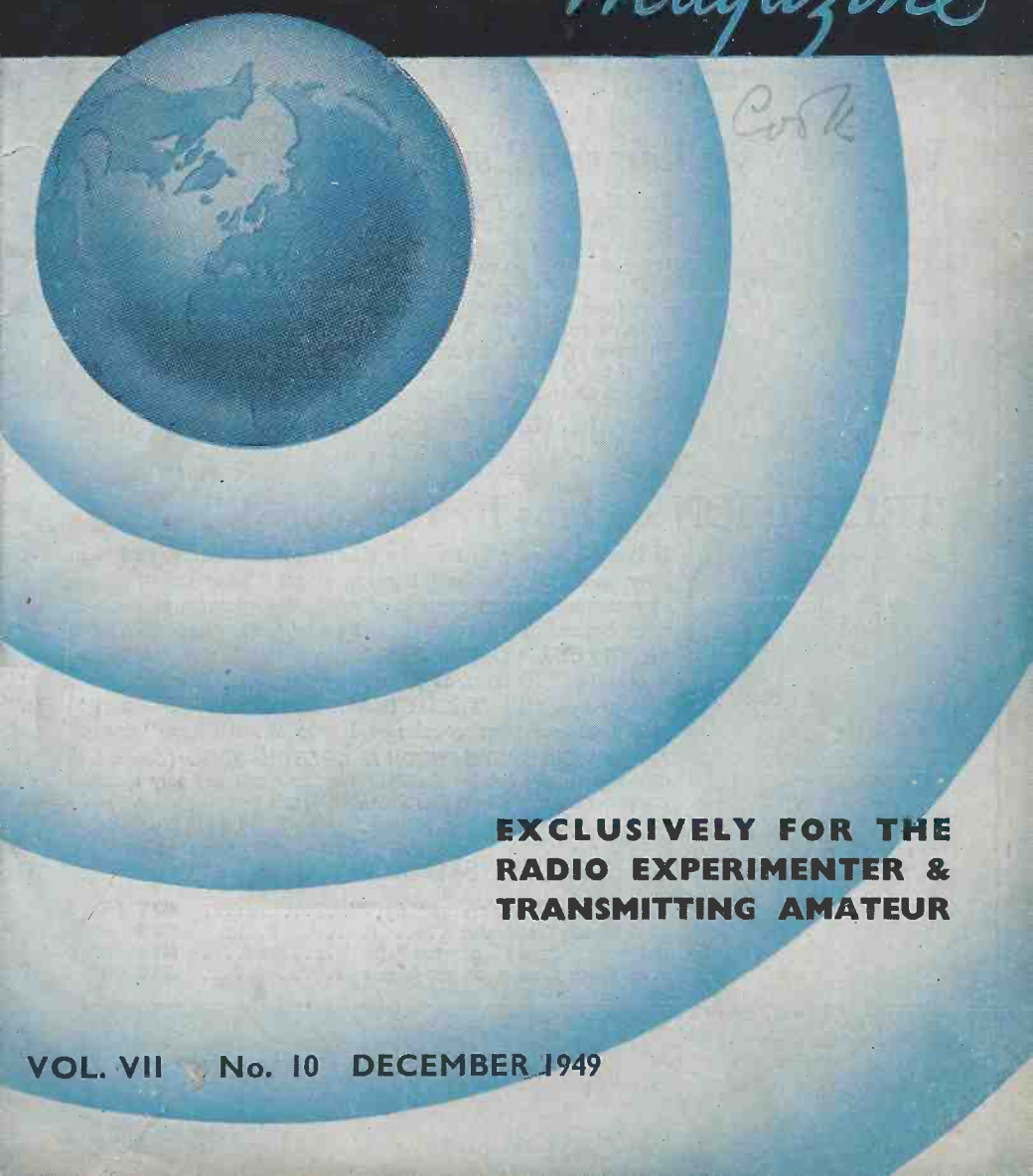


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# SHORTWAVE

*Magazine*



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**EXCLUSIVELY FOR THE  
RADIO EXPERIMENTER &  
TRANSMITTING AMATEUR**

**VOL. VII No. 10 DECEMBER 1949**



**HOME CONSTRUCTORS  
NOTE!**

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It is no economy to buy the cheapest components, and then have to spend months "friggling about" after construction. If you want designs capable of producing pictures as good, if not better, than commercial televisions, use WEBB'S SPECIFIED COMPONENTS and build the "Wireless World" or "Electronic Engineering" circuits. Also remember WEBB'S FREE TECHNICAL ASSISTANCE—we will gladly answer your queries and help smooth any "snags." Ask for WEBB'S "TELEVISION PRICE LIST"—FREE. (Covers both Birmingham and London details). Play safe and use only specified components backed by WEBB'S GUARANTEE.

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Complete Valve Characteristics including  $I_a/V_g$ ,  $I_a/V_a$ ,  $I_s/V_g$ ,  $I_s/V_a$ , Amplification Factor, Anode A.C. Resistance, 4 ranges of Mutual Conductance covering mA/V figures up to 25mA/V at bias values up to—100v., together with "Good/Bad" comparison test on coloured scale against rated figures.

"Gas" test for indicating presence and magnitude of grid current, inter-electrode insulation with heater cold directly indicated in megohms, separate cathode-to-heater insulation with valve hot. Tests Rectifying and Signal Diode Valves under reservoir load conditions, and covers all the heater voltages up to 126 volts.

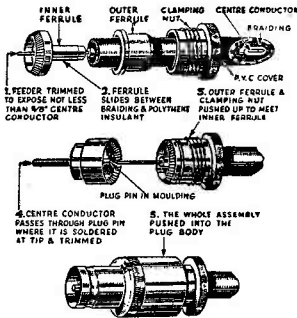
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P. S.

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Fit a 'Belling-Lee' suppressor L.1274 or L.630 to the distributor lead, does not affect engine performance and helps an industry

This plug is an improved version of our standard plug L.604/P. It is more robust and compact, is better value and is interchangeable with the old range of sockets and coaxial outlet box.

Ideal for connecting feeder to television receivers and for connections from oscillator to power amplifier, from modulator to transmitter and, when used with appropriate socket, as an output plug and socket for a signal generator.

## FEATURES INCLUDE

- (1) Easy loading of cable without the necessity of unravelling or soldering the braiding.
- (2) Low self capacitance. Plug with L.604/S approximately 1.5 pF at 45 Mc/s.
- (3) Low contact resistance.
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## Lyons Radio

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Telephone : Shepherds Bush 1729

**INDICATOR UNITS TYPE 157.** These units are fitted with the now well-known Cathode Ray Tube, type VCR97, as used in many television designs, 16-VR65's, 2-VR54's, 2-VR92's, Muirhead slow motion drive, wire-wound pots, switches, condensers, resistors, crystal unit, etc. The whole is built on a metal chassis and fits into a case 18" x 8½" x 11½". Condition practically as new and C.R. tube tested before despatch. Price £3/17/6. Carriage 7/6.

**25-WATT RADIO AUDIO AMPLIFIERS.** These are brand new, made by the Romac Radio Corp. A radio tuning unit is incorporated with these amplifiers enabling radio programmes as well as Microphone and Gramophone inputs to be distributed at volume levels up to the full output of 25 watts. Operation is from 200-250V A.C. mains. S.A.E. for further details. Our price £30. Carriage paid.

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*Radio Valve Application Manual.* Deals with transmitting as well as receiving types, C.R. tubes, etc. 5/3, post free.

*Radio Modernisation Manual.* 3/8, post free.

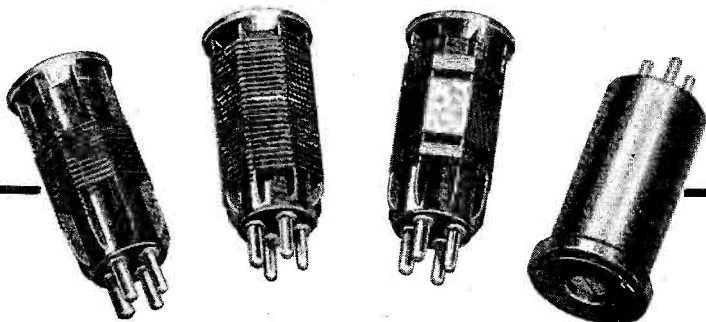
**VALVES.** Brand new, unused, American made. Type 866A, 15/6, post free. Type 832. 25/-, post free.

**CALIBRATORS RANGE CD/CHL.** This unit contains a complete A.C. power pack comprising a mains transformer for 230v 50 c.p.s. input, with outputs of 250.0-250v at 25mA, 6.3v and 4v at 2A. An L.F. choke rated 50H at 25mA, and rectifier valve type UU5. Much other useful gear fitted including 3 valves, type ARP36 (SP61), a 163.86 kc crystal, etc. The whole is built on a neat metal chassis and fits into a metal case 10½" x 7½" x 9". In new condition. Price 32/6. Carriage 3/-.

**POWER UNIT TYPE 3.** A high grade unit operated from 200-250V A.C. mains, with output of 220V D.C. at 70mA and 6.3v, A.C. at 4A. Designed for use with the R1132 or R1481 but quite suitable for most other communication receivers. Panel size 19" x 7", depth over dust cover 11". Fitted with 0/300 voltmeter and 0/150 milliammeter. Two section filter gives high degree of smoothing. In good condition and perfect working order. Price £4/4/-. Carriage free. Also as above but with only milliammeter fitted. Price £3/16/6. Carriage free.

**RECEIVERS TYPE R1132A.** In brand new condition these 11-valve superhet receivers have a tuning range of 100 to 125 Mc/s. and can be modified for reception on the 144 Mc/s. band. Fitted with 'S' meter, B.F.O., etc., and with circuit diagram pasted inside dust cover. Chassis size 19" x 10½" x 11". Price £4/19/6. Carriage free.

**RECEIVER R1132 & POWER UNIT,** together £8/8/-. Carriage free.



## EDDYSTONE MINIATURE PLUG-IN COILS

The Eddystone "706" coils being only 2" long and 1" diameter overall lend themselves well to the construction of a compact receiver. The "Q" values and efficiency are high, enabling good results to be secured. Each coil has three windings—coupling, tuned circuit and reaction. One end of each winding is brought to a common earth pin, so that four pins suffice. Shunt feeding should be used with the coupling and reaction windings. The seven types listed below give, in conjunction with a tuning condenser of 140 pF max. (e.g. Eddystone Cat. No. 586) a wide continuous frequency coverage. The three higher frequency coils (LB, Y and R) are air-cored, the other four having adjustable dust-iron cores.

Coil Type	Frequency Coverage	Price	Coil Type	Frequency Coverage	Price
706/LB Blue	33-15 Mc/s	4/3	706/P Pink	1.4-720 kc/s	5/3
706/Y Yellow	10-6.7 Mc/s	4/3	706/G Green	750-300 kc/s	5/3
706/R Red	7.3-3.1 Mc/s	4/3	706/BR Brown	370-150 kc/s	5/3
706/W White	3-3.1-35 Mc/s	5/3	707 Base for 706 Coils		1/9

These coils and other Eddystone products are available from your local Eddystone retailer. We do not supply direct. Be sure to obtain an illustrated catalogue (price 6d.).

### STRATTON & CO. LTD.

EDDYSTONE WORKS, WEST HEATH, BIRMINGHAM, 3

### AMATEUR CRYSTALS QCC

Frequencies : 1716, 1723.5, 1927.5, 1941.5, 1952, 1957, 1941, 1965, 1967 Kcs **32/6** each  
 7077, 7083, 7131, 7154, 7170, 7182, 7190, 7239, 7260, 7466 Kcs **32/6** each  
 S.T.C. Crystals : (B7G) 7112, 7246, 7255, 7384, 7398, 7107 Kcs **27/6** each

### AERIAL ENAMELLED COPPER WIRE

14 S.W.G. 75 ft. ... .. **5/3**  
 14 S.W.G. 100 ft. ... .. **7/3**  
 14 S.W.G. 150 ft. ... .. **10/6**

### FINAL TANK COILS

All bands 3-5, 7, 14, 21, 28 Mc with end links, centre links, and also split centre coil for swinging links. All **12/6** each.

### CERAMIC BASE FOR S13 VALVES 12/6 each

### MATCHED PAIRS OF VALVES

PX25 ... .. **54/10** per pair  
 KT66 ... .. **36/6** per pair  
 PX4 ... .. **33/-** per pair

Steel chassis, black finish, 17" x 10" x 2", **10/6**  
 Steel chassis, black finish, 17" x 10" x 3", **12/6**  
 Aluminium chassis, plain, 17" x 10" x 2½", **11/6**  
 Wego 4 mfd 1,000v paper **3 for 7/-**

### PRECISION RESISTORS, WIRE WOUND, .1% ACCURACY

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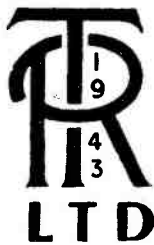
## TELE-RADIO (1943) LTD.

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Please include sufficient for postage and packing when ordering

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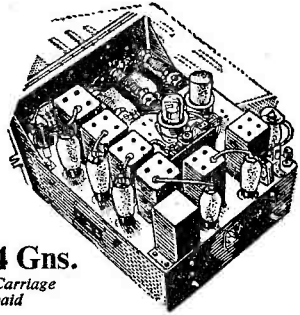


# Thinking of building a Television Set?

## 10 - VALVE 1½ - METER SUPER - HET

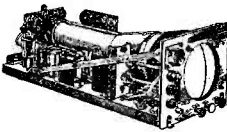
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Conversion notes and circuit diagram free.



**4 Gns.**  
Carriage paid

### AS.V. INDICATOR UNITS



#### Type 6 H

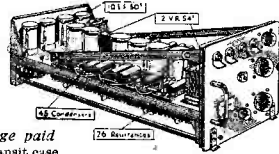
Containing seven valves and one 6 in. CathodeRay Tube type VCR 97.

Brand new and unused. In sealed wooden transit case.

**3 Gns.** plus 5/- carriage

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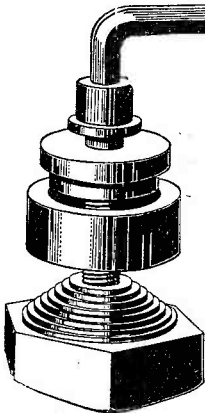


**£2-15-0**

BACH Carriage paid  
In sealed wooden transit case

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# YOU'LL DO BETTER AT LAWRENCES

**AN/ARC-5 COMMAND RECEIVERS (SCR-274N).** These famous 6-valve superhets are fitted with valves : 12K8, 3 12SK7, 12SR7, 12A6. Following models available : R23/ARC5 (BC453), known as "Q Fiver," 550-190 kcs, I.F. 85 kcs ; R26/ARC5 (BC454), 3-6 mcs, I.F. 1415 kcs ; R27/ARC5 (BC455), 6-9 mcs, I.F. 2830 kcs. All brand new and perfect in maker's cartons, with circuits. 45/-.

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**CONVERSION COMPONENTS FOR AN/ARC5 RECEIVERS.** (BC453-4-5). Medium-wave coils, specially manufactured from finest materials. Complete with full instructions. Convert your Command Receiver to a high performance Broadcast Set. State type required, 10/6 ea. Dynamotors BC453, etc., 28v in, output 250v at 60 mA. Genuine plug-on type, 12/6. A.C. Power Packs, 230v, specially designed to plug on to rear of set. Eliminate tedious heater wiring alterations. Employ 6X5 rectifier. Complete, 45/-.

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**NEW R.C.A. QUALITY AMPLIFIERS, TYPE MI-11220.** This is a professional instrument, housed in a most attractive cabinet which is finished in stuckle enamel. Employ seven valves, viz. 4 6J7, 2 6L6, 5U4G. Operate on 210-250v 50 c/s. Multi-ratio input and output transformers. Rated output, push-pull with negative feedback 15 watts. In sealed maker's cartons. Only £15.

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**Canadian Carbon Microphones.** As used with 58 sets, 2/6, post 6d.

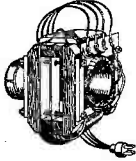
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**FRAME AND LINE COIL ASSEMBLY.** Perfectly made by a very famous maker, for standard type magnetic tubes, 9 in., 10 in., 12 in. or 15 in., we have a limited number only, the price is 16/6, and cannot be repeated once these are cleared, so please act quickly.

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**P.M. FOCUSING for clear pictures**

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**R.F. E.H.T.** We were so pleased with the quality of this unit that we have taken up the entire output of the manufacturer, the voltage can be adjusted to make it suitable for working 9 in., 12 in., or 15 in. tubes, the unique design and vacuum impregnation combine to give a trouble-free unit which will give years of satisfactory service, and, of course, the big point about the R.F. E.H.T. is that it is not lethal, the size is only 4 1/2 x 3 1/2 x 4 in., price, complete ready to operate, 65/-.

**218 FOR A MAGNETIC TELEVISOR** (and H.P. terms if you wish), this we think you will agree a remarkable low price, even though the tube is not included, but the quality of the picture has not suffered, this was demonstrated to thousands of people at Radiolympia. We will demonstrate to you if you call. Full constructional data for novice or expert, 5/-. Explanatory leaflet free.



## MISCELLANEOUS ITEMS

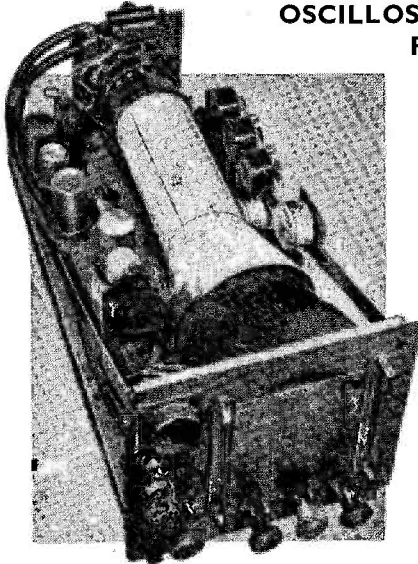
Blocking Osc. Transformer, 6/6. 9 ft. dural. tube for aerial, 4/6. .1 mfd. 2.5 kV., 2/6. .1 mfd. 5 kV., 4/9. .028 kV., 3/9. .17 kV., 13/6. Vision Receiver strip (type 194), 45/-.

Varley E.H.T. Transformer, 4 kV., 67/8. 2.5 kV., 27/8. B7G Valve Holder, 1/8. EF50 Valve Holder, 6d. Chokes, 200 mA. 10 henry, 10/-.

200 mA 3 henry, 8/-.

80 mA 10 henry, 4/6. 80 ohm feeder, thin, 10d. per yd. thick, 8d. per yd. Plastic 8 kV. Sleeving, 3/- doz. yds.

## OSCILLOSCOPE PARTS



**TYPE 6 INDICATOR.** As specified for the "Wireless World" oscilloscope (reprint of data 9d.). Also for the "Inexpensive Television" (booklet 1/6), and the Mark I Televisor (constructors envelope, 2/8). These indicators are brand new, packed and sealed in manufacturer's original crates, they contain VCR97 Cathode Ray Tube, 4 EF50 valves, 3 other valves, and hundreds of useful components, including wire wound pots. Price is only 24/10/-, plus carriage and packing, 7/8.

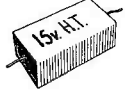


**PRECISION EQUIPMENT**

# SPECIALS

## PARTS FOR PERSONAL RECEIVERS

New ex-W.D. chassis containing three B7G Valve Holders, resistors and other spares with valves type 184, and 2 1T4's, 29/6, complete with diagram of a midget receiver.



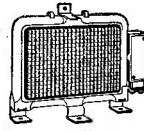
**H.T. BATTERY UNITS, 15 volts, but measure only 1 1/2 in. x 2 1/2 in. x 1 3/8 in., 10 for 10/-.**

**L.T. UNITS, 36 each; 2/6 dozen. MIDGET .0005 TUNING CONDENSER, 4/8 each. MIDGET P.M. SPEAKER, 2 1/2 in., 10/8.**

**SHORTED TURNS COIL TESTER.** You know that it is almost an impossibility to test or shorted turns in I.F. Transformers, Coils, L.T. Transformers, etc., with an ordinary ohmmeter. Our mains operated shorted turns coil tester will reveal these faults in a second. For one month only we are offering these to you at the remarkably low price of 25/10/- each.

## THE "SPEE-DEE" SIGNAL TRACER.

A small metal case a few inches square, a flex terminating in a probe, a twin lead for connecting to either A.C. or D.C. mains, no switching, no tuning controls, and there you have the "SPEE-DEE" Signal Tracer. H.F., I.F., or L.F. checks—makes no difference; note frequency change is automatic. The fault lies in the no-note stage. Yes, it's as simple as that. Price, with directions, 24, leaflet free.



## ELECTRIC HEATERS

Heavy cast framework totally encloses the elements, so these are 100% safe even in confined spaces, just right

for your radio den, garage, office, shop, etc. 900 watt (general) model, 23/6, plus 4/6, 250 watt (personal) model keeps legs and body warm for less than a farthing per hour, 23/6, plus 4/6. 600 watt (medium) model, 23/6, plus 4/6.



## HOUSE TELEPHONES

### Desk or Wall Mounting

Suitable for intercommunication between offices, workshops, stores, garages, big houses, kitchens, etc. Each station consists of normal size Bakelite handset and desk or wall mounting cabinet with built-in selector switch, buzzer and push. All stations can communicate with one another independently. Each installation is absolutely complete and internally wired. 3-station installation complete with 50 yards 9-core cable 28/10/-.

4-station installation, complete with 50 yards 6-core cable, 28/10/-.

2-station installation, complete with 25 yards 4-core cable, 23/17/6.

**3 Electron House, Windmill Hill, Ruislip Manor, Middlesex**

# G3SJ ★ HAROLD W

*We take this opportunity of wishing all our friends at Home and Abroad the Compliments of the season, and have pleasure in offering for the Month of December, a fine range of material at prices which defy competition. All goods are brand new except where stated. Carriage or post paid British Isles.*

**VALVES.** A bulk purchase enables us to offer at a new record LOW the following: 866/866a, 10/6; 832, 16/-; 100th, 25/-; 304th, 39/6; 450th, 60/-; 5R4 GY 950/0/950 190 mills, 1625 (12v 807), 4/- ea., 36/- doz. 807, 5U4, 6/-, 60/- doz; EF50, 6V6, G, GT, or metal, 6X5, 6K8, 6AC7, 6SC7, 5Z4, 6K7, 5/- ea., 48/- doz. 6SH7 met. R.C.A. boxed, 3/-, 25/- doz. 6SH7 glass, 6H6, 12J5, 1/- ea., 9/- doz. 12SG7, 12SK7, 12C8, 12SR7, 4/-, 36/- doz. *Note:* Cannot be assorted, half doz., will not be sent at doz. rate.

**T.U. UNITS.** 7 and 9 with a few 26's, approx., 6,000 to clear, brand new, with outer cases at 10/-. Carr. paid, England and Wales, 3/- extra Scotland, Ireland.

**CRYSTALS.** Special offer for top band. A complete range by Weston Elec. Co. Totally enclosed in FT4 holders with half-inch pin spacing. All are for doubling into top band. Range 875Kc to 998Kc, all are plated electrode type and prolific harmonic generators. Over 5,000 to clear at 5/- each, 48/- per doz.

**CRYSTALS.** The following range by Billee, R.C.A. Stand, Valpey, etc. All are FT4 holders with the exception of the 3-5 Mc range, which are  $\frac{1}{2}$ " BC610 fitting. 7,000/7,300 Kc, your choice of freq., 12/6, 6,000/6,083 Kc, 8,000/8,200 Kc, your choice freq., 15/-, 3,500/3,800 Kc, your choice freq., 15/-.

**B.C.221's.** Without a blemish, £15/10/-. A few slightly soiled, £12.

**B.C.610's.** Complete with speech amplifier, and exciter units for four bands. All valves and auto trans. Fine chance for the XYL who appreciates the OM's hobby. £150.

**TOP BAND COILS** for the above, Barker & Williamson, 8/6.

**EXCITER UNITS, BC610.** Any band including 21 Mc, 25/-.

**TANK COILS BC610.** Air-spaced  $\frac{1}{2}$ " copper tube, 10, 20, 21Mc, 8/6 each, 40 meters, 10/6.

**RES. CAP. BRIDGE.** Mullard GM.4140/1. A few more available at £10.

**METERS.** 0/200, 0/300, 0/500 mills, 3" round flush, either model, 10/6, above by Weston Ferr, etc. 0/100 mills, 3" square flush, Spartan Canada, 14/-, 0/2,000 Electrostatic voltmeter, Sangamo Weston, 15/-.

0/1/2 amp Thermocouple, 2" square flush, 3/-, 0/4 Thermocouple in oblong bakelite cases for wall mounting with shorting push button switch incorporated, Weston, 8/-, Ideal for mounting in window for visual aerial indication. Westinghouse U.S.A., 0/15v A.C. 3" round flush, 25/-, Westinghouse 0/48 mills calibrated 0/1,200v, 3" round flush, 10/-, Ferranti 0/250 microamps, 3" round projecting, 10/6, Weston 0/1 milliamp, 3" round flush, 14/-.

**VOLTAGE REG.** VR 105, 7/6; VR150, 8/-.

**WALKIE TALKIE.** No. 58 MK 1. Complete with all accessories, vibrator supply unit, and spare set of valves, ready for the air, 6 to 9 meg., brand new and unused. £15.

**AS ABOVE.** Model 57 complete, brand new, with all accessories, £12/10/0.

**POWER UNIT PP51/APQ9.** See "Short Wave Mag.," Nov., for interesting article by G5PR. The above unit in original wooden crates, brand new and unused, complete with 4 5R4 GY rectifying valves. Carr. paid, 35/-.

**P.O. DESK MICROPHONES.** Another fine lot in sealed cartons, complete with 6 ft. screened copper flex and standard jack plug. 8/6.

**RX 1124b.** Less valves, 8/6.

**POWER SUPPLY COMPONENT PARTS.** R.C.A. Input 230/50 cy. Output 2,000/1,500/0/1,500/2,000, at 800 mills, 90/-, R.C.A., as above but 110/120v primary, ideal for the 610, 70/-, R.C.A. Filament trans., 10v C.T. Twice for a pair of 813's, 230/50 cy, primary, 25/-, R.C.A. Driver trans., 1:1.74 ratio. 616's to TZ40's or 811's, 15/-.

**BIAS TRANSFORMER.** 230/50 cy, 175/0/175 + 40/0/40. 7/6 each.

R.C.A. Filament trans. 230/50 cy. Output 10v ct 20 amp 10v ct 20 amp, 10v ct 10 amp, 10x8x8, weight 50 lb. £3/10/-.

**MET VIK.** 230/50 cy., output 12, 13 or 14v at 60 amp. Con. rating. 35/-.

**FIL. TRANS.** 230/50 cy., 4v 10 amp, 4v 10 amp, 4v 10 amp, 6v 3 amp. Potted. 9x6x6. 27/6

**THERMADOR.** The following still available, quality, finish, and performance unequalled as hundreds already using these will testify.

## 10 YORKSHIRE STREET • BU

# WHITAKER ★ G3SJ

**MODULATION TRANS.** 400 watts. Primary 6,700 ohms C.T. Secondary 4,500, 5,000, or 5,500 ohms Max. operating level +47 db. Freq. plus or minus 1db, 400/4,000 cy. Size 7"×6"×5", 2 $\frac{3}{4}$ " core. Porcelain stand offs., and completely screened. In original wooden crates. 50/-.

**PLATE TRANS.** 230/50 cy. Output 680/0/680 at 225 mills. 6 $\frac{1}{2}$ ×5×4. Core size 2 $\frac{1}{4}$ ". 50/-.

**FIL. TRANS.** 230/50 cy. Output 10v CT 10 amp, 10v CT 8 amp, 7×5×4 $\frac{1}{2}$ . 2 $\frac{1}{2}$ " core, 2,000v text. 30/-.

**FIL. TRANS.** Input 230/50 cy. Output 2 $\frac{1}{2}$ v CT 10 amp, 2 $\frac{1}{2}$ v CT 10 amp, porcelain stand offs, sec. test volts 7,400, core size 2 $\frac{1}{2}$ ". Size 6×4×4 $\frac{1}{2}$ . Completely screened. For a pair of 866's at 30/-.

**L.F. CHOKE.** 10 hy at 225 mills DC res. 84 ohms, 5×4×4 $\frac{1}{2}$ , completely screened. 20/-.

The 6·3v 5v, in the above range, is now absorbed.

**RADIO RECEPTOR CO., U.S.A.** Input 205/230v, switched. Output: 1,250/0/1,250 at 400 mills, 12v 14 amp. CT., 2 $\frac{1}{2}$ v 10 amp for 866's. 0/10, 11, or 12v at 5 amp, 10,000v. Insulation. Weight 60 lb. £5. Carr. paid.

**AUTO TRANS.** 230/110 or 115. Woden 100 watt, 25/- . Ex-Admiralty 2KVA, £3. 2 $\frac{1}{2}$  or 3 KVA, £5. Met-Vik 500 VA, new and boxed, at £2. Carr. paid.

**WODEN MOD TRANS.** UM1, 54/-; UM2, 72/6; UM3, 90/-; UM4, 215/-; immediate delivery from stock.

Full stocks of most Woden material mains trans, driver trans, etc., at current list prices.

