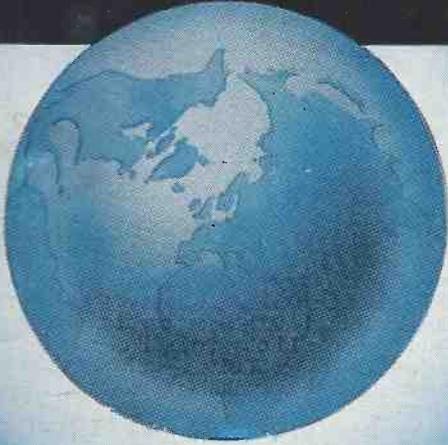


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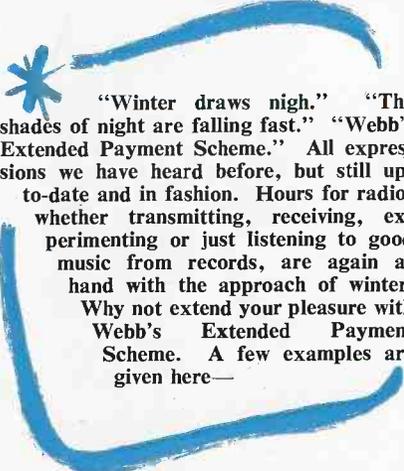
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**EXCLUSIVELY FOR THE  
RADIO EXPERIMENTER &  
TRANSMITTING AMATEUR**

**VOL. VII No. 9 NOVEMBER 1949**

# WEBB'S RADIO

## E-x-t-e-n-d-e-d Payment SCHEME

 "Winter draws nigh." "The shades of night are falling fast." "Webb's Extended Payment Scheme." All expressions we have heard before, but still up-to-date and in fashion. Hours for radio, whether transmitting, receiving, experimenting or just listening to good music from records, are again at hand with the approach of winter. Why not extend your pleasure with Webb's Extended Payment Scheme. A few examples are given here—

### WEBB'S "MX50" TRANSMITTER

Professionally built 50-watt transmitter for c.w. and telephony. Self-contained mains supply, 200/230/250v A.C. with internal bias supply. Covers 7, 14, 28 and 3.5 Mc/s amateur bands. Built in 31½" standard rack form. Cash Price **£88/10/-** (or Deposit **£17/14/-** and 12 monthly payments of **£6/9/10**) (or Deposit **£17/14/-** and 18 monthly payments of **£4/10/6**).

### AVO SIGNAL GENERATOR

The new oscillator giving high standard performance at a reasonable price, combined with AVO's renowned workmanship and reliability (50 Kc/s to 80 Mc/s in 6 bands). Cash price **£25/-** (or Deposit **£5** and 12 monthly payments of **£1/16/8**).

### TAYLOR VALVE TESTER 47A/P

A comprehensive valve tester, combined with multi-range test meter. Cash Price **£29/10/-** (or Deposit **£5/18/-** and 12 monthly payments of **£2/3/4**).

### LEAK TL/12 and RC/PA

### PRE-AMPLIFIER

Power output 12 watts for input of 160 mV r.m.s. The RC/PA Pre-Amplifier permits use of modern low output pickups and moving coil microphones. Distortion content 0.1% at 1,000 cycles 10 watts.

Cash Price **£32/10/-** (or Deposit of **£6/10/-** and 12 monthly payments of **£2/7/8**).

### CHARLES CONCERTO AMPLIFIER

10 watts using a pair of P27/500's. Separate bass and treble controls. Sensitivity 30 mV r.m.s. Frequency characteristic linear from 30 to 18,000 cycles.

Cash Price **£27/10/-** (or Deposit of **£5/10/-** and 12 monthly payments of **£2/-/4**).

### BARKER LOUDSPEAKER

Flux density 14,000 lines per sq. cm. Coil impedance 15 ohms, overall diameter 12¼". Hi Fi enthusiasts will readily appreciate the outstanding features of this unit.

Cash Price **£15/15/-** (or Deposit of **£3/3/-** and 12 monthly payments of **£1/3/2**).

### WHARFEDALE CORNER CABINET

Twin unit construction of outstanding merit. Realistic balance is obtained between treble and bass without audible resonance. Fitted two volume controls, one for each speaker. When bass control is turned to the "off" position the cross-over network is cut out and the top speaker operates as a single unit.

Cash Price **£48/10/-** (or Deposit of **£9/14/-** and 12 monthly payments of **£3/11/2**).

### MORDAUNT DUPLEX

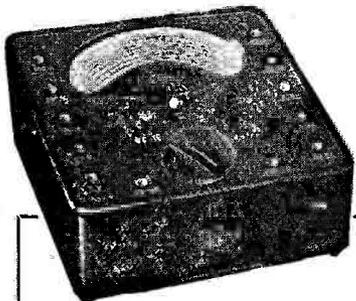
A reproducer for the connoisseur, uses a pair of highly specialized units for treble and bass. Both work into carefully designed exponential systems. Will handle 10/15 watts, but efficiency is so high that 1/2 watts is all that is normally required.

Cash Price **£102/18/-** (or Deposit of **£20/11/8** and 12 monthly payments of **£7/10/11** or Deposit of **£20/11/8** and 18 monthly payments of **£5/5/3**).

**Webb's Radio \* 14, SOHO ST., OXFORD ST., LONDON, W.1.**

# 'AVO' Precision ELECTRICAL TESTING INSTRUMENTS

A dependably accurate instrument for testing and fault location is indispensable to the amateur who builds or services his own set. Stocks are now available of these two famous "Avo" Instruments. If you have any difficulty in obtaining one locally, please send us the name and address of your nearest Radio Dealer.



## The UNIVERSAL AVOMINOR

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

### D.C. VOLTAGE

- 0-75 millivolts
- 0-5 volts
- 0-25 "
- 0-100 "
- 0-250 "
- 0-500 "

### A.C. VOLTAGE

- 0-5 volts
- 0-25 "
- 0-100 "
- 0-250 "
- 0-500 "

### D.C. CURRENT

- 0-2.5 milliamps
- 0-5 "
- 0-25 "
- 0-100 "
- 0-500 "

### RESISTANCE

- 0-20,000 ohms
- 0-100,000 "
- 0-500,000 "
- 0-2 megohms
- 0-5 "
- 0-10 "

Size : 4 3/4 ins. x 3 1/2 ins. x 1 1/2 ins.  
Nett weight : 18 ozs.

Price : £8 : 10 : 0

Complete with leads, interchangeable prods and crocodile clips, and instruction book.

## GUARANTEE

The registered Trade Mark "Avo" is in itself a guarantee of high accuracy and superiority of design and craftsmanship. Every new Avometer is guaranteed by the Manufacturers against the remote possibility of defective materials or workmanship.

CURRENT	
0- 3 milliamps.	
0- 6 "	
0- 30 "	
0-120 "	
VOLTAGE	
0- 6 volts.	
0- 12 "	
0- 30 "	
0-120 "	
0-300 "	
0-600 "	
RESISTANCE	
0- 10,000 ohms	
0- 60,000 "	
0-600,000 "	
0-3 megohms	



## The D.C. AVOMINOR

A conveniently compact 2 1/2-inch moving coil precision meter for making D.C. measurements of milliamps, volts and ohms. The total resistance of the meter is 100,000 ohms, and full scale deflection of 300 v. or 600 v. is obtained for a current consumption of 3mA. or 6mA. respectively.

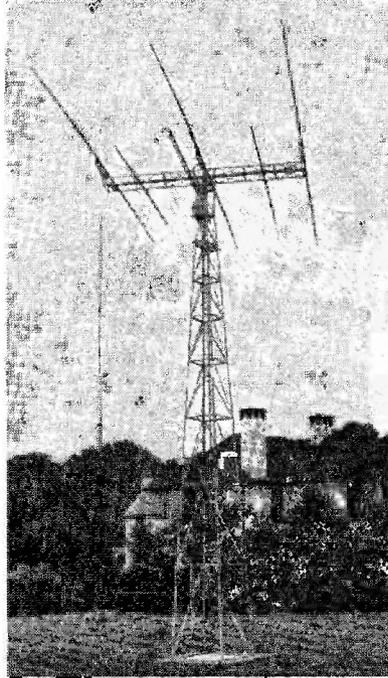
Size : 4 1/2 ins. x 3 3/4 ins. x 1 1/2 ins.  
Nett weight : 12 ozs.

Complete as above.  
Price : £5 : 5 : 0

● Complete descriptive Booklet available on application to the Sole Proprietors and Manufacturers :—

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WINDER HOUSE, DOUGLAS STREET, LONDON S.W.1. TELEPHONE: VICTORIA 3104/9

# “DX-PANDA”



GM2ACQ

10/20 Dual array-mounted  
on 32 feet standard tower

COMPLETE INSTALLATION BY

## PANDA RADIO CO.

58 SCHOOL LANE • ROCHDALE

# Build Your Own Television Receiver!

WE CAN SUPPLY EVERYTHING YOU REQUIRE FOR THE  
ELECTRONIC ENGINEERING TELEVISOR

**CHASSIS, V1.** Vision chassis fitted 6 valve holders, screens, coil formers, etc., London Transmissions. V1/M, same as above, but for Midland Transmissions, 23/6.

**SOUND CHASSIS, S1,** for London; S1/M for Midland. Fitted with 3 valveholders, screens and coil formers, £1.

**TIME BASE CHASSIS, TB1/C.** Cadmium plated steel, fitted 6 valveholders, 18/6.

**POWER SUPPLY CHASSIS, P1/C.** Cadmium plated steel, fitted valveholders and sockets, 26/-.

**COILS.** T.R.S. Tele/CC. Permeability tuned coils and R.F. chokes for sound and vision for London. Tele/CCM for Midland. Set of coils for either transmission, 16/-.

**CONDENSERS,** As specified in wiring diagram and handbook.  
CM/30. 500 pf, Micadisc .. 1/6  
CP31N. .005 pf, metalmit .. 1/9  
CP30S. .002 pf, metalmit .. 1/9  
CP35N. .05 pf, metalmit .. 2/-  
CP33N. .02 pf, metalmit .. 1/9  
CP32N. .01 pf, metalmit .. 1/8  
CP37N. .1 pf, metalmit .. 2/3  
(Include sufficient extra for post and packing, etc.)

**HIGH VOLTAGE CONDENSERS**  
.1 mf 6kV working B.I., with clips, 15/-; .01 mf 6kV working B.I., with clips, 10/-.

**AERIALS.** "H" type aerials for London and Midland transmissions. Two element type, with brackets and chimney lashings, and 7 ft. mast, 77/6, plus 5/- rail and packing charge.

**INTERCONNECTING PLUGS.** For Television chassis: 10-way flex plugs and 10-way chassis sockets,

with cover plates; 7-way flex plugs and 7-way chassis sockets; 7-way chassis plugs and 7-way flex sockets. 2/6 per pair, all types.

**12-WAY CABLE.** Cotton covered 12/024 tinned copper conductors. Each lead colour coded ( $\frac{3}{8}$ " diameter), 6d. per yard.

**GANTRY BRACKETS** and front strap. Cadmium plated, 10/-.

**DEFLECTOR COIL ASSEMBLY,** £1/19/0.

**LINE OUTPUT TRANSFORMER,** £1/14/0.

**FOCUS COIL ASSEMBLY,** £1/14/0.

**TUBE MASKS.** For 9" tube, 12/-; for 12" tube, 23/-.

**CARRIER.** For 9" tube, 19/-.

**TRANSFORMERS.** 4K5EH, 4,000v with 2-4-6v tapplings for 9" tube, £3/5/0; 2K/BEG, 1,750v. with 2-4v tapplings for 6" tube, £2/7/0; PT/1 Power Transformers, 350-0-350v at 250 ma, 6-3v 6a, 4v at 8 amp, 0-2-6v at 2 amp, 4v at 3 amp, £4/14/0.

**CHOKES, VARLEY.** DP52, 5H, 250 ma, 50 ohms, 19/6; Varley DP62, 10H, 80 ma, 190 ohms, 18/-.

**COILFORMERS.** With iron dust cores. Aladdin, 11/- per doz. With iron dust cores. Aladdin Midget, for Midland Transmissions, 8/- per doz.

**TELE BOOSTER, M.** 1 valve pre-amplifier for Midland Transmissions, 46/6.

**POTENTIOMETERS.** Wirewound, 2,000 ohms, 2,500 ohms, 10,000 ohms, 100,000 ohms, by Colvern. Set of 7, 41/9.

**RESISTORS.** LAB Kit AR/1,  $\frac{1}{2}$ -2 watt. Complete set for "Electronic Engineering" Televisor, 41/9.

**SCREEN ENLARGERS.** "New Vue." 6", A10, £3/11/6; 9", A11, £5/1/6; 10", B12, £5/6/6; 12", C14, £6/16/6; 15", D16, £8/1/6.

**VCR97 C.R.T.** For use in "Inexpensive Television," 37/6; 6" Green. Short persistence.

**CHASSIS.** For those who wish to build their own time bases, vision and sound receivers, etc. The following sizes are all 2 $\frac{1}{2}$ " deep. 8" x 5", 6/-; 10" x 6", 8/-; 12" x 8", 8/8; 14" x 9", 9/6. 3" depth: 10" x 8", 8/6; 12" x 8", 9/2; 14" x 9", 11/2. Aluminium, with four sides and bracketed corners. EF50. We have a few ex-Govt. left at 7/6 each, plus post, etc., boxed.

**INDICATOR UNITS, TYPE 73.** Containing 4 SP61 valves and 1 EA50 diode. 1 EB34, 1 ECR35 C.R.T., 3 $\frac{1}{2}$ " screen, same base and connections as VCR97; 3 .01  $\mu$ f 2-5 kV condenser, and host of resistances, potentiometer and condensers. Brand new and boxed, 37/6, plus rail and packing charges. Ideal basis for an oscilloscope.

**E.H.T. RECTIFIERS.** VU111, 4v Heater, 2-5 kV, 4-pin, British base, 9/-.

**TELEVISION HANDBOOKS.** "Electronic Engineering," London, 2/6; wiring diagram, London, 2/9; "Electronic Engineering," Midland, contains wiring diag., 4/6; "Inexpensive Television," 1/6; "Wireless World" superhet, for vision and sound, 2/6; "Television Receiving Equipment," by Cocking. A handbook which deals with the theory and practice of building T.V. Equipment, 10/6. All plus postage.

All goods are post free except where otherwise stated.

Goods can be sent C.W.O. or C.O.D. All goods are post free except where otherwise stated, if so please include sufficient extra for post and packing.

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Dept. S.W.M.

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# H. WHITAKER G3SJ

10 YORKSHIRE STREET, BURNLEY

Phone 4924

**XTALS.** We offer the following range of xtals from the biggest stocks in the British Isles. All these xtals are by Leading American Manufacturers, R.C.A., Valpey, Bliley, G.E.C., etc., and are unconditionally guaranteed by us except against misuse. An output of upwards of 4 watts is readily available, and they can be used straight pen or tritet. All the holders are  $\frac{1}{4}$ " pin spacing, standard U.S.A. FT4 type, except the 80-metre band which are BC610 type fitting with  $\frac{3}{8}$ " pin spacing.

**144 Meg. BAND.** Your choice of freq. 8000/8110, 15/-; 6000/6083, 9000/9125, 15/-.

**7 Meg. BAND.** Your choice of freq. 7000/7300, 12/6.

**28 Meg. BAND.** Triple 9333/10 Mc., quad. 7 Mc to 7500 Kc, 12/6.

**3.5 Meg. BAND.** 3500/3800. Your choice of freq., 15/-.

**I.F.'s, etc.** 290/400 Kc, 800/1040 Kc with the exception of 1000 Kc dead, any freq., 15/-.

**21 Meg. BAND.** Our special offer for the band remains open, your choice to quad. 5327.5 or 5295 Kc at 7/6.

Due to the exceptionally heavy demand for the high frequency end of 144 Mc our special offer of last month has been reluctantly withdrawn, all September orders having been now fulfilled.

**U.S.A. POWER UNITS.** A few more of these popular units available. R34H. Input 110/230v. Output 1000v DC at 400 mills, 12v 14 $\frac{1}{2}$  amp, 10v 3 amp. Weight 250 lb, £12.

R34 G, F or B. Input as above. Output 1,200v at 450 mills, 12v at 14 amp, 10v DC at 3 amp from separate metal rectifier. Variac control of 12v AC, and 1200v DC. Two 3" flush Westinghouse Meters, 0/15v AC, and 0/1,200v DC. Complete with 2 866 rectifiers. Price £18, carr. paid.

Both the above models are the last word in power units. They are completely foolproof. Three circuit breakers are employed, which trip on any short, or overload. Push-button stop, start. Provision for relay remote control if desired. Automatic delay switch for 866 rectifiers. Automatic heating for cold weather, fan cooled for hot weather, both with thermostatic control. Finish is in black crackle and beyond reproach.

**BLEEDERS. Vit.** A huge purchase enables us to offer at give-away prices. 20k 120 watt, 20k 60 watt, 75k 40w, 50k 60w, 50k 50w, 75k 50w, 60k 50w, 50k tapped at 25k 50w, 5k 40w, 5k 20w, 435 ohm 100w, 350ohm 100w. Any size, 2/- each, 18/- doz. assorted.

**B.C.610,** top band tank coils, Barker and Williamson, 8/6. **B.G.610,** top band exciter units TU61, 8/6. **B.C.610,** modified exciter units or 10, 20 or 40, 27/6 each. Plate transformer 2,000/0/2,000, 800 Mills primary 110/120, suitable for B.C.610, £3/10/-.

**GERRARD AUTO-RECORD CHANGER,** Model RC65. 250/110v A.C. 10" or 12" mixed. List £22/10/- New and boxed, £15

**R.C.A. PLATE TRANSFORMER,** 2,000/1,500/0/1,500/2,000, 800 mills, primary 230v, £4/10/-.

**R.C.A. FILAMENT TRANSFORMER.** 230v, primary 10v CT twice, for pair of 813's, completely screened, 25/-.

**THE FOLLOWING POWER SUPPLY COMPONENTS BY THERMADOR,** Los Angeles, Cal. Represent the cream of American production, both in appearance and performance, and carry our full and unconditional guarantee.

**MODULATION TRANS.** 400 watts. Primary 6,700 ohms, centre tapped. Sec. 4,500/5,000 or 5,500 ohms. Max. operating level plus 47db. Freq., plus or minus, 1db, 400/4,000 cy. Size 7" x 6" x 5". Core size 2 $\frac{1}{2}$ ", porcelain standoffs, and completely screened. In original wooden crates, 50/-.

**PLATE TRANS.** Input 200/250v 50 cy. Output 680/0/680 at 225 mills. 6 $\frac{1}{2}$ " x 5" x 4". Core size 2 $\frac{1}{2}$ ". 50/- each.

**FIL. TRANS.** Input 200/250v 50 cy. Output 10v CT 10 amp. plus 10v CT 8 amp, 2,000v test. Size 7" x 5" x 4 $\frac{1}{2}$ ". 2 $\frac{1}{2}$ " Core. 30/- each.

**FIL. TRANS.** For pair of 866's. Input as above. Output 2 $\frac{1}{2}$ v CT 10 amp. Porcelain standoffs. Sec. test volts 7500. Size 6" x 4" x 4 $\frac{1}{2}$ ". Each 30/-.

**L.F. CHOKE.** 10 Hy. at 225 mills. DC. Res. 84 ohms. 5" x 4" x 4 $\frac{1}{2}$ ". 20/-.

**DRIVER TRANSFORMER P.P.** 6L6 anodes to P.P. TZ40 or 811 grids. 1-74 to 1. Completely screened. Split Secondary, at 15/-.

**VALVES. RX.** 6C5, 6B8, 6SJ7, 6K7, 6G6, 6SK7, 6SH7, 6AC7, 1852, 6SC7, 6SN7, 6AG7, 6H6, 6SL7, 6K6, 1A5, 37, 12SK7, 12A6, 1619, 12SR7, 12SL7, 12SG7, 12K8, 12SJ7, 12J5, 12C8, 9001, 9004, 80, 955, 1T4, 1L4, 1S5, 1A3, all at 7/6 each. 6F6, 6V6, 6L7, 1613, 6K8, at 8/- 884, 7/- 717A, 12/6, 2051, 7/6, 5V4, 5Z4, at 7/6. 2C22, 3/-, VR105, 7/6. VR150, 8/-, 617, 6X5, 7/6.

**BIAS TRANSFORMER.** 230v Primary. 175/0/175X40/0/40, at 7/6.

**SYLVANIA.** IN21 Xd. Diodes at 5/-.

**METERS m/c.** Ferr. 0/250 microamps, 2 $\frac{1}{2}$ " round. Proj. 10/6. Weston 3" round flush 0/1 Mills, at 14/- 0/200, 0/300, 0/500 Mills, 10/6. Ferr. 0/150 Mills, 2" square flush, 7/6. Turner 0/12v D.C., 2" square flush, 5/6. Westinghouse 0/15v A.C., 3" round flush, 25/-, Westinghouse 0/48 mills, 3" round flush, Cal. 0/1,200v, 10/-, Taylor, 0/500 Mills, 3 $\frac{1}{2}$ " round flush, 15/-.

**AUTO TRANSFORMERS.** 230/115 2 $\frac{1}{2}$  kVA., £5; ditto Kenyon, 1 Kva, £3

**CONDENSERS.** T.C.C. 4 mf. 2,000v wkg., size 4" x 4" x 3", at 5/-.

And now full range of G3SJ CW/FONE TX's; 50W to 1 kW.

**TU UNITS.** TU7, 8 and 9, brand new without a blemish, complete with outer cases. 10/- each. Carriage paid.

**AM14 ART.** Another fine lot of this well-known 144 meg. final, using a pair of HK257's in PP. at the record breaking price of £4/10/-, carriage paid. Complete with valves in original cartons.

FULL DETAILS AND SPECIFICATIONS ON REQUEST

# H. WHITAKER G3SJ

10 YORKSHIRE STREET, BURNLEY

Phone 4924

**VALVES:** An extremely favourable quantity purchase enables us to make the following offer at unrepeatable prices:—

**EIMAC**—100TH, 25/-; 250TH, 39/6; 304TL, 42/6; 450TH, 47/6; 832, 16/-; 866, 10/6; 5R4GY, 4/-; 813, 30/-; HK257B, 32/6; 807, 6/6.

**BC.610.** Complete for four bands including auto-transformer, £150.

**BC.221's.** Brand new, without a blemish, £15/10/-.

As above, a few with slightly soiled cases (not dented) from £9 to £12, according to condition.

**MULLARD.** Bridge GM.4140/1, a few more available at £10.

**BEAT FREQUENCY OSC.** Type L050A, 0 to 15 KC. Output impedance 600 ohm. Maximum error .05%. 230v AC Mains. A precision instrument for generating audio frequencies sine wave form. Original cost, £40. Brand new, black crackle case, grey panel, completely enclosed. Made for the Admiralty by B.S.R. Price £20.

**VALVE TESTERS.** A fine selection of ex-gov. Avc, Mullard and American. Full details and prices on receipt of enquiries. These are all in fine new condition, mostly unused.

**DYNAMOMETER WATT METER.** Polished wood case, 6" dial, mirror scale, 0-250 watts, 50 to 500 cycles. B.S.I. accuracy. By Everett Edgecumbe. £7/10/-.

**RECTIFIERS.** RA43B. 115v. AC input, 115v. DC output at 4½ amp. 2 6CJ Mercury vapour rectifiers. For teleprinters. Weight 1 cwt. Brand new, unused, in ventilated black crackle steel cases, £10/-/. Original cost £50.



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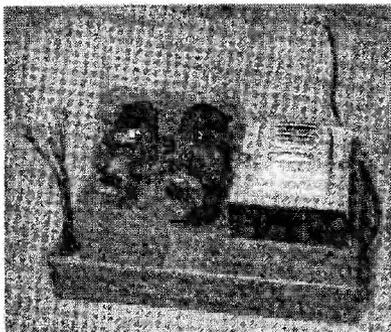
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ELECTRONIC ENGINEERS  
76 PRESTON STREET · FAVERSHAM · KENT



Instructions and  
template included

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**TX HARMONIC SUPPRESSORS FOR ELIMINATION OF TVI.** These suppressors are now in production and will be available shortly. Write for details.

## Now Ready—New Production STABILISED POWER PACK

for BC221 frequency meter or similar application. Input 0-110-200/250v 50 c/s. Output 150v 5-40 ma. Regulation 5/30 ma 2v—5/40 ma 4v. Type P22/A fits the battery compartment of the BC221 and is manufactured by us using new high grade components on stove enamelled aluminium chassis.

Size 8" × 6 $\frac{3}{4}$ " × 4".

## Benson's Better Bargains

**R1355.** Brand new, cartoned, 70/- RF UNITS 24, 25, with 3 var. conds, 75 pf double-ended, Eddy-stone couplers and Muirhead dial, for conversion, each 25/- RESISTORS 100k 2w, 1/-.

**R1116A.** 15/2,000 metres, battery Rx. complete, £7.

**R3131.** For TV coil data supplied. Valves 2 × EF54 RF, EF50 Mixer, EC52 Osc. EF50 × 6, VU120 and VU39. EA50. Store-soiled, 45/- MODULATOR 68. Brand new. Valves CV172, 4 stages RCC (Sp61s), KT61 output, 30/-.

**TRANSFORMERS :** 610-0-610v 185 ma, 20/-; 6v, 1a (2), 7v 5a, 4v 6a, 12/6 : Reversible 230v to 15-10-5-0-195-215-235v 2½a, 17/6 ; 0/260-300-340v 120 ma, 10/-; 48v ½a, 8/-; 400-0-400, tapped 250, 300, 350 80 ma, 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. 2KV. insulation, 7/6.

**VIBRATOR PACKS.** DC 6v to 190v 80 ma and 6v. 22/6. 12v to 250v 120 ma, ex No. 19 Set, 20/- BC453/4/5 3-gang variables, 3/6 ; Dynamotors, 7/6. (45/5 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 vw, 5/6, .01 1 kv, 4/- doz. DIODES IN22, 3/-.

**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, ¾ in., 15/- PYE PLUGS (2) on 1 yd. coax., 1/6.

144 mcs CONVERTERS : Valves CV66, EF54 (2), EC52, 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, 12 v 1½a, 8/-, 48v 1a, 5/6, 70v ¾a, 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, 1/9 ; DP, 1/3, DPDT, 2/-; 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 ; 160 pf 3-gang, 5/- Knobs, various, 6/- doz. SPINDLE COUPLERS std. ¼ in., 9d., Epicyclic drives SM, 1/3. METERS MC 0/50ma, 6/-; 0/2½a, 7/6 ; 0/1a, 5/-; 0/30a, 7/6 ; 0/100ma, 6/-; 0/500 µA, 5/- 0/250ma Thermo, 3/-, 4/ 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, 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, at 6/6 ; 6V6G, 6L7M, ECH35, 6K8M, 6F7, 807, EC52, CV66, at 7/6 ; 6J6, 6C4, at 8/6 ; 12SK7, 12SR7, 12SG7, 12AH7, 12K8, 12C8, 9003, 9002, 25/- parcel of 8. 3E29 at 25/-.

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

YAXLEYS ; 3P3W3B, 3/6, 2P11W, 2/6, 4P2W, 1/-.

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

W.A.BENSON, 308 RATHBONERD., LIVERPOOL 13 STONEYCROFT 1604

# RADIO CLEARANCE LTD.

27 TOTTENHAM COURT ROAD, W.I MUS 9188

## U.H.F. RECEIVERS R.1481

To clear space in our warehouse prior to rebuilding, we are offering the remainder of our stock of these well-known receivers at clearance price. Freq. range 65-86 Mc/s, 6" S.M. Dial, 10 6.3v Valves, 3 VR65s, 4 VR53s, 1 VR66, 1 VR54, 1 VR57. I.F. Freq. 12 Mc/s. B.F.O. These receivers are 19" rack mounting brand new in transit cases, with circuit diagram. £4/4/-, carriage paid.

## PERSONAL RECEIVERS B.C. 728c

7-Valve receiver with 1-4 valves, R.F. VT171, mixer VT171, osc. VT173, I.F. VT173, det. and audio VT172, output VT174, bias rect. VT174; covers 2-6 Mc/s with 4 push buttons adjustable 2-2.6, 2-6-3.5, 3.5-4.5, 4.5-6.0 Mc/s respectively. Operates from self-contained 2v acc. by 2v vibrator, with 12v vib. for charging 2v acc. from 12v source. Built-in loudspeaker. Carried slung on shoulder. Supplied brand new with valves, vibrators, telescopic aerial, mounting accessories, and instruction book. £8/19/6, carriage paid.

## MASTER OSCILLATORS

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/-.

## POWER UNITS, TYPE 46

Power units with 1154/55. Input 200/250v 50 c/s. Outputs 220v 110mA D.C., 6.3v 12 Amp. D.C. Metal rectifiers used in both cases. In perforated metal cases. 19" x 15" x 12". £2/10/, carriage paid.

## MAINS TRANSFORMERS

Primary, 200/250v 50 c/s. Secondaries, 460v 200 mA, 210v 15mA, 6.3v 5A. 12/6.  
 Primary, 200/250v 50 c/s. Secondary, 110v. Rating, 60w. Enclosed. 18/6.  
 Auto. Trans. 230/250v 50 c/s. 100V. Unshrouded, 10/6.  
 Primary, 200/250v 50 c/s. Secondary, 360-0-360v, 220mA, 4v 8A, C.T. 4v 3A, 6.3v 3.5A. 32/6.

## SMOOTHING CHOKES

20H, .300mA, 150  $\Omega$ , Weight 13 lb., size 7" x 5" x 5" ... 20/- 6H, 200mA, 100  $\Omega$  ... 6/-  
 5H, 120mA, 140  $\Omega$  ... 5/- 5H, 200mA, 90  $\Omega$  ... 7/6

## MOVING COIL METERS

Metal cased 2" circular 0/15-600v (500 microA F.S.D.), 6/6; 0-20A, 0-40A, with hunts, 5/-; 2" square bakelite cased, 0-1 mA, 8/6; 0-5 mA, 6/-; 0-50 mA, 7/-; 0-20v, 5/-; 2 1/2" circular bakelite cased, 0-30 mA 6/6; 0-50 mA, 0-100 mA, 0-200 mA, 9/6; 100-0-100v (1 mA F.S.D.), 8/-; 0-500 micro amp., 16/6; 0-1 mA desk type, 15/-; 2 1/2" bakelite cased moving iron, 0-20v, 7/6.

## LOUDSPEAKERS, P.M.

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 all. speech coils. Post extra.

## TELEVISION POWER PACKS

ALI Chassis, 15" x 6 1/2" x 2 1/2", with 2 trans (5Kv 5mA, 4v 1A, and 360-0-360v as above), wired with smoothing choke, electrolytics, and rectifier holder. £4/4/-, carr. paid. Input 200/250v 50 c/s.

## R.F. UNITS

Type 24, with valves, used, good condition ... 8/6 plus 1/6 post

## MODULATOR AND MIXER UNITS W6332A

Ex-Admiralty Units with 7 valves, 1-5U4G, 1-VR54, 2-6J5, 2-P61, 1-VR65. On chassis 10 1/2" x 11 1/2". Also 5H 200mA choke, large mains trans. (500 c/s), pots, res., comds., etc., in metal case with louvres, 10 1/2" x 11 1/2" x 6 1/2", 21/- carr. paid.

## 10-VALVE RECEIVERS R28/ARCS

Covers 100-150 Mc/s. Supplied New with valves (including 4-717A's), 39/6.

## ROTARY POWER UNITS

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.  
 Type 87, input 24v. Output as Type 104, 5/11 post paid.

## CERAMIC SWITCHES

2P 3W 1 Bank ... 2/- 3P 3W 1 Bank ... 2/6  
 3P 3W 2 Bank ... 3/-

## VIBRATOR PACKS

Input, 12v. Output, 250v 65mA, with 12v vibrator and OZ4 rectifier. Mounted on chassis 5 1/2" x 3 1/2" x 1 1/2", with 8 ft. screened cable, on output. Brand New, boxed, 17/6.  
 Vibrator Power Units Type 173. Input 24v D.C. Output 120v. Stabilised by S.130. With 12v vib. and metal rect., in metal case, 6 1/2" x 10 1/2" x 3 1/2", 11/6 post paid.

S.M. DIALS, as used on R.F.26, less Cursor, 3/11

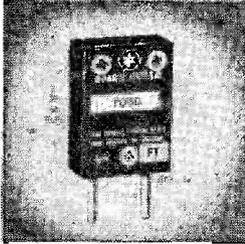
## RECEIVERS TYPE 76

150-505 Kc/s in 2 bands, 3 Valves, VR53, ARTH2, VR92. Feeds out on I.F. of 560 Kc/s. Spiral S.M. dial, cal. every Kc. New in transit case, 22/6, carriage paid.



## H.F. QUARTZ CRYSTAL UNITS (TYPE FO)

*These crystals are now available in the fundamental frequency range from 15 Mcs. to 27 Mcs. They are overtone type plates designed for operation at series resonance in low power transmitters, and in v.h.f. receiver oscillators, in which the i.f. section of the receiver is tuned. The Squier circuit is especially recommended, and full circuit details will be found in "Q.S.T." for Oct., 1948, and "Proceedings R.S.G.B.," Summer, 1949. Maximum r.f. volts across the crystal should not exceed 15 volts r.m.s., and the h.t. volts at the anode of the c.o. valve should not exceed 150.*



TYPE FO

The crystal is mounted in our type F miniature mount, which is directly interchangeable with the U.S.A. pattern FT243. Two units, back to back, plug in to the standard International octal valve socket.

