc., 7/6).

U.E.I. CORP.,

Open until 1 p.m., Saturdays, we are two mins. from High Holborn (Chancery Lane Station) and 5 mins. from King’s Cross.

YOU CAN RELY ON US FOR BRAND NEW, CLEAN, COMPETITIVE COMPONENTS. IMMEDIATE DISPATCH

VALVES

In addition to our large stock we again have a few of the following —

610 (Matsui, 10/-; 6AG, 0/-; 6AL, 0/-; 6CS, 0/-; 6CG, 0/-; 6CG2, 10/-; 6SL2 (Mullard), 6/-; 76, 0/-).

VALVE CANS

Octal, three piece, aluminium, 1/6. 25/MT, 4/0-0000.

Block paper condensers, new but surplus, 2/6 each.

FILAMENT TRANSFORMERS

Finished in green crackle and of very small dimensions, 2/6 each.

LIGHTWEIGHT SPEAKERS

Shallow with very small magnet. Brand new. 5/-, 10/-, 15/-, 10/-.

"P" COILS

Full range stocked, 5/- each.

POSTAGE STAMP SIZE MOULDED MICA

-0001 mfd., -0002 mfd., -0003 mfd., -0005 mfd., -0010 mfd., 60 each.

VIEWMASTER TELEVISION

All parts stocked, sold separately any part except rectifier kit. Envelope containing 7 plans and booklet, 5/-, state London or Midland.

CERAMIC OVAL VALVEHOLDERs

Can be used without any bolts by spring clip, 1/6 each.

SELENIUM RECTIFIERS

250v at 75 m/cs. New and checked at this rating, 5/- each.

SPEAKER TRANSFORMERS

Goodman, 55; 1, 4, 6; midget makes phone, 5/-; super midget for personal to match 484, 28/-, 4/-.

Do not forget some postage, please.

P.C.A. RADIO

HALLICRAFTERS BC.610 (or HT4B). Operat-
ing over 2 Mc to 18 Mc and modified for 21 and 28 Mc. Crystal and VFO on all bands. Complete with signalantenna, antenna tuning unit, exciter units and coils for all bands, set of 36 x-tals specially made for BC610 and new valves.

RCA TRANSMITTERS, TYPE ET.432B.

2 Mc to 20 Mc, 350W. C/W, 250 W. R/T, two 813's output. Crystal controlled and modified for VFO. Complete with separate speech amplifier.

60W. TRANSCEIVERS. Very compact, weight 13 lbs. 829 output 2 Mc to 8 Mc or 4 Mc to 16 Mc. Phone and key. High class superhet receiver. Complete with power pack for 110/220 V.A.C. and two rotary convertors for 12v battery operation, two sets of aerials (dipole and counterpoise aerial), microphone, spare valves. AR-88-D's, AR-88-LF, SX28's, HRO's with 9 or 9 coils.

All above items in excellent working condition with new valves. Working demonstration on request. Large stock of transmitting condensers, valves, crystals, and other components. Alignment and repair of communication receivers and all other amateur equipment undertaken.

P.C.A. RADIO


Receiver Div.: 170 Goldhawk Road, Shepherds Bush, W.12.
XTALS. The complete Xtal Kit in sealed cartons for the SCR, 536 (BC611) Walkie Talkie. 14 xtabs in all with 14 coils, 7 osc. and 7 final covering the complete freq. range of the unit. There are 7 tx, freq. and a further 7 xtabs spaced 450 kc for the receiver. All are in Ft 243 holders with 3½ pin spacing. The complete range is as follows:

- 3885/4340, 4000/4535, 4260/4735, 4397/4852, 4840/5295, 5327/5782, 547/5892 kc.
- The complete kit including coils, $5.60, post free.
- Set of 14 xtabs less coils, $.48, set of 14 coils, $8.
- Any pair of xtabs, $.80, with the exception of 5327-5 and 5295, these 7/6 each.
- All xtabs are being sold by U.S. makers.

XTALS. 1000 kc Billey, Valpey or Somerset, standard 3½ pin spacing, 20. 100 kc RCA, Billey, substandards, 17/6. Marconi, etc., 500 kc British 3½ pin spacing, 6$. Western Elec. 500 kc 1½ Ft 243 holders, 7/6.

FOR 144 Mc. Any freq., 8000 kc to 8110 kc Ft 243 fitting at 1½ $. A few Bendix 3½ pin spacing 8007-69 kc at 12/6.

FOR 28 Mc. Any spot freq. from 7 Mc to 7500 kc at 12/6, with the following specials:
- 7200, 7225, 7250, 7275, 7300, 7325, 7350, 7375, 7400, 7425, 7450, 7475, 7500 kc at 7½ each or 72/- per doz. All 3½ Ft 243 holders.
- FOR 7 Mc. 7000 to 7300 kc any spot freq. at 12/6, with the fone band specials as above.
- 6 Mc Band for 144, 6000 kc to 6063 kc any spot freq. at 12/6, Ft 243 holders.

FOR 21 Mc. 5250 to 5350 kc any spot freq., 12/6. Ft 243 holders.

TOP BAND. Double, 850 kc to 863 5 kc and 937 to 1038.5 kc, Ft 243 holders, by Western Elec. Prolific harmonic generators, Plated type, spot welded contacts, mounted in air gap at 5/6 each. To Commercial users and others. A complete range available from 2 Mc to 9 Mc in either 3½ or 1½ holders. The entire range by: RCA, Billey, Valpey, Stand, etc. and all leading American manufacturers. Quantity quotations are available on request. Export enquires welcomed.

VALVES RX AND TX. Another exceptionally keen 3SJ offer. All are brand new in sealed cartons and carry our full guarantee. A seldom seen line, 6/- doz. Western Elec. 500 kc Ft 243 holders, 7/6.

MODULATION TRANSFORMERS. R.C.A. P.P. 805s to P.P. 818s, 60.60, carr. paid.

THERMADOR. 400 watt. Pri. 6,700 ohms ct.— Sec. 4,500, 5,000 or 5,500 ohms. 7"x6"x5".

THERMADOR. 120/230v 50 cy. Secondary, 2280/1725/1420/1240/1275/2280 at 800 Mills. Porcelain standoffs. Sec. test volts 6,000. In original sealed crates, nett weight 150 lbs. 27/10, carr. paid.


HALLICRAFTER. Switched Primary 110/230v. S20. R. replacement, 30/-.

HALLICRAFTER. Output transformers. P.P. Primary. Separate High and Low impedance secondaries. 55C019. 30/10,000 cy. 7/6 each.

THERMADOR. 680/680 at 225 Mills. 210/230v Prim. at 50/-

THERMADOR. 350/350, 150 Mills. 5v 3 amp. 6-3V 3½ amp, 230v Primary, 30/-

THERMADOR. Output trans. Primary 5,000 ohm plate to plate load. Secondary 5, 75 or 15 ohm and 500 ohm line, plus wiring for 10 per cent. inverse feedback, 20/.

R.C.A. Filament trans. 230v primary. 10v ct Twice for a pair of 805s or 818s at 25/-. Ditto Thermador, 230v primary Output 10v ct 10 amp plus 10v ct 8 amp at 30/.

THERMADOR. 230v Primary. Output 2½ 10 amp twice for a pair of 866s. Sec. test volts 7,500. Porcelain standoffs, 30/.

DRIVER TRANSFORMERS. R.C.A. P.P. 6L6s to 805s or FZ 40s, 25/- Ditto Thermador, 500 ohm line to Split Secondary 805 grids, 1 to 27, 20/.

AUDIO LF CHOKES. 150 hy. BC221 replacement. 5/.

L.F. SMOOTHING. Miniature U.S.A. By Stancor Thordarson, etc. A well-assorted dozen at 12/., post free.


U.S.A. JACK PLUGS. 3 circuit for BC 348, etc. 20/..


Porcelain Standoffs, and completely screened at 5000 ohms. Rx. 6-x 5".

R.C.A. 500 ohm line to Split Secondary 805 grids, 1 to 27. 20/.

PAPER & OIL. Sprague 8+8+4 650v wkg. 5"x4"x2½. 4½/-. 36/- doz.

KELLOG. 4+4+4+2+1 650v wkg. in detachable cradled cases with Duzis lid these are exceptionally good, 7/6 each. T.C.C., etc. 4 mF 2000v wkg. 5x5x3, 5/-. Ditto, 4½ 1 m2 2000v wkg. 9x5x3, 7/6. 10 mF 1000v wkg. 5x4x4½, 5/-.
**Benson's Better Bargains**

**R1355:** Unused, £3/3/-, carr. 5/-; RF UNITS, Modulated to B'ham sound and vision, airtested, 30/-; BC454/5; Colpacks, 3/6; No. 18 Set Battery Rx. 6/9 mcs. ARP12(3), ARB(1). 465 Kcs. IF's, with circuit, 15/-; TRANSISTORS, 250-0-250v input 136-190 m, 8/-; 425-0-425 350 ma tapped (250v) 4v 6a, 4v 8a, pooled, 32/-; Parmeko, shrouded. 620-0-620v tapped 550, 375; 250 ma, 2 x 5v 3a, New, 42-/-; 300-0-300 200 ma, 6v 5a, 5v 3a, 70v 100 ma, 20v fa, 28/-; R.C.A. Fully shrouded. Input 190/250v, 50c. Output 400-350-0-350 200 ma, 6-3v 3a, 5v 2a, MOD. 1/1 Imp. P.G.K./SGK for FP807's (AR2) 507 final, 20w. Potted. 12/-; BIVERTAR PACKS. DC 6v to 190v 80 ma and 5v, 2/2; YAXLEYS; 3P1W3B, 3/6; 2P11W, 2P5W2, 2/6; 4P2W, 1/-; 3P4W Cor, 2/6. **MIURHEAD SM DRIVE, 5/-; XTALS 5/- to 6 84, 7-55 to 7-67, 8 132 to 8 79 mcs, 5/-, 8 09, 7 6, 100 kcs, 15/-; CO-AX; PXE-Plug Plugs/ Sockets, 9d. pr. Double-ended skts, 1/-; "**1 skts, 1/3; "**T" skt/plugs, 1/-; Plugs (2) on 1 yd. co-ax, 1/6; Plugs (2) on 20 ft, 4/- in co-ax (80u) 3/6. **PERSCX CRYSTAL CHASSIS*, 5/- inc. sor., 11/-; **SLYDLOCK FUSES 5a, 1/-, 15a, 2/-; POTEN TIOMETERS. Ceramic 1k 4a, 5/-, 50 ohms, 1/-; 1/3; 5/3 1/9. Carbon 1m 100k, 15k, 6k, 1/3; 1/15 300 ohms 14/-, 4/-; VITREOUS RESISTORS. 35k 35w, 30k 25w, 400 ohms 20w, 2k 15w, 3k 12w. 30 ohms 30w, 3k 30w, each, 1/-; W.R. RESISTORS.- Pads (2), 25 pf 3/6, 47 pf 3/-, 125 pf, 9/-; 470 pf 4/-, 1 micro 1/-; 47 1 micro 1/3, 10 pf 1/3; 47 pf 1/6; 100 pf 1/9. **ALL CONDENSERS.** 100 Assorted values. All useful sizes. Mica and All useful values, 9/- per 100. **RESISTANCES.** 100 Assorted values, from 1-watt to 3-watts. **CRYSTAL DETECTORS.** Semi-permanent type, 2/6. **WESTECTORS.** Wx6 and W112 types, 7/6 per doz. **SECTIONAL AERIALS.** Oft. interlocking, 3/6, base for same, 2/6. **CONTACTOR TIME SWITCHES.** 15-hr switches available. 3 impulses per second. Complete in sound-proof case, 15/- plus 1/4. **1931 SIX VALVES SUPER-HET RECEIVERS.** Complete with 6 valves, 4/- each, with plug, 1/6, extra long 2/6. Keys 3/6, Carbon mics, 3/6. **PLUGS/SKTS.—Big-Lec Octal, Jones, "W", types, 9d, each (State-fitting). **VEEDER COUNTERS, b/999, small, 5/-**

Terms: C.W.O. CARR. PAID OVER 5s.- S.A.E. enquiries please.

W. A. BENSON, 308 RATHBONE ROAD, LIVERPOOL, 13

**SOUTHERN RADIO'S WIRELESS BARGAINS**

**R.A.F. BOMBSIGHT COMPUTERS.**—Complete with motors, gyro, blowers, gears, etc., etc. Ideal for model makers and experimenters. The best component value ever offered. 55/-, plus 5/- carriage.

**SERVO UNIT ASSEMBLY** for bomber flight computer, including 27 units, motor, gearboxes, etc., etc., 17/-, plus 5/- carriage.

**CONTACTOR TIME SWITCHES.**—15-hour movement with thermostatic control. 3 impulses per second. Complete in sound-proof case, 10/-, plus 1/-.

**TRIAC SIX VALVES SUPER-HET RECEIVERS.**—Complete with valves, etc. 22/-.

**PHOTOCONDUCTIVE CELLS.** B-U.S.A. Type M.A. complete with removable telescope, 17/6.

**COMMAND RECEIVERS.** B.C.454 (49/100 metres), B.C. 455 (93/45 metres). Complete with 6 valves. Ideal for easy conversion to mains receivers or car radio, 35/-, plus 1/4. Conversion circuit to mains, etc., 1/8.

**CAMERA CONTROL UNITS.** Type 35 No. 26. Complete in wooden box, 20/-.

**LUMBER HOLE CUTTERS.** Adjustable from 4 in. to 24in. For use on wood, metal, plastic, etc., 5/-.

**SOUTHERN RADIO'S WIRELESS BARGAINS**

**P.M. SPEAKERS.** 5" Pleasure with pentode trans.-12/4; 8" Truvox 2-3 ohms, 11/-; 10" Truvox, 2-3 ohms, 15/4.

**MISC.** 6v-23a M.E.S. bulbs, 5/- doz.; Clix int. oval valve holders, 2/9 doz.; Pye co-axial plugs and sockets, 7/6 doz. prs. Smoothing choke 60m.a. 15h. 400s, 4/3.

**ELECTROLYTICS.** 8mf 450v tubular, 1/11; 8-25uf 450v can, 2/9; 16mf 450v can, 3/9; 16-16mf 450v can, 3/9; B-16-32mf 450v small can, 4/9.

Full list of bags, 3d. Special list for trade, C.W.O. or C.O.D. Post free over £2. Callers welcome 9 a.m. to 5:30 p.m.

**RADIO SUPPLY CO.**
15 Queen Street, Leeds, 2.
Receiver Type V.R.L.

In the short time that this receiver has been upon the surplus market it has established a reputation second to none.

Sixteen star features, such as the 19-valve circuit, crystal filter, optionally-damped A.G.C. for CW, noise limiter, built-in speaker, and the amazing crystal calibrator, which provides “spot on” frequency checks, make this unit one of the finest communications receivers ever designed.

Offered at a fraction of original cost, with 19 spare valves, in SEALED MAKER’S CARTONS £29/10/-.

Leaflet ‘V’ describes.

Vibrator Pack Type 21.

A fresh supply of these units which are store soiled due to long storage by the Ministry, are offered for stripping, at “scrap” price. They contain 2 x 4 µF 350v, 2 x 75 µF 12v, 6 x 1 µF 350v, 1 x 0.025 µF 1,000v condensers, one vibrator transformer, five chokes, vibrator, switch, plugs, etc., and two full-wave metal rectifiers. OUR PRICE, 7/6.

Mercury Batteries.

A huge new purchase of these wonder batteries, measuring only 8½” x 3½” x 3”, all of recent manufacture and delivering 94v HT and 1-3v LT, enables us to offer them at the ridiculous price of 5/6 each.

Midget Accumulators.

Measuring 4½” x 1½” x 1½”, 3 A.h., and BRAND NEW. ONLY 2/6 each, or per crate of 12 £1.

Receiver Type 21.

With nine battery-operated valves, and covering 4-2-7-5 and 18-31 mc/s, these contain BFO, crash-limiter, precision dial, etc. Complete with circuit and connecting data, and a super capacity all-dry battery, 43/6.

Field Telephones.

Of American manufacture, with hand ringing generator, bell, and P.O type handset, only requiring batteries for immediate use. In canvas cases, 35/-, or in solid leather cases, 47/6.

Brand New Speakers.

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FOR THE RADIO AMATEUR & AMATEUR RADIO

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

**Assistant Editor : L. H. THOMAS, M.B.E. (G6QB)**

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The Time Bases, blocking oscillators on Line (68117 and 807), and Line Output Transformer, 10in. P.M. Speaker, Sync. separators 6116 and 6V6. and Frame (VR137 and 6V6). E.H.T. from Line Output Transformer.

The Power Supply, double wound transformer isolating the former, 10in. P.M. Speaker, Sync. separators 6116 and 6V6. and Frame (VR137 and 6V6). E.H.T. from Line Output Transformer.

Complete Kit with valves, £3/10.

The following Sensitivity figures prove that the Premier Televisor Complete Kit with valves, 14/16/6. Carriage 5/.. Power Supply, double wound, transformer isolating the receiver from the mains. Rectifier 5V4G.

Complete Kit with valves, £4/16/6. Carriage 5/.

The Sound Receiver is capable of reception at greater distances than any other receiver from the mains. Rectifier 5V4G.

The Instruction Book costs 2/6, but is credited if a Kit for the complete Televisor is purchased.

The following Sensitivity figures prove that the Premier Televisor Kit is capable of reception at greater distances than any other

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## Vision Receiver (Electrostatic Tube)

<table>
<thead>
<tr>
<th>Valve</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>616G</td>
<td>Video Valve</td>
</tr>
<tr>
<td>6116</td>
<td>Sync. Separator</td>
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<tr>
<td>6V6</td>
<td>Speaker</td>
</tr>
<tr>
<td>68117</td>
<td>Line Output Transformer</td>
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## Sound Receiver (Electrostatic Tube)

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</tr>
</tbody>
</table>

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## NEW LONG RANGE TELEVISOR KITS (ELECTROSTATIC TUBE)

For the London or Birmingham frequencies at the same price as the standard kit

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## NEW TELEVISOR KITS INCLUDING PARTS AND VALVES

<table>
<thead>
<tr>
<th>Kit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Kit</td>
<td>Complete kit of parts with cabinet in brown or ivory and diagrams, 86/19/6, including Purchase Tax.</td>
</tr>
<tr>
<td>Premier Kit</td>
<td>Complete kit of parts with cabinet in brown or ivory and diagrams, 86/19/6, including Purchase Tax.</td>
</tr>
</tbody>
</table>

## PREMIER MIDGET SUPERHET KIT

This powerful Midget Superhet Receiver is designed to cover the shortwave bands between 16 and 30 metres, and the medium wavebands between 200 and 557 metres.

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## OUR NEW SUMMER CATALOGUE NOW READY—PRICE 6d.
Reflection

It is often said by those who should know better that in the amateur sense the limits have now been reached in the field of technical endeavour—meaning that technically speaking there is nothing left for the amateur to do; that the whole territory has been surveyed and it is simply a matter of developing and exploiting it along well-established lines.

It is quite true that within the limits of present experience the amateur has little or no technical contribution to make to the science of radio. Commercial research and application are now far ahead of the most advanced amateur practice, whereas 20 years ago the exact reverse was the case. It would therefore seem that technically speaking the scope for the amateur is in truth very limited.

But consider the vast field of endeavour, well within the technical competence of the amateur, which has not yet been entered by him, and therefore still awaiting investigation in the Amateur Radio sense. There is at present a great gulf between the amateur and the professional radio engineer on such subjects as pulse working at VHF, the transmission of amateur TV and the possibility of DX communication by moon reflection. These are all subjects, potentially of absorbing interest, quite new to and entirely untouched by amateurs, and therefore as yet outside the orbit of Amateur Radio activity.

So we see that so far from the amateur having nothing more to do, there is in fact a great deal for him to learn. Note that these possible new outlets for our energies are all in the VHF region. There can be no question that the developments of the future will be in the direction of the higher frequencies.
CRYSTAL CONTROLLED
SEVENTY-CENTIMETRE CONVERTER

New Design for Amateur Operation on 430 mc

By S. GREEN (G3EJL)

Here is another practical converter design for the 430 mc band, described by an operator who has already had considerable success on 70 cm. with it. Essentially, it consists of a crystal mixer with Lecher type tuned circuit, crystal controlled harmonic oscillator and IF head amplifier, giving 27-30 mc tuned IF. Construction is greatly simplified by the ingenious design principles put forward by our contributor; the result is a receiver unit capable of holding crystal controlled 70 cm. transmissions, to a design right up to the minute at the present state of the art.—Editor.

AFTER the initial onslaught on 430 mc, the writer came to the conclusion that it was time for a more scientific approach to the problem of equipment for transmission and reception on the new band, if 70 cm. was ever to develop as a reliable point-to-point communication channel in the amateur sense.

For long-distance working on any band operators have always used CW, and as 70 cm. will be no exception the writer decided to construct a converter that would receive CW and produce from it a T9x note. In order to do this some limitation on the actual frequency range to be covered has had to be accepted and the converter here described is designed to receive signals which triple from the present 144 mc band. Consequently its frequency coverage is 432 to 438 mc.

In order to take CW on this converter, the transmission itself must be crystal controlled. Most amateurs who will eventually come on the 70 cm. band are already transmitting on 2 metres using crystal controlled exciters. If they construct 70 cm. final stages which will triple from their present 2-metre frequencies, they will arrive in that part of the 70 cm. band for which this converter has been designed. Furthermore, the operation of the Short Wave Magazine Zone Plan will still apply; indeed, it is essential to work to that plan in order to make the most of Seventy cms and avoid the necessity of cross-band working every time one wishes to establish contact on 70 cm.

More than that, with the necessarily high gain, very directive and narrow-band aerial arrays which it is hoped will be used by all operators, the portion of the 70 cm. band which needs to be searched on this converter with the aerial in any direction will be limited, so increasing the possibility of establishing a contact.

In order to obtain a T9x note from a converter, the major factors are the stability and freedom from hum of the local oscillator; if a crystal is used in the local oscillator then the resultant note leaves nothing to be desired in these two respects.

General Design

This converter, then, was designed with a crystal oscillator section in order to obtain the necessary stability. It was found unnecessary to inject a local oscillator frequency of 408 mc into the mixer circuit in order to produce an IF of 30 mc, as efficient mixing and ample injection could be obtained if the final multiplier of the local oscillator was tuned to 204 mc. By using 636’s, this made the design of the local oscillator and its associated multiplier stages simplicity itself. Consideration was given to various types of mixer circuits and in order that the constructor would not be burdened with having to purchase unnecessary (and by this time probably unobtainable) surplus equipment, it was decided to use a simple home-constructed Lecher line.

A crystal diode was chosen for use in the converter as it is the most efficient form of mixer at present obtainable for use on 70 cm., the noise produced by thermal agitation being very low. It is impossible with the present range of valves available in this country to envisage any appreciable gain from an RF stage; consequently the writer decided to dispense with an RF stage and rely entirely upon the high gain of a multi-element Yagi beam.

Thus we have all the essentials of a good converter for 430 mc. All that remains is the provision of a head IF amplifier as close to the mixer circuit as possible, so that no loss
occurs through long leads. A Mazda 6F12, or its equivalent, is used in this head amplifier. The 6F12 is an excellent RF pentode giving high gain and low noise at the intermediate frequency chosen. A band-width of some 3 to 3.5 mc with little falling off in gain was obtained. However, in order to tune from 432 to 438 mc the crystal oscillator frequency must be altered so that the IF always remains within the 3 mc band-width given by the head amplifier. The crystals adopted for this converter are the Type F.O. units obtainable from Q.C.C. These are "overtone crystals" as used in the Squier oscillator. In order to obtain an IF of 27 to 30 mc the actual crystal frequencies are 17 mc and 16.875 mc.

Tuning Ranges
The local oscillator and multiplier circuits tune as follows:—

<table>
<thead>
<tr>
<th>Stage</th>
<th>(a)</th>
<th>(b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oscillator</td>
<td>17 mc or 16.875 mc</td>
<td>17 mc or 16.875 mc</td>
</tr>
<tr>
<td>Tripler</td>
<td>51 mc or 50-625 mc</td>
<td>51 mc or 50-625 mc</td>
</tr>
<tr>
<td>1st doubler</td>
<td>102 mc or 101-25 mc</td>
<td>204 mc or 202-5 mc</td>
</tr>
<tr>
<td>2nd doubler</td>
<td>204 mc or 202-5 mc</td>
<td>204 mc or 202-5 mc</td>
</tr>
</tbody>
</table>

The injection frequencies are obtained thus:

To tune
- (a) 438 to 435 mc
- (b) 435 to 432 mc

The tuned circuits of the oscillator and multiplier stages are broad enough to operate satisfactorily with either crystal in circuit, without any need for retuning; this is because of the low output required from these stages.