**R.C.A. AR88 SPARES.** Another nice XYL, OM present. Complete set of 14 valves for the AR88 in sealed cartons at 70/-.

**CONDENSERS.** T.C.C. 4mf 2,000v wkg. Size 6"×6"×2 $\frac{3}{8}$ ", unrepeatable offer at 5/- each, 48/- doz. Ditto 2,000v wkg., 4mf +2mf, 8×4×4. 8/- . Ditto, 10mf 1,000v wkg., 6/- each. Ditto, .01 5 KVA wkg. tubular-metal can, 2/6. 3mf 6,000v wkg., size 12×10 $\frac{1}{2}$ ×6, 2" insulated terminals, 20/-.

**U.S.A. OIL FILLED.** 4mf 1,000v wkg., at 4/- . 1mf 1,500v wkg., 1/6. 6MF, 660v wkg., 4/- . .1 three times 600v wkg., at 1/- . .1 Tubular 350v, at 2/6 doz.

**L.F. CHOKE.** 7hy 70 mills Weston Potted, at 5/6. G.E.C. 10hy 500 mills, 25/-.

**STAND OFFS.** 1 $\frac{1}{2}$ " White ceramic, 1/- . Midget stand-offs, 1/- doz.

**FEEDERS.** 80 ohm poly. twin-line, 6d. per yard. 300 ohm Telcon ribbon, 8d. per yd. 52 ohm co-ax 1 Kw, 1/- per yd. 75 ohm co-ax Telcothane  $\frac{1}{2}$ " diam., at 6d. per-yd. Ex Air Ministry, 300 ohm open wire line at 1/6 yd.

**VARIABLE CON TX.** Johnson Cer. 250pf 1,000v wkg., complete with dial and coupler, 15/- . Cyldon 200pf, 1,500 v, 4/- . Ditto, 50+50 1,500v, at 12/6.

**CATHODE RAY TUBE.** VCR 97, new and boxed, at 35/- each.

**BLEEDERS.** 20k 120w, 50k 50w, 50k tapped at 25k 50 watt, 5k 40w, 5k 20w, 75k 40w, 60k 40w, 43 $\frac{1}{2}$ k 50w, 350 ohm 75w, 425 ohm 60w, all at 2/-, 18/- doz. 1 meg 20 watt, 35k 35w, at 1/- each. 2,200 ohm, 600 ohm, 82k 2w, at 3/- doz.

**MUIRHEAD S.M. DIALS.** Push button fast, slow, to clear, 3/- each.

**VALVE HOLDERS.** All Ceramic, Octal, 4-pin UX, chassis, 1/-; Johnson 4-pin U.X. Lock in, 4/-; 4-pin jumbo, 2/6; 813, 6/-; 7-pin English Clix, 6d., 4/- doz.

**MICROPHONES.** Weston Ball, £5. Shaftesbury ribbon, £12. Moving coil with push to talk button Nr 13, 5/6. Carbon hand Nr 8 push to talk, 4/6. Throat Magnetic, 3/- . U.S.A. Lip, 2/- . Transformer to suit, 2/- . Shure Carbon inserts, 1/6, with flex and plug.

**THE G3SJ 50/75 TX.** Immediate delivery from stock. Specification: 50w Phone 75w CW. Completely contained rack and panel rig of standard dimensions. Covering 80, 40, 20 and 10. A four section rack of inch angle steel, containing the following units: 1. Power supply section, separate power supplies for the RF and modulator giving 680v for the 807 final and 500v for the class AB2 P.P. 616 modulator. Both supplies are choke input fully bled, and give extremely good regulation. Component parts throughout are by R.C.A., Woden, and Thermador. Fuses on panel, mains on off switch, RF HT switch, mod switch, and pilot lamp, paper condensers throughout, two 5R4 GY rectifiers. 2. Modulator, 6SJ7, with jack for xtal mike input, res. coupled to a 6J5, provision for top cut on panel, driving two 6L6's in AB2 Woden trans. throughout. Controls, gain, top cut, mod/CW switch, mod/CW indicator lamp, metered for anodes of 6L6's. 3. R.F. Section, band switched xtal osc. Either straight pen or tritet. Anode circuit metered. capacity coupled to an 807, also metered, sufficient output available from a 7mc talt to drive the 807 to, full output on 28 Mc, National dials, Hammerlund condensers, Alsimag formers for final tank. Controls, Osc and P.A. Tuning, Osc Cathode and anode switching, key jack, pilot lamp. A further 6" panel available above for incorporation of ant. tuning. Finish grey cellulose, height 36", width 19", weight approx. 2 cwt Record breaking price of £55. Carr. forward. Complete with all valves, key, and interconnecting cables, ready for the air.

AM/14/ART. New Cased. At record breaking price of, £4/10/0. Carr. paid.

## URNLEY · LANCS. Phone 4924

## Benson's Better Bargains

R1355. Unused, cartoned, 63/-, carr. 7/. RF UNITS. Pre-tuned, air-tested to Birmingham frequencies, 35/- VCR97 CRT. Cartoned 35/- Base, 4/-. EHT TRANS. 2.5 Kv 4v1a Vv2aCT. std. input, 28/6; ACCUMULATORS, ebonite, 2v 20a, 10/. R1155 SPARES, write your wants. WAVEGUIDES, flexible, VHF, 3/6. Chassis lead thro', VHF min. Pyrex. 2/6 doz. CRTs 3BP1, cartoned 15/-. DIODES IN22, 3/-.

R1116A. 15/2,000 metres, battery Rx. complete, £7. R3131. For TVs. Coil data supplied. Valves 2x EF54 RF, EF50-Mixer, EC52 Osc. EF50 x 6, VU120 and VU39. EA50. IF. 30mcs. 45/-.

TRANSFORMERS: 610-0-610v 185 ma, 20/-; 6v, 1a (2), 7v 5a, 12/6; 230v to 5-10-15-20-40 Taps, 2½a, 17/6; 0/260-300-340v 120 ma, 10/-; 48v ½a, 8/-; 400-0-400, tapped 250, 300, 350 80 ma, 12/6. 230/115v 3a, 12/6. Above have std. input 50c. RCA. Fully shrouded. Input 190/250v, 50c. Output 400-350-0-350-400 200 ma, 6.3v 6a, 5v 3a, 37/6. DRIVER/MOD. CT Primary Twin Sec, each 1:1-74. Impedance P500/SS3K 7/6.

VIBRATOR PACKS, DC 6v to 190v 80 ma and 6v, 22/6. BC453/4/5 3-gang variables, 3/6; Dynamos, 7/6 (454/5 ONLY). Set 3 coils, 3/6; set 3 IFTs, 5/-. CONDENSERS. OIL-FILLED. -1 2.5 kv, 3/6, -1 600v, 9d., -5 800v, 1/6 all tub. (bakelite). Metal 1 mfd 1.5 kv, 1/6, 4 mfd 1 kv, 4/6, 12 mfd 750 vv, 5/6, .01 1 kv, 4/- doz.

YAXLEYS: 3P3W3B, 3/6, 2P11V, 2/6, 4P2W, 1/-, 4P4W, 1/-, 4P3W Ser., 2/6.

MUIRHEAD SM DRIVE, 4/6. XTALS 5.3 to 6.84, 7.55 to 7.67, 8.132 to 8.79 mcs, 5/6, 8.09, 7/6. 100 kcs, ½ in., 15/-, 3.5 mcs, 7/6. PYE PLUGS (2) on 1 yd. coax., 1/6.

144 mcs CONVERTERS: Valves CV66, EF54 (2), EC52. I.F. 16.5 mcs. with circ., 20/-.

METAL RECTIFIERS 600v 30 ma, 230v 80 ma, HW, each 5/-; 280v 100 ma, CT, 6/6; F.W. 230v ½a, 7/6; 48v 2½a, 15/6; 15v 5a, 17/6. 12v 6a, 22/6. 12v 1½a, 8/-, 48v 1a, 5/6, 70v ½a, 4/-. CHOKES 1 kv. w. 350 ma 7H, 15/-; 50 vv 250 ma 7H, 10/- 300 ohms 100 ma, 4/-. 20H 500 ma, RCA, 15/-.

POTENTIOMETERS. Ceramic 1k ½a, 5/6, w/w, 50 ohm 1/3, ¼k, 1/9; Carbon ¼m 100k 50k, 1/3. VITREOUS RESISTORS. 35k 35w, 30k 25w, 400 ohms 20w, 2.5k 15w, 3k 12w, each 1/-.

BULGIN. Twin fuseholders, 1/-; Ruby indicators, 1/3; Toggles Sp. 1/3; DP, 1/3; Mains (chassis), plug and socket, 2-pin 5a, 1/3. VAR. CONDENSERS. Spindled, ceramic miniatures, 100 pf, 2/-; 25 pf, 1/3; 75 pf D.E., 1/6; 75 pf Twin, 2/6; 160 pf 3-gang, 5/-. Knobs, various, 6/- doz. SPINDLE COUPLERS, std. ¼ in., 9d. Epicyclic drives SM, 1/3. METERS MC 0/50 ma, 6/-; 0/2½a, 7/6; 0/1a, 5/-; 0/30a, 7/6; 0/100ma, 6/-; 0/500 µA, 5/-; 0/250ma Thermo, 3/-; 4 in. 5kv mc, 15/-.

BC348. Trimmer Kits, 3/6; A1 Knobs, 9d.; Resistors, new, 40 values, 50 asstd., 5/6.

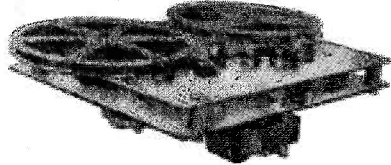
VALVES—5R4GY, 6SN7, 6SL7, ARP12, AR8, EF39, EF36, 6K7M, EBC33, 12SK7, 12SR7, 12SG7, 12AH7, 12C8, 9003, at 5/-; 2051, 6SH7, SP61, SP41, 9006, EF50, 3B24, at 3/6; 6H6, EA50, EB34, 7193, CV6, at 3/-; 5U4G, 5Z4M, 6X5, VR150/30, 6B8M, 6SC7M, 12A6, 6AC7, 12K8' 6J7, 6SJ7, VU133, 2C26, 2X2, 6AG5, EF54, 5Z3, 9002, at 6/6; 6V6G, 6L7M, ECH35, 6K8M, 6F7, 8J7, EC52, CV66, at 7/6; 6J6, 6C4, at 8/6.

CALLERS—Bendix 3 types. TR1196 Rx, No. 21 Set Rx, Indicators 6E, IFFs, Monitor 25, etc.

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

W.A. BENSON, 308 RATHBONE RD., LIVERPOOL 13 STONEYCROFT 1604

EASY TO ASSEMBLE  
EASY TO OPERATE



## THE R. H. QUALTAPE MAGNETIC RECORDER — KIT OF PARTS

- ★ LOW COST
- ★ EASY TO PLAY
- ★ COMPACT
- ★ PRECISION MADE
- ★ CAPSTAN DRIVE

The ideal Tape Recorder for ham use. For home — office — schools — hospitals — Board Meetings, etc. Use it to improve musical and vocal talent — provide synchronised speech and music for home cine — all these and many more with the Qualtape.

TOP QUALITY PLASTIC TAPE (not included in kit) 25/- 1,200 FT. REELS

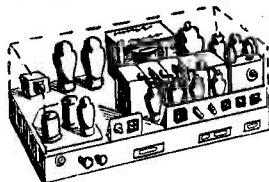
Complete Kit of Parts £12/10/-

R. H. ELECTRONIC SERVICE, 93 BUTTON LANE, SHEFFIELD

TEL: 21690

# RADIO EXCHANGE Co. for Bargains!

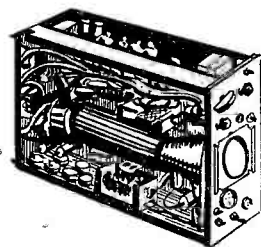
9, CAULDWELL STREET, BEDFORD.



**THE WORLD'S CHEAPEST TELEVISION!** The SLC receiver, with its 4 mc/s bandwidth, is the world's finest unit for television conversion. Two R.F. stages, tunable local oscillator, four staggered IF's, all necessary output stages, and additional stages, which may be converted for time-bases, enable you to build the simplest and finest vision receiver ever offered.

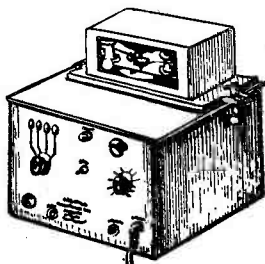
Only a new mains transformer, 4 new coils, 3 pots, two metal rectifiers, a couple of resistors and a VCR97 CRT are required to build this unit.

Our conversion data costs you 3/-, and the SCL complete with 17 valves, 30/-, carr. paid.

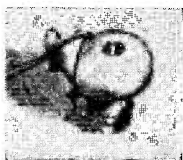


**INDICATOR UNIT I98.** Build your own modulation monitor, or oscilloscope! 3" (VCR138) tube, 4 SP61's, 3 EA50's, a host of pots, resistors, condensers, etc., make this unit one of the greatest bargains ever offered. Brand new, in sealed cartons. £2, carr. free.

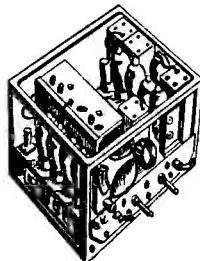
**WIRE RECORDERS.** Really high quality recorders, made by Western Electric, that may be used as a small public address amplifier, and as a recorder. The amplifier, with four stages, and two stages of NFB, incorporates the erase/bias oscillator, and the detachable head, using machine cut gears throughout, includes time indicators and automatic switches. There is sufficient wire for 40/45 mins. quality recording. Input is only 115 watts at 115v 50/60 cps. OUR PRICE, £37/10/-. A few available with slightly damaged heads (contacts, erase coils and spilled wire) but complete with all valves, and motor, etc. ONLY £20.



**NOISE LIMITERS.** A complete kit, with valve and all small parts, and comprehensive instruction manual, which, whilst referring to a particular USAAF receiver, will enable you to fit this sub-assembly to any superhet. GIVEN AWAY at 3/6 each.



**BLOWER MOTORS.** BRAND NEW fractional HP motors, designed for 12 or 24v input, and complete with fan and housing which may be removed to provide a first-class motor. TO CLEAR, 9/6.



**RECEIVER TYPE 21.** This set, the receiver unit of the W/S 21, has been removed from the Tx/PU section, and functions as a superhet from 4.2-7.5 mc/s and as a double superhet from 18-31 mc/s. Complete with 9 2v valves, it is designed for 6v LT input, but can be modified for 2v LT in five mins.! A crash limiter and BFO are incorporated. ONLY 35/-, complete with circuit.

**AMPLIFIER I65.** A five-valve unit, comprising two audio amplifiers, complete with two EL32's, two EF39's, and one EBC33. Complete with circuit, 17/6 to clear.

**TR9 RECEIVERS.** Complete with 6 battery-operated valves and covering approx. 6-9 mc/s. This TRF Rx is capable of really amazing performances, and may be converted for other frequencies. OUR PRICE ONLY 15/-.

**J50 RECTIFIERS.** — 400v at 2 mA — 2/6 each.

**VELOCITY TYPE SPEAKERS.** A really super job, which when loaded with suitable horn is capable of handling up to 50 watts, at really high quality. OUR PRICE, £1 ea.

**RF25 UNITS.** Brand new units, in original sealed cartons, covering 40/50 mc/s. ONLY 16/6.

**A Merry Christmas to you all, VY 73's and lots of DX**

All goods are sold as used unless otherwise stated

PLEASE write your name and address in Block Capitals

**RADIO EXCHANGE CO.**

9 CAULDWELL STREET,  
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**TRANSFORMERS** for the above TV have been specially made as follows : Time Bases and Vision Transformer, 350-0-350v 160 ma, 5v 3a, 6-3v 6a, 6-3v 6a, 6-3v 3a, ONLY 36/- . Sound Receiver Transformer, 250-0-250v 100ma, 5v 3a, 6-3v 6a, ONLY 27/6. EHT Transformer for VCR 97 Tube, 2,500v 5ma, 4v 1-1a, 2-0-2v 2a, ONLY 27/6. Postage 1/6 per transformer. Complete price list of components for this television sent on request.

**TELESCOPIC AERIALS** as used on Canadian 58 Walkie Talkie. 15" in length, extending to 103". Completely enclosed in metal case with dust cap. Only 12/6 (postage, etc., 1/-).

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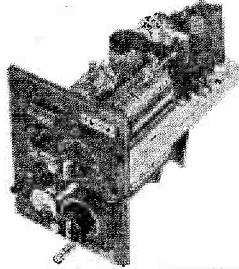
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For 230v, A.C., 50 cycles. Output 600v at 200 ma., smoothed D.C. 6.3v, A.C. 3A. Complete power pack, with 5U4G rectifier, etc., built on metal tray 10 1/2" x 9" x 1 1/2", with grey finish metal cover 11" x 9 1/2" x 7 1/2", 2 chromium handles, red indicator and inspection door, giving access to rect. and pilot bulb.

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Ratio : whole pri. to one sec. 1:2-1 ; 2 approx. Dimensions: Ht. 4 1/2" x 3 1/2" x 3 1/2". Wgt. 6 1/2 lbs. 4-hole fixing.  
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**Type 25 (1196) Receiver**, complete with valves, the I.F. is 465 kcs which with any standard coils makes a fine superhet receiver. As new, £11/3/6, post 1/4.

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**R.C.A.** plate transformers, 2,000v, 2,000v tapped 1,500v 800 mA, input 190-250v 50 c/s, £4, carriage paid.

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V.F.O. by Wilcox Gay Type M.I. 19467A. Uses 807 electron-coupled osc. very stable, well screened. Employs 2 circuits: (a) Using cath. grid, screen, tuning 1-5 Mc/s in 6 bands. (b) Plate circuit as multiplier; tuning 2-10 Mc/s in 3 bands. Incorporates grid choke, grid leak, grid current meter (0-10mA) for intermediate amplifier. Supplied brand new in original cartons, with installation accessories and instruction book. £5, carriage 5/-.

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6H, 200mA, 100 Ω ... 6/-      5H, 120mA, 140 Ω ... 5/-      5H, 200mA, 90 Ω ... 7/6

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5", less trans., 9/6, 5", with trans., 11/6; 6 1/2", less trans., 11/-; 10", with trans., 21/- All brand new boxed, with ali. speech coils. Post extra.

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Type 104. 12v D.C. input, outputs 250v 6-5mA, 6-5v 2-5A. D.C. P.M. Rotary on chassis with cover size 8 1/2" x 4 1/2" x 6 1/2", 6/11 post paid.  
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This Receiver consists of 4 units:—

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The cost of the Kits of Parts is as follows:—

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

Any of these Kits may be purchased separately; in fact any single part can be supplied. A complete priced list of all parts will be found in the Instruction Book.

20 Valves are used, the coils are all wound and every part is tested. All you need to build a complete Television Receiver is a screwdriver, a pair of pliers, a soldering iron and the ability to read a theoretical diagram.

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WE ARE CLEARING THE LAST OF OUR STOCK OF TEST UNITS AT LESS THAN HALF PRICE.

TEST UNIT TYPE 73. Consists of special purpose Oscilloscope that requires only re-wiring and the addition of a few Condensers and Resistors to convert into a standard Oscilloscope, input 230v 50c. A 3 1/2 in. CR Tube and 1 SU2150A, 1 E.B.34, 1 5Z4, 3 S.P.61, 1 V872 and 2 E.A.50 are included. Controls are "Brightness," "Velocity," "X Shift," "Y Shift," "Focus Amplifier "In/out," "Calibrate," "on/off" TX. Price £3/19/6. Complete in Metal Case, Size 19in. x 12in. x 8in. Carriage and packing, 3/-.

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EACH TUBE IS TESTED TO GIVE A FULL-SIZE PICTURE. SUPER MOVING COIL MIKE AND STAND. We have purchased the entire stock of a famous Manufacturer of PA Equipment at a very low price, and are offering a £5/5/- Super Moving Coil Mike, with a chromium plated folding stand to match. The list price of the stand was £3/8/-.

WE OFFER THE PAIR AT 79/6. LESS THAN HALF THE USUAL PRICE.

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A FERRANTI 500 MICROAMP M/C METER, with separate, High Stability, High Accuracy, Resistors to measure, 15, 60 150 and 600v D.C. Scale length 1 1/2 in., diameter 2 1/2 in. 10/- the complete kit.

SECTIONAL WHIP AERIAL. Seven sections which plug into each other making an aerial 14ft. long. Thinnest section 1/4 in. diam., thickest section 1/2 in. diam. Weather-proof enamel. 3/6 each complete.

INSULATED BASE for above, 2/6 each.

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FOR THE RADIO AMATEUR & AMATEUR RADIO

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## Christmas

Every year at this time it is our pleasure to spare those who may glance over this space any discussion of the burning controversies of the moment—and instead to send them greetings and good wishes for the Christmas season.

We now number our readers in all corners and in every country in the world, and some will not in fact be seeing these lines till well on in the New Year. In the realm of Amateur Radio, however, time and space are hardly ever factors of any great significance—for amateurs girdle the earth and are in constant communication. And it is in this realm of Amateur Radio that the true spirit of Christmas still lives.

So it is the season of the year when once again we are happy to have the opportunity of offering our good wishes for their happiness and our thanks for their support to all our readers at home and abroad—from the Editor, Management and Staff of the *Short Wave Magazine*.

Austin Fols/R  
6850  
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*The heading of this article almost suggests a medical treatise on a rare disease. Unfortunately, TVI is no strange malady and is becoming increasingly common. Like many other diseases, there is no one certain cure for it. But the exhaustive investigation of a particularly difficult case as presented here is of great interest for the thoroughness with which our contributor has tackled the problem, the success he has been able to achieve, and the lucidity with which he presents his findings. This article will go a long way to settling TVI for many transmitters in the fringe areas, where TV receivers operated wide open are over-sensitive to every sort of interference.—Ed.*

## Suppression of TVI

### Cure in Detail for a Typical Case

#### PART 1

By F. T. WILSON (G2XX)

---

**I**N view of the information already published on TVI and its cure, it seems at first sight difficult to justify yet another article on the subject. Much of the available information, however, has appeared in American publications and not every amateur has access to these. In addition, the writer feels that some of the difficulties which may be encountered have not been made sufficiently clear. These notes are based on work carried out over a period of six months under conditions of peculiar difficulty and, it is hoped, will assist and encourage others who experience trouble with TVI—more especially those in the so-called “fringe areas.”

Hitherto, harmonic radiation has been of relatively small importance since the amateur bands are in harmonic relationship and little, if any, trouble has been caused to other services. Undoubtedly the problem existed in the London area before the war but was probably masked to a certain extent by the power limitation imposed upon amateur stations.

With the use of power inputs up to 150 watts and the improvements in VHF technique as a result of the war, the problem has ceased to be a purely local one, and many amateurs who might reasonably expect not to have TVI troubles are finding them right on the doorstep.

It will be noticed that emphasis is placed on harmonics as the cause of interference. There is no doubt that this is the *primary* and most serious problem. Tests on a very unselective television receiver have proved that up to one volt from a harmonic-free oscillator operating in any of the amateur bands can be fed directly into the aerial circuit and produce no effect on either sound or vision channel. whereas

considerably less than a millivolt of harmonic energy at the TV frequencies will block the receiver completely.

The purpose of this article is to show that radiation of harmonics in the TV channels can be entirely suppressed. Any reasonably efficient Class-C amplifier is bound to generate harmonics, but there is no reason why these should be radiated. The transmitter at G2XX is a modified Hallicrafter HT4E. Since there are a number of these in use in this country it is felt that the experience gained here may be helpful to other owners of this particular piece of surplus equipment, as well as giving a line of approach to operators of other types of transmitter.

No investigation has been made into the possibilities of single-sideband, NBFM or Class-B linear amplifiers; all these systems should, theoretically, produce no harmonics, and the only case dealt with is the one considered to be most common—the Class-C CW or amplitude modulated amplifier.

#### The Test Conditions

It is felt that the set-up at the writer's station constitutes about the worst possible case for TVI suppression. The location is well outside any fringe area, being about 100 miles from Alexandra Palace, and although measurements in the neighbourhood have given figures as high as  $500 \mu\text{V/m}$ , the average field strength is probably nearer  $50 \mu\text{V}$  and is usually very much lower. The resulting reception thus varies from moderate to nothing at all. On rare occasions a steady picture and good audio signal provide really satisfactory entertainment, but generally the receiver gain is turned up to the limit and the overall result is something which includes the signal from A. P., all



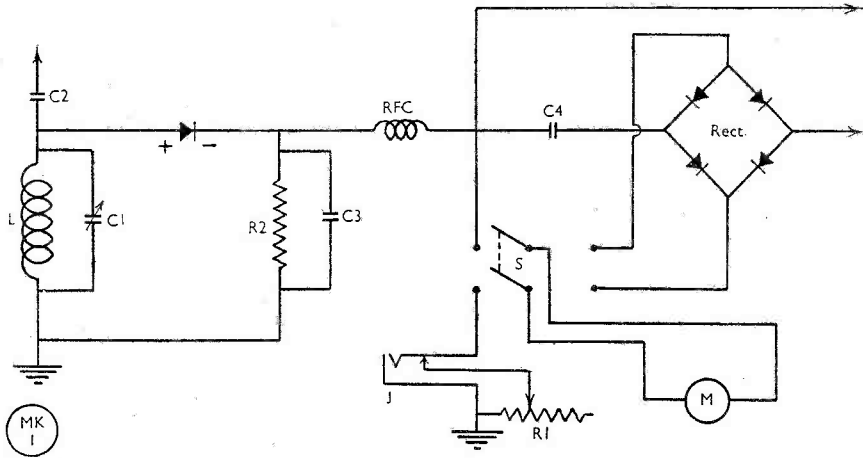


Fig. 1. Circuit of the combination field strength and modulation meter for checking harmonic level.

the cars in the district and any stray amateur harmonics that may happen to come along. At this distance outside the service area the television set owner has, of course, no grounds to complain about interference and the Post Office could not reasonably be expected to take action if complaints were made. But, after all, one has to live with one's neighbours, so at the beginning of this year the writer set about the task of cleaning up harmonic radiation from the transmitter.

A brief description of the layout will be useful. The transmitting equipment is set up in the living room of the top flat in a block of three. In the corresponding corner of the living room of the middle flat and immediately below the transmitter is the television receiver. The transmitting aerial in use at present is a 14 mc wire, three half-waves long, running from the roof of the house to a tree at the end of the front garden and is fed with 600-ohm feeders which come in through the left-hand window of the room. Mounted on a wooden framework projecting from the right-hand window of the centre flat is the TV dipole and reflector. The TV aerial is thus to the right of the transmitting aerial and below it, the spacing between the feeders and TV aerial being about 15 feet. The television set is a home-made affair consisting of two 45 mc IF strips from surplus radar equipment, one for audio and the other for vision. These units have five stages of RF amplification using EF50 valves, a diode detector and cathode follower output. The nominal bandwidth is 3-4 megacycles. The vision section has been re-aligned to receive the upper sideband only, 45 to 48 mc (which

#### Table of Values

Fig. 1. Circuit of Instrument for Checking Harmonic Level

C1	= 100 $\mu$ F, variable
C2	= .001 $\mu$ F, mica
C3	= 100 $\mu$ F, mica
C4	= 0.5 $\mu$ F, paper
R1	= 0.25 megohm, potentiometer
R2	= 25,000 ohms, $\frac{1}{2}$ -watt
J	= Closed circuit jack
M	= 0.50 $\mu$ A meter
RFC	= 2.5mH RF choke
Rect.	= 5mA meter rectifier
S	= DPDT toggle switch
L	= Suitable inductance to cover frequencies required

accounts for the lack of any trouble with the vision channel) but the sound receiver still has a total bandwidth of 1 megacycle although the damping resistors across the coils have been removed.

Working on the basis that the third harmonic from the 14 mc band would produce the worst interference, preliminary tests were made using a frequency of 14,200 kc. As expected, the TV set was completely blocked. The radiating aerial was then removed and a dummy load connected across the transmitter output. No change was noticeable on the TV set. Next, the final PA (push-pull 35T's) was switched off. The vision channel was now clear of interference but the sound channel was still blocked, showing that a strong harmonic was being radiated directly by the exciter. The owner of the set then co-operated by carrying out the tests referred to earlier, using a signal generator to feed fundamental signals of 3.5, 7, 14 and 28 mc into the aerial circuit of his

receiver. No interference was produced which finally proved harmonic radiation from the G2XX exciter to be the cause of the trouble.

**Finding the Solution**

This completed the initial work and a careful survey was then made of the whole situation. First of all, every written work on harmonic radiation that could be found was read thoroughly. This involved the expenditure of a very considerable amount of time studying issues of *QST* as far back as 1936, numerous textbooks from a well-equipped technical library and, more particularly, the recent articles on TVI in *QST*. Notes were compiled and many ideas acquired for dealing with the problem. The time spent was well worth while and a list of the most useful references is given at the end of this paper.

