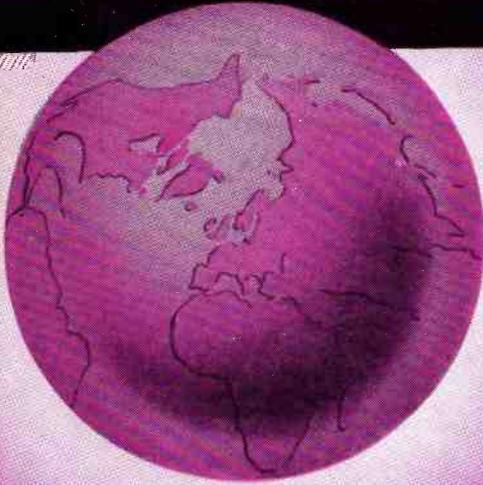


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The
SHORTWAVE
Magazine



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

VOL. VIII No. 3 MAY 1950

H. WHITAKER G3SJ

10 YORKSHIRE STREET, BURNLEY

Phone 4924

THERMADOR. Plate Transformer, 2280/1725 1420/0/1420 at 800 mills. to give 2,000v at 800 mills. with Choke input, plus 400 mills. at either of the available taps. Primary 210/250v, 50 cy. Secondary test volts 6,000. Porcelain stand offs, and completely screened. Usual Thermador finish in Grey Cellulose. In original crates, net weight 150 lb. at £7/10/-, carr. paid.

THERMADOR. Plate Trans. Input 210/250v, 50 cy. Output 680/0/680 at 225 mills. $6\frac{1}{2}'' \times 5'' \times 4''$, 50/-, carr. paid.

THERMADOR. Fil. Trans. Input as above. Output 10v ct 8 amp, 10v ct 10 amp, 2,000v test. Size $7'' \times 5'' \times 4\frac{1}{2}''$, 30/- . As above, output 2½v ct twice at 10 amp each winding for a pair of 866s. Porcelain stand offs. Sec test volts 7,500, $6'' \times 4'' \times 4\frac{1}{2}''$ at 30/- . As above. Output 6·3v ct 6 amp plus 5v 6 amp ct, $6'' \times 4'' \times 4\frac{1}{2}''$ at 25/- . As above, Plate trans. Output 350/0/350 at 150 mills. 5v 3 amp, 6·3v 3½ amp, 30/- . As above, Plate trans. Output 250/0/250 at 40 mills., 5v 3 amp. Bias trans., 22/6.

THERMADOR. Driver Trans. 500 ohm line to Split Sec. 805 grids. Flat from 400/4,000 cy. ratio 1 to 2·7 at 20/- . As above, output trans. Primary 5,000 ohms plate to plate load, Sec. 5, $7\frac{1}{2}''$, or 15 ohms, and 500 ohm line, 20/- . As above, Speech Input Trans. Primary 30, 250 ohms, split at centre with impedances symmetrically arranged either side centre, 25 mill. D.C. both halves of primary, Electro shielded level minus 65 db., 15/- .

THERMADOR. L.F. Choke, 10 hy at 225 mills., D.C. res. 84 ohms. $5'' \times 4'' \times 4\frac{1}{2}''$ at 20/- .

THERMADOR. Mod. trans. 400 watts. Prim. 6,700 ohms ct, Sec. 4,500/5,000 or 5,500 ohms. Freq. + or - 1 db. 400/4,000 cy. $7'' \times 6'' \times 5''$ Porcelain stand offs, and completely screened, 50/- .

All the above Thermador Components represent the cream of American production, finish is beyond reproach in grey cellulose, many hundreds of Hams have already testified as to their fine performance.

R.C.A. Plate Trans. Input 230/50 cy. Output 2,000/1,500/0/1,500/2,000 at 800 mills. $12'' \times 12'' \times 12''$. Weight 1 cwt., £4/10/-, carr. paid.

As above but with 110/115v primary, ideal for BC610, 70/-, carr. paid.

R.C.A. Plate Trans. switched 110/230v 50 cy primary. Output 300/0/300 at 250 mills. 5v 3 amp, 6·3v 6 amp at 30/- .

MET-VIK. Plate Trans. 230/50 cy single phase. Output 19,000/0/19,000 at $4\frac{1}{2}''/6$ kV.A. Oil filled, 6'' stand offs, weight 5 cwt. Brand new, £10.

R.C.A. Fil. Trans. 200/250v Primary. Output 10v ct twice for a pair of 813s. Completely screened at 25/- each, or £12 per doz.