Prices :-

### TYPE FO QUARTZ CRYSTAL UNITS FOR ANY FUNDAMENTAL FREQUENCY BETWEEN 15 AND 27 MEGACYCLES

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Plus minus 0.1% ... ..	£1/12/6
Plus minus 0.05% ... ..	£1/17/6
Plus minus 0.02% ... ..	£2/2/6
Plus minus 0.01% ... ..	£2/15/-

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**AMPLIFIERS.** College general purpose units. Model AC10E, 10 watt 4-valve amplifier. NFB separate mike stage and separate mike and gram. inputs. 2 Faders and tone control. £8/18/6. Model AC15E, 6-valve 15 watt amplifier with push-pull output stage and feedback over 3 stages. Separate mike stage and separate mike and gram inputs. 2 Faders and tone control £13/19/6. Model UI0E, 6-valve 10 watt amplifier for DC/AC mains. Specification as AC15E. £11/11/-. All above are complete with cases and chrome handles. Output matches 3, 8 and 15 ohm speakers. Guarantee with each unit. Model AC4C, AC, or U4C, AC/DC, 4 watt 3-valve amplifiers for records or radio. Output matches 3 ohm speaker. £4/19/6.

**SPEAKERS.** P.M. L/Transfr., 3½" Celestion, 10/-; Truvox 5", 10/-; 8", 14/6; 10", 23/9; 12" (3 ohm), 45/-; Goodmans 5", 14/9; 8", 16/6; 10", 28/6; 12", 130/-; Mains energised. Plessey 8", 2,000 ohm field and transfr., 19/9. 6½" less transr., 9/6.

**VARIABLE CONDENSERS.** Small 2-gang -0005, 4/6; 3-gang -0005, small with feet, 6/9. Dielectric -0001/2/3, 3/4, -0005 3/6 each.

**I.F. TRANSFORMERS AND COILS.** 465 kc/s I.F.'s. Wearite Midget M400, 10/6 each. Wearite Standard, 10/- each. Standard I.F.'s, 465 kc/s, 7/9 pair. Wearite "P" coils, 3/- each. All types. Denco L. & M.W., with reaction, 6/6. Dual range coil with reaction, 4/6.

**TRANSFORMERS.** Mains. Igranite, 2x350v 80m/A, 6v, 5v, 18/9; for UCT97. EHT, 2,500v,

4v, 4v, 28/6; 2x350v 120 m/A, 6v 6a, 5v 3a, 4v 4a, 36/-. Filament transfrs., 6.3v 2½a, 7/6.

**TRANSFORMERS.** Output. 30 watt multi-ratio. 10 ratios, 23/9; 5 watt 6 ratio, 7/6. Ultra midget for ICS, 35/4, 3/11. Rola 5 watt pentode, 4/6. Special transfr. Primary matches PX4 or 6L6. Output to 2, 4, 8, 15 ohms, 18/6.

**CONDENSERS.** Plessey Midget, 16x8x450v, 3/9; 8x8x450v, 3/6; 8x350v, 1/11; 32x350v, 1/11. Dubilier, 16x350v Midget, 1/11. B.I. Cardboard blocks. All 500/550v 8 mfd., 3/3; 8x8, 4/9; 8x16, 6/-; T.M.C., 8x450v, 2/3. Plessey 25 mfd. 25v, 1/-; 50 mfd. 50v, 1/9; -5x350, -1x350, -01x1,000, -05x350v, -0001/2 3/5x500v. All 6d.

**TELEVISION.** View Master Data and Construction Sheets, Parts List giving complete instructions for building a Televisor. As at Radiolympia: 5/3 post paid. Electronic Televisor Booklet, 2/9 post paid.

**VALVES.** New. 6V6, 6F6, 6I7, 6I5, 6K7, 6K8, 5Z4, 6Q7. All 5/11 each. 1R5, 1T4, 1S5, 1S4, 6J9.

**MISCELLANEOUS.** Volume Controls. L/Sw, 3/-; W/Sw, 4/6. Chokes, 60m/A, 20k, 6/6; 90m/A 10h, 10/6; 150m/A 10h 200 ohm, 14/3.

**VALVES.** BVA or Tungfram. Any type ex-stock. List plus tax. Stamp for list or enquiry. C.O.D. or C.W.O. Post paid over £1.

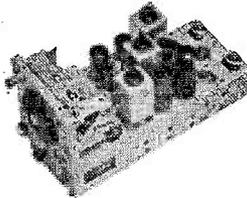
**LINCORD.** .3 amp 60 ohms Ft. 2-way, 5d. ft.; 3-way, 6d. ft. Voltage Droppers, with Adjusters and Fixings, .2A 950 ohm or .3A 750 ohm, 4/6. Jack Plugs and Sockets, 2/6 complete.

# CLYDESDALE

**Bargains in Ex-Service Radio and Electronic Equipment**

## Receivers of the AN/ARC-5 (SCR-274-N) 'Command' Series

- The Q Fiver  
 R-23/ARC-5.....B.C.453  
 I.F. 85 kcs.  
 550-190 kcs., 545-1,850 metres  
 or  
 R-26/ARC-5.....B.C.454  
 I.F. 1415 kcs.  
 3-0-6-0 mcs., 100-49 metres  
 or  
 a few only  
 R-27/ARC-5.....B.C.455  
 I.F. 2,830 kcs.  
 6-0-9-0 mcs., 49-33 metres



Each a 6-valve superhet receiver, with valves : 2/12SK7, 12K8, 12SF7 or 12SK7, 12SR7, 12A6.

The Receiver is totally enclosed, excepting the dynamotor (not supplied) for 24v operation. Dimensions 11" x 5 1/2" x 5". Complete with circuit. Brand New in maker's cartons, or unused, good condition, mainly R-23/ARC-5 and BC-453.

Clydesdale's **50/-** each Post paid  
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Or used, with case slightly dented, mainly BC-454, at 37/6 each, post paid.

Set of Circuits for Command Equip. (SCR-274-N) at 4/6, or BC-453, 1/3 ; BC-454, 1/3 ; BC-455, 1/3 ; BC-946, 1/3 ; post paid.

## MEDIUM WAVE CONVERSION COIL ASSEMBLIES

- Cat. No. H67, for 85 kc. I.F. BC-453.....R-23/ARC-5  
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 Cat. No. H68, for 1,415 kc. I.F. BC-454.....R-26/ARC-5  
 or  
 Cat. No. H69, for 2,830 kc. I.F. BC-455.....R-27/ARC-5

Each unit comprised, Ae. H.F. and Osc. coils, wound on former 4 3/8" long, max. dia. 1", min. dia. 3/8", with circuit and data.

Clydesdale's **10/-** each Post paid  
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## Brand New, in maker's carton Ex-U.S.A.S.C. MASTER OSCILLATOR Type MI-19467-A

A "ready made" V.F.O. unit, ranges, 2-10 mcs. with 807 valve, grid current meter-E.C.O. circuit, variable inductances, calibrated micrometer controls, etc., and instruction book. In metal case 12" x 10" x 6".

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## Brand New, in maker's carton Ex-U.S.A.S.C. CRYSTAL MULTIPLIER Type MI-19468

Ranges 2-6-7 mcs. 807 and spare (2 valves). Grid current meter, variable condenser, calibrated micrometer control, etc., in metal case, 13" x 10" x 6", with instruction books.

Clydesdale's **39/6** each Carriage paid  
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Now Ready New Illustrated List No. 6 (152 pages). New applicants please send 6d. to cover distribution cost.

## BC-733-D RECEIVER UNIT CRYSTAL CONTROLLED

Part of RC-103-A Beam Approach Equipment.

Operates on frequencies 108-3, 108-7, 109-1, 109-9 and 110-3 mcs. with suitable crystals (not supplied). Valve line-up :—3/717A, 2/12SG7, 12SQ7, 12A6, 12AH7GT, 2/12SR7, operates from 14v or 28v dynamotor (not supplied) complete in black crackle finish metal case, dim. :—overall length 14 3/8" x 7 3/8" x 5"

Clydesdale's **30/-** Post paid  
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## R9/APN-4 RECEIVER UNIT

Part of the "Loran" Equipment, 4 pre-set frequency positions, three in band 1 (1-6-3-3 mcs.) and one in band 2 (7-6-11-7 mcs.), 15 valves, 4/6SK7GT, 6SA7, 6SN7GT, 6H6, 6SL7GT, 6SJ7GT, 3/6B4, 5U4G, 2/2X2, plus VR105 stabilizer. Slug tuned I.F. trans. 1-05 mcs. In metal case 9" x 8" x 1 9/8" ht., with 400 cs. power unit which also feeds ind. unit. Used, good condition.

Clydesdale's **42/-** each Carriage paid  
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## R.C.A. (110K/117) XT.3202 DRIVER TRANSFORMER

E562. C.T. Primary :—Inductance 3-4 henries. 2 Secondaries :—Inductance 14 henries each. Ratio :—whole pri. to one sec. 1-2 approx. Dimensions : Ht. 4 1/2" x 3 1/2" x 3 1/2". Wgt. 6 1/2 lbs. 4-hole fixing.

Clydesdale's **15/-** each Post paid  
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## STILL AVAILABLE

Units of the SCR-522 ..... BC-624 receiver chassis with 11 valves, etc., plus Free gift of BC-625 transmitter chassis (partly stripped by B.O.T.) at **37/6** Carriage paid.

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NOW OPEN, Bargain dept., at No. 18 Bridge Street, large selection of items available too varied to list (small quantities), all at Clearance Prices. Well worth a visit.

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The type JCF/200 unit illustrated above is representative of the wide range of vacuum tube unit available for low and medium frequencies.

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Type JCF/200, 100 KC/S

Available from stock adjusted to  $\pm 0.01\%$ . Higher accuracies supplied to special order.

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Low temperature co-efficient — less than 2 in  $10^4$  per  $^{\circ}\text{C}$ .

Patented nodal suspension.

Mounted in vacuum; performance independent of climatic conditions.

Exceptionally high Q value.

High stability.

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Brand new Gov. Surplus, American made.

**12v 34 amp. hour** at 5-hour rate. Case size  $10\frac{1}{2} \times 10 \times 5\frac{1}{2}$ " approx., with terminal cover projecting on one side  $3\frac{1}{2}$ ". Price £3/15/-.

**24v 11 amp. hour** at 5-hour rate. Case size  $8 \times 7\frac{1}{2} \times 7\frac{1}{2}$ " approx., with terminal cover projecting on one side  $3\frac{1}{2}$ ". Price £2/12/6. Carriage both type, 10/6 (5/- returnable on packing crate).

### MICROAMMETERS

Moving coil 0-500 microammeters, hermetically sealed and only  $1\frac{1}{2}$ " dia. These meters are a first-class job and are complete with fixing ring for panel mounting. Would make an ideal tuning meter. Price 8/6 post free.

### AERIAL MASTS

Four-sectioned aerial masts consisting of four lengths of stout all-weather resisting paxolin tubing ( $3\frac{1}{2}$ " max. dia.,  $\frac{3}{8}$ " wall). Each section fits together with metal ferrules, forming a mast 28 ft. in height. Very light weight and can easily be raised by one man. Price 42/- (carriage 4/-).

### AERIAL SWITCHING RELAY TYPE 78A

This unit can be operated manually or from 24v, and will switch two separate feeders simultaneously. Directly adaptable as an aerial change-over relay especially for the 2-metre band. Price 10/-, post free. Set of six "Pye" female co-axial connectors for this relay can be supplied at 4.6.

**CONDENSERS.** Brand new metal cased, 0.5+0.5 mfd. 1,500v wkg., or with sections connected in series 0.25 mfd. 3,000v wkg. Size  $5 \times 3\frac{1}{2} \times 1\frac{1}{2}$ ". Price 3/3, post free.

### DYNAMOTORS, Type DM-32-A

A most useful rotary converter made by Weston Electric Co. Measures  $2\frac{3}{8}$ " dia.  $\times 4\frac{1}{2}$ " on base plate fitted with 3-pin socket. Input 24-28v D.C., output 230-250v D.C. at 60 m/a. Casing soiled and dented but all dynamotors in perfect working order and tested before despatch. Price 10/6. Postage 1/-.

### NEW RADIO PUBLICATIONS

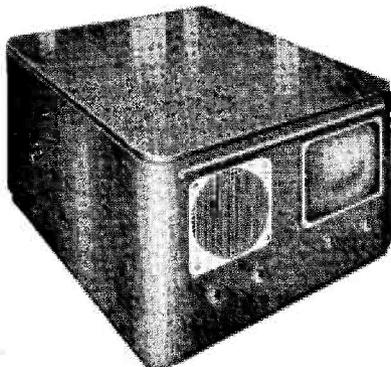
Midget Radio Construction Manual. 3/8, post free.  
Wire Recorder Construction Manual. 2/8, post free.

High Definition Television Construction Manual. 3/8, post free.

### D.C. TO A.C. CONVERTER UNITS (POWER UNIT TYPE 195)

Input 24v D.C., output 230v A.C. (50 cps.), rated at 100 watts. Consists of rotary transformer in metal case, fitted with on/off switch and input and output sockets (plugs supplied with unit). Good working order but on/off switch might be broken. Overall size approx.  $12 \times 12 \times 8$ ". Price £3/15/- (carriage 6/-).

# TELEVISION for £15 : 5



BY USING OUR EX-RADAR UNITS FOR YOUR HOME-BUILT TELEVISOR YOU ARE LETTING THE BEST OF BRITISH BRAINS AND INDUSTRY SAVE YOU MONEY, TIME AND TROUBLE. For instance the vision receiver is practically built for you, and after all the vision receiver is the stumbling block of many constructors, because in this unit even the spacing of each component is important. To have one of these almost ready made, obviously is a tremendous advantage. Again the Indicator supplied for our Mark II Televisor is a double-decker type, so that it accommodates the time base, sound receiver, power pack and tube in a very professional manner. In fact the whole receiver assembles into a compact table model, size approximately 16in. wide, 12in. high and 19in. deep as illustrated. Of course, if you want to make up a console, you can spread the units about.

**TRIED AND APPROVED CIRCUIT.** Our Mark II has already been built by over 1,000 people (men and women), and many have remarked "that it worked first time," and we have even had letters from people claiming results from places as far off as Birmingham, Liverpool and York. A few, of course, get into difficulties, but this is inevitable with any set using 20 or so valves. Nevertheless, we have a technical information service to help you in these cases.

- SOME QUESTIONS ANSWERED.**
- QUESTION 1.** Is technical knowledge necessary?  
**ANSWER.** You need not know anything about television, but you must be able to work from and understand a theory circuit diagram.
- QUESTION 2.** What is the total cost?  
**ANSWER.** £15 5s. 0d. if you collect the goods yourself, otherwise £1 extra for the packing cases and carriage. (All items may be bought separately, detailed price list is enclosed with our 7/6 data, or will be sent on request.)
- QUESTION 3.** Does £15 5s. 0d. include everything?  
**ANSWER.** It includes a new VCR.97 Picture tube, 6in. Loud-speaker and everything else which goes into the cabinet, but it doesn't include the cabinet nor the aerial and lead-in. (Aerial kits can be supplied, indoor type 15/-, outdoor type 25/-, lead-in at 3d. per ft.)
- QUESTION 4.** How much is the data?  
**ANSWER.** Our data contains 26 pages of instructions, wiring diagrams and photographs and was very costly to produce, and for this we charge 7/6 per copy, but this will be credited to you if you buy the bulk of the components and the units, and also this price includes free technical advice.
- DEMONSTRATIONS DAILY.** Why not call to see our demonstration model, we are open until 6 p.m. weekdays and until 5 p.m. Saturdays, when a made-up receiver can be seen working if a programme is being transmitted.
- if you can't call, we will send the outfit carefully packed in wooden crates for £1 extra.

# SALE OF RADIO SPARES

**MAINS TRANSFORMER. "WODEN"** made for the "AR88"—potted—fully shrouded and impregnated, fitted primary screen. 280-0-280 at 150 mA, 6.3v at 10 amp and 5v at 3amp. Primary suitable for 50 cycle mains, 110-280v, 27/8. List No. 01

**MAINS TRANSFORMER. "PARMEKO"** half-shrouded drop-through type, 360-0-350 at 80 mA, 6.3v at 4 amp, 5v at 3 amp, primary tapped for 200-240, fitted primary screen and impregnated, 16/8. List No. PF2.

**MAINS TRANSFORMER.** 260-0-260 at 60/70 mA, 6.3v at 3 amp, 5v at 2 amp otherwise as PF2 above, 13/9. Order List No. PF3.

**MAINS TRANSFORMER.** 260-0-260 at 60-70 mA, 4v at 4 amp, 4v at 2 amp otherwise as PF2, 13/9. Order List No. PF4.

**TUNING CONDENSER.** Standard size 2-gang -0005 long (2" spindle) "PLESSEY," 3/8. Order List No. 06.

**AMPEHENOL INTERNATIONAL** octa valve holder, 6d. each. Order List No. PE10.

**MIDGET TUNING CONDENSER.** 2-gang "00035 fitted with trimmers, and complete with Perspex dust cover. These condensers made by "PLESSEY" are of the type used for tuning personnel receivers, 6/6, plus 8d. postage. Order List No. PF6.

**4-GANG TUNING CONDENSERS.** -0005 each section—fitted trimmers—ceramic insulation. These are complete in a very useful chassis, and arc fitted with a drive. Government surplus equipment but new and perfect, 2/9, plus 1/3 postage, case of 6 units, 17/6, carriage paid. Order List No. PF7.

**3" P.M. SPEAKER "ROLA"** less output transformer, 8/9. Order List No. PF11.

**5" P.M. SPEAKER "ROLA"** fitted standard O.P. transformer, 11/3. Order List No. PF13.

**12" P.M. SPEAKER "TRUVOX,"** 42/8. Order List No. B88.

**ELECTROLYTIC CONDENSERS**

8 mfd. 350v	..	..	..	1/6
16 mfd. 350v	..	..	..	1/11
32 mfd. 350v	..	..	..	1/11
25 x 25 mfd. 200v	..	..	..	3/11
8 mfd. 50v	..	..	..	1/3
25 mfd. 25v	..	..	..	1/6
25 mfd. 50v	..	..	..	1/3
50 mfd. 12v	..	..	..	10d.
10 mfd. 25v	..	..	..	10d.
2 mfd. 450v	..	..	..	1/-
4 mfd. 450v	..	..	..	1/3
8 mfd. 450v	..	..	..	1/11
16 mfd. 450v	..	..	..	2/8
8 x 8 mfd. 450v	..	..	..	3/4
8 x 16 mfd. 450v	..	..	..	3/4
16 x 16 mfd. 450v	..	..	..	3/9
16 x 8 x 24 mfd.	..	..	..	4/9
8 mfd. 500v BR.850	..	..	..	2/6
16 mfd. 500v BR.1650	..	..	..	3/6

## AMERICAN VALVES

024	7/6	6AG7	8/6	6K8	7/6	7B6	7/6	35Z4GT	10/6
1C5	8/6	6B4	7/6	6L6G	10/-	707	7/6	35L6G	8/6
1LA4	7/6	6B7	10/2	6L7	7/6	12A6	6/6	3944	8/9
1N5	8/6	6B8	6/-	6N7	10/-	12K7	8/6	32	7/8
1R5	8/6	6C5	7/6	6Q7	6/8	12K8	8/6	41	7/6
1S5	6/6	6C6	9/6	6SA7	7/6	12BH7	7/6	42	10/6
1T4	6/6	6D6	7/6	6SG7	6/6	12SK7	8/6	58	7/8
1S4	6/6	6E7	6/6	6SH7	6/6	12SQ7	8/6	50	10/-
2A3	9/-	6F8	7/6	6SK7	6/8	12T7	7/6	83	8/6
2X2	7/6	6F7	8/6	6SL7	6/6	12SR7	7/6	89	8/-
5U4	7/6	6GG6	6/6	6SJ7	6/6	14F6	9/6	807	7/6
5V4	7/6	6H6	8/6	6SN7	6/-	13	10/6	84/6Z4	10/-
5X4	8/9	6J5	8/6	6T7	8/-	19	10/6	9001	9/-
3Z3	13/6	6J6	15/-	6U7	8/6	25L6GT	7/6	9002	9/-
3Z4	7/6	6J7	6/6	6V6	7/6	25Y5	10/-	954 acorn	5/8
6A3	10/6	6K7G	7/6	8X5	6/6	25Z4	9/-	866A	15/8
6AC7	6/6	6K7GT	9/6	7A7	7/6	25Z6GT	7/6		
6AG5	8/6	6K7 MET	7/6	7A8	7/6	28D7	6/6		



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## PRECISION EQUIPMENT

3 Electron House, Windmill Hill, Ruislip Manor, Middlesex

**RECEIVERS R.1355.** The ready-made Vision and Sound receivers specified for "Inexpensive Television," a copy of which is supplied with each set. Receives London or Birmingham Television simply by plugging in the requisite RF unit. **ONLY 45/-** (carriage 7/6).

**RF UNIT 26.** Used with the above receiver for Birmingham TV. **BRAND NEW IN MAKERS' CARTONS. ONLY 35/-** (postage 1/6).

**INDICATORS, TYPE 6.** The Indicator Unit specified for "Inexpensive Television." Contains C.R. Tube VCR97, 4 valves EF50 and 2 EB34. **BRAND NEW IN MAKERS' CRATES. ONLY 90/-** (carriage 7/6).

**TRANSFORMERS** for the above Television have been specially made as follows:—Time Bases and Vision Transformer, 350-0-350v 160 ma, 5v 3a, 6-3v 6a, 6-3v 3a, **ONLY 36/-**. Sound Receiver Transformer, 250-0-250v 100 ma, 5v 3a, 6-3v 6a, **ONLY 27/6**. EHT Transformer for VCR97, 2,500v 5ma, 4v 1-1a, 2v-0-2v 2a, **ONLY 27/6**. Complete price list of components for this television sent on request.

**RECEIVERS R.3170.** The unit used to construct the 53B Driver described in this Magazine, August and October issues. Contains 13 valves as follows:—7 of EF50, 2 RL37, 1 RL16, 1 S4 2150A, 1R3, 1 EA50, and a 30 mc/s IF strip, etc. **ONLY 59/6** (carriage 7/6).

**RECEIVER APW 4790.** A 1½-metre receiver containing 9 valves; 6 of SP6I and 1 each of RL7, RL16, EA50, ideal for use as a Vision Receiver as it has 6 IFs of 12 mc/s with 4 mc bandwidth. **BRAND NEW**, but some less coils which were not fitted by the makers when the contract finished. With these we supply 3 11mm formers enabling coils to be wound. **ONLY 59/6** (carriage 5/-).

**INDICATORS, TYPE 162B.** Contains 2 C.R. Tubes, a 6" VCR517 and a 3" VCR139, and 3 valves, SP6I, 4 EA50, 1 VR17, and a Klystron CV67. In addition is fitted with a .5 millimeter and a 12v blower. **ONLY 67/6** (carriage 12/6).

**ADMIRALTY TRANSMITTER 7AD.** Contains valves 6V6, VU111, CV73, and 2 of CV63, in addition to transformers, condensers, resistors, transmitting gear, etc. **BRAND NEW. ONLY 19/6** (carriage 5/-).

**TRANSMITTER "PARCEL."** A beautiful assembly used in an R.A.F. Transmitter. Contains 2 large .002mfd. variable transmitting condensers, short wave coils, variable inductance, switching, 3 2½" knurled tuning knobs, 4 2½" bar knobs, etc., etc. **BRAND NEW IN MAKERS' CARTONS. ONLY 10/-** (carriage 3/6).

**CUNNING UNIT 159.** Contains 1 each valve types RL37, EF50, SP6I, EA50, and a 24v selector switch. **ONLY 15/-** (postage 1/6).

**RECEIVER TYPE 25/73.** The receiver portion of the TR1196. Covers 4.3-6.7 mc/s, and makes an ideal basis for an all-wave receiver, as per "Practical Wireless," August issue. Complete with valves, types EF36 (2), EF39 (2), EK32 and EBC33. **BRAND NEW CONDITION. ONLY 25/-** (postage, etc., 2/6).

**MIDGET POWER PACK.** Made for the MCR 1 "Spy Set." AC or DC, input 97-250v; output 90v and 7.5v. Fully smoothed. Size 8½" x 3½" x 2½". **ONLY 39/6** (postage 1/6).

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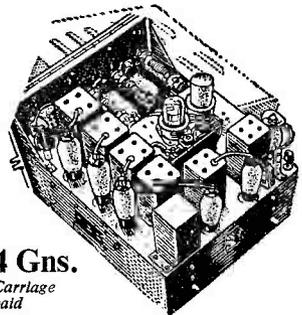
Open until 1 p.m. Saturdays. We are 2 mins. from High Holborn (Chancery Lane Station), 5 mins. by bus from King's Cross.

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### 10 - VALVE 1½ - METER SUPER - HET

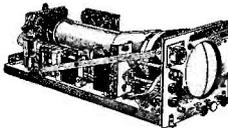
Ideal for conversion into Television Receivers, I.F. 12 Megs. Band width 4 megs. Co-axial input and output sockets. 10 Mazda Mains type VR65 (SP6I) valves, 6-3 volt filaments.

Conversion notes and circuit diagram free.



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#### Type 6 H



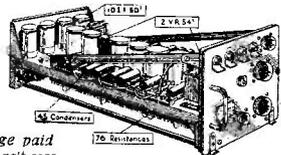
Containing seven valves and one 6 in. Cathode Ray Tube type VCR 97. Brand new

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

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New and unused. Contain 10 type VR 91 (EF50) valves, 2 type VR 54 valves, 45 various condensers, 76 various resistances, 2 Transformers, 1 Relay. Offered at a fraction of price of valves alone.



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**POWER UNIT TYPE 247.** Input 230v 50c. A.C.; output 6·3v 3 amp A.C. and 500v 250 mA D.C., fully smoothed with choke, and two 4 mfd 1,000v condensers, rectifier 5U4G. In grey steel case, size 11 × 9½ × 7½ ins., with chrome handles. Brand new, in packing case, £3/10/-, carriage paid.

**TRANSFORMERS.** 230v 50c. input; 6·3v C.T. 3 amp output; 2,000v test. New and boxed, 12/6, carriage paid.

**PARMEKO MAINS TRANSFORMERS.** 620-550-375-0-375-550-620v. The 375v winding is 250 mA and the 550 or 620v winding is 200 mA. Also two windings of 5v 3 amp. Input 230v 50c. This transformer will run both driver and P.A. stages of a 100 watt transmitter or modulator. Every one tested and guaranteed perfect. 52/6, carriage paid.

**INDICATOR UNIT TYPE R78A/APS15A.** Containing 43 valves as follows:—7 type 6L6G, 3 type 5U4G, 8 type 6SN7, 1 type 6SL7, 11 type 6AC7, 2 type 6AG7, 2 type 884, 3 type VR105/30, 1 type VR150/30, 2 type 6X5GT, 2 type 6H6, 1 type 2X2, 2 C.R.T., 1 type 5FP7 and 1 type 2AP1; 3 meters, cooling fan and hundreds of condensers and resistors. Size: 26 × 19 × 12 ins. A gift at £7/15/-, carriage paid.

**VALVES, NEW AND BOXED.** 813, 37/6; 866A, 16/6; 805, 18/6; 6L6G 10/-; 1622, 10/-; 5Z3, 7/-; 5U4G, 7/-; 6N7, 6/6; 25L6GT/G, 8/6; 6J7 and 6K7, metal, 6/6. All post paid.

45-ft. Portable Aerial Masts, as per last month's advert., still available.

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**Selenium Rectifiers.** H.W. 60 mA, 4/6; 120 A, 6/6. F.W.6 or 12v 1·5 mA, 10/6. 6 or 12v 4A, 25/- Postage 6d. on each. 150, 3/-.

**1 mA Selenium Rectifiers.** Measure ¼" × ¼" × ¼" Price 4/- each, post paid.

**TR 1196.** These 6-v Superhets are the best buy of the day. Just fit a 2-gang variable condenser and Osmor all-wave coil pack. Requires only five connections to frequency changer valve and slight modifications. Price 29/6 with circuit, plus 2/- carriage.

**Osmor All-Wave Miniature Coil Pack,** 3½" × 2" × 1½" for 465 Kc. IP's, 33/6. Post paid.

**Maines Power Supply Unit.** In black enamelled case, 9" × 6" × 5", contains heavy-duty transformer, rectifier valve, smoothing choke, condensers, panel light switch and fuses. Input 200/260v AC. Output 6·3v at 3·5 amps. H.T. 350v at 80 ma. Power unit for RI155-RI132A, etc. Jones Plugs supplied with each. Price £3/5/-.

**250-watt Double-Wound Transformers.** 230v/110v. Made by G.E.C. With steel shroud. New, £2/7/6 each, carriage paid.

**RI132A.** 10-valve superhet, covering from 100 to 126 mcs. Large slow-motion dials, 5 meter, etc. Case measures 20" × 12" × 12". Price £4/19/6, or converted ready for use on 144 Mcs band, £7/1/-.

3½" Speakers, P.M., 8/6 each, plus 9d. postage. 5" Plessey P.M., 10/6 each, plus 1/- postage. 8", 19/6 each, plus 1/- postage. 10", 25/- each, plus 1/6 postage.

18" Bakers P.M., £6/-, plus 10/- packing and carriage.

**Small Mains Transformers.** Our own make. Input 200/240v. Output 6·3v 2A, 8/6, post 9d. 13v CT. 3A, 14/6, post 1/-; 24v 4A, 16/6, post 1/-; Input 200/230v. Output 240v 60 ma. 6·3v 1·5A. For use with metal rectifiers, 15/- each, post 1/-.

Input 200/240v. Output 275·0-275-120 mA 6·3v 3A 5v 2·5A, 18/6. Post 1/-. Also 300·0-300v at the same price.

**Type AI271.** Microphone pre-amplifier. Contains EF36-2 trans, resistors, condensers, etc., in black metal case 5" × 5" × 5", 10/- each.

**Twin Gang .005 Mfd.** variable condensers, 5/6. Midget ditto, with dust covers, 8/-. Three-gang, 8/6. All post paid.

**New IN34 Crystal Diode Cartridges,** 5/3. Post paid.

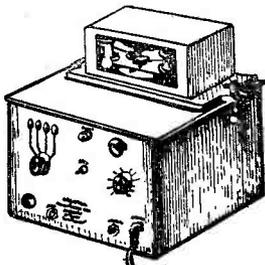
**Miniature Neons,** 110v, 1/6 each. Post paid. **First Grade Single PVC Copper Wire,** 100 yds., 4/6, 50 yds. 3/-, ideal for bells-chassis wiring, etc. Colours pink, white, blue. **Headphones,** 2/6 pair. Postage 9d.

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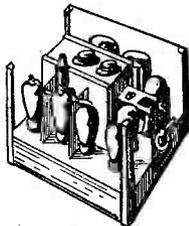
**WIRE RECORDERS.** A huge new purchase of these wonderful machines enables us to establish a new record low price. Differing slightly from those previously offered, they consist of a four stage (6S17) wide band amplifier which is used as record/playback amplifier, or as a preamp for PA purposes. Two independent stages of negative feedback are incorporated; the erase



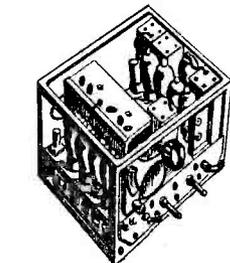
oscillator, which applies a super-sonic bias during recording, and the very rugged motor, are built into this unit. The detachable recording head, using machine-cut gears throughout, contains timing scales, an automatic switch, and sufficient wire for 40/45 mins. There is provision for high impedance mike, or pickup input. Designed for the U.S. Navy, they will give a lifetime of trouble-free use. Power requirements are only 115 watts at 115v AC. 50/60 c.p.s. PRICE £37/10/-... and NO WAITING.

**COMMUNICATION SET RG42.** Containing 13 valves (inc. rect), they cover 1.5-26 mc/s, but will pull down to 30 mc/s, and have variable selectivity, BFO, and all normal controls. There is provision for phone or speaker operation. Power pack is built in. Marconi manufacture, and in tip-top condition £20.

**S.L.C. RECEIVERS.** Are you interested in TV?... or do you want to get down to "2"? The SLC receiver, with 2 RF's, tunable oscillator, 4IF's staggered from 9.5 to 13.5 mc/s, det, and all necessary output stages... plus additional stages, fitted for specialised purposes, forms the ideal unit for either of these functions. 17 valves in all, SACRIFICED at 30/-. Circuit and our TV modification data, 3/-.



**TR9 RECEIVERS.** This six-valve battery operated Rx is one of the greatest bargains ever offered... Six valves, ready to use... and easily converted for other bands... a TRF receiver that will amaze you. Our price ONLY 15/6, carr. paid.

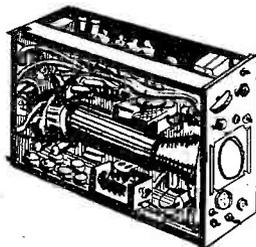


**RECEIVER TYPE 21.** 9 battery operated valves! A superhet from 4.2—7.5 mc/s and a double superhet from 18.31 mc/s, they incorporate a BFO and a crash limiter. These sets, the Rx of the W/S21, have been removed from the transmitter/PU section and appear to be new. OUR PRICE ONLY 35/- carr. paid, with full circuit. Suitable batteries 7/6.