Several definite conclusions were reached. First, it did not seem likely that the fundamental would cause much trouble even with 150 watts input, providing the harmonics were well and truly suppressed. Secondly, a large

part of the harmonic was being radiated directly by the exciter and this would obviously have to be cleaned up first. Finally, some really good and dependable test gear would be required.

The first move was to take stock of the test gear on hand. Available were an SX-28 receiver covering 43 mc on the top range, a TN16/APR4 convertor unit tuning from 38 to 95 mc and a sensitive field strength meter using a 0-50  $\mu$ A meter as the indicator. Unfortunately, no grid dip meter was available at G2XX and from experience since it cannot be too strongly recommended that anyone following the same course should beg, borrow, steal or even make one. Much time in cut-and-try methods would have been saved had such an instrument been used.

The TN16 unit is illustrated in the photograph. The line-up is a 6AK5 RF amplifier, 9002 mixer and 9002 oscillator. The IF is 30 mc and the output is fed into the SX-28. The bandwidth of the converter is not very great but the sensitivity is probably better than that of the average television receiver.

The field strength meter is also photographed and its circuit is as Fig. 1. There is nothing unusual about this with the possible exception of the meter which is 0-50  $\mu$ A. Published articles on this type of instrument generally recommend the use of a 0-1mA or 0-500  $\mu$ A meter. Neither of these is sufficiently sensitive for detecting harmonic currents in chassis wiring.

**Transmitter Points**

As previously mentioned the transmitter is a Hallicrafter HT4E and has been extensively modified. The exciter now consists of a 6AG7 crystal controlled harmonic oscillator driving a 6AG7 buffer/doubler which in turn drives a single 807 in place of the original parallel 807's. The PA is a push-pull stage using 35T's and is link coupled to the 807. In connection with the transmitter one point is

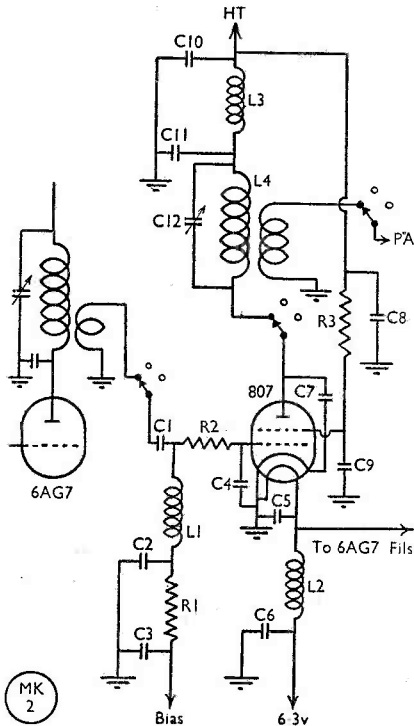
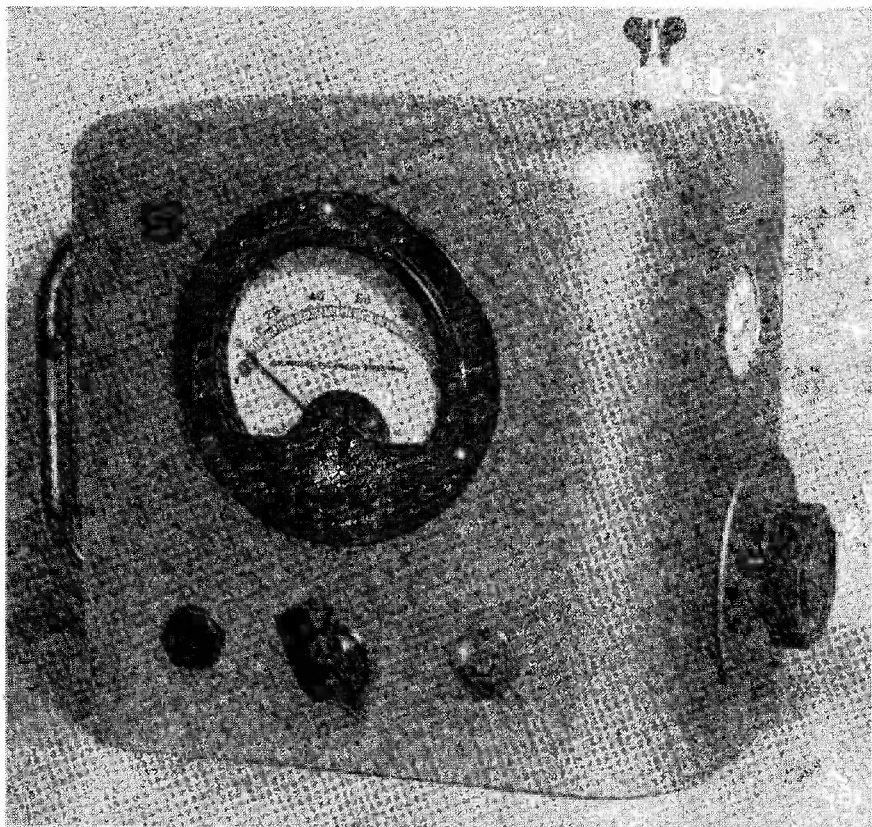


Fig. 2. The 807 amplifier circuit with TVI filters incorporated. Values are given in the table.

**Table of Values**

Fig. 2. 807 RF Amplifier with TVI Filters

- C1 = .004  $\mu$ F
- C2, C3 = .001  $\mu$ F
- C4 = 10  $\mu$  $\mu$ F, ceramic
- C5, C6 = .002  $\mu$ F
- C7 = Copper tube RF bypass (see text)
- C8 = .002  $\mu$ F
- C9 = .006  $\mu$ F
- C10 = .002  $\mu$ F
- C11 = .005  $\mu$ F
- C12 = 100  $\mu$  $\mu$ F
- R1 = 4,700 ohms
- R2 = 50 ohms
- R3 = 20,000 ohms
- L1 = 2.5mH RFC
- L2 = 48 turns 18 SWG enam. on 2-in. length of 1/2-in. diam. tufnol rod
- L3 = 2.5mH RFC
- L4 = 8 turns 16 SWG enam. 1-in. diam.



Field strength meter for the tests discussed by G2XX in his article.

very clear from the experience gained here. The old days of breadboard layouts and hook-ups have gone for ever. Any amateur who constructs a transmitter which is not completely screened is just asking for trouble with TVI. Even with a commercial rig like the HT4E (which is built into a steel case) much time was spent, albeit profitably, in cleaning off a lot of the paint to ensure that all the sections of the cabinet were properly bonded together. This alone accounted for a 20 dB drop in the harmonics radiated from the wiring.

Detailed circuits of the HT4E are not relevant to this article, but those who are interested are advised to read the excellent article in the March, 1949, issue of the *Short Wave Magazine* ("The BC-610 Exciter," by F. E. Wingfield, G2AO).

The logical start was with the crystal oscillator stage. The drive to the second 6AG7 was therefore removed and the oscillator

switched on. No trace of harmonic could be detected on the chassis wiring with the FS meter and nothing was obtainable on the SX-28 or converter until the receiver aerial was closely coupled to the oscillator plate circuit. Coupling the FS meter to the plate circuit produced a reading of 10  $\mu\text{A}$  which remained unchanged when the oscillator was re-wired as a straight pentode oscillator. The use of an RF choke in place of the tuned plate circuit eliminated all trace of harmonic but there was then not sufficient drive for the second stage to quadruple.

The 6AG7 buffer/doubler was next added and tuned to resonance. Although the FS meter showed a reading of 50  $\mu\text{A}$  when coupled to the tank circuit, nothing could be detected outside the cabinet and the harmonic was only just audible on the receiver with the gain turned well up.

Now the 807 was connected, whereupon the

S-meter on the receiver went over to S9 plus 20 dB and stayed there. Obviously, the 807 was producing practically all of the harmonic. Since this valve was operating as a Class-C amplifier on 14 mc an attempt was made to find out whether it was generating the harmonic itself or merely amplifying one produced by an earlier stage. No definite conclusion was reached but the indications were that a lot of the harmonic was developed in the 807 circuit since the grid drive could be reduced almost to zero before any significant drop in the harmonic radiation took place.

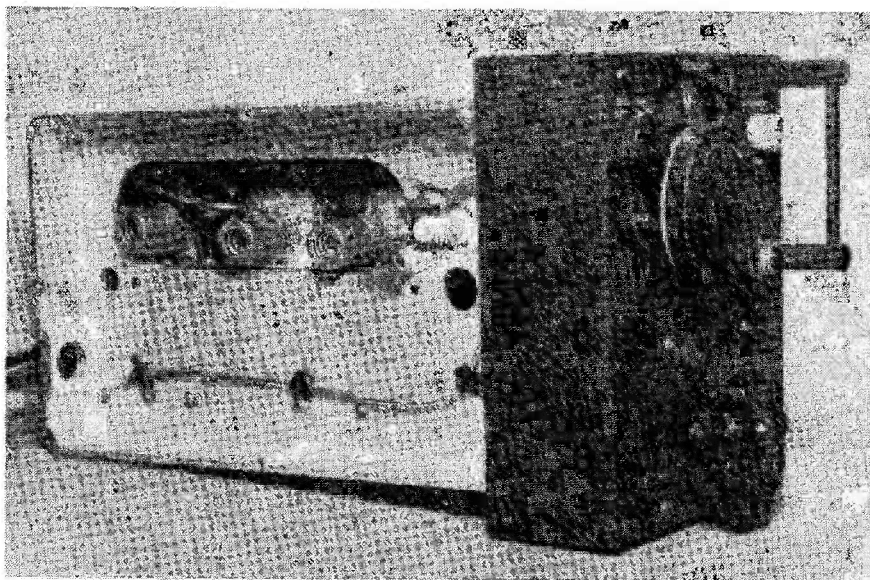
#### Isolating the Harmonic

The next stage was the location of the "hot circuits." All outgoing leads from the exciter chassis are connected to two 12-way tag strips mounted on the apron and from these a cable form runs up and along the chassis, the various leads being connected to the appropriate points. Several attempts were made to filter the leads at the tag strips without success and so an attack was made on the cable form. All unnecessary leads were cut out whilst others were re-routed and covered in copper braid earthed at each end. The net result was about 10 dB reduction in the harmonic. Quite useful, but it didn't mean much since the S-meter still read 10 dB above S9.

Source filtering was then tried by inserting

by-pass condensers at each end of the 807 grid resistor and anode choke, thus forming pi-section filters. This gave no apparent improvement. A 10  $\mu\mu\text{F}$  ceramic condenser was connected directly from grid to cathode forming, in conjunction with the 50-ohm grid stopper, a low-pass filter, and a copper tube RF by-pass condenser was connected directly between anode and cathode. The bias was reduced to 60 volts. All this produced a further reduction amounting to some 10 dB, but the signal on the SX-28 was still S9. Substituting link coupling for capacity coupling between the 6AG7 and the 807 gave no noticeable improvement.

The difficulty which now arose was that the FS meter was not sufficiently sensitive to give any indication of harmonic RF on the chassis wiring, whereas the signal picked up by either the SX-28 or TN16 unit was too great to permit of these being used to locate the radiating leads. However, by checking and re-checking it was eventually discovered that a very slight movement of the microammeter needle occurred when the FS meter was tightly coupled to the filament leads of the PA. At first sight this seemed a most unlikely source of harmonic radiation since the PA was entirely disconnected from the circuit except for the filament supply. Examination of the circuit diagram, however, showed a possible route for



The TN16/APR4 unit, as originally designed for 38-95 mc coverage, employed by G2XX for general reception tests on TV frequencies.

the harmonic. The filament transformer mounted on the exciter chassis has three windings, 6.3 volts for the exciter stages, 5 volts for the HT rectifier filament and 5 volts for the PA filament. All these windings had already been bypassed and an elaborate filter inserted in the primary circuit. It was just possible that the harmonic was feeding back from the 807 heater and so into the PA filament winding. With more hope than expectation, a .002  $\mu$ F condenser was therefore connected from the live side of the 807 heater to the cathode, mounted right across the valve base. The heater lead was removed and an RF choke consisting of 48 turns of 18 SWG enamelled wire on a 2-in. length of  $\frac{1}{4}$  in. tufnol rod was connected between the heater terminal and a convenient tag. Another .002  $\mu$ F condenser was connected between this tag and earth with the shortest possible leads and the transformer lead reconnected to the tag.

The harmonic was again checked on the SX-28 and had dropped to S4, a reduction of 30 dB. *Not* so bad!

After this further reduction was comparatively easy. The TN16 converter unit was used in place of the FS meter, the co-axial aerial lead being employed as a probe to locate further leads which required bypassing. Finally, a point was reached at which no indication could be obtained on the S-meter and tests carried out in conjunction with the owner of the television set showed that no trace of any harmonic could be found on either the sound or vision channel. The final circuit of the 807 stage is shown in Fig. 2.

#### Some Immediate Conclusions

At this stage it was interesting to check the effectiveness of some of the filtering which originally had appeared to do little or nothing towards reducing the harmonic. Removal of even one of the bypass condensers brought up the harmonic and it is quite clear that every condenser and choke shown in the diagram plays its part, however small.

There is no easy way out of this TVI business. A fair amount of patience is needed, but, given this, together with a good supply of chokes and mica condensers and some reliable means of checking the harmonic level, the result is absolutely certain. The only condensers available here were of the postage-stamp mica type. The newer button mica types would be far superior since lead inductance is practically absent, but even midget mica condensers can be quite effective if every care is taken to reduce the leads to the minimum length possible, say  $\frac{1}{8}$  in. to  $\frac{1}{4}$  in.

A good grid dip meter is practically a necessity because with its aid resonant circuits can readily be found. For example, suppression of the 42 mc harmonic has resulted in the

appearance of one at 70 mc which is not more than 10 dB down on the fundamental. At the moment it isn't doing any harm but as soon as time can be found to construct a grid dip meter that harmonic will also be suppressed.

*(Part II of this article will follow)*

#### LIKE MOTHER LIKE SON

Sending us her address for appearance in "New QTH's," Mrs. Paula Sollom, G3GDI, of Farnborough, Kent, mentioned that her son is V57PS. This is one of the most interesting amateur relationships of which we have yet heard. There are fathers-and-sons, husbands-and-wives, and brothers, but this surely must be the first instance of a mother and son separately on the air at opposite ends of the earth, yet held together by the intangible thread of Amateur Radio.



#### LETTER IN THE MAIL

"Who is this bloke Ed with so much to say about technical articles in the Magazine?" We wouldn't know—stranger to us. *(It has frequently been suggested that the diminutive should not be used in this way.—Ed.)*

#### XTAL XCHANGE

Here are the month's offers. Insertions in this space are free—but send in yours on a separate slip in the form shown below, headed "Xtal Xchange—Free Insertion," and have a look at the rules on p. 441, August, respecting entries.

**G3CEG, 5 Byron Road, Cheltenham, Glos.**

Has American 7273 kc crystal. Wants frequency 1500 or 1700 kc.

**G3FZS, 26 Redhill Drive, Fishponds, Bristol.**

Has Bliley 3570 kc crystal,  $\frac{3}{8}$ -in. pin spacing, no certificate. Wants frequency 1800-1900 kc, or near.

**G5UM, Wyldes, Bulls Green, nr. Knebworth, Herts.**

Has QCC Type B crystal 8062 kc. Wants multiplier crystal for Zone G section Two-Metre band.

**G6DZ, 6 Chesilton Road, Fulham, London, S.W.6**

Has American crystals 7050, 7060, 7130, 7140, 7170 kc,  $\frac{1}{2}$ -in. pin spacing, no certificates. Wants frequencies 3500-3575 kc,  $\frac{3}{8}$ -in. or  $\frac{1}{2}$ -in. mounting and 100 kc bar.

**SWL, Rhoslynw, Llanybyther, Carm., S. Wales.**

Has 7300 kc crystal. Wants frequency for CW area 3.5 mc band, or suitable 1.7 mc crystal.

**SWL, 22 Dungiven Road, Derry, Northern Ireland.**

Has 8000 kc crystal, octal based. Wants frequency in 7 mc band.

# A Transmitter for Beginners

## Construction, Adjustment and Operation

### PART II

By J. N. WALKER (G5JU)

AS both are carried out simultaneously, construction and wiring will be dealt with under one heading.

Before commencing the actual construction, it is important to have ready *all* the components, including the "bits and pieces" such as screws, washers, nuts, pillars, wire, and so forth. As previous experience will probably confirm, it is a real nuisance to find this or that is missing just when it is wanted. For this reason, the list of parts has been made unusually complete—in fact, the transmitter has been gone over with a tooth-comb and every item put down on the list.

To take the metal work: The chassis is of aluminium, easily drilled, and the large holes are few in number. Some other metal parts are required—a large screen between the two valves, and small brackets for fixing L1 and the neutralising condenser C10. The metal pillars may be difficult to obtain in the ordinary way and it will then be necessary to make them from lengths of brass or aluminium tube of suitable bore. Some readers will be quite happy to do all the metal work themselves—others will be glad to take advantage of the opportunity offered by G.L.G. Radio to supply the chassis with the larger holes cut and complete with all metal parts, as shown in the list. By doing so, much time will be saved and an immediate start can be made mounting and wiring the components. The finished article will also probably present a better appearance.

Two other metal items are necessary—a mount for the meter and a screen to go round the lower portion of the 807 valve. Both are readily available in the correct sizes from Philpott and again manual labour is saved and a good finish is assured.

The tuning condenser controls are fitted to Masonite panels. For those who are not familiar with it, Masonite is the trade name (there are other varieties) of a hard fibre board, about  $\frac{3}{8}$  in. thick, obtainable from timber merchants. This material is easier to work than

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The first half of this article appeared in our November issue, in which (on pp. 662-663) the List of Parts and Circuit Diagram were given. It is hoped that constructors with little previous experience of amateur transmitting apparatus of this nature will find themselves able, by reason of the detailed treatment, to cope with the building of the unit as described and illustrated. Those with more experience will be content to work from the circuit diagram and will find this in every way an excellent piece of equipment for its purpose.—Ed.

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wood, has reasonably good insulating properties, and, in small panels, is strong and rigid. As can be seen in the photographs, the panels are finished by painting with glossy black enamel, but this is a matter of personal preference.

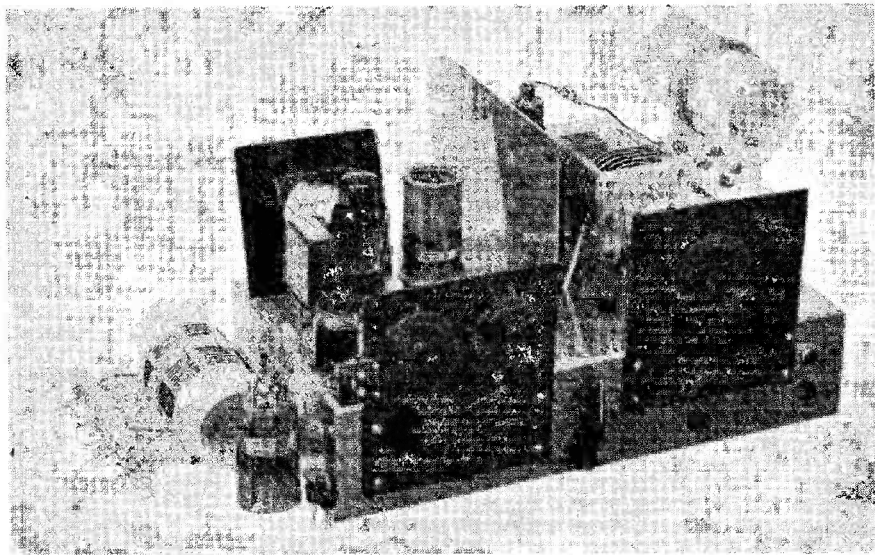
A few words on mounting the components and other items. It is always advisable to place a shakeproof washer beneath the fixing nut—doing so ensures that the assembly remains firm over a long period, and also electrical contact, where applicable, is better than would otherwise be the case. In places, plain washers fitted beneath the head of the bolt are useful—for instance, with bakelite components. In the present instance, plain washers should be used when fixing the V1 valveholder, the L2/L3 coil-holder, the moulded mica condensers and the Masonite panels. Also, too much force should not be employed when tightening up bolts or the material may crack.

To describe the construction in every detail would take up a lot of space. The photographs, studied in conjunction with the notes on various points given later, will enable a near replica of the transmitter to be built without difficulty. The lay-out should be followed fairly closely, but small differences in the placing of the components are unlikely to affect the performance.

Assembly should commence with the 6V6 valveholder and its associated components. Leads of suitable length should be soldered to the pins on the valveholder and coil-holder *before* mounting, not forgetting that R2 and R5 are fitted close to their respective pins. Also remember to drill holes beneath the holders for the following leads to pass through:—(a) LT, (b) screen HT, (c) anode HT, (via L2) (d) two connections to L3. A hole should be made below C1 for the lead to R3.

Coil L1 is a permanent fixture and should be made up early—the other coils can wait until the chassis construction is complete.

The PA stage is fairly straightforward, except possibly, for the neutralising condenser. The brass strip holding this is *below* the chassis—the edge of the latter fits in between the strip and the centre fixing bolt. Thus the



Another view of the prototype for the Beginners' Transmitter, discussed in this article.

rotor (connected to the grid) comes just below chassis level and the small stator plate well above the chassis. The necessary modification to the Eddystone Cat. No. 481 condenser is made quite clear in the small photograph.

The stout lead from the rear contact of the PA coil-holder passes beneath C12 and is soldered to the tag on the rear stator of C12, from which point connections are made to the upper tag of C10 and to the stator of C11. The latter is mounted (on a Masonite panel) alongside C12 and above C10. The HT lead to the centre tap of the PA coil passes through a hole in the chassis.

#### Switch Wiring

At first sight, the switch wiring may appear a little complicated but it is reasonably easy to carry out if due care is taken. The separate sketch (Fig. 5) gives details, also of the connections to the 5-way tag strip mounted near the switch. When completed, the wiring should be checked thoroughly and if possible continuity tests made between appropriate points, at each switch position. The switch specified actually has six poles, two of which are not used.

#### Meter Shunt (R14)

As explained earlier, the value of R14 must be made equal to the resistance of the Pullin milliammeter, so that the latter reads half the actual current flowing through V2 (incidentally, the reading obtained is the sum total of anode,

#### BRIEF DETAILS

The following particulars will be found useful ;

Two 4BA clearance holes (one each end) are used for mounting the crystal holder, instead of the four small holes provided.

The two-pin socket across L1 is bolted alongside C1—both sockets must be insulated from chassis.

R1 is soldered directly across the crystal holder sockets.

C3 is bolted to the chassis underneath C1.

C4 is bolted to the chassis near V1 valveholder.

C5 and C6 are bolted to the chassis one on top of the other) between the coil-holder and valveholder—see Fig. 4.

C8 and C9 are bolted together and to chassis, below chassis and near V2 valveholder—see chassis view.

C16 and C17 are bolted together and to side of chassis, alongside power supply socket.

C15 is soldered directly to filament tags on V2 valveholder.

The 1019 insulator holds one end of R10 and connections to L3 and C10.

Tag strips are used as follows ;—

5-way—one near switch—see Fig. 5 under chassis photograph.

2-way—two for R8 and R9 (inside front wall of chassis), one for R4.

one for R6.

one for R7.

1-way—one for cathode end of R3.

two for the RF choke.

two for R15.

C12 is supplied with mounting pillars, etc.

Spindle of C12 is insulated by flexible coupler, which also assists alignment of spindle to dial.

Only the bush and metal rod portions of the extension control are used.

R12 consists of two 12-ohm  $\frac{1}{2}$ -watt resistors wired in parallel and held between valve top cap and tag on C12.

C13 is actually two .25  $\mu$ F condensers in parallel (fitted to inside front chassis wall).



screen and grid currents, *i.e.* the total cathode current).

The easiest (and safest) way to arrive at the correct value is as follows. In series with the meter terminals place a resistance of about 100 ohms (variable if possible), and a source of DC voltage giving between 4 and 4½ volts—this may be two accumulators or three dry cells, in fairly good condition. A meter reading of between 40 and 50 mA will result—if it can be adjusted to an even value of 40 mA, so much the better. Wind some turns of resistance wire on a former and connect across the meter terminals. The reading will be reduced—if above 20 (or the figure representing half the original current indicated), the resistance of the shunt is too high and *vice versa*. Cut off wire, or make up another former having more turns, until exactly half the original reading is obtained. Then solder the resistor so obtained (fitting copper wire leads if necessary) to the five-way tag strip, as shown in Fig. 5.

**Insulating Sleeving**

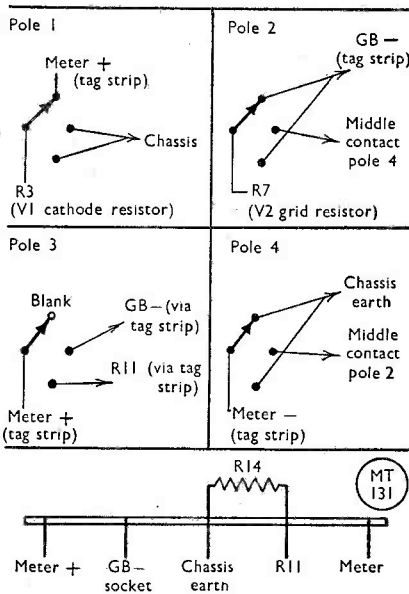
Where bare tinned wire is employed for wiring it is necessary to cover it with insulating

sleeving. If the wires carry only DC or AC, or are on the low potential side of RF circuits, PVC sleeving is excellent. However, this material has high losses when used for "hot" RF leads and its use must then be avoided. The best sleeving for RF wiring is Telcothene, obtainable in the usual diameters (1½ mm upwards), but if this cannot be purchased, oiled silk sleeving will be satisfactory.

**The Coils**

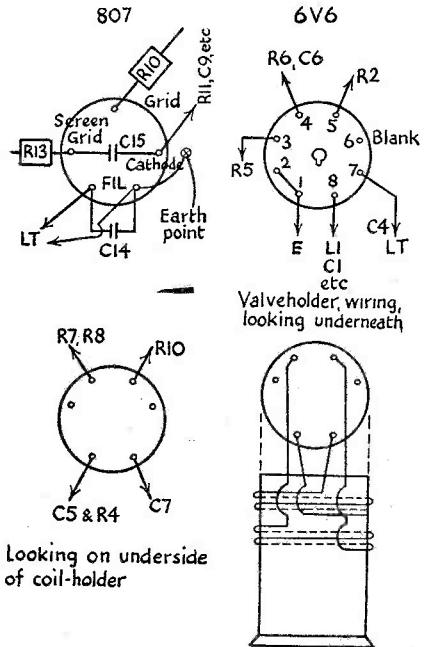
Values are given in the table. The wire gauges are not critical and if wire of the gauge specified is not available, the nearest possible size should be used, preferably erring towards a larger gauge. The 14 mc PA coil shown in the top view photograph is actually wound with 14-gauge wire but this is not too easy to handle and 16 gauge is equally suitable.

Winding L2 and L3 well down the former avoids putting fingers on the wire when changing coils. There is no necessity to cement the windings in place but, if this is done, Dencofix



Connections to tag strip mounted near meter switch

Fig. 4. The meter switch connections ; these must be carefully followed and all necessary details are given in this sketch.

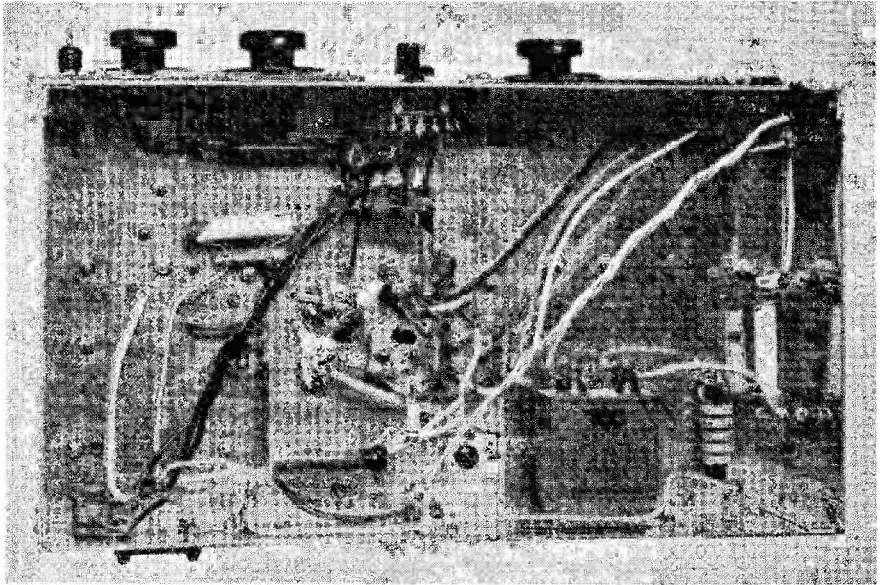


Looking on underside of coil-holder

MT 132

Method of winding L2/L3 coils - looking at underside of base

Fig. 5. Base connections for the valves and the coil winding detail. Turns values for the coils are shown in the table on the opposite page.



An under-chassis view of the Transmitter. Some points about wiring out are given in the text.

or Durofix should be used for the purpose—not bakelite or shellac varnish.