The writer has used a high fundamental crystal frequency in order that there shall be no crystal oscillator beats in the communication receiver used as the main IF amplifier. It is obvious that the first beat from the crystal oscillator is 34 mc and consequently no interference is suffered in tuning from 27 to 30 mc, the IF of the converter.

If the Lecher line is constructed exactly to the dimensions given it will be possible to tune to the centre of the band by adjusting the small capacity at the open end. The grid coil of the head IF amplifier is placed as close as possible to the crystal diode, and the output of the mixer is tapped into the coil in order to prevent over-damping of the 6F12 grid circuit. The IF output is link-coupled to the main receiver via a coaxial cable, good bonding and screening of the amplifier and its output being essential to prevent breakthrough of ten-metre signals.

Construction
The chassis is made of 16-gauge aluminium, the finished size being 10 1/2 in. long, 4 3/4 in. wide and 3 in. deep. Details of the drilling of the chassis have not been given, due to the
obvious variation in components that will be used by different constructors. The layout of the oscillator section is simple and can easily be followed from the photograph, the under-chassis view suggesting also the general layout.

The most important part of the converter is the Lecher line and its associated condenser (C5). The dimensions given in the diagram should be adhered to strictly. The line is made of \( \frac{1}{4} \)-in. square brass, all joints being tapped and screwed as well as soldered. The Lecher is mounted on \( \frac{1}{4} \)-in. stand-off insulators at the open end, and on a piece of \( \frac{1}{4} \)-in. square brass at the centre of the closed end, this mounting being tapped and soldered to the base plate so that the Lecher is solidly made, and finished as a complete unit.

The condenser C5 is formed by bending two pieces of brass sheet \( \frac{1}{4} \) in. by 1 in. of 20 gauge into L-shape and they are fixed to the open end of the Lecher. The capacity so formed by these is about 1.5 \( \mu F \) and by slight bending they can be used to peak the lines at the centre of the band.

The Lecher being a complete unit in itself it can, of course, be used with any type of local oscillator, and thus overcomes the major difficulty in the construction of any 70 cm. converter by providing the mixer tuned circuit.

**Adjustment**

Tuning the converter is extremely simple, starting with the crystal oscillator rotate C1 until RF is produced. This is easily detected by any communication receiver or calibrated wavemeter. The tripler stage is then tuned, the RF being detected either by a 40 mA loop

---

**Table of Values**

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1, C2, C3, C6</td>
<td>3-30 ( \mu F ) concentric trimmers</td>
</tr>
<tr>
<td>C4</td>
<td>1-5 ( \mu F ) concentric trimmer</td>
</tr>
<tr>
<td>C5</td>
<td>See Lecher circuit construction</td>
</tr>
<tr>
<td>C7, C8, C9, C10</td>
<td>500 ( \mu F ), mica</td>
</tr>
<tr>
<td>C11, C12, C13</td>
<td>0.001 ( \mu F ) mica</td>
</tr>
<tr>
<td>C14, C15, C16</td>
<td>30 ( \mu F ) ceramic or silver mica</td>
</tr>
<tr>
<td>C17</td>
<td>5 ( \mu F ) ceramic</td>
</tr>
<tr>
<td>R1</td>
<td>10,000 ohms, 2-watt</td>
</tr>
<tr>
<td>R2</td>
<td>25,000 ohms, 1-watt</td>
</tr>
<tr>
<td>R3</td>
<td>100,000 ohms, 2-watt</td>
</tr>
<tr>
<td>R4</td>
<td>100,000 ohms, 1-watt</td>
</tr>
<tr>
<td>R5, R9, R11</td>
<td>10,000 ohms, 1-watt</td>
</tr>
<tr>
<td>R6, R8, R10, R13</td>
<td>50,000 ohms, 1-watt</td>
</tr>
<tr>
<td>R7</td>
<td>100,000 ohms, 2-watt</td>
</tr>
<tr>
<td>R12</td>
<td>220 ohms, 4-watt</td>
</tr>
<tr>
<td>V1, V2</td>
<td>6J6</td>
</tr>
<tr>
<td>V3</td>
<td>Mazda 6F12, Mullard EP91, or CV138</td>
</tr>
<tr>
<td>V4</td>
<td>IN23A crystal diode</td>
</tr>
<tr>
<td>X tantal</td>
<td>17 mc and 16 875 mc Q.C.C.</td>
</tr>
<tr>
<td>Type FO (see text)</td>
<td></td>
</tr>
</tbody>
</table>

---

**Fig. 1.** Construction of the Lecher tuning circuit. These dimensions should be carefully followed—see text for discussion.
lamp or wavemeter loosely coupled. The same technique is applied to the doubler stages. Injection to the mixer is inductive and the crystal current should be checked at the earthy end of the 6F12 grid coil, and the HT voltage to the whole of the local oscillator and multiplier stages reduced until a maximum current of 400 microamperes is indicated with the aerial connected to the converter. Close coupling of the 204 mc circuit is essential in order to obtain maximum second harmonic output to the mixer circuit.

With the converter connected to the main receiver, the slugs of the 6F12 grid and anode circuits are adjusted for maximum gain on 28.5 mc. It only remains for the converter to be connected to the beam and the co-operation of a local amateur enlisted to obtain a 70 cm. signal.

It is interesting to note that the writer was able to receive the third harmonic of a 2-metre transmission from a distance of 2 miles well enough to give a reading of S6 on the HRO used as the main receiver. The tuning of both mixer and doubler stages will be found to be very broad. Both local oscillator crystals should be checked and all circuits tuned for optimum on an incoming 70 cm. signal.

**General Points**

The efficiency depends largely on the crystal diode used. A quick, though not infallible, check is to measure the back-to-front ratio on an ohmmeter. The forward value should never be more than 150 ohms. The backward value varies considerably and a crystal is never used by the writer unless the back-to-front ratio exceeds 300 to 1. The actual 1N23A in use measures 90 ohms forward and 100,000 ohms backwards. Furthermore, these diodes can be easily damaged in two ways; one, by excessive crystal current, the other by overheating.

**Coil Data**

- **L1**: 25 turns 26 gauge enamelled wire, ½-in. diameter former, close-wound, tapped 8 turns from grid end.
- **L2**: 7 turns 16 gauge enamelled wire, ½-in. diameter, slightly spaced.
- **L3**: 4 turns 16 gauge enamelled wire, ½-in. diameter, spaced diameter of wire.
- **L4**: Hairpin loop, ½-in. long, ½-in. wide 16 gauge enamelled wire.
- **L5**: Lecher circuit (see text).
- **L6**: ½-in. winding length of 26 gauge enamelled wire on ½-in. diameter slugged former tapped at centre. (May need slight pruning due to variations in crystals).
- **L7**: ½-in. winding length of 28 gauge enamelled wire on ½-in. diameter slugged former.
- **L8**: 5-turn link of 28 enamelled wire at cold end of L7.
by heating whilst soldering adjacent components.

The optimum crystal diode current for best signal-to-noise ratio varies with each type of crystal. With a 1N23A or CV103 the best value was found to be 50 to 75 microamps. For a 1N21, 1N22, CV101 or CV102 somewhat higher current is required.

Results

This converter is some 6 dB better than that used in the initial 119-mile contact with G5BY. Many CW QSO’s have now been made using it and the notes received are T9x. In addition to several contacts with G5BY, six other stations have been heard: G2BMZ (102 miles) at RST-549; G3ABH (35 miles) R5, S7; G3CFR, using a two-metre beam (25 miles) RST-559; G3RI and G3CGE (local), R5, S9 plus. All these signals were crystal controlled. It has been found that with stabilised equipment 70 cm. paths are open at all times up to 35 miles between fixed stations QTH-to-QTH.

It is hoped the ideas set out in this article will bear fruit and that there will be more crystal-controlled operation on 70 cm. The writer will be pleased to help any constructor who is having difficulty in any way.

QRP WITH A PUNCH

Nice Design for 80-160 Metre Operation

By A. G. WOOD (G5RZ)

The impact of TVI and a series of Low Power Contests first revived the writer’s interest in QRP work. For a time the station VFO unit and the QRO rig (suitably muted) were used, and not without success, but it was very apparent that the best results could scarcely be expected from equipment designed for other purposes. In consequence plans were made for the production of a special rig for the job. The final specification decided upon called for a stable VFO driving a two-band PA with more than the average efficiency. In addition, the rig had to be as small as possible with a low total power consumption (with an eye to portable work).

Preliminary tests were made with a VR99 (6K8 triode-hexode) as combined oscillator and buffer employing ECO, Franklin and Transitrion circuits, but for various reasons these were all discarded in favour finally of a 6SN7 twin-triode with one triode operating as a Colpitts oscillator. Since this valve has separate cathode leads it was feasible to make use of the cathode feed method to the second half of the valve operating as a broadly tuned buffer amplifier. The prototype was built using “breadboard technique” so that alterations could quickly be made before arriving at final values for the components.

Incidentally, one or two QSO’s were achieved using this unit alone and tolerably good reports were obtained—up to 75 miles at night on the Top Band with an input of approximately 0.75 watts from a stage which was never intended to operate as a PA.

Having checked the stability and keying characteristics of the first stage, the PA unit
The packet of cigarettes compares the size of G5RZ's QRP transmitter, described in the accompanying article.

was added. For this the VT501 (TT11) was chosen as a suitable valve because of the low driving power required and the really good screening which was possible due to the top cap anode connection.

The Circuit

Consider now the complete circuit diagram in Fig. 1. It will be seen that the oscillator operates as a Colpitts but with the anode at earth potential, the output voltage to the next stage being taken across the cathode RF choke. Keying is achieved by breaking the cathode return to earth and the capacity across the key jack effectively prevents any possibility of hand-capacity on the key varying the frequency of oscillation. With 150 stabilised volts on the anode, the current consumption of this stage is barely 5 mA and the keying characteristic very good and clean.

The oscillator coil calls for some comment. This consists of a slug-tuned coil of "unknown inductance" taken from a piece of ex-Service equipment, the adjacent IF transformer and various small condensers being discarded, but the screening can retained. Tuning is accomplished by connecting the tuning condenser across the lower of the two 0.001 µF capacities and adjusting for band-set by means of the slug. With this arrangement the unit was found to tune very nicely between 1750 kc and 1900 kc, and this range was considered adequate for the purpose in mind.

The 0.1 µF condenser between anode and earth on this stage is very necessary and contributes substantially to the available output. Coupling to the grid of the second half of this valve is via a 200 µF mica condenser. The value is not critical, but some loss of output is suffered if this value is much reduced, whereas an increase over this capacity makes no measurable difference.

The anode coil of the buffer consists of 70 turns of 28 SWG enamelled wire pie-wound on to a 1-in. diameter slug-tuned former, and is loaded to approximate resonance with 100 µF capacity, final adjustment being made by means of the slug. With 250 volts on the anode, the optimum value for the cathode biasing resistance was sharply defined at 5,000 ohms.

The PA circuit is conventional with shunt feed, the tank coil being made to resonate in the 3-5 mc band with the midget tuning condenser and loaded to 1.7 mc by means of a 350 µF mica condenser which is brought into operation when required by the panel-mounted wafer switch. A second wafer on the same switch is so arranged as to cut off HT to both buffer and PA stages when tuning the VFO.

It will be seen that the PA functions as such on the Top Band and as a power doubler on 3.5 mc. In practice it was found that greater output was obtainable on 3.5 mc employing this method than by doubling in the buffer stage and as this also simplified switching the former arrangement was adopted.

The anode meter mounted on the front panel is calibrated 5 mA F.S.D. and is shunted suitably to give four times this reading. Since in this particular model the HT supply is at 280 volts and there is approximately 30 volts of auto bias, it follows that the meter as scaled reads directly in watts input which is convenient for rapid inspection.
Power Control

Some means of reducing input was required for very-QRP work and the more usual method of tapping the PA screen across a potentiometer was eventually discarded in favour of adjustable cathode bias. This consists of a limiting resistor of 1100 ohms in series with a 20,000-ohm potentiometer which is itself in parallel with a 10,000-ohm fixed resistor. This arrangement gives very smooth control from a maximum of just over 5 watts to approximately 1 watt input. There is another reason for adopting this scheme. As already stated the PA operates as a power doubler on the 3.5 mc band, and a PD is more efficient if anode volts, grid drive and grid bias are increased above normal. With this arrangement it is possible to increase the HT supply slightly (which causes the buffer amplifier to give greater output) and at the same time raise the anode voltage of the doubler. The cathode bias can then be turned down to maintain the same input with increased bias and the all-round efficiency is thereby improved.

Aerial Coupling

Coupling the aerial to this transmitter will depend largely upon the type of aerial employed. The writer is fortunate in having room for a 270-ft. long wire, one end of which is brought right into the operating room. The method of adjusting the aerial tapping in this case is as follows:

A small crystal diode field strength meter was loosely coupled to the aerial lead; the set was switched on and with key down the PA tank was tuned to resonance, indicated by a marked dip in plate current as registered by the meter on the set. Tap the aerial on to the tank coil a few turns up from the earthy end using a piece of insulating material to keep the hand remote from the coil, and tune the tank condenser for maximum reading on the diode meter. Note this reading and repeat the process a turn at a time up towards the "hot" end of the tank coil, retuning the tank condenser each time. A point will be found where any further increase in the number of turns (of coupling) will cause a drop in output. Work back to the turn giving the maximum output and solder on at this point. For those not possessing any means of measuring output, employ the same method but check the plate meter for minimum dip at each adjustment. This dip will become less and less as the tapping point approaches optimum and with the aerial

![Diagram](image-url)

**Fig. 1.** The 1.7/3.5 mc QRP transmitter unit described by G5RZ, discussed in the text and illustrated in the photographs.
Rear view of the G5RZ QRP job, showing general arrangement of the parts and mounting of the valves.

correctly adjusted there will be the faintest of dips as the tank condenser is resonated.

Construction

Now with regard to construction and general lay-out. The front panel is cut from the usual gauge of aluminium sheet to the size 6 in. wide by 5 in. deep and as shown carries the meter, anode tuning condenser, aerial stand-off insulator, combined on-off and band switch, cathode resistor control, VFO bandspread condenser, band-set slug adjustment and the key jack. Once the panel has been cut and all holes drilled a very attractive finish can be obtained by immersing it in an open flat pan containing boiling water and a handful of ordinary washing soda (caustic soda) for a period of two or three minutes. The panel is subsequently washed clean in cold running water and carefully dried. The chassis is cut from a sheet to the same size and along one 6-in. side is bent at right angles to form a \( \frac{1}{2} \)-in. lip for bolting to the front panel. A second right-angled bend is made at the rear of the chassis to form a vertical section 1\( \frac{1}{2} \) in. high to form the back panel and to provide anchor-age for the five supply terminals. The horizontal section of the chassis thus measures 6 in. \( \times \) 3 in. deep. Fig. 2 illustrates the layout of the main components and also shows the manner in which the PA valve is mounted horizontally, and also the position of the small dividing screen which is cut to fit the chassis and panel and through which a hole is made to fit the diameter of the valve envelope. This layout makes for very short, direct wiring, especially where RF leads are concerned.

Table of Values

Table 1. Circuit of Midget Transmitter

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1, C2</td>
<td>0.001 µF</td>
</tr>
<tr>
<td>C3</td>
<td>500 µµF variable</td>
</tr>
<tr>
<td>C4, C5</td>
<td>200 µµF silver mica</td>
</tr>
<tr>
<td>C6</td>
<td>100 µµF silver mica</td>
</tr>
<tr>
<td>C7</td>
<td>300 µµF silver mica</td>
</tr>
<tr>
<td>C8</td>
<td>65 µµF midget variable</td>
</tr>
<tr>
<td>C9</td>
<td>350 µµF mica</td>
</tr>
<tr>
<td>C10</td>
<td>30 µµF mica</td>
</tr>
<tr>
<td>C11, C14, C15, C16, C17</td>
<td>0.01 µF</td>
</tr>
<tr>
<td>C12</td>
<td>0.1 µF</td>
</tr>
<tr>
<td>C13</td>
<td>0.004 µF</td>
</tr>
<tr>
<td>R1</td>
<td>50,000 ohms</td>
</tr>
<tr>
<td>R2</td>
<td>5,000 ohms</td>
</tr>
<tr>
<td>R3</td>
<td>68,000 ohms</td>
</tr>
<tr>
<td>R4</td>
<td>1 megohm</td>
</tr>
<tr>
<td>R5</td>
<td>1,000 ohms</td>
</tr>
<tr>
<td>R6</td>
<td>1,100 ohms</td>
</tr>
<tr>
<td>R7</td>
<td>10,000 ohms</td>
</tr>
<tr>
<td>R8</td>
<td>20,000 ohms potentiometer</td>
</tr>
<tr>
<td>L1, L2</td>
<td>See text</td>
</tr>
<tr>
<td>L3</td>
<td>27 turns 22 SWG tinned copper, spaced on 1( \frac{1}{2} ) in. dia. Aerial tap approx. 18 turns from earthy end</td>
</tr>
<tr>
<td>J</td>
<td>Phone jack</td>
</tr>
<tr>
<td>M</td>
<td>0-5 mA meter shunted to read 20 mA F.S.D.</td>
</tr>
<tr>
<td>S1, S2</td>
<td>Yaxley wafer switch, two-bank</td>
</tr>
<tr>
<td>RFC1, RFC2</td>
<td>Pie-wound broadcast type</td>
</tr>
<tr>
<td>V1</td>
<td>6SN7-GT</td>
</tr>
<tr>
<td>V2</td>
<td>VT501 (TT11)</td>
</tr>
</tbody>
</table>

(over)
Power Supply

The power requirements of this little set are very modest and it is therefore admirably suited for operation from batteries where no mains are available. The filament supply is 6.3 volts at 0.9 amps. The oscillator takes 4.5 mA at 150 volts stabilized, but will still give results with only 105 volts, when the current drain is reduced to 2.5 mA. The buffer amplifier takes 5 mA key up and 7.5 mA key down with 280 volts HT and the PA a maximum of 22 mA, also at 280 volts at maximum cathode resistor setting. It is an easy matter to set the band switch control to the “tune” or “off” position, when a prolonged stand-by is in operation; there is then no drain whatsoever from the HT supply.

Results

Tests were carried out to check the stability and freedom from drift of the oscillator. Starting from cold and with the key screwed down the frequency was found to drift towards the high-frequency end to the extent of about 60 cycles per minute for the first 15 minutes; thereafter the drift became negligible as things warmed up and after 20 minutes the frequency remained absolutely constant.

It is possible that even this figure could be improved upon by a more careful choice of condensers in the oscillator stage, but in view of the relatively low operating frequencies involved it was not thought necessary to rebuild part of the set for the sake of so slight an improvement.

The equipment has now been thoroughly air-tested, especially on the Top Band, and most gratifying reports have been received all over the country. The best broad-daylight QSO has been 100 miles on 3 watts and reports of RST-579 were obtained at night at 300 miles, also on 3 watts. Reports of S8 and S9 at 100 miles range at night are commonplace and tests have shown a reduction of approximately one S-point (measured) when power has been reduced from 5 to 1 watt, which is what is to be expected. Tests on 3.5 mc are not yet complete, but daylight QSO’s of 100 miles (RST 569) and 600 miles (RST 549) have been obtained, which seem to hold out promise of good results at night on this band. T9x is frequently reported and not one T8 or poorer has been given in over 50 QSO’s.

A final refinement is the fitting of a perforated zinc screen (of the meat safe variety) cut to fit the top, back and sides of the unit, and this adds appreciably to the appearance of the whole job, especially if the screen is given a bright finish with metal polish before fitting. But from a TVI point of view this is not in the least necessary
since no TVI has been experienced either on the Top Band or on 3.5 mc with a TV set operating in the same room as the transmitter.

One small point of interest concerns the power supply. This was a rectifier unit built originally for supplying receivers and/or ancillary apparatus and contained a somewhat high resistance smoothing choke. To obtain results when using slightly higher HT supply this choke was temporarily short-circuited.

Strangely enough there was no apparent deterioration in the purity of the radiated signal and reports continued to be T9, so that from then on the choke was permanently discarded!

In conclusion the writer can claim to have had great satisfaction both from the building and operating of this miniature rig and plans are already on foot for providing speech equipment to go with it!

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**TACKLING TVI AT THE OUTPUT END**

Experiences on Twenty

*By M. E. Tapson (G6IF)*

As TV spreads, so do individual experiences in combating it increase; the notes below suggest an approach for those who may be looking for a quick cure where a neighbour's TV receiver is involved, though it should be noted that much depends upon such factors as relative field strength and, in some cases, the design of the offending TV receiver.—Editor.

About this time of year, when the 28 mc band is closing for the summer season (though many may dispute that it ever does close), more of the DX fraternity will be turning their attention to 14 mc—and this brings up the old problem of TVI, which may be due partly to 3rd harmonic radiation, and partly to badly designed aerial couplers and radiating systems.

Since DX conditions are usually good between the hours of 2030 and 2230, it was decided at the writer's station that some cure for TVI had to be found.

As a result of the efforts discussed here, it is now possible to work on the 14 mc band using 100 watts of fully modulated telephony with absolutely no ill-effect on a TV receiver (sound or vision) located only 100 yds. away, with the television dipole looking towards the transmitting aerial.

**Equipment Involved**

The final at G6IF employs a pair of PT15's, plate-screen modulated, run at 100 watts input, and the first consideration was the use of 3rd harmonic traps in each anode lead (see circuit arrangement). No originality can be claimed for these traps, as they are a well-known "first approach" to the whole business of harmonic suppression.

Next, it was necessary to eliminate any possibility of strong vertical radiation from the aerial feeder system, since this is one of the worst causes of TVI. Various aerial systems were tried, but with little success; finally, it was decided to use a folded dipole, constructed entirely of 300-ohm ribbon. With this, it is possible if care is taken to get a perfect match between the feeder line and the centre of the half-wave.

The folded dipole "top" itself was cut to resonate at 14.2 mc exactly—not by formula, but by experiment and the assistance of a BC-221 frequency meter. The general result is suggested by Fig. 1, the method being to couple the aerial feeder quite loosely to the PA tank, and then trimming equally each side of centre on the dipole until maximum plate current is drawn at the required frequency (in this case, 14.2 mc). The degree of coupling must be maintained constant during this operation, and the aerial raised and lowered each time an adjustment is made to its length, so that it is resonated at its height.

![Image](image-url)

**Fig. 1.** Showing effect of resonating the aerial by the method discussed in the text.
of normal operation. This height was made \( \frac{1}{4} \)-wave at 14.2 mc. All this will ensure that an exact match is obtained for the centre impedance of 300 ohms, and the ribbon feeder will operate as an RF pipe and not as a radiating element.

Operation

The aerial and feeders are finally coupled to the transmitter through the network shown in Fig. 2. Two-turn links are used throughout and the PA is itself link-coupled to the driver stage. Some suggested values for 14 mc operation are given in Fig. 2.

Testing for TVI

The next step was to seek the co-operation of the GPO, and with the ready assistance of two of their engineers, the official test set, tuned to the TV channel, was placed alongside the transmitter. With its pick-up wire off, the test set was adjusted to an arbitrary zero on its meter; the Tx was then switched on and tuned up for 100 watts input on 14.2 mc; the test set meter showed a considerable deflection. The 3rd harmonic traps in the PA stage were then adjusted until this deflection was reduced to a minimum—actually the test meter zero, so that there was no indication of 3rd harmonic radiation with the transmitter on or off.

Then the GPO test set was taken out into the road, directly in line with the aerial, and 4-ft. of pick-up wire attached. Some deflection was obtained, and the test set was then walked down the road. At a distance of 15 yards, there was a 15 dB loss in field strength of the harmonic radiation and a few yards further on, the meter reading was again zero.

As the nearest TV aerial is about 100 yards away, no interference whatever is noticeable on this receiver, and the tests outlined suggest that the writer could tolerate a TV receiver as close as 20 yards without interfering with it.

Results — On the Air

Having thus beaten the local menace, it was surprising to find what excellent DX results were obtainable with what is really no more than a single dipole, accurately matched and fed. The low-angle radiation characteristic appears to be excellent—one VK remarked that he thought that at least a 3-element beam must be behind the S9 signal he reported, and a W5 even went so far as to say that G6IF was the loudest DX signal he had "ever recorded" (the writer is not boasting; this is what he said!).