**NOISE LIMITERS.** Another huge purchase of these COMPLETE kits, containing double diode valve in a complete sub-assembly, with all small parts and an instruction manual, which although it refers to one particular American Rx, is sufficiently comprehensive to enable you to fit the unit to ANY superhet. OUR PRICE 3/6, post free.

**COMMUNICATION SET RG39.** A seven-valve "super" superhet, covering 100 kc/s—26 mc/s (but easily modified down to 10), with built-in BFO filter, etc. Coils are turret mounted, and the unit appears to be of Marconi manufacture. A REAL communications set, for the price of a toy!... with power pack £17/10/-.

**RECEIVER TYPE 25.** The Rx unit of the 1196... You read G6FW's article in Aug. S.W.M. on how to convert this unit, but even as a unit for stripping the IF's, valves, etc., make it one of today's most attractive buys. RADIO EXCHANGE PRICE 20/6, carr. paid.



**INDICATOR 198.** With 3" CRT, 4 SP61's and 3 EA50's, and a host of pots, condensers, switches and resistors, it is contained in an attractive steel case and forms the ideal unit for building a C.R.O. or modulation monitor. BRAND NEW, in sealed cartons £2. Still a few, new, but slightly store soiled for 30/-.

All goods sold as used unless otherwise stated.

**RADIO EXCHANGE CO.**

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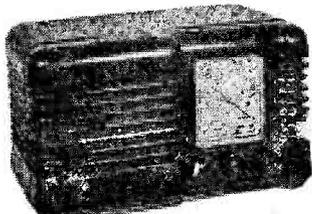
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PRICE: £8/15/-, ready for use

Complete Kit of Parts with diagrams: £4/19/6, inc. Purchase Tax.

## A NEW A.C. ALL-WAVE SUPERHET CHASSIS

7 Valves (plus metal rectifier) for 200/250v, 40/60 cycle AC mains.  
4 Wavebands, 15-6-52, 51-200, 200-550 and 900-2,100 metres.  
Pick-up input. Uses 6K7, 6K8, 6K7, 6B8, 6J7 and 2-6V6 in push-pull, giving an output of 10 watts.  
Specially designed OP transformer to match 8V's to 3 and 15 ohm speakers.  
Negative feedback is applied over 3 stages giving a high fidelity output.  
Completely wired and tested, £15/7/9, inc. Tax.  
Our Universal model is still available at £16 built, or £13/8/- in kit form.

## VALVES

We have large stocks of new boxed valves at very low prices—2003, 6SL7, 6SA7, 6AC7, 6SU7, 6SK7, 6V5, 6U5, 6J5, 6FA, 6C5, 6SN7, 6Q7, 6SH7, 6K7, 6X6, 6J7, 6K8, 5Z4, 5U4, 6SC7, 12Q7GT, 12K7, 12K8, 1S5, VR55, VR56, VR137, CV86, 807, VU39, VR37, all at 8/6 each. 6B4G, 6H6, HL23, CV78, 854, CV6, at 5/- each. 1R5, 717A, U74, 2X2, 1L5, VR138, at 7/6 each. 5Z3, 6K4, 25Z6, 25Z5, 1L5N, 3D8, at 8/6 each. 6F6, 1L6C, VU134, VR116, VU133, at 10/- each. CV102, VR65, VR92, at 3/6 each. 1T4, 6/-, RL18, 12/6, VR91, 5/-.

## MOVING COIL METERS

All 2 1/2" outside diameter. 1 mA, 7/6; 5 mA, 5/-; 50 mA, 8/6; 150 mA, 9/-; 20 amp, 7/8; 40 amp, 7/6; 20v, 5/9; 40v, 5/9; 500 microamps, 7/8. All 3 1/2" outside diameter. 1 mA, 15/11; 30 mA, 10/8; 200 mA, 8/6; 500 microamps, 19/8. Thermocouple meters, 2 1/2; 2.5 amp, 5/-; 3 amp, 5/-; 3.5 amp, 5/-, 3 1/2; 2 amp, 8/6. Electrostatic 3 1/2; 2kV, 25/-; 4 1/2 5kV, 50/-.

## PREMIER L.F. CHOKES

40mA, 2/6; 60 mA, 5/6; 100 mA, 8/6; 150 mA, 16/-; 250 mA, 25/-.

## PREMIER MIDGET RADIO RECEIVER

Due to greatly increased production we are now able to offer this receiver at a greatly reduced price. The Receiver is housed in an attractive bakelite case, 12" long x 5" wide x 8" high. The valve line-up is 6K7, 6J7, 6V6 and a Selenium Rectifier in the AC model, and 6K7, 6J7, 25A6 and a Selenium Rectifier in the AC/DC model. Both are for use on 200 to 250v mains. The dial is illuminated, and the receiver presents a very attractive appearance. Coverage is for the medium and long wavebands.

## PREMIER MIDGET SUPERHET RECEIVER

This powerful Midget Superhet Receiver is designed to cover the short-wave bands between 16 and 50 metres and the medium wavebands between 200 and 557 metres. Two models are produced, one for 200-250v AC mains, and the other for 200-250v AC or DC mains. Both are supplied in the same plastic cabinet as the TRF Receiver. The AC valve line-up is 6K8, 6K7, 6Q7, 6V6 and a selenium rectifier. The AC/DC line-up is the same, with the exception of the output valve which is a 25A6. The dial is illuminated, making a very attractive receiver.

PRICE: £8/19/6

Complete Kit of Parts with diagrams, £8/19/6, inc. Purchase Tax.

PLASTIC CABINETS as illustrated above. In Brown, 17/6. In Ivory, 22/6

## "PREMIER"

The Television Kit  
YOU can build for  
£17 · 17 · 0

This Receiver consists of 4 units:—  
The Sound Receiver, Vision Receiver, Time Base and Power Pack. As is usual in all Premier Kits, every single item down to the last bolt and nut is supplied. All chassis are punched and layout diagrams and theoretical circuits are included.

The cost of the Kits of Parts is as follows:  
The Vision Receiver with valves £3/13/6  
Carriage . . . . . 2/6  
The Sound Receiver with valves £2/14/6  
Carriage . . . . . 2/6  
The Time Base with valves . . . £2/7/6  
Carriage . . . . . 2/6  
The Power Supply Unit with valves £6/3/6  
Carriage . . . . . 5/-  
Tube Assembly with VOR97  
Tube and 6" PM Speaker . . . £2/18/6  
Carriage and packing . . . . . 2/6

The Instruction Book costs 2/6, but is credited if a Kit for the complete Televisor 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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FOR THE RADIO AMATEUR & AMATEUR RADIO

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*Published the Friday following the first Wednesday each month at 49 Victoria Street, London, S.W.1                      Telephone: Abbey 2384.*

*Annual Subscription: Inland 20s. Abroad 22s. post paid*

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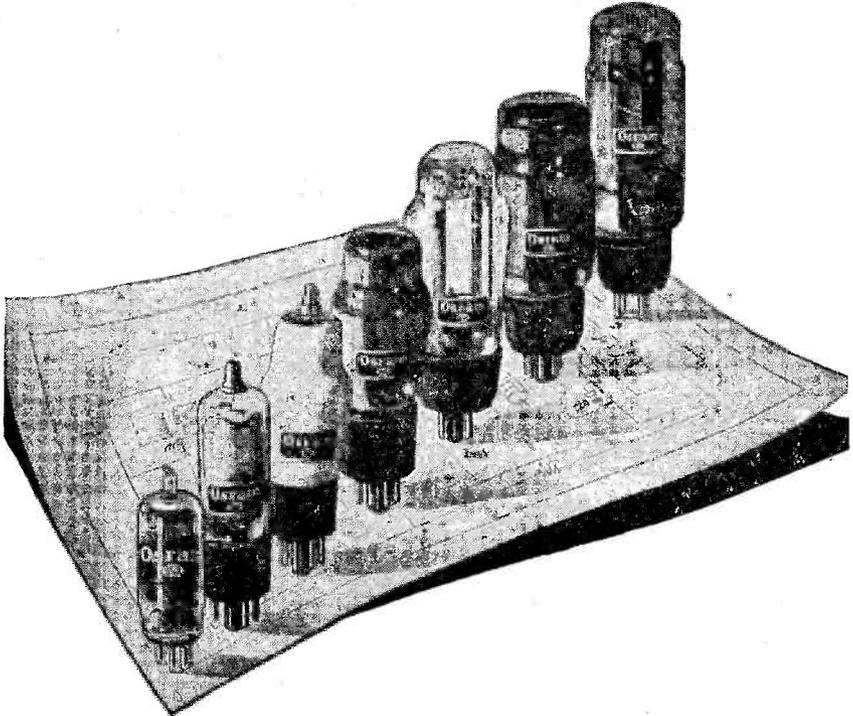
### AUTHORS' MSS

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## EDITORIAL

## Specialising

The Radio Show which concluded a few weeks ago was notable for the large amount of space, energy and enthusiasm devoted to exhibits having no connection whatever with sound broadcast reception or television. Though of course incomparably larger than the "wireless exhibitions" of the 1920's—which were as a magnet to all the keen practitioners—it is probably true to say that the 1949 Radiolympia came nearer to recapturing the technical enthusiasms of those early days than any show since 1930.

This is as it should be. There is nowadays a large technically-minded public for these well organised and extremely interesting exhibitions. Thus, spectacle is not by any means the only attraction, either at the Radio Exhibition, the Motor Show or the Engineering Exhibition. A great many people go to them not just to look, but also to learn and to criticise. There was at one time a danger that Radiolympia would lose its purely technical appeal, and some of the shows staged in the late 1930's reflected this tendency.

But the Exhibition just concluded was of considerable interest in the purely radio engineering sense. It went part of the way at least to demonstrating the extent to which radio has developed in the last ten years, and the rapidity of its progress. Indeed, the pace has been so fast that few qualified engineers can claim to have more than a vague working knowledge of applications outside their own immediate sphere of activity.

On this theme, one can see the parallel in the field of Amateur Radio. Until about 1930, most amateurs of experience were reasonably competent on all bands then in use and had a sound grasp of the current techniques. But since then Amateur Radio also has developed. It has in fact widened its scope to such an extent that now most operators automatically tend to become specialists in the activity most appealing to them, and no longer have time or opportunity to become equally expert in all phases of the game.

*Austin Foxgk  
G6FO*

*This is the second in our new series of descriptive articles on the design and construction of up-to-date British equipment for the amateur bands. The transmitter discussed here is not only entirely suitable for the G3-plus-3 with his new licence, but will also meet the requirements of all who wish to operate equipment of the highest possible efficiency at the lower power limits. The actual construction and general "putting together" of the apparatus described in this series is intentionally being covered in some detail so that the units can be built exactly as described.—Ed.*

## A Transmitter for Beginners

### Modern 25-Watt for CW on the DX Bands

#### PART 1

By J. N. WALKER (G5JU)

IT is desirable to make clear, at the outset, two points concerning the design and construction of this transmitter. In the first place, it is intended primarily for the newly licensed amateur who has not previously constructed a transmitter for any frequency—hence, the fairly full details given may be of no particular interest to the "old timer." Secondly, the transmitter is not just another CO/PA—it has been engineered to give high efficiency CW operation on two bands (7 and 14 mc) with absolute stability. Thus, it is also suitable for anyone wanting a completely reliable transmitter for home station, portable or field day use.

#### Essential Requirements

Let us consider first the essential requirements for a beginner's transmitter. The following points, of more or less equal importance, must be borne in mind :

- (a) Economy.
- (b) Ease of construction.
- (c) Ease of adjustment and operation.
- (d) Complete stability (in every sense).
- (e) Efficiency.
- (f) Frequency coverage.
- (g) Power input.

Economy must be thought of in two ways—short term and long term—and it is wiser, in the long run, to budget for components which will permit the same transmitter to be used at higher power at a later date or, alternatively, which can be incorporated in another design for higher power. Also under Economy must be reckoned such factors as choice of valves and simplicity of power supplies.

Ease of Construction is a variable—some newcomers will already have had general experience of radio equipment construction,

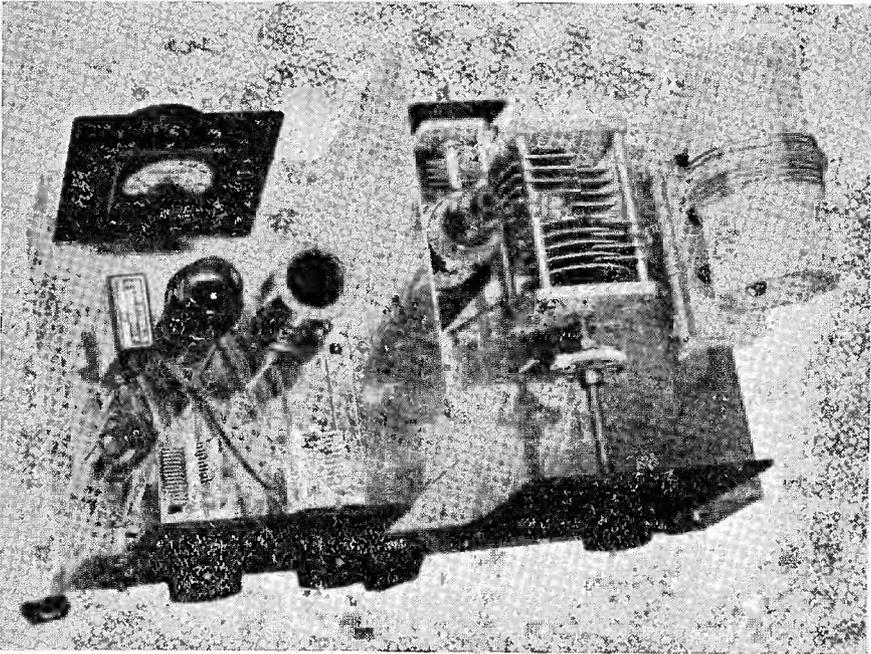
particularly of receivers, and will find no difficulty with a transmitter of the type to be described. At the same time, it is a good thing to make construction as simple as possible. Coupled with Ease of Construction is ready availability of all the parts employed. In the present design, care has been taken to choose only components and valves which are easily obtainable. Ease of Adjustment is definitely important and has received full consideration.

Power Input is bound up with the initial licence, which allows 25 watts input on the majority of the frequency bands allotted to amateurs. The efficiency needs to be high, to make the most of the 25 watts input. CW operation only is catered for.

The two most popular bands are 7 mc and 14 mc—hence, the transmitter has been designed primarily for these two bands. Modifications can be made if desired, to include 3·5 mc and possibly 1·7 mc in the coverage.

Last, but by no means least, comes Stability, implying constancy of frequency, accuracy of frequency and freedom from spurious emissions. The first two are assured by the use of crystal control. Incidentally, when an accurately calibrated frequency meter is not available, the Post Office authorities require a crystal calibration certificate as proof that radiation is kept within the allotted bands. Also under Stability may be classed the quality of the emitted signal—and by the quality of his signal is an amateur often judged. The achievement of a clean, clear-cut note is assisted to a considerable extent by the use of crystal control.

Freedom from spurious oscillation is essential—otherwise, power is wasted in the transmitter, local amateurs may experience severe interference and nearby broadcast receivers are also likely to be affected.



General view of the transmitter complete, as described in detail in the text.

### Valve Combination

Before the war, triode transmitting valves were much more in evidence than is the case to-day. There is much to be said in favour of the beginner commencing operations with triode valves, which, on the whole, tend to have fewer vices than the popular beam tetrode type of valve. However, there are other factors to be considered. For one thing, more drive is required by a triode than by a tetrode and more power has to be employed in the exciter stage, which means bigger and possibly additional valves. In turn, a larger power unit has to be provided, and the overall cost inevitably increases. Again, the choice of triode valves is somewhat restricted, there being few small transmitting types readily available.

On the other hand, beam tetrodes are in plentiful supply, are reasonable in price, and, provided suitable precautions are taken, can be made to operate efficiently, economically and with complete stability. The types chosen in the present design are the 6V6, which may be metal or glass, and the 807.

### Circuit Discussions

Almost a whole issue of the *Magazine* would be taken up if all the points relative to

the complete circuit, shown in Fig. 1, were treated in detail. Suffice it to say that a good reason exists for the inclusion of every component shown, and for certain wiring features—for example, the rotor connection of C12 going to the *cathode* of the 807 and not to chassis. Some of the points may be relatively unimportant but the collective result is a thoroughly reliable transmitter, and, to reproduce the results given by the original, every detail should be followed closely.

The first valve (a 6V6) is used as a straight crystal oscillator on 7 mc and as a triode on 14 mc. Hard things have occasionally been said about the triode circuit but, properly designed, it is absolutely reliable and thoroughly efficient. The point to watch is the inductance of the cathode coil L1—this must be much less than would normally be used in a circuit operating at the same frequency. It follows that the parallel capacity must be relatively high—hence the inclusion of a fixed condenser of 100  $\mu\mu\text{F}$  (C2) in parallel with the tuning condenser of 140  $\mu\mu\text{F}$  (C1). Across L1 is wired a two-pin socket, into which fits a short circuiting plug, for use when output on 7 mc is required.

Also important in this stage are the grid and anode stopper resistors and the arrangement

## List of Parts and Values

## A TRANSMITTER FOR BEGINNERS

- 1 Transmitting Coil Base, Cat. No. 1092 *Eddystone*  
 2 Transmitting Coil Sub-bases, Cat. No. 1091 *Eddystone*  
 2 Transmitting Coil Formers, Cat. No. 1090 *Eddystone*  
 1 Small Coil-former (for L1), Cat. No. 646 *Eddystone*  
 2 Plug-in Formers (for L2/L3), Cat. No. 537 *Eddystone*  
 1 Coil Base, Cat. No. 964 *Eddystone*  
 1 RF Choke, Cat. No. 1022 *Eddystone*  
 3 Direct Drive Dials, black, Cat. No. 595 (or silver) Cat. No. 638) *Eddystone*  
 1 Pointer Knob (for switch), Cat. No. 1027 *Eddystone*  
 1 Flexible Coupler, Cat. No. 50 *Eddystone*  
 1 Valve Cap Connector, Cat. No. 562 *Eddystone*  
 1 Miniature Insulator, Cat. No. 1019 *Eddystone*  
 1 Extension Control, Cat. No. 1008 *Eddystone*  
 1 Octal Valveholder (for V1), List No. VH85 *Bulgin*  
 1 5-pin American Valveholder (for V2), List No. VH75 *Bulgin*  
 1 Red Signal Lamp fitting, List No. D180 *Bulgin*  
 1 Yaxley type Switch 6-pole, 3-way, List No. S438 *Bulgin*  
 1 5-way Tag Strip, List No. T20 *Bulgin*  
 1 2-way Tag Strips, List No. T18 *Bulgin*  
 1 1-way Tag Strips, List No. T32 *Bulgin*  
 1 Insulated Short-circuiting Jack, List No. P72 *Igranic*  
 1 Moving-coil Meter 50 mA FSD, 2 in. square flush *Pullin*  
 1 Meter mounting bracket 4 in square (with hole  $2\frac{1}{8}$  in. diam.) *Philpott*  
 1 Valve Screen,  $2\frac{1}{2}$  in. high, 2 in. diam. matt black *Philpott*  
 1 Valve type 6V6 (or 6V6G or 6V6GT) (V1) *Brtmar*  
 1 Valve type 807 (V2) *Brtmar*  
 1 Crystal, mounted. Frequency in 7 mc band *Brookes*  
 1 Crystal Holder *Brookes*  
 1 5-pin Plug, List No. L1258 *Belling-Lee*  
 1 5-pin Socket, List No. L331 *Belling-Lee*  
 1 2-pin Plug, List No. L1286A *Belling-Lee*  
 1 2 pin Socket, List No. L607 *Belling-Lee*  
 4 Battery Plugs (2 red, 2 black), List No. L341 *Belling-Lee*  
 2 9-volt Grid Bias Batteries *Ever-Ready*  
 1 6.3 volt MES lamp *Osram*
- Metal Parts (all G.L.G. Radio)**  
 1 Reinforced Aluminium Chassis,  $14 \times 8 \times 3$  in.  
 1 Aluminium Screen 16 gauge, 6 in. high by 8 in. long, with fixing flange.  
 2 brackets for L1 and C10, each  $1 \times \frac{3}{8} \times \frac{3}{8}$  in. wide  
 1 bracket for coaxial socket,  $1\frac{1}{2}$  in. long,  $1\frac{1}{2}$  in. wide,  $\frac{3}{8}$  in. hole near top  
 5 1 in. pillars, 6BA clear, for coil-holder and crystal-holder  
 2  $\frac{1}{2}$  in. pillars, 4 BA clear, for V1 holder (but 1 in. pillars also suitable)  
 2  $\frac{1}{2}$  in. pillars, 4 BA clear, for V2 holder  
 2 doz. 6 BA Screws,  $1\frac{1}{2}$  in. long  
 3 doz. 6 BA Screws,  $\frac{1}{2}$  in. long  
 2 doz. 4 BA Screws,  $\frac{1}{2}$  in. long  
 1 doz. 4 BA Screws,  $\frac{3}{4}$  in. long
- 6 doz. 6 BA nuts  
 3 doz. 4 BA nuts  
 6 doz. 6 BA shakeproof washers  
 3 doz. 6 BA plain washers  
 3 doz. 4 BA shakeproof washers  
 2 doz. 4 BA plain washers
- Masonite Panels**  
 2 pieces, each  $6 \times 5$  in.  
 1 piece,  $2 \times 5$  in.  
 (i.e. a piece  $14 \times 5$  in. or larger is required)
- Miscellaneous**  
 12 ft. 18 SWG enamelled wire (for L1 and L5)  
 15 ft. 20 SWG enamelled wire (for L2)  
 15 ft. 24 SWG enamelled wire (for L3)  
 25 ft. 16 SWG bare or enamelled wire (for L4)  
 Small quantity resistance wire for R14  
 10 ft. good quality 2 or 3 mm. sleeving.  
 10 ft. 20 SWG tinned copper wire  
 40 ft. 7/-029 PVC flex, for heater wiring and for making up power supply cable. Several different colours for preference.
- Condensers**  
 C1 = 140  $\mu\text{F}$ , Microdenser, Cat. No. 586 *Eddystone*  
 C7 = 54  $\mu\text{F}$ , Microdenser, Cat. No. 589 *Eddystone*  
 C10 = Neutralising Condenser, Cat. No. 481 *Eddystone*  
 C11 = 12.5  $\mu\text{F}$ , Microdenser, Cat. No. 580 *Eddystone*  
 C12 = 50-50  $\mu\text{F}$ , Split Stator, Cat. No. 612 *Eddystone*  
 C2 = 100  $\mu\text{F}$ , Silver Mica type CM23 *T.C.C.*
- C3, C4, C5, C6  
 C9, C14, C15  
 C16, C17 = .002  $\mu\text{F}$ , Moulded Mica type M2M *T.C.C.*  
 C8 = .0005  $\mu\text{F}$ , Moulded Mica, type M2N *T.C.C.*  
 C13 = 0.5  $\mu\text{F}$  (or  $2 \times .25 \mu\text{F}$ , in parallel) Paper block type *T.C.C.*
- Resistors (all Erie)**  
 R1 = 47,000 ohms,  $\frac{1}{2}$ -watt  
 R2, R10 = 22 ohms,  $\frac{1}{2}$ -watt  
 R3, R11 = 100 ohms, 1 watt  
 R4 = 4,700 ohms, 2 watt  
 R5, R12 = 12 ohms,  $\frac{1}{2}$ -watt (3 off) (see text)  
 R6, R7 = 10,000 ohms,  $\frac{1}{2}$ -watt  
 R8 = 10,000 ohms, 2 watt  
 R9 = 47,000 ohms, 2 watt  
 R13 = 330 ohms,  $\frac{1}{2}$ -watt  
 R14 = see text  
 R15 = 430 ohms, 2 watt

for preventing the screen voltage assuming too high a value. Note further that no RF choke is included.

Plug-in coils are used in the anode circuit of the 6V6, to permit quick change of frequency. L2, the anode coil, is tuned to resonance at the operating frequency by C7, the rotor of which is returned to earth. The reason is to remove high voltage from the spindle, since the con-

denser is mounted alongside C1 and both spindles are fitted with metal dials.

A separate winding (L3) is employed in the grid circuit of the 807, the benefit secured being the removal of the grid condenser and leak (C8 and R7) from the high potential (RF) side of the grid circuit to the low potential side, thereby preventing the damping which would occur if R7 was placed directly across the

circuit. The secondary winding L3 is made self-resonant and, being fairly tightly coupled to L2, it possesses a wide band-width. No difficulty will be found in winding the coils, full details being provided later.

R4 drops the voltage applied to the anode of the 6V6, the value given being correct for an HT voltage of 300 to 350. A higher resistance (6,800 to 10,000 ohms) will be necessary for a higher HT voltage. The screen supply is derived from the junction of the potentiometer formed by R8 and R9, with an additional series dropping resistor R6.

The screen supply for the 807 is also taken from the junction of R8 and R9 (the keying jack comes between these two resistors). This time the series resistor R13 is there to provide decoupling only and has a relatively low value.

The most important feature about the 807 PA stage is the inclusion of a neutralising condenser. Now, in the case of a triode, neutralisation is liable to cause a newly fledged amateur some bother, but no one should be put off on that account. Fitted as described, neutralisation is almost automatic and adjustment is most unlikely to be required.

To say the least, neutralisation of a beam tetrode amplifier is highly desirable and is a major factor in the achievement of real stability. (More information on this subject was given in the October 1948 issue of the *Short Wave Magazine*.) A split-stator type of tuning condenser becomes necessary in the anode circuit and this is beneficial also in enabling a higher L to C ratio to be used, with greater efficiency than would otherwise be the case.

The output capacity of the 807 is given as 7  $\mu\mu\text{F}$ , a value which is appreciable when compared to the total tuning capacity of about 25  $\mu\mu\text{F}$ . This 7  $\mu\mu\text{F}$  is across one side of the circuit only, with the result that the tank circuit is unbalanced—more RF voltage appears at one end than the other, the physical centre tap of L4 does not coincide with the electrical centre tap, and the link winding L5 is also not around the real centre of L4. To correct the unbalance, a small variable condenser (of high quality to avoid introducing any loss) is connected across the other side of L4 and adjusted to a value equivalent to the 807 output capacity (C11 in the circuit).

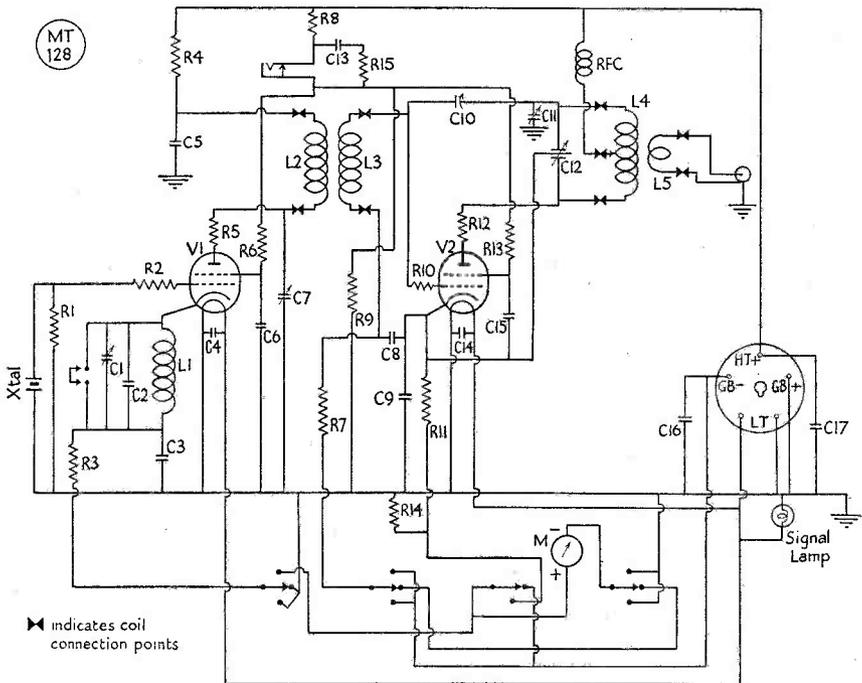


Fig. 1. Circuit complete of the Beginner's Transmitter, designed for 25-watt operation on the 7 and 14 mc bands at the highest obtainable efficiency. Points on the circuit are discussed in the text.

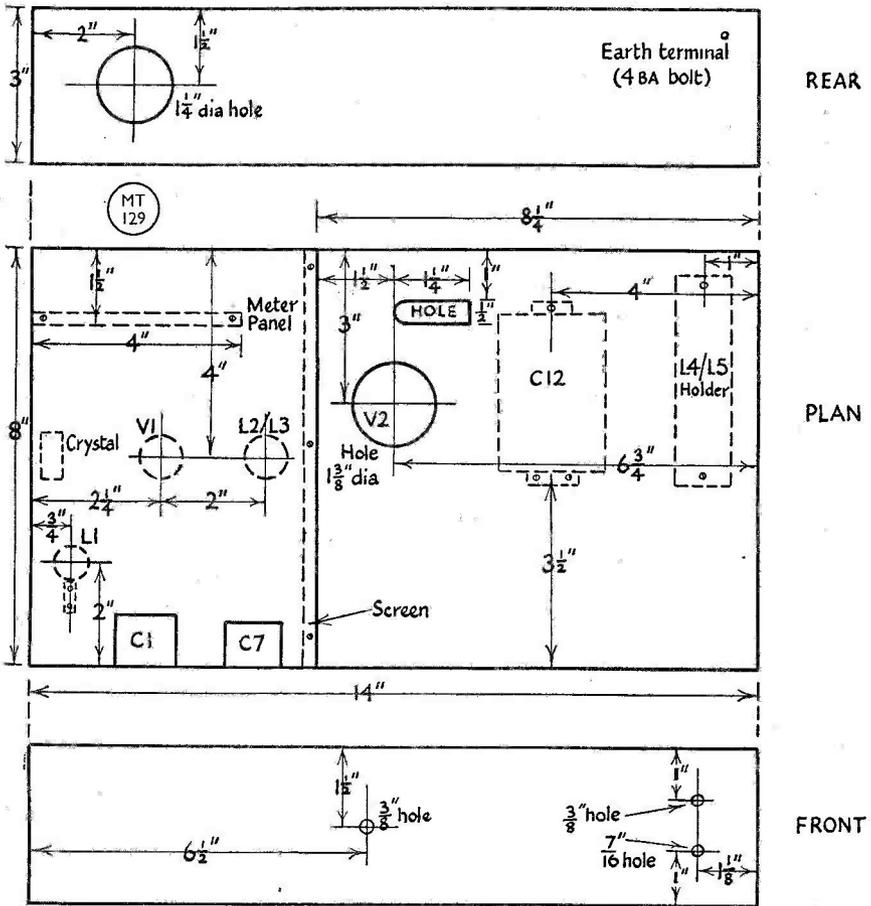


Fig. 2. Chassis drilling details for the Transmitter. For those who would like to buy the metal work complete, G.L.G. Radio can supply chassis, brackets and metal stock, ready drilled, as listed in the Table of Parts and Values.

RF output is taken from the link winding via a coaxial socket and a length of coaxial cable, to an aerial coupling unit. The various power supplies are fed in through a Belling-Lee 5-pin plug and socket.

**Bias**

Grid bias for the first valve is provided mainly by the grid resistor R1. A small amount is developed across R3 but the main purpose of the latter is to improve decoupling.

It might be expected that bias for the 807 would be derived automatically but the operating conditions of the output stage can

be adjusted much more satisfactorily if a certain amount of negative bias is constantly present. Two standard grid bias batteries in series give 18 volts and this is sufficient to reduce the anode current of the 807 to a low value when no drive is being applied. Approximately 40 volts bias are required for correct operation under Class-C conditions and the additional 20 to 25 volts are derived from the flow of grid current through R7.

**Decoupling**

Thorough decoupling is provided throughout the design. The "earthy" connection from

by-pass condensers associated with V1 are taken to a central earthing point on the chassis as, with 14 mc operation, the cathode assumes an RF potential. With the 807, by-pass condensers are returned to the cathode.

By-pass condensers are wired across the heater pins of each valve and further capacities are connected from chassis to HT positive and to GB negative pins on the power socket. These condensers prevent stray RF leaving the transmitter and, perhaps more important, prevent radiated RF picked up on the supply leads being fed into the transmitter—a common source of instability, modulation hum and poor notes.

**Meter Switching**

Proper adjustment of the transmitter calls for means of measuring the anode current of the first valve, and the grid and anode currents of the second valve. A single meter is employed for all three purposes and is brought successively into circuit by rotation of a switch fitted to the front panel. The meter has a full scale deflection of 50 mA and reads directly in the first two positions—in the third position (total current through V2) it is shunted and the reading indicated is doubled to arrive at the correct value.