**Power Supplies**

An HT voltage of between 300 and 350 volts will enable the transmitter to be operated at the full 25 watts. The power unit should be of the choke input filter type, to ensure good regulation, and capable of delivering up to 120 mA. A bleeder resistor should be incorporated in the power unit, to prevent the condensers holding a charge.

For preference the LT supply of 6.3 volts 1.6 amperes should be derived from a separate filament transformer, but a winding on the HT transformer can be utilised if the transmit/standby switch is wired in the HT centre-tap lead—that is, between the centre-tap and chassis. Two standard 9-volt grid bias batteries connected in series, are required for PA bias.

**Initial Checks**

First of all, the transmitter should be given a final careful examination to ensure that each and every connection shown in Fig. 1 has been made, and made correctly. It is only too easy to wrap a wire around a tag, intending to solder it later, and then forget to do so, and a check on all soldered joints is advisable.

The transmitter should then be set up for transmission on 7 mc—crystal in its holder, shorting plug inserted in the socket across L1, 7 mc coils in both holders, For the time being,

the balancing condenser C11 should be adjusted to about two-thirds of full mesh—instructions are given later for final adjustment. A 25 or 40 watt lamp (ordinary domestic type for 230 volts or so) should be connected

**Coil Table**

L1 (cathode VD) 8 turns 18 SWG enamelled wire, wound at the top of a 1 in. former. Close spaced.

7 mc { L2 (anode VD) 12 turns 20 SWG enamelled wire, wound close at bottom of Eddystone 537 former.  
L3 (grid V2) 14 turns 24 SWG enamelled wire, wound about 1/8 in. above L2.

14 mc { L2, 6 turns 20 SWG enamelled wire  
L3, 8 turns 24 SWG enamelled wire, about 1/4 in. above L2.

7 mc { L4, 18 turns 16 SWG bare or enamelled wire on Eddystone 1090 former. Centre tapped.  
L5, 3 turns 18 SWG bare or enamelled wire (insulated with sleeving) wound over centre L4.

14 mc { L4, 8 turns 16 SWG wire, centre tapped.  
L5, 2 turns 18 SWG wire.

to the coaxial output socket, either direct or via a length of coaxial cable. The five-pin power plug is inserted and LT and grid bias supplies connected up.

The indicating lamp and the valve heaters should glow and a voltmeter connected between the grid pin of V2 and chassis should indicate a negative voltage, with the meter switch in each of its three positions. The full voltage may not be shown because of the presence of R7.

It is now necessary to carry out a test to ascertain if the final stage is inherently stable. Temporarily remove the 6V6 valve (in a non-oscillating state, more anode current will flow than is good for it) and reduce the bias voltage to that given by a single battery. With the meter switch over to the right, in the position where V2 current is registered, apply HT. An actual reading of about 20 mA (a reading of 10 mA on the meter scale) will be indicated. Rotate C7 and C12 and watch the meter—the needle should remain quite steady. Turn the meter switch to the centre position (V2 grid current) and repeat the process—no reading should show at any positions of C7 and C12. If, in the first instance, variations result and, in the second, some current is registered, the PA stage is self-oscillating. In the unlikely event of this happening, the capacity of C10 should be increased by small stages until complete stability is secured.

### 7 mc Operation

The 6V6 is replaced, the second grid bias battery put back in circuit and the meter switch turned to the left-hand position. On applying HT the meter will probably register a high reading but rotation of C7 will result in a large reduction in the current. The dial of C7 should be set a few degrees *lower* than the position which gives minimum current (rotation in the other direction will cause oscillation to cease abruptly), when it will be found the crystal follows the key very smoothly. The meter reading will be in the region of 25 mA.

On moving the switch to the centre position (but switch off the HT before doing so), a grid current will be observed—the value is not critical and the transmitter will function efficiently provided the grid current is 2 mA or more. Over-driving must be avoided and, if the grid current exceeds 6 mA, the distance separating L2 and L3 should be increased—easily accomplished by gentle pressure on the upper (grid) winding.

Now turn the meter switch to the right-hand position—a full scale reading is probable. Lose no time in tuning C12 to resonance, shown by a dip in the meter reading and by the

Dial Reading	7 mc	14 mc
C1	—	70
C7	45	27
C12	75	33

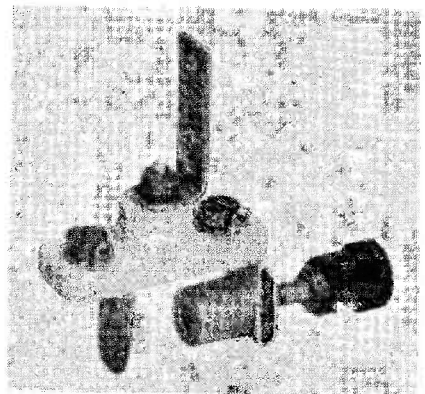
Point	Volts	mA	Volts	mA
Anode V1	200	24	200	24
Screen V1	170	—	170	—
Anode V2	320	70	320	72
Screen V2	200	(5)	200	(5)
Grid V2	—	5	—	5

appearance of a glow in the artificial aerial load represented by the lamp.

The setting of C1 is immaterial during these tests. When operating correctly, a small neon lamp will glow when held against the stator of C7 and glow brightly at either end of the tank coil L4.

### Adjustment of the Balancing Condenser

The two-thirds meshing of C11 mentioned earlier will be found roughly correct for balancing the output capacity of the 807 valve. To check the balance, hold one contact of a small neon bulb to the centre tap of L4, either at the coil-holder or underneath the chassis to the coil end of the RF choke, not forgetting the 350 volts or so present. A slight dull glow may be visible, due to the DC potential. Ignoring this, look for a brighter glow indicating RF—if it occurs, adjust C11 one way or the other (returning C12 as necessary) until the RF glow disappears.



The neutralising condenser, made up for the purpose from standard parts.

### 14 mc Operation

Remove the shorting plug and replace the plug-in coils with the ones for 14 mc. Almost certainly, the crystal will oscillate over practically the whole dial of C1 but the current through V1 will reach a minimum with the vanes of C1 well meshed. Leave the dial at this setting. Rotation of C7 will result in a further reduction of the current flowing through V1 and, on moving the meter switch, grid current should be registered—about 4 or 5 mA. Again, the current through V2 will be high until C12 is adjusted to resonance.

The table shows the meter readings which can be expected to apply to the transmitter when using a crystal at the low frequency end of the 7 mc band.

### Final Operation

The transmitter is now ready for putting on the air. The output is transferred to a separate aerial tuning circuit through any reasonable length of coaxial cable, the latter being terminated at the aerial unit end with a link winding of similar dimensions to those of L5. The design of the aerial tuning unit will of course depend on the type of aerial it is proposed to employ. It is not possible to enter into discussion here of this important subject, which

must wait for a later article. Suffice it to say that a suitable multi-band universal aerial coupler, suitable for this or any other transmitter, is to be described.

A few final points. The transmitter should not be operated in an unloaded condition except for brief periods. Unloaded, the PA anode current will drop to a low value but the screen current is liable to increase unduly—although, in the present design, this effect is reduced by taking the screen voltage from a potentiometer. Still, unloaded operation may cause harm to the 807 valve.

With the aerial coupled up, it should be possible to secure a noticeable dip in anode current when tuning C12 through resonance—the 807 may be loaded up until a current of about 80 mA is registered.

In the key-up position, HT is removed from the screens of both valves. A small current through V1 may still be registered but no current will flow through V2. To prevent wild fluctuations of the meter needle when keying the transmitter, it is suggested that the meter switch be placed in the central position during actual operation. The small flicks of grid current will from a useful monitor to indicate that the transmitter is functioning correctly.

## Audio Amplifiers

### For Communication Purposes

By W. J. CRAWLEY (G2IQ)

**A**UDIO equipment for communication working is quite a different proposition from that used for high-fidelity. In the writer's opinion it is a waste of time and money to use high-fidelity amplifiers for modulating RF amplifiers in communication, *i.e.* amateur band work, for the following reasons:

A good quality amplifier is capable of handling frequencies from between 30 and 20,000 c.p.s. without noticeable attenuation and with a low order of harmonic distortion. The frequencies required for intelligible reproduction of the human voice lie approximately between 200 and 3,000 cycles, with most of the power below 1,000 cycles. For amateur communication purposes, therefore, nothing is gained by designing an amplifier with wide-range response, and considerable simplification of design may be effected by confining the frequency response within the limits required by the human voice.

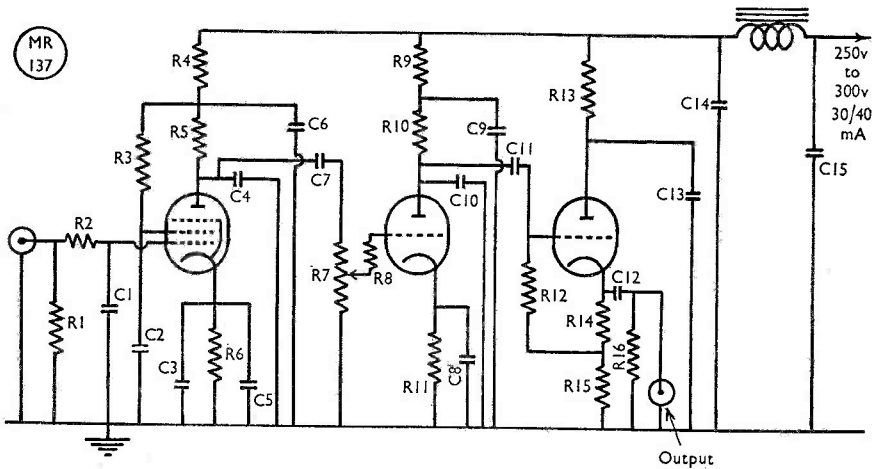
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Our well-known contributor is off his usual beat here, and argues the case for less "hi-fi" and more common-sense in the operation of amateur telephony transmitters. There is no doubt whatever that on our narrow bands, busy with the voices of so many enthusiastic phone operators, what we should aim for is no more than reasonable communication quality. This can only be achieved, other things being equal, by the economical use of frequencies in the audio spectrum, as explained in the article following.—Ed.

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### Advantages of Restricted Low-Frequency Response

If the speech amplifier is arranged so that the frequency response below about 500 cycles is considerably attenuated, the power requirements of the output stage are substantially reduced without seriously affecting intelligibility. In other words, the input level may be considerably increased into an amplifier of reduced bass response without overloading the output stage. This is equivalent to increasing the actual power-output capability of the amplifier. There is another advantage to be gained in that the output or modulation transformer may be reduced in size and cost, because the size is usually governed by the range of low frequencies the transformer has to handle.



Circuit of the speech preamplifier unit recommended in the article as giving adequate quality.

Thus, it can be seen that to use a high-fidelity amplifier for amateur telephony is not only unnecessary but is actually uneconomical and a disadvantage. By cutting out the power-consuming bass frequencies the amplifier will be capable of a higher power output at the useful voice frequencies—those providing intelligibility—which in effect is equivalent to a substantial increase in power. It is possible almost to double the power output of an audio amplifier by intelligent suppression of bass and, believe it or not, in most cases there would be an improvement in the speech from the readability point of view. Most amateur telephony transmissions contain far too much bass, and lifting the general tone of the speech enables the carrier to be filled with useful sounds instead of mumbblings!

#### Suggested Method of Suppressing Bass

It is neither desirable nor necessary to design the amplifier to show a sharp cut-off of the lower frequencies; all that is required is a gradual falling off in the response below 5/600 cycles and this may easily be effected by reducing the size of the coupling condensers in the resistance-capacity stages. The usual size of condenser, assuming a grid resistor of 1 megohm, is between  $\cdot 01$  and  $0\cdot 1 \mu\text{F}$ . In a two-stage amplifier the use of  $0\cdot 1 \mu\text{F}$  condensers with 1-megohm grid resistor results in a loss of less than 1 dB at 10 cycles. The size can therefore be reduced very considerably. For example, on reducing the two condensers to  $\cdot 002 \mu\text{F}$  each, the response gradually falls away from 500 cycles with 5 dB loss at 100 cycles and 12 dB at 50 cycles.

#### Table of Values

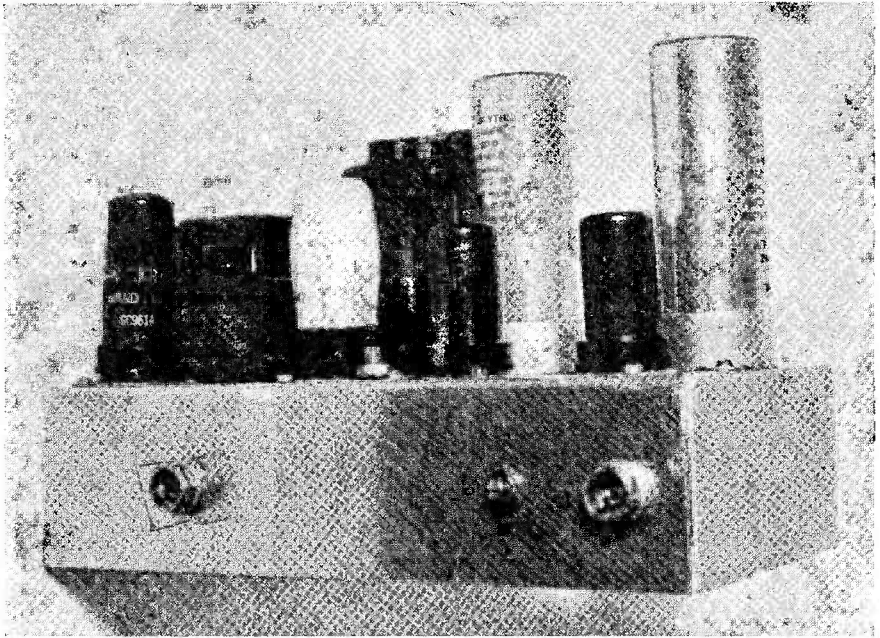
##### Circuit of G2IQ's Audio Preamplifier

C1	= 300 $\mu\text{F}$ mica
C2	= $0\cdot 5 \mu\text{F}$ 350 volt paper
C3, C12	= $\cdot 01 \mu\text{F}$ mica
C7, C11	= $\cdot 001 \mu\text{F}$ mica
C5	= $50 \mu\text{F}$ 12 volt
C6, C9, C13	= $3 \mu\text{F}$ 450 volt
C8	= $1 \mu\text{F}$ 250 volt
C4, C10	= $\cdot 002 \mu\text{F}$ mica
R1, R16	= 500,000 ohms, $\frac{1}{2}$ -watt
R2, R10	= 100,000 ohms, $\frac{1}{2}$ -watt
R3, R12	= 1 megohm, $\frac{1}{2}$ -watt
R4, R9	= 33,000 ohms, $\frac{1}{2}$ -watt
R5	= 220,000 ohms, $\frac{1}{2}$ -watt
R6	= 1,200 ohms, $\frac{1}{2}$ -watt
R7	= 1 megohm potentiometer
R8	= 47,000 ohms, $\frac{1}{2}$ -watt
R14	= 500 ohms, $\frac{1}{2}$ -watt
R15	= 10,000 ohms, 1 watt
R13	= 5,000 ohms, 1 watt
V1	= 6SH7
V2	= 6C5 or 6J5 or 6SJ7 triode-connected
V3	= SP61 triode-connected (VR65) or VR66

Read from  
left to  
right

The use of two  $\cdot 0005 \mu\text{F}$  condensers would result in approximately 12 dB loss at 200 cycles and 20 dB at 100 cycles, and whilst the latter case may seem rather drastic it is doubtful whether on the male voice the ear would notice much difference between them.

For all practical cases it is sufficient to arrange the resistance-capacity coupled stages of the amplifier so that the sum of the capacities used divided by the number of condensers equals  $\cdot 0005$ . Thus, in a 4-stage amplifier the condensers need be no larger than  $\cdot 002 \mu\text{F}$  with a grid resistor of 1 megohm, and increased in proportion as the grid resistor is reduced.



General view of the unit described by G2IQ.

### Advantages of Reduced High-Frequency Response

Turning now to the other end of the musical scale it is necessary to point out that reduced high-frequency response is advantageous not so much to the user as to the other occupants of the particular band on which he is working, particularly those in the immediate vicinity! Most amateurs agree in theory that in consideration of the restricted width of the amateur phone bands to-day, it is of the utmost importance to keep the signal as clean and as narrow as possible. Yet there appear to be more broad, splashy signals about than ever.

Increased activity and competition for DX make it necessary to get everything possible from the rig, but that is no excuse for spreading across the band. It is not generally realised that audio amplifiers with extended high-frequency response result in a much broader signal from the modulated Class-C amplifier, and moreover the excellent high-frequency response of such amplifiers increases the ability of the RF amplifier to emit side-band splash and splatter. In addition, a level response amplifier is more susceptible to harmonic distortion than one with restricted high-frequency response. Should there be any non-linearity in the audio amplifier a high

order of harmonic distortion will be developed, resulting in a signal from the Class-C stage at least as broad as twice the frequency of the highest frequency audio harmonic.

It is therefore the writer's contention that it is not only unnecessary to use a high-frequency response beyond 3/4000 cycles, but also selfish and inconsiderate. Most of the high-intensity peaks that cause temporary over-modulation and consequent chatter lie in the higher frequency range, and a very considerable reduction in interference and in the width of the signal may be obtained by judicious high-note cut. This may be achieved either in the low-level stages of the audio amplifier through by-passing the plates of the audio valves with condensers, or in the high level stages by using suitable mica condensers across primary and secondary of the modulation transformer. Still further improvement may be obtained by the use of clippers, but that is outside the scope of this article.

### Reduction of RF Feedback

Most people seem to have trouble with RF feedback at some time or other. Even if there is no obvious feedback howl, there is often a metallic quality about the speech making it sound as though the microphone were stand-

ing on a cymbal, which denotes that the transmitter is working on the threshold of feedback. It is caused by RF getting into the speech amplifier, usually at a low level stage, but the cure is often elusive. Complete screening of the audio equipment is always advocated, but is not often practicable. The first cures to be tried are mica condensers from grid to earth, mica condensers across cathode by-pass electrolytics, grid stoppers, RF chokes and thorough screening of the low-level stages of the preamplifier. If these expedients do not work, thorough screening of the entire modulator is indicated. In extreme cases, even that does not effect a complete cure and the whole speech amplifier has to be moved away from the rack housing the RF amplifier.

There is an easier and better way, however, of eradicating this bugbear. The feedback is almost certainly entering the speech amplifier either at the first or second valve. It is therefore only necessary to remove this portion of the modulator away from the main rack; but to do this requires a long lead which, to avoid picking up RF itself, has to be at low impedance. Thus, it is usually assumed that a step-down transformer at the end of the preamplifier and a step-up transformer at the end of the coupling line, are required and naturally most people jib at this extra expense and decline to install the preamplifier separately.

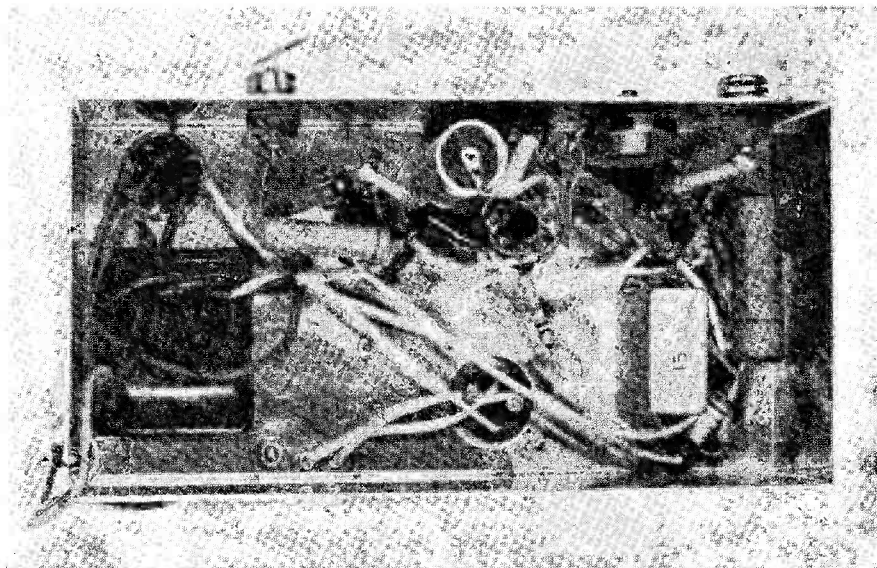
There is, however, a very simple method of

stepping down the impedance to the line without having to resort to transformers, namely the cathode-follower. This is essentially an output stage in which the input voltage is applied in the conventional manner between grid and earth; the plate is earthed with respect to both input and output signals, and the output is taken from between cathode and earth. The cathode-follower gives a stage gain of less than unity, but its output impedance is considerably less than that of the same valve working in the normal mode and depends on the mutual conductance. The output impedance may be determined from the formula:

$$R_o = \frac{R_p}{\mu + 1}$$

so that the higher the slope the lower the output impedance. Thus, a valve with a slope of 10 mA per volt will have an output impedance of approximately 100 ohms. This is an ideal impedance for coupling audio frequencies through coaxial cable, with negligible attenuation.

To avoid RF feedback, then, it is only necessary to remove the first two valves of the modulator proper, construct a small preamplifier using as output stage a cathode-follower, and couple the output to the input of the modulator *via* coaxial cable. The latter may be run around the house if necessary



Underneath the "communication" audio amplifier discussed by G2IQ.



with complete freedom from bother. We thus save two transformers and in most cases completely eradicate any tendency to feedback. An ideal valve as cathode-follower in this application is the surplus VR65, triode connected, or the VR66, the output resistance of each being in the region of 120 ohms.

#### Preamplifier Incorporating Suggestions Made

A small preamplifier incorporating the improvements suggested in the foregoing has been in use at the writer's station for some time and it is interesting to note that nobody has apparently noticed the severe curtailment of high and low frequencies. Much comment has been made, however, on the narrowness of the signal and the lack of splatter, even with full modulation.

Metal single-ended valves are used in the first two stages. This enables a clean layout to be adopted and eliminates the need for a screening box as all the parts likely to pick up RF are under the chassis. The photographs clearly illustrate the layout and it is only in the first stage that special precautions may be taken in wiring. The first stage should be treated as would be an RF amplifier at VHF ;

that is to say, all earth returns should go to one point on the chassis, the grid lead should be carefully isolated from the rest of the wiring and the grid stopper enclosed in shielded sleeving. The heater wires are twisted together along the chassis and one side of the heaters is earthed at the first stage. The volume control, which should be of the metal-cased type, is mounted exactly opposite the 6C5 holder so that the grid lead from this valve is only about 1 in. long. It is advisable in an amplifier of this type to suspend the resistors and condensers in the wiring rather than to attempt neatness by using mounting panels which only result in longer leads than are necessary.

There is sufficient gain from the pre-amplifier to allow of its output being fed straight into the phase-splitter valve grid in the conventional push-pull Class-A or AB1 modulator using normal types of microphone of about - 50/60 dB output, or into the phase-splitter valve of Class-AB2 driven amplifiers. It may be necessary to cover the underside of the set with a metal plate in cases of bad feedback, but the writer has not found this necessary in his own case.

#### BRITISH OLD TIMERS' CLUB

The following nine new entrants bring the Membership Total up to 172 :

- G2CZ** C. T. Atkinson, 15 Greenland Avenue, Humberstone, Leicester (1912).  
**G2DZ** Basil Hall, 11 The Inlands, Daventry, Northants (1929).  
**G2GM** F. D. Cawley (*ex-G5FC*), 58 Thurlow Road, Torquay (1929).  
**G2JU** E. J. Pearcy, Spindrift, Marine Drive, West Wittering, Sussex (1920).  
**G2YN** F. S. Adams, The Croft, Wilton, Salisbury (1921).  
**G4RK** G. Smith-Clarke (*ex-G2PV*), Shenandoah, Stoneleigh Road, Gibbet Hill, Coventry (1904).  
**G4RS** W. E. Corbett (*ex-FE1ES and G5WG*), 17 Tudor Avenue, Bebington, Cheshire (1924).  
**G5VF** C. J. Matthews (*ex-G5DI*), 14 Salisbury Avenue, St. Albans, Herts. (1925).  
**G5DF** J. D. Pinchbeck, 32 Church End Lane, Tilehurst, Reading, Berks. (1929).

Operators of British nationality are reminded that they are eligible for membership of the British Old Timers' Club if they were first licensed for open-aerial working not less than 20 years ago and are still active to-day.

It is hoped shortly to announce date and other details for the next Old Timers' Dinner, to be held in the spring of 1950. In the meantime, the new Membership Register is in course of preparation, and will be circulated to everyone on it as soon as we receive it from the printers. The last was issued just twelve

months ago, but since then membership has increased considerably and there are also many changes of address.

If you hold an OT call, let us know as soon as possible, as the closing date for the new list (for circulation) will be December 31.

#### CARDS IN THE BOX

The calls following are those in respect of which we are holding QSL cards in our Bureau, as we are without the postal addresses of the stations named. Please send a large S.A.E., with name and call sign, to BCM/QSL, London, W.C.1 (which by itself is a full and sufficient address from any part of the world) and the cards will be forwarded on the next G clearance. And if you would like your call sign to appear in our "New QTH" feature, please mention that at the same time ; it ensures eventual publication in the *Radio Amateur Call Book*.

G2APR, 2FGQ, 2HHX, 2HJQ, 3AA, 3AID, 3ANN, 3AXS, 3BOF, 3BPX, 3CJP, 3CNJ, 3COK, 3CRS, 3CXY, 3CZC, 3DGN, 3DJP, 3DRF, 3DRG, 3DZI, 3EAD, 3EAJ, 3EEZ, 3EFT, 3EYN, 3FDT, 3FLO, 3FNL, 3FRF, 3FRW, 3FSG, 3FTI, 3FXA, 3FYX, 3GAG, 3IW, 6JF, 8BI, G13FOB, GM3FXJ, 3GBZ.

# DX COMMENTARY

## CALLS HEARD, WORKED & QSL'd

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

ANOTHER mighty interesting month has passed, and once again a commentator's chief difficulty is that of knowing what to comment on, out of so much worth discussing. All bands, from 28 to 1.7 mc, have been bustling with activity; conditions have been extremely good all round except for occasional dull periods which have not lasted long. In short, the 1949/50 season, up to date, is far, far better than the prophets would have dared to expect.

It seems that there must come a time when we cease to comment upon individual stations who have worked this and that, unless their haul includes something of more than passing interest. After all, what most of our readers expect from a Commentary like this is some useful news of What, Where and When in the way of DX. Having found that out, their next interest lies in the sphere of cut-throat competition, which is probably a healthy sign, although there are some who don't agree.

### Competitive Stuff

The idea that we sketched out last month for a completely new form of contest has certainly brought in a great deal of comment. Broadly speaking—in case you don't remember—the scheme was that a two-hour period should be nominated, during which everyone would work the best DX they could find, on one set band. Scoring would be on a sliding scale according to the "DX-ness" of the DX, and each contestant's *five best* contacts would be taken to compile the final score. Put like that, it sounds beautifully simple, but there are those who would introduce complications at once!

But let us summarise the replies. G3AKU (Benson) thoroughly disagrees with it; he enjoys a contest, not for the thrill of working an AC4 and a ZK2, but for the joy of rolling off snappy contacts as fast as possible—although he agrees that most contests run for too many consecutive hours. He also suggests that it is essential, during a contest, for contacts to be as *short* as possible—just an exchange of numbers—or else a rare DX station will only have time to make a few

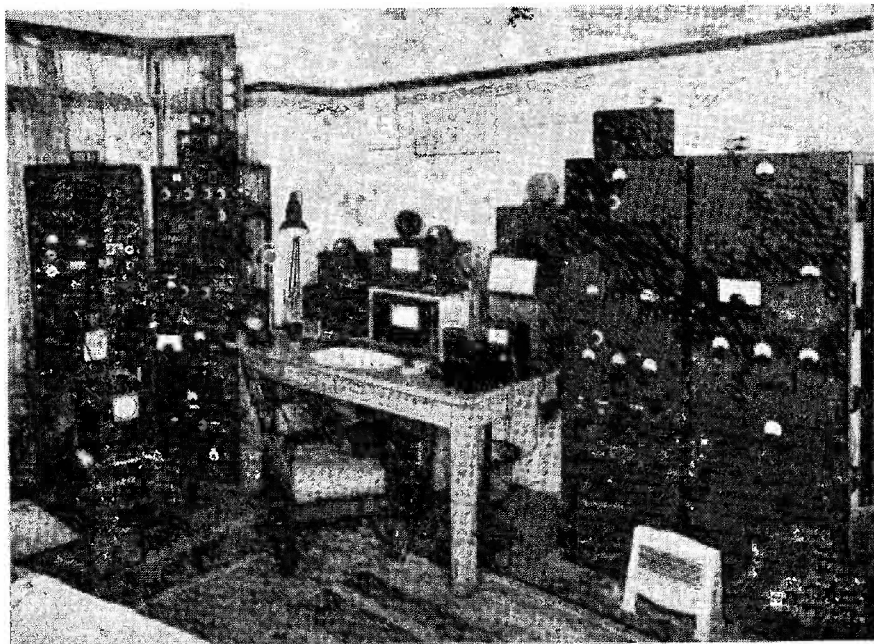
contacts. Well, our come-back to that is that in general we agree with his opinion, but there are already more than enough contests of that kind for the many who like them; we are aiming at something *different*, for those who don't.