However, apart from all this, the really gratifying feature of the whole undertaking is that one is free to come on the air at any time without that uncomfortable feeling at the back of one's mind that a neighbour is about to complain.
SELF-CONTAINED VFO UNIT

Driving the Four-Band QRO Transmitter

By G. P. ANDERSON (G2QY)

As already stated in the article in the May issue, provision is made in the Four-Band QRO Transmitter for working on four spot frequencies from crystals incorporated in the transmitter and selected by a switch. But of course during recent years increasing use has been made of variable frequency oscillators for the control of amateur transmitters; under present-day operating conditions, VFO control on some bands is almost imperative. Numerous such oscillators have been described in the past, using various types of circuits; that to be discussed here is specially designed to work with the Four-Band QRO Transmitter, but it is suitable as a driver unit into the crystal oscillator stage of any transmitter using 3.5 or 7 mc crystals.

Basically the oscillator consists of the well-known Franklin circuit, arranged to oscillate very weakly, and operating with very low power. This is followed by two untuned amplifier stages, and then by a frequency doubler, providing an output on 3.5 or 7 mc crystals. Precautions have been taken to minimise variation in frequency due to heating, the oscillator being assembled inside a screening box with the valves outside, and the amplifiers mounted on a separate sub-chassis. The model shown in the photograph is arranged for rack mounting and is completely self-contained, with its own power supply, on a standard 5½-in. panel.

Circuit

The Franklin oscillator uses a pair of metal 6J5 valves, in a straightforward circuit. The coupling condensers C4 and C5 should be only sufficiently large to provide oscillation over the range desired; the value of 6.8 µF shown appears to be satisfactory. The VFO was required to drive the Four-Band Transmitter on the higher frequency amateur bands, and consequently the frequency range of the oscillator was limited in order to spread out the tuning; using the condensers and coil shown, the tuning range is 1750 to 1840 kc, the harmonics of which fully cover the 7, 14 and (future 21?) mc bands, and up to 29.5 mc on Ten. As will be seen, the frequency range selected is a compromise; if full coverage was required from 28 to 30 mc, the tuning on 7, 14 and 21 mc would become unduly critical. The output is at high impedance through a small condenser, and for convenience is brought out to a terminal. The heater circuits are decoupled by the .001 µF

Though this drive oscillator was actually designed for the Transmitter described in detail by the author in our issue for May, it can be used for the same purpose with any similar type of amateur band transmitter. Output is available on two bands for operation through doublers, and the unit is self-contained for power.—Editor
condensers C9, C10, which are connected midway between the two valveholders. The earth connection to the centre tap of the heater circuit is also made in this unit by means of two 56-ohm ½-watt resistors.

The 6J5 valves were used in place of the more usual double-triode (6SN7) type so that advantage could be taken of the metal envelopes in order to achieve screening combined with efficient heat dispersal.

Amplifier

The amplifier unit consists of a small RF pentode, SP61, with resistance anode load, capacity-coupled to a larger pentode, EL32, which has an inductive anode load. This in turn is capacity-coupled to another EL32, the anode circuit of which is tuned to 3.5 mc. Cathode resistor bias is provided on all stages, and provision is made to obtain output from the plate of each EL32 at 1.75 and 3.5 mc respectively, at high impedance. The level of the 1.75 mc signal is of the order of 5 volts, and 15 volts are available at the 3.5 mc terminal, which is more than sufficient to drive the SP61 frequency doubling stage in the main transmitter. The 3.5 mc output from the VFO is connected to a position on the “Crystal/VFO” selector switch (see Short Wave Magazine, p. 178, May), and although the connecting lead is about 2 ft. long, no trouble has been encountered.

The condenser tuning the anode of the 1.7 to 3.5 mc FD is controlled from the front panel; in operation no adjustment is required over quite a wide frequency range, but it does provide an effective means of controlling the output level.

Power Supply

The power supply required is 6.3 volts at 1.7 amps, and about 180 volts at 50 mA. Any suitable supply may be used, the one shown having metal rectifiers in a bridge circuit. The smoothing as specified is adequate, a pure DC note being obtained even after multiplication to 60 mc. The HT feed to the oscillator is stabilised by means of a 5130 stabiliser; a VR150 would be equally satisfactory.

Keying

Keying may be carried out in the cathode of the first amplifier valve V3, permitting “break-in” operation. No chirp is apparent even at 60 mc, the combination of voltage stabilisation and light oscillator loading being effective in producing a signal of stable frequency.

Construction

The construction of the unit is based on the

Table of Values

| C1 | 70 µF, variable |
| C2 | 30 µF, trimmer |
| C3 | 470 µF mica + 70 µF ceramic |
| C4, C5 | 6.8 µF |
| C6 | 22 µF |
| C7 | 33 µF |
| C8, C11, C13 | -01 µF |
| C15, C18 | -01 µF |
| C9, C10, C12, C16, C19 | -001 µF |
| C14, C17, C22 | 47 µF |
| C20 | 122 µF |
| C21 | 50 µF variable |
| C23 | 16 µF 250v |
| C24 | 8 µF 250v |
| R1 | 100,000 ohms 1-watt |
| R2, R3 | 22,000 ohms 1-watt |
| R4, R12 | 10,000 ohms 1-watt |
| R5 | 22,000 ohms 1-watt |
| R6, R7 | 36 ohms 1-watt |
| R8, R14 | 220,000 ohms 1-watt |
| R9, R15, R19 | 4,700 ohms 1-watt |
| R10 | 330 ohms 4-watt |
| R11 | 47,000 ohms 1-watt |
| R13 | 100,000 ohms 1-watt |
| R16, R20 | 470 ohms 1-watt |
| R17, R21 | 4,700 ohms 1-watt |
| R18 | 220,000 ohms 1-watt |
| V1, V2 | 6J5 |
| V3 | SP61 |
| V4, V5 | EL32 |
| V6 | S130 or VR150 |
| L1 | 25 turns 22 Enam. wire, 1 in. dia. (13.9 µH) |
| L2 | 2.5 mH RF choke. |
| L3 | 28 turns 22 Enam. wire, 1½ in. dia. (15 µH) |
| Ch 1 | 20 H. 10 mA |
| Ch 2 | 20 H. 60 mA |
| T | Mains/320v 50 mA and 6.3v 2 A |
| Rect | Bridge rectifier to suit |

use of sub-chassis, the oscillator stage being assembled in a copper box, and the amplifier on a small chassis. In the original model it was convenient to mount the power supply components directly on the panel, although a further chassis could have been used.

As may be seen from the photographs, the oscillator components are all assembled inside the screening box, with the exception of the valves, which are mounted on a small metal bracket, so that each valve is outside the box. This, together with the use of adequately rated components, avoids trouble from heat inside the oscillator compartment. All wiring should be firmly tied down, to avoid changes in frequency which could be caused by vibration. The coil, after winding, should be painted with polystyrene solution to secure the windings in place; alternatively, several coats of shellac could be applied. The dimensions of the box shown in the illustration are 5 in. × 2½ in. × 3 in. high.

The amplifier unit is assembled on a threesided chassis. No particular care is required in screening this unit, although normal precautions should be observed in wiring. It will be seen that the rotor of C21 is at high
potential to earth and consequently the condenser must be insulated from the chassis; a small fibre block was cut and the condenser was mounted on it in the model shown.

No particular reference need be made to the construction of the power supply, any convenient layout being followed.

The assembly of the units on the panel may be seen from the photograph. Any good slow-motion drive will be suitable for the control of the oscillator tuning; the frequency doubler tuning does not require any gearing, direct drive being entirely satisfactory.

**Operation**

After the application of power to the unit, check should be made by means of a suitable receiver to ascertain that the oscillator is functioning. After allowing a period of about 15 minutes for warming up, the tuning condenser C1 should be set fully meshed, and the frequency of the oscillator adjusted to 1750 kc by means of the trimmer condenser C2. Next tune in on the receiver the harmonic at 3500 kc and vary C21, to confirm that it will tune the plate circuit of the frequency doubler stage to that frequency. It should do so with about half capacity. If it does not, turns should be added to or removed from L3 in order to achieve this result.

It may be found that during the first few periods of operation the oscillator will drift slightly; this should not be serious, even at 28 mc, but it is undesirable, and it will be found advantageous to "age" the components in the oscillator by running it continuously for a period prior to putting it into operation. If the valves are removed from the amplifier stages, the power consumption of the unit will be very low, and the oscillator may be left running continuously for say 24 hours, after which time it should be found to be perfectly stable, and ready for use within a few minutes of switching on from the cold condition.

The unit described has been in operation for more than two years at the writer's station, mainly on the 28 mc band (and previously on 58 mc) and its stability has been commented upon very favourably.
AUTOMATIC FREQUENCY CONTROL

AFC Circuits at VHF

By R. E. B. HICKMAN

ONE of the obstacles to the full exploitation of that portion of the radio spectrum above 30 mc is the difficulty of providing effective automatic frequency control (AFC) at these frequencies. At an operative frequency of say, 100 mc, serious detuning may be caused by an oscillator drift of only 0.01 per cent. The difficulties of controlling oscillator drift to such fine limits become obvious when one realises that the major portion of the tuned circuit may be inside the oscillator valve itself.

This drift falls into two general classes: The first, due to the oscillator valve and its socket, is characterised by a short time frequency drift as the valve and socket warm up; the second, due to the other oscillator circuit components, has a longer time drift as the chassis reaches its operating temperature. Both these effects tend to lower the oscillator frequency.

The use of miniature valves in VHF oscillator circuits greatly assists stability as due to the poor heat-conduction properties of the glass base used in this type of valve, little heat is lost to the chassis. Substitution of a mica-filled rubber valve holder for the normal phenolic holder will give reduced drift. Further improvement may be achieved by means of a condenser of suitable value, having a negative temperature coefficient, connected, at the valve socket, across the tank circuit of the oscillator. In a circuit using a converter such as type 6BE6 it is convenient to connect the compensating capacity between the screen grid and one side of the heater. This effectively brings the condenser between the cathode tap of the coil and earth and permits the use of a larger more convenient value. By this means the frequency drift may be reduced to approximately half that before compensation.

Electronic AFC using a separate reactance valve has been used effectively at frequencies below 100 mc. (See Terman.) Above this frequency, however, inter-electrode capacitance and transit time effects limit the use of such a device.

This article describes a new AFC valve which combines the functions of local oscillator and reactance device in a single unit, and functions by controlling the transit time of the electrons. (See Kurshan.)

Transit Time Frequency Control

Electrons reflected back from the RF signal grid of a converter valve to the oscillator section interact with the electrodes and space charge. When the signal grid bias is varying, these electrons have variable transit times and give rise to a "pulling" of the oscillator frequency. These effects are normally largely overcome by careful electrode design in converter valves intended for high frequency working but the action may be turned to

This article discusses a principle not yet well understood in amateur circles, though it has a number of useful practical applications. The figures quoted by our contributor will interest those concerned with the design of stable oscillators at the higher frequencies.—Editor.
Table of Values

Fig. 3 Suitable AFC (Automatic Frequency Control) Oscillator Circuit.

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>0.01 µF</td>
</tr>
<tr>
<td>C2, C3, C6</td>
<td>0.0005 µF</td>
</tr>
<tr>
<td>C4</td>
<td>27 µµF</td>
</tr>
<tr>
<td>R1</td>
<td>10 mµohms</td>
</tr>
<tr>
<td>R2</td>
<td>1,800 ohms</td>
</tr>
<tr>
<td>R3</td>
<td>30,000 ohms</td>
</tr>
<tr>
<td>R4</td>
<td>50,000 ohms</td>
</tr>
</tbody>
</table>

(See oscillatory circuit as for frequency required)

Use of Commercial Types

A receiving tetrode may be used as the controlled oscillator by making the plate the reflector and using the screen grid as the anode. A receiving pentode can also be used with its suppressor grid either at ground or plate potential.

Of a number of miniature valves tested, the 9001 gave the greatest control sensitivity, but it was difficult to sustain oscillation. Type 6AK5 performed readily at a slightly lower control sensitivity. It was found that approximately 50 volts on G2 gave a reasonable compromise between sensitivity and oscillation amplitude, while at least 1 or 2 volts negative on the reflector were needed to prevent current to the reflector.

The 6AU6 and 6AG5 required higher values (90 to 100 volts) of reflector potential to overcome their greater spacing between screen and plate, and oscillation was very weak.

Design and Performance of Special AFC Valve

One of the strongest oscillators was found to be the 6BE6 converter valve with its RF signal grid used as a reflector. It produced large frequency shifts, but a reflector bias of at least 20 volts negative was needed, due probably to wide spacing between screen and plate. A special valve was therefore built using 6BE6 parts with the RF signal grid replaced by a reflector designed to work at zero potential.

Tests conducted in a commercial FM receiver showed that the warming up drift of the oscillator, i.e., the difference in the frequency existing 30 seconds after switching the set on, until a steady state was reached at 120 mc was 230 kc in the first nine minutes. Using the special AFC valve constructed as above, in the same receiver, the drift was reduced to 28 kc in three minutes at the same frequency.

The circuit used was as shown in Fig. 3. It comprises a permeability tuned Colpitts oscillator. Cathode bias is provided so that the AFC voltage may be centred at ground potential.

By applying AM to the reflector electrode, the AFC valve can be used to generate a frequency modulated signal directly. It has the advantages of high sensitivity and high impedance.

References


A NEW 807

The 807 is probably the most popular, widely used and best-known valve in the amateur catalogue, and is freely available at a very reasonable price. So look out for the new Sylvania 807W, described as a “ruggedized cousin” of the 807; it is smaller, has a tubular glass envelope, is claimed to be free of parasitics (though that must depend largely on the way in which it is operated) and is fitted with the standard 807 5-pin base. We are not at all sure what “ruggedized” is supposed to mean in this context, unless it is that the 807W will stand heavier overloads for longer periods.
TOP BAND Tx

Describing A VFO/CO-PA for 1.7 mc

By N. P. SPOONER (G2NS)

COMPLETE saturation of the amateur bands is indeed a very long way off. But it must be obvious to many operators that although congestion is quite heavy at times on certain frequencies other bands remain relatively unoccupied. To relieve such congestion and to make fuller use of the elbow-room already available does not necessitate mass-emigration to the VHF's. These may well be left to those amateurs mainly interested in them, and as a future retreat should TVI eventually expel us in disgrace from the lower frequencies. The effect of harmonics in connection with the proposed new 21 mc band may later give some pointers in this respect.

In the meantime there is another avenue and

Apart altogether from the present favourable tendencies for DX on our lowest-frequency band, every station should be equipped with a small 1.7 mc transmitter, even if only to work the locals. For many obvious reasons, a Top Band Tx is most conveniently built as a separate unit. Here is a good practical design.—Editor.

Table of Values

<table>
<thead>
<tr>
<th>Function</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>500 μF</td>
</tr>
<tr>
<td>C2</td>
<td>100 μF</td>
</tr>
<tr>
<td>C3</td>
<td>20 μF</td>
</tr>
<tr>
<td>C4</td>
<td>100 μF</td>
</tr>
<tr>
<td>C5</td>
<td>51 μF</td>
</tr>
<tr>
<td>C6</td>
<td>200 μF</td>
</tr>
<tr>
<td>R1</td>
<td>100,000 ohms</td>
</tr>
<tr>
<td>R2</td>
<td>33,000 ohms</td>
</tr>
<tr>
<td>R3</td>
<td>20,000 ohms</td>
</tr>
<tr>
<td>L1</td>
<td>45 turns 18 SWG bare, spaced one turn, on 2-in. ceramic former: cathode tap 10 turns from earthy end</td>
</tr>
<tr>
<td>V1</td>
<td>6L6, 6V6</td>
</tr>
<tr>
<td>S1</td>
<td>SPDT switch</td>
</tr>
</tbody>
</table>

Fig. 1. The VFO driver circuit suggested by G2NS. Functions of S1 and C1-C3 are explained in the text.

Fig. 2. Stabilised power supply for the VFO, V2 being the neon stabiliser.

Table of Values

<table>
<thead>
<tr>
<th>Function</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1, C2</td>
<td>16 μF, 600v working</td>
</tr>
<tr>
<td>R1</td>
<td>10,000 ohms, 50 watt</td>
</tr>
<tr>
<td>Ch</td>
<td>10-henry 129 mA choke</td>
</tr>
<tr>
<td>T1</td>
<td>Transformer 350-0-350v, 100 mA, 5v and 6.3v</td>
</tr>
<tr>
<td>S1</td>
<td>VFO on-off, HT</td>
</tr>
<tr>
<td>V1</td>
<td>80 or 83</td>
</tr>
<tr>
<td>V2</td>
<td>Cossor S130 voltage stabiliser</td>
</tr>
</tbody>
</table>
few placid visitors and an increase in the strength of the static, the carriers and the nautical expressions.

Suitable Gear
The construction of a conventional 6L6-807 transmitter for 1.7 mc is simple enough and most of the needed components are in the junk-box or what-have-you category. The power input is limited to 10 watts (a limitation which might well be exercised on other bands by operators themselves in order to lessen the general QRM). Although on 1.7 mc quite 75 per cent. of success lies with the aerial itself, this does not necessitate the erection of a "special array" and very satisfactory results are usually obtainable with the HF system already in operation at the average stations, plus a good earth or counterpoise and perhaps some type of matching coupler.

Driver Stage
The variable driver suggested here is mentioned in a little greater detail because it has so outgrown itself since starting life along the lines of G6QB’s “VFO Drive Unit” described in the June, 1946, issue of the Short Wave Magazine. Use of the oscillator was required on all bands and the present ECO version allows a fundamental of 1.7 or 3.5 mc at will. The three variable condensers C1, C2, C3 (Fig. 1) are employed in the following roles: C1 sets the band for 1.7 mc but is switched out of circuit on 3.5 mc; C2 spreads the band on 1.7 and becomes the bandsetter on 3.5 mc; C3 is locked at zero and left untouched on 1.7, but on 3.5 mc it becomes the band-spreader. Although intended mainly for use on the Top Band the two stages of the transmitter actually allow CO/PA working on 1.7, 3.5 and 7 mc, besides VFO/BA/PA on 1.7 and 3.5 mc and

Table of Values

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1, C3, C4</td>
<td>0.01 μF</td>
</tr>
<tr>
<td>C2, C7</td>
<td>150 μF</td>
</tr>
<tr>
<td>C5</td>
<td>100 μF</td>
</tr>
<tr>
<td>C6, C8, C9, C10</td>
<td>0.1 μF</td>
</tr>
<tr>
<td>C11, C12</td>
<td>500 μF</td>
</tr>
<tr>
<td>R1</td>
<td>50,000 ohms</td>
</tr>
<tr>
<td>R2</td>
<td>3,500 ohms</td>
</tr>
<tr>
<td>R3, R5</td>
<td>10,000 ohms</td>
</tr>
<tr>
<td>R4, R10</td>
<td>250 ohms, 5 watt</td>
</tr>
<tr>
<td>R6</td>
<td>20,000 ohms</td>
</tr>
<tr>
<td>R8, R9</td>
<td>50 ohms, carbon</td>
</tr>
<tr>
<td>S1</td>
<td>Xtal-VFO switch</td>
</tr>
<tr>
<td>J1, J3</td>
<td>Key or CO cathode current. PA cathode current</td>
</tr>
<tr>
<td>J2</td>
<td>PA grid current</td>
</tr>
<tr>
<td>J4</td>
<td>PA plate current</td>
</tr>
<tr>
<td>V1</td>
<td>6L6, 6V6</td>
</tr>
<tr>
<td>V2</td>
<td>807</td>
</tr>
<tr>
<td>L1</td>
<td>1.7 mc, 45 turns 18 SWG enam., close wound on 4-in. former</td>
</tr>
<tr>
<td>L2</td>
<td>1.7 mc, 30 turns 18 SWG enam., close wound on 3-in. former</td>
</tr>
<tr>
<td>L3</td>
<td>1.7 mc, 24 turns 14 SWG enam., close wound on 4-in. former</td>
</tr>
<tr>
<td>Link</td>
<td>5 turns</td>
</tr>
</tbody>
</table>

Fig. 3. Circuit complete of the VFO/CO-PA transmitter for the Top Band, discussed in the article.
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VFO/FD/PA on 3-5 and 7 mc. When variable frequency is used in the LF portion of the 3-5 or 7 mc bands the buffer or FD/PA and the aerial tuning may all be adjusted and left at the centre frequencies of the required wave-range, no retuning being required except for heterodyning incoming signals with the oscillator 20 µF spreader C3 itself. On 1.7 mc, however, a band-width of nearly 300 kc (1715 to 2000) has to be covered and exactly 100 deg. of the C2 100 µF spreader dial happen to accomplish this once the edge of the band has been hit by the 500 µF setter C1. For reasonable steps, therefore, no retuning is required but should the chase lead one right across the band then both stages and the aerial condensers as well will require readjusting for resonance.

The easiest way to do this is to heterodyne the incoming signal with HT on the oscillator only, and when commencing to call, quickly to retune the other circuits for maximum output on a small loop-lamp fixed near the aerial coupling coil. This not only saves metering after the initial tuning up but also provides a constant visual assurance that RF is actually "going up the spout."

The VFO described has been collecting consistent T9 reports. But of far greater importance than the generation of RF power is the method by which it is launched on its journey.

Aerial Arrangement

Descriptions of aerials best suited for Top Band working have appeared in the pages of this Magazine at various times. Aerial change-over by means of a relay is, of course, optional but it can be accepted that faint 1-7 mc signals make better copy when taken off a good outdoor aerial, such as that used for transmitting, than from a piece of flex draped round the picture rail. The coupler in use is of the Collins type described by G6FO in his two articles "Aerials Worth Trying," February, 1939, and "Multi-Band Aerial System," August, 1946, in the Short Wave Magazine. In the writer's case the combined length of the top and the strapped feeders of the 14/28 mc Zepp, used end-on for 1-7 and 3-5 mc working, happened to total 85 ft. and instead of an earth that proved to be poor and of high resistance a so-called "counterpoise" of 60 ft. of wire was run down the garden.

To conclude it is suggested that greater use be made of the huge slice of territory in the Top Band region, not only to encourage the few regulars who are already there ploughing rather lonely furrows, but because the more we spread ourselves the happier we shall be!

CORRECTION AND APOLOGY

This is more a case of the Ha! Ha! Department than Error Crep' In, and no doubt a great many readers did think "Ha! ha! they've done it again". Did you notice that drawing captioned Fig. 1 on p. 189 of the May issue—if not, you should have done! The dotted curve is quite wrong, and the drawing should have appeared as given here. Note that this in no way affects the argument—the points X are still there, and in the same places on the wire—though the words "decreasing to a lower value at the ends" in line 18 of the left-hand column of text should be deleted. Sorry about this one; it was a case of the wrong block being put down and slipping through undetected. However, we have been putting earth on our head and drinking ink as a penance.
MORE IDEAS ON THE CAY-47155C

Top Band Conversion

By J. CRERAR (G3BYV)

After reading G2CZ's conversion of the CAY-47155C tuning unit (Short Wave Magazine, February, 1950) and having two of them available, it was decided to put them to a similar use. The circuit follows normal practice and the stability proved to be very good. When checked against WWV for four hours the oscillator drifted a maximum of 70 cycles starting from cold, most of this taking place in the first 10 minutes.

The circuit finally used consists of a series tuned Colpitts (Clapp) using either a 6J5 or a 6V6 strapped as a triode. This is followed by an untuned buffer using a 6V6, and is capacity coupled to the cathode of the oscillator. An 807 is used in the PA, and there is plenty of drive for an input of 10 watts.

Modification Details

The MO section is completely stripped of all components (more for the junk box) with the exception of the slow motion dial and the socket strip at the rear. A 1½-in. hole is cut in the compartment screen and the 807 socket sub-mounted, preventing any tendency for the 807 to "spill over." The other holders are mounted on 2 in. by 2 in. dural brackets, one of these being the original "MO step" switch bracket.

The coil, consisting of 60 turns of 22 gauge close wound on a 1-in. polystyrene former, is rigidly supported by a pair of 1-in. stand off insulators.

The tuning section, comprising a 0.00014 μF variable condenser with a midget 0.0001 μF
Fig. 1. From the CAY-47155C, G3BYV produced this circuit arrangement, the result being a useful Top Band transmitter.

air trimmer (slot adjusted with locking collar) and a -0.0001 µF silver mica in parallel with it, is mounted on a 3½ in. by 2 in. steel bracket.

The photograph shows the relative positioning of the important components.

The only additional component on the PA side is C14 and this is soldered directly from the cold end of the coupling coil to earth. The wire from socket F to the coil is removed and the HT fed through a rubber grommet from socket A.

A short length of braid from the wire leading to stud 1 to the valve cap completes the PA section.

Keying

J1 is fitted on the front panel in place of the MO step switch and J2 is mounted above the socket strip at the rear. The transmitter may be keyed either at J1 or J2, depending on whether break-in working is required or not.