**Keying**

There are a number of methods of keying applicable to the transmitter. The one chosen is the result of long experience and gives smooth keying without clicks. The screens of both valves are keyed simultaneously—if either one only is keyed, a slight amount of RF will be present in the PA tank circuit with the key up. A simple but effective filter, consisting of C13 and R15 in series, is connected across the keying jack. To ensure freedom from

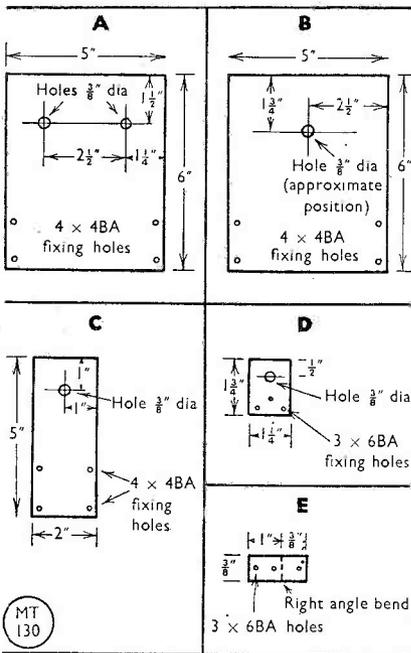


Fig. 3. Certain components are carried on Masonite panels and metal brackets. Details in this sketch are for (A) Panel to hold C1, C7; (B) Panel for C12 dial; (C) Mount for C11; (D) Bracket for coax socket; (E) Fixings for L1/C10, two off.

breakdown, C13 and R15 must be adequately rated, as both are subjected to severe voltage and current surges.

*(Part II of this article will follow)*

**CALL BOOK POINTS**

We are frequently asked either to supply the *Radio Amateur Call Book*, or for the address from which it can be obtained. We are not the publishers. The Call Book is an American quarterly which lists amateur stations throughout the world and until recently could be ordered through agents in this country. As American book imports have been severely curtailed under the new economy measures (and for the second time in the last three years!), it is not at present possible for us to give any address for ordering.

But on this point, we always state the position with the latest G listings as each issue appears. Thus, if your call was printed in "New QTH's" in the *Magazine* at any time

up to May last, you know it is in the Summer 1949 edition of the *Call Book*—because a note to that effect was given on p. 459 of our August issue. Hence, even if you are unable to obtain a copy of the *Call Book* for yourself, you can tell your overseas contact that your QTH is "OK in Summer edition." This is one of the reasons why we do a careful analysis of each quarterly issue of the *Call Book*. The next will appear in the December *Short Wave Magazine*, covering the Fall (Autumn) *Call Book*.

Of course, all this can only apply if your QTH has been passed to us for appearance in our "New QTH" feature.

# Extended Double-Zepp for Twenty

## Development for Omni-Directional Working

By A. G. WITHAM (G3AEN)

IT has always appeared to the writer that many of the admirable articles on aerial design published in this *Magazine* have done little else but arouse envy in the heart of the amateur who has only limited ground-space at his disposal. Rotary beams (though obviously the ideal answer to the quest for the omni-directional aerial) require much more width than the average suburban garden; the necessary supporting tower, besides being expensive, tends to change the aspect of the house into a miniature Brookman's Park. Obviously, what is required is something on more conventional lines, which will not arouse the suspicions of the most distrusting neighbour and which, giving as great a gain as possible in all directions, does not require tedious tuning, or call for too much hard-earned cash.

One other factor, which never seems to receive the consideration which it deserves, is the necessity for end-feeding the aerial, as in most cases the provision of the more usual and indeed more correct centre-feed would involve running the feeder parallel to the aerial, thereby running the risk of the unpleasant effects of induced aerial currents and consequent unbalanced feeders. Although it is admitted that end-fed aeriels are deprecated because of the difficulty of providing a balanced feed, the writer has found from experience that with reasonable care these difficulties can be overcome and the removal of the feeder from the stronger aerial field does help to minimise the effects of induction currents.

### Layout of QTH

The writer's QTH conforms with the average layout of a suburban dwelling, with a garden about 25-ft. to 30-ft. wide extending approximately 90-ft. behind the house. By bilateral agreement (these XYLs!) two poles were erected, one at the end of the garden and one at the side of the house, giving a wire direction of NW-SE (see Fig. 1). It is not possible to erect any twin parallel wire arrays, as this would necessitate overhanging the neighbour's garden, nor is there room for a stacked

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This is a very interesting and instructive discussion on the general problem of overcoming local site difficulties in the search for all-round DX coverage. There are many readers who can truly say they have even less space than our contributor—nevertheless, his own solution may give them not only ideas, but also hope and encouragement.—Ed.

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array, because of trees and bushes directly below the wire line. The choice of aeriels is therefore limited to single wire types which all have the same failing—poor low angle radiation off the ends. It was therefore decided that those DX countries lying to NW and SE would have to be neglected and attention was turned to improving results in other directions.

### Choice of Aerial

An extended double-Zepp aerial, which gives a gain of 3 dB in its preferred direction, seemed to be the most suitable choice, but no trace of any suggestions regarding end-feeding could be found. The radiation pattern is as shown in Fig. 2 and it will be noted that an arc of approximately 50 deg. is covered on each side of the aerial. In addition there are four minor lobes each making an angle of 35 deg. with the line of the wire. The increase of 3 dB over a dipole in its optimum direction makes a worth-while improvement, especially as it is accompanied by a decided reduction in QRM from the unfavoured directions. Armed with a standing-wave meter of the Maxwell bridge type an aerial was erected and the following suggestions may be a help to those who would try their luck.

### Tuning of the Aerial

The dimensions given in Fig. 3 should serve as a useful guide and are based on accepted formulae of 0.64 wavelength for each section of the top and 0.15 wavelength for the centre phasing stub.

The tuning to resonance of the top involves principles which are no doubt familiar to all and which apply equally well to any type of single-wire aerial.

First a length of feeder, longer than a  $\frac{1}{4}$ -wavelength and with an open end, is supplied with power from the Tx, at the required working frequency. The position of the voltage node is detected by a standing-wave meter actuated by voltage and the position is marked (see Fig. 4a). The feeder is now connected to the aerial and is again fed with power at the reference frequency. The new position of the voltage node is checked and compared with the previously marked position (see Fig. 4b). If the new position is closer to the aerial, the aerial is too long, and *vice versa*. The top is

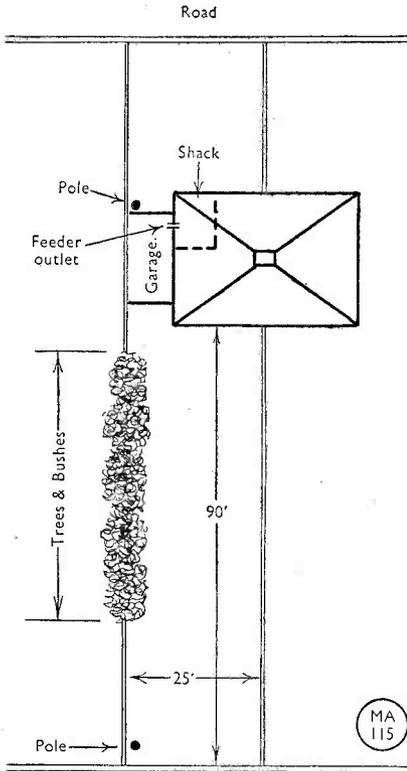


Fig. 1. General layout plan of the QTH of G3AEN. The discussion is based upon the shape of the space shown here.

then adjusted until the voltage node coincides with the original marked position.

It should be noted that with the dimensions of the flat top given in Fig. 3, the easiest method of adjusting the length of the aerial is by varying the length of the centre phasing stub. This is permissible as the lengths of the halves of the flat top are not very critical.

**Matching**

Having adjusted the aerial to resonance, it can be put into service immediately, if it is the intention to use tuned feeders for operation on 14 mc and 28 mc. As the writer prefers flat lines, which although limiting the aerial to single band working, are less troublesome from the aspect of insulation, a standing-wave meter of the Maxwell bridge type was constructed and with its help the matching of 300-ohm lines proved less than an hour's work.

With the bridge interposed between the Tx

and the feeder, sufficient power at the reference frequency is applied to enable the standing-wave ratio to be measured. In the writer's case, the ratio was measured to be 8, using a 300-ohm feeder and indicating an aerial end resistance of 2400 ohms. The "dead" feeder was carefully pruned until balance in the feeders was obtained—this condition was met with the dead feeder 6 in. shorter than the "live" side. From the dimensions given in Fig. 5 (based on formulæ to be found in most text-books) a matching stub was constructed and connected to the feeder. The standing-wave ratio was again measured and proved to be less than 2. Since the length of the feeder from the stub to the Tx is only 18 ft., further

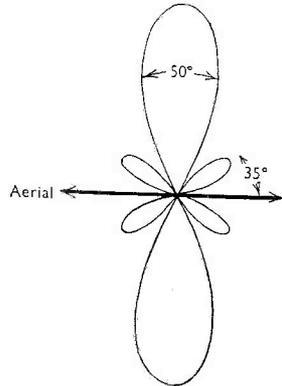


Fig. 2. The familiar "free-space radiation pattern" of the extended double-Zepp aerial; it is hardly ever like this in real life!

adjustments were considered unnecessary. The dimensions given in Fig. 3 are the actual dimensions after all the above adjustments were made, but naturally they may differ from those obtained in other locations.

**Results**

Results were far in excess of expectation and on 25 watts CW, ZL, VK, KG6, JA, UA Ø PY, LU, CE and CX were raised quite regularly, even with visitors in the shack! DU was also worked twice with a report of 589, although of course no QSL's will be forthcoming because of the restrictions on Amateur Radio there. Over a period of three months this aerial gave far better results than any which had been previously tried and contacts with the above named countries became monotonous by their regularity! Signal reports were exceptionally good, S6 to S7 being the average from the DX stations and S8 to

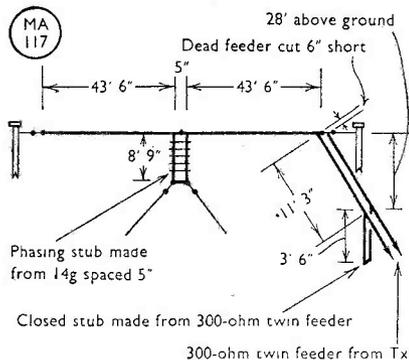


Fig. 3. Dimensions of the extended double-Zepp for 14.1 mc, as used at G3AEN.

S9 the usual from the European countries on the beam.

**Development**

Being a true-to-type amateur, naturally this state of affairs could not be considered final, and attention was turned to the original problem of raising DX off the ends of the aerial, *i.e.* in the NW and SE directions. A few hours' thought and a bit more paper work resulted in the idea of an additional half-wavelength at right angles to the main aerial. From the estimated radiation diagram this would achieve practically omni-directional propagation, *without* reducing the gain from the original aerial. It is true that the advantage of the reduction in QRM would be lost, but more value was placed on being able to work in all directions than on the ability to receive all signals in the clear. Accordingly a con-

ference was held and a third pole was agreed upon, providing it did not look too unsightly (these XYL's again!). See Fig. 6.

**Tuning**

The addition of the half-wave was extremely simple and consisted of first locating the voltage antinode near the centre of the aerial, adding the half-wavelength and then pruning its length until the standing wave ratio returned to its original value.

A standing wave meter, consisting of a tuned circuit, RF type crystal detector and milliammeter, was secured to the aerial at the estimated position of the voltage antinode. The power input to the aerial was reduced to give about half-scale deflection on the meter and the reading noted. The meter position was changed and the new reading also noted. After about five readings, the exact position of the voltage antinode could be accurately estimated. It is important that the aerial be as near as possible to its operating height during these measurements and although the raising and lowering of the aerial may be a little tedious, results justify the extra work. (Incidentally, a pair of binoculars were found to be invaluable at this stage of the proceedings—much to the wonderment of the XYL.)

The half-wave radiator was then soldered to the extended double-Zepp at the datum point thus deduced and the aerial once more raised to its normal height. The standing wave ratio at the Tx end was again checked and the half-wavelength pruned until the SWR returned to its original value of 2. It is appreciated that this may not be strictly ethical, as no doubt the end resistance of the whole array may be slightly different to that of the extended double-Zepp alone. However, results have proved the error, if any, to be small enough to be neglected.

It may have been noted that whereas the width of the garden was originally given as 25-ft. to 30-ft., the writer has glibly proceeded to talk in terms of a half-wavelength of wire at right angles. The extra wire as shown in the diagram was bent down at right angles and folded back on itself. This latter precaution was deemed necessary to prevent any possible vertical radiation and possibly increased TVI in consequence. Because of this folding, the physical length of the half-wavelength proved to be somewhat longer than usual and it is suggested that an initial length of 35-ft. before pruning would be most suitable.

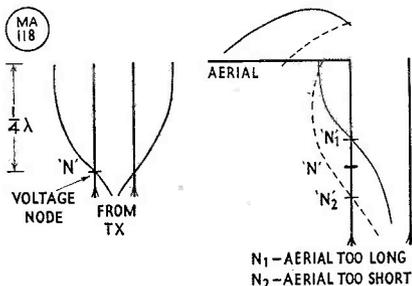


Fig 4a

Fig 4b

Fig. 4. Method employed by G3AEN to resonate the aerial at the desired frequency.

**Results**

Reports which have been received prove that in this case theory and practice are really in agreement. WAC was made in 2 3/4 hrs. after the aerial was put into service—and this on a normal weekday evening when 14 mc condi-

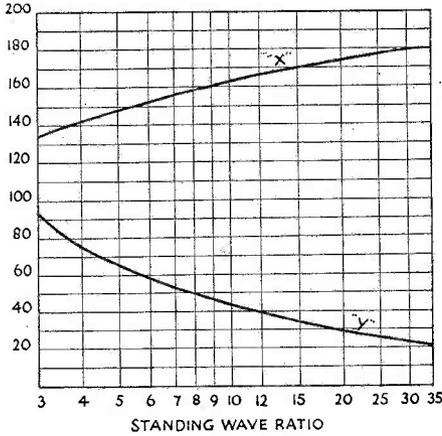
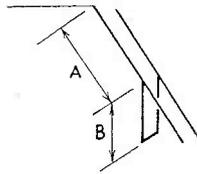


Fig. 5. Curves from which the location and size of the matching stub on the aerial feeder can be derived. The figures taken by G3AEN for the preparation of this graph are shown in the table.

tions were admittedly poor. It is true that the power used was 100 watts, but Southern Africa, hitherto unobtainable, has obliged with VQ4, CR7 and ZS, and DX has been raised from all points of the compass. Even where the theoretical radiation diagram indicated the presence of near-nulls, DX has been worked and confounded theory (or

S.W.R.	"x"	"y"
3	135	92.0
4	142	76.0
5	148	65.5
6	151	59.0
7	155	54.1
8	158.3	49.3
9	160.8	46.1
10	162.5	43.6
12	165.8	39.6
15	169.6	34.8
20	173.8	29.9
25	177.0	26.7
30	179.2	23.4
35	181.0	21.8

Data from which the curves in Fig. 5 are derived.



MA 119

FEEDER & STUB MADE FROM 300ohm RIBBON

$$A = \frac{X}{f(mc)} \text{ feet} \quad B = \frac{Y}{f(mc)} \text{ feet}$$

FEEDER & STUB MADE FROM OPEN-WIRE LINES

$$A = \frac{X}{f(mc)} \times 1.19 \text{ feet} \quad B = \frac{Y}{f(mc)} \times 1.19 \text{ feet}$$

FEEDER & STUB MADE FROM 75 ohm RIBBON

$$A = \frac{X}{f(mc)} \times 0.83 \text{ feet} \quad B = \frac{Y}{f(mc)} \times 0.83 \text{ feet}$$

perhaps confirmed it) as there is always the excuse of local conditions, topography and the XYL's clothes-line.

In conclusion, it would be stressed that all of the results mentioned have been obtained during average operating hours, *i.e.* week-day evenings and Sunday afternoon and evening. Approximately 18 hrs. a week are spent on radio but as at least half of this time is devoted to construction, the writer is certain that for anyone with more air time the above results will be easily equalled and more than likely rapidly outclassed.

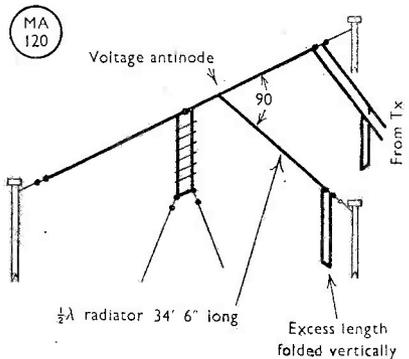


Fig. 6. The composite omnidirectional aerial eventually derived by G3AEN from his extended double-Zepp, as described in the article.

## More on the Wilcox-Gay Driver Unit

### Modifications for Increased Output

By R. W. H. BLOXAM (GM6LS)

THE excellent article by G2VV in the September issue of the *Short Wave Magazine* prompts the writer to show how considerably increased power output may readily be obtained by carrying out the simple modifications described below.

An oscillator modified in this way has been in use at this station for nearly two years, and has been found to be exceedingly satisfactory, accurate, and reliable. Originally, it was used for direct drive to an 813 at 150 watts input, for which the grid current requires to be 6 mA, with —130 volts bias for telephony. As it was found, however, that it only just "made it," a 6V6 buffer stage was added so as to have a little more margin of drive capability. For 'phone at any rate, the first arrangement was found to be perfectly satisfactory from the point of view of frequency stability, even when modulating fully.

#### Modifications

(1) Short out the two RF chokes L404 in the heater supply leads. These chokes are wound together, in sections, on a former standing close to the valveholder. It would appear that a rather high source of heater voltage must have been used on the original

Service transmitter; in fact, measurements made showed that with the chokes in circuit a voltage input to terminals 1 and 2 of 9.4 volts AC was required to give 6.3 volts at the valveholder, due to the drop in the chokes.

Naturally, one had misgivings about this, but the removal of the chokes did not appear to affect the operation in any way. With the chokes in circuit and a 6.3-volt source the voltage measured at the valveholder is only 4 volts.

(2) Short out the 5,000-ohm resistance R404 in the HT line.

(3) Remove the 100,000-ohm screen resistor R402 and substitute a 33,000-ohm 2-watt resistor.

It is evident that a very low output was necessary from the oscillator in order to drive the Service type ET 4336 transmitter for which it was designed. The modifications above bring the 807 nearer to its capabilities, without detracting from the desirable features of a VFO.

With a 400-volt power supply the measured conditions of the modified VFO were found to be as follows:

E <sub>p</sub>	370 volts
I <sub>p</sub>	26 mA
E <sub>s</sub>	180 volts
I <sub>s</sub>	5.75 mA

A length of 6 ft. of 80-ohm coax is used between the VFO and the Tx, enabling the VFO to be situated on the bench beside the receiver.

As G2VV remarks, there is a small amount of drift for the first few minutes, after which the VFO settles down, so that it is zero beat every time with the Rx oscillator (HRO).

## Improving the Q5'er

### Better Selectivity, Easily Obtained

By R. W. ROGERS (G6YR)

THE BC-453, often referred to as the "Q5'er," and probably one of the best-known pieces of American surplus equipment, is chiefly of interest in amateur circles as an additional aid to selectivity. When used in that application, the output from the last IF stage of a normal receiver is fed into the aerial terminal of the BC-453. The signal is converted to the low IF of 85 kc, where it passes through three IF stages at that frequency and thence to the final detector and output of the unit.

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More than a year ago we published details on the conversion of the BC-453 to operate as a second IF unit with any communications receiver, thus obtaining the advantages of a double-conversion system with its marked improvement in selectivity. This principle was adopted by a large number of readers, who will be very interested in the notes below describing further possible modifications to the BC-453 unit itself.—Ed.

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It is the purpose of this article to show how the already excellent selectivity of the BC-453 can be still further improved by a small modification.

#### Modification

The second detector of the receiver is a diode, comprising part of a double-diode-triode valve (12SR7). The other diode side of this valve is not used and the triode portion acts as a BFO. Anyone who has lined up the

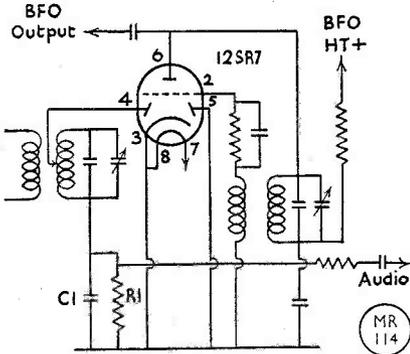


Fig. 1. Second detector and BFO section of the BC-453, before modification.

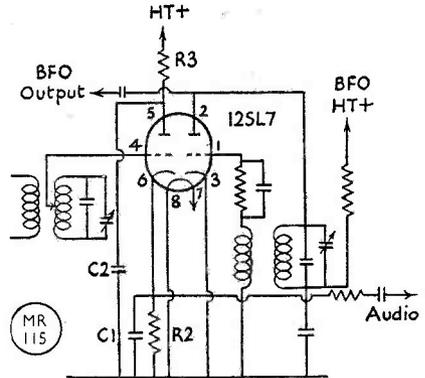


Fig. 2. The circuit alterations suggested by G6YR. A 12SL7 is used as combined BFO and infinite impedance detector, giving improved selectivity.

IF's of a superhet will know that the tuned circuit associated with a diode rectifier is more flatly tuned than the preceding IF circuits, and the BC-453 is no exception. This effect is entirely due to the heavy loading of the diode and can be eliminated by the use of an infinite impedance triode detector which, as its name implies, imposes negligible load on the tuned circuit. If a 12SL7 twin triode (now readily obtainable on the surplus market) is substituted for the 12SR7, the second triode section can be used for the BFO and none of the facilities of the original set are lost. The only extra components needed are a fixed condenser and two resistances.

**Conversion Details**

For a full circuit diagram of the BC-453 in its original form, readers are referred to the excellent article by G2AO in the September 1948 issue of this *Magazine*, but for ease of reference, the relevant part of the original circuit is shown in Fig. 1. Fig. 2 gives the circuit after modification for use with a 12SL7.

The exact wiring alterations are as follows : Locate the underside of the 12SR7 valveholder. Cut off the short connections to pins 1 and 5. Remove the lead from pin 2 and connect it to pin 1. Remove the red lead and small condenser lead from pin 6 and connect them both to pin 2, after extending the condenser lead by about 1/2-in. Remove the 200 μF mica condenser lead from its tag on the last IF transformer, leaving the short black wire intact, and connect the condenser lead to pin 6 on the valveholder. Remove the other end of the black wire from the 510,000-ohm resistance and connect it to the adjacent earthing tag. Take the 510,000-ohm

**Table of Values**

Fig. 2. The Modified Circuit

- C1 = 200 μF
- C2 = 0.5 μF
- R1 = 510,000 ohms (In Fig. 1).
- R2 = 150,000 ohms
- R3 = 25,000 ohms

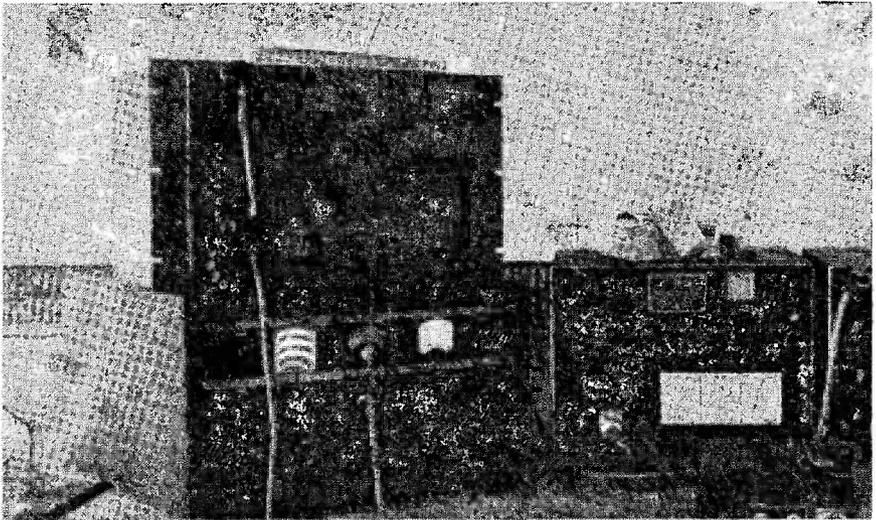
resistance off its tag board, substitute a new 150,000-ohm 1/4-watt resistance, and connect a short lead from the tag not earthed to pin 6. Connect a new 25,000-ohm 1/4-watt resistance between pin 5 and HT positive, the centre tag of the 3-by-0.22 μF block being a convenient point. Connect a 0.5 μF condenser between pin 5 and chassis.

It only remains to substitute a 12SL7 valve for the 12SR7, and carefully peak up the trimmers of the last IF transformer for maximum performance.

Possible alternative valves, which may be on hand (and will probably work equally well) are the 12SN7 and the 6SL7 or 6SN7 with suitable dropping resistances in the heater circuit. A 12AH7 can also be used, but as its base connections are quite different, the necessary wiring alterations will have to be worked out afresh.

**RADIO AMATEURS' EXAMINATION**

Readers overseas, where runs the writ of our G.P.O. in the matter of amateur licences, should note that application to take the next R.A.E. (on May 10, 1950) should be in the hands of the local secretaries of the City & Guilds of London Institute by December 31, 1949. The rules applying to U.K. candidates were given on p. 619 of our October issue.



## Voice Controlled Transmission

### Improved VOR Circuit and Some Operating Details

#### PART II

By R. KNOWLES, B.A. (G3AAT)  
*Instr. Lieut., R.N.*

**I**N Part I, the need for a better Voice-operated relay system was stated. Later work has produced a very much more satisfactory VOR, which is, however, more complicated.

The main disadvantage of the previous control equipment was that leakage through the hybrid coil caused received speech to trigger the transmitter and also the hang-over time depended on relay characteristics. The new circuit overcomes these disadvantages and adds one advantage, a partial interlock between receiver and transmitter.

The circuit can be divided into three distinct sections: The relay trigger circuit; the differential rectifier; and the receiver blocker. The reasons for all this complication should become apparent as the details are explained. Basically, the principle is that of balancing a direct current obtained from the received signal against a direct current obtained from

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The first part of this interesting article appeared in our issue for October. The discussion as a whole will suggest to many 'phone operators the practical possibilities of remote voice-controlled working, as well as revealing the ingenious way in which G3AAT has succeeded in overcoming the difficulties inherent in the design of a two-way system. By present standards, the ultimate on this theme would seem to be remote operation of the receiver with corresponding VFO control of the transmitter—a bit too elaborate, perhaps!—Ed.

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the hybrid leakage and using the resultant direct current to operate the transmitter through a Siemens high-speed relay. The receiver must be silenced during transmission to prevent this differential action from occurring when transmission is actually taking place.

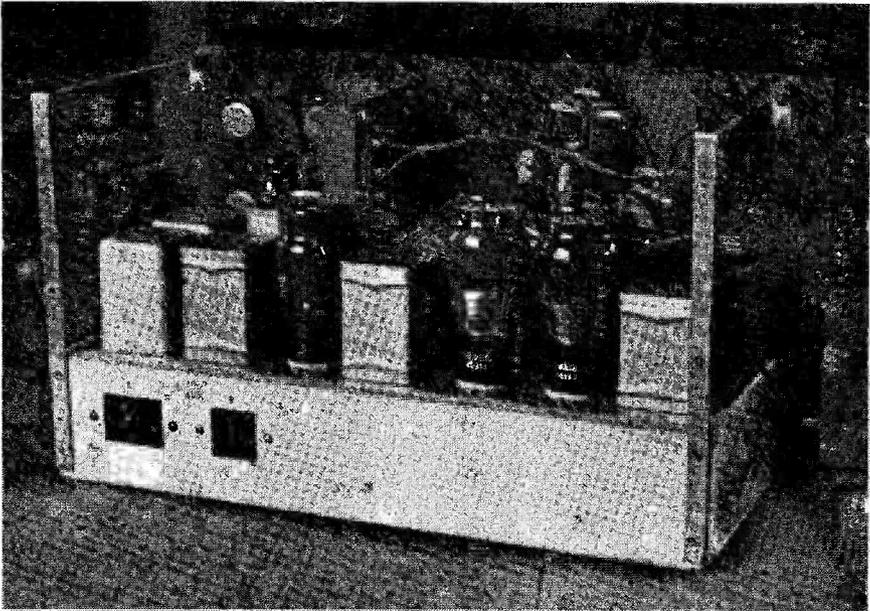
#### Relay Trigger Circuit

Any relay will operate most satisfactorily if it has either full current or no current flowing through its coils, with no intermediate states. To do this, a circuit is borrowed from radar technique to enable a valve to help the relay. The circuit is a DC coupled version of the Cathode Coupled Flip-Flop, which has two stable states with an unstable transition between them. The circuit is shown in Fig. 7. Consider the control voltage to be positive. Then V1A will be brought to a conducting state, raising the cathode potential very slightly and lowering the anode potential greatly if RL is much larger than RK. Under these conditions R1 and R2 are chosen so that V1B is cut off completely.

As the control voltage is lowered the anode potential of V1A rises till a point is reached when V1B conducts. This raises the potential

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*Above:* The station set-up at G3AAT, with the VOR unit on the AR88.



Chassis assembly for G3AAT's VOR unit.

of the common cathodes, thus further raising the anode potential of V1A, till as a result V1A is cut off by its cathode being made very positive. The resistance of the high-speed relay must be low compared to RK for this to occur.

Now, if the control voltage begins to return slowly to its original value, it must overcome the cathode bias before V1A can be made to conduct once more; that is to say, there is back-lash between the values of control voltage required to energize and release the high-speed relay. This is precisely the effect desired as small noises will not operate the transmitter, but once the initial noise is overcome the same small noises will keep the transmitter switched on.

Provided the loop gain round RK, V1A, RL, R1, R2, V1B back to RK is greater than one, there will be no half measures. V1B will conduct fully ( $V_g = 0$ ) or not at all. If the loop gain is less than one there will be a smooth transition between the two states and V1A and V1B will be conducting at the same time. Using 6SN7GT valves the loop gain is considerably in excess of one for small currents in V1B and the transition is very abrupt. The high-speed relay repeats this change to the transmitter in 1.5 mS. The problem is now to derive a suitable control voltage. This is where the differential rectifier fits into the scheme.

**Differential Rectifier**

A positive-going control voltage will merely cause V1A to conduct more strongly until grid current flows and further positive excursions of

the control grid are prevented. Now for transmission, a negative-going control voltage is required. By making the receiver output give a positive-going control voltage and the transmitter input a negative one, the difference can be used to switch on the carrier. Received speech leaking through the hybrid coil into the transmitter input meets itself "coming back," as it were. Since these controls are derived from speech by rectification, the question of relative phase (which after all, defeated the

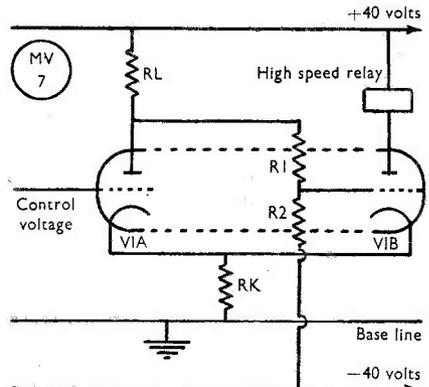


Fig. 7. Cathode-coupled flip-flop circuit, the action of which is described in the text.

hybrid coil) does not arise. The hang-over circuit can be incorporated in the trigger unit (delay independent on speech) or in the differential rectifier. The circuit is that of Fig. 8. Triodes are shown, although in the final circuit the transmit channel amplifier is a pentode.

The variable voltage controls the hang-over time and can be adjusted to suit varying speakers. The delay on starting transmission is 1.5 mS in the control unit and a few more milliseconds in the transmitter itself.

It is to be noticed that the output of the receiver channel amplifier is not taken to the hybrid. This is because the line feeds both inputs to the hybrid equally and speech would be fed directly from line to the left-hand pair of diodes, opposing transmission. Another amplifier is used to feed the line, *via* the hybrid coil, from the receiver.

Transmitter break-through from the receiver would also cause similar trouble, so the receiver is suppressed during transmission by electronic means involving no time delay.

**Receiver Blocker**

The characteristics of metal rectifiers provide the solution to this problem. If a metal rectifier is passing current it looks like a relatively low impedance but if it is cut off it is a high impedance. A metal rectifier in series with the receiver channel can be cut off during

**Table of Values**

Fig. 10. Circuit of the Improved VOR Unit

- C1, C4 = 0.1  $\mu$ F
- C2, C3 = 0.01  $\mu$ F
- C5 = 0.23  $\mu$ F
- R1, R6 = 100,000 ohms
- R2 = 1 megohm
- R3 = 270,000 ohms
- R4 = 560,000 ohms
- R5 = 10,000 ohms
- R7 = 470 ohms
- R8, R9 = 4.7 megohms
- R10, R11 = 560 ohms
- R12 = 330,000 ohms
- R13, R15 = 33,000 ohms
- R14 = 5,600 ohms
- VR1, VR2 = 250,000 ohms
- V1, V5 = 6SN7
- V2 = EL32
- V3, V4 = EB34

transmission and a rectifier in shunt can be cut in.

Where is the voltage to do this to come from? The obvious place is the cathode of V1B. During reception, this cathode is at about + 2 volts, rising to + 10 volts, during transmission. A slight circuit change makes this zero during reception and + 10 volts during transmission.