G2HIF (Wantage) suggests that two hours is too short a period, as local DX conditions vary so rapidly and so often. He rightly adds that people in a location which is poor for some particular direction would possibly have a thin time, for the two-hour period might possibly be good only for that direction. So he thinks a contest should be long enough for world-wide DX to be possible. G3XT (Saxmundham) is completely in favour. G8VG (Dartford) also thinks it good. G2FSR (Chingford) agrees that the long-drawn-out contests are becoming too much of an endurance test, rather than a test of operating ability, although he adds that the competitive side of Amateur Radio is in danger of spoiling what ought to be a friendly hobby.

G6TC (Wolverhampton) is all in favour; so is GM6IZ (Aberdeen). G2HKU (Sheerness) would like it if it would do away with all other types of contest, but as it wouldn't, he doesn't agree! G8OJ (Manchester) describes the usual contest as "exchanging numbers with a few hasty meals between, and at the end a giant headache adding up the scores."

G3ANH (Stockport) thinks two hours too short, and suggests that there should be a limit on the type of aerial used, so that the operator with a suburban garden is not walked over by somebody with a rhombic. G3ENH (Birmingham) wants to see the power limited to 25 watts; G3DCT (Brentwood) would like to see three categories, for 10, 50 and 150 watts; and G3APV (Bradford) says that the more humble type of station, with 25 watts and an inexpensive receiver, together with an aerial dictated by circumstances, would not stand a chance.

There are many more letters, nearly all of them agreeing with the scheme in general, but all suggesting a pet restriction concerning aerial, power, receiver or something.



In our issue for January 1949 we published a photograph of the station of G6XJ as it was early in 1929. Here is the G6XJ (Birmingham) of to-day. It can almost be described as an "all-Eddystone station"—and well it might, for G6XJ himself is Sales Director of the well-known firm manufacturing Eddystone equipment.

Now, at the risk of being unpopular, we wish to say that this seems all wrong. If you restrict the aerial to a 67-ft. Zepp, someone who can only use an indoor aerial will say "Why not indoor aerials only"? If you try to rule out communications receivers, unless home-built, someone else will say "Why not keep it to 0-v-l only"? It's true that the fellow with 25 watts and a poor aerial cannot hope to beat the chap with 150 watts and a beam—but *has he any right to expect to?* Should not his object be put up as creditable a show as possible, considering the equipment available? In fact, must *every* race be run on a handicap basis?

GM6IZ makes a delightful *reductio ad absurdum* by saying "I think the log-making would be far too easy. Suggest that the score should be calculated from:

$$S = (an_1 + bn_2 + cn_3 + dn_4 + en_5) \left( \frac{\alpha \times 100 \times \tan x \times 1 \times 25}{y \quad g \quad p} \right)$$

where  $n_1$  = No. of contacts in Class 1.

$n_2$  = No. of contacts in Class 2, etc.

a, b, c, d, e, = Points for multiplier in different classes;

z = Handicap set by sponsor (.01 - 1);

y = No. of countries already worked on band;

x = Degrees of aerial orientation N. or S. of E. or W.;

p = Input power.;

g = Gain of aerial as given when you are bragging about it."

And *that* seems to us to be about the last word on the subject. We will defer to the QRP/QRO contention by running one event for 150 watts and another for 25 watts but in any case we shall have to wait for awhile, because January is full of BERU and February will probably bring its own fill of ARRL Contest. Watch out for a date, or dates, in March!

#### The DX on 14 mc

G2FSR becomes the first station to make the score of 200, as recorded in our listing of Zones Worked; all the others who have attained the dizzy height of the double century have been too modest (or something) to say so in these columns. Congratulations, G2FSR, not only on the score but on coming forward to claim it!

G6TC remarks that 14 mc is very interesting round about dusk. One day at 1700 GMT, he heard ZL, W6, W7, KM6 and FR8. G2VJ (London, S.E.22) has collected F9QU/FM8,

## FOUR BAND DX

Station	Countries Worked					Power
	7 mc	3-5 mc	28 mc	14 mc	Total	
W2RDK	134	33	34	116	180	?
G6BS	102	28	4	165	172	150
G5GK	89	11	36	126	187	150
G5FA	87	17	61	125	143	35/150
G6QB	68	34	127	170	192	150
G3ATU	61	26	95	170	178	10/150
G2VD	59	27	96	161	168	150
G8VG	54	21	26	107	122	60/75
G5WC	50	1	12	119	121	45
G8VB	49	51	61	124	144	120
ZB1AR	41	29	43	94	106	100
G3FNJ	40	21	63	113	133	150
G8IP	38	13	65	114	130	3/150
G6BB	38	19	34	110	123	10/70
G6TC	38	11	13	78	90	20/65
G3DO	37	21	103	158	188	150
G2HKU	35	1	8	92	100	4/25
G4QK	33	19	3	103	107	150
G2WW	32	21	85	163	176	150
GW3CBY	27	17	8	43	58	15/30
G8KU	26	9	51	130	140	120
G2YS	26	21	25	111	122	150
G2BJY	24	4	96	74	128	25
G3FGT	24	22	23	72	84	25
G3EIZ	23	36	15	39	54	25
G2DHV	20	18	4	79	84	25/60
G8QX	18	12	73	111	131	150(P)
G3ACC	13	20	5	103	112	150
G2VJ	13	4	55	79	99	? (P)
G2HIF	9	6	80	42	97	150(P)
GM6LZ	2	5	25	102	104	150

OY2RD, YK1AC, VS7BR, HI6EC, VQ8AX, and KH6IJ—all on phone.

New ones for G3DO (Sutton Coldfield) were CR5UP, CR6AI and HE1HY on phone, and FK8AC on CW. G2WW (Penzance) managed EA8RB and ET3AF, as well as VQ8AX (all phone) and has his card from

CR5UP confirming the first British contact with Saõ Thomé. Nice, too, because CR5UP called G2WW—and gave him S9+30 dB.

G3NBE (London, N.W.3) remarks on the wonderful way the VP8 stations came in during October. He raised VP8AI, VP8AN, YK1AB, KG6KJ, CR7BZ and KL7OL—all between 1800 and 2200. He also worked ZE2KY, with G3DUR at the other end; 'DUR passed his 73 to all the chaps in Leicester.

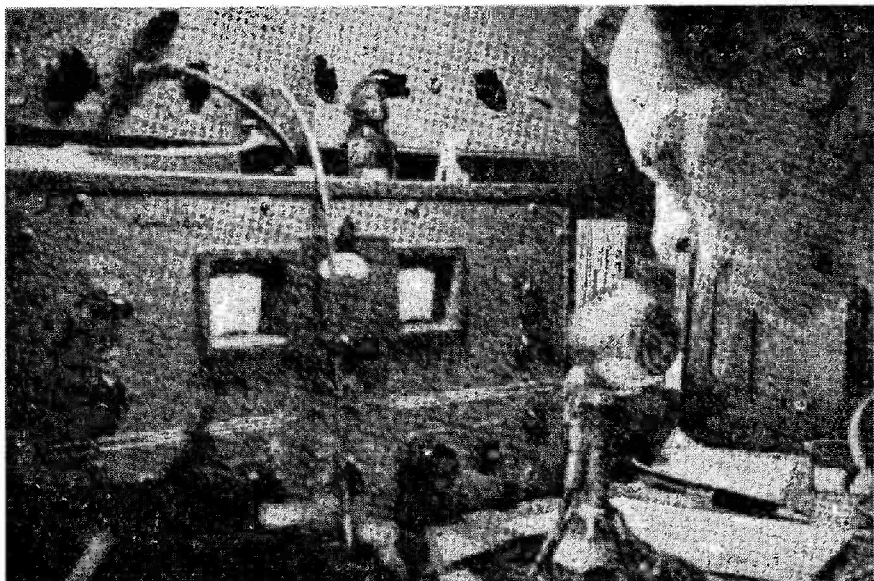
Strangely enough the next letter is from G2SO (Leigh-on-Sea), who is sailing with his family for Southern Rhodesia in January, and hopes to be on with a ZE call next year.

G3FXB (Hove) has had his first month on the air, and on 14 mc he has scored 14Z and 37C with 25 watts and an 807. The XYL is taking Morse lessons, so he regards her as "sewed up"! New ones from G8OJ (Manchester) include IS1FIC, ZD9AA, TA3GVU, XZ2FK and FN8AD. G3ATU (Roker) collected FK8AC, CR10AA, PK5EE and VQ1CUR; with the arrival of AC4RF's card he now has his 40 Zones confirmed. G3FNJ (London, N.W.6) also joins the 40's, having worked VQ8AX and UAØKFD for his last two.

## All the World on Ten

There have been many days recently when 14 mc has just been a mess with lots of short skip, although Ten has been bringing in practically everything. In general it is safe to say that 28 mc has been the better DX band of the two for consistency and interest. Here are some comments: G3DO raised FF8PG, MP4BAE (phone) and FE8AB (CW); G2WW, never having raised KG6 before, proceeded to work KG6ET, 6DI and 6SF. Other nice ones were CR9AG, HP2RO, FF8PG, VQ5ALT and some "wanted" States. His funniest event of the month, though, is worth reporting. He worked AR8AB in his "best French," and AR8AB responded and then put a friend on the mike. 'WW went back with "Merci beaucoup, mes chers amis" only to be greeted with loud laughter because the "friend" was a recording of G2WW's own transmission, played back! As 'WW says—"I know one often fails to recognise one's recorded voice, but that I should fail to recognise my own French accent is unbelievable."

G2BJY (West Bromwich) wielded his 25 watts to some purpose and collected HC2OT, PK3WH, MP4BAE and ZS9F—all new ones. Another nice one was W1MIJ, with 10 watts to a quarter-wave whip on his car. G3ATU heard a station signing LY1XX, who, when asked by a W for his QTH, said, "Look in the 1938 call-book." LY, in those days, was Lithuania, so we think he's just another



VQ3KIF, one of the DX men, is also W3KIF/MM and VQ4KIF. He signs the /MM call when on board *S.S. Robin Wendley*. VQ3KIF went into action from Dar-es-Salaam early in May last, the first stations worked being G6ZO and G5HB. After that, QSO's were made at the rate of about ten an hour, the assisting operators being G3CHN and VQ4IMS. VQ3KIF is active for several weeks every three months or so, and will always QSL on receipt of your card

phony. Unusual ones heard by 'ATU were VE8SI and 8SF.

G2HIF (Wantage) collected a few nice new ones, and quotes MP4BAE, TA3GVU, KZ5's ZD2RGY W3EDV/PK3, ZS9F, PK4DA, CR5UP, HH2W, ZP5BL—all on phone. He adds that ZS9J has left ZS9 and ZS9F is departing shortly, so that country will be unrepresented again.

#### Department of Low Moans

Several of these this month, but it does do people good to get them out of their systems, so here goes. G3CJM (London, S.W.17) says that several correspondents broadcast advice to the amateur world through this feature, but fail to practise what they preach. He quotes an incident in which one very well-known DX operator behaved like the worst type of spiv. Yes, we have rather too many "signposts"—they point the way but don't go there. (Are you one?)

GM6RV (Ardrossan) heartily dislikes people who work BK without signing, particularly during Phone Contests. As it saves practically no time and can cause a lot of ambiguity, it ought to be ruled out. Our licences don't allow it, anyway, if you read them literally.

"An XYL" (Birmingham) takes a very poor

view of our habit of mentioning stations heard, but not worked, as, for instance, by G3ATU last month. She castigates these as anglers' stories about "the one that got away," and regards them as pure waste of space. And here we disagree violently; we think that what most people expect of this feature is an indication of the DX that is workable (even if not *worked*). Hence, if someone fails to raise some outstanding DX, readers would just as soon hear about it as if he *had* raised it; it's not a question of boasting or rushing into print, surely, but just a log of what goes on.

G2HIF thinks it is time that someone protested about "Traffic, BC-610's, and ops. who lack the Amateur Spirit." He was working a nice DX station, but when he went over for the third time, there was said station talking to a DL4 who had simply sat on 'HIF and pinched the QSO. Several other G's have suffered this, and it is nearly always achieved by BC-610's with anything from 600 watts to a kilowatt.

Our own private moan: Have you noticed the terrific number of diathermy-like noises that fill the DX part of the 28 mc band when the W's are coming through in full cry? Our theory is that these noises are *all* parasites radiated by the high-powered W's above 28.5 mc. If they aren't, what *are* they? They

are definitely 60-cycle "notes," and not 50.

### We've Got Them on the List

This month's pet aversions :

- (1) The man who sends "Well, o.m., I'll cum back to you now" on CW.
- (2) The types on 7 and 3.5 mc who say, "No, I don't go in for DX—it's so easy these days it isn't worth it." Funny thing, but we never seem to have heard them working any. And—for the CW types—it strikes us that they wouldn't get much, judging by their standard of operating.
- (3) The phone operator who chatters for about 15 minutes and then asks the other man to "Keep it short—have to QRT very soon."
- (4) The similar type who, working a DX station, says, "Well, there's sure to be a queue for you, so I musn't hold it. Oh, by the way, I forgot to tell you that . . ." and then goes on for another 20 minutes. (Yes, it *does* happen.)
- (5) Practically all the notes one hears from EA and 4X, in particular.

### News From Overseas

A hot one for the Top Band Boys : Ken Ellis of HZ1KE will be on 1.7 mc every week-end, 0200-0230 GMT, looking for G's. He will also be on 3.5 mc by arrangement. His QTH is 5,000 ft. up and "vy FB"; he uses about 60 watts but hopes to QRO later.

G2UW is at Habbaniya, Iraq, but doesn't see any hope of putting YI on the air because of the Civil Authorities' attitude to Amateur Radio. He visited ZC1AZ, who is 2,000 ft. up

with a grand climate. At Habbaniya they had a "cool" summer and didn't go above 115 deg much this year !

VS1BX, ex-G3DFI, is now VS1BX again, and hopes to be on the air before long. XZ2FK (Rangoon) says the contacts one makes out there are quite fantastic ; since last June he has had 2,000 of them, in 106 countries. All QSO's to date, he adds, have been QSL'd.

VS1DB, who is also G3CMP, has not yet been heard, because he is still building his transmitter. But he hopes to be on all bands from 28 to 3.5 mc with about 50 watts. He did a bit of listening on 3.5 and heard VK5KO (589) working a G, and also heard LA7Y at 339. Turning to 14 mc, 'DB asks why G's spend so much time calling CQ DX ? He says that out in VS1 they hear them do this and then go back to a European, and they can frequently copy both sides.

G3AXU (ex-ZC6JZ, XADZ) will be on again shortly from Tripoli as MT2DZ and MT2DZ/A—the latter call being used portable/mobile on 28 mc from a Humber station wagon, fitted up for the purpose ; the input under the /A call will be about 20 watts, with 80 watts for fixed station working on 14 and 28 mc with MT2DZ.

From ST2KR (Khartoum) comes an apology in the matter of QSL cards ; having



overlooked ordering them when at home, he has found it impossible to get any printed locally. However, a supply is now on the way out and as soon as they arrive ST2KR will get down to the job of QSL'ing 100 per cent. And ZB1AR (Malta) says that having just sent off 200 cards, he has run out of them, so further QSL's will be delayed.

### General Patter

G3ATU says that LZ1ID has turned out to be genuine—he QSL's on a Radio Sofia card with his own dope superimposed. Also he adds that VK3FH and ZL2GX both vouch for CR10AA.

Referring to 'ATU's tirade on DX-chasers who ride on the back of someone else, G2HKU says, "Why confine remarks to F8EO?—some very well-known G stations are even worse."

On the subject of 28 mc DX, G2HIF asks why so many G's only tune from 28.5 mc upwards? One VE told him he had given up replying to G's because of this habit. And whenever you work a W above 29 mc he is invariably very pleased and surprised. W6MI (San Diego) remarked to us in a QSO the other day that he loves to hear a European station announce what frequency he is going to listen on; he tunes straight up there and invariably gets a QSO. So please state "tuning from 28.5 down" or "from 29.5" or "listening between 29 and 29.7"; the other chap will like you, and you will probably benefit.

G3BFV (H.M.S. *Flowerdown*, Hants.) has returned from South Africa, where he was ZS1GV, and makes a few remarks about things down there. He used to hear "G's galore" on 7 mc but never raised one, although he had all the W districts; 14 mc, he says, was often spoiled by ZS's working each other; 28 mc was patchy, just as it is anywhere else. In general, 'BFV thinks that G's in the Midlands and up to Northumberland were easier to work than those down South, GM's were rarely heard at all, only two GW's were logged the whole time, but GI's were quite good.

Last month's "Here and There" paragraph about the OM/XYL combination of G3DQC and G3FSZ brings a letter from G8HX (Mansfield). He says that G3DBF and G3FCH, both of Mansfield, are OM and XYL—both ex-Wireless Operators (RAF) and CW types.

We have not had many scores through for the CQ DX Contest, but the highest yet heard of comes from G2VD (Watford) with a total of 142,332; 337 QSO's with a multiplier of 174! This, for a one-operator station, sounds pretty good to us.

## TOP BAND LISTING

Starting August 1, 1949

Station	Counties	Countries
G4LX	42	7
G2YS	41	7
G6AB	39	8
GM2HIK	38	7
G6ZN	32	8
G2HDT	32	7
G2AJU	31	7
G6QB	30	8
G5XF	30	4
G3ALE/A	28	4
GW3CBY	27	6
G3NT	24	4
G3CZU	24	3
G2DHV	10	1

### Phonetics Again

G2QY (Pinner) adds a note to last month's remark about inane "phonetics"—he actually heard someone say "The handle is John . . . J for John, O for Oboe," and so on. We can hardly believe it. But it reminds one of the gink named Lomax who used to say "L for Lomax, O for Omax, M for Max, A for Ax, and X as in Lomax."

G3FIC (Liverpool) tells us that he has a card from SP5AC, marked "QSL No. 4," and giving details as "Rx: SX28; Power, 85 watts; QTH, Box 320, Warsaw." So it seems OK.

The second op. at G3CVG (Wakefield) queries a station signing 4X4CV, who roared through at S9 on 7 mc, round about 1600 one day. Band conditions were queer, and the signal had a slight flutter and sounded like DX. Can anyone give a check on this, please? The date was November 1.

### Top Band News

Activity up Top has been at a very high level, helped by two contests and excellent conditions. Compare the Counties Worked List with last month's and you will see what we mean. G6ZN (Horbury) worked OK1ZB and OZ1W while using one watt—his QRO is only 3 watts! G2YY (Berwick-on-Tweed), one of the veterans of the 1.7 mc band, was heard by G6QB (Bexhill) at high noon on a Sunday, which seems like good daylight DX.

G2AJU (Ipswich) worked twenty countries in

3½ hours, using 2 watts, and would have had the eighth if a GC station had stayed on. G2CZU (Bath) has rolled in 24 counties since October 1. G3ALE/A (Darlington) finds local activity almost negligible and is glad to give people their first QSO with Co. Durham. He has moved into a QTH with a 50-ft. pole (30 years old) outside his bedroom window, and a bound volume of *QST* for 1924 lying about the house!

G3AGQ (Benson) has worked six countries and about 30 counties during a few odd evenings since the end of October. G6AB (Holland-on-Sea) describes conditions as excellent, but says there is a lack of GW stations and an absolute rarity of GI. Also no GD station has been heard since early in the year.

**DX QTH's**

EA8LS	Box 346, Las Palmas, Canary Islands.
EQ3SAM	Sam Harrison, 509 Weldon Ave., Oakland, Calif.
HC2JR	Box 1304, Guayaquil, Ecuador.
HP1TS	Box 913, Panama City.
KP4AA	Box 515, Rio Piedras, Guantanamo Bay, Cuba.
KP6AH	U. C. Beebe, C.A.A., Palmyra Is., via Hawaii.
MP4BAE	c/o International Aeradio, Ltd., Bahrain Islands, Persian Gulf. ( <i>Station at Sharjah.</i> )
MT2BFC	Bill Wheeler, G3BFC, c/o B.O.A.C., Tripoli.
MT2DZ MT2DZ/A	} P.O. Box 260, Tripoli, North Africa.
VE8MB	
VP2GK	c/o Pan American Airways, Grenada, B.W.I.
VP6SD	Box 252, Barbados, B.W.I.
VQ5ALT	Box 27, Entebbe, Uganda.
VQ5PBD	Box 444, Kampala, Uganda.
VS1DB	Sgt. White, C.M., No. 2 Sgts. Mess, RAF Seletar, Singapore.
VS1DZ	GHQ, Royal Corps of Signals Regt., Singapore.
XE2W	Morelos Ote 816, Monterey, Mexico.
XZ2SY	Box 833, Rangoon.
YU3A	Box 180, Ljubljana, Yugo Slavia.
ZB2I	E. D. Wills, 9 Naval Hospital Road, Gibraltar.
ZC6DZ	R. H. Lemon, American Consulate, Jerusalem, Palestine.
ZD1PW	Lungi Airport, Freetown, Sierra Leone.
ZD4AE	G. R. Stewart, A.B.A. Ltd., Box 26, Tarkwa, Gold Coast.

**ZONES WORKED LISTING  
POST WAR**

Station	Z	C	Station	Z	C
<b>Phone and CW</b>			<b>Phone and CW</b>		
G2FSR	40	200	G2YS	36	122
G6QB	40	192	ZB1AR	36	106
G3DO	40	188	G2AKR	34	116
G5GK	40	187	G3ACC	34	112
G3ATU	40	178	ZD4AM	34	102
G2WW	40	176	G4QK	32	107
G2VD	40	168	G6TC	32	90
G3FNJ	40	133	G2SO	31	93
G8IP	40	130	G2DHV	31	84
G5FA	39	143	G3FGT	30	84
G8KU	39	140			
GM3CSM	39	132	<b>Phone only</b>		
G3CNW	39	130	G3DO	37	151
ZS2AT	39	124	G8QX	35	131
G5MR	39	118	G2VJ	34	99
G8VB	38	142	G2HIF	30	97
G3DCU	38	128			
G6WI	38	128			
G6BB	38	123			
G3CVG	38	122			
G3BNE	38	112			
GM6IZ	38	104			
G2BJY	37	128			
G5WC	37	121			

G5UM (Knebworth) comments on the good conditions and adds that he operates in a CW net every Monday from 1930 onwards. All are welcome. They start on 1878 kc, but dodge about the band "to give the participants experience in quickly parking on others' frequencies." G2HDT (Burton-on-Trent) runs a 6V6 CO with 6 watts, and a 14 mc Zepp with feeders strapped; with this combination he has worked 32 counties and 7 countries.

**Eighty Metres**

There is again a great scarcity of 3-5 mc news, but G3EIZ (Liverpool) tells us that he has worked CT3AB, FA8JO, KP4HU, MD2GO and YO3RI, in addition to W's and VE's. He raised VE1BV at 2315 one night and, at the other end, held on to W1KJO until 0815 one morning. He also hears the FA8's working ZL. G8VG reports working EA8MC and ZB1AR, and W1IM (Boston, Mass.) sends a list of exactly fifty G's worked on 80-metre phone.

**Forty Metres**

Also a surprising lack of interest in 7 mc, considering that conditions should be getting very good again by now. G5FA (London, N.11) mentions SV0WJ, VP4TAB and F9JD (Corsica), the latter giving him a new country for any band. G8VG worked EA8AN. And G2AJU wielded his QRP to some effect, using just over half-a-watt of phone. With this he



worked GM, ON and most parts of G, and with half-a-watt of CW he raised SM and F. Great stuff, this QRP! We really *must* find a QTH that has no mains, otherwise the temptation would be far too great. (We suffered from no-mains during our first five years on the air, and have never really been the same since.)

#### And the Season's Greetings

No one has yet worked out how many kWh are devoted, about this time of year, to lengthening all QSO's to include the mystic formula "Mri Xmas and Happy New Year," but by the time you read this it will be starting to happen all over again. So let us sign off by wishing you *all*—QRO or QRP, Key-basher or

Phone-hound, DX-chaser or Local-natterer—the very best of Christmasses and the most prosperous of New Years. May all your QSO's be uninterrupted by Spivs; may all the DX you call come straight back to you (unless we are calling it too!); may your PA never die on you; and may Amateur Radio continue to mean to you everything that it can and should.

And, finally, in the words of a PY friend of ours, "We put to you our 73 very strong."

Next month's deadline, December 13. Don't be late! And send it all to DX Commentary, *Short Wave Magazine*, 49 Victoria Street, London, S.W.1.

## Eighty-Metre Phone DX

### An American Comment

By J. H. FERGUSON (WIIM)

"EIGHTY" in the States is considered as that part of the 3500 to 4000 kc band where 'phone is *not* permitted. The 'phone segment is known as "Seventy-five." All operators may use CW over the entire band, whereas only Class "A" (advanced 'phone) licenses are permitted AM 'phone between 3850 and 4000 kc and NBFM between 3850 and 3900. Our Canadian friends to the north can operate 'phone from 3750 to 4000 kc, but in general use the low 100 kc to avoid American QRM.

Wattage per kilocycle is higher on 75 at night than on any other 'phone allocation—except perhaps from 28·5 to 28·6 mc during weekends. Average power is 500 watts. Hundreds of amateurs who have no opportunity for daytime operation start beating the key or blasting at their mikes on 80 and 75 after supper. These lads are joined by hundreds more moving up from 14 and 28 mc, when these bands begin to close. From 7·00 p.m. to 12 midnight (EST) the competition is ferocious! Many regional groups have taken to round-robin operation to minimise the bedlam and ensure solid QSO's.

#### European Reception

Europeans start to come through on the East Coast, during the fall (autumn) and winter, sometimes in broad daylight, and mostly about supper time here, as dusk falls. At this hour, as the Gs are enjoying their nightly round tables, the Canadian 'phones and American CW nets have not started the evening's operation. Very often DX signals are most readable about this time, although

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This note from the other side of the Atlantic will be of great interest to many readers, particularly those who would like to find a new outlet for DX enthusiasms—working Canada and the States on 80-metre phone, for instance.—Ed.

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not so strong as later in the night. While many excellent early DX contacts could result under these conditions, the writer has listened to dozens of British round-tables, between 3685 and 3760 kc, and with signals R5 and S8, only to hear the DX go QRT with "cheerio" and never a "look about the band"! This latter has discouraged many patient VE's and W's, who sit by and bemoan lost DX contacts.

Others, however, have persevered and run up a surprising number of countries on this band. The excellent work of Hal Simmons, G8VB (including his 'phone WAS on 80 during 1947-48), has encouraged many "G's" to look for the W's and VE's. It may be worthy of note that G8VB has been worked from Boston during each of the last 18 months. The power in use at WIIM is 20-100 watts, and many other Europeans have been worked.

#### Propagation Factors

Certain interesting characteristics of this DX have been observed here. In the first place, a complete darkness path is not always required. A further oddity is the lack of slow fading. The most remarkable feature is the absence of flutter on DX at times when local kilowatts are unintelligible because of Aurora Borealis disturbances.

To sum up, the major obstacles to DX on 75/80 'phone (in the winter season) are VE 'phone and W CW QRM. Conditions are best from 2250 to 2359 GMT, and from 0300 to 0700 GMT. Solid two-way skip and clear channel operation are most likely in the early morning, British time. Signals suffer some attenuation inland from our coast, and often

are stronger in Virginia than in Massachusetts. VE and W stations looking for DX in the 3700 to 3800 kc spectrum will usually be heard between 3760 and 3860 kc.

When the monotonous inconsistency of Twenty begins to pall, or the daylight limitations of Ten bother you, try your hand at 100 miles-per-watt on 80 'phone DX.

## FIRST CLASS OPERATORS' CLUB

On the eve of the completion of its third post-war year, the Club can record an active membership exceeding 250, with members in many parts of the world. For the FOC, it has been a year of noteworthy achievements extending over all amateur bands.

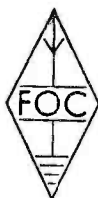
### Marathon Contest

W. H. Windle, G8VG, worked the necessary fifty members in the remarkable time of 60 hours, and so wins the Cup for 1949. Two years ago, the contest took about as many weeks as this one took days. Competition was very keen—G8VG had very little sleep during the time—and a high standard of operating was evident throughout the period of the Marathon Contest.

Activities of FOC members to be noted this year are the Field Day success (both G6GB and G6NB are members); extracts from the *Magazine* showing that in the Four-Band DX Table approximately 30 per cent. are FOC members, the same applying to the Two-Metre listings; and in Zones Worked the first four in the list are FOC. And at the other end of the scale, we have members doing good work in the centimetre range, one, at least, having helped to make early history.

### Circular Letters

G5PS is now sending these out regularly once a month. To ensure members getting their copies, it is essential to send in any changes of address without delay, so that the register can be kept up to date.