R.C.A. Swinging choke, 5/15 hy at 450 mills. Weight 30 lb. at 20/- each, or £10/10/- per doz., carr. paid.

STANCOR. L.F. Choke, 10 hy 300 mills. Potted, Black crackle, 17/6 each.

MINIATURE L.F. CHOKES by Thordarson, Stancor, etc. One doz. well assorted, a really good buy at 12/- doz.

R.C.A. CERAMIC TRANSMITTING SWITCHES. 5 Bank, 9-way each bank, $10\frac{1}{2}''$ overall, 5'' ceramic wafers, ceramic construction throughout with $\frac{1}{4}''$ ceramic spindle. Long shaft for $\frac{1}{2}''$ knob. Heavy silver plated positive contacts for up to 2 kW of R.F. The last word in final tank switching. R.C.A. Part No. 429128-1. Brand new and boxed. Will switch completely anything up to 9 bands including link and centre tap. Another 3SJ special record-breaking price, 12/6. As above, single bank 9-way, 7/- . As above, 5 bank 2 position, 8/- . Spare 5'' wafers available for all the above.

CERAMIC SWITCHES. Single bank 4 position, $2\frac{1}{2}'' \times \frac{1}{2}''$ ceramic wafer, 2/- .

CERAMIC SWITCHES. Single bank, 11-way, 3/- . Do. Single bank 3 Pole 6-way, 3/- .

XTALS. Marconi, etc. still available, 500 kc/s. $\frac{3}{8}''$ pin spacing, 6/- .

SOMERSET, BILEY, VALPY. 1,000 kc/s, $\frac{3}{8}''$ pin spacing, 20/-, £10 per doz.

R.C.A. OR BILEY. Sub-standard 100 kc. New bulk purchase, 17/6 each, £9 per doz.

SPECIAL OFFER. One month only, 7200, 7225 and up in 25 kc steps to 7500 all for quadrupling on 10 your choice of freq. FT 243 $\frac{3}{8}''$ pin spaced holders at 7/6 each, post free, 72/- per doz. These are all by R.C.A., Biley, Valpey, Stand, etc.

8 meg. TO 8100 kc. Your choice of freq., 15/- .

7 meg. TO 7300 kc. Your choice of freq., 12/6.

21 meg. BAND. Quadruple, 5327·5 kc or 5295 kc, 7/6 each. 72/- per doz.

2 TO 10 meg. Quotations by return for any freq.

VALVES. TX. 866/866A, 10/6; 805, 25/-; 832, 16/-; 100TH, 25/-; 813, 32/6; HK257B, 32/6; 807, 6/-, or 60/- per doz. 6K8GT 6K8 6N7MET 6N7GT 6SK7GT 6SK7MET 5Z4 @ 6/-; 1622 @ 10/-; 6V6MET, 6K7, 6J7, 6C5, 6J5, 6X5, 5/-, or 48/- per doz. 80, 7/6; 6AG5, 6C4, 7/6; 616, 8/-; 717A, 6/-; VCR.97 tubes, new and boxed, 32/6. IN21 Sylvania Xtal Diode, 3/-, 30/- doz.

BC.221s. New only, complete with spare valves. Mostly model A.C. and A.H. 30 only. Early acquisition essential. £17/10/- .

MICRO WAVE FREQUENCY METER. TS-127/U. 375/725 meg. Accurately calibrated throughout the range. Modulation switch, gain control, 'phone jack for monitoring, 0/200 3'' Westinghouse Microammeter. Automatic time switch for filaments. Micrometer dial with 100 divisions to 1 division of the main dial. Individual calibration chart. Button base valves, operates entirely all dry. Require only batteries for immediate and accurate operation. This is a high class laboratory instrument. In grey crackle steel cases, $11'' \times 8'' \times 8''$ with carrying handle. £7/10/-, carr. paid. Manufactured by The Lavoic Laboratories, New Jersey.

MORE SALE BARGAINS

Especially low prices only until May 31st

CRYSTAL SUBSTITUTE TUSB

This very famous tuning unit has been referred to by one of radio's leading journals as an efficient crystal substitute. For instance for band spreading it has a micrometer dial which gives 2,500 divisions of the 180° of rotation of the tuning condenser. In addition the unit has a high Q tank circuit which has temperature compensated coils, 4 temperature compensated tuning condensers, all efficiently made up in a black crackle case. This tuning unit covers the band from 1.5 to 3 Mc/s. We will supply (where requested) a copy of the article which appeared in the radio journal showing how this can be converted into an efficient V.F.O. The total cost of the extra parts if you have to buy them all from us is less than £1/10/-, so as the price of the TUSB is only 12/6 your V.F.O. will not be a costly item. In addition a TUSB can quickly become a transmitter or one of many other devices. Sale Price 12/6, plus 2/6 carriage and packing.