The circuit is shown in Fig. 9. The 33,000 ohm resistors provide source impedances to get the necessary voltages set up in the right places. A 6 dB attenuation occurs during reception, rising to 30 dB during blocked periods. This is quite adequate to prevent

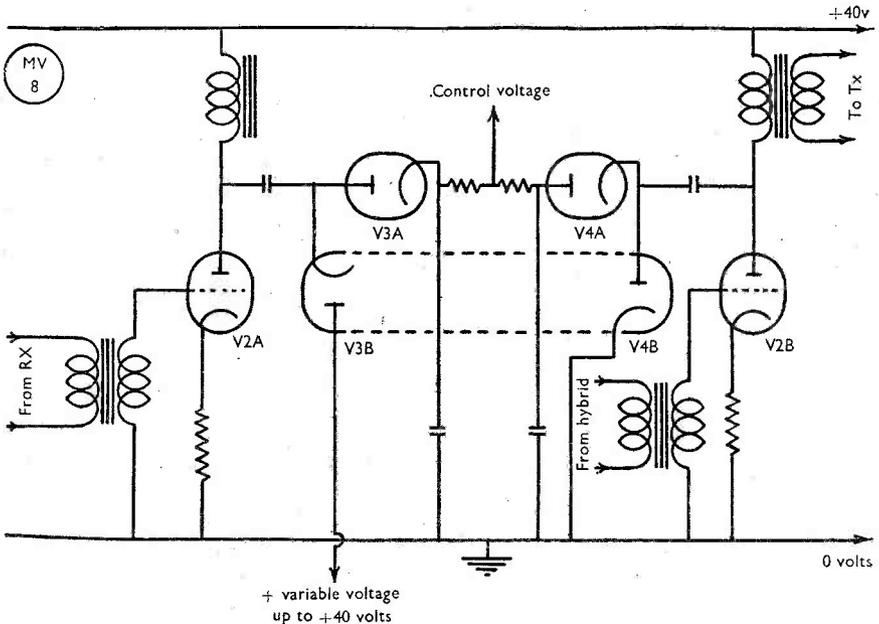


Fig. 8. Hang-over circuit for variable time-lag adjustment to suit different speaking rates.

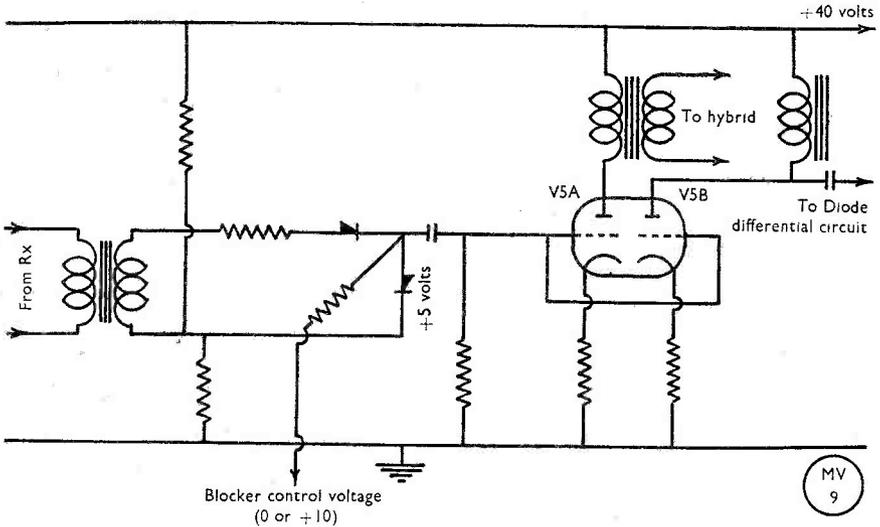


Fig. 9. Automatic blocking circuit to render receiver inoperative during passages.

break-through upsetting the differential rectifier.

The Complete Circuit

The complete VOR is shown in Fig. 10. There are one or two slight changes in the circuit which need explanation.

The two metal rectifiers in the trigger unit are to clamp the control voltage for the receiver blocker accurately at zero during reception and to increase the available range from 8 volts to 10 volts.

The valves in the receiver channel amplifier are run between the +40 volt and -40 volt lines to get a sufficient output level without distortion. All valves are provided with (at least) 10,000 ohms grid stoppers to prevent stray RF fields from upsetting the calculated operation of the circuit. That they are effective is shown by removing the one in the transmit channel pentode amplifier, which causes a continuous howl to occur when the unit is controlling a local 150-watt transmitter.

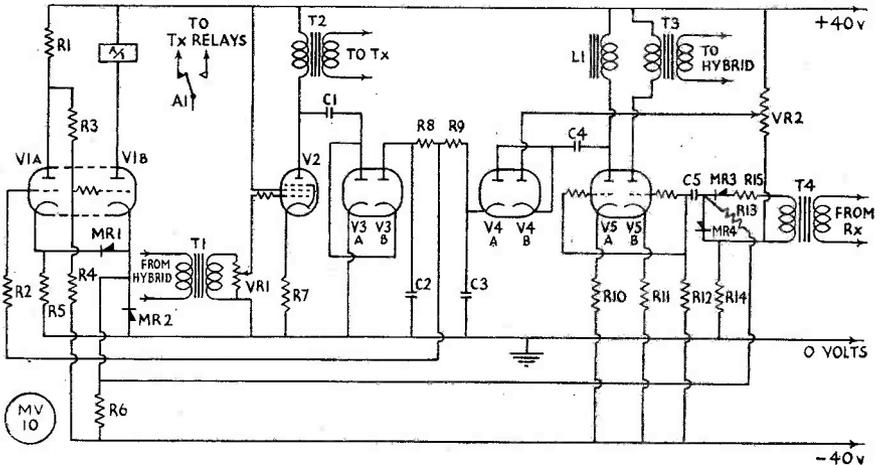


Fig. 10. Circuit complete of the both-way VOR, designed by G3AAT to work with both transmitter and receiver extended to a single telephone handset over a two-wire control line.

# DX COMMENTARY

## CALLS HEARD, WORKED & QSL'd

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

ONLY one thing makes a Commentator's life more difficult than absence of DX, and that is a month like October, 1949. There has been such a profusion of every kind of DX that one cannot tell where to draw the line. What was DX in July is no longer DX in October—but may be again in November! At all events, things have been happening on all bands, and we feel inclined to look upon VK, ZL, W6 and 7, KH6, KL7, ZS and "all that stuff" as purely local! The QRP boys will not agree, of course, but that just goes to show that they get more fun out of life than the 150-watters.

During the second half of the VK/ZL Contest (the CW event) we heard VK2EO, 2RA, 2US, 3YP and others coming across at 1600 to the tune of an honest 589, the like of which we have never heard before in 25 years (the following morning they were a watery S3!); we have heard ZS's practically blocking the receiver at 1900; and we have had ZL phones on 28 mc, S9 at midnight. The only DX that really *is* DX still is that which has a scarcity value, and is therefore pounced upon by every eager-beaver and every spiv in creation. Pretty state of affairs we've come to when "a mere VK" is too easy and an HE1 is DX! But there it is, and we can't do much to it.

### Contests and the Like

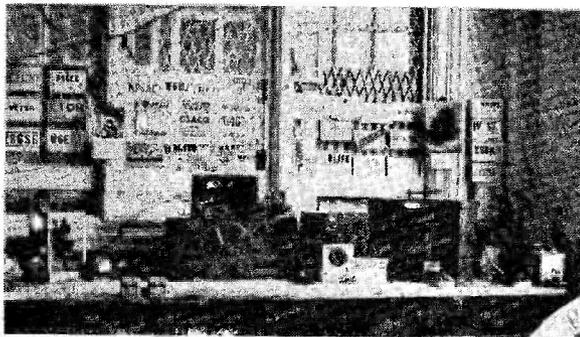
This leads us to the evergreen subject of contests once more, and we wish it to be known that We Have an Idea! For a long time it has seemed to us that the well-worn formula for contests has something missing. Take any of them, and what do they require? A reasonably good signal, a considerable amount of operating ability, a colossal amount of patience and a bottle of Benzedrine tablets. In our opinion they *all* go on much too long, and they *all* involve far too great a number of mere hit-and-run contacts. After all, the winner even of the CQ DX Contest is likely to be the chap who works thousands of W's at the quickest possible rate, having worked enough countries and Zones to have a

reasonable multiplier. Our contention is that this ultra-rapid working of loads of stations with a mere exchange of RST isn't really worth anything. If one W6 gives you 589, then it's pretty obvious that you can go on collecting 589's as long as your patience lasts out and as long as the conditions stay the same.

We have been trying to find a formula for a contest which will demonstrate (a) The ability of a station to lay down a good signal in far-away places; (b) The ability of the operator to *hear* the best DX that is going; and (c) The reliability of the station in a contact which involves more than an ear-straining exchange of RST and numbers.

This is the idea, briefly, for a contest which could be laid on at any time for the amateurs of any one country without the need for notifying the rest of the world. We decide on, say, a two-hour period on a certain day. During that period you have to work, not the *most* DX, but the *best* DX that is on the air at the time. It would take place on one frequency-band only, and the points would be awarded by the judging committee on a scale determined beforehand. Say, for the sake of argument, and referring to a purely "G" contest on 14 mc, something like this: One point for W, VK, ZL, ZS and "all that"; two points for FE8, ZD2, ZD4, CR7, XE, JA and so on; five points for ZD8, ZD9, ZS9, ZP, KM6, KB6 and the real difficult ones. Perhaps ten points for AC4, KJ6, FG8 and ZK2!

Right! You work your DX during that period, and you then have to submit an entry consisting of your *five best* QSO's. These must be 100 per cent. copy and must include, as a minimum, the other chap's QTH, name, brief account of rig and aerial and, if you like, his Wx as well. (But note the saving of labour in making out your Contest Log!) All our formidable army of SWL's, organised into action by our companion journal the *Short Wave Listener*, will also be busy logging these same QSO's and putting in reports—and so will the members of the judging committee, including your Commentator. Any funny



VS2CQ, Kuala Lumpur, is ex-G2NR and has been operating from Malaya for about a year, with over 300 QSO's logged to date. The fan, in the wire cage to the left on the bench, is an essential item. The BC-348 has to be kept dry with a silica-gel pack, as humidity is very high; cockroaches eat the insulation and are themselves quite immune to HT as they are non-conducting! VS2CQ enjoys himself nevertheless, and can be found on 14060 kc using 28 watts to a B2 Tx and a dipole aerial.

business will thus have an excellent chance of being overheard and reported, as will any form of Spivvery, off-frequency operation or bad note, as the logs will all tend to cross-check one another. The winner will be the operator of the G station putting up the five highest-scoring QSO's without a single blot on his escutcheon.

We have been told that the weak link in this scheme is the unpredictability of conditions for so short a period as two hours. Does that matter? The chap who winkles the best DX out of a spell of bad conditions still deserves to be the winner.

Now will you *all* please digest this, discuss it and then write and say what you think of it—quickly? Because if it meets with sufficient support there is no reason why we should not organise such a contest every two months or so. Its beauty is that it does not need world-wide organisation and it does not create havoc on the bands for a whole week-end. Furthermore, the winner does not have to be a Sleepless Wonder or even a 50 w.p.m. basher on a bug. Both CW and Phone events are feasible. What do *you* think?

### We've Got Them on the List!

Brief catalogue, while fresh in our mind, of the pet aversions that have been particularly noted this month:

- (i) The man who says "You're R7 on the S-meter";
- (ii) The talkative chappie who plunges straight into his name, his rig, and all the DX he has worked, but forgets even to give you a report.

(iii) The fellow who says, very clearly on an S8 transmission, "The name is Norman" and then has to go on blathering about "N for Norway, O for Okinawa, R for Radio, M for Madagascar (*why* Madagascar, by the way?), A for Arabia, N for Norway." When the fellow says "The QTH here is Paramaribo" and proceeds to do the same, and repeat it three times, the process takes about three minutes!

(iv) The CW enthusiast who says "Sorry, bug sticking"—as if a sticking bug could account for two dots too many on the end of everything Operator sticking!

There are plenty more, of course, but these are just the particular ones recently noted down in the log.

### DX of the Month

We have been particularly glad to see a number of letters each month from relative newcomers who say "Can't hope to compete with the DX Kings, but we've done so and so with our 25 watts." They are the real backbone of Amateur Radio, and it is to them that this Commentary is addressed, rather more than to the "DX Kings" (whoever they may be) who have worked it all and know it all. We also notice a singular fact concerning the DX Tables; people with relatively low scores keep on plodding along and slowly climbing the ladders—they rarely give up and have their names removed. It is those at the *top* who default and eventually disappear! It seems that they no longer wish to compete, or that they feel the competition is not hot enough. (But we notice that they still appear in the out-of-date DX lists in American publications, which seems strange.) As a mild protest

(as if anyone cares) we have removed our own scores from the DX Tables this month.

### The 14 mc Band

G3ATU (Roker) was one of the lucky ones who winkled out FN8AD (14120). He also collected SP5AC, but continues to suspect him until a card arrives. Good stuff *heard* at G3ATU includes ZD3D, VP7NU, KB6AJ,

KJ6AF, FY8AC, ET3AM, FK8AC and FO8AA—truly a mouth-watering list.

G4NS (Workington), replying to GM3CSM's query, assures us that LX1BG is OK and *does* QSL. 'NS recently unearthed two queer ones in the shape of XA1A (QTH "Macaro") and FS5I (QTH "Central Africa"). Offerings from G8OJ (Manchester) are UN1KAA, MD7DC, VS1's and 2's, VU2LK, HZ1AU, SV1VS/MM and MP4BAD. The latter, 'OJ tells us, is returning home and asks for all QSL's to be sent to Cpl. Smethurst, 6 Alder Lane, Hollins, Oldham, Lancs.

## FOUR BAND DX

Station	Countries Worked					Power
	14 mc	7 mc	3-5 mc	28 mc	Total	
G3ATU	116	60	26	89	172	10/150
G6BS	165	102	28	4	172	150
G2WW	162	31	21	80	174	150
G2VD	160	52	27	87	166	150
G3DO	153	37	21	97	183	150
G8KU	130	26	9	51	140	120
G5GK	126	89	11	36	187	150
G5FA	125	84	17	60	141	35/150
G8VB	122	49	50	59	142	120
W2RDK	116	134	33	34	180	?
G5WC	116	50	1	12	117	45
G8IP	114	34	13	62	129	3/150
G2AO	114	34	30	32	123	125
G8QX	111	18	12	73	131	150 (P)
G2YS	111	26	21	25	122	100/150
G6BB	110	38	19	34	123	10/70
G8VG	107	53	19	26	122	60/75
G3FNJ	105	34	19	43	117	150
G3ACC	103	13	20	5	112	150
G4QK	103	33	19	3	107	150
G2HKU	90	33	1	7	98	4/25
G2DHV	79	20	18	4	84	25/60
G6TC	75	38	11	3	87	20/65
G2BJY	74	24	4	92	124	25
G3FGT	72	24	22	23	84	25
G2HIF	42	9	6	70	89	150 (P)
GW3CBY	40	22	16	8	53	15/30
G3EIZ	39	23	34	15	53	25
G6CB	37	6	1	86	103	20/150

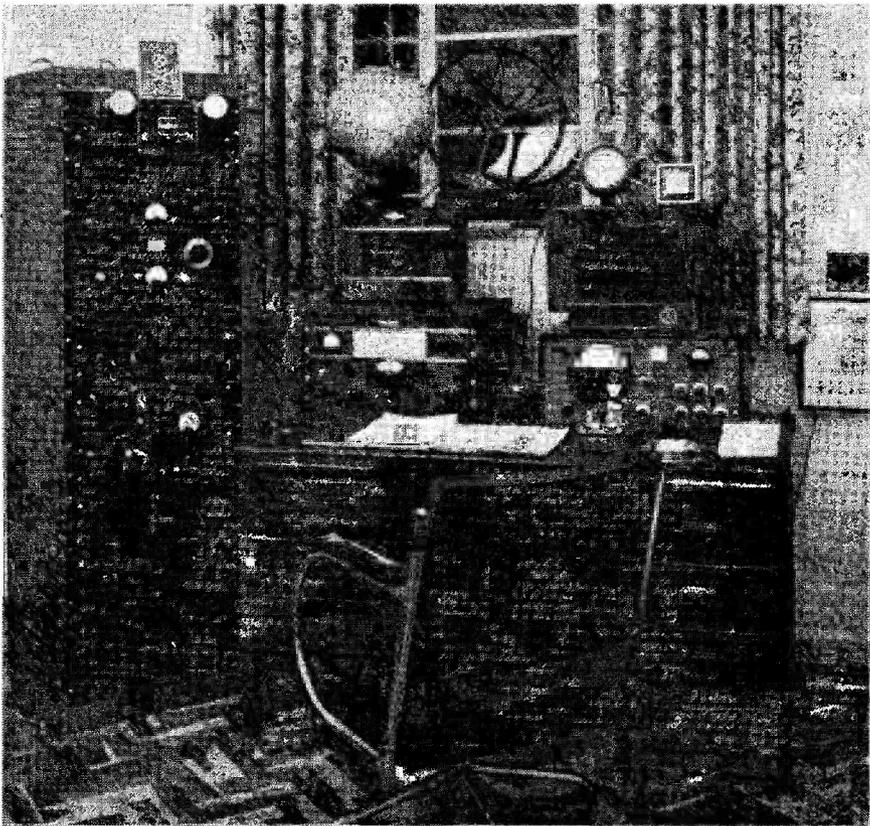
G8KU (Scarborough) has collected some new ones, such as EA6EG (Balearics), VP3YG, YK1AB and VP8AK (South Shetlands). G3FGT (Birmingham) still climbs up that ladder with such DX as MD4GC, MD7DC and 7GR, VS9AL, VS1DZ and some MI's, rounding off with ZD3D and VP8AO. The last-mentioned was snagged on a fixed beam specially erected for South America.

G3GEX (Harrow) wonders how people manage DX on 14 mc without a beam or a long wire these days. He is troubled chiefly by the W's stealing all his possible DX contacts! But as he has room for a 66-ft. aerial he should be able to do plenty, and we would refer him to "Backyard Skywire" on p. 862 of the February issue of the *Magazine*. We worked on 14 mc for nearly twenty years with nothing better than a fixed 66-ft. span, and it didn't seem so bad.

G2WW (Penzance) has had another burst of activity, which has yielded EA6EG, VP8AO, VU7AF and other lesser fry. VU7AF is in Mysore, Southern India, and seems to be using the wrong prefix. G5FA (London, N.11) found a new zone with UAØKFD and added a few extra countries as well. G5GK (Burnley) says his best on 14 mc CW were FN8AD, FK8AC, VP8AO, 8AK, 8AN and CE7AA. Having collected the latter he has now worked all Chilean districts—any challengers?

G8QX (Malvern) was on 14 mc phone for a while and worked VS6AE, VQ8AX and VQ3AA. G6AT (Hampton Hill) weighs in with MD4GC, KH6VP, KL7BE, PK3JF, ZD2P and ZE2JN. Incidentally, he poses a problem in ethics: What do you do when you receive a card from a station claiming a QSO for a time when you were working someone else? When your log shows that you *called* this same chap on another occasion without raising him? And when, although you have worked his country, you do not possess a card? The real answer to this is obvious—but what would *you* do?

GM3CSM (Glasgow) is still vainly looking



One of our South African readers, ZS6SG, runs this fine outfit at Linksfield, Johannesburg.

for Zone 23, but seems to be getting out nicely in other directions. Stations worked on Twenty include HB1JJ/HE, LX1QF, JA2RO, VS6BI, ZD4AM, KH6's and KL7's, and OX3UE, who claims to be the most northerly station in Greenland. Stations heard but not worked were KM6AO, FK8AC, VP5AK, VP8AK and HP1FL. CSM says that DX from GM begins to get difficult at this time of year; things that we work from down South are just watery whispers that can't be raised from 'way up there near the North Pole.

#### DX on Ten

The general opinion is that 28 mc has staged a better come-back than was expected of it. Certainly there were days during October when it was as good as at any time during 1946 or 1947. Maybe such days are scarcer, though. G8QX noted that conditions have been "incredibly good" for ZL1 and ZL2 on many days. Phone DX for him has included

VQ2, 4 and 5, VU, DU, KR6, OQ, ZS3, JA, VS2 and 7, ZS9 and VK9. He has worked VK9GW at yearly intervals since 1946—always in September or October.

The scarcity of KL7's on Ten still excites comment, but G2AKR (Manchester) raised KL7EH (28740 phone). G6XS (Ashton-under-Lyne) worked KL6YK on CW at 2050—the KL7 was using 15 watts and 'XS was his second DX QSO. Other news from G6XS—HS1SS has been showing up on CW around 1600; W7's in Idaho and Montana came in up to 2100; can anyone persuade a W7 in Utah to forsake phone and work 'XS on CW? He would like a 28 mc WAS with his 35 watts of CW only.

G3ATU raised ZS9F on phone for a new one, but couldn't catch YS2AG, FF3CN, FF8FP, ZS3X or ET3AF. G2BJY (West Bromwich) continues to specialise in 28 mc work, with good results; JA2AF, ZD2LMF, PK4KS, VS1DX and VS7PW have fallen to

his 25 watts. An interesting QSO was one with W8AOX/Portable/Mobile, using 20 watts and a vertical quarter-wave whip aerial on the back of the car. This contact was solid, both ways, for 40 minutes. ZL3LE was worked one morning at 0720 GMT with both beams looking South, and a three-way between VK2AFE, GM6MS and G2BJY was unusual.

G2HIF (Malvern) is another 28 mc specialist who has a lot to say about the band. He noted a "perfect" Dellinger fade-out between 1300 and 1400 on October 2; shortly after this W and VE signals came up rapidly from S3 to S9-plus. Stations coming in for comment are ZS9J, XE2W, HC1OY and 2JR, JA2OK, 2CA and 2AF, VS6AE, CE5BH, FF3CN, CM9AA, ZP8AB and MP4BAE—all on phone. The latter, by the way, is giving lots of ten-metre enthusiasts their first MP4 contact, and he uses a vertical dipole 90 ft. high.

Contacts with KH6 are not all that common on 28 mc, so we might mention that G8KU worked KH6FD. G2WW collected ZS9F, FF8PG and a suspicious-sounding type rejoicing in the call EQ3SAM! G5FA, too, found a KH6 and also worked FA9UO, PK3ST, AP5B, UL7AB, ZD2LMF and all the more usual things.

GM3CSM found the band very patchy up there, but on phone he raised FF3CN, ZS4BL, AR8MR; on CW he added FE8AB,

TF5TP, HC1KP, FM8AD and VK4EL, several evenings running, the long way round (time about 2000). HZ1KE, worked at 0640, said the signals from 'CSM were the loudest ever heard out there.

**Overseas News**

We open a strong Overseas Bag this month with a letter from ex-VS7AD concerning the Maldive Islands. It is believed that the first and only amateurs to operate from the islands were VS7AD and VS7DR, both in the crew of a flying boat which went there in December, 1947. They operated the aircraft transmitter on 14 mc and worked a ZS on phone. Then, in March, 1949, VS7CC, 7DD and 7AD all found themselves there again, and the first call from VS7AD/VS9 raised W6TS. A VQ4 was also worked, but then the power supply failed.

On finding that these contacts didn't count for a new country unless the station was operated from dry land, some of the boys then planned an expedition for a one-night stand with a portable. So they modified an 1154 to take an 813, rigged a portable power supply and had everything nicely organised for August 15—all ready to give the world an earful. Several DX stations were already lined up and waiting. Alas! the HT generator packed up and nothing would persuade it to go. Feeling extremely low, VS7AD and the others had to return to Ceylon and 'AD left there for home on August 27. He doesn't think there is a hope of any further activity, because the keen Squadron has now been posted from Ceylon.

You can take it definitely that there has never been any other activity in the islands; there is only one post office there and the postmaster had never seen a QSL until VS7AD showed him one. Very hard luck, 'AD, but full marks for trying! Incidentally, the attempt had "full Maldivian authority."

A real DX letter comes from ZD3D (Gambia). His chief complaint is "Why do the G's call CQ, stop, and then start again, almost before I have time to get my hand on the key?" He says he has called many, many G's both on 14 and 7 mc, but rarely gets an answer. He also listened to a W working "ZD3D," but that one was T9, whereas he is T7, or T4 at worst! On 14 mc he has collected KH6BA, ZD2S, KP4's, ZS's, LU's, PY's and only one single G.

ZD4AM (Tafo) has built a new PA and will now be on 7 mc and possibly even 3.5. Look for him on 7010. New countries for Harold have been UA9, LX, ZS9, VP8AK, VU and VQ4. Yes, he has been chasing VQ4 for months. He also worked his very first ZL4, and understands it to be the first ZL4/ZD4

**ZONES WORKED LISTING  
POST WAR**

Station	Z	C	Station	Z	C
<b>Phone and CW</b>			<b>Phone and CW</b>		
G2FSR	40	197	G2YS	36	122
G5GK	40	187	G6CB	35	103
G8IH	40	186	G2AKR	34	116
G3DO	40	183	G3ACC	34	112
G2WW	40	174	ZD4AM	34	102
G3ATU	40	172	G2FYT	33	100
G2VD	40	166	G4QK	32	107
G2AVP	40	163	G6TC	31	87
G3AKU	40	138	G2SO	31	87
G8IP	40	129	G2DHV	31	84
G2AO	40	123	G3FGT	30	84
G5FA	39	141			
G8KU	39	140			
GM3CSM	39	132			
G3CNW	39	130			
ZS2AT	39	124			
G5MR	39	118			
G8VB	38	142			
G6WI	38	128			
G6BB	38	123			
G3FNJ	38	117			
G3BNE	38	109			
			<b>Phone only</b>		
G2BJY	37	124	G3DO	37	147
G5WC	37	117	G8QX	35	131
GM6IZ	37	98	G2HIF	30	89

contact. Commenting on our scheme for a "CQ-less" period once in a way, ZD4AM says, "Wouldn't it be nice if we could arrange for all the W's to go fishing, say once a month?"

VU2DH (alias GM3FLM) is *en route* for India again and would like the gang to listen for him every evening on either 14 or 28 mc. He will be running 100 watts to an 813 and using an SX-42.

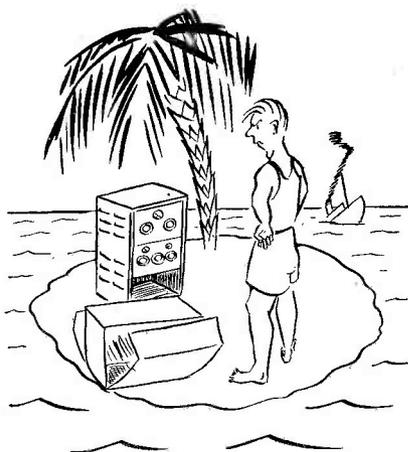
ZB2G, which is the call used by a Royal Navy Club Station in Gibraltar, has been extensively pirated of late. The Secretary of the Club sends the full QTH (see list) because the boot is now on the other foot and people working the genuine ZB2G accuse *him* of being a pirate.

ZS2AT (East London) has moved into the 39-Zone class, thanks to UAØPA. These 39 Zones and 124 Countries have all been worked since August, 1948, too. He mentions "LU2AZ" (although others call him LU2ZA), said to be in the South Orkneys. Is this any relation of LU1ZA, who used to say the same thing? 'AT also takes a poor view of LX's and others who won't QSL, even when specially asked to do so for DXCC purposes. Don't we all?

VS2CP (Sungei Patani) has been inactive "owing to lack of certain vital parts" and is still waiting for a few bits, but hopes to be on regularly before long. He sends the QTH of VS1DD (see list) who has recently been licensed and is very keen on contacting the U.K.

VS7BJ (Koggala) expects to be opening up in Trincomalee very soon. He, too, confirms that there have never been any resident amateurs in the Maldives, and that VS9BU was phoney. 'BJ has promised to concentrate on 7 and 3.5 mc during the winter, but he will be QRP, with not more than 20 watts.

From ST2TC (Malakal) comes an interesting letter, reporting the fact that ST2



“. . . . Just my luck—no power pack . . . .”

activity has now fallen to a low ebb, with only five stations—2AM, 2ES, 2RF, 2TC and 2WB—still left to hold the fort; eight ex-ST2's have closed down. An interesting point is that in ST2 they are forbidden by the terms of the licence to call "CQ" at all! Activity has to be commenced by answering some other station's call—this is an idea with possibilities! ST2TC himself is on 14 or 28 mc almost daily 1430-2200 GMT, and anxious to work G's. He will QSL 100 per cent, and if anyone is owed a card, a reminder to his QTH (see list) will produce it.

**Eighty Metres**

G3CED (Broadstairs) writes to say that he has been hearing ZL4GA and another ZL4 round about 0650 GMT—working each other. Signals were 559 in spite of CW and phone QRM. G8VB (London, W.5) points out an error last month—it is ex-VO2CO, not VO2BL, who is now VP9HH. 'VB has found conditions pretty bad to the West, but he has worked OH3NY and OY2RD on phone. VO2BL is still the most consistent VO on phone, with W1IIM and W4CQW the best from U.S.A.

**The 7 mc News**

VK's were fairly plentiful on 7 mc during the CW parts of the Contest, but the band never seems to have been really good as yet. G3GEX reports W's coming through in force as early as 2200, and has also heard IS, YU and EA6 around. He had a nice QSO with LX1ZA at 0830 one day. G4FA collected EA6AF and TF5TP—also "quite a few VE's, W's and ZL's." G5BZ (Croydon) raised

**TOP BAND LISTING**

*Starting August 1, 1949*

Station	Counties	Countries
G2YS	31	5
G6AB	26	4
G2AJU	22	4
G5XF	22	2
GW3CBY	20	5
G6ZN	15	3
G2DHV	10	1

ZD9AA and has found conditions good at times.

### Miscellany

GM3FBA (Helensburgh) makes a few trenchant remarks on the state of 7 mc. As he says, the users of the band could organise themselves a bit better, and *some* of them might do a bit of listening occasionally instead of yielding to their terrific urge to burn up some power. In particular, he dislikes the types who call endless CQ's and then romp through a QSO sending everything twice at about 25 w.p.m.

G3FWU (Dartford), who is ex-MD5LR, has a grouse against *us*. He has read so much about DX on the LF bands in the small hours that he stayed up until 0300 one night, and then rose again at 0600. But he says it left him cold (literally). G3AZF (Stafford) says his call is being pirated, and the same person also seems to work on 7 mc pirating his friend's call-sign G3AUL.

GM3EDU (Dumbartonshire) has been using 20-25 watts for just about a year, with a 138-ft. all-band aerial, and has piled up 26Z

and 75C. On 7 mc he has worked VP6 and KP4, and on 3.5 he has worked HH, VE, W, CT3 and KP4—nice going. Recent DX on 14 mc includes VP8, TI2, VE8, VU and UN1. The secret, if any? Well, 'EDU says he does not call CQ; he prefers the "sit, listen and pounce" technique.

G2WW pleads for a more complete clean-up of the country-counting position. The Ruanda-Urundi/Belgian Congo affair is unsatisfactory and now 'WW says that he worked MP2BH in Qatar, which is an Independent Shiekdom. Likewise he suspects that Oman and Trucial Oman are not the same. Well, the last thing we want to do is to start *another* new list, so, for the present, we abide by the internationally-agreed one, with all its faults. But let us hope that daylight breaks through one day.

An interesting echo of 80-metre DX last winter comes from GI3ECQ (Crumlin), who forwards VK5KO's card for a QSO on December 10, 1948. '3ECQ, it may be remembered, thought that his QSO was a phoney one, but it has since proved, not only genuine, but, apparently, VK5KO's first QSO with the British Isles on 80 metres post-war. G2KO was his first G, but GI3ECQ came earlier still. This for the record.

G5SR (Harrow) tells us that YO3RF is QSL Manager for Roumania, and that all QSL's for that country may be sent to A.A.U.S.R., Box 95, Bucharest. G3EGR (Mundesley) had a very interesting QSO with W2ZFP on 7 mc. The W turned out to be a YL using 18 watts to a transmitter built in a cigar-box! Her receiver was a BC455. Trouble was that she was so thrilled at getting into G that the QSO practically broke up. 'EGR says that he has been working on 7 mc only, with 20 watts or less, and has lined up 80 W's, FT4, OX3 and his first ZL. He wonders whether this is a fair average for one year's operation by a 63-year-old? We should say it was.

### QRP Topics

G2AJU (Ipswich) reports working DL2DV on the Top Band with 0.75 watt, also PAØII on 3.5 mc with 0.5 watt. He works regularly on the Top Band with 1 watt, but sometimes uses QRO—2 watts! G6ZN (Wakefield) shares the biscuit this month, for a QSO with W2SOY on 3.5 mc, with 2 watts input. In the Low-Power Contest on that band he worked 118 stations in 41 counties with half-a-watt. G3FPQ (Bordon) has been working also on 3.5 mc with between 1 and 3 watts, and has raised 20 countries, including W! He, too, worked W2SOY, and also W1BGW, thus meriting the other half of G6ZN's biscuit. His Tx consists of a 6C4

### DX QTH's

CR5UP	Lionel Pierce, St. Thomas Is., Portuguese West Africa.
FF3CN	Box 566, Dakar.
FF8GP	c/o P.A.A., Box 583, Dakar.
FN8AD	D. S. Seal, Hatkhola, Dyerdhar, Chandernagore, French India.
HP1BR	A. R. Rowley, Apartado 883, Panama.
KL7EH	c/o C.A.A., Iliamna, Alaska.
KR6BV	A.P.O. 239, c/o P.M., San Francisco.
ST2TC	T. H. Christodoulides, P.O. Box 25, Malakal, South Sudan.
VQ4AQ	Box 171, Nairobi, Kenya.
VQ8AX	Box 155, Port Louis, Mauritius.
VS1DD	S. Steele, R.S.F., S.A.S.S., R.A.F. Tengah, Singapore.
VU2DH	D. M. Hamilton, c/o M/S Madura Co., Ltd., Cochin, South India.
YO3GK	QSL Bureau, Box 95, Bucharest, Roumania.
ZB2G	Royal Naval W/T Station, North Front, H.M.S. Rooke, Gibraltar.
ZP9FA	C. S. Martin, Box 716, Asuncion, Paraguay.

in a Hartley circuit, with a 136-ft. aerial, North-South.