President :

GERALD MARCUSE, G2NM

Hon. Secretary :

Capt. A. M. H. FERGUS, G2ZC

Asst. Hon. Secretary :

J. E. CATT, G5PS

C/L No. 28 contained six foolscap pages, so domestic news is not lacking! As now produced, the C/L's carry "Members' News" as a feature, as well as items concerned with the more serious side of the Club's activities.

A new reprint of the Rules is available to any member wishing to have this—please send a penny S.A.E. to G2ZC.

### The Club Dinner

The FOC Second Annual Dinner took place in London on Friday, November 25, with many members present who had made special journeys for the purpose of attending. A full report will appear in the next Circular Letter issued. The evening was a great success, though it was generally agreed that a Saturday would be more convenient for most members.

The activities of the Club and the achievements of its members were reviewed in detail, and presentation of the

Club trophies made to the winners. The evening was further enlivened by the appearance of several members of the Five-Band Club, who were also dining not far away. It is quite certain that the FOC Dinner has become firmly established as an annual affair.

### Election Notice

In accordance with the Rules of the First-Class Operators' Club, the following are declared elected to active membership :

P. R. Smith, G3DYQ (Lancing) ;  
R. W. Denniston, W4NNN (Falls Church, Va.)

R. C. Spenceley, KV4AA (Virgin Isles)

R. C. Kenny, G3AAU (Enfield)

R. W. Bailey, G2QB (Watford)

J. F. Winter, G3BQM (Leasingham, Lincs)

J. R. Keys, ZL3GU (Christchurch, N.Z.)

J. F. Salisbury, G8GB (Weston-super-Mare)

E. H. Chaudri, G3DCS (Ipswich)

J. Garner, G2BGG (Liverpool)

S. C. B. Cousens, G3CPZ (Portslade)

J. R. Macpherson, GM3XO (Cupar)

P. G. West, G3EFF (Bristol)

D. de Vries, PAØDV (Amsterdam)

J. Kroon, PAØIF (Haarlem)

A. R. George, G2MX (East Kirkby)

W. Salquin, HB9BX (Schaffhausen)

S. C. Johnson, G3DGM (Stour-bridge)

D. Brabner, GM3CXE (Cupar)

All correspondence on matters other than the C/L's should be addressed direct to Capt. A. M. H. Fergus, G2ZC, 89 West Street, Farnham, Surrey, and on the C/L's (only) to J. E. Catt, G5PS, 33 Hempstead Road, Kings Langley, Herts.

# Automatic Morse Key

## Ingenious Electro-Mechanical System

Devised by J. P. BROMLEY (G3EPR)

THE semi-automatic, or "bug," key as it is appearing on the market to-day is deficient in one respect—namely, the ability to produce automatic dashes as well as dots. Although very fine instruments, they have this inherent failing which renders them incomplete from a designer's point of view. It may be remedied, however, by the inclusion of a multi-vibrator circuit consisting of one or two valves which require both LT and HT supplies. There are also available expensive electronic instruments which fulfil the requirements by being completely automatic, but they are beyond the financial reach of most amateurs. The key about to be described is an extremely simple arrangement which may be built in under half an hour from components which appear in every amateur's "spares" box.

As may be seen from the accompanying diagram, the circuit is simplicity itself, consisting of two relays, two paper condensers, one resistance and a gas-filled diode.

### Circuit

Concerning the components, one which gave most trouble to find was the relay A1, it being required to operate on a very small current. After a search, an ex-Government relay of the SPDT type was chosen, having twin operating coils similar to the kind used in earphones, each of resistance 1,000 ohms in series. The armature carries a contact strip, and is supported by a single-leaf spring, the tension of which may be adjusted by means of a thumb-screw. The strip engages with two screw-adjusted contacts, one in the "up" or de-energised position A1/1, and one in the energised position A1/2. After careful manipulation of the contacts and spring tension, it was found possible to close the relay on a current of 1.5 mA.

The rest of the components were conscripted from spare gear lying idle in the workshop. Valve V is a voltage-stabilising gas-filled diode, type CV188. For the benefit of future experimenters the characteristics are as follow :—

Maximum striking volts	140
Normal working volts	100
Quiescent current	4 mA
Maximum cathode current	10 mA
Minimum cathode current	1 mA

This valve has not been seen advertised. A

There is still enormous interest in the technique of Morse operating as distinct from the business of radiating a CW signal. Various devices have been put forward to make keying easier and more certain. Some of the results leave much to be desired, but here is a clever and original idea which should do much to improve bug-key working.—Ed.

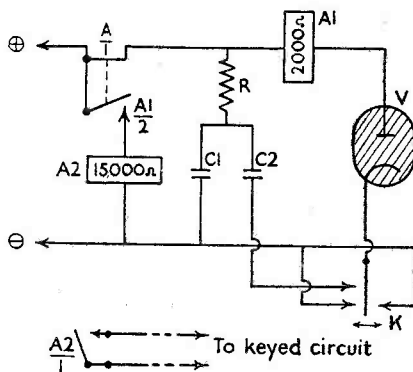
similar valve may be used with advantage having a striking voltage in the region of 250v.—a more usually available supply.

C1 and C2 are ordinary paper condensers, 250v. working, of 5  $\mu$ F and 8  $\mu$ F respectively.

An improvised control, consisting of a short length of spring steel tape anchored horizontally, making contact with small screws held in brackets, was originally tried. This was found to give trouble in the "dash" position due to the steel tape being pivoted off the rear contact by excess pressure applied in front of the forward contact. This condition was remedied by fitting a small compression spring on the end of the screw forming the rear contact. A normal "bug" key which has been modified would be very suitable as the control unit.

### Operation

The principle of operation is easy to follow, viz., the instrument is connected to a supply



Circuit arrangement for the auto-key suggested by G3EPR. Values are: C1, 5  $\mu$ F; C2, 8  $\mu$ F; R, 2,000 ohms; V, CV188; K, Bug Contents.

of about 120v. via the terminals marked + and -. The contact A1/1 of relay A1 is closed, and hence the condenser C1 is charged up to the full 120 volts. This voltage is applied to the anode of V through A1 and resistance R. When K is pushed to the right-hand side,

the neon strikes, since the cathode circuit is now closed. This allows C1 to discharge through R, A1 and the neon to the negative line, in doing so, energising A1, closing contact A1/2, and breaking A1/1, thus disconnecting the 120v. supply from the circuit, and at the same time closing the circuit to the energising coil of A2. C1 continues to discharge through V and associated circuit until the discharge current falls to below 1.5 mA, when A1/2 opens again and A1/1 closes, allowing C1 to charge through R up to the striking voltage of the diode. Provided that K is still closed, *this cycle is repeated until K is centred.*

When K is moved to the left-hand position, two contacts are made connecting one side of C2 to the negative line, together with the cathode of V. The same cycle of events as already described re-occurs, except that now both C1 and C2 discharge together through R, A1 and V. As there is now a greater storage in C1 and C2, the discharge is of longer duration, closing A1/2 for a longer period, thus forming the dashes.

This method of introducing an extra capacity to increase the length of discharge period was chosen in preference to any other for the following reasons: The resistance of the discharge circuit is already in the region of 4,000-6,000 ohms, depending on the state of ionisation of the diode V. In order to produce a sufficiently short discharge to operate a dot, a fairly small capacity had to be used. Any larger valve would result in a period too long to operate a dot. In order to produce a longer period to operate a dash, an increase of resistance R could have been utilised. The resistance of the discharge circuit is already

fairly high, and although any increase of R would certainly increase the time of discharge, it would at the same time also reduce the current flowing to a value which most probably would be insufficient to operate A1.

#### Output Circuit

A2 is of a simple single pole, make-and-break type, the contacts A2/1 closing when its coil is energised. The circuit to be keyed is connected across these contacts, so that when A2 is energised, the keyed circuit is completed. As A2 operates in harmony with A1, it follows that whenever the condenser(s) discharge through A1, A2 is also energised *via* A1/2, thus closing A2/1 for the duration of a dot or dash.

The precise relationship between the time of discharge  $t$  and the resistance value R is complicated by the fact that the resistance of the diode varies as a function of the current through it, which may again be expressed in terms of  $t$ , R and C.

Small changes of the overall speed of transmission may be accomplished by switching in extra capacity across C1 and C2 in the ratio of 1 : 2 respectively. If this ratio is adhered to, the relative duration of dots and dashes is kept constant, thus overcoming one of the major difficulties encountered with an orthodox "bug" key. Speeds ranging from about 12 to 18 w.p.m. have been used with complete success.

The mathematical aspect of the changes occurring is not of great importance, and it is quite sufficient to say that the instrument is capable of providing a really professional touch to the CW operator's signals.

#### CLUB PUBLICITY

We are occasionally informed that our "Month with the Clubs" section can serve no useful purpose and is of interest only to the individuals who feature in it. But such an opinion overlooks some of the facts. First, a healthy local club movement is of vital importance for the general progress of Amateur Radio, since it is through the Clubs that so many new recruits are drawn into the fold. Secondly, the club movement itself must be sustained by regular and reliable publicity if it is to attract support. Thirdly, many clubs are doing work of the greatest value in bringing Amateur Radio to the notice of a wider public—we refer in particular to those clubs up and down the country making the enormous effort that they do to run a stand at some local exhibition or trade fair. Such exhibitions,

open to the public at large, bring in greater numbers of people than is often realised. For instance, the Sidcup Exhibition and Trade Fair (to mention only one example) recorded an attendance of rather more than 50,000—and the Cray Valley Radio Transmitting Club stand there, with a continuous "live demonstration" of Amateur Radio, was a focus of public interest during the whole of the week that the show was open. Similar activities are recorded by many other clubs, such as Medway, Exeter, Oxford, Liverpool, Salisbury, Romford and Sutton.

So far from considering club activities a waste of space, it is our wish to be able to give them much more—and in due time to form a strong Association of Amateur Radio Clubs so that all this effort and experience can be turned to the benefit of every local club.

## First Steps on Phone

### A G3-plus-3 Gets Going

By W. FARRAR, B.Sc. (G3ESP)

WHEN the writer was starting up as a licensed amateur, he firmly decided, after a few contacts, that CW was rather a bore! It took such a long time to say a little, and he looked forward to the end of his probationary 12 months so that he could start on 'phone and take things easy. But during that first year, he came to realise that CW has its uses after all, though that still did not lessen the desire to be able to use speech as well, even if only for local ragchews and schedules.

After about eight months of the CW treatment, plans for the new rig began to take shape. With an eye to utilising material on hand where possible, thus keeping expenditure to a minimum, it was decided to have a table-rack layout, with maximum inputs of about 100 watts on CW and 70 watts on 'phone, covering all bands from 10 to 80 metres. The modulator for this was to be a rather superior plate-and-screen job with clippers and such-like devices, so that nobody could rightfully say harsh words about G3ESP's harsh signal. After much drafting, tearing up and re-drafting, a design for the new transmitter was more or less finalised, and it was hoped to get it running by the time the 'phone and QRO permit arrived. Mere castles in the air! Due to uncontrollable circumstances, when the first year was over all there was of the new outfit was the table rack and half a power supply deck, but not a sign of the transmitter or modulator.

#### First Efforts

The desire to put out a signal on 'phone was now rather pressing (having paid for the privilege), and so it was decided to go in for emergency 'phone operation until the new equipment was ready. The original CW transmitter was a 6V6 CO driving an 807 PA, with grid leak bias and running about 12 watts input, using a 300-volt supply. The first step was to raise the power, if possible, and the obvious method appeared to be to increase the anode voltage on the 807. That part already constructed of the new power pack would deliver 1,000 volts off-load and an estimated 800 volts on load, so this was forthwith smacked on the PA. After some violent sparking, the anode current meter developed a rosy glow and sank into everlasting repose! So it was regretfully concluded that the PA stage would not take so

This is an article which will be helpful to the operator who, having served his year of "CW only," is about to give tongue with a modulator.—Ed

much HT. Success was gained by dropping the voltage using a 5,000-ohm heavy-duty resistor, and on CW the input was raised to about 30 watts (500 volts at almost 60 mA).

#### Grid Modulation

To apply modulation the idea of using a triode in series with fixed PA bias was first adopted (see the September 1948 issue of the *Magazine*), employing an old eliminator as the bias supply. In the absence of a suitable triode an RF pentode was connected as a triode for the modulator (Fig. 1). It worked, but not well. Change to an HT battery for the bias made no difference. Test reports described it as mushy and undermodulated, in spite of various adjustments. Two stations said almost exactly the same thing: "Don't know what you're doing, OM, but it sounds as if you are speaking down a long tube." Attempts to add a pre-amplifier to this modulator with a moving-coil microphone instead of a carbon made

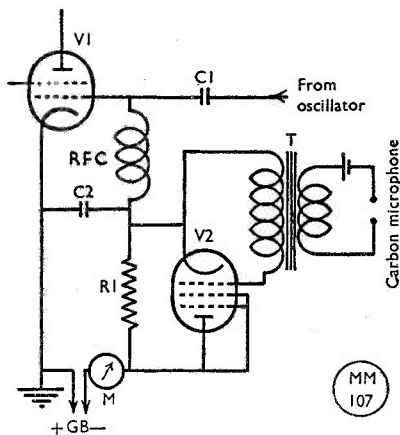


Fig. 1. This circuit was not a success in G3ESP's case, probably due to the characteristics of the modulator V2.

#### Table of Values

Fig. 1. Circuit tried unsuccessfully for grid modulating G3ESP's PA stage

- C1 = 100  $\mu$ F
- C2 = .001  $\mu$ F
- Ch. = RF Choke
- M = Grid current meter (10 mA)
- R1 = 1 megohm
- T1 = Mic. transformer
- V1 = 807
- V2 = Receiving type RF pentode

things worse, so it was decided to go in for the more orthodox system of grid modulation.

An old chassis was dug out and a two-stage resistance-coupled amplifier mounted on it, using a pair of pentodes approximating to 6F6's, with the first stage used triode connected. A moving coil microphone was connected at the input and the output taken through an old Ferranti AF3 intervalve transformer, the secondary of which was connected in series with the grid bias supply (Fig. 2). This arrangement at first produced very poor quality, but this was found to be due to wrong connections at the front end of the modulator! This having been rectified, a fair signal was at last emitted. To test it out properly a QSO was made with a non-local G during a quiet period one afternoon (yes, quiet even on 40 metres!) who gave assurance that, while it was not too good, there were many signals on the band much worse.

#### Further Improvement

A critical report having been obtained from this helpful operator, *plus* advice on modulation systems in general, a more cheerful atmosphere prevailed at G3SEP. During a subsequent QSO the PA bias was raised from around 40 volts to about 100 volts negative on the 807, and a marked improvement was evident. Modulation was now upwards (whereas it had previously been downwards) and the modulation depth and quality improved. Two distant G friends gave the same report: "The modulation has no bass and therefore it doesn't sound like your voice, but it rides over the QRM fine. It's quite a nice signal." Since that time a few more 'phone contacts have been made, including ON and PA, and all stations commented that the quality was good.

In the circumstances it was considered that reasonable success had at last been achieved. But due to the high bias voltage, the PA grid current was no more than 1 mA and could not be increased. Had this been possible, the PA input could have been driven beyond the 20 watts to which it had fallen. However, since a respectable signal was going out, it was decided not to make any further modifications to this emergency equipment, but to use any

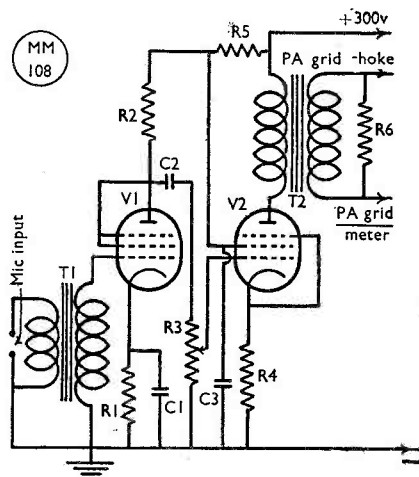


Fig. 2. The circuit shown here gave the satisfactory results discussed in the text.

#### Table of Values

Fig. 2. Circuit with which success was achieved

C1	= 25 $\mu$ F, 25v wkg.
C2	= 0.1 $\mu$ F
C3	= 8 $\mu$ F, 400v wkg.
R1	= 800 ohms
R2	= 50,000 ohms
R3	= 200,000 ohms
R4	= 125 ohms
R5	= 8,000 ohms
R6	= 10,000 ohms
T1	= M/c mic. transformer
T2	= Ferranti AF3 intervalve transformer (primary in V2 anode circuit)
V1, V2	= LV1 (Continental type, approximately a 6F6)

available time for the construction of the new rig.

It is hoped that these notes will assist any G3-plus-three, whose year of brass-pounding is about over, to put out a reasonable signal on 'phone quickly, whether as an interim measure or through lack of facilities for more superior apparatus.

#### "RADIO AMATEURS' PROGRAMME"

On p. 461 of the August issue of the *Magazine*, we gave some details of this *Voice of America* programme, "designed for radio amateurs everywhere." It seems that the producer is anxious to interview some G's over the air (not by radio, but in front of the microphone) and if this happens to meet the eye of one in New York (if two or three could

be found, the entire programme would be devoted to them), please ring New York Trafelgar 6-6000. Peter Lovelock, ex-G2AIS, will answer on that number and would be very glad to make the necessary contacts. We know of at least eight G's in the States at this moment, but not the address of any in New York itself.

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# VHF BANDS

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By E. J. WILLIAMS, B.Sc. (G2XC)

**Contest Conditions—  
Centre Impedances—  
The FA8IH/G6UH Phenomenon—  
Contact on 25 Centimetres—  
Reports by Zones**

THERE has seldom been greater unanimity of opinion than that existing on the subject of VHF conditions during the Contest week-end. From Devonshire, Lancashire, Northumberland, Scotland, East Anglia, the Netherlands and London comes the same story. A strong westerly gale on the Saturday afternoon and a cold northerly air stream on the Sunday reduced DX to a minimum and provided a real test for both equipment and QTH. Many scores have still to come in, so the proclamation of the winner must wait until next month (although the result may possibly have been announced at the Fiveband Club dinner on November 25).

General impression seems to be that the advantage lay with stations 50 to 75 miles from the centre of London, but a rapid glance through the entries already to hand indicates that with the exception of one or two isolated areas, the leading stations in various parts of the country have attained scores of the same order, and it is unlikely that anyone will show a lead such as G5BY achieved last year.

Activity appears to have been reasonably high and, although the Londoners probably received the impression that 99 per cent. of the active stations were within 50 miles of the Metropolis, logs received from other parts of the country prove that the band was lively with local stations in many other zones.

G2OI (Eccles) heard 36 stations and worked 29, his best DX being a contact with G2XC (Portsmouth) at 192 miles. G5BY claims G2CIW, at 204 miles, for his best effort, but only worked 15 stations in all. G5RP (Abingdon), on the other hand, found 60 stations to work with the most distant at 106 miles, while G4HT (Ealing) reached 62 contacts, all under 75 miles.

Fading was bad at times and that may account for the many reports of missed calls.

But in spite of these conditions, in 46 contacts at G2XC not one request had to be sent for a repeat, and except one, all outgoing reports were R5.

Further, and in spite of the storm it is almost certain to provoke from the London area, your conductor must record that he did not experience even one instance of QRM during the whole Contest!

It was hoped that the Contest might settle some of the arguments on the superiority of one or another type of aerial system, and it is possible it may do so when all the entries have arrived and been analysed, but so far it appears that although some of the stacked colinear arrays did well for their owners under the exacting conditions that existed, others failed miserably and only confirmed what has always been true—that location and conditions are major factors in all VHF work. For what it is worth, it is noted that at three out of the four stations concerned in the two longest-DX contacts so far reported, stacked Yagis were in use. G2OI had 5-over-5, G2XC 4-over-4, and G5BY 4-over-4-over-4-over-4. At the remaining station, G2CIW, there was a 16-element colinear array.

Before leaving the subject of the Contest, it is with pleasure that we report a good entry from the Netherlands. It was unfortunate that conditions were against G/PA contacts, but it is indeed grand to have the support of our PA friends. Full report of the Contest and all the scores will be given next month.

## Aerials

Although the main aerial question of the month has been whether or not it will survive the existing gale, the subject of the performance of the simple Yagi and the more elaborate multi-element stack still finds its place in correspondence. Several readers have discovered that the single-tier Yagi often performs best by direct feed from low-impedance coaxial cable to the centre of the driven element, and not by the more usual folded dipole method. (This, of course, is all wrong according to the text-books.) It was, therefore, with interest that your conductor read some comments on the subject in the Newsletter No. 4 of *Radio Amateur Scientific Observations*, an organisation sponsored by CQ and under the supervision of Oliver P. Ferrell. Investigations made by their workshops showed that the text-book figure of 20 ohms or less for the impedance of a three-element beam does *not* always apply, and that it was possible to adjust the beam to offer almost any impedance from 1 to 200 ohms. The adjustments are the variation of the lengths and spacing of the elements.

Precision measurements made on their standard workshop 3-element beam showed it

## TWO-METRE ACTIVITY BY ZONES AND COUNTIES

### ZONE A (144 to 144.2 mc)

**Dumfries**  
GM3OL

**Fife**  
GM3EGW, GM3ENJ, GM3FGH, GM3FYB

**Lanark**  
GM5VG, GM6WL

**Midlothian**  
GM3BBW, GM6LS, GM6SR

**Stirling**  
GM4QV

### ZONE C (144.2 to 144.4 mc)

**Cumberland**  
G3BW

**Durham**

**Lancashire**  
G2DCL, G2HCJ, G2OI, G3AGS, G3BY,  
G3CHY, G3CSC, G3DA, G3ELT, G5KX,  
G6DP, G8SB

**Northumberland**  
G2BDQ, G3CYY, G4LX

**Westmorland**

**Yorkshire**  
G2IQ

### ZONE E (144.4 to 144.65 mc)

**Cheshire**  
G3AYT, G5CP, G5MB, G6TL

**Derbyshire**  
G5RW

**Leicester**  
G2FNW, G2RI, G3BKQ, G3ENS

**Lincolnshire**  
G5BD

**Nottinghamshire**  
G3APY, G3CZV, G3DJL, G6CW

**Staffordshire**  
G3CXD

**Warwickshire**  
G2ATK, G3ABA, G4RK, G5JU, G5ML, G8QY

### ZONE F (145.65 to 145.8 mc)

**Glamorgan**  
GW5SA, GW8UH

**Montgomery**  
GW2ADZ

**Shropshire**  
G3AHT, G3ASC, G4LU

**Worcestershire**  
G2HX, G3BHE

*Note: The frequencies shown above are those recommended by the Two-Metre Zone Plan, but all stations may not be using them.*

Next Month : Zones G to J

to have a centre impedance of 68 ohms, which accorded well with a theoretical calculation for the same beam. Thus, a 72-ohm line will match well directly into the centre of the driven element of the beam. The spacings employed in this beam are 0.12 and 0.17 wavelengths. With this a gain of 5 dB is maintained over a wide band. With closer spacing the drive impedance drops to a much lower value and a gain of up to 6.5 dB can be achieved, but the whole system becomes frequency sensitive, and much more difficult to put into operation.

If two beams of the type mentioned are spaced by a half-wave, one influences the other and the driving point impedance of each of them drops to about 50 ohms. If we attach a quarter-wave section of 72-ohm coax to the driven elements of each beam, then 102 ohms appears at the other end of each section, and if these are now paralleled the resultant impedance will be 51 ohms. A good quality 52-ohm coax cable can then be used to feed the paralleled junction, and due to the close matching of all impedances efficiency is assured. In practice, however, this cannot be done as  $\frac{1}{4}$ -wave sections of coax are not a physical  $\frac{1}{4}$ -wave long and therefore the  $\frac{1}{2}$ -wave separation of the two beams will not allow the two  $\frac{1}{4}$ -wave sections to meet. Accordingly, the branch cables must be made three-quarter-wave long, when they will function (electrically) in the same way as  $\frac{1}{4}$ -wavelengths.

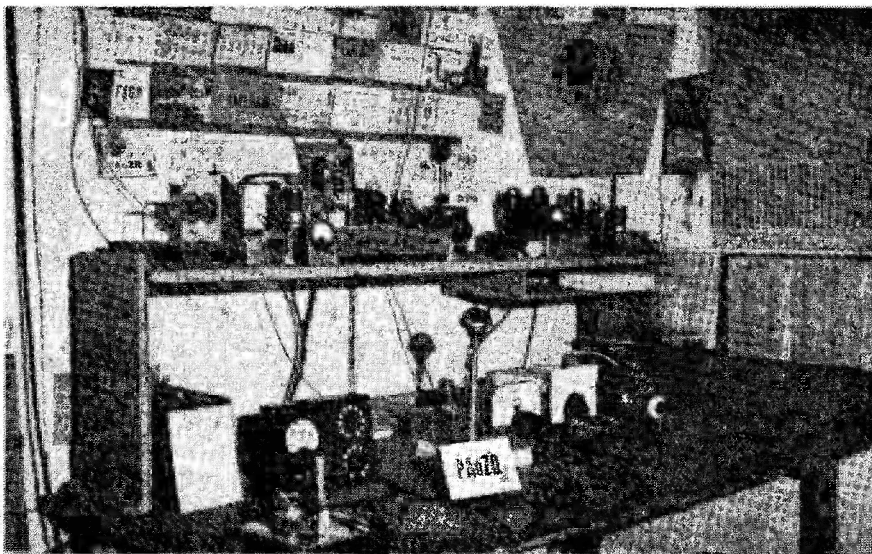
The aerial itself is capable of covering a relatively large frequency range without deterioration of drive point impedance, and the array bandwidth is determined mainly by the  $\frac{1}{2}$ -wave transformer section. In practice the SWR is less than 2-to-1 over a frequency range of plus or minus 4 per cent. of nominal frequency.

At G2XC, a somewhat similar method of feeding two stacked Yagis has been in use since August. 300-ohm ribbon feeder is used throughout, and the difficulty of reaching the driven elements of the beams with  $\frac{1}{4}$ -wave sections of 300-ohm ribbon (16  $\frac{1}{2}$  in.) has been overcome by making the final connection from these branch sections by a Y-match. This system has the advantage of flexibility, and is easy to adjust for optimum results.

### Algiers on Two

As briefly reported in our last issue, G6UH heard FA8IH on the evening of October 17 last. Faint CW was first received at 1950 BST on approximately 144.1 mc and this, four minutes later, resolved itself into FA8IH calling "CQ F." When the Algerian station changed over, G6UH gave him a short call, but no reply was heard. Then at 2005 FA8IH was heard again working an F9. Signals then faded and nothing was heard after 2010. The





This is the station of PA0ZO, Voorburg, who is one of the PA's most active on VHF. His callsign will be familiar to many readers; cards visible are for 58-60 mc working only.

reception has since been confirmed by FA8IH. Unfortunately, this is not a world's record (as has been stated elsewhere), for there are at least two instances of reception over longer distances in the United States. The distance from Hayes to Algiers is somewhat over 1,030 miles. The world record is believed to be 1,250 miles—held by W4HHK for his reception of W7FGG earlier this year—while W7KOP also has logged W5JTI at 1,170 miles during this summer.

However, record or not, it is an extraordinarily interesting happening, particularly as there appears to be no straightforward explanation of how it happened.

The natural first line of investigation appeared to be the possibility of sporadic-E reflection, such as produced our summertime European and North African DX on 5 metres. If this was the answer then the most likely place for the ionisation would be over France. A letter to F8OL, who is on the French National Committee of U.R.S.I., produced the reply that he had consulted the ionospheric records and there was not a slightest trace of any sporadic-E ionisation between 1800 and 2000 GMT and that the whole day had been remarkably quiet so far as the E-layer was concerned, the critical frequency never having risen above 4 mc.

The meteorological picture is no more encouraging. The South of England and the

North of France were coming under the influence of a depression just West of Ireland, an occlusion from this depression stretching across the centre of France from West to East. F8OL on his nightly schedule with F8NW (Paris-to-Boulogne) found F8NW at 1940 GMT to be 12 dB below average, and G6DH, also on schedule, was inaudible. Over the Mediterranean conditions were much better and quite suitable for a FA/F contact.

G6DH (Clacton) checked for MUF at 1845 GMT, that is, a few minutes before G6UH heard FA8IH, and found the MUF to be 33 mc. However, F8OL mentions that at the time of the reception the F2 layer critical frequency was as high as 14 mc over France, and this would provide a usable frequency up to 48 mc by that means, and at that frequency the attenuation would be very small indeed. In fact, if FA8IH had a stage in his transmitter working on 48 mc it might well radiate sufficient energy to produce a strong signal in Hayes. The question then is, could this 48 mc propagation somehow produce a third harmonic in the receiver and so appear as a 144 mc signal? One is reluctant to accept this as the answer, and it is only mentioned here to add interest to the problem and at the same time give as complete a picture as possible of the existing conditions.

Just to round off the story, it may be of interest to record that over in the States the

previous day had produced a terrific North-South opening on 50 mc. HC2OT nearly worked all States in one day! Many LU's were heard all over W-land. On the previous 3 days auroral scattering had been reported.

The G6UH/FA8IH reception still remains a mystery from the point of view of the propagation factor—but we are now investigating the possibility of moon reflection.