Both the oscillator and the buffer brackets are wired as far as possible before fixing into the unit, keeping long leads down to a minimum. All earth connections for each stage are taken to a common earth tag and these are then joined together by a 12-gauge busbar. Two 0 BA ½-in. bolts are soldered to studs 2 and 3 and the lower bolt, fixing stud 3, is reversed so that a shorting link may be connected when required.

Finally a ¼-in. hole is drilled at the rear to

Table of Values

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1, C6, C8, C11</td>
<td>-0.0001 µF, silver mica</td>
</tr>
<tr>
<td>C2</td>
<td>-0.0001 µF, air variable</td>
</tr>
<tr>
<td>C3</td>
<td>140 µµF, variable</td>
</tr>
<tr>
<td>C4, C5</td>
<td>-0.001 µF, silver mica</td>
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<td>C7, C9, C10, C12, C13</td>
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</tr>
<tr>
<td>C15, C16, C17</td>
<td>-0.1 µF, mica</td>
</tr>
<tr>
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<td>47,000 ohms</td>
</tr>
<tr>
<td>R3</td>
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<td>R4</td>
<td>47 ohms</td>
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<tr>
<td>R5</td>
<td>230 ohms</td>
</tr>
<tr>
<td>R6</td>
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<tr>
<td>RFC</td>
<td>2.5 mh</td>
</tr>
<tr>
<td>L1</td>
<td>See text</td>
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Table of Values

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<tr>
<th>Socket</th>
<th>Voltage or Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>300 volts</td>
</tr>
<tr>
<td>B</td>
<td>6.3 volts, 3 amps</td>
</tr>
<tr>
<td>C</td>
<td>Chassis</td>
</tr>
<tr>
<td>D</td>
<td>Chassis</td>
</tr>
<tr>
<td>E</td>
<td>150 volts, stabilised</td>
</tr>
<tr>
<td>F</td>
<td>Not used</td>
</tr>
</tbody>
</table>

Fig. 2. Rear view of the CAY-47155C chassis, showing socket connections.
enable C2 to be adjusted when the dural cover is replaced.

The tuning range spreads the 160-metre band over the whole dial, with a spare 5 kc either side of the band edges. Greater stability still would result if the coil were made larger (the former used would only take 60 turns) and less series capacity used.

The modified unit will also double to 80 metres and can be operated as a driver for the QRO rig.

A power pack, modulator, and control unit has now been completed with the same size panel as the RF section and is mounted below it. The two chassis are held together by two pieces of chromed angle strip and thus make a complete "rack and panel transmitter" for the Top Band.

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**BAND EDGE MARKER**

**With Visual Indication**

*By H. M. HUMPHREYS (GI3EVU)*

MOST readers will probably agree that in these days of congested bands a VFO is essential if a reasonable number of contacts are to be made. While the self-excited oscillator has the advantage that it can be adjusted either to the frequency of the call being heard, or to a clear spot on the band if a CQ is contemplated, it also has the great drawback that it is all too easy to stray outside the band—an offence which the GPO is understood to view with grave displeasure!

The fact that the terms of the amateur licence require an approved frequency meter to be kept and used at a station where variable frequency control is employed does not entirely solve the problem, for several reasons. Despite good intentions, dials can be read incorrectly, especially where graduations are small and close together; graphs or calibration charts can easily be misread; oscillators can go off calibration quite unexpectedly; and last, but far from least, is the frailty of human nature, which usually turns out to be at its weakest when there is a possibility of bagging some rare DX. There is great temptation to swing the VFO to within a few hundred cycles of zero-beat with that unusual call sign, and to hang on expectantly with the hope of beating all opposition to a snappy reply immediately the CQ ends. In such circumstances, accurate frequency measurement is usually postponed until a contact is firmly established, on the assumption that the automatic check against the other station's signals is sufficient assurance of being in the band. While this assumption may prove reliable in most cases, there is ever present the danger of being lured outside the band by a station in one of those countries in which frequency measurement seems to be a very approximate matter, or by a member of the ever-increasing pirate crew who presumably have no hesitation in adding the minor offence of operating outside the recognised amateur bands to their major crime of being on the air at all.

**Suitable Unit**

To obviate all these risks, it would appear eminently desirable to have a marker which would give an unmistakable indication of the band edge. As far as the CW enthusiast is concerned, he is unlikely to run out of any of the communications bands except at the

---

**Table of Values**

<table>
<thead>
<tr>
<th>Band Edge Marker</th>
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</thead>
<tbody>
<tr>
<td>C = 0.01 μF, mica</td>
</tr>
<tr>
<td>R1 = 2,500 ohms, 1-watt</td>
</tr>
<tr>
<td>R2 = 15,000 ohms, ½-watt</td>
</tr>
<tr>
<td>R3 = 1 megohm</td>
</tr>
<tr>
<td>R4 = 47,000 ohms</td>
</tr>
<tr>
<td>L = 2-5 turn link</td>
</tr>
<tr>
<td>L1 = VFO tuning or buffer tank</td>
</tr>
<tr>
<td>V = Y63 Electron Indicator Tube</td>
</tr>
<tr>
<td>Xtal = 3500 kc crystal</td>
</tr>
</tbody>
</table>

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![Circuit diagram](MT180)
low-frequency end, and the fortunate harmonic relationships which exist make it a simple matter to design and construct a thoroughly efficient indicator which can be arranged to serve for all bands.

Apart from a valve mounting and a couple of resistors, the only components needed are an Electron Eye Indicator Tube and a crystal, the frequency of which should be exactly 3500 kc. Both these items are readily and inexpensively obtainable from surplus sources. The circuit diagram is given at Fig. 1, and although it is fairly well self-explanatory, a few hints on adjustment and operation may help to get it working at maximum efficiency. A 3·5 mc crystal is used at GI3EVU, because the VFO in use operates in that band, doublers being included in the exciter to give outputs at 7, 14 and 28 mc as well as on the fundamental. There is, however, no reason why a 7 or even a 14 mc crystal should not be substituted at will, and no doubt many variants will suggest themselves to the experimenter. The principle of the circuit is straightforward. The crystal, which is not in continuous oscillation, has no frequency controlling effect, its sole purpose being to cause the eye of the indicator tube to close when the link is coupled to a tuned circuit oscillating at the same frequency as its own fundamental. The degree of coupling is fairly critical—not exceptionally so, but the link should be adjusted so that the eye is almost fully closed at resonance. If the coupling is too loose, the opening of the eye may be found to vary slightly at points well off resonance as the VFO tuning control is rotated. This effect will, however, disappear completely as the coupling is increased to the optimum, and in any event is not likely to be confused with the indication of resonance, which is sharp and unmistakable. It is immaterial whether the indicator is coupled to the frequency controlling inductance of the VFO or to the anode coil of a tuned buffer stage, as it has a negligible damping effect. The HT and LT demands of the tube are so small that they can almost invariably be supplied by the VFO or exciter power pack.

The electron tube should be mounted with the eye through a hole in the panel as close to the VFO tuning dial as possible, and gives a clear visual warning of approaching danger as the operator nears the band edge.

XTAL XCHANGE

Here are the current offers—for the few simple rules respecting insertions in this space, please see p. 188 of the May Magazine.

G3AIZ, 157 Wanstead Park Road, Ilford, Essex.
Has QCC Type P5 crystal 7064 kc, also Brookes Type C7BT 7089 and 7139 kc, all certificated. Wants frequencies about 1800, 1850 and 1900 kc.

G3AT/L, A, The Limes, Station Road, Hugglescote, Leicester.
Has Standard Radio 7029 kc crystal, in holder, 2-in. pin spacing. Wants 100-1000 kc bar, holdered.

G3FDU, Honeycroft, London Road, Alderley Edge, Cheshire.
Has QCC Type P5 3506 kc crystal, certificated; also 3528 and 7035 kc crystals, mounted. Wants similar crystal in range 6016-6026 or 8022-8036 kc.

G3FWX, 11 Primrose Croft, Hall Green, Birmingham, 28.
Has QCC Type P5 3601 kc crystal, mounted, with certificate. Wants similar crystal 7017-7100 kc.

G3HAT, 100 Beaufort Avenue, Norbreck, Blackpool, Lanes.
Has 100 kc bar. Wants any type crystal about 1750 or 1790 kc.

G3SB, 16 The Parks, Minehead, Somerset.

NEW QTH's

Readers who may be concerned at what they feel is undue delay in the appearance of their callsign and address in our “New QTH” feature need not fear we have lost the slip or are otherwise disinterested. At the present time, due to the very large number of new callsigns and changes of address that we are receiving, it can take from six weeks to two months, i.e. two issues, before a new QTH actually appears. This is because of demands on space, apart from the fact that new callsigns are published in the order in which we receive them. But about every third month we take some extra space to clear off the back-log—but even at that we seldom have fewer than 40 new QTH's awaiting publication.

QSO COINCIDENCE

ZB1IH, Malta, was working VE3ZW recently and asked the VE if he happened to know a great friend of ZB1IH's in the R.C.N.; to which the reply from VE3ZW was, “I am John Doull, so you must be Geoff Turner!”
The annual dinner of the First Class Operators' Club will be held in London on the evening of Saturday, November 25 next. Members who intend to be present will assist by giving early notice; more detailed information will appear in the Club circular letters, but in the meantime—enter that date.

It is hoped that a new membership list will be issued before the autumn—with a present total of some 280 members, the current list is out of date, though additions, amendments and changes of address are duly notified to all concerned in the circular letters. Members are asked particularly to inform the Honorary Secretary of changes of address, if possible in advance.

Club Activity

The monthly C/L's now carry as a feature "Members' News", giving much information about individual activity. From the May issue of the Short Wave Magazine it is evident that the Club is represented in practically all branches of Amateur Radio achievement. To pick out a few instances, an FOC member heads the "Dozen DX" Contest; in the Four-Band DX table, the first three places are taken by members; four others are in the first eight callsigns in the Top Band list, and an FOC member also takes second place in Post-War Zones Worked.

In the QRP field, the "monthly bun" goes to G6ZN of the FOC, and the new pair of G's mentioned as having been worked by ZLIHM on Eighty are Club members.

FOC DX Contest?

It has been suggested by one of our overseas members that the Club should hold a DX contest of its own during the coming season. Will those who would care to take part let us know (especially overseas members), so that if the idea has sufficient backing, arrangements can be made. Details will be discussed in the C/L's.

The married couple within our ranks, both holding a licence in their own right, are G3EYO and G3CTE—and G3EYO is already having her call pirated! On this subject of piracy, a G2 member actually heard his own call on the air with a GM prefix.

Circular Letters

Will those members who do not receive a C/L by the end of each month please be good enough to notify G5PS, so that in their own interests an investigation can be made as to the cause of any delay. The C/L's are now posted regularly at the beginning of every month, and G5PS hopes that he has at last devised a system whereby full and prompt circulation can be assured.

Election Notice

In accordance with the Rules of the Club, the following new members are declared elected to the active membership list of the F.O.C.:

L. F. Crosby, G3FGT (Birmingham 25); Mrs. Duesbury, G3EYO (Sunderland); B. M. Selby, G4LV (South Killingholme); J. Banner, GW32V (Rhigos); S. T. Hudson, ZL4FO (Dunedin); A. Lindgren, SM5IQ (Sandbybars); O. W. Reid, ZS6DO (Germiston); P. R. Solder, G5FA (London) and F. Dearlove, G2QO (Hull).

All communications respecting the First Class Operators' Club should be addressed direct to Capt. A. M. H. Fergus, G2ZC, 89 West Street, Farnham, Surrey. (Tel: Farnham Surrey 6067).

CARDS IN THE BOX

We are holding cards for the stations listed below—please claim by forwarding a large stamped addressed envelope, with name and callsign, to BCM/QSL, London, W.C.1, which is a full and sufficient address for our QSL Bureau. If you would like your name and callsign to appear in our "New QTH" feature, and subsequently in the Radio Amateur Call Book, please mention that at the same time.

G2FWI, 2KV, 2LR, 2VB, 3CAQ, 3DEH, 3DEZ, 3DWN, 3EDH, 3EXV, 3EYH, 3FSG, 3FSY, 3GBD, 3GBI, 4JZ, 4PV, 5GU, 5QD, 6YF, 8BS, GW3CPU, 3DNN.
JUST to show that it is not the accepted custom to begin this Commentary by moralizing, we propose to plunge boldly into the subject of DX without further ado. Suffice it to say, in passing, that last month’s homily resulted in a considerable volume of comment, mostly of a sympathetic nature.

With the exception of Ten, which has been decidedly scratchy, all bands have been bringing in the good stuff and have been well occupied. Ten, as one would expect at this stage of the sunspot cycle, has relapsed into summer conditions almost by the middle of spring; from time to time little bursts of Far East activity make a pleasing diversion, and on many occasions the South Africans roar in, but on the whole the activity is very restricted, and there is practically nothing at all for the CW man. So we will refer briefly to 28 mc when we come to the proper place, but first will deal with the Old Reliable.

DX on 14 mc

No shortage of activity here, judging by the mail. Peak periods continue to be the breakfast hour, 1730-2000 and, sometimes, the hour around midnight. One phenomenon remarked upon by several chasers is the way in which the VE8’s seem to crowd around the band at midday—a most unusual time for them. It is pretty safe to say that one simply cannot listen between 1100 and 1300 without coming across one or, two of them. G3ID (Dawlish) reports VE8AS at 1115; other contacts were FF8JC, KV4AA, VQ4BJ, YV4AX, KL7VV—mostly in the early evenings. Heard, but not worked, were HZICK, VS7KR, CR5AC and KG6FAA.

G3FGT (Birmingham) has worked UI8KAA, CE3DZ, KL7YJ, VQ4WHL, YI3DYN, FF8JC and plenty more on 14 mc CW, and he has been active on three other bands as well. G3FZW (Lichfield) remarks that OX3BR gives his QTH as Peary Land, but presumable this only counts as Greenland; it’s the northernmost part and of interest for that, if no other reason.

G6BB (London, S.W.2) offers AC4KK, giving QTH as Lhasa, name “Fred,” on 14045 at 0853. The time seems a little peculiar, and we don’t know, via the grapevine, of an AC4KK, but let us hope he is the real thing. Others for ‘BB on Twenty were CR7AD, EQ3FM, VK6GA and lesser fry. G3FPQ (Bordon, Hants) built an 832 PA for the band and collected 53 countries in four weeks. Some of his best were VS7SV, TF5TP, EA9BB, PJ5TR, ZS3BA, KV4AO, CX4CZ and the doubtful M1B.

From G3BDQ (St. Leonards) comes a list including KR6CA, VP8AO, VP4CO, KG6HG, FN8AD and EA8LP—all new ones—plus several old pals. ‘BDQ adds that VE2IQ is in the Arctic at a remote Eskimo settlement (Fort Chimoin) and is looking for G contacts. G3FXB (Hove) has teed up his G8PO aerial
and has collected some new ones thereby, again including this doubtful M1B. (Our own private buzz is that the real M1B uses 'phone only, and that this chap giving his QTH as "Snt Marino" is a Suspicious Character).

The little surprise that makes life interesting is the theme of the letter from G8OJ (Manchester). After repeated fruitless calls to PK1RI and PK1HX, he eventually called one of them and the other came back! As 'OJ sagely remarks, if every DX rarity came back to us every time we should soon lose interest in the business—hence the lack of any desire for 1 kW and a Rhombic. Others from G8OJ were FKS8AD, SVØWM, CE2BC, V8RX, Y13DYN and EA8LP.

G13EDN writes from R.N.A.S., St. Merryn, to say that he worked VK1RD on 'phone from G1ZHML’s, his brother’s station; QSL via VK3ASD, R.A.A.F. Station, Laverton, Victoria—but boats visit Macquarie Island only about once in six months. This particular contact was on 'phone, but we have heard VK1RD twice on CW. G2GM (Torquay) now uses 150 watts on 14 mc only and is finding DX good. He raised W7KJQ in Nevada for his WAS, although he is short of four cards. 'GM says he finds the Far East the most difficult to work, with local Europeans busy pouncing and drowning the DX with their terrific signals.

G6BS (Cambridge) seems to specialise in "K" stations; his "KH6 beam" has given him no fewer than twenty "KH6's during the past month or so. It is operated by a GPO type who has been in VP7 for only a year.

The latter, of course, was strictly a short-time station and has long since been non-existent. The former has been in VP7NM, FF8JC, EA8CL, UM8KAA, UA9KFD, VP3FJ, VP8AO (South Shetlands) and many others. The call of G6HL, temporarily over there. G2BJY (West Bromwich) has heard ZK1AZ calling CQ DX (0800-0830) but has had no luck. Best DX for 'BJY was VE6, 7 and 8 plus KH6PM and VQ4WLH.

A long list of 14 mc 'Phone DX comes

<table>
<thead>
<tr>
<th>Station</th>
<th>Countries Worked</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>G2BJY</td>
<td>104 95 24 4 138</td>
<td>25</td>
</tr>
<tr>
<td>G3DO</td>
<td>103 161 37 23 191</td>
<td>150</td>
</tr>
<tr>
<td>G3ATU</td>
<td>100 183 70 26 190</td>
<td>150</td>
</tr>
<tr>
<td>G2WW</td>
<td>100 168 46 21 178</td>
<td>150</td>
</tr>
<tr>
<td>W2QHH</td>
<td>98 183 62 70 189</td>
<td>35</td>
</tr>
<tr>
<td>G2VD</td>
<td>98 161 60 29 168</td>
<td>150</td>
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<tr>
<td>G6CB</td>
<td>94 42 6 1 112</td>
<td>20/150</td>
</tr>
<tr>
<td>G3BOC</td>
<td>72 34 25 17 83</td>
<td>15/60</td>
</tr>
<tr>
<td>G3FVJ</td>
<td>71 114 45 24 135</td>
<td>150</td>
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<td>G6KA</td>
<td>70 132 45 9 148</td>
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<td>G8FA</td>
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<td>G8IP</td>
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<td>3/150</td>
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<td>G8PW</td>
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<td>G2DHV</td>
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<td>G3AGB</td>
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<tr>
<td>G6AT</td>
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</table>

FOUR BAND DX
from G3CIZ (Wakefield) and includes ZD1SS, SV5UN, ZP2AE, VP3MCB, VP5MU, VP9II, T12KW and 2OE, TG9AI, as well as VQ2, 3 and 4, CR6, PK4, KZ5, KP4, XE and heaps of others. In short it seems that 'Phone has paid off better than CW does for many people.

Some Rarities

It isn’t by any means everyone who has worked ZK2AA yet! And yet there he was, calling CQ DX and not getting a single reply, on two recent occasions. Admittedly he was pretty weak, but our own particular AR88 is no better than anyone else’s; so get weaving, someone. And now we have a long report from David Mitchell (ZL1MP) about the proceedings at VR1C. This station is run under the auspices of the U.S. Loran Station Nr. 84, and is on Bikati Island, part of the Makin Atoll at the northernmost end of the Gilbert Islands. There are three stations in Transmitting Unit 84, one of which is operated by KX6BA in the Marshall Islands. The third is at Kwadack Island, near Kwajalein, but has no amateur population (as yet).

VR1C has been operated by KX6BA (who is also W6PZ) and another operator, “Dave,” who apparently has no amateur call. He uses 100 watts to a dipole but expects to have some beams up soon (after which he will go on to ‘phone, so hurry up, you key-bashers). Best time for Europeans on 14 mc is apparently between 1700 and 1800 GMT. Cards will be QSL’d, and should be addressed to Loran Unit Nr. 84, Navy 824, c/oFPO, San Francisco.

This station is very isolated, and the operators would appreciate copies of English radio magazines, so if you want to make sure of a contact and a QSL you know just how to go about it.

While on the subject of rarities there is no harm in mentioning that there will be an FP8 on the air one of these fine days, but we are not yet allowed to release the whole story. We will warn you in good time!

Still on the subject of 14 mc DX, G3CDC (Sherwood) would like any information on the subject of CS3WS, heard calling CQ round about 0800. ‘CDC also heard AC4KB, but as he was 579x, gave his QTH as “Pikifx” and said the weather was “gode,” he didn’t get unduly steamed up about him. Others from G3CDC were EA9BB (1840), UAOFR in Sakhaline (2000), ZKIBC, Rarotonga (0900) and KX6BA (1910). But most of all we thank him for “Pikifx”, for which we can think of several uses!

Just as we had written about G4QK (Harpenden) and his “magnificent” tree, he wrote to say that someone had called and cut it down; so now he will have to move again. Before its demise he contacted UA0KSB and ØSJ, ZE2KF and OX3BR, and heard KR6CF and YN1LB.

**DX News on Ten**

Very little 28 mc activity is reported, but during the good patches the band has been known to get very lively. G2BJY records that on one particular day all continents were coming in, and he heard ZL, VK, ZS, W, VE, PY, LU, CE, VU, AP, VP2, KZ5, PJ, VP8, KP4, YV, OA and CX! Of course there is no doubt that after the brilliant behaviour of Ten over the last four years, we have all become thoroughly spoilt and expect too much. There’s not much wrong with that little list for

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**TOP BAND LISTING**

*Starting August 1, 1949*

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G2ZF, Bramhall, Cheshire. is active mainly on 14 and 28 mc, CW and phone. The Tx consists of ECO-TU5 into a 3-stage exciter driving an 813 in the PA. The receiver is an HQ120X and the aerials a folded dipole on Twenty with a two-element beam for Ten. The score as at the beginning of February was 147C and WAS on 28 mc phone.

a band that is actually being neglected because conditions are bad.

G3AWP (Bournemouth) managed to raise HC8GRC at 2200 by calling him on 28640 kc, since the HC was tuning from 28500 up. He tells us that G2AKQ worked him as HC9GRC, when he was on the boat on the way out from Ecuador. It seems that during the short stay on the Galapagos the station made 1116 contacts! G3FXB has got up a three-element beam which, although low and badly screened, is rolling in the DX that he couldn't work on his Zepp. But 'FXB complains bitterly of the lack of CW activity, which is definitely unfair to those who haven't yet been issued with their 'phone tickets.

G6BB also has a new beam up in the air, but had to be content with VS6 and LU during the month. G3FGT has been using 'phone on the band and has snagged ZE2JP VQ4RF, PK1CR and 4X4CZ during brief openings.

7 and 3.5 mc News

Activity on these bands has also been at a low level this month, since they have been pretty slow after an encouraging burst of DX conditions. G6BB raised PY2DY to give him his WAC on 7 mc, after 22 years on the band. A week later he raised PY2AC with his first call, and also found HP1LO. G4RZ (Harrow) sticks to the band through thick and thin; he says that signals have become much weaker, but there is still DX about every morning. To prove it he quotes contacts with ZL (three of them), plus UR, SP and KP4 for new ones. All this with 25 watts and a single crystal on 7036—and all between 0600 and 0630.

G6BS has pushed his 40-metre score up to 112 countries with I1YAT/Trieste, 4X4DF, MB9BJ, AP5B, and ZE2JN. G3FGT has favoured the 3.5 mc band, on which he has raised KP4KD, ZB1AB/P, VO1W, LX1DU and sundry VE's and W's.

G3FPQ, whose QRP feats on the same band were reported some little while ago, continues to wield his three watts, with which he has worked VE1BV, FA8BG and 3V8AB. He lost a TA3 through the much-hated "ferrying" technique, by which the TA3 was passed from G to G until 'FPQ gave up in despair.
ZONES WORKED LISTING
POST WAR

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It will be noted that a number of operators at the head of this table are now credited with "WAZ". They are those who have actually received the WAZ Certificate issued by CQ. If their country scores are not the same as those quoted in CQ, this merely means that they have kept us notified of their latest scores. Stations credited with "40" are those who claim 40 Zones but have not yet been issued with a WAZ Certificate.

The Top Band

This threatens to become the most popular band, judging by the great increase in the amount of mail dealing with it, and also by the sustained level of activity. What shakes us is the terrific amount of listening that goes on up there. On two brief occasions when our local nightingales were shouting their heads off late at night, we stood the mike outside the shack window and put them on the air; as a result of these two periods of roughly five minutes each, they were heard in four countries—G, GW, GM and GC! And all we did was to call one station and ask him to listen for them.

G5LF (Stanmore) will be on from Islay, in the Hebrides, between July 28 and August 16. Operating hours will be erratic but fairly frequent. Apparently Islay counts as Argyllshire, so if you want that country, listen out for GM5LF/A. G3GDW has joined the QRP boys, and finds the Top Band a very friendly tract of territory, especially for 'phone-to-CW working, not often found on the other bands.

QRP Activity

So many reports of QRP results on the Top Band have been received this month that we will try to deal with them all together. G2AJU (Ipswich), a well-known exponent, has Worked All English Counties with less than 4 watts, using battery HT and 2-volt valves. He has also worked ZB1AR twice—the second time with one watt and a report of 339. Other QSO's from 'AJU were GM8FM with 24 watts of 'phone, GM3ATV with 1 watt, DL1IX with 2 watts. Highly recommended for jaded DX-chasers—try building yourself the simplest possible one-watt and see what you can do on the Top Band.