A dissenting voice on the subject of QRP comes from G6AT, who says that those who say all would be better if everyone worked on QRP have obviously overlooked "site noise." So he says "let people use QRP if they like, but they may rest assured that amateurs in noisy localities will never hear them." He adds that some of the phenomenal reports that the lower-powered stations sometimes received are obviously due to a chance shaping of the ionosphere which gives a "focusing" effect. Such a shape probably exists for a large proportion of the time for *some* two locations on the earth's surface. But this still does not mean that QRP work is not good work.

#### Operating Topics

G3JZ (Haywards Heath) breaks our record of 35 CQ's without a call-sign—he heard a station call 43 times, and thinks that *must* be a new record. G3ATU comes up with a reasoned protest against what we may call "parasitic DX working"—raising the rare ones by jumping on the back of a friend

who asks them to stand by. He says, in particular, that FY8AC and FK8AC have been "appropriated" by F8EO, who lines up all his pals to work them. 'ATU considers that such contacts should not count as real DX. If you can't find the chap for yourself and work him off your own bat, then it is not a real contact. We are inclined to agree; but it *is* difficult, in the case of a much-sought-after DX station, to avoid forming a queue; and possibly a controlled queue is better than a disorderly one? Or is it? One thing is certain—that if one had to find and raise a station oneself before counting a country for DXCC, WAZ or what have you, some of the claims would be somewhat shrunken.

That's about the size of it this time, so we must sign off. We are giving the deadlines for the next *three* months, for the benefit of overseas readers who may be put off writing for the fear that they will miss the bus for the "next issue." They are: November 15 for the December issue; December 12 for the January issue; January 11 for the February issue. Please note these dates and address all your outpourings to DX Commentary, *Short Wave Magazine*, 49 Victoria Street, London, S.W.1. 73 and BCNU.



In May last, G3WW was in Cambridge as Under Sheriff attending the Judge of Assize and the High Sheriff; over the week-end he worked our old friend VP6CD1, who mentioned that VP6ZI was also in Cambridge and, in fact, staying at the same hotel as G3WW. Physical contact was made the very next day between two amateurs who had several times been in QSO on 28 mc phone. In this picture, VP6ZI is on the right.

# Practice of QRP

## Notes on Low Power Working

By C. PROCTER (G5PR)

WHEN the writer was first licensed in 1934, he was handicapped by having no mains and for three years all work was done with low power from batteries. During that period excellent results were obtained and, in addition to numerous contacts on the lower frequency bands, WAC and WBE were achieved on 14 mc with a power which never exceeded 5 watts.

About a year ago permission was obtained to use a /A call at week-ends and once again the no-mains problem was encountered. It was decided to see what could be done with an input of one watt from dry batteries. The following notes comparing results now and pre-war may be of interest to others who enjoy low-power working and an encouragement to would be newcomers who are deterred by the no-mains bogey.

### Comparisons

The two chief differences between conditions to-day and those pre-war are: First, the greatly increased number of stations on the air; and secondly, the average power is much higher. Before the war many British amateurs were happy with 10 watts or less and the one- or two-watt station with a highly efficient aerial often produced a signal almost as strong as the 10-watt man with a not-so-good aerial.

To-day, few stations use less than 25 watts and very many are around the 100-watt mark. One must therefore be resigned to having a weaker signal than the average and overcome this handicap by clever and thoughtful operating—in other words, by using the “tricks of the trade.” Incidentally, these same tricks might yield high dividends to some of the higher-powered stations and considerably reduce interference, but there is no need to tell them this. The best operators know them anyway, and that is why they are so successful in contests.

An important consideration in battery working is the cost of current, and anything which can be done to increase the life of the batteries and still produce the same net result is obviously well worth while.

We are helped considerably in this battery saving by the present practice of calling a station only on his own frequency. Pre-war when most stations used crystal control and searched the whole band for replies to CQ's

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There is a large body of amateurs interested in getting results with low power—either for its own sake or by force of circumstances. Whatever the reason, there are few experiences more satisfying than working DX the hard way; this article is by an operator who is able to discuss the practical aspects of QRP working.—Ed.

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it was necessary to give fairly long calls to make sure that the CQ'er had covered one's frequency. To-day, nearly all stations listen first on their own frequency after a CQ. Only a short call from the answering station is necessary, say, the called station's call three times followed by one's own twice.

### Points on Procedure

One is forced to the conclusion that crystal control on a single frequency is a considerable handicap, particularly for low-power work where it is necessary to avoid interference. If crystal control is to be used one must have a number of crystals for the frequency to be varied so that the whole band is covered in steps. But it is so easy to build a stable VFO with modern components that the expense of several crystals seems hardly justified.

On the lower frequencies many fruitless calls can be avoided by careful listening. Let us take an example: A strong station CQ's on 3.5 mc. Before answering, wait a second to see if anyone else replies—one can hear replies from most British stations. If a “big” station comes up the chances are he will put in a stronger signal than you and the CQ'er will usually take him as a matter of choice. Clearly, *your* chances of raising this station are small; by all means give him a short call on the offchance, but don't be surprised or disappointed if nothing happens. Pass on to the next station and try again. *Persistence* is the first essential qualification for low-power working.

Next, we come to the best way of making a contact. Generally, the writer finds that on low power more contacts are made by calling other stations than by sending CQ. This is logical enough when one thinks about it. The average amateur is a lazy sort of fellow; he picks the strongest signals because they are easiest to read. Therefore, if you are an S5 signal in a band full of S7's, the chances are you will be passed over. Of course there are exceptions to this rule, and they make life just wonderful. So if you can find a clear spot on the band try an odd short CQ. But don't do it all evening and then complain that conditions are bad.

### Conditions

This brings us to a study of conditions. Everyone has evenings when nothing goes right and whatever one's power it seems

impossible to work anything. These evenings can happen all too frequently with only 1 watt of power. With a bit of practice one can spot them right away. The writer can usually tell in five minutes' listening whether he is likely to do any good. For example, when the 7 mc band is cluttered up with high power foreign phone and broadcast stations, one little watt of CW is unlikely to make much impression. The best thing to do at such times is to forget Amateur Radio entirely and go down to the local or, if you can't leave it alone, do some useful constructional job. If you continue to operate you will only run down your batteries, lose your temper and finish up at the local anyway.

Next, when a contact is made keep your transmissions as short as possible. This does not mean having only rubber stamp QSO's, but get the OK after each two or three sentences. With the present congested bands the chances of your channel staying clear for long periods are small. If possible, of course, work break-in; then you can often hear any interfering signal start on your frequency and in any case the station you are working can interrupt you if necessary.

Finally, when working CW keep to a steady 12-15 words a minute. Anything slower is

tedious and by taking longer makes the transmission more liable to interference. Anything faster is the very devil to copy through interference.

### Some Results

Now what has the writer to show for all this good advice? With an indifferent 132 ft. end-on aerial slung over the roof and at the far end about 20 ft. up in a tree, S6 and S7 reports have been obtained around the British Isles and the nearer European countries on Forty and Eighty. Seldom has a contact been impossible when a schedule has been arranged and the usual comment when a new station is told of the power is "Very FB, OM." These results are obtained at odd and infrequent week-ends and no sleep is ever lost if conditions are poor and no contact is made. The writer has acquired a very philosophical attitude but has no doubt that if there was time for regular working many hundreds of contacts would be made annually. Twenty has not yet been attempted, but before the war a few persistent enthusiasts made WAC on about 2 watts. There is no reason why it should not be done to-day especially if a directional aerial is available, though it would be a good deal more difficult.

## Power Pack PP-51/APQ9 on 50-Cycle AC Mains

### Further Application Note

By R. D. McQUEEN (G3DVP)

THE interesting data given in G2QY's article in the April issue of the *ShortWave Magazine* led the writer to consider the possibility of modifying the Power Pack PP-51/APQ9 for use on 240-volt 50-cycle AC supply mains.

The power pack as purchased is designed for a 400-2,600 cycle supply at various input voltages, of which 80 and 115 are typical, and it is clear that the turns per volt used on the windings of the HT transformer and on the heater transformer in the power pack are considerably less than those which would normally be employed for normal 50-cycle operation at the marked voltages.

However, the writer considered that in view of the considerable safety factor always built into Service equipment, 240 volt 50 cycle AC mains might reasonably be connected across the HT transformer terminals marked 485, 485

(Nos. 12 and 14), thereby multiplying the turns-per-volt factor by four. When this was done (with some hesitation in the first instance, it must be confessed) the transformer showed no signs of distress and 208 volts AC appeared across the terminals marked 425, 425 (Nos. 8 and 10).

Voltages as shown in the following table were given across the original input winding of the HT transformer:

Terminal Nos.	Volts AC
1-2	15
1-3	17
1-4	18
1-5	22
1-6	24
1-7	27

### Loading

Power was then taken from the 208 volt AC supply thus obtained, and at 50 watts (about 250 mA) even after two hours continuous operation the HT transformer remained quite cold. It should be noted that 250 mA does not exceed the marked current-carrying capacity of the winding in question.

Terminals Nos. 1 and 7 of the HT transformer were then taken to Nos. 1 and 7 of the heater transformer and the four secondaries of the latter put in series by connecting terminal No. 9 to No. 10, 11 to 12, and 13 to 14. This gave about 5.2 volts AC across terminals Nos.

8 and 15 of the heater transformer, which was found to fall to 5.0 volts when connected across the heater of one of the 5R4GY rectifiers supplied with the power pack.

The 208 volt AC supply was applied to this rectifier in a conventional half-wave circuit using the two 4  $\mu$ F condensers of the power pack in parallel. A DC voltage of 295 was obtained across these condensers at no-load, falling to 250 volts DC at 25 mA output and to 230 volts DC at 50 mA. There is little if any noticeable rise in temperature in the transformers when 50 mA is being taken.

The power pack modified as described could be used for a receiver HT supply, heater current at up to 20 watts at least being drawn at 24 volts AC (terminals Nos. 1 and 6), 12 volts AC (terminals Nos. 2 and 7) or 6 volts AC (terminals Nos. 4 and 6) from the original input winding of the HT transformer according to requirements, the two 1  $\mu$ F condensers and the two chokes being used for HT smoothing.

The modifications described can be carried out without removing the main components from the power pack chassis, the whole remaining self-contained in its original case. Three of the four 5R4GY rectifiers are left as spares !

#### OVERSEAS READERS—PRICE NOTE

With devaluation of the pound (or "adjustment of the sterling rate," as the Chancellor would prefer it called) and the consequent alterations in foreign exchange quoted on the pound, here are some of the new overseas subscription rates for a year of twelve issues of the *Short Wave Magazine*: America, \$3.08; Canada, \$3.40; France, Fr. 1,078; Belgium, Fr. 154; Sweden, 16 Kr.; Switzerland, Fr. 14.00; Holland, 11.70 Gdr.; and Portugal, 88.55 Escudos. Where currency control permits, we shall be glad to accept new subscriptions at these rates from the countries named.

#### G.P.O. AT RADIOLYMPIA

The Post office put on an exceedingly interesting exhibit at the Radio Show. This included a working demonstration of the operation of the 999 service; a replica of a G.P.O. coast radio station for communication with small shipping and the fishing fleets round our coasts; the latest developments in interference suppression; the part played by the G.P.O. in the development of television; and the working of the radio link now being used for handling telegraph traffic over short sea routes.

As taxpayers, we all have something to be proud of in the services provided by our Post Office and the great contribution made by its

#### Increasing Output

If a greater HT output is required, terminals Nos. 5 and 7 of the HT transformer can be used for the heater of a second 5R4GY rectifier and the 208 volts AC from terminals Nos. 8 and 10 connected to the two rectifiers in a conventional voltage-doubling circuit, the two 4  $\mu$ F condensers being in this case used in series, with the mid-point connected to terminal No. 8 of the HT transformer; the two 1  $\mu$ F condensers are now connected in parallel across the HT output. With this arrangement an output of 60 mA at 400 volts DC can be obtained, or a somewhat lower voltage for greater current. The writer has, however, found it preferable to put an additional 6  $\mu$ F condenser in parallel with each of the 4  $\mu$ F condensers, in which case 420 volts DC at 80 mA can readily be obtained—enough to drive a QRP transmitter to about 20 watts input. Where the voltage-doubling circuit is used as described no heater current supplies are available.

With two of the HT transformers (as G2QY apparently has!) even more useful 50-cycle power packs can probably be built up, but numerous variants will doubtless suggest themselves to readers.

engineering departments to the techniques of radio and landline communication. There is no other public authority of a similar kind in the world which can show such results.

#### K2UN REORGANISATION

From Peter Lovelock (ex-G2AIS, Loudwater, Bucks.), our American correspondent, we hear that the activities of K2UN have been completely reorganised. It seems that though a lot of money—in fact, some £3,000—was invested in the station by the United Nations, the personnel factor was overlooked and the U.N. Radio Division allowed the original K2UN concept to fade into oblivion. Truly, a shocking state of affairs, since about £750 of that money was contributed by Britain. Under the new arrangement, the affairs of K2UN will be managed by a six-man committee consisting of W2FX (chairman), W2BW, W2FI, W2GX, W2KH and W2KR—and we expect to see full value for our share of that seven-fifty!

#### CHANGE-OF-NAME

It is announced that the Osram Valve Department of the General Electric Co., Ltd., will in future be known as the Osram Valve and Electronics Department. The reason is the widening scope in the great new field of electronics for all kinds of valve types not remotely associated with purely radio applications as one used to know them.

# Converter for Seventycems

## Stable-Signal Receiver Design

By G. M. KING, B.Sc., M.B., Ch.B.  
(G3MY)

IT is perhaps rather a pity that the start made by many people on the new 70 cm band was not quite so thorough nor wholehearted as was the case with two metres. By this it is not meant that there was any lack of enthusiasm, but that the equipment used was definitely not up to that standard of which most amateurs interested in VHF work are capable.

And so, after being in possession of the band for one whole year, we still find most operators using SEO transmitters and either broadband superhets or super-regenerative receivers; in other words, a technique which we had all decided was most undesirable even on Two if long-distance contacts were to be made from any but portable locations.

The faults of this technique were admirably demonstrated during the recent 420 mc field tests, when at the author's /P location, quite a number of stations were heard at distances up to 100 miles, at altogether unexpected strengths. Unfortunately, however, most of these were using SEO type transmitters which, when tone modulated, produced in some cases literally scores of separate carriers spaced over 2.5 mc of the band—and when each carrier was S9, as was often the case, the hopelessness of looking for weak 'DX crystal-controlled signals can be well appreciated. In addition, it was quite a task to follow a station over as much as 5 mc of the band whilst he warmed up; and this was repeated each time he came over!

Already, a number of writers have described relatively easy methods of obtaining crystal control on the band with valves which are currently available on the surplus market. But not quite so much attention seems yet to have been given to the receiver problem.

### Technique

As with the 2-metre band, a logical approach to the 420 mc receiver would seem to be a tunable converter, feeding into a regular low frequency IF channel; but, if straight CW is to be copied with ease, then the stability of the tunable oscillator presents a major problem.

RF amplification is also extremely difficult to achieve unless one is blessed with a source of "lighthouse tubes." For a simple converter it was therefore decided to omit the preselector stage, and to work straight into the mixer for

The quest for receivers capable of taking CC signals on 70 cm has now started and presented here is the first such design, by one of our keenest and most successful operators on the 420 mc band. This converter arrangement is by no means the ultimate either in sensitivity or stability, but it will be a very good beginning towards those desirable, and indeed essential, characteristics for effective working on 70 cm. The technique employed for the signal-frequency circuits was developed during the war and gave very successful results under conditions far more onerous than are usually encountered in amateur operation—and it should not be difficult to obtain the necessary ironmongery from surplus sources.—Ed.

which a crystal diode, such as the 1N21B, is the obvious choice.

When a crystal diode is used as a mixer, the conversion loss is to a considerable extent dependent on the local oscillator injection, being high for a low rectified diode current but falling quite rapidly as the injection is increased (see Fig. 1). If the local oscillator is set to give between 0.4 and 1.0 mA diode current, the conversion loss should not exceed about 6 dB.

With a mixer that gives a loss rather than a gain, the overall noise-factor of the receiver is dependent also on the noise-factor of the IF channel, and so it is worth while to pay considerable attention to the design of the first IF stage in order to achieve a really low IF noise figure.

In the author's case, the converter feeds into a BC-455 as the IF channel, operating at 8 mc and the first IF stage has been built on the converter chassis. Measurements with the noise generator show that the IF channel (i.e. from 6AK5 input to the output of the

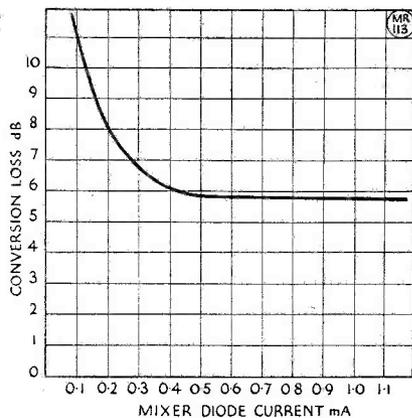


Fig. 1. Graph showing the relationship between mixer diode current and conversion loss; the significance of this curve is discussed by G3MY in his article.

BC-455) has a noise factor of 2 dB only, so that we may hope for an overall 420 mc receiver noise-factor of better than 10 dB ; this is as good as, or better than, many of the receivers currently in use on the 2-metre band.

### The Converter

This was built around the concentric line tuning assembly found in a surplus R89A/ARN5A Glide Path receiver which originally covered a range of 330 to 340 mc. This assembly is shown in the photograph.

These lines are well constructed from 1 in. inside diameter silver-plated brass tube, with an inner conductor of  $\frac{1}{4}$  in. diameter rod of the same material. Tuning is by means of end capacity loading, and is accomplished by adjusting the screwcap on the end of the assembly.

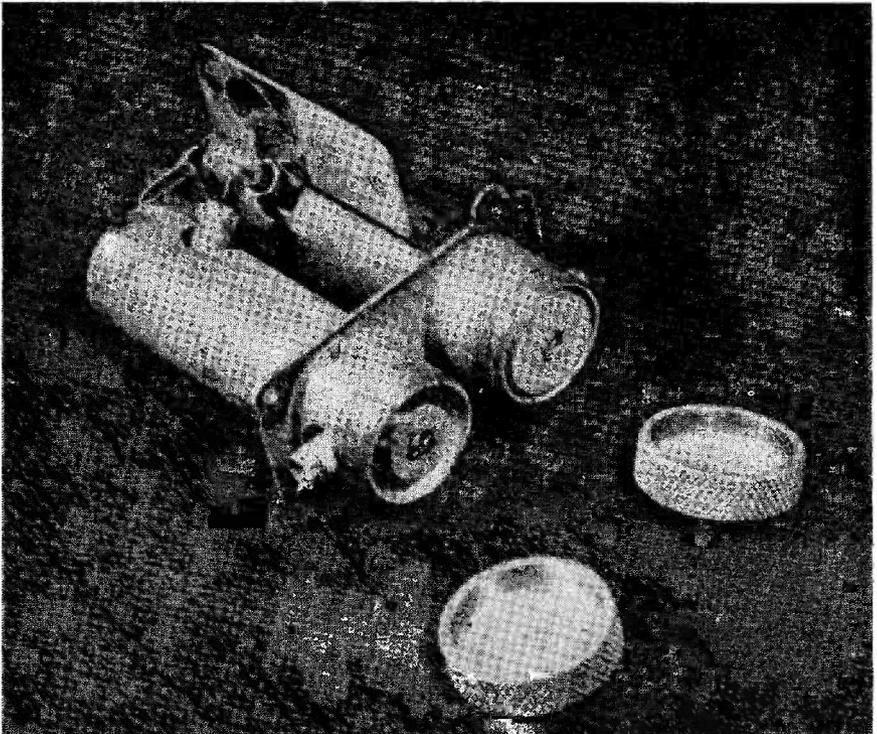
The mixer line is 4 in. long whilst that used for the local oscillator is  $3\frac{3}{4}$  in. long, and to make the mixer line tune to the 420 mc band, it was necessary to remove the original capacity loading disc, and fit one of the same size

as fitted to the oscillator line.

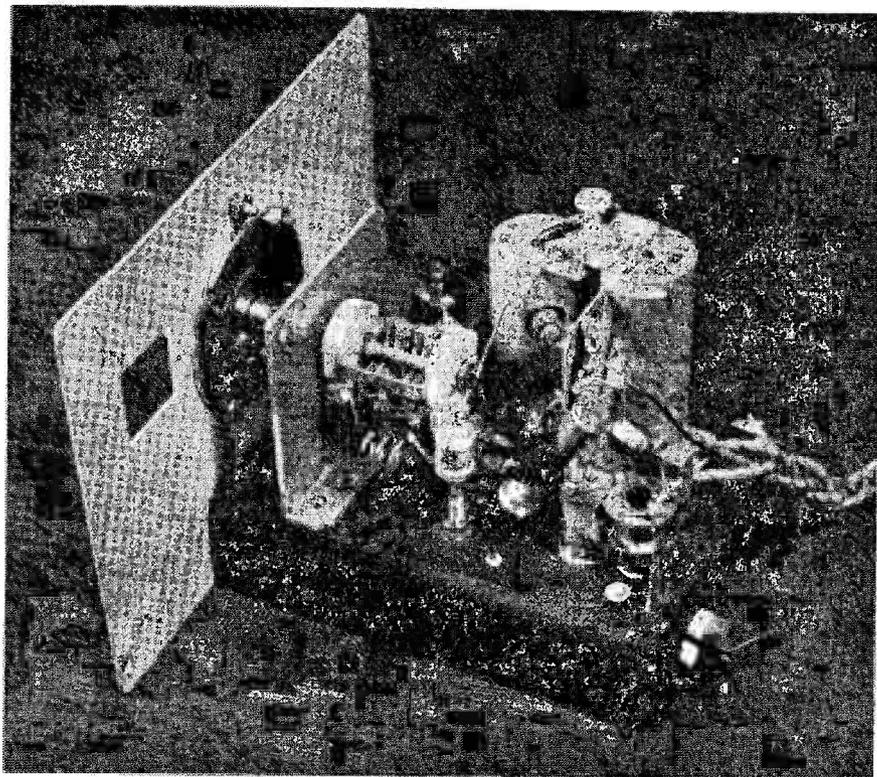
As used in the original receiver, coupling from the oscillator to the mixer line was by a capacity tapped on to the inner conductor of each line approximately 1 in. from the shorted end, and it was found unnecessary to alter this arrangement. The circuit diagram suggests these connections quite clearly.

The local oscillator is a 6J6 operated as oscillator-tripler, covering from 144 to 149 mc on the fundamental, thus giving a third harmonic range of 432 to 447 mc. This, with an IF of 8 mc and the oscillator on the high side of the incoming signal, gives a tuning range of 424 to 439 mc. It is an extremely wide frequency range to cover when looking for CW stations and when crystal control becomes universal (as must be hoped will soon be the case) then the range can be reduced to cover only the 432 to 438 mc area of the band with somewhat better spreading.

The 6J6 circuit is perfectly straightforward, as will be seen from the circuit diagram, and needs no further explanations except that



Concentric line assembly for G3MY's 420 mc converter—the heart of the whole unit, and actually extracted from an R89A/APNSA glide path receiver, available as surplus.



General view of the completed 70 cm. converter.

mechanical rigidity and stability are of paramount importance in the local oscillator if CW signals are to be held without the constant necessity for chasing them round on the tuning dial.

As stated earlier, the mixer is a 1N21B crystal diode which is connected across the high potential end of the appropriate line. This results in the line being very heavily damped by the low impedance crystal, and consequently it is so broadly tuned that, once set at the middle of the band, no further adjustment is necessary. It was also found that the tuning of the tripler plate line was very broad, and that after the initial setting up no adjustments were needed here either.

In the course of many tests with different forms of aerial coupling, it was found that the best signal transfer and signal-to-noise ratio were obtained with one side of the 300-ohm feeder tapped directly on to the high potential end of the mixer line *via* a 2  $\mu\text{F}$  capacity. The other side of the feeder goes to the chassis of the receiver *via* a 3-30  $\mu\text{F}$  trimmer.

The 6AK5 first IF stage is quite conventional except that the output of the mixer is tapped one-fifth of the way up the grid coil to give a better match and to prevent this circuit from being heavily damped by the crystal.

#### Adjustments

Tuning up the converter is extremely simple. Starting with the local oscillator, the two trimmers C11 and C12 are adjusted so that with C10 at full capacity the frequency of oscillation is exactly 144 mc. During this process, the two trimmers should be kept as nearly as possible at equal capacity so as to preserve the circuit balance in the oscillator stage.

Next, an 0.1 mA meter should be temporarily connected in series with the lower end of the 6AK5 grid coil, to give an indication of diode current, and the plate line of the tripler is then adjusted to maximum diode current, which in the author's case was about 1.0 mA without an aerial on the receiver, falling to 0.4 mA with the feeders connected. At this

stage it is as well to check the frequency of the tripler output with the 420 mc wavemeter (or Lecher wires) as these lines will also tune the second harmonic on 290 mc.

Finally, with the feeders connected, tune in a signal at about 432 mc and peak the mixer tuning for maximum signal strength. Tuning of both mixer and tripler plate lines will be found to be quite broad.

**Results**

This converter has been in use for about one month and was built specifically for the August 420 mc Field Tests, during which it was noticed that the strength of signals up to approximately 100 miles distant was in every way comparable with those received on 2 metres. Stations heard at S6-8 were called repeatedly on Phone, CW and ICW, but were not apparently receiving our crystal-controlled signals—so at least it would seem that this simple little converter can out-perform the majority of converted ex-Service and super-regenerative receivers at present in use on the band.

**Table of Values**

Fig. 2. Circuit of the 420 mc Converter

- C1 = 2  $\mu\mu\text{F}$
- C2, C11, C12 = 3-30  $\mu\mu\text{F}$  Phillips type trimmer
- C3 = 7.5  $\mu\mu\text{F}$
- C4, C7 = 30  $\mu\mu\text{F}$
- C5 = 3  $\mu\mu\text{F}$
- C6, C8, C15, C20 = 500  $\mu\mu\text{F}$
- C9 = 5  $\mu\mu\text{F}$
- C10 = 7 + 7  $\mu\mu\text{F}$  split stator tuning
- C13, C17 = 25  $\mu\mu\text{F}$
- C14, C16, C18 = 0.1  $\mu\text{F}$
- C19 = 10  $\mu\mu\text{F}$

(All fixed condensers midget mica type.)

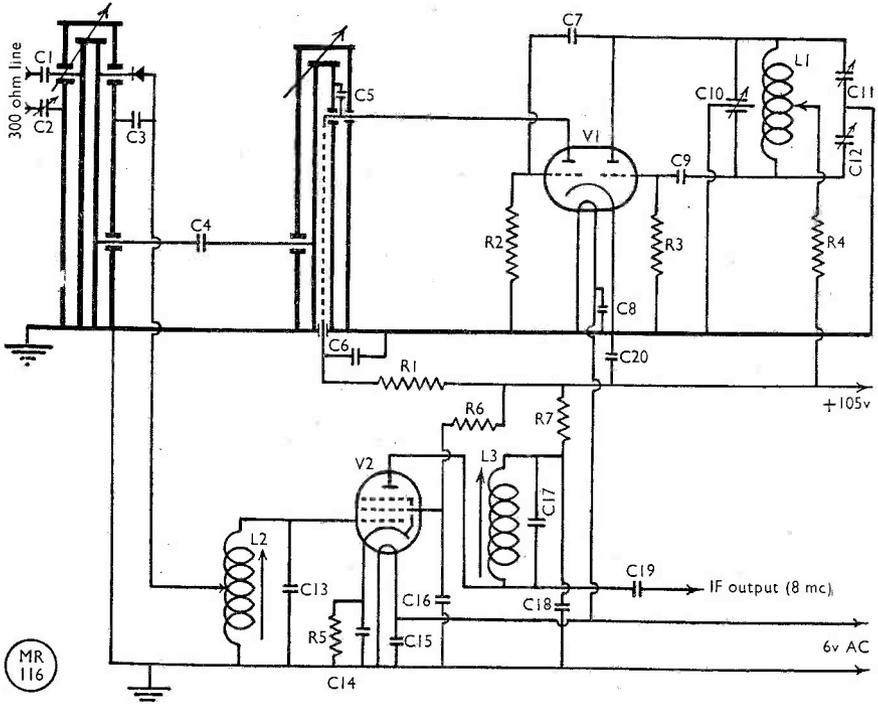
- R1 = 470 ohms
- R2 = 33,000 ohms
- R3, R6 = 10,000 ohms
- R4 = 1,000 ohms
- R5 = 270 ohms
- R7 = 4,700 ohms

(All resistors  $\frac{1}{2}$ -watt ratings.)

- L1 = 3 turns 18 SWG,  $\frac{3}{8}$  in. inside dia.,  $\frac{1}{2}$  in. long, self supporting
- L2, L3 = 30 turns 34 SWG enamelled wire,  $\frac{3}{8}$  in. dia., slug-tuned former

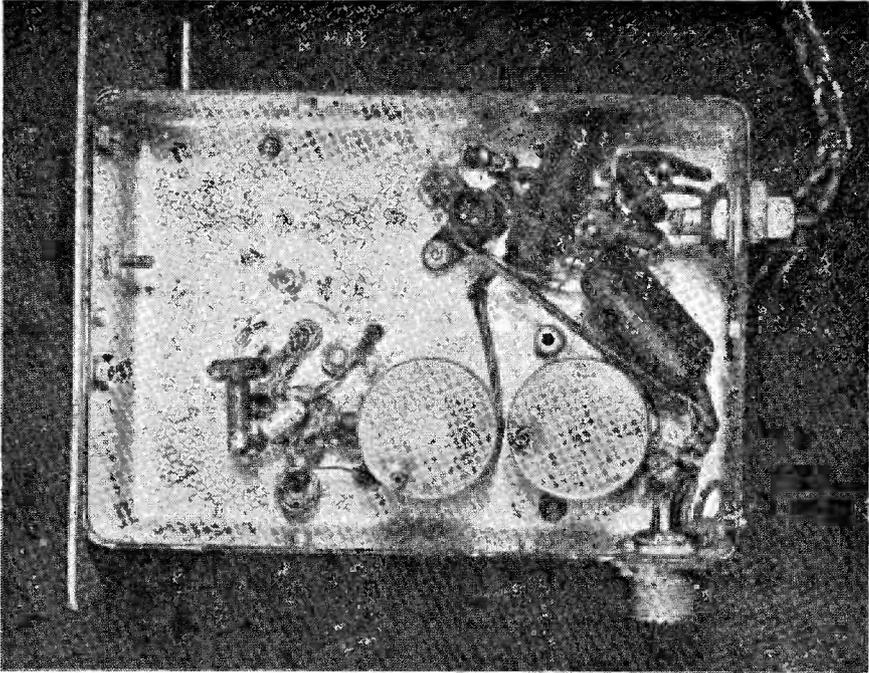
(L2 is tapped 6 turns from earthy end.)

- X = 1N21B or similar HF crystal diode
- V1 = 6J6
- V2 = 6AK5



MR 116

Fig. 2. Circuit complete of the 420 mc converter described by G3MY. The arrangement of the concentric tube circuits (actually obtained from a surplus glide path receiver) is clearly indicated.



Underneath G3MY's 420 mc receiver unit, showing the butt ends of the concentric line tuners.

#### AMATEUR RADIO EXHIBITION

For the Third Amateur Radio Exhibition, sponsored by the Radio Society of Great Britain, we shall be on Stand 9, where we hope to meet many of our readers, as in previous years. If space permits we shall be showing (in addition to our publications) certain of the prototype units described in constructional articles in recent issues of the *Short Wave Magazine*. The Stand will be continuously manned by our office staff, and at various times G2XC, G3AKA, G6QB and the Editor will also be available.

#### COLOUR TELEVISION

At Radiolympia, Pye of Cambridge scooped the pool on the novelty aspect of television by a successful demonstration of colour TV on their own closed-circuit system. Though it may be a long time yet before CTV takes the air, it has very considerable immediate commercial possibilities in connection with education, sales demonstration and industrial control. In such applications, an actual radio link need not be used, as the cameras and screen can be

connected by wire circuits. Pye's are first in the world to produce a colour-transmission system with practical commercial possibilities.

#### CARDS IN THE BOX

If your call is here, we want your address for the forwarding of QSL cards held in our Bureau. Please send a large, self-addressed envelope, with name and callsign, to BCM/QSL, London, W.C.1. If you ask for it, we can also print your callsign and address under "New QTH's" as space permits; this ensures eventual publication in the *Radio Amateur Call Book*.