POWER PACK TYPE 392

This is an extremely useful unit which works off A.C. without modification giving an output of 700v. D.C. adequately smoothed. Here is a list of the components contained in the power unit: Mains Transformer for 200-250v 50 cycle, with secondaries of 700-0-700v at 70 m, 4v at 2.5 amps, 12.5v at 1 amp. (Note these are Admiralty ratings the transformers will stand at least twice these figures). Also two rectifier valves type CV54, 10-watt resistors, three 4 mfd. 100v condensers, LF choke, 10 henry 100 mA, 2 slydok fuses. The power pack is unused and is contained in a louvered case size 12" x 5½" x 8½". Sale price 47/6.

COMMUNICATIONS RECEIVER R1155

This is one of the finest communication sets ever made. Designed by leading engineers, this receiver will undoubtedly give you years of good listening. Most readers will know it fairly well. The receiver covers the broadcast bands, long waves and medium waves, and short waves up to 20 Mc/s.

RECEIVER TYPE 25/73

This is the receiver portion of the TR.1196 and it is undoubtedly one of the most useful receivers that has ever been offered as Government Surplus because once you have removed the tuning unit and replaced it with a standard coil pack, you have a domestic receiver. You can use almost any valves, for instance, in the first stage it needs an R.F. pentode, SP61, EF39, 6K7, etc. V2 is the frequency changer, here you can use VR57, EK32, 6K8, etc. V3 is the I.F. Amplifier, this can be the same type as V1. V4 is the detector and first A.F. Amplifier, this can be EBC.33, 6Q7, VR55, etc. V5 is the output valve, say 6V6, EL32, 6F6, VT52, etc. You can see then that you will be able to make a very efficient superhet for a very small figure.

MCR1 POWER PACKS

Universal power supply to operate on all mains voltage. Designed for miniature receiver MCR1 but suitable for any small superhet. Output 120 volt H.T. 7.5v L.T. Size 2½" x 3½" x 8½". Sale Price only 24/6, carriage and packing 1/6.

A FREE GIFT

The famous American indicator unit APN4 uses a 5" C.R. tube type 5CP1 and has a front panel which is most impressive, equal in fact to the most expensive 'scope. It is a double decker unit and it is literally crammed with parts for it is a 26-valver. The parts include focus and brilliance and time base controls and hundreds of condensers, pot meters, resistors, etc., which if bought separately must cost £30 to £40. We give the unit away free if you buy the tube 5CP1 and the sale price we ask for this is only 27/6, plus 10/-, partly returnable carriage and deposit on packing case.

RECEIVER 1132A

This is a V.H.F. receiver covering 100-126 Mc/s. It uses eleven valves, it has a super tuning scale and slow motion drive and 0.5 mA moving coil tuning meter. Totally enclosed in grey metal cabinet with plated handles. Valve line-up as follows: VR65, VR66, three VR53, VR54, VR57, VS70, VR56. Sale Price only 59/6, carriage, etc., 7/6.

MILNES H.T. UNITS

Rechargeable H.T. batteries, 120 volts, 600mA hours, rechargeable from 6v D.C. charger or car battery; will last for ever and show a great saving over dry batteries. Ideal for school, laboratories, boats, etc. Complete with full operating and maintenance instruction. Brand new and unused in carrying case with handle and armoured glass lid 14" x 11" x 8½". Sale Price 47/6 each, carriage and insurance, 7/6.

METAL (MINE) DETECTOR

For the detection of ferrous or non-ferrous metals, under ground, under water or in animals, timber, chemicals, etc., etc., originally intended for detecting mines by one of our allied armies. This equipment has never been used. We have to clear the warehouse in which these are stored, and, therefore, we are offering these complete Mine Detectors for less than the cost of the transit case alone. The equipment comprises a 3-valve battery amplifier in a steel case, a shoulder haversack, and long counter-balanced search coil, short search coil, head-phones, junction box, sensitivity measuring stick and operating instructions and circuit diagram. The original cost of this equipment was enormous, but as we have to clear our store, we will supply while they last at the very low figure of 22/6, plus 8/6 carriage. We understand that these Mine Detectors were tested and in working order before being stored, but in view of the very low price, we can give no guarantee other than of completeness.

MAGNETIC TELEVISION

For 9" or 12" tubes, the sale price of the complete outfit is only £18/10/- (terms available). Call to see our demonstration model. Data for novice or technician, 2/6 only. Black and white pictures, tube is extra.