Another QRP treatise comes from G3FYY/PA (London, N.W.2). He uses a portable rig, designed to be carried by hand, complete with a 30-ft. Dural mast weighing less than 4 lb. He gave the rig a try-out in the garden one day; on 3-5 mc he worked several G's up to 95 miles and finally ON4AP (180 miles) with an input of 1 watt to a 3QS. Ahead of this PA is a 1T4 which can be used as either CO or VFO, both heaters being run from a single dry cell. The mast is used as a radiator and insulated from earth by a small bakelite cup.

Top Band Counties

Several stations now claim WAEC, but quite a few people seem to be in an unnecessary state of confusion about the way in which the leaders in the table claim 60 or more counties, when in their schooldays there were only 40. Too simple! In England there are 40 counties plus London, making 41 for the purposes of scoring; then you may add all the Welsh, Scottish and Northern Ireland counties, plus the Channel Islands and the Isle of Man. But for "WAEC", take it literally as English counties. G2AJU, mentioned above, has them all; so have G2YS (Chester), and G6AB (Holland-on-Sea). No further claimants have yet come up, but they will! G3CUC and G3CRJ have both been active in Westmorland, so there's now nothing to stop you.

G5MR reminds us that the light vessels round the coast are now working on 1860 kc and rightly says that we should not treat them as a nuisance but should keep well clear of their frequency. If we QRM this service, which is vital, we may not only cause a situation but
G4LX, currently scoring 60 counties, tells us that this will be his final claim, as he will not be on the band much more until November. He set 60 counties as his target, which has now been well and truly hit. And he returns to VHF for the summer season.

G6AB reports that he has his card from HZ1KE confirming the first G/HZ contact on the Top Band, and very nice too. 'AB continues to head the table with his score of 61 counties and 16 countries. G6VC (North-fleet) has added a few more counties in spite of being involved in a QRP Contest on 3.5 mc. G2CZU (Bath) wonders whether he might be the only amateur in the country (or in the world) who is also the trainer of a rugger team? For that reason he has more time on the air in the summer than in the winter. 'CZU is preparing to build a new shack and to erect a 40-ft. steel mast—he is already 540 ft. up. In answer to his final query, we are, so far, only talking about “WAEC” as a Top Band activity, and there is, as yet, no such thing as a certificate, though that is in hand.

G3AKU (St. Ives, Hunts) has changed his tactics to the extent of spending nearly all his time on the Top Band. As a result, he has worked 52 counties and 9 countries in a total of 52 days. It was easy at first, because several people were only too eager for Hunts—but the tempo is a bit slower now. He pleads for activity in Shropshire and Hereford—just as a few people did a month or so ago for Hunts! 'AKU asks whether portables can count for “WAEC”—in view of field day activity this summer. We really don’t see why not, provided the location is authenticated and QSL’d. Finally, he remarks how strange it is to find people on the band who have been operating for years and can still only handle a shaky 10 w.p.m.

G3EPR (Tankerton) is one of those who are mystified at the way more than 40 counties have been explained, so we won’t dwell on it. G3BAP (Lancaster) tells us that ex-GC2BMU is already active as G2BMU from Westmorland, although as yet he can only use a few feet of wire across the room as an aerial.

G2BID, Middleton, Lanc., in a small space 7 ft. by 5 ft. by 6 ft., runs a rack-panel job with a pair of push-pull 807’s in the PA, driven by a four-stage exciter unit, with a push-pull 6L6 modulator. The Rx is an AR88D, the aerial an end-fed 85-footer, and main activity is on 160, 80 and 10 metres, with a separate CO-PA for the Top Band. All the transmitting equipment is from designs published in the Short Wave Magazine.

NEWS FROM OVERSEAS

VE2KS (Montreal) puts in a plea for an Empire Contest, but strictly on an inter-Continental basis. He adds that VE2AGF is ex-G2CIN and is a director of the Montreal Amateur Radio Club. 'KS himself has been
on the air since 1921 and says, "treat it as a hobby and it's still wonderful . . . but how many hours have certain people wasted on acquiring hundreds of new countries?"

VS7NX (Colombo), via G2ZC, says that there are many pirates with VS7 calls, including VS7AB, 7AX, 7JG and VS7EL, who states that he is in the Cocos Islands. No such call has ever been issued. VS7NX is the one and only holder of the DXCC in Ceylon; he started transmitting in 1928, is 46 years old and still going strong.

AP5B (Lahore) sheds a little light on why some G operators don't get all the QSL cards they would like, by telling more than one story of bad behaviour which so enraged him that he certainly would not dream of sending a card! He is still active on 7 mc with 25 watts to a B2, but has given up 3.5 mc until the winter, when he hopes to be back there again. His power on the DX bands is only 8/20 watts, but he has 40 countries on 7 mc and 95 on 14 mc to his credit (to say nothing of 60 on 28 mc).

Mal Geddes, formerly G2SO and now firmly settled in Southern Rhodesia, is expecting a ZE3 call at any moment. He hopes to work lots of G's, and on the night of April 18, on 14 mc CW, he heard G3APB, 3BRQ, 3CBU, 3CSP, 3DCU, 3EET, 3EGQ, 4MU, 5BZ, 60Y, 8LS, 8RQ, GM3AHQ and GM3EST—so it looks fairly propitious. Likewise Bill King (ex-G3ECU) notifies us of his arrival in Iraq, complete with gear, and he, too, says the G's come through well on 14 mc CW.

WØUOX (Redwood Falls, Minn.) is one of the lucky ones who have already worked VR1C. He has also collected EA9BB and VP5BF, and he landed ZD8B just before he left for G-land.

An interesting letter from ZL3NE of Christchurch discloses that 80-metre G's are audible out there during the period 2000 to 2100 BST, and that conditions from the ZL3 point of view should improve during the next few weeks as the Antipodean winter advances. ZL3NE lists a number of European prefixes, all received up to May 12 last, and mentions G3FQ and G3RZ as having been called by him on the evening (our time) of May 5. He says that he will be on 3501 kc regularly till about 2200 BST, able to QSY anywhere up to 3600 kc if necessary, also that ZL1CI and ZL4IE are others similarly interested. What kills it for us, of course, is the high level of noise and European QRM, but contacts of this kind are well worth the effort.

VS1BQ (Singapore) is now on Twenty again with a modified B2, VFO driven, but is somewhat handicapped by lack of a decent receiver; he and VS1CO operate from adjoining rooms, so the mutual-QRM problem has taken a bit of sorting out! However, things "work out fairly well," as VS1BQ puts it.

More on the difficult DX theme, HZ1KE says that G/HZ working on the Top Band is now over for this season, as daily storms and a very high level of QRN make listening impossible. For the information of all interested, Ken authenticates the following as the only four G's with whom he had full and proper 1-7 mc contacts: G6AB, G6BQ, GD3UB and GM2HIK—though several cards have arrived at HZ1KE from other G's who thought (or hoped) they had worked him too! Ken says he will be on the Top Band again next season and expects to be in Saudi Arabia till some time in 1952.

And from the Free State of Trieste, we have a line from ex-DL2CU who is now signing MF2AD and looking for G contacts on the 3-5, 7 and 14 mc bands.

Miscellaneous Gen.

GM3EST (Motherwell) seems to have got the idea that all the fellows who work lots of super-DX have very deep pockets, possibly in addition to ideal locations and heaps of shiny modern equipment. 'Taint so, 'EST, not by a long way. Some of the top-scorers have very modest gear, a far-from-perfect QTH and as shallow a pocket as one could lament upon. We know personally that three in the "over-200" class use a pair of 807's and completely home-brewed gear with the exception of an ex-Govt. surplus receiver obtained at a very modest price. The most important things, we are convinced, are the operating ability and the aerial. And the latter doesn't imply a superlative location but merely an intelligently-strung-up piece of wire which makes the best use of all the local circumstances.
G8AR (Sunderland) sends us a local press cutting reporting him as working DL4NH, airborne at 12,000 ft. over Iceland... G3COL (London, N.W.11) had a CQ replied to by a VR6QL, who dodged the question of QTH and finally faded away when asked for it... G3DCU (also N.W.11) tells us that ZS8MK is ex-G6MK and ZS5MK, and his QTH when in ZS8 is Dr. R. L. Markham, Qachas Nek, Bechuanaland. He was found for some time on 14115 kc between 1730 and 1830, but we believe he is now out of ZS8 again.

G8IX (Stoke-on-Trent) sends us a Japanese SWL Report—from a member of the JARL and BSWL. This card expresses the hope that Japanese nationals will be allowed on the air in the near future.

More QRP

G2FXA (Stockton-on-Tees) has been trying very low powers. Having been on the air with an exciter unit only, he dispensed with its power supply and used a 100-volt HT battery. With this, on 7 mc, he found that about eight out of ten stations came back; so he went down to 30 volts of HT and still got around. And he adds that although he has some nice receivers and converters, he still sticks mostly to his favourite 1-V-2. GM6IZ (Aberdeen) is a funny one which we have met personally on one or two occasions. With his 150 watts he had been calling his head off for a long time, and finally worked a W4 who gave him 599 plus. When told of all the abortive calls he suggested that signals were so strong that people suspected them of coming from a local phoney! So GM6IZ gave his 866's a week's leave, reduced to 18 watts and promptly worked Calif., Ariz., Ore., Mont., Idaho, Alberta, and the rest (to say nothing of VO6, ZE2 and UA0) and ended up with a W6 who said: “I can honestly say that you are the strongest signal coming in from Europe.” There's a moral here all right!

G3ACC (London, S.E.22) is yet another who has gone QRP, but, in this case, because of TVI. Meg now has a TVI-proofed 25-watter and also uses 10 watts (QRO) on the Top Band, but she bemoans an apparent lack of stations up there. The new Tx consists of a 6V6 and an 807—nothing more.

G3COJ (Hull) wants to see the UA0 position clarified, since there is no means of telling which are in Zone 18 and which in Zone 19. The short answer probably is that it doesn't much matter which zone they are in until the card arrives, so the best plan is to try to work them all. Frankly, we just don't know who is in which, except that 'KFD is in Zone 19 all right. G2BBI (Westcliff) requests light on the VO/VE matter, and asks whether VO's worked before the “merger” still count as a separate country. It has been ruled, quite recently, that they don't, so we all lose one country from our scores. 'BBI heard VT1RF (Kuwait) make his first QSO on ten-metre 'phone, but couldn't raise him. Since then he has heard that VT1RF limits himself to three contacts a day, because he has no cards and three letters a day is all he can manage.

G3CJV (London, N.13) wishes one could indicate, when calling, whether one wants a chatty QSO or just a rubber-stamp affair. He suggests some signal for the purpose, but we are always chary of trying to introduce such things, because for the next three years one will have to waste so much time explaining to every single contact what they mean! We have seen another suggestion, recently, for ruling out the CQ call altogether and calling one's own prefix, so that anyone hearing “G G G G de G6ABC” would know at once that it was a G calling. At the same time the use of the prefix would indicate that it was a general call. This, too, might be a very good thing, but unless it was internationally introduced it would merely waste an awful lot of time.

GC2CNC (Jersey) makes the frightening suggestion that we should start a column giving the calls of all stations who have been heard committing acts of “Spivery.” Times, frequencies and details to be given, and general remarks on the transmissions. Not in a thousand years, ‘CNC—we are not the type to stick the old neck out quite so far, apart from the fact that what is called spivvery is very often a matter of opinion. But the further suggestion of publishing a “Code of Good
Conduct” is more likely to meet with general approval and is well worth considering. Then those who didn’t come up to the standard could possibly be educated in a painless manner; the other would be far from painless, and might actually lead to innocent parties being pilloried.

Pirates

G3EAZ (Exeter) says his call is being pirated by someone using 'phone on the Top Band; he himself has been off the air since October last and has never used 'phone.

G3EVP (Harrogate) has had cards confirming QSO's on the 3.5 mc band, on which he has not yet worked. He is going on it shortly and hopes to have a QSO with himself, if the other chap persists in sticking to the call.

And that brings this month’s offering to a close. Nothing now remains but to extend the usual wishes of Good Hunting and Good Conduct, and to remind you that the closing date for next month’s outpourings is June 13, first post. For overseas mail it will be July 12 for the August issue. Address it all to DX Commentary, Short Wave Magazine, 53 Victoria Street, London, S.W.1. 73 and BCNU.

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**Portrait Gallery**

**G2VV**

JAMES N. ROE of G2VV is one of our younger Old Timers, in terms of “radio age”, having taken the air in January 1929. Prior to that, however, he had served a three-year apprenticeship with an artificial aerial licence and the call 2BUW. Jim's was the first amateur station to be licensed in Farnham, Surrey, and his early interests were QRP work, rag-chewing and DX, all of which have persisted right up to date.

In 1934, he held WAC and WBE certificates achieved without exceeding 9 watts from batteries; he still holds a portable licence and takes pleasure in wielding QRP! But at present G2VV is undergoing an extensive QRO rebuild, and is only active on 3.5 mc CW.

In addition to being M.I.R.E. and F.R.S.A., Jim belongs to the FOC and BOTC, and was for five years the Hon. Sec. of the Thames Valley Radio Society. He also holds an unusual distinction in the form of the pre-war DJDC (German) Olympic Games Radio Contest Certificate.

Radio is a full-time interest with G2VV; before 1940 he was in turn with E.M.I., Ferranti, Baird Television and Gambrell Radio Communications. During the war he was a production engineer with Rediffusion Ltd., and a member of the R.O.C. Since the war he has been working as a free-lance engineer and journalist, and is engaged on the design and servicing of domestic, communications and amateur equipment, together with the preparation of technical service manuals.

The fact that Jim remains an active enthusiast on the amateur bands goes to prove that professional radio men can still enjoy Amateur Radio as a hobby. The present QTH of G2VV is Hampton-on-Thames, Middlesex.

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*The Short Wave Magazine covers the whole field of Amateur Radio*
KEYING TECHNIQUE
Click Suppression and a General Discussion
By I. E. HILL (G6HL)

Each passing year seems to produce increased activity on the various amateur bands to the extent that it is now most unusual to receive one signal without a background of several others. 'Tis bad enough if the signals in the background are clean, but one or two indifferent ones and a few key clicks can strain the patience of the most saintly. Particularly is such interference annoying when one considers that it is almost entirely unnecessary and could be avoided. In this country, at any rate, there is no shortage of good equipment and an adequate supply of literature on radio theory and practice. Nevertheless, we still have bad notes, signals with unstable frequency control or no control at all, and shocking key clicks, particularly on the lower frequency bands where there is least excuse.

In the past, key click elimination has been practised only to the point where BC1 is avoided and radiated clicks do not trouble neighbouring amateurs listening off the transmitter frequency. To-day, it is necessary to go even further and completely remove clicks from the radiated signal.

Cause of Key Clicks

Key clicks, or apparent key clicks, are of three kinds, and can be classified as:

(a) Clicks caused by the spark at the key and radiated as an RF pulse of short duration and no particular frequency.
(b) Clicks caused by the start and/or stop of a CW signal.
(c) Apparent clicks associated with keying which are actually short bursts of parasitic oscillation.

This is an essentially practical article on a most important subject and will be of interest to every operator of a CW transmitter. The author also suggests a method of clickless keying which while involving no new principle, is a system not often used in amateur working.—Editor.

By always keying a circuit carrying a minimum of current and including a small fixed condenser at the key contacts, together with RF chokes in the key leads, the click caused by sparking is not difficult to avoid. This type of click is normally only heard quite locally to the source.

At the instant before the key is depressed, plate supply is at a maximum voltage, and with the average amateur installation this is at least 10 per cent. above the loaded condition. As the key is depressed RF drive is suddenly applied and the radiated signal builds rapidly to a peak as illustrated in Fig. 1. This sudden change from no signal to a maximum peak will produce a click in the receiver on the fundamental and nearby frequencies. Similarly, when the key is released, the signal will fall rapidly to zero and another click will result.

In the old days of LS5B drivers and DET1's or T250's in the final, parasitics were almost unknown and in any case were easily avoided. To-day, sensitive tetrodes or pentodes are the general rule for both exciter and final stages. The sensitive valve is more prone to parasitic oscillation, particularly of the HF type. Careful design and the liberal use of carbon resistor "stoppers" in grid and screen feeds will do much to prevent parasitics. If preventative measures are not taken, it is likely that the action of keying will jerk the transmitter into producing parasitic oscillations, each of short duration. As these parasitics are often present only during the process of keying, absence of this trouble when the key is depressed does not give the transmitter a clean sheet; 807's are particularly prone to such effects.

Fig. 1. Waveform to be expected of keyed CW signal with no key click correction.

Fig. 2. Waveform of ideal CW signal, showing effect of click elimination. The build-up is slow, with constant amplitude of the "made" signal, followed by a slow fall-away.
Fig. 3. Waveform of acceptable amateur CW signal, with adjusted key click correction. Slight peaking must be expected at "make" unless the power pack regulation is perfect. It is difficult to obtain exactly similar build-up and fall-away, and it is preferable to have the former faster than the latter, as suggested in this sketch.

Cure

It was explained earlier that the click is caused by the sudden application of RF drive and/or plate supply, and the rapid build-up of the RF output. If this process can be slowed down and the oscillation made to build up gradually to its peak and similarly to fall slowly to zero, then the clicks will be avoided. There is then less likelihood of shock excitation into parasitic oscillation, and if suitable precautions are taken that trouble will also be avoided.

If the slowing-up process is overdone, the keyed signal will become "woolly" and difficult to copy. A happy medium is the sort of waveform illustrated in Fig. 2—with a further comment in Fig. 3.

How to Do It

At "make" it is necessary to slow down the speed of build-up to the steady peak value. An inductance objects to any change of passing current and insertion of a suitable value in the plate feed of the keyed valve will have the desired effect. Increase of the inductance will increase the time taken to build up to normal and a minimum value should therefore be selected which will remove the click on "make."

So far so good; use of a suitable LF choke will remove the click on "make," but when the key is broken the current in the keyed stage will fall to a minimum or zero. The choke is still in circuit and it will object strongly to the further change in passing current, and will demonstrate its objection by a spark at the key.

Sparking contacts—the cure is obviously a condenser which will be put across the key contacts. The spark occurring when the key is broken is now taken care of by the condenser which will be charged by the voltage previously producing a spark at the key contacts. The click on break is thus removed.

But next time the key is depressed a click is heard in the receiver, this time caused by the condenser discharging. It is now necessary to show up the discharge rate of the condenser. This can be done by the use of a series resistor of a few hundred ohms.

The final keying filter is the conventional circuit of Fig. 4. The size of the choke Ch.will determine the build-up on "make" and the condenser the fall on "break." The resistor must be adjusted to slow down the discharge rate of the condenser. Correct adjustment of the three variables will give clickless keying of the keyed stages for one given value of current and operating conditions.

Primary Keying

Primary keying using a heavy relay will give a slow build-up at "make." The power supply has to charge up the filter condensers; the bigger the condensers and the bigger the filter choke, the slower the build-up. Similarly, on "break" the condensers will discharge slowly and again the bigger the condensers the slower the fall. Unfortunately, the power supply filter is limited to a relatively small size if the keying is to be readable; it is therefore almost impossible to obtain a PDC signal. High speed keying is possible only if the filter size is reduced and a T7 or T8 signal is acceptable.

Bias Keying

A condenser takes time to charge up; for a given applied voltage the bigger the condenser the longer it will take. Similarly, if the condenser is shorted by a resistor the time taken for the condenser to discharge will vary with the size of the resistor. The bigger the resistor the greater the time taken to discharge.

A condenser-resistor combination can be employed to avoid key clicks when using one of the various forms of bias keying. Unfortunately, however, the grid is the sensitive part of a valve and the slightest click produced in the grid circuit is amplified in the output. Bias keying can be used satisfactorily, but it is touchy and not easy to adjust. It is difficult to isolate completely the key from the RF circuits under control.

Valve Keying

The use of a valve specifically for keying purposes has much to commend it. The key
and associated circuits can be completely isolated from the keyed RF stage and are at low potential. The waveform of the RF in the keyed stage can be determined by the values of condenser and resistor in the bias keying of the keyer valve. By the provision of suitable selector switches a rapid change of condenser and resistor value can be made and thus the waveform of the keyed stage can be changed over a wide range of loading. Constructional details of a suitable valve keyer follow later.

Where to Key

Various handbooks and radio manuals detail keying methods and how they may be applied in a transmitter. To outline them all would be outside the scope of this article; it must suffice therefore to specify the author's preference.

Undoubtedly the cathode circuit is the best place to insert the key and will minimise clicks before introduction of the keying filter. With cathode or centre tap keying raising the key breaks the plate circuit and at the same time puts a high negative potential on the grid, thus reducing plate current rapidly. On "making" the key, the high negative bias is removed from the grid and the plate circuit is completed.

In a transmitter which has fixed loading on the keyed stage the choke-condenser-resistor network, properly adjusted, will be satisfactory. But most amateur transmitters are used on several bands and inevitably the keyed stage loading varies somewhat. In this case, a valve keyer with its ease of adjustment is much to be preferred.

The location of the keyed stage in the transmitter is important.

First, it should be emphasised that keying of the oscillator is outdated practice and bad. If BK is an essential requirement two oscillators should be run, one fixed, one variable and fed to a mixer valve which can be keyed. The oscillators must be well screened and frequencies selected so that they add to the required output frequency but with neither giving low order harmonics in the amateur bands, e.g. a crystal oscillator on 2000 kc can feed the grid and a VFO on 1500 kc can feed the suppressor of a pentode mixer, the output of which is tuned to 3-5 mc. An untuned buffer should be used between the VFO and the mixer.

If BK is not a requirement—and except for traffic handling it is difficult to see its necessity in amateur communication—then the keyed stage should be moved as near to the PA as possible. The objectives are to reduce the likelihood of setting off parasitic oscillation in the post-key stages and also to isolate the keyed stage from the oscillator. Except for low-power work it is not good practice to key the PA owing to the difficulty in adjusting the keying filter and the higher voltages involved. In the case of the valve keyer the loss of power in the keyer valve is undesirable and for large plate current in the PA the keyer becomes unwieldy.

Suggestions

1. Do listen to your signal on a receiver with aerial off, RF gain turned down, AVC off, BFO off. If manipulating the key produces only a rushing sound in the receiver and there is no sign of click or thump on "make" and "break", and if you can find no other funny noises associated with keying—replace halo headaddress and continue operating! In the more likely case of detecting clicks, make a resolution to remedy them and get started now.

2. Do put a .0005 μF mica condenser (or larger in some cases) across the key at the contacts and insert HF chokes in the key leads at the key end. Screen the lot and take the key leads away in screened cable, earthed at the transmitter end.

3. Do locate the keyed stage as near the PA as electrically possible—not necessarily physically.

4. Do put parasitic stoppers in all stages; 25- to 50-ohm carbon resistors inserted in grid and screen leads at the valve holder and before the by-pass condensers.

5. Do use a well filtered and well regulated power supply. A condenser input filter gives a higher voltage output, it's true, but a choke input filter gives better regulation.

6. Do stabilise plate and screen supply of the oscillator and screen supply of the next stage. VR tubes will do the trick.

7. Do avoid parallel feed and use series feed, thus avoiding RF chokes in the transmitter. RF chokes are prone to help LF parasitic oscillations.

8. Do report key clicks or absence thereof when making contacts.

Practical Valve Keyer

The circuit at Fig. 5 is almost self explanatory and values can be varied somewhat to suit junk box parts available. The keyer has been built into a TU5B case and provision made for the use of up to four keyer valves in parallel. Any type of low impedance triodes can be used—45, 6B4, 2A3 and so on. Allow 50 mA per valve and expect a voltage drop across the keyer of 50 to 100 volts. In the writer's transmitter an 807 which operates on 3-5 or 7 mc is
keyed and one 6B4 is adequate in the keyer. The 807 plate current varies from 25 mA when used as a doubler to feed other driver stages to 50 mA when used to drive the PA. The 807 cathode connects to the plate of the 6B4 and is by-passed for RF at the 807 holder.

As the TU5B case was large enough an additional LT rectifier was incorporated to give relay supply for aerial and control switching. The unit becomes a combined keyer and send/receive box.

The variable resistor across the bias supply is useful as its adjustment to give a lower value of bias voltage will precisely control the keyed stage input. This enables one to obtain a convenient signal in the receiver for oscillator setting when working on the higher frequencies and the oscillator harmonic is weak or inaudible. After setting the oscillator frequency the bias resistor must, of course, be restored to maximum or the keying will be woolly and a spacer radiated.