#### Some Zone News

In Stirlingshire, GM4QV (Bonnybridge) has been active for over a year now, using a 1392 Rx, 522 Tx and 4-element beam. He radiates automatic calls on 145.8 mc CW for the benefit of listeners and to encourage activity. In addition, a contest entry from GM3EGW shows that there are at least nine other GM's on the band. GM3EGW (Dunfermline) is running 50 watts or so to an 829B, and has a Cubical Quad on the Tx and a 4-ele Yagi for the receiver.

#### Zone C

G2IQ (Sheffield) makes some suggestions on operating procedure. These are similar to those sponsored by the ARRL for LF bands. When signing after a CQ use K only (no  $\overline{AR}$ ). After calling another station use  $\overline{AR}$  only. When signing whilst still in QSO use  $\overline{KN}$ . When sending the last over to the other station but still listening for his reply send  $\overline{SK}$  before the two call signs followed by K after the call signs. When absolutely finishing and ready to listen for other calls send  $\overline{SK}$  and QRZ (if you wish). When closing down send  $\overline{CL}$ . This certainly makes it clear to the other fellow what you are doing and is worth serious consideration. G2IQ also draws attention to a point which has been mentioned many times in these columns, namely long CQ's, or call sign of station being sought, with the sending station's call made only at the end. In your conductor's opinion this is one of the poorest aspects of operating procedure on Two. It is urged seriously upon everyone to send their own call sign after every third CQ, and similarly when calling another station.

#### Zone E

Two outspoken critics of the increased power facilities are G3ABA (Coventry) and G2ATK (Birmingham). The former says, "We have proved in 12 months or so that 25 watts with a good aerial can work anything that can be heard with a Rx of noise factor 4 to 6 dB. Now, for those who can afford it, we are to be allowed to increase our signal by about 7 dB. This increase, under certain conditions, may be worth while but is it worth the local QRM that it is going to cause?" G2ATK says, "When I hear that stations with 150 watts have beaten

G3BLP's record (and he uses an 832) I shall then believe higher power is worth while. Also, why give the people with plenty of spare cash an unfair advantage?" Both these readers are worried that now 150 watts is permitted some stations will be tempted to go still higher in power—and it is true that rumours have been going the rounds. May an earnest plea be made to anyone who is thinking of running the half-kilowatt or so on two metres to refrain from doing so, both in his own and everyone else's interests!

#### Zone G

G3BBA has shifted QTH, and is now mine host at Shutlanger, near Towcester. He has no mains at "The Plough Inn" but has installed  $1\frac{1}{2}$  kW of power at 24 volts. (This should *not* be read in conjunction with the paragraph above! Possibly he requires some of it for lighting!) G3BBA hopes to recommence on 420 mc shortly. An 8-ele. Yagi has so far proved more effective on that band than a 24 or 32 stacked array!

G3WW (Wimblington) reports both G3BK (March) and himself active, but bemoans the number of stations who are interested solely in GDX or who work endless schedules. G3VM (Norwich) argues against the policy of omitting local calls from the Two-Metre Activity Reports as they give an indication of what stations really are on the band. The answer to this is that the Activity by Counties List contains all calls reported as active, and every endeavour is made to keep this up to date. Inactive stations are deleted at the first opportunity. Assistance of all readers in keeping these lists correct and complete is requested.

G3VM is now building a GG Rx and incorporating a Clapp BFO. He has changed his aerial feeder from 80-ohm twin to 300-ohm and thinks there is some improvement. Congratulations to G2XS (King's Lynn) on his promotion. However, it probably means we shall not be hearing much of him on two metres in the near future, as he will have to shift QTH to Hull. G3GBO is a newly licensed station at Denham, who has made his *debut* on 2 metres.

#### Zone H

G3EUP (Swindon) reports active, while G8LY (Lee-on-Solent) is temporarily inactive, due to Rx trouble. G5RP (Abingdon) feels that many stations still confine their searching of the band for replies to the section from 145 to 145.3 mc. To those who complain of lack of signals from the South Hampshire area, it is worth mentioning that all the stations, in the Portsmouth and Southampton coastal regions are very badly screened to the North by the South Downs which rise to 900 ft. a few

miles away. The only station with a reasonable location in the area is (believe it or not) G2XC and even then any radiation lower than one degree from horizontal goes straight into a hillside.

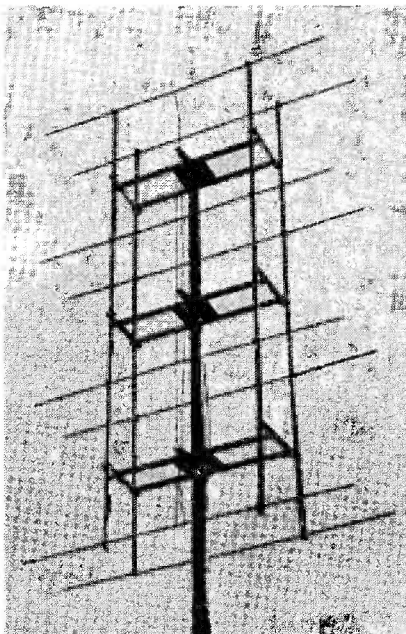
### Zone I

G3EHY (Banwell) has been on the sick list but could not resist coming on for a few hours during the Contest. From October 15 he found conditions decidedly poor, and in particular the period October 25-29. The Tx is now running at 100 watts. G4RX (Bridgewater) is back on VHF, using a converted TR1143 with an 832 PA and 20 watts for Tx, and a CC converter using 6AK5 RF and EC52 mixer. The aerial is a rotatable folded dipole. He has worked G3FMO (Chard) and GW5SA (Neath). G5BY (Bolt Tail) lost his 24-ele 145 mc beam in a gale, and now has 4 stacked 4-ele beams in use. It appears to have almost identical gain as had the 24-ele array, but has more horizontal directivity. His 24-ele 430 mc beam rotates with the 145 mc beam; he can get correct direction on the higher frequency by first D/F'ing the station on 145 mc. G5BY has built the "Wallman cascode converter," as described recently in *CQ*, but at present its performance is no better than that of his acorn receiver.

### Zone J

Several new stations have been heard on the 145 mc band, including newly licensed G3GAX (Rochester) and G3GSE (Kingsbury, N.W. London). G3CAZ (Gillingham) has added a separate 832 PA to his 522 and is altering the latter to reduce TVI from the 48 mc stage. G4HT (Ealing) reports working G6NB/A (Aylesbury) on October 23 first on 7 mc and then on 145 mc, the signal being two S points better on the higher frequency! G4HT still uses 25 watts although he can increase to 100, but finds it makes little difference. He complains that members of the VHF Century Club are the most difficult people from whom to get QSL's! (*Tut, tut! Ed.*) It may be worth reminding offenders of the pledge they gave when they were elected VHF CC members—to reply to all QSL's received. Consistent offenders are liable to be removed from membership.

G4CG (Wimbledon) writes to suggest that anyone who wants contacts on 145 mc in the daytime should look for G3FP and himself. QSO's can be arranged by ringing *LiBerty* 1661. G8SM (East Molesey) has 8 half-waves stacked in pairs and fed with 300-ohm line, and reports some reasonably good DX with it. G8VR (Upper Abbey Wood) in trouble taming a 6J6 RF stage, has been having little luck with it. During the Sunday of the Contest he built a 6AK5 RF stage and



G3ABA (Coventry), from a design by G4RK, built this 16-element array for Two Metres.

immediately started getting results. His Tx is 832 PA, and a 3-ele beam at 16 ft. is the present aerial.

### Continental

DL1DA was on during the Contest, but achieved no positive result. At 1000 GMT on the Sunday he heard some carriers from a NW direction, and one of them on about 145.5 was S3/4 and a few English words were identified. His Tx runs 50 watts into an 832A, the Rx is 6AK5 type converter, with a 3-ele rotary beam. During the summer DL1DA worked HB1HK over a distance of 205 km, with 4,500 ft. mountains on the path. Active two-metre stations in Germany are DL1CK, 1CS, 1DA, 1HC, 1LR, 1LS, 1VV, 3FM, 4XS and their DX record is 250 km. DL1DA hopes to have 150 watts by next year.

G6UH (Hayes) informs us that OH2NV, 2NY, 2OK and 2PK are operating at the LF end of two metres nightly 1900 to 2000 GMT, and can receive CW. PAØZQ suspects that some G stations may not have received his QSL for VHF contacts. If these stations will inform him he will do his best to rectify the matter. PAØLU requires some crystal diodes

## TWO-METRE CONTEST CALLS HEARD BUT NOT WORKED

G2CIW, Romford, Essex.  
GW2ADZ

G2DCI, Liverpool, Lancs.  
G3ELT, 6DP, GM30L.

G2MV, Kenley, Surrey.  
G2IQ, 2OI, 2QV, 3BLP, 3EHY,  
3EJL, 4AP, 5BY, 8SB, GW2ADZ.

G2NM, Bosham, Sussex.  
G2BMZ, 2KG, 2XS, 5ML, 6XM.

G2OI, Eccles, Lancs.  
G2AJ, 3BKQ, 3BW, 3EHY, 5RP,  
6NB, GM30L.

G2XC, Portsmouth, Hants.  
G2XV, 2YC, 3BWS, 3CWW,  
3GBO, 3WS, 3WW, 5BY, 5JO,  
5MI, 5ML, GW2ADZ.

G3ABA, Coventry, Warks.  
G2ANL, 2CIW, 2KG, 2MV, 2XS,  
3DAH, 3DJL, 3DJQ, 4AU, 4DC,  
4HT, 5BY.

G3CAZ, Gillingham, Kent.  
G2CPL, 2NH, 3ANB, 3BTL,  
3GAX, 4CG, 5WP, 6UH, 6LL

G5UM, Knebworth, Herts.  
G5TP, 6XM, GW2ADZ, PAØPN

G3ENS, Loughborough, Leics.  
G2KG, 3WW, 6NB, 6XM.

G3FOD, Rochester, Kent.  
G2MV, 2XS, 3ABH, 3CNF, 3DAH,  
3GAX, 5MR, 5RP, 6LL, 6PG,  
6WU.

G5MR, Hythe, Kent.  
G2FZR, 2NH, 3DCC, 5RP, 5WP,  
6UH.

GW2ADZ, Llanymynech, Mont-  
gomery.

G2AOK, 2CIW, 3WW, 4HT, 4MW,  
5TP, 6VC.

to make the G3MY converter, and would be pleased to exchange other suitable items with any G station able to supply them.

### 420 mc News

As readers will probably know by now, a new 70 mc record was set up on October 8 between GW6DP/P on Snowdon and GM2JT/P on Criffell. The heights involved were 3,493 and 1,866 ft. respectively and beyond geometrical range. The distance is 130 miles. Contact was first made at 1330 BST and maintained intermittently over a period of 3 hours. Deep and generally slow fading was recorded. At Criffell a 16-element Sterba with the transmitter mounted on the aerial structure was used for transmitting and a 4-ele Yagi for reception. At Snowdon, a corner reflector was employed. It is hoped to present greater details of these interesting and successful tests in an early issue of the *Magazine*.

At the South London VHF Group's October meeting, it was decided to set apart a narrow portion of the 70 mc band for CC work

in order to facilitate searching with selective receivers. The portion in harmonic relationship with the 144 mc band is most suitable. The Group's own CC Tx is near completion and 436 mc is the likely frequency. Present activity periods are Wednesdays, 2000-2200 and Sundays, 1100-1300. On the Sunday schedule a meeting of all stations takes place on 1.7 mc for the first 15 minutes to arrange tests and transmitting times.

G2IQ also points out the advantage of using only a small portion of the band, at least during the present period. The design of the front end of the receiver is greatly simplified if a frequency range of only 3 or 6 mc needs to be tuned. He disagrees emphatically with people who say "70 cm. will never be as good as 2 metres," considering them unduly pessimistic and suggests that there is far from sufficient evidence to prove that location is as important as is commonly believed. G2IQ has been heard RST 559x at G3APY at 26 miles when his Tx aerial was on the first floor of the house and shooting signals through three brick walls and several houses farther away! He thinks it

## TWO-METRE ACTIVITY REPORT

*To maintain the usefulness of this section, please set out your list on a separate sheet and exactly as shown below. That is, with callsigns in numerical and alphabetical sequence, arranged horizontally, repeating the numeral but not the prefix, and divided into "worked" and "heard" listings. And please print all calls clearly!*

G4HT, Ealing, Middlesex.

**WORKED :** G2AAN, 2ANT, 2ATK, 2FJD, 2IQ, 2KG, 2XC, 2XV, 2XS, 3ABA, 3AHT, 3BHE, 3BKQ, 3CGQ, 3FFU, 3GBO, 3GSE, 3WS, 4AP, 4KG, 4MW, 4RO, 5AS, 5DF, 5HN, 5JM, 5JO, 5RP, 6LL, 6VC, 6XM, 8QY, 8WV, GW2ADZ.

**HEARD :** G2AOK/A, 2OI, 3ABA, 4LU. (October 10 to November 12).

G3CAZ, Gillingham, Kent.

**WORKED :** G2CIW, 2CPL, 2IC, 2KG, 2VA, 2WJ, 2XS, 3ANB, 3BTL, 3BWS, 3CWW, 3DAH, 3FIJ, 3FOD, 3GAX, 3WS, 3WW, 4MW, 5BD, 6LL, 6VC, PAØPN,

**HEARD :** G2BYF, 2FZR, 2IQ, 2XC, 3BKQ, 3DCC, 3GW, 4AC, 5TP, 5UD, 6PG.

G3VM, Norwich, Norfolk.

**WORKED :** G2CPL, 2XS, 3DMU, 4MW, 5UD, 8SM, GW2ADZ, PAØPN.

**HEARD :** G2AJ, 2CIW, 2HCG, 2KG, 2XC 3APY, 3GBO, 4AU, 5BP, 5DF, 5RP, 5RW, 5TP, 5WP, 5NB, 6VX, 6YP. (October 11 to November 14.)

G3EHY, Banwell, Somerset.

**WORKED :** G2CIW, 2OI, 2XC, 3AHT, 3BHE, 3BLP, 3CSC, 3EJL, 5BM, 5DF, 5MA, 5RP, 5TP, 5WP, 6NB, 8L, GW2ADZ.

**HEARD :** G3WS, 4RK, 8SM. (October 11 to November 13.)

a great pity that some of the 420 mc experimenters are adopting a defeatist attitude about this matter of location almost before they have started.

G2ATK (Birmingham) has a schedule with G2BFT (4 miles) every evening across built-up areas. The Rx is an ASB8 without RF stage, and the Tx a Type 105 unit. G2DWV (Tottenham) hopes to be on 70 cm. by Christmas. Some of his gear for that band helped gain him first award at the Enfield Radio Group's Exhibition in September.

#### And Now 25 Centimetres !

We are very glad to be able to report what may be the first 1215 mc two-way contact on this side of the Atlantic. On November 17 at 2100 GMT, G6CW/G8DD were in QSO on this band over a distance of 4½ miles, S9 'phone both ways. Two transceivers were used, employing GG triodes in suitable cavities, with dipole aerials backed by 18-in. parabolas. It is much to be hoped that these encouraging results will be actively followed up by other VHF workers—in the meantime our congratulations to G6CW and G8DD, and their helpers G3CZV and G3QC.

#### FBC Dinner

For the second time, the Fiveband Club held a VHF Dinner to coincide with the Amateur Radio Exhibition—on Friday, November 25. The attendance totalled more than the 70 the accommodation allowed and it was altogether one of the most successful meetings we have had. Members were present from many distant parts—including the West, the Midlands and North-East—and there were full and interesting discussions on all aspects of VHF operation. Your conductor was supported in the chair by G6VX, organiser of the London area meetings, and the Editor of the *Short Wave Magazine* (who had several dinners to visit that evening !) also came along during the proceedings. The keenness and enthusiasm of the VHF fraternity was again much in evidence and it can be said that this was another VHF occasion which was not only most enjoyable but also very useful. It is hoped that a photograph and list of those present will appear in this space next month.

#### In Conclusion

The inundation of Contest entries during the last few days (often mixed up with county and other claims) has made it impossible to produce the Achievement Tables this month in time and with any degree of accuracy. They have accordingly been omitted from this issue, but will re-appear next month, provided the Contest report does not occupy too much space. Also, the new "Twenty Best Contacts" monthly competition's inauguration is post-

#### VHF CENTURY CLUB

##### NEW FULL MEMBERS

G3BBA	B. Stockley (Towcester)
G3COJ	A. H. B. Bower (Hull)
G5TP	R. Page (Stoke Row)
G6CB	R. L. Castle (Wimbledon)
G6LX	D. L. Glaisher (Croydon)
G6NB	D. N. Biltcliffe (Chertsey)

*Total 65 members*

poned for one month, as it is certain there will be insufficient room for it next time.

It now but remains to wish you all a happy Christmas and the best of luck in 1950, with a new season of achievement before us. Reports for the January 1950 *Short Wave Magazine* should reach E. J. Williams, G2XC, The Short Wave Magazine, 49 Victoria Street, London, S.W.1, by December 14 latest. Here again on January 6.

#### CORRESPONDENCE POINT

When writing us on any subject whatsoever, do not on any account address your letter to BCM/QSL. The reason is simply that "BCM/QSL, London, W.C.1" is our QSL Bureau address and should be used *only* for sending in cards and envelopes. The Bureau is not organised to deal with correspondence (even if it affects the Bureau) and letters sent to that address are inevitably delayed before they can receive office attention.

#### PIRATES

*The following reports of piracy have been received from the owners of the appropriated call-signs :*

- G3EGI (Preston) : Has a large number of QSL's awaiting collection, but he has never been on the air.
- G3AHA (Hitchin) : Operates only on the Top Band, but has been receiving cards for 3·5, 7 and 14 mc.
- G3FZR (Leeds) : Was only licensed on October 25, but has received a large number of cards accumulated in the Bureau before that date.
- G3FXL (Ashton-under-Lyne) : Licensed on October 6, but is receiving cards for QSO's in June and July.



## The other man's station G8QB

This smiling chap is G. Wheatley, who runs G8QB at Gardenia Cottage, Millmead Road, Cliftonville, Margate, Kent.

The first licence was issued in October 1928 under call G6WH, becoming G8QB after the war. The transmitter at present in use is a much-modified Collins TCS-12, operated off DC mains and running at 25 watts input. On the receiving side, G8QB has a BC-348, an HRO and an all-EF50 straight TRF. Frequency measuring equipment includes a crystal calibrator and a heterodyne frequency meter.

In the way of sky-wires, a centre-fed 66-foot top is operated on 7 mc through a tuned feeder line some 40 ft. long. The feeder itself is spaced 5 in. with spreaders made of perspex strip, and is a method of construction found to withstand the gales and salt-laden air of a

seaside location. The aerial coupling unit is arranged for either series or parallel tuning, and also carries a three-way switch to connect the aerial to either of the receivers. The TCS-12 transmitter incorporates an aerial relay system of its own which automatically throws the aerial from Rx to Tx when the key is pressed, and also earths down the receiver at the same time.

G8BQ is a member of the Thanet Amateur Radio Society which is one of those organisations favoured by the local authority in the matter of QSL cards—his bears the inscription "Broadstairs for Sunshine," with a view of that delectable resort! Apart from this, his interests in Amateur Radio are building transmitters and just working other stations on the 3.5 and 7 mc bands.

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*Mention the Magazine when writing to Advertisers—It Helps You,  
Helps Them and Helps Us*

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# Here and There

## The BSWL

We have recently accepted responsibility for the control and management of the British Short Wave League, an established organisation which has survived the vicissitudes and difficulties of nearly 15 years' continuous existence.

The League as now reconstituted will operate in close association with our *Short Wave Listener*. The organ of the League, the *BSWL Review*, is a 12-page monthly published as an addition to the *Short Wave Listener*, the combined 44-page journal thus going to League members only. The normal activities and circulation of the *Short Wave Listener* are in no way affected, and it remains available to non-League readers without the addition of the *BSWL Review*.

A Transmitting Section is a feature of the new organisation, and readers who would like details of the League and its activities generally are invited to write to The Manager, British Short Wave League, 53 Victoria Street, London, S.W.1.

## Call Book Data

The Fall (Autumn) issue of the *Radio Amateur Call Book* came in just after our November issue had gone to press. Checking the lists shows that all G addresses printed in "New QTH's" up to and including our issue for August last appear in the Fall *Call Book*. The G listings now run to a total of 48 columns, averaging 115 QTH's per column. Some of the other column totals are also interesting: VE's, 43 columns; VK's, 21 columns; ZL's, 14 columns; and W's, 654 columns! There are actually nearly twice as many American amateurs licensed as the whole of the rest of the world put together. And that is just what it sounds like on any of the DX bands!

## Photographs

Each month in the *Short Wave Magazine* and *Short Wave Listener*, taken together, we publish a large number of new photographs. This means that we are always in need of good, clear prints of Amateur Radio interest. They can be any size, print or negative, but *must* be clear and sharp; we cannot do anything with dark or fuzzy impressions. All prints used are paid for at good rates im-

mediately on appearance—but as we necessarily have to keep pictures in hand for future issues, there may be some delay before they actually appear.

## "Voice Controlled Transmission"

In G3AAT's excellent article under this title in our issues for October-November, a slight drawing error was made in Fig. 5 on p. 582, October. The secondary of that coupling transformer into the grid of V1 should of course be taken to earth from the lower side of the winding. In the Table of Values (p. 583), D1 should be described as "Dial, Auto No. 10."

G3AAT, who is at present serving afloat, also informs us that his equipment (as described in the article) is being operated by G3EAD, who will be glad to work others interested in voice-controlled phone.

## Getting Around

In what through almost any office would be a large general correspondence, we frequently come across interesting items of information about the coverage of the *Short Wave Magazine*. One of the most recent is the case of an ON4 reader who buys it off a bookstall in Antwerp and sends it to a friend in the States.

## Point on Procedure

It has been suggested that in the minds of some operators at least there is confusion as to the exact meanings of the procedure signals VA and CL. The former indicates "I am signing off with the station just worked and am open to a call from someone else." But the meaning of CL is "I am now closing my station down." In other words, "Don't call me, for I have finished on the air for the time being" (and am now going to have my supper, or take the XYL to the pictures, or go to the local).

## Trade Note

We are asked to say that the price shown for the Model E two-valve kit in the H.A.C. Short Wave Products advertisement on p.718 of our November issue should be 43s., and not as given.

## NEW QTH's

This space is available for the publication of the addresses of all holders of new call signs, or changes of address of transmitters already licensed. All addresses published here are automatically included in the quarterly issue of the Call Book in preparation. QTH's are inserted as they are received, up to the limit of the space allowance. Please *write clearly* and address on a separate slip to QTH Section.

- DL2PO Major F. F. Bolton, 434 (L.G.) G.C.L.O. (BSE), Neumunster, B.A.O.R. 6.
- EI4Z T. O'Donnell, 89 Orwell Gardens, Orwell Road, Rathgar, Dublin, Eire.
- G2BJM A. Garlick, 38 Warwick Road, Ashford, Middlesex.
- G2BUQ E. B. Butler, Church Lane House, Shadoxhurst, Near Ashford, Kent.
- G2CIC H. S. G. Clark, 27 Charlcombe Lane, Larkhall, Bath, Somerset.
- GW2FMM J.Dain(ex-G2FMM)/ZS1MM, Berthlwyd, Overlea Avenue, Deganwy, Caernarvonshire, N. Wales. (Tel.: Deganwy 83192)
- G2FSI L. W. Smith, 5 West Avenue, Wallington, Surrey.
- G2HDK C. G. Wileman, 161 Broadway East, Northampton.
- G3CJV R. G. Easton, 40 Hereward Gardens, Palmers Green, London, N.13.
- G3DJN T. W. Martin, 88 Blackpool Road, Ribbleson, Preston, Lancs.
- G3DMB C. W. Burford, 86 Rossitter Road, Balham, London, S.W.12.
- G3DSE L. Walsingham, West Lodge, Park Road, Sutton-on-Sea, Alford, Lincs.
- G3DXI R. C. Scott, Club Cottage, Great Parndon, Harlow, Essex.
- G3DXN J. C. Elsdon, 269 Gristhorpe Road, Selly Oak, Birmingham, 29.
- G3EGI S. J. Hardman, 34 Addison Road, Preston, Lancs.
- G3EGT R. A. Harris, 22 Colvin Gardens, Chingford, London, E.4. (Tel.: Silverthorn 1472.)
- G3EOY A. G. Jones, 10 Avondale Road, South Croydon, Surrey.
- G3EPB P. Woolhead, 51 Glanfield Road, Beckenham, Kent.
- G3EQF P. E. Templeman, 25 Brunts Street, Mansfield, Notts.
- G3ERN E. Read, High Street, Harlow, Essex.
- G3ETD E. N. Squires, 35 Princes Avenue, Sanderstead, Surrey.
- G3ETE A. H. Shipp, c/o G. Brown, 2 Lansdown Road, Salford, Near Bristol.
- G3EUP W. T. Dodd, 89 Hythe Road, Swindon, Wilts.
- G3EXY D. G. Lale, 48 Broadway, Sandown, Isle of Wight.
- G3EYT F. J. Merson, 55 Chapel Street, Southport, Lancs.
- G3FES F. E. Sullivan, 12 Crewes Close, Warrlingham, Surrey.
- G3FHM J. R. Brannigan, 668 Bolton Road, Pendlebury, Lancs.
- GD3FLH Isle of Man Amateur Radio Society, The Nook, Quarter Bridge, Douglas, Isle of Man.
- G3FNT P. Dean, Sunnyside, Mount Road, Prestwich, Lancs.
- G3FPR K. A. Eaton, 103 Grange Road, Ramsgate, Kent.
- G3FPV E. H. Baerselman, 12 Knowle Road, Maidstone, Kent. (Tel.: Maidstone 4806.)
- G3FOR C. C. Townson, Bella Vista, Greenodd, Near Ulverston, Lancs.
- G3FSK T. W. Chamberlain, 45 Glebe Road, Hinckley, Leics.
- G3FSO R. A. Fursey, 16 Elmshurst Road, Langley, Bucks.
- G3FTG D. Calcott, 2 Leawood Road, Trent Vale, Stoke-on-Trent, Staffs.
- G3FUN R. E. Kemsley, Laveland Court, Laveland, Near Faversham, Kent.
- G3FUP J. W. Moss, 18 Crossway, Campden Crescent, Dagenham, Essex.
- GM3FUU B. Henniker, 15 Bonaly Road, Edinburgh, 11. (Tel.: Edinburgh 62128.)
- G3FUW S. Webster, 32 Bowling Green Road, Hinckley, Leics.
- G3FUZ R. Thompson, Strathmore, A.2 Baghill Lane, Pontefract, Yorks.
- G3FVC E. C. Palmer, 4 Chestnut Grove, Englishcombe Park, Bath, Somerset.
- G3FVD R. K. Mildren, 69 High Street, Penzance, Cornwall.
- G3FVF E. A. C. Morley, 94 Kingston Avenue, EastBedfont, Near Feltham, Middlesex.
- G3FVG W. A. Martin, 21 Brixton Hill, London, S.W.2.
- G3FVL H. J. Hudson, 59 Gladsmuir Road, London, N.19.
- G3FVP R. Morgan, Church Farm, Bredfield, Near Woodbridge, Suffolk.
- G3FVR R. L. Bannister, 15 Hollar Road, Stoke Newington, London, N.16.
- G3FVS V. Clemence, 1 St. Henry Street, Penzance, Cornwall.
- G3FVC T. F. Retallack, North Street, Marazion, Cornwall.
- G3FWI W. E. Sutton, 1 Park Villas, Whalley, Blackburn, Lancs.
- G3FWJ W. Sorrell, 30 Boscombe Road, Southend-on-Sea, Essex.
- G3FWK W. Ward, 20 Etna Street, Great Horton, Bradford, Yorks.
- G3FWL K. Sutton, 52 Devon Road, Leeds, 2, Yorks.
- GM3FWM J. Hutchison, 57 Main Street, Rutherglen, Lanarkshire, Scotland.
- G3FWQ D. J. Pennicott, 6 Priory Road, Chichester, Sussex.
- G3FWR S. A. Morley, 22 Old Farleigh Road, Selsdon, South Croydon, Surrey. (Tel.: Sanderstead 3258.)
- G3FWU L. O. Richardson (ex-MD5LR), 73 Eastfield Avenue, Upper Weston, Bath, Somerset.
- G3FWV R. J. Monk, High Wykehurst Cottages, Ewhurst, Cranleigh, Surrey.
- G3FWW S. W. Watts, 4 Lynton Road, Burnham-on-Sea, Somerset.
- GW3FWY G. Tashara, 15 Sea View Terrace, Aberavon, Port Talbot, Glam., S. Wales.
- G3FXB A. J. Slater, 26 Landseer Road, Hove, 4, Sussex.
- G3FXC A. H. Watts, 38 Sandymount Drive, Wallasey, Cheshire. (Tel.: Wallasey 5712.)
- G3FXF A. Sykes, 11 Cecil Street, Springwood, Huddersfield, Yorks.
- G3FXG A. Benyon, 152 Ferndale Road, Clapham, London, S.W.4.
- G3FXL S. H. Scragg, 212 Trafalgar Street, Ashton-under-Lyne, Lancs.
- GM3FXM J. Christie, 8 Dick Place, Kirkton, Burntisland, Fife, Scotland.
- G3FXP J. L. Bowley, Post Office, Twyford, Melton Mowbray, Leics.
- G3FXY M. W. Swithinbank, 28 North Park, Eltham, London, S.E.9. (Tel.: ELTham 2183.)
- GW3FXZ T. McNamara, 30 Dillwyn Street, Swansea.
- G3FYA L. E. Profaze, 106 The Mall, Southgate, London, N.14.
- G3FYG E. W. Edwards, 164 Icknield Way, Letchworth, Herts.