G2AAY, 2BKD, 2FIY, 2FOS, 3AJL, 3BIT, 3CDM, 3CHQ, 3DQO, 3DUD, 3EER, 3EJV, 3EOF, 3ERC, 3ETE, 3EXK, 3FAT, 3FIX, 3FJS, 3FJU, 3FMJ, 3FOH, 3FRR, 3FRV, 3FTK, 3FTU, 3FVH, 3GEC, 3KR, 6DR, GC3FMS, GI3FFF, GM3CSO, 3DYC, 4PV, GW3DWR, 3FEJ, 3FEZ.

# VHF BANDS

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

*Good Conditions Maintained—  
French Stations Worked at DX—  
Zone Plan Points—  
Station News—  
Fiveband Club Dinner—  
Activity Report & Achievement  
Tables*

IS it the prolonged summer weather, or is it just the generally improved equipment everyone seems to be using that is the cause of the consistently good conditions prevailing on Two since the middle of the summer? There may be one or two who will disagree about the conditions, but the general consensus of opinion (shared by your conductor) is that Two Metres has been reliable to a degree far above anticipations.

Excluding a week's absence from home, there have only been four days during the past three months when signals from distances in excess of 100 miles have failed to appear in the reception log at G2XC. These dates, it may be worth recording, were August 6 and 10, and September 23 and 30. This is far superior to anything ever experienced on Five Metres. It is difficult to know how much of this is due to better propagation characteristics on the higher frequency and how much to high gain beams and efficient equipment. If it is the former, then there would appear to be good reason to expect an even better performance on 70 cm. But so far there has been no evidence of contacts much beyond line-of-sight, in spite of the fact that several of the 70-cm. field days have coincided with excellent conditions for DX on Two Metres. As G5BY says, no reports have yet been seen of 70-cm. contacts due to ducting.

Another point which has been noted is that fading appears to be more severe on Two than on Five. Confirmation of this is easily obtained by checking on the London TV signal at a QTH such as the writer's, some 70 miles from the transmitter. Observations over a long period have shown that fading on 45 mc is much slower and generally less deep

than on 145 mc, and frequently the London 145 mc amateur signals are showing rapid and deep fading while the 45-mc TV signal is steady within a dB or so for an hour or more. It is not just a matter of power, for it must be remembered that 25 watts aided by a 12 dB gain beam at both ends is equivalent to 6 kW! No conclusions are being drawn here, but these observations may serve as more "food for thought."

## The Two-Metre Zone Plan

Support for the Zone Plan has been excellent. True, there are still a few who have not yet come in; some due to temporary lack of a crystal; some due to apathy, and just a few refuse even to give the scheme a trial. (No need to mention call signs here; an hour or two of listening will provide them.) From observations on the South Coast it appears that most of the Northern, Midland and East Anglian stations have moved into their correct Zones, as also have the Devonshire group. This is all very commendable. Non-operation is evident among a certain number of London area stations. As it happened, most operators in this area were already in their correct frequency zone. A few who were outside have moved in, but some are

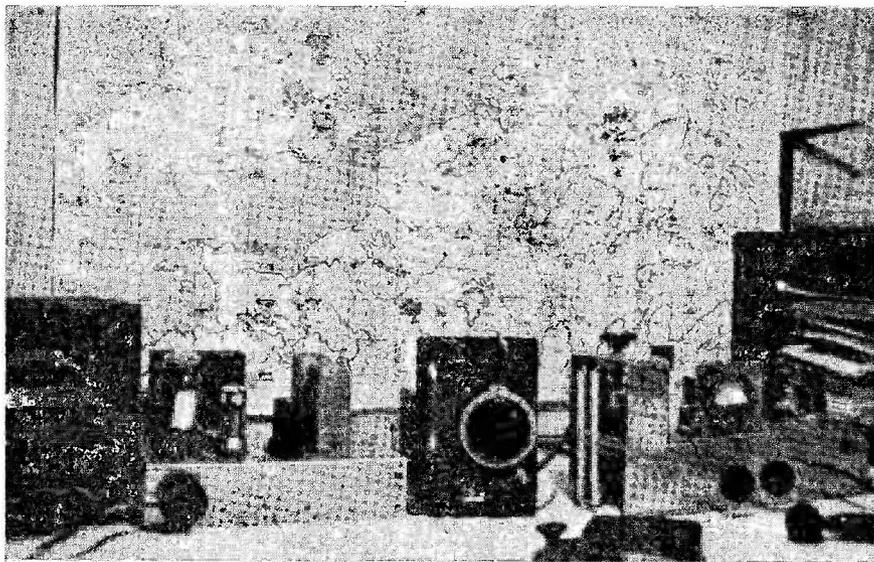
## NORTH AFRICA ON TWO!

### G6UH RECEIVES FA8IH

At 1955 on October 17, G6UH (Hayes, Middlesex) heard FA8IH calling "CQ F" on 144.1 mc, and subsequently (1959-2003) working F9???. At 1320 on October 18, G6UH confirmed the reception of the previous evening by working FA8IH on the 28 mc band. FA8IH will be on 144.1 mc daily 1800-2200 GMT looking for G's. Once again, we are on the eve of great things. Congratulations, G6UH!

still to be found scattered all over the band; they have been heard as low as 144.3 and as high as 145.9 mc during the past few weeks. There appears to be some idea amongst these stations that they will be unable to work DX if they move into their correct Zone, due to QRM from other London signals. This fear is largely groundless. At 60 miles from the centre of London, mutual interference between London signals is almost non-existent and there are plenty of open spaces between 144.85 and 145.25, even when activity is at its peak. One London station has been heard to say that he had moved out of the Zone frequencies intentionally. The only result is that he QRM's the DX for his neighbours. Your conductor wonders if this is what is meant by the "Spirit of Amateur Radio"! (We hope not!—Ed.)

The chief effect of the scheme has been to



PAØUHF, Leiden, plots his VHF coverage on the map shown in this photograph.

enable the more distant stations to be worked free of local QRM and also to make it possible to find stations in a given area quickly. Checks on conditions have become much easier. There has been less hanging on to a weak signal wondering (perhaps, hoping) it was some 300-mile DX, only to find it was a local off the side of the beam. However, the Plan does call for good operating, and G3EHY has commented that there is now a tendency for Northern stations to call CQ and just search Zone. J forgetting that someone in Zone I may have heard them and be calling. It is therefore suggested that the Zones on which the beam is directed might be mentioned in the CQ call and that these be searched first, but that if no call is heard on these frequencies the whole band be searched carefully. Stations in zones other than those

specified would then know that a long call was needed. Use of the QLH, QML, procedure signals is also worth considering, but in any case vary the method of search after successive CQ's to give everyone a chance. If only one particular Zone is to be searched then the word "only" should be included in the CQ call. In fairness to the Northern stations it should be mentioned that "CQ Zone I" has been heard a number of times.

#### 70 cm. News

As will be seen by the Table of Results the 70-cm. Contest did not draw a large entry. A number of factors were responsible. The lateness in the season mitigated against portable working, while few stations are really ready for fixed station operation. One well-known VHF man had arranged to get

#### 420 mc Contest

##### RESULTS

Position	Station	Contacts	Points
1	G3BUR/P	8	192
2	G3APY	4	163
3	G5BM/P	2	119
4	G2JT/P	1	109
	and		
	GW6DP/P	1	109

#### FULL POWER ON VHF

We are officially informed that the GPO has been able to agree to the use of full power (150 watts) by holders of Class "B" licences operating on all bands above 28 mc, except 420-460 mc ; on 70 cm. the power limitation remains at 25 watts.

This power increase is a valuable concession and will do much to forward amateur research on the VHF bands.

## TWO-METRE ACTIVITY BY ZONES AND COUNTIES

### ZONE G (144.65 to 144.85 mc)

#### **Bedford**

G3CGQ

#### **Bucks.**

G3CVO, G8WV

#### **Cambridge**

G2FJD, G2PU, G2XV, G3WW, G4MW, G8SY

#### **Hertford.**

G3FD, G3NR, G4RO, G5UM

#### **Huntingdon.**

G3AKU

#### **Norfolk**

G2XS, G3VM, G5UD

#### **Northants.**

G2HCG, G3DUP

#### **Suffolk**

G2CPL, G3AVO/A

### ZONE H (145.25 to 145.5 mc)

#### **Berkshire**

G3CCP, G5RP, G6OH

#### **Dorset**

G3ABH, G3BM, G3TN

#### **Hampshire**

G2DSW, G2NS, G2VH, G2XC, G3AAE, G3ARL, G3BHS, G3CFR, G3CGE, G3CVE, G3DEP, G3EJL, G3FAN, G3LV, G3RI, G4QL, G5PB, G5SP, G6DT, G8DL, G8JB

#### **Gloucester**

G5BM, G6ZQ

#### **Oxon.**

G5TP

#### **Wiltshire**

G4AP, G8IL

### ZONE I (145.5 to 145.65 mc)

#### **Cornwall**

G3AGA

#### **Devonshire**

G2BMZ, G3AVF, G5BY, G5QA, G5ZT, G6WT

#### **Somerset**

G3EHY

### ZONE J (144.85 to 145.25 mc)

#### **Surrey**

G2ANT, G2MV, G2NH, G3BLP, G3ENY, G3FP, G4CG, G4CI, G5AS, G5MA, G5MI, G5NF, G5RD, G5WP, G6CB, G6NB, G8SM

#### **Sussex**

G2AVR, G2NM, G2QV, G3AAK/A, G3EBW, G4RD

#### **Essex**

G2CIW, G2KG, G2WJ, G3ANB, G3BTL, G3CC, G3ECA, G3FIJ

#### **Kent**

G2AJ, G2BYF, G2FZR, G2IC, G2UJ, G2VA, G3BOB, G3CAZ, G3DAH, G3FOD, G3GW, G5MR, G6PG, G6VC, G6VX

#### **London**

G2DWW, G2HDY, G3CNF, G3FXG, G4DC, G5DT, G5LI, G5PY, G6HG, G6LR, G8KZ

#### **Middlesex**

G2AFB, G2AHP, G2FMF, G3CWW, G3DCC, G3QK, G4HT, G4KD, G5BC, G5IB, G5LQ, G6UH, G8IP, G8SK

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

**Next Month: Zones A to F**

married on the first of the contest week-ends and this made it rather difficult for him to take any real interest in a 70-cm. Contest! Others were busy rebuilding as a result of experiences gained earlier in the season.

The winner, G3BUR/P operated from Redhill Farm, Kings Norton, Birmingham, on this first week-end, and at Quinton, Birmingham, on the second. Both QTH's were actually in Worcestershire. Six watts to an SEO on the first session was changed to 9 watts CC on the second. In both cases a 32-element stacked array was used and the receiver was a much modified ASB8. The difficulty in copying weak MCW is stressed in G3BUR's report. The following points are also made: The use of stabilised equipment is desirable so that the bandwidth of receivers can be narrowed and so improve the signal-noise ratio. People who say 70 cm. will be as good as two metres are mistaken. Even if stabilised equipment becomes the order of the day location is very important. New stations active during the contest included G2ATK and G8QY (Birmingham), the latter with a Type 105 unit and a 24-element beam. The other contest news has already been covered in last month's VHF Bands.

G5BY (Bolt Tail) has been doing some tests with G3LV (Southsea), but so far these have proved abortive.

### Two-Metre News

Contacts of 150 to 200 miles or more have been so numerous as to be almost commonplace throughout the period under review. Worthy of comment though is the period in early October when the French stations created a certain amount of excitement and provided many operators in the Southern counties with a new country. F8OL (Paris) worked 23 different G's on the evening of October 6, and described it as the best day since November, 1948. The field strength of the G stations in Paris was, however, much lower than last November, 100 microvolts against 1 millivolt. The cause of the good conditions seems to have been a large humidity gradient over Northern France at a height of about 5,000 ft. On October 7, the London stations were inaudible in Paris, but G2XC and G3EJL from Hampshire were well received.

PAØPN has also been putting a good signal through and has been heard by GW2ADZ and G2XC as well as the East Coast stations.

Among the inter-G contacts must be mentioned a phone QSO between G5WP (Woking) and G8BI (Darlington), and the reception of G5WP and G6VX by the Newcastle group.

**TWO METRES**  
**ALL-TIME COUNTIES WORKED LIST**

**Starting Figure, 14**  
**From Fixed QTH only**

Worked	Station
43	G3BLP (180)
40	G5MA, G5WP
39	G2OI
38	G2IQ, G2NH (183)
37	G3ABA
36	G6NB (167)
35	G3APY, G5BY, G5GX
34	G3CUJ
33	G2XC (198), GW2ADZ
32	G3EHY
31	G2KG (110), G2MR, G4DC (170), G4LU
30	G2XS (111), G5BM
29	G3DMU
28	G2HDY (107), G5BD, G8WV
27	G3BKQ, G3DAH, G5JU, G8QX, G8SM (106)
26	G2CIW (137), G2RI, G4HT (121), G5MI, G6VC
25	G2AXG, G4AU, G6PG (109), G6WT
24	G3CGQ G3VM, G5NF (111)
23	G2CPL (101), G3BOB, G8QY
22	G8IP (109)
21	G2NM, G3CCP, G6UH (130)
20	G8KZ
19	G3EJL, G3FD, G5RP
18	GM3OL, G6DT
17	G3AUA
16	G8KL
15	G2FLC, G3AKU, G3CWW, G3FJ, G3WW, G4RK
14	G2ANT, GM3BDA, G3BW, G6LK

**Note:** Figures in brackets after call are number of different stations worked. Starting figure, 100.

### Around the Stations

With no reports this month from Scotland (Zones A and B), a start must be made with Zone C, where G2FXA (Stockton) is about to commence operations on Tees-side. The Rx is a converter using EF50 RF and mixers, and CV6 oscillator. The aerial is a 6-element "turnstile" and the Tx PA an 832. G3CYY (of Zone Plan fame) is rebuilding and hopes to have an 8-element stack up at 45 feet and a 6J6 converter, as well as a new Tx (and a crystal on the correct frequency!) when all is completed. G3CUJ (Hull) had trouble with a 6J6 and so missed hearing G2XC call him! Since then, both G2XC and G3DEP (Ryde, I. of W.), have been heard. G6MI is active in Blackpool, and G2OI continues to keep the two-metre flag flying in Eccles. Apparently we got things muddled in the September *Magazine* with regard to the beam at G2OI; just to clear it up G2OI uses a 5-element close spaced Yagi, although a five-over-five may be up shortly. The schedule with G12FHN has now reached 49 contacts.

### Zone E

G8KL (Wolverhampton) found September 25 to 27 the best period. He hopes to conform to the Zone Plan as soon as a crystal is obtainable, and has a new 36-foot mast up. G8KL disagrees with GW2ADZ about the Counties Table and says "keep it going until everyone is in the forties." G3ABA (Coventry) has replaced his roof space 4-ele Yagi with an outdoor 16-ele stack, at 35 feet, and finds signals up about 6dB, with less fading on the DX. The beam width is about 30 degrees at the 6 dB points, which is better directivity than his Yagi had.

### Zone F

GW2ADZ considers the end of September and beginning of October as very good, with activity the chief limiting factor. He has worked G5MR at 216 miles, and logged PAØPN on October 7. His daily schedules, now number 8, and the series with G2XS, G3VM, G2CPL and G5UD between 2115 and 2200 every night are particularly interesting. They are in a straight line from GW2ADZ at distances from 140 to 210 miles. G4LU has also been listening to these schedules and confirms the consistency of G2CPL and G2XS.

### Zone G

G3AKU (St. Ives) remarks that in our constant pleas for signing on CW it is overlooked that some stations find it very difficult to use a key! G3AVO/A (Lakenham) has been putting out a good signal from Suffolk and has G2OI and G2XC as best DX so far.

## 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 call signs 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!

F8LO, South-West Paris.

WORKED: G2CIW, 2QV, 2XC, 3DCC, 3EBW, 4HT, 5MR, 6NB.

HEARD: G2AJ, 2KG, 2NM. (October 3 and 6.)

G3BLP, Selsdon, Surrey.

WORKED: F8OL, G2BFT, 2BQC, 2CPL, 2HCG, 2NS, 2OI, 2RI, 3AAK/A, 3ABA, 3AKU, 3AVO/A, 3BHE, 3CXD, 5BD, 5BM, 5ML, 5PB, 5QA, 5UD, 8IL, 8UZ.

HEARD: G8BI.

G4HT, Ealing, Middlesex.

WORKED: F8LO, G2AIQ, 2BFT, 2FJD, 2OI, 2WI, 2WS, 3AAK/A, 3ABA, 3AUA, 3ENS, 3FXG, 4RO, 5ML, 5NR, 5PY, 5RP, 5UD, 6VC, 8QC, 8UZ.

HEARD: F3DC, 8OL, 9BY, 9MX. (New stations since September 12.)

G3BOB, Hayes, Kent.

WORKED: G2BMZ, 2BQC, 2CPL, 2FJD, 2OI, 2XC, 3AKU, 3DJQ, 4MW.

HEARD: G2IQ, 2XS, 3ABA, 3EHY, 5BD, 5BY, GW2ADZ. (September 9 to October 5.)

G4LU, Pant, Salop.

HEARD: G2AJ, 2CPL, 2IQ, 2IZ, 2MA, 2NH, 2OI, 2RI, 2XS, 3AAV, 3ABA, 3APY, 3DEP, 3DJQ, 3DMU, 3DRG, 3EHY, 3EHY, 3EVK, 3VM, 3WW, 4DC, 4HT, 4OS, 4RK, 5BY, 5ML, 5RW, 6NB, 6VC, 6VX, 6ZQ, 8KI, 8UZ. (September 10 to October 9.)

G3CSC, Prescott, Lancs.

WORKED: G3AHT, 3CHY, 3CXD, 3DA, 4OS, 5KX, 5WP, 6LC, 6IL, 8SB, GW3ELM, 5UO.

HEARD: G2JT, 2IZ, 2OI, 2XS, 3BY, 3BLP, 3CZP, 3DH, 3DMU, 3EHY, 3ELT, 3FML, 3BM, 5BY, 5CP, 5RW, 6NB, 6VX, 6YO, 8KL, G1ZFHN, GM3OL, GW2ADZ. (September 10 to October 10.)

G2OI, Eccles, Lancs.

WORKED: G2AJ, 2HDY, 2IZ, 2MV, 2XC, 2XS, 3ABA, 3ABH, 3AHT, 3AVO/A, 3BBHE, 3BLP, 3BOB, 3CFR, 3CXD, 3DJQ, 3EHY, 4AP, 4AU, 4DC, 4HT, 5BM, 5BY, 5KX, 5MA, 5ML, 5RP, 5RW, 5TP, 6NB, 6VC, 6VX, 6YP, 8KL, 8WV, G1ZFHN, GM3BDA, 3OL, GW2ADZ, 3ELM, 3KY, 5UO.

HEARD: G2APW, 2ATK, 2BFT, 2CUJ, 2IQ, 2KG, 2MA, 3AEX, 3AGS, 3AKU, 3APY, 3CSC, 3DEP, 3DRG, 3EEZ,

3EMY, 3ENS, 5BD, 5LI, 5VN/P, 5WP, 6GR, 6MI, 6QO, 6ZQ, 8BI, 8QY, 8UZ, GWSYB.

G6MI, Blackpool, Lancs.

WORKED: G2AOA, 3AYT, 3CZP, 3DA, 3IY, 3VX, 4PF, 5KX, 5VN, 6LC, 8SB, GM3OL.

HEARD: G2BTO, 2OI, 3BW, 3DH, GM3BDA.

G3EHY, Banwell, Somerset.

WORKED: G2AJ, 2CIW, 2KG, 2NH, 2OI, 3AHT, 3BOB, 3CVO, 3RI, 4CI, 4RK, 5MA, 5MI, 5ML, 5TP, 6NB, 6PG, 8IP, 8KI, 8UZ, GW2ADZ, 3EJM.

HEARD: G2XS, 3DMU, 5BC, 5GX, GM3OL. (September 13 to October 9.)

G6NB, Chertsey, Surrey.

WORKED: F3DC, F8LO, 8OL, 9MX, G2AIQ, 2AVQ, 2BFT, 2BMZ, 2BQC, 2FJD, 2IQ, 2OI, 2XS, 3ABH, 3AHT, 3BHE, 3CCP, 3DA, 3EBW, 3EHY, 3FAN, 4MW, 5BD, 5ML, 5UD, 6YO, 8KL, GW2ADZ.

G3EIL, Southampton, Hants.

WORKED: F3DC, 8OL, G2BMZ, 2CIW, 2UJ, 3ABA, 3AHT, 3AUS, 3BHE, 3DAH, 3EBW, 3EHY, 3FXG, 3TN, 4AU, 4CI, 4MW, 4RK, 5ML, 5QA, 5TP, 5ZI, 6OH, 6PG, 6UH, 6WT, 6ZQ, 8KZ, GWS5A.

HEARD: F8LO, 9MX, G2AJ, 2ANT, 2FMF, 2IQ, 2MV, 2OI, 2WS, 2XS, 3BLP, 3CO, 3FKF/A, 5BM, 5RP, 5UD, 5WP, 6LR, 6NB, 6VX. (September 12 to October 11.)

G5MR, Hythe, Kent, NGR 61/15352.

WORKED: F3DC, 8BY, 8LO, 8OL, G2AVR, 2KG, 2QV, 2XC, 3CWW, 3EBW, 6OH, 6PG, GW2ADZ.

HEARD: G2AJ, 2CIW, 2FJD, 2FZR, 3CVO, 3DCC, 3EJL, 3FIJ, 3GW, 3WW, 4MW, 5IB, 5TP, 6NB, 6VX, 6YP, 8KZ. (September 11 to October 9.)

G2XC, Portsmouth, Hants.

WORKED: F8LO, 8OL, G2BFT, 2BMZ, 2CIW, 2CPL, 2HX, 2IQ, 2KG, 2OI, 2RI, 2WI, 2XS, 2XV, 3ABA, 3AHT, 3AKU, 3APY, 3AVO/A, 3BHE, 3CO, 3CVO, 3DJQ, 3VM, 3WW, 4MW, 4RK, 5BD, 5BM, 5BY, 5GX, 5ML, 5MR, 5UD, 6YO, 6ZQ, 8SY, 8WV, GW2ADZ.

HEARD: F3DC, G2MA, 3BKQ, 3BQC, 3CUJ, 3CXD, 3DRG, 3ECA, 5JU, 5PY, 6CB, PA0PN. (September 16 to October 12.)

G5BY, Bolt Tail, Devon.

WORKED: G2CIW, 2DSW, 2OI, 2XC, 3BM, 3LV, 5PB, 5ML, 5UD, 8IL, 8KL, GW2ADZ.

HEARD: G2NH, 2NM, 2XS, 3BBQ, 3CCP, 3CVE, 4DC, 5BM, 5MA, 6OH, 6UH, 8UZ. (September 15 to October 12.)

G4LX, Newcastle, Northumberland

WORKED: G2BDO, 3COJ, 3CYY, 3DMK, 3DMU, 4QA, 4WB, 5GX, 8AO.

HEARD: G2DKH, 2MA, 3ALD, 3ALY, 3APY, 3BLP, 3CUJ, 3EHZ, 5BD, 5UD, 5WP, 6VX, 8GL, GM2CAS, 3BDA, 3OL. (To October 10.)

G3CWW, Hendon, Middlesex.

WORKED: F8OL, G2AFB, 2IC, 2QV, 2XS, 2XV, 3FXG, 5UD.

HEARD: F8LO, 9MX, G3ANB, 4MW, 6YO, 8UZ.

G6WT, Torquay, Devon.

WORKED: G2DGO, 2DSW, 2MV, 2QV, 3ARL, 3BHS, 3BM, 3CQC, 3CZV, 3EBW, 3FP, 3LV/A, 5ML, 5ZI, 8IL, 8IP.

HEARD: G2PU, 2WJ, 3EKV, 3FI, 6OH, 8SY. (July 24 to October 12.)

G3VM, Norwich, Norfolk.

WORKED: G2CPL, 2HCG, 2KG, 2PU, 2XC, 3ABA, 3AVO/P, 3CGQ, 3DCC, 3DMU, 3FD, 5MA, 5MI, 5TP, 5UD, GW2ADZ.

HEARD: G2AJ, 2FJD, 2IQ, 2MA, 2NH, 2TK, 3ALD, 3APY, 3BOB, 3DAH, 3DRG, 4MW, 5BD, 5GX, 5WP, 6NB, 6PG, 6VX. (September 13 to October 10.)

G8KL, Wolverhampton, Staffs.

WORKED: G2IZ, 2OI, 2XS, 3AHT, 3BHE, 3DJQ, 3EHY, 4DC, 4LU, 4OS, 5BM, 5BY, 5RP, 5WP, 6NB, 8UZ.

HEARD: G2AJ, 2BFT, 2MA, 2NH, 2XC, 3BLP, 3BOB, 3BUR/P, 3CXD, 3DMU, 4HT, 5BD, 5JU, 6VX, 8QX, GM3OL, GW2ADZ. (Month ending October 10.)

G3DCC, Harringay, Middlesex.

WORKED: F8LO, 8OL, G2CPL, 2FMF, 2MV, 2WJ, 2WS, 2XS, 3BUN, 3CGQ, 3CNF, 3CVO, 3CWW, 3ECA, 3FD, 3FXG, 3VM, 4DC, 5AA, 5KH, 5TP, 5UD, 5VY, 6HG, 6JI, 8KZ.

HEARD: G2ANT, 2QV, 2XC, 2XV, 3BWS, 3GW, 3WW, 4MW, 5BD. (Month ending October 12.)

The Tx is a 522, but other circuits are likely soon. The Rx is a pair of CV66's into a 6AK5 mixer with a 9002 oscillator, and a 4-ele Yagi completes the line-up. G3VM (Norwich) has found his schedules with GW2ADZ and G3DMU of continuing interest, and the excellent signals he gets from them suggests that "poor conditions" should often be read as "poor activity." He has been doing much thinking about feeders and finds the manufacturers able to give information on their behaviour at 45 mc but nothing about what happens at 145 mc! G2CPL (Lowestoft) is raising his 4-element Yagi another 14 feet shortly and later may try a stacked system. The G2XS-G2XC schedule failed for the second time on Sunday, October 9, although weak R2 signals were audible at the Portsmouth end. G2FJD (Cambridge) has heard G2XS on his 420 mc Rx, this being third harmonic reception from 145 mc—so there are now hopes of an actual 70 cm. contact the future.

#### Zone H

In spite of the scarcity of reports activity in Zone H is at a high level. G3EJL (Southampton), having raised his aerial, has been adding to his county score in no uncertain manner, and has also been in on the French DX. With only one or two exceptions all the Zone H stations appear to be in their correct segment of the spectrum. Newcomers to the band include G3AAE and G3CVE, both in the Bournemouth area.

#### Zone I

G3FIH (Bath) hopes to be on soon, to

#### TWO METRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1949

Starting Figure, 14

Worked	Station
30	G2XC
24	G6NB
23	G2OI, G2XS
22	G4HT
21	GW2ADZ
20	G2CIW, G3EHY, G3VM, G5UD
19	G3EJL
17	G2CPL, G6VC
14	G3CWW

*Note: Scoring for this Table is cumulative, and it will run for one year to August 31, 1950.*

#### FIVEBAND CLUB DINNER

FRIDAY, NOVEMBER 25

Slater's Restaurant,

142 Strand, W.C.2

(Opposite Aldwych)

at 7 p.m.

All-in Charge, 10/-

Reservations to M. D. Mason, G6VX  
16, Abbotsbury Road, Hayes, Kent

assist G3EHY (Banwell) in keeping Somerset on the two-metre map. The latter has found many spells of good conditions, some lasting all day. He has a new Tx and is now starting on a new receiver. G5QA (Exeter) continues his daily schedules with GW2ADZ, and hopes to be on his correct-zone frequency as soon as the new crystal arrives. G5BY (Bolt Tail), contrary to the general opinion, has found conditions very poor. However, he has been hearing GW2ADZ daily at very good strength.

#### Zone J

There would appear to be no doubt which Zone contains most activity, to judge from the volume of reports received. Among newcomers are G3CAZ (Gillingham) whose first contact was with G2CPL at nearly 100 miles. The Tx is a modified SCR522, while the Rx is a BC-624 with additional 9003 RF stage. G2VA and G2BYF are active in Sheerness and G2IC in Margate. G3FOD (Rochester) is also reported on the band. G3CNF (Wanstead) has a G2IQ converter and a 4-ele indoor beam. G2AHP (Perivale) is another with a modified 522. His best DX is G2XC.

G8SM (East Molesey) makes a welcome return to the two-metre band, using a 522. He recently gave a talk to the T.V.A.R.T.S. on the conversion of this set, assisted by G6NB. G3BLP (Selsdon) still leads in the "all-time" counties total, having worked G3AKU to add to his score. However, G5WP (Woking) is well on his track, and had a nice one with G8BI. G4HT (Wembley) was in on the Frenchmen on October 6, and now has a 6-element stacked colinear array across the bedroom window, suspended from the pelmet. G8IP (Hampton) has got four countries to his credit. G3BOB (Hayes, Kent) is using a CV66-EF54-EF54 converter with CC oscillator, and bemoans low activity during TV hours. G6VC (Northfleet) can often be active during the daytime and would like schedules between 1000 and 1530. He remarks on the consistency of G2IQ. G3DCC

(Harringay) worked two of the F stations on the 6th. G2CIW (Romford) also was successful with the Frenchmen, working three of them and getting S9 reports. Ge3FIJ (Colchester) wants some 446A lighthouses and also information on the CV90. Last of the G's to be mentioned is G5MR (Hythe) who points out that, although he is in Kent, he is 50 miles south-east of London, and much better DX for the Northerners !

#### Across the Water

GC2CNC (Jersey) hopes to be on very soon, and is busy planning. F8OL (Paris) has a 4-cle beam and calls CQ at 1930 GMT every night on 145 mc. His Rx is 6J6 RF and 6J6 mixer, with a noise factor of 4 dB. He is also on 435 mc with vertical polarisation, finding this superior to horizontal. F8LO promises to be on during the contest. He is situated in South-West Paris and uses 100 watts to HK54's.

#### THE TWO-METRE CONTEST

**Week-end November 12-13, midday on Saturday to midnight on Sunday. Rules in full on p. 611 October issue *Short Wave Magazine*. Take your part and send in your results, irrespective of scoring or conditions. Parallel with the Transmitting event we have organised a Receiving Contest for SWL's, rules for which appear in the November issue of our *Short Wave Listener*.**

PAØU (Voorburg) tells us that the Netherlands two-metre contest last July was won by PAØPN, who made 42 contacts. Runners-up were PAØUN, PAØZQ and PAØLU. Many BC-624's are available in Holland and it is hoped this may result in an increase of activity.

#### The Contest

As many of you have pointed out there was no mention in the Contest rules of how many times a station could be worked to score. The answer is *Once Only*. Rules appeared last month, and just to remind you, the duration is 1200 GMT November 12 to 2359 November 13. We hope for plenty of activity and a large entry. Never mind if you think you have made a low-score—send it in. We are running an SWL Receiving Contest in parallel with the event, the rules for which appear in the November issue of our *Short Wave Listener*.

#### In Conclusion

It has, once again, been impossible to

include all the "Activity Reports" this month. The lists that *have* got in were picked at random from the pile received and it is much regretted that a quite large number have had to be omitted for reasons of space. Preference will be given next month to stations who have been unlucky this time. But it is suggested that, in order to make the feature as useful as possible, all calls distant less than 50 miles should be omitted from the lists. In fact, except where it is known a report will be useful it might be well to make the minimum distance 100 miles. This would enable all lists to be included.

And now it but remains to wish you the best of luck in the Contest and to draw your attention to the Fiveband Club dinner on November 25, details of which appear in these columns. Your conductor hopes also to be present at the *Magazine* Stand 9 during the Friday and Saturday of the Amateur Radio Exhibition, November 25-26, and to meet many readers there.

Latest date for next month's reports is November 16 and the address E. J. Williams, G2XC, *Short Wave Magazine*, 49 Victoria Street, S.W.1. On the line again on December 9.

#### X-TAL XCHANGE

Though insertions in this space are free, there are few simple rules, given in full on p. 441 of the August issue under this same heading, to which we would refer readers. Please set out your notice on a separate slip in the form shown below, headed "Xtal Xchange—Free Insertion."

- G2GM, 58 Thurlow Road, Torquay, S. Devon.  
Has QCC band-pass filter, 465 kc twin crystal unit. Wants QCC Q5/100 100 kc bar.
- G3DVF, Link Farm Cottage, Amble, Northumberland.  
Has octal-based 3500 kc crystal, no certificate. Wants frequency 6750 or 7000 kc.
- G3ESO, 11 The Close, Salisbury. Wilts.  
Has two Standard Radio 1000 kc bars, sealed holders, wire ends. Wants frequencies in 'phone sections 3.5 and 7 mc bands.
- G3FXT, 8 Ferns Road, Higher Bebington, Wirral, Cheshire.  
Has 3510, 3520 and 8000 kc crystals. Wants frequencies 8020-8036 kc, in SCR522, FT243 or A.M. fittings.
- SWL, St. Aidan's Manse, Melrose, Roxburgh, Scotland.  
Has 6010 kc ex-WD crystal, P5 spacing. Wants frequency 7005-7045 kc.
- SWL, 30 Fernbank Road, Bristol, 6.  
Has two ex-A.M. 100 kc bars, 3/4-in. pin spacing. Wants 500 and 1000 kc bars.