Adjustment of the R and C switches for keying characteristic is quite simple. To reduce click on "make" increase R; to reduce click on "break" increase C. The correct adjustment is obtained when there is just a trace of click on make and the click has just disappeared on break but there is no tail. It will be found that the adjustments of R and C interlock; after setting R to optimum for "make" an increase in C will necessitate a slight readjustment of R, but a balance between the two can easily be found.

Finally, it is perhaps opportune to say "Check your transmission carefully and get a few opinions from nearby operators if you are in doubt. If it does not measure up to K9 it is time to do some hard thinking and make a few quite simple modifications to the transmitter."

**Table of Values**

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<th>C2</th>
<th>C3</th>
<th>C4</th>
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<td>.003 (\mu F)</td>
<td>.005 (\mu F)</td>
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V1, V2 = Any low-impedance triode (2A3, 6B4, 45)

T = 250-0-250v, with suitable LTs
By E. J. WILLIAMS, B.Sc. (G2XC)

Great DX Break on Two—Continents Worked May 8–12—Seventyem Equipment and Results—VHF News, Views and Comments

FOR the last eighteen months November 1948 has been quoted as “Those were the days” on two metres. Newcomers to the band have been encouraged by the old timers with amazing tales of the DX worked during those foggy November evenings. Our first two-metre contest for G’s only was almost wrecked by the unexpected opening to the Continent. For eighteen months the VHF enthusiasts have waited for a repeat, and at last their patience has been rewarded. True, some parts of the country enjoyed better things than others—one must commiserate with G5BY down in Devon when he says, “Conditions do not seem to have been at all good on 145 mc. Howling N.E. gale been blowing here ever since May 9”—though the Northern, Midland and Eastern stations found the band almost like Forty, with F, ON and PA signals coming in literally by the dozen.

Your conductor was preoccupied with 70 cm. tests during this good spell and so can give little first-hand information, but the reports which have poured in draw a clear picture of all the amazing things that happened in the middle of May.

In Northern Ireland G12FHN (Bangor) heard G3BLP (Selsdon) on phone on the evening of Saturday, May 13. G3BW (Whitehaven), nursing a dislocated shoulder, also found May 13 the best when he heard and worked G6XM at S8 phone and G3BLP at similar strength, also hearing G5MA/P from Sussex. G3CYY (Newcastle) found May 12 the superior date and worked ON and PA as well as southern G’s; on the next evening he heard much but could not work the DX. G4LX (Newcastle) also knocked off ON and PA and got as far south as G5MA/P. G8SB (Horwich) worked many southern G’s and was called by G2XC several times in vain! G20I (Eccles) heard a number of ON and PA signals.

In the Midlands, G5SK (Coventry) could hardly believe his ears when on May 12 he switched on and heard the PA’s coming in mostly at S9. G3ABA (Coventry) was also on to hear and work the DX during what he calls “this marvellous opening.” G4RK (Coventry) also got in QSO’s with PA0EO and PA0BP. G8KL (Wolverhampton) was amazed at the lack of fading on the ON and PA stations, and managed to work two. G3CXD (Newcastle, Staffs) worked the Continentals but could not hear any northern DX, although he noted southern stations working stations in that direction.

It was in East Anglia that the Continental working reached its peak. G2XS put S9 phone into PA. G3WW (March) worked three Belgian and five Dutch stations. G2CPL (Lowestoft) worked one French, seven Dutch and four Belgians. G2WJ (Dunmow) managed eight PA’s and two ON’s, all on phone and mostly at S9, while G2CIW (Romford) in addition to working three PA’s and one ON, heard twelve other PA’s and two more ON’s; he comments that on May 13 the Sutton Coldfield TV at over 100 miles was 5 dB stronger than Alexandra Palace at less than 20 miles!

In the south-west G3EHY (Banwell) heard only weak signals from Holland, but managed to work PA0MU. G8IL (Salisbury) received PA0BP, but worked only F3LQ on May 14. At G2XC, listening was for a short period only and but one weak PA was logged. Some good signals were heard from the north, however. The same sort of story comes from all stations in this district; the area of good conditions simply did not extend as far west and south. In the neighbourhood of South London also it appears that, although the Continental DX could be heard, it was almost impossible to work it. At one time G3BLP could hear the Oswestry stations calling and working PA when there was no sound of the signals in Surrey.
Late Flash!

NEW SEVENTYCEM RECORD

At 2245 BST on the evening of May 30, G2XC of Portsmouth and G5BY of Bolt Tail, South Devon, established two-way contact on 70 cm. over a path of 132 miles, the QSO being comfortably held for half-an-hour with signals up to RST-579. This is a new QTH-to-QTH record for the band, and the congratulations of all readers will go to two of our leading VHF workers on their success.—Editor.
This survey of what happened on May 12 to 14 could go on a lot further, but what has been said should be enough to show that there was an excellent opening from the North to the South-East, including Belgium and Holland, but that conditions from Southern England to the Continent (and from South-West England to anywhere) were not so good. The absence of fading remarked by many stations is believed to indicate that the propagation was by ducting and doubtless if there had been adequate 70 cm. activity in the regions affected some good DX would have been possible on that band, too. It was unfortunate that the part of the country where such activity was highest was not covered by the duct.

Report from The Netherlands

In a very interesting letter PAØLU discusses results during the period May 8-12, when conditions were exceptionally good on Two for the PA’s as well. On May 12, PAØLU himself heard no less than fifteen G’s, with G2CPL (Lowestoft) as the strongest signal and in QSO in turn with all the PA’s on the 144 mc band at the time—well done, G2CPL! It was all very interesting and reciprocal, because many PA’s who had never previously worked a G had their first DX contacts on May 12, so that VHF interest and activity in Holland has been greatly stimulated in consequence. The first G to break through to Northern Holland during this particular period of good conditions was G3DIVA (Eastbourne) who worked PAØAJA of Rotterdam on May 10; two days previously, on the 8th, PAØPN is reported as having worked F, G and ON.

It also looks as if PAØWL (Hoogezand) has, with G3AHT (Oswestry), made a new European DX record for Two for the PA’s as well. On May 12, PAØLU himself heard no less than fifteen G’s, with G2CPL (Lowestoft) as the strongest signal and in QSO in turn with all the PA’s on the 144 mc band at the time—well done, G2CPL! It was all very interesting and reciprocal, because many PA’s who had never previously worked a G had their first DX contacts on May 12, so that VHF interest and activity in Holland has been greatly stimulated in consequence. The first G to break through to Northern Holland during this particular period of good conditions was G3DIVA (Eastbourne) who worked PAØAJA of Rotterdam on May 10; two days previously, on the 8th, PAØPN is reported as having worked F, G and ON.

Also it looks as if PAØWL (Hoogezand) has, with G3AHT (Oswestry), made a new European DX record for Two, as the distance is roughly 412 miles; this will be finally checked when we have had time to make the pin-point calculations, as some other northern G stations—notably G2MA (Rotherham), G6LI (Grimsby), G2ADR (Acomb) and G8SI (Halifax)—were also in on the PA DX and between them worked a number of Dutch stations.

Special Note: During the periods July 1, 1900-2359 BST, and July 2, 0500-1700 BST, the PA’s will be running a Two-Metre Contest with scoring rules as for the last Magazine VHF Contest—see p. 611, October 1949 issue—except that there will be no code numbers and for “miles” in the Magazine Rule (6) read kilometres. All G logs should be sent to us for onward transmission to the PA organiser responsible for this contest, which we hope will be well supported by G’s (for whom also it will of course be a contest).

PAØLU demonstrated his version of the G3MY 70 cm. converter at the PA VHF conference on May 14, when another interesting piece of gear in operation was a 70-cm. straight PA using a Philips QQE-06/40 giving 30 watts of RF output, all tuning inductances being Lecher lines. (We are checking up on the Mullard equivalent to this valve.) Incidentally, PAØZQ will probably be the first Dutch member of our VHF Century Club, as he now has the necessary 100 QSL cards.

It is particularly gratifying to your conductor to be able to discuss these interesting PA results, and we are most grateful to PAØLU (who writes excellent English) for keeping us up to date with news from Holland.

Propagation Note

An interesting article by Booker and Gordon in Proc. I.R.E. for April 1950 describes some experiments made in the Caribbean Sea area on VHF propagation. One conclusion reached from these tests is that signals on centimetric and metric wavelengths are received beyond the horizon as a result of scattering from turbulences in the atmosphere at points of high field strength above the horizon. This is of course quite a different phenomenon from ducting and is particularly interesting to your conductor, who has for long contended that ducting would not supply the answer to the amount of 2-metre DX experienced in this country over land paths. The article concerned suggests that much of the fading on metre-wave broadcasting, such as TV, is due to this scattering.

The Zone Plan

The Zone Plan has been coming under fire from the misinformed and un instructed, so that a note on its operation may not be amiss here. It has been contended that as a result of the Magazine VHF Band Plan it is now difficult to find the DX. This is strange, as when the scheme was first propounded, one of the criticisms was that it would make DX working too easy. The present difficulty regarding operating frequencies is surely entirely due to those stations who are not working within their Zone area. There are some notable examples of this and almost without exception these stations are causing severe QRM to their own locals on DX signals. Correspondence we have received this month shows an overwhelming condemnation of the spirit displayed by these operators—who are of course free to do as they please, even if they do hash up the band for everyone else.

At the same time it must be placed on record that some of the severest critics of the Zone Plan are nevertheless operating on the correct zone frequency and showing thereby a fine example of the spirit of Amateur Radio. Though they do not agree that a plan is
## TWO METRE ACTIVITY BY ZONES AND COUNTIES

<table>
<thead>
<tr>
<th>Zone</th>
<th>Frequencies (MHz)</th>
<th>Callsigns</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>144 to 144.2</td>
<td>GM3DDE, GM3DIQ, GM3EGW, Lanark : GM2DI, GM3BDA, GM3EHI, GM5VG</td>
</tr>
<tr>
<td></td>
<td>144.2 to 144.4</td>
<td>Fife : GM3EGW, Lanark : GM2DI, GM3BDA, GM3EHI, GM5VG</td>
</tr>
<tr>
<td></td>
<td>144.4 to 144.6</td>
<td>Cumberland : G3CW, Durham : G2FO, G3EZH, G8BI</td>
</tr>
<tr>
<td></td>
<td>144.6 to 144.8</td>
<td>Northumberland : G3CYY, G4LX, Lancashire : G2DCI, G2OI, G3A00, G3BY, G3CHY, G3SC, G3DA, G3ELT, G5TH, G5VN, G8SB, Yorkshire : G2ADR, G2IQ, G2MA, G3CC, G3DMK, G5QU, G6YO, G8GL</td>
</tr>
<tr>
<td></td>
<td>144.8 to 145.0</td>
<td>Zone D : G12FHN, G13GQB, Cheshire : G3AMP, G3AYT, G3GMX, G5CP, G6TL, Derbyshire : G3RW, Leicestershire : G2FNY, G3ENS, Staffordshire : G3CXD, G3E36, G8KL, Warwickshire : G3ABA, G4RK, G5JU, G5SK, G6CI, G6SN, G8QY</td>
</tr>
<tr>
<td></td>
<td>145.0 to 145.2</td>
<td>Glamorgan : GW2DUR, G3EMJ, G8WSU, Monmouth : G4GR, Montgomery : G2ADZ, Shropshire : G3AHT, G4LU</td>
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<tr>
<td></td>
<td>145.2 to 145.4</td>
<td>ZONE E : G12FHN, G13GQB, Cheshire : G3AMP, G3AYT, G3GMX, G5CP, G6TL, Derbyshire : G3RW, Leicestershire : G2FNY, G3ENS, Staffordshire : G3CXD, G3E36, G8KL, Warwickshire : G3ABA, G4RK, G5JU, G5SK, G6CI, G6SN, G8QY</td>
</tr>
<tr>
<td></td>
<td>145.4 to 145.6</td>
<td>Zone F : G21CM, G2CWJ, Kent : G2AJ, G2AOL, G2BYF, G2KF, G2UI, G3AFV, G3B0B, G3AZL, G3FOD, G5MR, G6VC, G6VX, London : G2HDY, G3BUN, G3CNF, G3CZY, G3FXG, G4AU, G4DC, G5PY, G6OT, G6WU, G6YP, G8KE, G6VX</td>
</tr>
<tr>
<td></td>
<td>145.8 to 146.0</td>
<td>ZONE G : G21CM, G2CWJ, Kent : G2AJ, G2AOL, G2BYF, G2KF, G2UI, G3AFV, G3B0B, G3AZL, G3FOD, G5MR, G6VC, G6VX, London : G2HDY, G3BUN, G3CNF, G3CZY, G3FXG, G4AU, G4DC, G5PY, G6OT, G6WU, G6YP, G8KE, G6VX</td>
</tr>
</tbody>
</table>

**Note:** The frequencies given above are those recommended by the Two-Metre Zone Plan but some stations are not conforming.
from 300-ohm line. G2BYF is active in Sheerness; G3AFV (Sittingbourne) has a "City Slicker" in operation; G3CAZ (Gillingham) is hoping to replace his 4-ele.

Yagi with a W3GV 12-ele. array; he would like information from anyone who has tried one successfully. G3FOD (Rochester) is using a 6AK5-6J6 converter after failing to tame a G2IQ type; his Tx is the SCRS522, and he has worked PAØ. G5MR (Hythe) now has four countries worked; his new PA uses a 3E29 at 70 watts.

G3DIV/A (Eastbourne) has been keeping Sussex well on the map. He worked ON4YV on April 30 and finds he can raise him most nights. PAØPN was raised on May 9; 20 watts to an 832 and a 4-ele. Yagi put the signals out from G3DIV/A, but a 4-over-4 is promised shortly. G5MA/P on Linch Down also provided a much-needed Sussex contact for a number of operators. His QSO with G4LX he claims as a record for a portable station on two metres in this country. He was using the G6VX exciter unit as described in the Short Wave Magazine for July 1948, with only 12 watts input to the 6C4's.

Hampshire continues to be a centre of activity on VHF. G3BHS (Eastleigh) puts in a plea for more CW working, or at least of signing on CW after phone QSO's. Phone "overs" are far too often dismissed as a formality and become completely unreadable to someone hearing the signal at S3 or so. G3BHS gives the information that G3EDN/A is now on Two at St. Merryn, Cornwall, with 60 watts to an 829B. G6XM (Farnborough) has 150 watts but did not hear the Continentals during the recent good spell. Much good DX was worked to the north, however.

G5QA (Exeter) is still active and maintaining regular schedules with G4RX and the Torquay stations; a new beam is ready to go up. G4RX (Bridgewater) has his "City Slicker" up and working; he reports G3FUM (Weston-super-Mare) as being on in the near future. G3EHY (Banwell) says his signals were QRM'd by a PA while working G3WW during the good spell! He is running a lunch-time schedule with G3BHS as described in the Short Wave Magazine for July 1948, with only 12 watts input to the 6C4's.

G3CAZ, GM3BDA

NOTE: Figures in brackets after call are number of different stations worked, starting figure, 100.
G8QC (Chalfont St. Peter) managed F3LQ and two PA's and heard many more. G8WV (Bletchley) writes from Canada where he will be for a month or two. His arrival at his hotel synchronised with the holding of the local radio club’s annual dinner in the same building; he collected a 6AQ5 in the draw! G8WV considers 2-metre technique in VE to be quite a bit behind the standard in this country.

G2AHP (Perivale) suggests the need for the establishment of a reliable and regular station on both the 144 and 420 mc bands to enable receivers to be checked. (This need has certainly been felt on 70 cm. by many, but with limited range on that band many such transmitters would be needed if all are to be served.) G3GSE (Kingsbury) uses a modified SCR-522 with 18.9 watts and an RF26 into an 1155 for reception; the beam is a 4-over-4 fed with 300-ohm ribbon. He has worked 100 stations in just under five months, which is very good going. GRIP (Hampton) has been testing a 4-over-4 against a single-tier Yagi of the same dimensions, and although there is little difference on local signals the weaker DX shows up to advantage on the stack. He found the evening of May 9 most exasperating as he heard PAOPN over a long period but failed to raise him.

G3AHB (Slough), at present on 145.35 mc, would like to change crystals to put him in his correct Zone; an 8050 kc rock would be suitable. His Rx is 6J6 mixer/osc with EC91 GG RF stage and has a noise factor of 4. A 4-ele. Yagi will shortly be replaced by four stacked folded dipoles, with reflectors. G3GBO (Denham) was another who heard the Continental DX but failed to work it.

G8VR (Abbey Wood) uses a single 6J6 as converter into an S.640. He hopes to move into Zone J very soon. He was lucky with the PA’s and worked three of them. G6CB (Wimbledon) draws attention to the congestion in Zone J and the lack of occupancy outside it. (However, G3BW tells us he has moved out of the Zone C spectrum due to the terrific QRM there! So perhaps the occupancy is spread a little more than some think. The only really sparsely occupied section is above 145.6 mc.)

**THE MONTH ON SEVENTYCEMS**

<table>
<thead>
<tr>
<th>Two-way Contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3EJL/G5BY</td>
</tr>
<tr>
<td>G3ABH/G5BY</td>
</tr>
<tr>
<td>G2XC/G6LK</td>
</tr>
<tr>
<td>G3ABH/G3EJL</td>
</tr>
<tr>
<td>G2XC/G3EJL</td>
</tr>
<tr>
<td>G3EJL/G3RT</td>
</tr>
</tbody>
</table>

**Signs Heard**

At G2XC: G3BHS (18), G3DEP (11)
At G3EJL: G3BHS, G3CGE, G3DEP (18), G6LK (42)
At G6LK: G3DEP (41), G5TF (56)

**Stations Active**

G2ANT Godalming
*G2CNT Cambridge G3RI Southampton
G2XC Portsmouth
*G2XY Cambridge G5BY Bolt Tail
G3ABH Poole G5PY Clapham Park
G3BHS Eastleigh G5DT Park Lane
G3CGE Southampton G5KH S.W. London
G3DEP Ryde G5TP Stoke Row
G3EJL Southampton G6LK Cranleigh
*SEO. Others are crystal-controlled.

**East Anglia**

G2CPL (Lowestoft) has increased his beam height to 60 ft. and fitted a better feeder. A new converter is also in use with 6J6 RF stage, followed by push-pull EF91 RF and the same again as mixer and EC53 osc. G5UD (Kings Lynn) is running a 624C Rx and has been enjoying the DX. G3BK (March) has an 8-ele. stack in the air and results have been good; he hears little from the north, however. G3WW (March) has a 5-over-5 in action and finds it 1 to 1+ S-points better than his previous single 5-ele. beam; he was there to work the DX on May 12 to 14. G3WW complains of Cambridgeshire stations working off their Zone frequency and so causing needless QRM.

G2CIW (Romford), in spite of some success with the PA’s, was disappointed with his results to the north. G3WS (Gidea Park) is
moving to Chulmleigh in Zone I (Devon) and says the new location looks good from a VHF point of view.

Midlands

G3CXX (Newcastle, Staffs) has been running a weekly schedule with G5RW, but had been finding things very dull until the May 13 week-end when he worked his share of the Continentals. G8KL (Wolverhampton) has given G4HT his much-needed QSO, to the latter's delight. G5SK (Coventry) remarks that one has to be a regular user of two metres to take advantage of the short bursts of good conditions. GW2ADZ (Llanymynech) says although not yet a believer in one-way paths some recent results have made him keep an open mind on the subject. He is now using a lower frequency (see table herewith) and in some directions this shows an improvement, whilst in others it is not so good as the old frequency.

North

G3GMX (Timperley) has a 522 Tx and a R28/ARC5 with a CV33 and also a 6J6 job for Rx. G2OF (Eccles) continues to work the DX and sends some comments on the “Best Twenty” contest. Unfortunately, space will not allow a discussion on that this month. G3CSC (Prescot) has 18 watts to a 522 Tx, and a 4-ele. beam in the roof; a new converter using the cascode circuit is under construction. G8SB (Horwich) has found the path to G3EHY open every day, but due to the fixed position of his City Slicker he was unable to take part in the PA and ON excitement.

G3COJ (Hull) is within sight of being active again. His 2-metre Tx will run 150 watts to a pair of 4E27's and the Rx will be a cascode arrangement. G2ADR (Acomb) lost his beam and mast in the winter gales; hence his period of inactivity. A new beam is now up and is a 20 reflector square corner fed with 400-ohm open line. A 6J6 converter takes care of the Rx side; he is using four IF's; first is 28 to 30 mc tunable; then 7-4 mc; third at 465 kc with crystal filter available; and finally at 85 kc for good selectivity. G2ADR asks us to encourage the Zone Plan.

Going still further north, G2FO writes a little indignantly, as a result of our remarks last month suggesting that the North was inactive. He gives most definite assurance that G2ADR, G2FO, G3DMK, G3EHZ, G5QU and G8BI operate 365 days a year! G4LX (Newcastle) complains of certain well-known stations who do not QSL in spite of being members of the VHF CC. Your conductor will see what he can do about it, but no miracles are promised. G3CYY (Newcastle) got back on Two in time for the DX. He has 6J6 Rx and 522 Tx; a new Tx and beam are planned.

G3BW (Whitehaven) is another to assure us he has been active and he now has his 5-ele. beam on top of a 42-ft. tower. He is operating just inside the Scottish Zone to avoid the Lancashire QRM.

GM3DIQ (Saltcoats) and G3DDE (Largs) continue busy on the air. They were using 4-ele. c.s. beams and not doing too well with them. Since GM3DDE has put up an 8-ele. stack signals have improved markedly. The Rx at Saltcoats is a 522 with a 6AK5 mixer and RF. G2FHN (Bangor) is now in Co. Down, and suggests that GI stations use Zone A. This seems all right to your conductor, but might need review if activity in Northern Ireland should increase. Both he and G3CQB (Ballywalter) are operating most evenings at 2100 BST.

News received via G2FPC is that DL4DD is there on 144:58 mc using 180 watts to two 24G’s; his aerial is eight half-waves in phase, and a new 30-element beam is under construction.

Seventy cem

Although no new records have been put up during the past month it has been a period of consolidation and increasing activity. Interest is keen all over the country, but it is mainly in the Southern Counties that action is apparent. Here crystal control is used by all stations. In the south-west corner of Surrey, G2ANT and G6LKL are both fully operative on 70 cm. The former is in a poor location, with hills on most sides. G6LKL has worked G2XC over a 32-mile path, which includes much high ground rising at one point to 700 ft. Signals vary somewhat and reports have ranged from S3 to S7 on CW, but it is believed the path is always open and a series of tests to prove this will be undertaken shortly. G6LKL has also been receiving G3DEP at strengths up to S8 over a rather longer path, and G5TP at S3.

At G2XC your conductor has also worked G3EJL on several occasions, and this 17-mile path has provided S7 phone signals both ways. G3DEP on the other side of Portsdown Hill, and 10 miles away, is an S9 signal, while G3BHS at 18 miles is S5 phone. None of these paths is optical.

From Southampton, G3EJL has continued his good work with further contacts with G5BY (Bolt Tail) and G3ABH (Poole), while he can work his local G3RI, two miles away, with no aerial connected at either end. This is, of course, “through” the built-up area of Southampton; G3DEP has been worked cross-band and G6LKL heard.

The G3ABH/G5BY path has produced further contacts, but is not 100 per cent.
reliable, signals varying between zero and S9. Tests between G5BY and G6LK, and G2XC and G3ABH have not yet produced any signals.

As a generalisation, results so far on 70 cm. suggest that for normal ground-range working it is necessary for S9 signals to obtain on 2 metres before there is much chance of a 70-cm. contact over the same path. This does not apply, however, to tropospheric propagation, due to ducting and other similar manifestations. On that point G5BY mentions that on May 14 G3ABH was if anything stronger on 430 than on 145 mc, while on May 16, when 2-metre conditions were good, G3ABH was inaudible on 70 cm., an entirely opposite effect. Obviously there is much to be learnt.

Notes on 70 cm. Equipment

Most of the southern stations are using 832A triplers in the Tx and converters based on the G3EJL design which appears in this issue of Short Wave Magazine. At G2XC, the mixer Lecher circuit is as suggested by G3EJL, but the oscillator is of the tunable SEO type similar to that of G5BY described last month and using a 9002 operating in the 142 mc region. Third harmonic injection gives a 10 mc IF; injection is controlled by varying the HT voltage on the 9002, and G3EJL suggests that a similar arrangement may with advantage be tried with his CC oscillator.