PAY US A VISIT

On this page we have mentioned only a few of the many bargains which will be available during our sale. We suggest that you "Pay us a Visit" because there will be many items for callers only. Failing this you must send for our Bumper Sale List. Do not forget to enclose 6d. in stamps, because we shall probably have to send it out in two editions.

Orders for and enquiries relating to the items on this page must be sent to the address below. Where your total order is £2 or more only include the specially mentioned carriage and other charges, otherwise under £2 add 1/6, under £1 add 1/-. Postable items can be sent C.O.D. additional charge approx. 1/-. Good stock of all items at time of going to press. Bargain list 6d. p.f.



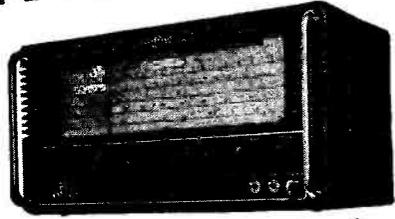
PRECISION EQUIPMENT

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(A British Product)

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



Four wavebands covering 32 mc/s to 480 Kc/s continuous except for a small gap around 1,600 Kc/s. Eleven valves. Separate oscillator, supplied with stabilized H.T. Independent R.F., I.F. and A.F. gain controls. Linear frequency scales, directly calibrated. Mechanical bandspread. With high reduction ratio geared tuning mechanism.

Price £49 10 0 (Exempt from Purchase Tax)

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

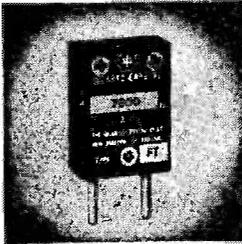
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Telephone : Priory 2231/4
Telegrams : Stratnoid, Birmingham



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

Tolerance from nominal frequency	Price
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/-

THE QUARTZ CRYSTAL CO., LTD.

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COMPARE THESE PRICES

R.C.A. 813 VALVES 27/6

All goods BRAND NEW unless otherwise stated

Any type of electronic equipment built to specification

VALVES VALVES VALVES

We hold the largest and most varied stock of receiving and transmitting valves in the United Kingdom—and, what is also important, we pride ourselves on a "RETURN OF POST SERVICE." The following are a small selection of popular types—we also have some very unusual ones and many obsolete types.

ALL IN MAKER'S CARTONS

R.C.A.	813	VALVES	27/6
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6J6 9/6, 6L6 9/6, 6L6G 9/6, 6K8 6/6, 5U4G 6/6, 5Z3 8/6, 805 23/6, 807 6/-, 954 7/6, 9001 7/6, 9002 7/6, 9003 7/6, 6AH7 8/6, 6AK5 8/6, 6SK7 6/-			

VCR 97 32/6 3CP1 17/6
QUANTITY DISCOUNTS. 6-12 Valves (your choice) 5 per cent. (1/- in the £); 13-24 Valves 10 per cent. (2/- in the £); 25-50 Valves 15 per cent. (3/- in the £); 51-100 Valves 20 per cent. (4/- in the £).

TRANSMITTER/RECEIVER No. 48 MK. Complete station in six cartons—an unrepeatable bargain. Note the price—£13/10/-, carr. paid. **115/230v 500 VA AUTO TRANSFORMERS.** Made by Cowan Switchgear Co. Completely shrouded. In sealed tropical packs. Weight, 20 lbs. List price £15/10/0. Our price £12/2/6.
R.C.A. COMMUNICATION RECEIVERS, TYPE CRV46151. 195 kc/s to 9.05 Mc/s in 4 bands. Two R.F. and I.F. stages. Line up (4)12SF7, 12A7, 12A6 and 991 stabiliser. Complete with dynamotor for 28v—easily modified for mains. Cases soiled but unused. Note the price, carriage paid. £4/19/6.

COMMAND RECEIVERS
 6-valve superhet with R.F. stage and two I.F. stages. In maker's cartons **COMPLETE WITH DYNAMOTOR AND VALVES.**
 R26/ARC5 = BC454 3-6 Mc/s £2/5/0
 R27/ARC5 = BC455 6-9.1 Mc/s £2/2/6
CONTROL PANELS for above with thru reduction drives (one being for R25/ARC5), three volume controls, six switches, etc. In maker's carton. 9/6
CONTROL CABLES for above, 14 ft. long. 9/6
MAINS POWER PACK for above. Plugs in, in place of dynamotor—no alteration to set required. Complete with 6x5 valve. £2/10/0

We hold stocks of all types of wire, tape and disc recording equipment

A 6d. postal order will bring you our latest 64-page catalogue—it contains over 1,000 attractive lines—it will save you £'s.