# Here and There

## The Amateur Reserve

Further to the note appearing under this head in our September issue (p. 541), we are informed that over 200 amateurs have written G3ADZ on the subject of the proposed Reserve. This is a most encouraging response, and fully justifies the further negotiations now in hand with the responsible authorities. As soon as definite proposals can be formulated and an organisation scheme laid down, all who have already sent in their names will be given full details as to their functions and responsibilities should they decide to join the Reserve. It is again emphasised that at this stage the scheme is tentative only, and no responsibility is incurred by licensed amateurs (ex-Service or otherwise) who may send, or have sent, their names forward as being interested. Indeed, it was essential to find out what the support was likely to be before going on with the idea. A further announcement will be made as soon as possible, and in the meantime all others who would like to join an Amateur Reserve should write Capt. D. W. J. Haylock, G3ADZ, 230 Devonshire Avenue, Southsea, Hants.

## Dinner—First Class Operators' Club

The F.O.C. second annual dinner takes place on Friday, November 25, and this will be the last notice to members reminding them that tickets must be reserved in advance (and as soon as possible now) with either G2ZC or G5PS, the joint honorary secretaries.

## American Amateur Politics

The September issue of *QST* carries the current controversies in Amateur Radio in the United States a stage further, and reveals a most remarkable state of affairs. The American licensing authority (the Federal Communications Commission—FCC) having put forward proposed new regulations for the closer and more definitive control of Amateur Radio activities, is being opposed on these counts by the American Radio Relay League (ARRL).

But the FCC is supported by two splinter groups of American amateurs—the National Amateur Radio Council, and the Society of American Radio Amateurs. The following for both these groups seems to come mainly from dissatisfied ARRL members.

The ARRL, showing a total home membership of 35,000 licensed American amateurs,

claims that the NARC (2,000 members) and SARA (400) are entirely unrepresentative—and not without justification. Moreover, the NARC seeks to increase the width of the phone bands, while the avowed objective of the SARA is to make the bands safe for CW operators by opposing the NARC attitude!

One of the more interesting points emerging from all this is that the ARRL itself is unable to claim as members of the League more than about half the total of American amateurs licensed. The other is that according to a later report in the *New York Times* the FCC decided to hear arguments by the NARC and SARA, in spite of the ARRL plea that they are unrepresentative.

The clue to the whole situation is, of course, that large body of unattached amateurs, not members of any organisation.

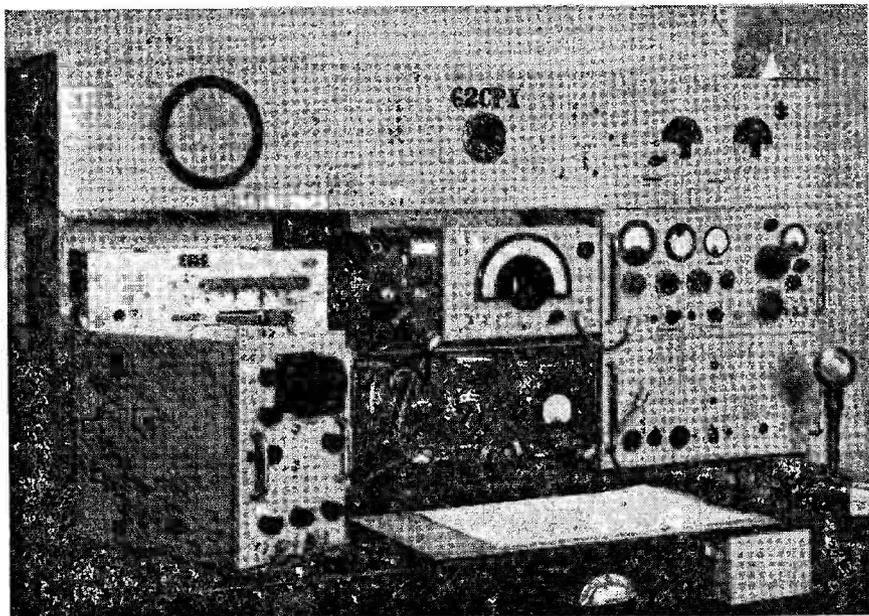
## G3FSZ—XYL G3DQC

We have frequently heard of XYL's who take an active part in the station activities; less often of wives who obtain second operator licences; but never before of an XYL who takes out her own licence at the same address as the OM. Mr. and Mrs. Salter, of High Wycombe, are just such a couple and we congratulate him (G3DQC) and her (G3FSZ) on having found a fair solution to the problem of operating a joint station—or have they! Anyway, it has all the makings of a most felicitous arrangement for them both.

## The Club Contest

The fourth annual *Magazine* 1.7 mc Club Transmitting Contest takes place during the period November 12-20, for which we are expecting a large entry. Club stations competing sign "MCC" to identify themselves to other Clubs as participating, since there is a bonus for inter-Club contacts. While we hope that many individual 1.7 mc operators will come on to give the Clubs a point (and, incidentally, to have a bit of fun themselves) we would be greatly obliged if they would refrain from using the "MCC" call, which is for participating Club stations only. It obviously confuses the issue if operators not actually battling for a Club sign "MCC". As they cannot in any case send in the prescribed entry form (which goes to Club secretaries only), it could mean considerable adjustment of the scores when we finally receive all the Club entries.





## The other man's station G2CPX

This time we describe another post-war station—owned and operated by W. J. A. Carlton, Sycamore Farm, Sycamore Road, Farnborough, Hants, assisted by R. Corps, B.Sc., G3FOR—incorporating some unusual and interesting features.

The entire equipment is relay-controlled for BK working, and even the monitor oscilloscope is so arranged that it automatically changes over from "send" to "receive" to permit examination of both the outgoing and incoming signal. With the exception of the receiver, the whole of the gear is home constructed—even to the table on which it is carried.

On the transmitter side, a Clapp VFO (6C5-6V6-6V6-3.5 mc), with a built-in 100 kc check oscillator and power pack, drives a 6J7-6V6-6V6-807 transmitter running 25 watts in Class-C. This Tx is fully band-switched for operation on 3.5, 7, 14, 21 and 28 mc, and is fitted with a harmonic trap in the PA plate; a filter to cut off at 35 mc is included in the output link to the aerial tuner, for TVI suppression. The PA is plate-screen modulated, with cathode keying, and a built-in 'Phone/CW monitor is provided.

The modulator unit is also right up to the minute. The speech end is 6J7-6SH7-6SH7-

6SH7 arranged for bass boost and negative feed-back, using a crystal microphone; the modulator proper is a pair of 807's in Class-AB1, with a 6H6 speed clipper on the grids of the modulator valves, a panel control for the clip level, and a low-pass filter cutting off at 5,000 cycles.

The BC-348M receiver has been modified by the inclusion of television-pentode RF stages, EA50 noise limiter, an extra stage of audio into 6V6 output, and send-receive relay; a tertiary winding on the 4th IF transformer couples the BC-348 to a Q5'er and the oscilloscope. The latter uses a CRT139A tube, and is provided with a tuned amplifier and time-base, both for EF50's.

Aerials at G2CPX vary from time to time—testing aerials being one of the interests—but the main concern of the operators is the design and construction of CC converters and test equipment, with occasional sessions on 80-metre 'phone as opportunity offers.

Readers will agree that this is one of the best examples of modern British amateur station design it has yet been our pleasure to describe. It also shows what scope there is for the 25-watt man in the way of applying the latest techniques to low power equipment.

# THE MONTH WITH THE CLUBS

## FROM REPORTS

This month sees the activity record broken once again, with no less than 43 Clubs reporting. Winter activities are, in most cases, in full swing already, and some heartening increases in membership are reported from many quarters.

It is expected that the *Magazine* Club Contest, which begins on November 12 at 1700 hours, will also be attracting a record entry. Please note, in this connection, that the Rules and Entry Form were sent, early in October, to the secretaries of all Clubs known to us at that time to be active, and to any others reporting since.

No advance list of participating Clubs will be circulated, since from previous experience no complete listing is possible before the Contest actually commences. The declaration form at the foot of the Rules now constitutes the Club's official entry, and these entry forms comprise our own check list.

We have recently had more than one complaint from a Club member, to the effect that his call-sign has been incorrectly given, or that he himself has been identified wrongly in a photograph appearing in these columns. Checks reveal that we have published the information exactly as sent to us by the Secretary of the Club concerned. Will Secretaries therefore please keep a very careful watch on such points, as we have to take their word for details accompanying photographs.

Deadline for next month's Club Reports is November 15. Address them to Club Secretary, *Short Wave Magazine*, 49 Victoria Street, London, S.W.1. To those who are about to do battle in "MCC"—Good Luck!

### Stourbridge & District Amateur Radio Society.—

A talk on Television (introductory) was given by G3CLG, a member of the Society, at the October meeting. The trip of the month was to Daventry, and 28 members voted this their best outing to date. Future meetings are on the first Tuesday and third Friday of the month.

### Spen Valley Radio & Television Society.—

The first meeting of the new season was attended by members of the Bradford club and the Spen Valley Engineering Society. The lecture, on Electronics in Industry, was given by Mr. P. H. Briggs (Ferranti, Ltd.). Other meetings have been devoted to a talk on Oscilloscopes by G6KU, and to a visit to Catterick Camp, members of the Catterick club acting as hosts. Next talks are on "Radio All Sorts" (November

9) and Wire Recording (November 23).

**Slade Radio Society.**—Members visited Daventry on October 16. On November 11, there will be a talk by a representative of R.G.D., Ltd., on Television Reception. This will be followed by a demonstration. The AGM is to be on November 25.

### South Manchester Radio Club.

—This Club now possesses the call G3FVA; the Club Station is on the way and should be on the air shortly. Meeting nights have been improved by the laying-on of tea and cakes, an arrangement which seems highly popular. The following is the plan for future meetings: 7-30-8 p.m., Morse Classes; 8-9 p.m., Technical Class for RAE, or Constructional Work by those not taking part; 9-9.15 p.m., Refreshments; 9.15-10 p.m.,

Talk or Demonstration; 10.10-30 p.m., General Discussion.

### Crescent Amateur Radio Society.—

Welcome to this newcomer, which meets on alternate Tuesdays at the Winnington Works of I.C.I., Ltd. Membership is open to all on the staff of the company, and new members will be welcomed by the Hon. Sec., whose name and address will be found in the panel.

### Richmond & District Radio Society.—

This Club is also a new reporter, and is welcomed to this section. The next meeting is on November 3 at the Station Hotel (Oak Room) Richmond, Surrey, at 7.30 p.m. See panel for Secretary's QTH.

### Hull Radio Group.—

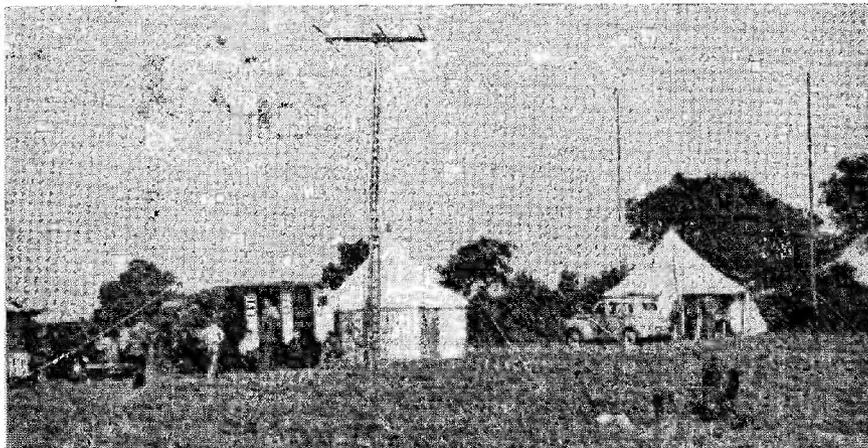
The November meeting will be held on the 30th at the REME Barracks, Walton Street, Anlaby Road, Hull, at 7.30 p.m. The title of the lecture is "The Elementary Facts about Audio," with demonstrations on a scope. The Group operated a portable station (G3PL/P) from Willerby on October 1, using the 3.5 mc band.

### Garats Hay Radio Club.—

Constructional work has been much in evidence for the past months; a three-element rotary beam is at present under test, and a 150-watt Tx for 14 and 28 mc CW is also being built. A class for the RAE has been arranged in conjunction with Loughborough College, and it is hoped that this will bring some call-signs home to the membership. Garats Hay hopes to be an entrant for MCC.

### Torbay Amateur Radio Society.

At recent meetings G3FHI gave a talk on The Oscillatory Circuit, and G5SY, the President, demonstrated his own design of Frequency Meter and Multivibrator. The Club now has a Junior Section for members aged 14-17—particulars from the Secretary. Meet-



The Birmingham Post took this picture of the M.A.R.S. set-up for the recent field day activities.

ings are held on the third Saturday, 7.30 p.m.

**Slough & District Radio Society.**—This Club started up in July, and now has 30 members, but no permanent headquarters as yet. Meetings are being held at the County Library, William Street, Slough, at 8 p.m. The next are on November 10 (VHF Receivers, by G5MI) and December 16 (Television Construction, by Mr. W. I. Flack).

**Hawick Radio Society.**—The AGM for 1949/50 was held recently with 14 members present. GM3BCD was elected Chairman, and GM3CV Secretary/Treasurer. Two members recently passed the RAE, and the Club hopes to be on the Top Band during the winter. Morse classes and lectures are held on Thursdays at 7 p.m.

**Midland Amateur Radio Society.**—At the recent AGM, G2AK gave an interesting talk on the past, highly successful, 12 months. The new President, G6DL, was elected and gave all members great confidence for the coming season. The ever-faithful Mr. A. Rhodes continues as Secretary.

**Solihull Amateur Radio Society.**—This Club is now well established in its new Headquarters, after comple-

ting alterations to the premises. The fourth D/F Contest of the season was held on September 24; a fine winter programme of lectures, discussions and constructional work has been planned, and membership continues to grow. The Club call-sign is eagerly awaited.

**West Somerset Radio Society.**—An "end-of-season" Field Day was held near Watchet; this was well attended and many contacts were made over the air. In view of the growing support from the Taunton area it is hoped, at an early date, to commence regular meetings in that district.

**West Cornwall Radio Club.**—This far-flung group manages to keep its members together by means of *The Radio Link*, which circulates its news items each month to Penzance, St. Ives, Redruth, St. Agnes, Truro and Falmouth. Activity is pretty high, and Penzance, in particular, is "breeding" quite a number of new amateurs.

**Brighton & District Radio Club.**—A recent visit to the RNVWR at Hove was of great interest to the members, and meetings during October covered the subjects of Television from Surplus, the 420 mc Band, and Radio Servicing. The Club Tx, G3EVE, has also been on the air fairly frequently. Meetings are on Tuesdays, 7.30 p.m., at the

Eagle Arms, Gloucester Road, Brighton.

**Rhigos & District Radio Club.**—The winter programme has already started with a lecture on Receiver Design (Mr. K. Chambers). New members will be welcomed, as it is proposed to open up the Club so that the transmitter and receiver can be used more often. Readers will probably remember that the Rhigos Club station, GW3FFE, was winner of the *Magazine Club Contest* last year; this year they are once more hot on the scent!

**London Short Wave Club.**—Weekly meetings continue at Ostade Hall, Brixton, and the committee is arranging a comprehensive programme for the winter months. Lectures are being given, by members, on home-built equipment, Government Surplus conversions and similar subjects. Morse classes are also held for 45 minutes at each of the Thursday meetings.

**Yeovil Amateur Radio Club.**—Regular Wednesday meetings have continued through the summer, but attendances remain very small, despite the presence of several amateurs and enthusiasts in the district. It is hoped that more of them will turn up and make proper use of the facilities offered by a local club—to say nothing of lending a hand themselves. The Club Tx, G3CMH, has

been on the air on 14 mc Phone and CW with considerable success.

**Wanstead & Woodford Radio Society.**—The AGM was held in October, and all Officers and Committee (except the Vice-Chairman) were re-elected. Equipment for use in MCC has been rebuilt, and it is hoped that some of the 16 transmitting members will come forward this year instead of leaving the operating to the usual half-dozen.

**West Bromwich & Handsworth Radio Society.**—A new committee was elected at the AGM, with Mr. E. Shackleton, M.B.E., G6SN, as President, and G2BJY continuing as Secretary; 30 members were present. The Club is assured of a good winter programme of talks, and the transmitter, G3BWW, is available.

**Basingstoke District Amateur Radio Society.**—Most of the officers and committee were re-elected at the AGM, at

which a review of the past successful year's work was given. A recent lecture was on Test Equipment (Mr. J. A. Lowe) and a full winter programme is being arranged.

**Forfar & District Amateur Radio Club.**—A very good attendance is reported for the AGM, which was preceded by a show of films supplied by the Ministry of Information. The subjects were The Berlin Air-Lift, Trouble Shooting, The Hydro-Electric Scheme, and Radio Design. The President and Secretary were re-elected and the Club is looking forward to a busy winter. They are entering for MCC.

**Southend & District Radio Society.**—Summer activities were reviewed at the first meeting of the new season, and suggestions made for coming events. A competition for the best design of Club Badge is running at present, and it is also hoped that a Club magazine will be possible. The Club will celebrate its

30th Anniversary in 1950, being a real veteran among Radio Societies.

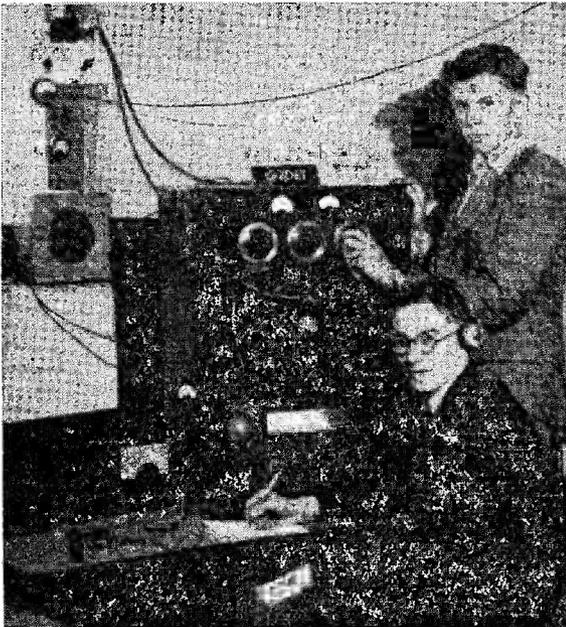
**Radio Society of Harrow.**—We note with much regret the death of Mr. N. Greasley, G8VQ, a Founder Member of this Club. Recent events have included a Field Day and the Third Anniversary celebrations. Several members passed the latest RAE. On November 29 the annual Construction Contest will be judged; members are also awaiting MCC with great interest.

**Gravesend Amateur Radio Society.**—The two members who recently sat for the RAE were successful, and one, the Chairman, now holds the call G3FST. A course for next year's exam is included in the winter programme, and the Morse class is also continuing each meeting night. It is hoped to divide this into three sections to cover the different speeds required.

**Wirral Amateur Radio Society.** Recent meetings included a discussion on Television, with G3ETI giving interesting details regarding reception in the Wirral area. G2AMV repeated his lecture-demonstration with his home-built 14-valve superhet. November meetings are on the 9th and 23rd, YMCA, Whetstone Lane, Birkenhead, at 7.30 p.m.

**Chester & District Amateur Radio Society.**—Negotiations for permanent headquarters have just been completed, and several members have turned cleaners and decorators. Meetings continue for the present at the United Services Club, Watergate Street. Since the Club was formed the number of transmitting members has increased from two to eight, and the Club Tx should be taking shape very soon.

**Lothians Radio Society (Edinburgh).**—Regular fortnightly meetings are held on Mondays at 7.30, in the Chamber of Commerce, 25 Charlotte Square, Edinburgh. At the last meeting a talk and demonstration on CRO's was given by Mr. Stobie. Prospective members will be welcomed at



During "Battle of Britain" week at Spalding, Lincs, G2DRT and G3EKV (standing) gave live demonstrations, under call G2DRT/A, at the Corn Exchange in aid of R.A.F. Association funds. Considerable public interest was aroused by their effort.

the next two meetings, on November 14 and 28.

**Grimsby Amateur Radio Society.**—Club night has been changed to Wednesdays, at 7.30. By the time these notes appear it is hoped that the club call G3CNX will have been heard on the air. Operational sessions for beginners, on the club Tx, are contemplated.

**Bradford Amateur Radio Society.**—The Secretary's report, at the AGM, told of a steadily rising membership. Officers and committee for the new season were elected, with G6KU as President and G2BYC as Secretary. A feature of the new syllabus will be a competition among members for the best piece of home-built gear, the prizes to include a year's subscription to the *Magazine*. New and old members will be welcomed at the Cambridge House meetings.

**Clifton Amateur Radio Society.**—The new session has started off briskly with technical classes and Morse practice. A successful Junk Sale has been held, and interesting visits were paid to the Grafton Club and to Radiolympia.

**Grafton Radio Society.**—A lecture-demonstration was recently given by G2FLG and G2BCX. The subject was Aerials, and scale models working on 144 mc were used. The competition for the best single-valve Tx is arousing much interest. Clifton and Enfield Clubs were welcome visitors—the first of the current season. Meetings continue, every Monday, Wednesday and Friday.

**Lincoln Short Wave Club.**—This Club was another to visit Radiolympia, and the trip was much enjoyed by members. Publicity in the local Press has aroused local interest and an increase in membership is hoped for. Morse classes are run before the normal meetings, which begin at 7.30, and the committee is working on the winter programme.

**Kingston & District Amateur Radio Society.**—An interesting talk on CRT's and the Miller time-base was recently given



Up goes the balloon at G3CUM, Balldon—with a 1.7 mc long-wire aerial attached.

by the Secretary. Morse practice and rag-chews continue. The September meeting was the AGM, and the next regular meeting will be on Wednesday, November 9.

**Reading Radio Society.**—Recent meetings have included a film show on The Nature of Plastics and a lecture on the Construction of VHF Portables, illustrated by demonstrations of commercial models as used by the Police. November 6 sees the Hamfest; on November 10 there is a talk on the Development and Manufacture of Test Equipment; November 12, Instructional Section; November 26, meeting—subject open. All meetings are now held at Abbey Gateway, The Forbury, beginning at 7 p.m.

**Edgware & District Radio Society.**—Activity dropped off

somewhat in the summer, but attendances are now pulling up. Plans are afoot for participation in MCC. Recent events have included a talk on Multi-Range Test Instruments and a discussion on the proposed Club Tx. On December 7, Mr. Turner of the BBC will lecture on Aerials.

**Southport Radio Society.**—Three new call-signs have

#### TEES-SIDE

It is hoped to re-form the old Tees-side Amateur Radio Club. A meeting for all those interested in this will be held at 7.30 on November 24 at the Cleveland Scientific and Technical Institute, Corporation Road, Middlesbrough.

recently appeared among the members, and a record attendance was reported at the last meeting—a Film Show. In October, a Junk Sale and a Hot-Pot Supper kept things going. Morse classes every Monday and lectures every Wednesday continue to be well supported. The monthly meetings are held on the third Monday, 8 p.m. at the Clubroom, 38a Forest Road.

**Thames Valley Amateur Radio Transmitters Society.**—At a recent meeting, G8SM (assisted by G5LC and G6NB) lectured on the conversion of the 522 for operation on 145 mc. This was a full-demonstration talk, and a number of QSO's were made from the lecture room. It is hoped to get the membership really interested in Two, and to start a Club net on that band on the lines of the well-established "club meeting" on

160 metres. The annual dinner and dance is to be held at the Caernarvon Castle Hotel on December 3, and another good gathering is expected.

**Walsall & District Amateur Radio Society.**—A full lecture programme is planned for the winter season, and it is hoped that a new and much better Clubroom will soon be available. Slow Morse transmissions are also being arranged for two nights a week. The Club Tx will also be started shortly, and theoretical instruction is available for the younger members. Meetings are on alternate Wednesdays at 7.30 p.m.

**Oxford & District Amateur Radio Society.**—Attendance figures have been improving, and a recent highlight was the running of a stand at a local Scientific Exhibition, when a station was operating and a display of gear made

by Club members was shown. The AGM is scheduled for October.

**Edinburgh Amateur Radio Club.**—A new committee has been elected, and the Club is getting into its stride again. Visits are scheduled to the BBC, Police Radio HQ, and so on, and they have already been to Edinburgh Telephone Exchange. Social evenings, which will also be a recruiting drive, are planned. Three more members have their licences and it is hoped to take part in MCC.

**Neath, Port Talbot & District Amateur Radio Club.**—Their meetings are held on alternate Wednesdays at the Royal Dock Hotel, Briton Ferry; an outstanding recent event was the Club dinner, and annual general meeting, when new officers were elected. GW3EOP, the Club station, will again be entered for MCC.

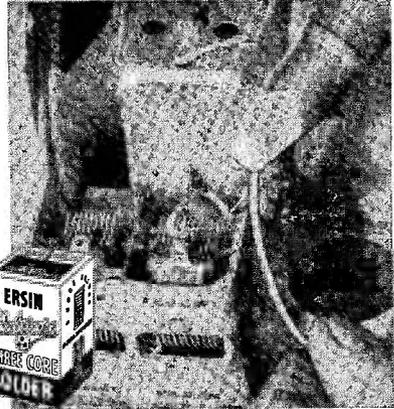
#### NAMES AND ADDRESSES OF CLUB SECRETARIES :

The list below represents only those Clubs reporting for this issue of the *Magazine*. A similar list appears every month and the Active Club Register complete is periodically printed in our *Short Wave Listener*.

**BASINGSTOKE :** L. S. Adams, 16 Brambly Drive, Basingstoke, Hants.  
**BRADFORD :** V. W. Soven, G2BYC, Rushwood, Grange Park Drive, Cottingley, Bingley, Yorks.  
**BRIGHTON :** L. Hobden, 17 Harrington Road, Brighton.  
**CHESTER :** H. Morris, G3ATZ, 24 Kingsley Road, Boughton Heath, Chester.  
**CLIFTON (S.E. LONDON) :** W. A. Martin, G3FVG, 21 Brixton Hill, S.W.2.  
**CRESCENT (CHESHIRE) :** W. Houseman, Riverdale, 15 Snowden Street, Barnton, Northwich.  
**EDGWARE :** R. H. Newland, G3VW, 3 Albany Court, Montrose Avenue, Edgware, Middx.  
**EDINBURGH :** D. A. E. Samson, GM3EQY, 56 Elm Row, Edinburgh, 7.  
**EDINBURGH (LOTHIANS) :** I. Mackenzie, 41 Easter Drylaw Drive, Edinburgh, 4.  
**FORFAR :** R. E. Ascoli, Prospect House, Letham, Angus.  
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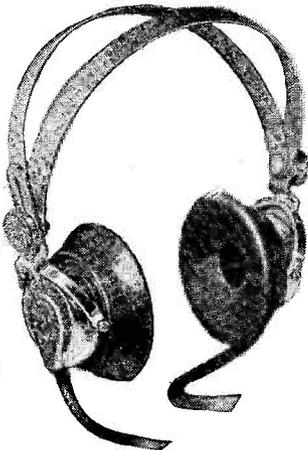
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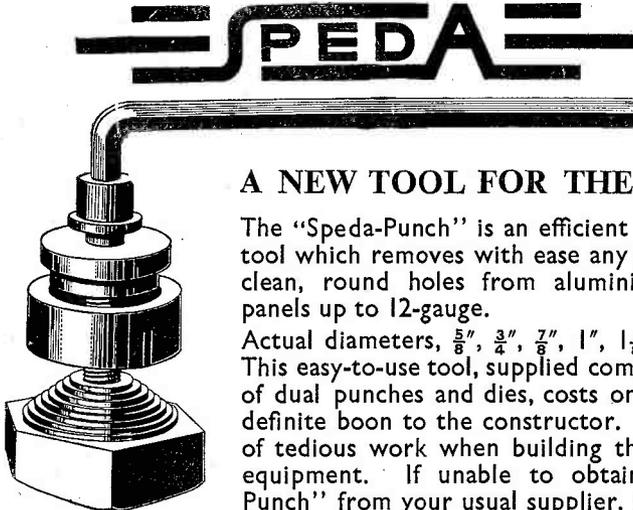
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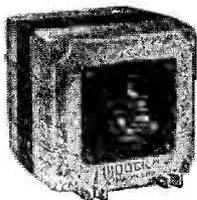
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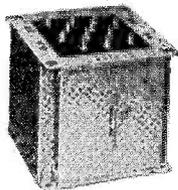
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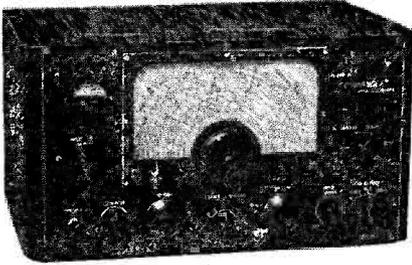
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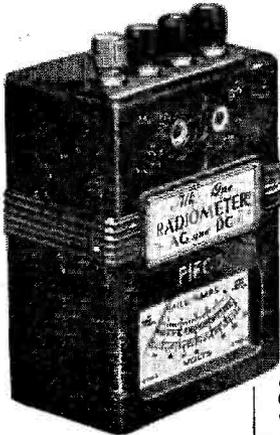
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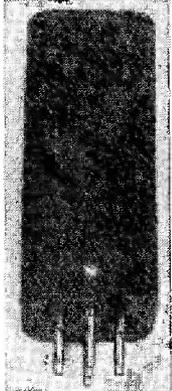
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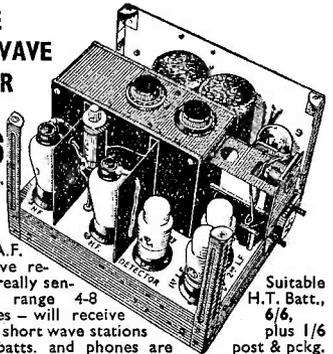


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	Input 200/250v.	Output 300.0/300v.	80 ma
H.S.30.	Input 200/250v.	Output 350.0/350v.	80 ma
H.S.3.	Input 200/250v.	Output 250.0/250v.	100 ma
H.S.2X.	Input 200/250v.	Output 300.0/300v.	100 ma
H.S.30X.	Input 200/250v.	Output 350.0/350v.	100 ma
H.S.3X.	Input 200/250v.	Output 350.0/350v.	100 ma
<b>Fully Shrouded—</b>			
F.S.2.	Input 200/250v.	Output 250.0/250v.	80 ma
F.S.30.	Input 200/250v.	Output 300.0/300v.	80 ma
F.S.3.	Input 200/250v.	Output 350.0/350v.	80 ma
F.S.2X.	Input 200/250v.	Output 250.0/250v.	100 ma
F.S.30X.	Input 200/250v.	Output 300.0/300v.	100 ma
F.S.3X.	Input 200/250v.	Output 350.0/350v.	100 ma
All above have 6-3-4-0v at 4 amps, 8-4-0v at 2 amps.			
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	6-3v 4 amps C.T. 6-3v 4 amps C.T. 5v 3 amps		42/6
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	6-3v 6 amps C.T. 5v 3 amps. Half shrouded		24/6
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READERS'—continued.

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**HRO** coils from 15/-. S.A.E. for details.—Eldridge, 254 Grove Green Road, E.11. LEY 4986.

**B2** Transmitter, Receiver and power pack, with transit cases, coils, leads, etc. New condition. Best offer secures. Also new, boxed, QCC xtal, type P5, frequency 3723 kc, with certificate.—Box No. 620.

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## SMALL ADVERTISEMENTS

## READERS'—continued.

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HALLICRAFTER SX24 with speaker, very good condition, £24 or offer.—380 Brincliffe Edge Road, Sheffield, 11.

UHF converter TN3A/APR-1, 300-1,000 mc. Exchange for BC453, less valves, plus some useful gear. Have also pre-war AC/DC record changer. Offers?—E. H. Phelps, 20 Cadifor Street, Carmarthen.

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WANTED.—Tuning unit TN17/APR4, or TU58A, covering 75-300 mc for AN/APR4 Radar Search Receiver.—Box No. 624.

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**RG.39** 8-valve communications Rx, separate power pack coverage 100 kc to 25 mc in 6 bands. Controls: Antenna, RF, AF, reaction, crystal filter. Large Vernier dial. In very good condition. Nearest to £20 secures.—Holdway, 4 Willington Road, Copie, nr. Bedford.

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**AC** Model RME69 Receiver, LS-1 noise suppressor, handbook. Excellent condition, £25. Ham-bander as new, nearest £14. Either post paid.—Cpl. Nuttall, Sigs. HQ, 3 Group, R.A.F., Mildenhall, Suffolk.

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Printed in Great Britain by Lochend Printing Co., Ltd., London, S.W.9, for the Proprietors and Publishers The Short Wave Magazine, Ltd., 49 Victoria Street, London, S.W.1. The *Short Wave Magazine* is obtainable abroad through the following: Continental Publishers & Distributors, Ltd.; William Dawson & Son, Ltd.; CANADA—Imperial News Co., of Canada; AUSTRALIA AND NEW ZEALAND—Gordon & Gotch, Ltd.; AMERICA—International News Company, 131 Varick Street, New York. Registered for transmission to Canada and Newfoundland by Magazine Post. November, 1949.