Injection in the G2XC converter is obtained by a very small capacity (about 2 µµF) at the point where G3EJL feeds in the inner line of his coaxial cable. The aerial (in spite of much criticism from other workers) is fed with 300-ohm ribbon and is coupled inductively at the earthy end of the lecher lines. This arrangement was devised after some experimenting during which it was found that it is easy to shift the resonant frequency of the lines unintentionally if modifications are made indiscriminately. Using the SEO it is a simple matter to check the line frequency by swinging the oscillator tuning and watching the mixer diode current. This should peak noticeably when the SEO is tuned to about 145 mc if maximum signals are required on 435 mc. In the final arrangement at G2XC it is possible to get over 2 mA of current at 435 mc, falling to less than 5 microamperes 30 mc off tune. Oscillator stability is remarkably good and the notes of received signals are pure DC. An appreciable amount of break-through at IF was experienced at first but was cured by connecting a 4-wave line of ribbon across the aerial input and shorting and earthing the other end of it. This provides a short circuit to earth for all signals coming down the feeder in an unorthodox manner or on the wrong frequency!

One point regarding the measurement of diode current appears to be worth mentioning. The figure obtained is affected by the resistance of the meter employed, and if a meter of high resistance (more than 100 ohms or so) is used the actual current when the meter is removed will be higher than when the meter was in circuit. This should be remembered when comparing results with others.

It is not customary for the results and activities at G2XC to be discussed at length in this column, but it is thought that with the prevailing interest in the band and the large number who hope to be on Seventy-cms in the near future, the various points mentioned may be of interest and possible use to others.

Those making the G3EJL converter exactly as it is described in the article in this issue can be assured that its performance is really first class. For any to whom the cost of two quartz crystals and 6J6's is prohibitive, assurance can be given that excellent and worthwhile results can be achieved with an SEO. In the interests of both stability and bandspread use a small inductance and plenty of capacity.

Other points worth making are, first, that most 70-cm. stations are radiating appreciable energy on two metres. This is due to the high power driving stages used and to the comparative ease with which a 2-metre circuit radiates. In the interests of avoiding false reception reports it would seem advisable to reduce this radiation. Secondly, during the present very experimental stage of 70-cm. work it is almost essential that contacts be made by first establishing a QSO on a lower frequency. Indiscriminate listening and calling

<table>
<thead>
<tr>
<th>Station</th>
<th>Total Miles</th>
<th>Best Contact &quot;Call&quot;</th>
<th>&quot;Miles&quot;</th>
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</thead>
<tbody>
<tr>
<td>G3EHY</td>
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<td>G2XS</td>
<td>175</td>
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<tr>
<td>G2EI</td>
<td>3030</td>
<td>G6VX</td>
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<td>2884</td>
<td>G5MR</td>
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<tr>
<td>G2FNW</td>
<td>925</td>
<td>G6VX</td>
<td>100</td>
</tr>
</tbody>
</table>

For this table send details of date, mileage and callsigns of best 20 contacts made during previous calendar month. No station to be counted more than once per day (0600 to 0600 GMT).
on 430 mc is not likely to produce results. Schedules may work but it is thought success will come quicker the other way. In any case, setting up the converter for maximum results needs much co-operation and it is advised that whenever possible two stations should become active on the band in a locality. A lone station hearing nothing is unable to know whether this is due to a poor location or poor receiver, but once a signal is heard, however weakly, then adjustments can be made with a view to improving things. Thirdly, most stations, including G2XC, are using multi-element Yagis with very sharp horizontal polar diagrams. At G2XC, moving the beam 20 deg. off G3EJL drops signals from S7 to near inaudibility. This is much too sharp for convenience and it looks as if aerial arrays with broader characteristics must be used if signals are not to be missed through mis-alignment of beams.

Some 70 cm. Reports

Other 70 cm. news comes from Cambridge where G2CNT and G2XV are active with SEO transmitters, but promise to be CC before long. They are active daily with 5 to 15 watts and have several aerals in use, including 10-ele. Yagis and corner reflectors and stacked arrays. They call in the London direction every evening at 2100 BST for five minutes on MCW and phone, and then listen for five minutes. Periods of calling and listening alternate until 2230 when they listen for G3FUL in Luton for five minutes, after which a call is made in that direction. Co-operation from anyone between Cambridge and London would be welcomed. On evenings when 2 metres is good it is proposed to operate portable from the Gog-Magog Hills, a slight though noticeable eminence in the otherwise portable from the Gog-Magog Hills, a slight though noticeable eminence in the otherwise flat country round Cambridge! London is also called on Sundays at 1000, 1100 and 1200. G2ClW (Romford) is at work on a converter; G6XM (Farnborough) hopes to be on 70 cm. in about a month; G3COJ (Hull) is thinking of starting up with 8012 triplers and asks for information on using them; G3CSC (Prescot) also has some 8012's in mind and an ASB8 for Rx; G3AHB (Slough) has four half-waves in pairs side-by-side with a wire-mesh reflector. The Rx is an ASB8 and it is hoped to have either an 832A or push-pull 8012 tripler stage going soon in the Tx.

In Conclusion

Our sincere thanks to all those who put in such interesting reports on the past month's activities on both Two and Seventycems; it has been very nearly a record mail. If your own achievements seem to have received but scant mention you can be assured that cuts have had to be made on all the stories, otherwise "VHF Bands" would have filled the Magazine this month! It is probable that the Editor will have had to make some further calls on his own account, and it may not be possible to get in the long lists of calls worked and heard which so many of you sent; if that is so, please do not let it discourage you from sending in further lists. They are an invaluable source of information for the "Activity by Counties" table, and will also appear as Calls Heard lists whenever possible.

Next month's news, and here's hoping it will be as good as the present one's, should reach us addressed E. J. Williams, G2XC, Short Wave Magazine, 53 Victoria Street, London, S.W.1, by June 15 at latest.

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SOME TWO-METRE FREQUENCIES

<table>
<thead>
<tr>
<th>Calls</th>
<th>Frequency</th>
<th>Power</th>
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<tbody>
<tr>
<td>G2ADR</td>
<td>144-39</td>
<td>G5BM</td>
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<tr>
<td>G2XC</td>
<td>145-29</td>
<td>G5MR</td>
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<td>G3AHB</td>
<td>145-35</td>
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<td>145-0</td>
<td>GW2ADZ</td>
</tr>
<tr>
<td>G4RX</td>
<td>145-8</td>
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The above figures are those quoted by the stations concerned and have not been measured over the air.

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BACK IN HISTORY

In case anyone still imagines that Amateur Radio is without its roots in the early history of this century, here are some interesting facts: Before the 1914-18 War, some 40 years ago, the following radio clubs were in active existence—Birmingham Wireless Association, London Wireless Club, Coventry Wireless Club, Bristol Wireless Association, Derby Wireless Club, Liverpool District Wireless Association, Liscard Wireless Telegraphy Club, Cheshire Radiographic Scientific Society and the Liverpool Amateur Wireless Association. Remember, all this was 40 years ago, and many of the members of these organisations are long since dead and gone—we dare say that even the names of some of the clubs had been forgotten until this moment. To the Liverpool and Cheshire groups must go the distinction of being first in the world to adopt the words "Amateur" and "Radio" respectively in their titles.
Turn Up for the Book

We are informed from the States that at the present value of the pound sterling, most items of ex-U.S. Army/Air Force surplus advertised in the Magazine are much cheaper over here than in America, where the good stuff is getting very short, anyway. So we can expect a lot of this gear to be drained off for dollars. As originally it was all bought by the British Government for dollars, it seems to be the case of the biter bit, or the elephant never forgets, or something.

Amateur Television

The current (June) issue of our Short Wave Listener and Television Review carries the first of what is to be a series of regular reports on the activities, technical and otherwise, of the British Amateur Television Club. The B.A.T.C. is worthy of the support of everyone with an experimental interest in amateur TV transmission, which is itself one of the newer branches of the art of Amateur Radio. The Club hopes soon to obtain official permission for the operation of TV transmitters on part of one of the amateur VHF bands. In the meantime, successful closed-circuit work is being done. The Honorary Secretary of the B.A.T.C. is M. W. S. Barlow, G3CVO, Cheyne Cottage, Dukes Wood Drive, Gerrards Cross, Bucks., who is also responsible for CQ-TV.

The same issue of our companion journal publishes Part I of an extremely interesting article on BC-348 modifications, details on the adaptation of an RF-26/R.1355 combination for sound-vision reception from Sutton Coldfield, and Part II of the new series on "Television for Beginners."

Copies of the June issue of Short Wave Listener and Television Review are obtainable from us (Circulation Manager, Short Wave Magazine, Ltd., 53 Victoria Street, London, S.W.1) at 1s. 4d. post free, or 16s. for a year of twelve issues.

Thought for the Morrow

It is reported that one of the more important matters discussed at the recent Acheson-Bevin-Schumann meetings was an intensification of the radio propaganda war against our erstwhile allies on the other side of the Curtain. It seems that Britain and America can, between them, mobilise some 70 transmitters for the purpose, the idea being that the more frequencies we on our side can use simultaneously, the more difficult it will be for the Stalinistobaskets to apply effective jamming. (We had all this during the last war, when the major preoccupation of the Bomber Command signals staff was to eliminate by jamming the communications and control system of the Luftwaffe night defence organisation.)

For us as amateurs, the result of these decisions by the Big Three may well be the appearance of a new flock of high power stations on our bands in the 6-23 mc region, adding to the large areas already occupied by force majeure.

The Call Book

Now available is the Spring 1950 issue of the Radio Amateur Call Book, once again a remarkable compilation giving the callsign, name and address of every known amateur in the world—with the melancholy exception of those blessed by the rule of Soviet Russia. The Call Book is compiled in two main sections, America and The Rest; the latter or "foreign" section is set out alphabetically by country-prefix and callsign, the zone area for each country also being given, together with the address of its QSL Bureau. The price of the Spring issue of some 350 pages is 16s. 9d. post free. It might also be mentioned here that we are now sole forwarding agents for the G section of the Radio Amateur Call Book, this being compiled and kept up-to-date from QTH lists supplied by us to the American publishers.

Top Band Crisis

On the night of April 29-30 last, amateurs were officially asked to keep off 1.7 mc for the period 2359-0100 in order to give the lost trawler Milford Viscount (ex-Milford Haven) the best possible chance of making herself heard. It was subsequently reported that an SWL living near Porthcawl, S. Wales received what may have been her last transmissions. During this same period GD5CZ (who is himself a ship-owner) heard with many other listeners an SOS from the Mary Heeley (ex-Douglas); GD5CZ was instrumental in getting help to the ship, and those listening were able to follow the proceedings through Seaforth Radio, the GPO coast station in control.
NEW QTH's

This space is available for the publication of the addresses of all holders of new U.K. callsigns, as issued, or changes of address of transmitters already licensed. All addresses published here are reprinted in the quarterly issue 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

EI2A S. C. MacNamee, 4 The Square, Navan, Co. Meath, Eire.
GI2ALO/A R. P. Munn, Whitnest, Sandgate Lane, Storrington, Sussex.
GI2BOF F. J. Harris, 143 Collingwood Road, Sutton, Surrey.
GI2FOW L. Gostelow, 21 Cannon Street, Lincoln, Lincs.
GI2HCG B. Sykes, Roslyn, Debedale Road, Northampton.
GI2HGA C. A. Shutt, 65 Boughton Green Road, Northampton.
GI3BCZ R. P. Stevens, 65 Drayton Road, Northampton.
GI3BJY N. Cantrill, 4 Nelson Street, Swadlincote, nr. Burton-on-Trent, Staffs.
GI3BSR M. W. Pearce, 58 Hollam Road, Milton, Portsmouth, Hants.
GI3EKZ/A D. E. Blacklock, B.Sc., Radio Society,oveleys School, Rostock, Utt hyper, Staffs.
GI3EMO H. Ward, 12 Ashbourne Crescent, Roby, nr. Liverpool.
GI3EMV J. McGreevy, 240 Braiderc Road, Penkist, Glasgow, S.W.3.
GI3EPK R. L. S. Harrison, 12 Westfield Road, Beno, Hertford.
GI3EKX S. Bindley, Main Road, New dnton, Northampton.
GI3EZX C. A. Turner, 28 Cambridge Street, Wolverton, Bucks.
GI3FAD L. Glasscock, 25 Bridge Street, Downham Market, Norfolk.
GI3FWZ D. Vaughan, 25 London Road, Camberley, Surrey. (Tel: Cam berley 1268).
GI3FYJ R. J. White, White Tor Road, Stark holmes, Matlock, Derbyshire.
GI3FZD S. Walker, 3 Bakehouse Yard, Knutsford, Cheshire.
GI3CGG R. C. Murden, 4 Holmesdale Road, Bexleyheath, Kent.
GI3GU W. Houseman, Riverside, Swindon Street, Barnstall, Northwich, Cheshire.
GI3GJB W. A. McClean, 2 Crewe Place, Faliclrk, Stirlingshire.
GI3GLS H. Silvester, 37 Gothic Road, Twicken ham, Middlesex.
GI3GML K. W. May, 112 Dale Valley Road, Shirley, Southampton.
GI3GNB K. G. Reid, Brainley, Torphins, Aberdeenshire.
GI3GNC N. S. Potter, 47 Derby Road, Fallowfield, Manchester, 14. (Tel: Rusholme 5329).
GI3GNR R. E. Short, 112 Southwick Street, Southwick, Sussex.
GI3GOX Miss A. B. Walford, The Old Rectory, Farway, Colyton, Devon.
GI3HAA J. L. Morgan, 81 Breckfield Road South, Liverpool, 6. (Tel: Antel f 4248).
GI6TJ A. Cooper, 31 Madrefield Road, Malvern.

CHANGE OF ADDRESS

EI3Z P. Conway, 12 Castle Street, Athlone, Eire.
GI2ACD A. C. Dunn, 412 Newbexin, Hornea,Yorkshire.
GI2AON W. A. Allwright, 332 Seaside Eastbourne, Sussex.
GI2FRI T. J. Swain, 34 Howe Gate Road, East Sheen, London.
GI2FTY G. E. Duffin, 94 Birdfield Road, Reddish, Worcs.
GI2FZI F. Hill, Cheriton, St. Mary's Road, Mortimer Common, Berks. (Tel: Mortimer 80).
GI2LA S. E. Smith, 12 Elers Drive, Bessacarr, Doncaster, Yorkshire.
GI2SX J. D. Ordish, 23 St. Georges Road, Petts Wood, Kent.
GI2XW A. W. Wells, 20 Crickfield Grove, London Road, Leigh-on-Sea, Essex.
GI3ZD T. C. Whimster, Home Place, Whattle ton, Sussex.
GI3ADG H. Swift, 31 Mary Street, King Cross, Halifax, Yorkshire.
GI3ALW P. G. Baker, 8 Sunningdale Crescent, Kinson, Bournemouth, Hants.
GI3BHD R. H. Whitley, 73 Westgate, Peterborough, Northants.
GI3BR S. T. Hall, 57 New Street Hill, Bromley, Kent.
GI3BSC B. W. Dodd, 5 Smitham Bottom Lane, Purley, Surrey.
GI3BWR N. B. Greenall, 16 Shaw Lane, Prescot, Lancs.
GI3FCF A. E. Harrison, Acacia House, Grove House, Middlesborough, Yorkshire.
GI3CPE I. G. Gibbs, The Cottage, Horne Park Farm, Newchapel, Lingfield, Surrey.
GI3CRY J. Williams, 11 Adelaide Terrace, Waterton, Liverpool, 22.
GI3DHD G. W. D. Brown, 19 Laverock Road, Trinity, Grantaon, S. Edinburgh.
GI3EPF J. C. Pennell, Jnr., 30 Grange Gardens, Pinner, Middlesex.
GI3KEM A. W. Tonkyn, 19 Trevery Road, Truro, Cornwall.
GI3FNT P. Dean, 31 Park Lane, Whitefield, Lancs.
GI3FPW S. V. Cleaver, 40 Dark Lane, Hollywood, nr. Burton-on-Trent, Staffs.
GI3GJJ A. H. G. Watson, 60 Thornton Road, Cambridge.
GI3S1 E. L. Wright, Brooklins, Thaxted, Essex. (Tel: 229).
GI3AO E. G. King, Acacia House, Fosse Road, Farndon, nr. Newark, Notts.
GI3BX J. W. Heffernon, 25 Lancaster Gardens, Preston, Lancs.
GI3QK J. B. Roscoe, 6 Birch Way, Harpenden, Herts.
GI3DH D. Heightman, 25 Lancaster Gardens, Preston, Lancs.
GI3FNT P. Dean, 31 Park Lane, Whitefield, Lancs.
GI3FPW S. V. Cleaver, 40 Dark Lane, Hollywood, nr. Burton-on-Trent, Staffs.
GI3GJJ A. H. G. Watson, 60 Thornton Road, Cambridge.
GI3S1 E. L. Wright, Brooklins, Thaxted, Essex. (Tel: 229).
GI3AO E. G. King, Acacia House, Fosse Road, Farndon, nr. Newark, Notts.
The other man’s station G6LR

Above is a view of the station designed and operated by L. P. Elmer at 608 Nelson House, Dolphin Square, Westminster, S.W.1, who suffers from the extreme disadvantage of being located in a large block of flats which, through lack of space, restricts his activities to the 28 and 145 mc bands.

G6LR is one of the real Old Timers, having been first licensed in 1911, with the call-sign EXD, and later operating on 400 and 1,000 metres with an input of 40 watts. After the 1914-18 war, he joined the Marconi Wireless Co. as a ship's radio officer, and did not re-apply for an amateur transmitting licence until 1932.

The 28 mc transmitter is xtal or VFO controlled and uses either NBFM or amplitude modulation. The final is a 100TH running at 150 watts. The receiver, mounted in the rack to save space, is a Hallicrafter SX28, with an improved noise limiter to cope with the severe interference from car ignition and other neighbouring noises.

With a telescopic dipole, which can be erected quickly outside the window (60 ft. above the ground) many DX contacts have been made, especially with California. Owing to the mass of steel in the building, it is practically impossible to work any stations between the North-Eastern and South-Eastern directions.

On the 145 mc band, a BC-625A transmitter is used. The aerial is a simple folded dipole which leans against the window, inside, facing due West. Nevertheless, phone contacts have been obtained with stations in Southampton, Portsmouth, Torquay and the Isle of Wight when conditions have been right. The receiver is a Hallicrafter S27 modified to cover up to 147 mc, and is preceded by a wide-band RF amplifier using a neutralised 6J6.

A xtal microphone is employed with both transmitters, and modulation depth can be checked on incoming and outgoing signals by means of the E.M.I. oscilloscope; the BC-221 also provides a very useful and accurate check on all frequencies.

Always mention the Short Wave Magazine when writing to Advertisers—It Helps You, Helps Them and Helps Us
The Month with the Clubs

FROM REPORTS RECEIVED

It seems that the swing from winter to summer programmes is more or less complete, and most Clubs are now thinking in terms of Field Days, D-F Contests and visits to places of interest, rather than of lectures, demonstrations and film shows.

Many of the flourishing Clubs are, however, able to command good attendances at many indoor meetings right through the summer season, and this would seem to indicate that a high standard has been set for the meetings, and also that enthusiasm has been kept up by good organisation. To our way of thinking it is a great pity if any Club activity shows a serious dropping off during the middle of the year; the loss of continuity is bound to be reflected in the attendances during the next winter season.

This month 42 Clubs report to us; a very fine total. Next month’s deadline will be first post on June 13; address your reports to “Club Secretary”, Short Wave Magazine, 53 Victoria Street, London, S.W.1. And in order to assist us with the compilation of accurate records, would all secretaries please be good enough to add a note showing the membership total as at the date of sending in the report. These figures are not necessarily for publication; but if anyone likes the idea, we can run a sort of Club Ladder (not in the competitive sense) showing new members gained each month.

British Amateur Television Club.—This Club recently gave a demonstration, in collaboration with the Shefford & District Short Wave Society, of amateur TV equipment. The whole meeting was televised, from the reading of the minutes to a Junk Sale, the audience viewing the proceedings on a 15-in. tube. Some 250 people were present, and were most impressed. It is hoped to repeat the demonstration in London in the near future. See panel for Secretary’s name and address.

Coventry Amateur Radio Society.—The April meeting featured an introductory talk to the R.A.E., which many local members were taking.

There should be some new calls in the locality before long. May meetings comprised a discussion on NFD and a complete trial Field Day, results of which were to be “scrutinised” carefully in preparation for NFD.

Radio Society of Harrow.—Attendance at recent meetings has nearly doubled, and members are growing every week. Morse classes are now held at every meeting. Forthcoming events are: June 14, G2TA, on Building a Receiver; June 29, Dr. Rogers on Quality Reproduction; June 8 and 22, Club Tx on the air. Several Field Days are being arranged for the summer.

Hemsworth & District Radio & Television Society.—This Club, a newcomer to our columns, meets alternate Mondays at 7.30 p.m. in the Co-operative Reading Room, Hemsworth. Morse classes are held from 7 to 7.30, and everyone who is interested in short-wave transmission, reception or television (including beginners) will be welcome.

Midland Amateur Radio Society.—The “MARS Receiver”, designed and built by Messrs. A. Rhodes and G. Brown, was described and demonstrated at the last meeting. Its performance is said to be amazing, and many members are now busy making receivers to the same specification. Meetings are on the third Tuesday of each month, 6.45 p.m., at the Imperial Hotel, Birmingham.

Montrose Radio Club.—An interesting lecture on television was recently received with great enthusiasm by members. The club is still busy building, and is holding listening contests among its SWL members. NFD preparations are also well under way.

Penteradiant Hobbies Club, Stafford.—This Club, with headquarters at 59 Crooked Bridge Road, Stafford, now includes a radio section. Although this is in an embryo stage, it has a nucleus of keen members, and workshop facilities are available. Anyone in the Stafford district who is interested will be made welcome at the above address any Wednesday evening after 7.30 p.m., or by the Hon. Sec. (see panel for his QTH).

Plumstead, Woolwich & Abbey Wood Group.—We have received The Bull Sheet, the local Newsletter of this Group, which meets in the Club Room of the Bull Tavern, Vincent Road, on alternate Wednesdays at 8 p.m. Other S.E. area meetings are held in Lewisham (at The Anchor, Lewisham Road). Prospective members are asked to contact G3Eiw (see panel for address).

Poole & District Amateur Radio Club.—This Club, now five months old, is going ahead...
Barnsley & District Amateur Radio Club annual dinner was held on January 14 last, with an attendance of about 100 members and friends. The president, G2BH, took the chair and one of the highlights of a very successful evening was the presentation to G5IV, who has been connected with the Club for over 20 years nicely, and recently heard a talk by G5GG on an Audio Filter, described as the greatest improvement he had made to his receiver for years. Meetings are on the first and third Mondays of the month, in a Club Room with comfortable seats for 50—new members to fill some of them will be welcomed. The Club Tx will be on the air shortly on 14, 28 and 144 mc, with a prospect of Top Band work later.

South Shields Amateur Radio Club.—Meetings are held every Friday, 8 p.m., at Trinity House, Laygate, South Shields, and consist of Film Shows, lectures and discussions. There are some 25 members, 10 of whom have licences. The Club has its own “shack”, occupied by its Tx G3DDI. Prospective members and casual visitors will always be welcome.

Stourbridge & District Amateur Radio Society.—At the May meeting, the Hon. Sec. was able to report that the Club had received much publicity and interest at the Halesowen Hobbies Exhibition. Mr. W. H. Rigg, Principal of Lydiate Ash Laboratories, Bromsgrove, gave an interesting talk on Tricks with Electronic Circuits. Meetings are held on the first Tuesday and third Friday of each month.

Sunderland Radio Society.—At the recent A.G.M., the retiring Chairman reported a successful year, which included a number of lectures of outstanding interest. It is proposed to move the Club premises to the Y.M.C.A. at Toward Road, where a Club Room will be available on Thursday evenings; members will also have the right to avail themselves of any of the other Y.M.C.A. amenities on any evening. The Club Tx and R. will be stored there, and there are facilities for the erection of aerials.

Sutton & Cheam Radio Society.—At the recent A.G.M. the retiring Secretary was elected a Vice-President, and two joint Secretaries were elected for the coming year. Meetings are held on the first and third Tuesdays at Sutton Adult School, Benhill Avenue; on June 6, there is to be a demonstration of 420-mc equipment, by G2FKZ.

Warrington & District Radio Society.—Recent talks have been on Pre-War Gear (by G8TR) and Hum-Free Sound Amplifiers (by G8IZ). Forthcoming subjects are Valves (G8TA), Radio Simply Explained (G3EZX) and Communication on 3 cm. (G3LZ). Meetings are on the first and third Mondays, 7.30 p.m. at the Sea Cadet HQ. New members always welcome.

West Middlesex Amateur Radio Club.—The new Officers and Committee were elected at the A.G.M.; ordinary meetings will be on the second and fourth Wednesdays, 7.30 p.m., at the Labour Hall, Uxbridge Road, Southall, Middx. The June programme includes a lecture on Propagation (Mr. A. W. Watkins) on the 14th, and also informal talks by Messrs. Blomfield, Bostock and Gott.