G3FYY	V. G. P. Williams, M.A., 49 Melrose Avenue, London, N.W.2.	G3BBA	A. C. Stockley, The Plough Inn, Shutlanger, Near Towcester, Northants.
G3FZC	A. W. Warner, Sunnyside, Manor Road, Send Marsh, Ripley, Woking, Surrey.	G3BSU	A. F. Cleall, 23 Chapter Road, Stroud, Kent.
GW3FZV	V. Lewis, 36 Commercial Street, Aberdare, Glam.	G3BXU	W. E. Priest, 3 Elm Park, Southdown, Near Millbrook, Plymouth.
G3GDI	Mrs. Paula Sollom, The Rowans, Green Street Green, Farnborough, Kent.	G3CPI	G. P. Marley, 22 Kelvin Grove, Sandyford, Newcastle-on-Tyne.
G3GEN	C. F. Cole, 3 Kitchener Avenue, Gloucester.	G3DCT	P. H. Green, 2 Warecot Close, Brentwood, Essex.
G3GSS	S. M. Sugden, Loretto, Gores Lane, Formby, Near Liverpool, Lancs.	G3DJQ	B. H. T. Oliver, Cleeve Lodge, Nether Whitacre, Near Colehill, Warks.
G4GG	D. Wintle, Winswood, Hilltop Road, Whyteleafe, Surrey.	G3DKF	R. R. Stringer, 134 Hawkesmill Lane, Allesley, Coventry.
G6UX	A. Simmons, 161 Upper Bond Street, Hinchley, Leics.	G3DL	M. Brown, 26 Thrapston Avenue, Audenshaw, Manchester, Lancs.
G8BB	T. Brackenbury, 7 Scalby Avenue, Newby, Scarborough, Yorks.	GW3ECH	R. J. Price ( <i>ex-SU1VL</i> ), 10 Albert Street, Haverfordwest, Pembrokeshire.
<b>CHANGE OF ADDRESS</b>			
G2AJV	R. C. Jennison, 7 Bispham Drive, Meols, Hoylake, Cheshire.	G3ESO	A. D. Underwood, 11 The Close, Salisbury, Wilts.
G2ATL	F. M. Smith, 185 Mount Road, Birkenhead.	G3EUK	R. W. Curtis, 5 Ashley Avenue, Lower Weston, Bath, Somerset.
G2BGZ	J. Batey, 95 Kenilworth Crescent, Enfield, Middlesex.	G3EYD	E. J. Green, 17 Redfern Avenue, Sale, Near Manchester, Lancs.
G2CBR	A. Prince, Kingsley, St. Helens Road, Ormskirk, Lancs.	G3FDA	E. D. Abrams, 4 St. Martins Drive, Chapel Allerton, Leeds, 7, Yorks.
G2CP	H. P. Wiggins, 27 Wykeham Street, Scarborough, Yorks.	G3FFZ	G. E. Stamp, Manor House, Long Sandall, Near Doncaster, Yorks.
G2FQR	N. W. Austin, 99 Bescot Road, Walsall, Staffs.	G3HA	H. Crowther, 22 Mandale Road, Worton, Bank Top, Bradford, Yorks.
GM3AEI	K. N. Senior, 115 Greenbank Road, Edinburgh, 10.	G5KM	H. H. Eyre, 9 Woodstock Road, Barnsley, Yorks.
GM3AEI/A	K. N. Senior, The Cottage, Faladam, Blackshields, Midlothian.	<b>CORRECTION</b>	
G3AGP/A	F. J. Barns, 40 Park Ridings, Hornsey, London, N.8.	G2AYG	J. G. Openshaw, 22 Heywood Street, Bury, Lancs.
		G2AYQ	J. E. Bowden, Albany House, Goonown, St. Agnes, Cornwall

#### INFERENCE WITHDRAWN

A correspondent points out, and rightly, that our heading comment over Part I of G3JU's article "A Transmitter for Beginners," in the November issue, implies that all G3-plus-3's are in the 25-watt category. This was not the intention, nor of course is it the case. Many operators with post-war call signs have long since qualified for full Class "B" licence facilities. If anyone felt in the slightest degree offended, earth is on our head.



#### REPRODUCING OUR CARTOONS

We are so frequently asked for formal permission to use reproductions of *Magazine* cartoons for QSL cards and similar purposes, that it has been decided to allow them to be used without reference to us, provided only that acknowledgment is given. On a QSL card, this can simply be the single italic line *Short Wave Magazine*, set in small type. It should be noted that this permission applies only to cartoons appearing in the *Magazine*, the *Short Wave Listener* and the *DX Operating Manual*. We reserve the copyright throughout the world of all other material in any of our publications, and reproduction is absolutely prohibited unless the usual arrangements are made. Nor can we supply the blocks of the drawings.

#### NEW QTH's

This issue sees another onslaught on the accumulation of new call signs and addresses awaiting publication. Normally, we cannot give more than one full page for this service, and readers will agree that this is a reasonable allocation. About every three months, however, we take a little more space to accommodate the backlog, and the position now is that addresses not appearing this month but which were sent in before November 20 will be published in our January issue.

As has frequently been explained in the past, all new call sign-addresses we receive are air-mailed to the American publishers of the *Radio Amateur Call Book* (issued quarterly) in which in due course they make their appearance.



#### MORE BASE CONNECTIONS

Mullard Electronic Products, Ltd., announce the introduction of what are to be known as the Noval (9-pin) Base valves for applications where a ninth pin is necessary, *i.e.* in TV and certain special industrial electronic equipment. There is also the new Duodecal Base for cathode-ray tubes, with a large diameter spigot to accommodate the exhaust stem. It gets no easier!

# THE MONTH WITH THE CLUBS

## FROM REPORTS

In spite of the considerable activity brought about by "MCC," 38 Clubs had reported to us by the dead-line this month. Winter programmes show very little in the way of new ideas, but the tried and trusted formula for meetings seems to work very well and to attract the members regularly.

"MCC" appears to have been a great success once more, judging by the state of the band in the late evenings during the period of the Contest. Conditions, fortunately, were excellent for the Top Band.

In this connection, *please do not send the usual Club Reports next month.* In the January issue, this space will be given up to a full report on "MCC" with, of course, a list of participating stations in order of merit. So hold up your reports until after Christmas, and the next regular series of Club Notes will appear in the February *Short Wave Magazine*, for which the deadline is January 10. Club Secretaries, please note!

And so to this month's reports. . . .

**Coventry Amateur Radio Society.**—At the recent AGM the officers were re-elected; G5GR is Chairman and G3FOH Secretary. A Public Relations Officer has also been appointed. The President, G6WX (ex-Mayor of Coventry) has retired from the G.E.C., Ltd. after completing nearly 50 years of service with the firm. On October 10 a "Gadget Night" was held, members displaying their bright ideas. On October 24 there was a talk by G5GR and on the 31st a meeting was held to discuss plans for "MCC."

**West Bromwich and Handsworth Radio Society.**—At the October meeting G2RQ demonstrated his all-band transmitter with an 813 PA; band-changing is effected in a few seconds without the aid of switches. All stages are removable from the main chassis for servicing, and the grid and anode units can be slipped out, dismantled and reassembled without the use of a soldering iron. In November G6SN gave an interesting talk on "Radio in a German POW Camp." Meetings are at the Lewisham Hotel, last Wednesday in each month.

**Derby & District Amateur Radio Society.**—New Headquarters are now available in the Derby School of Arts and Crafts, with a Clubroom, transmitting station and workshop facilities. Forthcoming meetings as follows: December 7, Television; December 14, Open Evening (Clubroom); December 21, Film Show (Room No. 4, 119 Green Lane, Derby); January 4, AGM.

**Oxford & District Amateur Radio Society.**—Another successful year's work was reviewed at the recent AGM, at which the principal officers were re-elected. The President's lecture on Receiver Design drew a large attendance, and his own receiver was heard and examined with great interest.

**South Manchester Radio Club.**—On October 28 a large gathering assembled and several new members "got their heads down" right away with the new technical course. Refreshments have now been laid on at meetings with beneficial results. Activity concerning MCC has been keeping people busy, and for the future a demonstration of Radio Controlled Models

is planned. Meetings are held fortnightly at the Church Schools, Northenden, and new members will find a warm welcome.

**Aberdeen Amateur Radio Society.**—This club is carrying on with some difficulty, no permanent Clubroom having yet been secured, but meetings are held fortnightly in the local YMCA. Next meeting is the AGM, and the first December meeting is on the 9th. Two members (GM3RL and GM2FHH) now hold the DXCC; GM's 2XO, 2CAS, 2YA and 3ALZ are all active on 144 mc.

**Stourbridge & District Amateur Radio Society.**—At the November meeting at King Edward's School, Stourbridge, Mr. R. J. Lean, of Birmingham, gave a talk on "Home Construction of TV Receivers." Apparatus with many interesting innovations was on view. Station visits have been arranged for SWL members. Meetings are held on the first Tuesday of every month.

**Dorking & District Radio Society.**—This Club provided a stand of equipment at the recent exhibition of the Dorking Model Engineering Club. The Club transmitter was operated under G3CZU/A, with 'phone and CW on two bands. Amateur Radio was brought to the notice of about 2,500 members of the public, many of whom had not even suspected its existence! This Club now has rent-free premises available, and meetings are held on Tuesdays at 5 London Road, Dorking, except on the first Tuesday of the month, when an organised meeting is held at the Ram Inn, High Street.

**Lothians Radio Society (Edinburgh).**—At the next meeting, on December 12, Mr. W. Bloxam will talk on

VHF matters. This meeting will take place at 25 Charlotte Square, Edinburgh, at 7.30 p.m. A recent event was a very interesting talk and demonstration on Model Control, by GM3BBW. New members will be cordially welcomed at the next meeting.

**Malvern & District Radio Society.**—Forthcoming programme as follows: December 6, TVI Suppression, by G2XX; January 3, AGM; February 7, Practical Talk and Demonstration on Television, by Mr. Dalby.

**Neath, Port Talbot & District Amateur Radio Club.**—At a recent meeting GW3FSP talked on The Electron, and it was also hoped to demonstrate the GEC BRT 400 receiver. GW3CMR intends to set up a check station, with frequency-measuring equipment, oscilloscope and wire recorder, for the benefit of local amateurs. Meanwhile the club station is battling in MCC.

**Bradford Amateur Radio Society.**—At a recent meeting G6KU dealt very thoroughly with the theory and application of the Grid Dip Oscillator. The talk was illustrated by practical demonstrations of his own instrument, covering 500 kc to 30 mc. Members are preparing for the competition for the best-constructed piece of gear, to be judged on January 3. All visitors will be welcomed.

**Lincoln Short Wave Club.**—The first Annual Dinner is being held at 8 p.m. on December 7, and the AGM on December 21. At a recent meeting the members saw Part 6 (Industrial Applications) of the Mullard film on The Radio Valve.

**Barnsley and District Amateur Radio Club.**—Recent lectures have been given by G5KM (Frequency Measurement), G4JJ (Television Fundamentals) and G2BH (Practical Crystal Grinding). The syllabus for next year has been based on a ballot of members' opinions, and the Club is pleased to note that there is no difficulty in obtaining

lecturers from among its own members.

**York and District Short Wave Club.**—This Club now meets at Room 3, Rechabite Building, Clifford Street, York; next meeting, December 14, and thereafter every fortnight. The Club Tx, G3DQR, is being rebuilt. Eight of the twelve entrants for the recent RAE passed, and four of them are now licensed. Interesting talks and instruction have been given and are planned for the future; note new Secretary's QTH, in panel.

**Radio Society of Harrow.**—This club has now obtained more convenient accommodation for the coming season, and meetings will in future be held every Thursday, 7.30 p.m., at Eastcote Lane School, Eastcote Lane, Harrow, where new members and visitors will be welcome.

**R.A.E. and Farnborough District Amateur Radio Society.**—Recent meetings have included a lecture on various types of oscillator, by G3CJ, and a demonstration by G8RR of an automatic motor-tuned VFO which automatically selects any frequency to which the receiver is tuned. In November fourteen members were guests of the Reading Radio Society. The A.G.M. will be held on December 19—7.30 p.m. in R.A.E. Assembly Hall.

**Southend and District Radio Society.**—The winter session is in full swing, several new members having joined. Lectures have been arranged for the future, the next being on Simple Receiver Construction for Beginners, by G3BSI. The Club runs a Round Robin on the Top Band, alternate Fridays at 2130, and is taking part in MCC. Next meeting, December 16, Municipal College, Southend.

**Grafton Radio Society.**—Members brought much gear to a recent Junk Sale, but staggered away with even more. Forthcoming lectures and demonstrations cover such subjects as Aerials (Part II),

Under-Water Radio Communication, and a Display Night for Members' QSL Cards. Meetings continue every Monday, Wednesday and Friday at 7.30 p.m.

**Surrey Radio Contact Club (Croydon).**—At the November meeting members saw films on An Introduction to Electronics, and Principles and Application of Radio Valves—both loaned by the Mullard Co. The usual Christmas Social is being held this year on December 20 at the Purley Hall, Purley—tickets obtainable from the Hon. Sec. Next regular meeting is on December 13.

#### WAKEFIELD AND DISTRICT

It is hoped to form a Club in Wakefield, Yorks, and all those who would be interested in such a project are asked to send a post-card to W. Farrar (G3ESP) at Holmcroft, Durkar, Wakefield.

**Eastbourne and District Radio Society.**—A large gathering turned up at the November meeting to hear a demonstration of the Williamson Amplifier by Messrs. Goosdell, Ltd., of Brighton. The demonstration also took in a High-Fidelity Pre-amp and a Barker Loudspeaker. Meetings are on the first Friday of the month at the Friends Meeting House, Wish Road, Eastbourne—7.30 p.m.

**Spenn Valley Radio and Television Society.**—Forthcoming events: December 7, Visit to Trunk Exchange and Repeater Station, Leeds; December 21, lecture by G3SU; January 4, Annual Dinner at Star Inn, Robert Town.

**Brighton and District Radio Club.**—The autumn programme is under way, and items include further talks on Radio Servicing, Feeding an Aerial, and Professional Sound Recording. Once a month there is a "rag-chew" evening, during which the Club Tx is on the air. Several parties have visited the local (low-powered BBC station.



Another Club to run a stand at a local exhibition—Romford had G4KF/P perking on the Top Band at the Hobbies Exhibition there recently. G3BNI is at the microphone, with G3FNL seated. All the gear in view is home-built except the "Hambander" and the Class-D wavemeter.

**Wirral Amateur Radio Society.**—At the AGM the officers for 1950 were elected, the Chairman and Secretary continuing their duties. At a later meeting G3BOC (now Hon. Treasurer) outlined plans for a D/F Contest to be held next spring. December meetings, on the 7th and 21st, will both be at the YMCA, Whetstone Lane, Birkenhead, 7.30 p.m.

**Gravesend Amateur Radio Society.**—The Mayor and Mayoress of Gravesend visited the Club on its first anniversary, in October, at which a Birthday Cake made for the Club was cut with due ceremony. The Mayor agreed to take on his predecessor's position of Patron, and was presented with a Life Membership card. On December 7 there is a Junk Sale; on the 14th a discussion on What Band to Use; and on the 21st a talk on VHF by G3EJK. R.A.E. and Morse classes continue each Wednesday at 30 Darnley Road, Gravesend.

**Grimsby Amateur Radio Society.**—Highlight of a recent meeting was the demonstration

of a BRT-400 receiver. The Club Tx is now active, and local members who cannot attend meetings are urged to keep an ear open for G3CNX and to maintain touch over the air.

**Thames Valley Amateur Radio Transmitters' Society.**—At the November meeting the event of the evening was the judging, by G2NH and G6WN, of the competition for amateur-built gear. Out of a fine selection of entries the prizewinners were G4FC (Communications Receiver) and G6MB (Oscilloscope). The Annual Dinner and Dance was held on December 3.

**Kingston & District Amateur Radio Society.**—On November 9 the judging took place for the G6BI Cup for the best piece of apparatus turned out during the past year. It was awarded to the Secretary for his rack-mounted oscilloscope and modulation monitor. Fourteen entries made a very fine display. The 80-metre net continues on Sundays at noon and on December 7 Mr. C. W. Cobb (GPO) will talk on TVI and BCI.

**Reading Radio Society.**—During November about 120 members, friends and visitors were entertained at the Society's Annual Hamfest. At a later meeting Mr. Light, of Taylor Electrical Instruments, talked on the design and method of using simple test gear. A large party from the Farnborough Radio Society was present at his meeting. Future events: December 8, Cloud and Collision-Warning Radio (Ekco); December 10—Instructional Section; December 31—Open Meeting.

**Wanstead & Woodford Radio Society.**—The burden of MCC has fallen upon "the usual five members," and a few technical hitches have kept them busy. The Secretary would like to hear from old members who have not recently visited the Club—either by letter or in person.

**Stroud & District Amateur Radio Club.**—This Club, which has held weekly meetings since 1946, now meets at the Community Centre, Stroud Subscription Rooms, every Wednesday at 7.30. At the recent AGM G5HC was re-elected Chairman and G3CBH

NAMES AND ADDRESSES OF CLUB SECRETARIES :

**ABERDEEN** : G. B. Esslemont, GM3FRZ, 3 Kingshill Avenue, Aberdeen.  
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Secretary. A full winter programme has been arranged, including an R.A.E. Course.

**BTH Recreation Club, Radio & Television Section.**—Television has loomed large in this club's recent activities, and the Midland Test Pattern was demonstrated at great strength during the October meeting. In November Mr. Howard Boys talked on Radio Controlled Models and demonstrated a suspension model of a very large aeroplane, controlled by 27 mc transmitters at the opposite side of the room. G3BXF was actively engaged in MCC.

**Chester & District Amateur Radio Society.**—The new Headquarters is now The Tarran Hut, YMCA Grounds, The Old Palace Chester. The Club Tx and other gear is in course of construction, meetings being held every Tuesday at 7.30 p.m. More members will be welcomed, and it is known that several short-wave enthusiasts in the area have not yet made contact with the Club. Thanks are expressed to G2YS for the use of his station in MCC.

**Southport Radio Society.**—Not much to report; Morse and technical classes continue, although attendances have been down owing to bad weather and illness. There are now 30 members, of whom nine are licensed. The hot-pot supper formerly arranged for October should have taken place, all being well, on November 21!

**East Surrey Radio Club.**—Recent meetings have included a lecture on TVI by G5OH, a talk by G6FS on his journey from New Zealand, and one by G5LK on his recent visit to MARS at Birmingham. Future events will be a Junk Sale and a further talk on N.Z. by G6FS. The AGM will be held in January.

**Royal Air Force Amateur Radio Society.**—The Headquarters Section of this society, meeting at Cranwell, has opened its winter season. Recent events have been "An Introduction to Amateur Radio" by G6PZ, and a talk on Crystal Grinding by G5UG. The latter turned out to be a demonstration as well,

members of the audience suggesting a spot frequency and the lecturer grinding a blank to that frequency in front of a critical assembly! On December 15 G2LR will talk on Amateur Radio Overseas, and on January 12 there is to be a demonstration of TV-reception from Sutton Coldfield.

**Forfar & District Amateur Radio Club.**—This club, which now holds the call GM3GBZ, was very active in MCC and now meets every Wednesday, 7.30 p.m. in the Clubroom, 156 East High Street, Forfar. Note new Secretary's QTH, in panel.

**Salisbury & District Short Wave Club.**—This club had a stand at the recent Amateur Clubs Exhibition, and operated two stations on 3.5 and 144 mc under its call-sign G3FKF/A. New members were enrolled, including some licensed amateurs. Club meetings are now held on Tuesdays at 7.45 p.m. New members and visitors will be welcome, and are asked to contact the Hon. Sec. (see panel).

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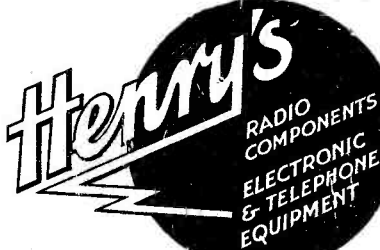
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H.S.30.	Input 200/250v. Output 300/0/300v. 80 m/a . . . . . 17/6
H.S.3.	Input 200/250v. Output 350/0/350v. 80 m/a . . . . . 17/6
H.S.2X.	Input 200/250v. Output 250/0/250v. 100 m/a . . . . . 19/6
H.S.30X.	Input 200/250v. Output 300/0/300v. 100 m/a . . . . . 19/6
H.S.3X.	Input 200/250v. Output 350/0/350v. 100 m/a . . . . . 19/6
Fully Shrouded—	
F.S.2.	Input 200/250v. Output 250/0/250v. 80 m/a . . . . . 19/6
F.S.30.	Input 200/250v. Output 300/0/300v. 80 m/a . . . . . 19/6
F.S.3.	Input 200/250v. Output 350/0/350v. 80 m/a . . . . . 19/6
F.S.2.X.	Input 200/250v. Output 250/0/250v. 100 m/a . . . . . 21/6
F.S.30X.	Input 200/250v. Output 300/0/300v. 100 m/a . . . . . 21/6
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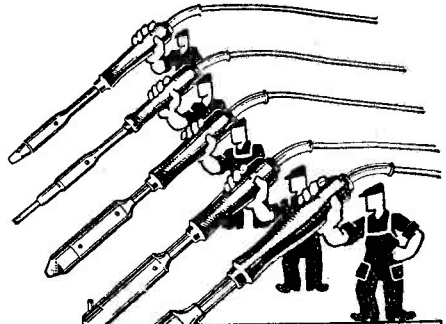


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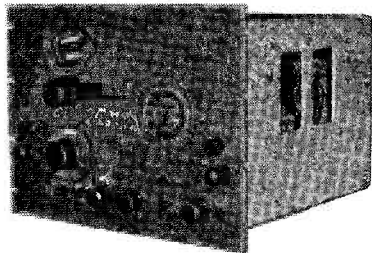


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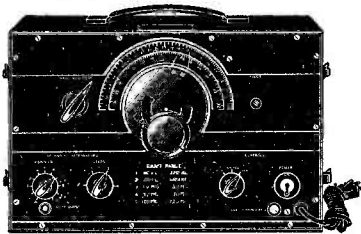
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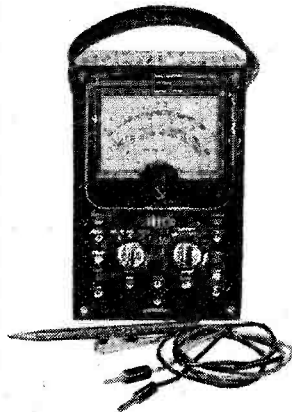
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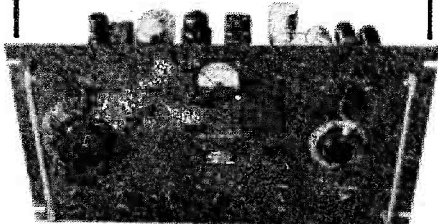
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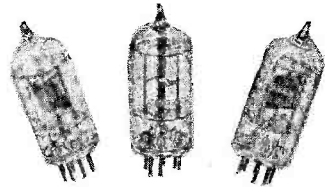
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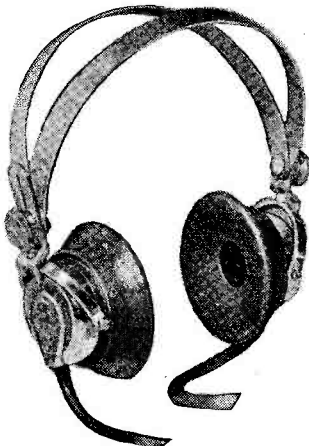
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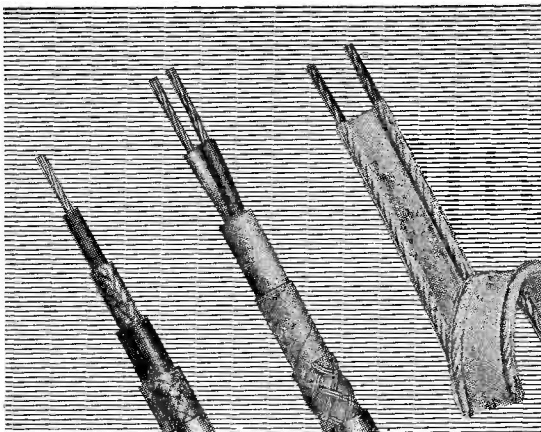
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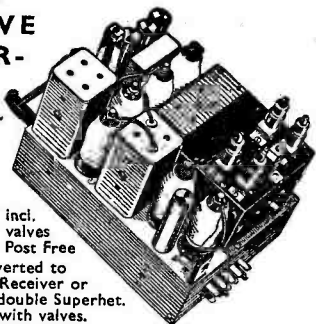
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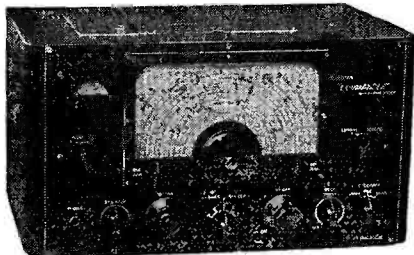
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**SALE**—HRO Receiver, four coils, PM speaker and Spare valves.—Offers? 34 Warton Avenue, Wells Road, Nottingham.

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**R1116A**, Ex-R.A.F. double-super; Ex-R.A.F. 1082 TRF, incomplete set of coils; RCA AVR20 4-valve Super, 2.3-6.5 mc; Command 3-6 mc Rx. All complete with valves and in working condn. £13 the lot or offers? G3EUG, 72 Plumstead Road, Erdington, Birmingham, 23.

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SMALL ADVERTISEMENTS

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**W**ANTED R1082 or similar battery receiver in good working order. Will exchange R1155 power pack, with or without cash adjustment, or willing to sell outright.—J. Wilkinson, Kimlet Hall, Bewdley, Worcs.

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**A**VO All Valve Oscillator, unused, with leather case. Taylor, 110a Bridge, little used. Offers.—31 Kenmuir Avenue, Northampton.

**G**EAR must be sold—going abroad. W1191 with crystal, brand new, £5/10/-. R103A, new condition, £5/10/-. Offers for SX24, immaculate condition. Hundreds of components, technical books, magazines, service sheets and valves. Brand new civilian boxed valves, U50; U14; U06; EF39; HL21DD; 615GT; 7/- each. SAE for reply. Callers Sunday mornings or by appointment.—P. W. Barnett, Station Residence, London Road, St. Albans.

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**INERT CELLS.** 1-5v each cell, 60v = 40 cells, 12/6; 120v = 80 cells, 20/-. Send 7½d. for sample cell. F.B. for Tx or Rx H.T., etc.

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**504** Eddystone and Speaker, 10 to 500 metres, AC mains, Xtal, NL, S-meter, as new. Cost £60. Best offer (Durham).—Box No. 647.

**T1131** complete, showroom condition, instruction booklet, final part-modified for 35T's. All valves, some spares. Offers about £60. Owner going abroad.—Box No. 653.

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SMALL ADVERTISEMENTS

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75pfd twin gangs as used in RF27/26 units, cellophane wrapped, 2/10. Ceramic airspaced trimmers, 50pfd., 5/- doz.; 25 pfd., 3/- doz. Jackplugs, 4/6 doz. VCR97 holders, 2/6. Parmeko, 4-20H 150 m/a shrouded swinging chokes, wt. 4 lb., 6/9 ea. 2v TX chassis (no valves) with high stab., 500K/cs xtal, numerous components, 10/6 ea.

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WANTED.—Communications receiver, condition immaterial (dented, rusty, unaligned, minus parts, case, etc). Lower price to: "Rowallan," Canada Drive, Rawdon, Leeds.

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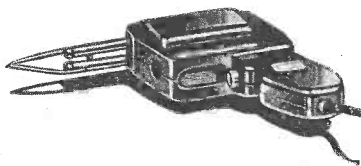
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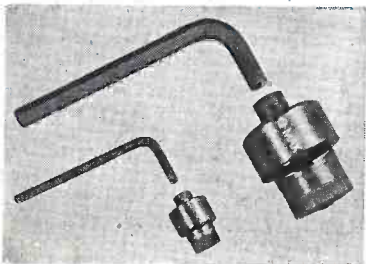
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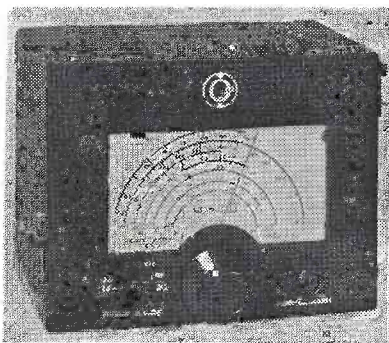
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