Bournemouth Radio & Television Society.—Arrangements for field day working are com-
Hounslow & District Amateur Radio Society.—The recent TVI Lecture by the G.P.O. was a great success, with an attentive audience of 77. Meetings continue every Monday, Wednesday and Friday evening.

Grafton Radio Society.—The Hon. Sec. gave a talk on Oscillators at the first of the May meetings. June 7 is Members' Night, when apparatus built by them will be displayed and demonstrated. The Quarterly Meeting will be on June 21, and the transmitting section meets every Sunday morning at Heston.

Lewes & District Model Engineering Club (Radio Section).—At the A.G.M. in March the Lewes Amateur Radio Club joined up with the Model Engineers and the above new title is the result. The programme for the next three months has been drafted with special reference to items of interest to both Clubs. Radio Section meetings are still held every Friday evening, 7.30 p.m., in the Club Room at Southover Grange.

Edinburgh (Lothians) Radio Society.—Fortnightly meetings are still held in the Chamber of Commerce Rooms, 25 Charlotte Square—7.30 p.m., every Thursday. June meetings are on the 8th and 22nd. Activity continues at a high level, including preparation for field day working. New members will be welcomed at any meeting.

Mansfield District Radio Society.—Officers and committee were elected at the A.G.M. in May, and field day arrangements have been completed. A Club Room is now available every Tuesday evening; Morse classes have begun, and technical lectures and a members' library are being organised. Weekly Club Nights are on Tuesdays, 6.30 p.m., in the Westfield Folk House. Secretary's QTH in panel.

Neath. Port Talbot & District Amateur Radio Club.—Main activity at present is the preparation for portable operation, in which the Club hopes to improve on last year's performance. At the next meeting GW3XY will talk on Radio in retrospect. Meetings are on alternate Wednesday evenings at the Royal Dock Hotel, Briton Ferry; visitors to the locality will always be welcomed on these occasions.

South Manchester Radio Club.—The last class in this year's R.A.E. course held recently, these classes will now be discontinued until the autumn. During May the Chairman gave a talk on the principles of D-F, in preparation for a forthcoming contest. Some 35 members are scheduled to take the field during this event. Other May activities included a talk on Television by a B.B.C. engineer; Ship-Shore Working, by an ex-Merchant Navy operator; and a Special General Meeting. A Hamfest has also been arranged for October 7—more of this later! Next meetings: June 9 and June 23.

Brighton & District Radio Club.—During the summer months the meetings will consist of talks and ragchews on alternate Tuesdays. More time for "ragchewing" has been found desirable, since members find little spare time after talks or demonstrations. The Club Tx, G3EVE, will be used more frequently. The June programme includes a further talk on aerials and a lecture on TVI-locating.

Cambridge & District Amateur Radio Club.—Next two meetings are on June 23 and July 21; at the June meeting G2PU will talk on Amateur Aerials for Long-Distance Communication, reviewing their design in the light of ionospheric conditions, angle of radiation and the sunspot cycle. Both meetings will be at The Jolly Waterman at 8 p.m.

Chester & District Amateur Radio Society.—At the recent A.G.M., G2YS was re-elected as President and a new Secretary was appointed. See panel for his QTH. G3GIZ, the Club Tx, has been very active in preparation for field day participation. New call signs among the members are hoped for, as many sat for the R.A.E. on May 10. G2CUR (ex-VQ4CUR and VQ1CUR) is a new member of the Club. Lectures, demonstrations and practical work continue at all meetings, and outdoor activities are being arranged for the summer.

Clifton Amateur Radio Society.—The first D-F Contest of the season was held on May 7, and was won by Messrs. Wooller and Meyers; the event was well attended. A Park Side is scheduled for the next meeting. The Club Tx, G3GHN, is being completely rebuilt on account of TVI, but it is hoped that it will be back on the air shortly.

Derby & District Amateur Radio Society.—June events include a Portable D-F Contest on the 25th, during which G3ERD/P will be operated on the Top Band from a hidden location. This is an open event and all interested enthusiasts are asked to contact the Hon. Sec. if they would like to "have a go." Members will visit the Derbyshire Royal Infirmary by way of concluding the series "Electronics in Science and Medicine."

Eccles & District Radio Society.—Weekly meetings continue to be well attended, Morse and general discussions occupying most of the time. Miniature oscilloscope building is all the rage, a dozen members having built one each! A visit to Telephone House, Manchester, proved to be an interesting event, and it is hoped, shortly, to visit the B.B.C. at Moorside Edge. The Technical College is being asked to form a class for R.A.E. next winter. Meetings are held every Monday at the Mill Brow Cafe, Worsley—7.30 p.m.

Gravesend Amateur Radio Society.—This Club ran a
At Thanet Amateur Radio Society’s dinner on February 4, G3CED (right), winner of their transmitting contest, was presented with a silver trophy.

stand at a local exhibition during April, and several pieces of apparatus were on show, including Transmitter and Receiver in operation. A constructional competition was held in connection with this exhibition. In May the Club ran a QRP Contest—maximum input one watt. This was won by G6BQ and G6VC. Meetings continue every Wednesday, 7.30 p.m., in the Clubroom, 30 Darnley Road, Gravesend.

Kingston & District Amateur Radio Society.—Recent lectures included one by G3DHZ on Field Day Operation. Arrangements have been made for a Club Shack and Workshop, and now a Tx licence is being applied for. Meetings have been well attended and new members enrolled. June meetings are at 7.45 p.m., on the 7th and 21st, both at Penrhyn House.

Kirkcaldy Amateur Radio Society.—The officers and committee were elected at the A.G.M. in May, and the Club now has its own call, GM3GOL. Meetings are held on the first Tuesday and third Wednesday of the month, 7.30 p.m., at the Club Rooms, 285 Links Street, Kirkcaldy.

Lincoln Short Wave Club.—Talks on field day activity have occupied recent meetings, but the subject for debate on June 21 is “The Crystal is Superior to the VFO”—which should stir up some discussion! It is hoped to arrange a visit to the Telephone Exchange and to GKZ in the near future.

Salisbury & District Short Wave Club.—Recent meetings have been devoted to preparation for the Club Stand at the Salisbury & District Model Engineering Society’s Exhibition, at the Guildhall, on June 17. It is hoped to operate stations on 3.5, 7, 14 and 144 mc, with the calls G3FKF/A and G2FIX/P. A display of equipment belonging to members will also be a feature of the Stand.

Sheffield Amateur Radio—Attendances at the technical meetings have shown an improvement which it is hoped, will continue. The next lecture is by G3FQJ on the Theory of UHF Operation; this will be on June 14.
Southend & District Radio Society.—More than 100 people attended the recent Hamfest, at which the cups for various contests held during the year were awarded. Projected activities for the summer include week-end camps with portable gear, D-F Field Days, and visits to several places of importance in the radio sphere.

Surrey Radio Contact Club (Croydon).—Meetings continue on the second Tuesday of the month, 7.30 p.m., at the Blacksmiths Arms, South End, Croydon. At the A.G.M. the officers and committee were elected—note QTH of new Secretary, in panel. At the May meeting, G3CU spoke on Modern Methods of Processing Quartz Crystals; the June meeting will feature an inquest on the Club’s field day participation.

Thames Valley Amateur Radio Transmitters’ Society.—The May meeting was well attended, and members heard a talk by G2QOS on Instrument Measurements, including practical uses of the various types of Bridges. Two stations will be in operation for the field day event—one at Broadmoor and one at Chobham. Visitors will be specially welcome.

West Kent Radio Society.—Fortnightly meetings continue at Culverden House, Culverden Park Road, Tunbridge Wells, the next being on June 7 and 21 at 7.30 p.m. Recent talks were on NBFM and the Amateur (G8KG) and on 144 mc Development (G2UJ).

Wirral Amateur Radio Society.—Talks on Television have recently been given by G2AMV and G3AKW. G3ERB, recently back from the U.S.A., gave members a summary of his experiences and impressions over there. Forthcoming events are the field day inquest and a talk by G2AMV on Practical VFO Design. June meetings are on the 7th and 21st, both 7.30 p.m., at the Y.M.C.A., Whetstone Lane, Birkenhead.

NAMES AND ADDRESSES OF CLUB SECRETARIES:

BOURNEMOUTH: F. G. Hamshere, G3EVE, 99 Elmes Road, Winton, Bournemouth.

BRIGHTON: L. Hobden, 17 Harrison Road, Brighton.

BRITISH AMATEUR TELEVISION CLUB: M. W. S. Barlow, G3CVO, Cheyne Cottage, Dukes Wood Drive, Gerrards Cross, Bucks.


CHESTER: R. Windsor, 17 Hough Green, Chester.


EDINBURGH (LOTHIAN): F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby.

ECCLES: G. G. Ward, 144 Meadview Lane, Worsley, nr. Manchester.

EDINBURGH (LOTHIAN): I. Mackenzie, G3FEG, 41 Easter Drylaw Drive, Edinburgh, 4.


GRAVESEND: R. Appleton, 23 Laurel Avenue, Gravesend, Kent.

HARROW: S. C. J. Phillips, 131 Belmont Road, Harrow Weald, Middx.

HEMSWORTH: E. Baddeley, 49 Regent Street, Hemsworth, nr. Pontefract, Yorks.


KIRKCALDY: F. A. M. Ashton, 115 Melbourn Road, Royston, Herts.

KINGSTON: R. Babbs, 28 Grove Lane, Kingston, Surrey.

KINGSTON: J. G. Peace, G3GFY, 190 Stone Road, Stafford.

KIRKCALDY: M. B. Beck, 5 Grange Road, Lewes.

KIRKCALDY: M. B. Beck, 5 Grange Road, Lewes.

LEIGH: M. B. Beck, 5 Grange Road, Leigh, Lancs.

LEWES: M. B. Beck, 5 Grange Road, Lewes.


MANSFIELD: F. Knowles, G3DBF, 8 Victory Drive, Mansfield, Notts.

MIDLAND: A. W. Rhodes, 135 Woolmore Road, Birmingham, 23.

MIDLAND: F. Knowles, G3DBF, 8 Victory Drive, Mansfield, Notts.

MIDLAND: F. Knowles, G3DBF, 8 Victory Drive, Mansfield, Notts.

MIDLAND: A. W. Rhodes, 135 Woolmore Road, Birmingham, 23.

MONMOUTH: Miss J. M. Steers, 182 High Street, Monmouth.

NEATH AND PORT TALBOT: W. F. P. Hill, G3AYW, 3 Tynycwch Avenue, Tonna, nr. Neath, Giswn.

NORTHAMPTON: F. Knowles, G3DBF, 8 Victory Drive, Forest Town, Mansfield, Notts.

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NEW VALVES. At 2/-, 6H6, 7193, EA40, LD210, LP220, SP41. At 4/-, 6JS7T, 6SH7, PM2, EB34, 991. At 5/-, 2X2, 269, 6L6GT, 6L7, 7177, 7187, 12AL5, 12AP7, 12A8T, 12A8G, 1225T, 1225K, 1225P, 1239T, 1237. 37, 713A. At 6/-, 3Q5GT, 5R4, 5U4G, 5Y3G, 5Z7, 5Z4M, 6CS, 6CS8, 6J5, 6K6, 6K7GT, 6L2GT, 6SK7, 6SS7, 6X6G, 6V6G, 6X5GT, 5Y6G, 507, 957, 9001, 9002, 9003, EBC33, EF36, EF50, E502, A52, A53, J87, V670, V671A, VU111, V919, V137. At 7/-, 115, 154, 3B26, 6AC7, 6AG5, 6A6T, 6AI4, 6C4, 6F6, 6F7, 6K7, 6L7, 6N7, 6SA7, 6SF5, 6SG7, 6VM, 12K8, 25L6, VR105/30, VR150/30, 9DE4, 72, 73, 83V, 2050, 2051, VR136, EF39, EF54, CV66, ECH35, 1625, VR136. At 10/-, 6AK5, 6L6, 717A, 6J6, 1616. At 15/-, 832, 866A, 724A, 1124, 3FP7. At 25/-, 446, 811, 8025. At 37/-, 813, 931A (Photo cell), 8013A, 8020. At 35/-, 715B, 805, V9379. At 45/-, 292B, SCP1. At 50/-, 212, 725A (Complete with magnets). At 75/-, 723A/B. All guaranteed. Two or more valves post free, otherwise please add 6d.

BRAND NEW NATIONAL H.R.O. SENIOR COMMUNICATION RECEIVERS. One of the most eminent of all radio RX, with all advanced refinements. Complete with valves, Instruction Handbook, packed in sealed makers cartons, less coils. Guaranteed perfect, £20.

NEW R.C.A. POWER TRANSFORMERS. Input 200-250v AC 50c. Secs.: 350-0-350v 200 mA. 6-3v 6A, 5v 3A. Fully shrouded. Finest quality obtainable. 35/-.

NEW NATIONAL FREQUENCY METERS TYPE BC 906. An "All-dry" portable instrument, covering the range 14-23 mcs. Fitted with "Velvet-Vernier" dial, Simpson 500 microamp meter, etc. Little modification required for alternative frequency coverage. Provision for Phone Monitor. Batteries fit into small self-contained compartment. Instrument housed in wrinkled case, with hinged front cover, and carrying handle. Complete with chrome telescopic antenna, calibration charts and circuit, 65/-.

NEW R.C.A. FILAMENT TRANSFORMERS. Input 230v 50-60c. Secs.: provide either 5, 10, 15 or 20v all at 5 amps, or paralleled for 5-0-5v at 10 amps. Fully shrouded, square case with terminal panel. In maker's cartons, 13/6.

NEW MOVING COIL METERS. Square panel mounting type 214. Scaled 0-150 mA (-15 amp), 5/6. Also New Micro Ammeters, panel mounting 24 round, 500 microamps, only 7/6.

NEW MULTI PURPOSE TEST METERS MODEL 886. Made by Precision Instruments Inc. An advanced American instrument, with a 20,000 ohm per volt movement, provision being made for optional 1,000 ohm per volt sensitivity by means of panel switch. AC/DC. Numerous ranges within the following limits: 60 microamps-12 amps. 3v-600v. 0-60 megohms. Also output range calibrated in decibels. Fitted in stout teak case with EHT Test Prods in compartment. Leather carrying handle. Ideal for Television Service and other exacting work. Fully guaranteed, £15.

NEW CAVITY MAGNETRONS. TYPE RK 725A. Freq. 9345-9405 mcs. Heater 6-3v 1 amp. Anode 12 kv. Peak power output 50 kW. Complete with 5400 gauss magnet assembly, 50/-.

NEW RADAR GAS GAPS. Type 1B24, 15/-; Type 721A (10 cm). 15/-; Type 724B. Complete with 12 kv. Peak power output 50 kW. Complete with 5400 gauss magnet assembly, 50/-.

NEW R.C.A. POWER TRANSFORMERS. Input 200-250v AC 50c. Secs.: provide either 5, 10, 15 or 20v all at 5 amps, or paralleled for 5-0-5v at 10 amps. Fully shrouded, square case with terminal panel. In maker's cartons, 13/6.

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NEW MOVING COIL METERS. Square panel mounting type 214. Scaled 0-150 mA (-15 amp), 5/6. Also New Micro Ammeters, panel mounting 24 round, 500 microamps, only 7/6.

NEW MULTI PURPOSE TEST METERS MODEL 886. Made by Precision Instruments Inc. An advanced American instrument, with a 20,000 ohm per volt movement, provision being made for optional 1,000 ohm per volt sensitivity by means of panel switch. AC/DC. Numerous ranges within the following limits: 60 microamps-12 amps. 3v-600v. 0-60 megohms. Also output range calibrated in decibels. Fitted in stout teak case with EHT Test Prods in compartment. Leather carrying handle. Ideal for Television Service and other exacting work. Fully guaranteed, £15.

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NEW RADAR GAS GAPS. Type 1B24, 15/-; Type 721A (10 cm), 15/-; Type 724B, complete with cavity holder, 15/-.

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MARCONI AMPLIFIERS TYPE 6. A really fine rack mounting job, employing two PX25 valves in push-pull, running at 500v. Undistorted output of 25w. Standard size panel is fitted with anode current meter. Volume Control Unit on similar panel is also supplied. Very robust construction with delayed HT switching. On operation for 230v AC mains, 50 cycles. Ideal for commercial installations, hospitals, auditoriums, amateur stations, etc., etc. Price complete with small mixer panel and circuit diagram is £6. Standard 5-ft. rack by Cossor also available for use with the above. Supplied separately, £2.

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R.F. CHOKES. 8d. each. 5/6 dozen. Carr. 4d. each. 1/- dozen.

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MAINS TRANSFORMERS. 350-0-350 at 100 mmps. 250-0-250 at 80 mlls. and all the tapping you need. 19/- each. Carr. 1/-. 

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Prim. 200-250v. Sec. 6-3v C.T.6A, 5v C.T.6A. 7-5 C.T.5A. 7-5v 5A. 4v 2A. Price 25/-. 


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12v. 16A. H. BATTERIES. By Pritchett & Gold. Brand new in fine oak containers. Dim. 62" x 81/2" x 83". 25/-, postage 2/-. 

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9 Only. Radar Indicators, Type VE. Grey enamel case. L. 24". D. 23". W. 11". Contains 16 valves. 6SN7 (7), 807 (3), V150 (2), 2X2, 5U4G, 6AG7, 6SL7, 10 mfd. 600v oil filled (3), 6 mfd. 600v (2), -1 mfd. 5000v (2). Potmeters, 16. 2 Small electric motors.

Westinghouse Transformer 406784. Input 115v 60c. Output 3,890v 0.0023a., 2.5v 3a.

Westinghouse Transformer 301164. Input 115v 60c. Output 6-3v 10a., 6-3v 0-6a, 5vCT 0-142a, 65v 0-142A.

2 Westinghouse Chokes 423117. 10h. 2a. 77 ohms. In addition to the above there are a large quantity of various resistors and condensers, 7" tube mounting and focussing coils (no CR tube). Double-deck chassis which slides in and out of outer case.

Brand New and Unused Equipment. Ideal for conversion to transmitter of TV receiver. Price £12/10/- (less than break-up value). Carr. paid per passenger train.

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Staff Call Signs: G3DGL, G3DLV.

****************************
PERSONAL RECEIVERS BC 728c, 7-valve receiver using 1-4v button base valves, covers 2-6 Mds with 4 push buttons, operates from 2v acc. with 2v vibrator for HT, will charge from 6 or 12v car acc., complete with shoulder sling, 2v acc. telescopic aerial and mountings for car, ideal as portable cum car radio, easily converts to broadcast bands. Brand new £9.

20 WATT PP AMPLIFIERS, using 6L6s PP output and 3 677s on amplifier stages, fitted with mike transformer and 3 channel input, 3, 7 and 15 ohms output. Mains supply 200-250 AC., £12, carr. paid.

BC 733 LOCALISER RECEIVERS, OK for 144 mcs, uses 7177A's, 2 12SQ7's, 12AH6, 12SQ7, and 12AH6. Price £3, or less crystals £2/10/.-.

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VIBRATOR PACKS, 6v input 180v 60mas smoothed output, self-rectifying vibrator by Mallory. 14/.-.

NOISE LIMITERS, complete with 6H6 valve and all instructions, 4x 14" chassis wired ready to fit in RX. 5/-.

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WEARITE IF TRANSFORMERS, 465 kcs, 9/- pair.

All goods advertised in April issue available, except R59/ARN5a. List now available.

BARTON'S
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To meet the demand of Specialist amateur requirements a redesigned 300 ohm transmission line, having stabilised electrical characteristics in varying weather conditions, has been introduced.

ELECTRICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Impedence</td>
<td>300Ω</td>
</tr>
<tr>
<td>Capacity 4½ F/ft.</td>
<td>4.0</td>
</tr>
<tr>
<td>Attenuation db/100 ft. at 1 Mc/s</td>
<td>0.125</td>
</tr>
<tr>
<td></td>
<td>1.35</td>
</tr>
<tr>
<td>Power Handling Capacity at 100 Mc/s</td>
<td>550 watts.</td>
</tr>
<tr>
<td>Velocity Ratio</td>
<td>0.86</td>
</tr>
</tbody>
</table>

TYPE: FLEXIBLE TELCO THENE INSULATED TRANSMISSION LINE

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TRANSMITTING VALVES. Condition as new and unused. Type 803, 25/- Type 803, 17/6. Post free.

ACCUMULATORS. Brand new Government surplus U.S.A. made. 12v 30 amp-hour at 5hr rate. Case size 10" x 5½" approx., with terminal cover projecting one side, 3½". Price 7/6. 24v 11½ amp-hour at 50mA. and 275v at 110mA. or from the vibrator pack is 275v. Housed in metal case, transformer and vibrator pack for either 12 or 24v output. Price 15/- post free.

SUPPLY UNITS No. 2. As used for the No. 19 Trans./Rcvr., these units combine a rotary transformer and vibrator pack for either 12 or 24v output. Price 11¾/6. Case size 10" x 5½" approx., with terminal cover projecting 2½". Price 52/6. Also some, mostly unused, but in a dirty soild condition due to careless storage. Since we are selling these so cheaply they will not be tested before despatch and although probably in working order this cannot be guaranteed. Price — Condition "A", 7/10/-. Condition "B", 6½/-. Carriage either price 7/6.

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HALF SHROUDED — All above have 6.3v at 10 amp. 5v at 10 amp. 2v at 2 amp. Fully shrouded —

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HALF SHROUDED — All above have 6.3v at 10 amp. 5v at 10 amp. 2v at 2 amp. Fully shrouded —

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RECEIVERS TYPE R1155H. Once again we can offer these popular communications receivers which cover the 20, 40 and 80 metre "Ham" bands and medium and long wave transmissions. In condition as new and unused in maker's original transit cases. Price 65/10/-. Post free. Carriage 7/6.

HALF SHROUDED — All above have 6.3v at 10 amp. 5v at 10 amp. 2v at 2 amp. Fully shrouded —

RECEIVERS TYPE R1155I. Once again we can offer these popular communications receivers which cover the 20, 40 and 80 metre "Ham" bands and medium and long wave transmissions. In condition as new and unused in maker's original transit cases. Price 65/10/-. Post free. Carriage 7/6.

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Small Advertisements
Readers—continued.

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Wanted urgently, complete set of nine coils for HR0 Senior, or any single coil.—St. Martins, Lockhath Park Road, Locksheathe, Southampton.

Edystone 358, excellent condition, 9 valves, 150 kc to 31 mc. power pack, £12.—Knowles, 44 Salisbury Avenue, North Shields.

AR88LF, good condition and alignment, nearest offer £25.—Box No. 760.

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MCr1 receiver, all coils 19-3000 meters. Power pack for 97-250 volts AC/DC, phones, perfect, 26 carriage paid. Also Wilkins and Wright movings-coil pick-up with equaliser, unmarked, £2; G2HAP, 80 Latchmore Road, Tullumpton, Manchester. (Phone URM 3383 after 6 p.m.)

BC348N external P/P, FB, CR100/4, ex. cond. SX17 overhauled, re-valved. Must sell. Best offers.—Gilbert, Homeview, St. Erth, Hayle, Cornwall.

For sale. AR88LF as new, S-meter and additional 6v RCA P/P complete, manual, £40.—BRS,18450, 184 Kingsway, Gatley, Cheshire.


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Edystone S640 with Edystone speaker, excellent condition, £24.—Everest, 44 Salcombe Drive, Chadwell Heath, Romford, Essex.

B2, Minor Rx/Tx (Type A Mx3) 10w 3-2-90 mc Rx superhet, with vibrator pack and built-in mains supply 100-225 AC, and 6v battery: components, instructions, manual, etc.; also small self-contained modulator with power pack for above Tx. £12/10/- the lot. 40-watt modulator GJ5-525-625 push pull 6L6's, built-in power pack, standard rack, transformer UM2, commercially built, £11, complete with valves. D2 wave meter adapted for Jams 6-2v AC or 6v DC. Instructions and manual, £3/10/- complete. Power supply Type 45 using Westinghouse Metal Rectification, 230/50 cy., output 1200v 200 mA, in steel case, £9,—Box No. 763.

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EXCHANGE and part buy R1116A 8v battery to 120 kc, for an R508.—26 Commercial Street, Church, Nr. Accrington, Lancs.

SALE or exchange, Dumont 224A CRO. £15. HRO—RB4J, complete P/P, 4 coils and speaker, £20. Disc recorder complete, amp., playback and 100 spare discs, all self-contained and modified for 230v, £20. 145 VFO with P/P, £4. BC455, £1. D104 mike. £3. Turner M/C mike, £3. Wanted : Tape or wire recorder, Collins TCS Rx and Tx or other good Tx.—Box No. 767.

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