COULPHONE RADIO, 53 Burscough Street, Ormskirk, Lancs.

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CARLTON CONVERSION COILS for BC443/4/5 To convert to Medium Wave, accurately made, boxed with circuit and instructions. per set 10/-
120 WATT MULTI RATIO STEP DOWN TRANSFORMERS. First Class American make. Input 230v 50c/s. Outputs 24v @ 5 amps or 12v @ 10A or 6v @ 20A and various other voltages at corresponding currents up to 28v. New and unused but taken from equipment. A rare bargain. £1/2/6

100 KC/S R.C.A. and BLILEY XTALS 14/6
 Holders with retaining springs for above 2/6

APN4 INDICATOR UNITS

Less valves and tube but complete with mu-metal tube screen. A super bargain for the components, of which there are literally hundreds. 17/6

TUSB TUNING UNITS 17/6

Unused cases are soiled due to storage. Each unit guaranteed perfect and complete.

TU9's and TU26's 10/6

T1154 TUNING PANELS containing two .00025 single and one split stator condensers, with reduction drives. Used. 4/6

TOP BAND TX ("S.W. MAG." Feb.)

TUNING UNIT CAY47155 RANGE C in maker's carton. £1/2/6

As above, range B, 860-1500 kc/s 19/6

SELF-SUPPORTING 36 ft. AERIAL MASTS. Made by Bendix. Bottom section 5in. dia. Tripod base. Mast constructed of laminated impregnated timber. Ideal for Television and mounting beam arrays. Note the price carriage paid to your home. £5/10/0

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Why risk indifferent results with surplus equipment?—build the VIEW MASTER and be sure of success. We not only stock the complete specified kits but can also supply from stock all the individual items separately. Full range of W.B. and TALLON cabinets.

Constructional envelopes with 34-page book and stage by stage details. 5/-

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We supply transformers to the B.B.C., Ministry of Supply, Admiralty, Army, R.A.F., Universities and Local Education Authorities, so they should be good enough for you!

IF it's Beams, Towers or Arrays for T.V., V.H.F. or General Communication Work—then

PANDA's the Name

Performance plus !

Ability to withstand the severest gales !

New countries galore !

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A guaranteed satisfaction !

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Benson's Better Bargains

R1355s : Unused, £3/3/-, carr. 5/- ; RF UNITS, Modified to B'ham sound and vision, airtested, 30/- BC454/5 ; Coilpacks, 3/6 ; No. 18 Set. Battery Rx. 6/9 mcs. ARP12(3), AR8(1), 465 Kcs. IF.s. with circuit, 15/- . TRANSFORMERS : Standard input 50c. 48v ¼a, 8/- ; 400-350-300-250-0-250-300-350-400 80ma, 12/6. 13v CT 2a, 8/6. 230v to 230v 1a or 230/115v 1a, 10/6 ; 425-0-425 350 ma (tapped 250v) 4v 6a, 4v 8a, potted, 32/6. RCA. Fully shrouded, Input 190/250v, 50c. Output 400-350-0-350-400 200 ma, 6-3v 6a, 5v 3a, 37/6. MOD. 1/1 Imp. P6K/S6K for PP807's (AB2) 807 final, 20w. Potted, 12/6. VIBRATOR PACKS. DC 6v to 190v 80 ma and 6v, 22/6. YAXLEYS : 3P3W3B, 3/6, 2P11W, 2P5W2B, 2/6, 4P2W, 1/-, 3P4W Cer., 2/6. MUIRHEAD SM DRIVE, 5/6. XTALS 5-3 to 6-84, 7-55 to 7-67, 8-132 to 8-79 mcs, 5/- . 8-09, 7/6. 100 kcs, 3-pin, 15/- . PYE PLUGS (2) on 1 yd. coax., 1/6. Pye plugs (2) on 20 ft. ¼" coax., 3/6. PYE coax. "T" pieces, 1/- . Pye Plugs with sockets, 7/6 doz. PERSPEX CRT "WINDOWS", 5½" sq., 1/- . SLYDLOCK FUSES 5a, 1/-, 15a, 2/- . POTENTIOMETERS. Ceramic 1k ¼a, 5/6, w/w, 50 ohm, 1/3, ½k, 1/9 " Carbon ¼m 100k, 10k, 250k, 5m, 1/3, ganged 3k/10k, 2/6. Ohmite 20 ohms 1¼a, 4/6. VITREOUS RESISTORS. 35k 35w, 30k 25w, 400 ohms 20w, 2-5k 15w, 3k 12w, 30 ohms 30w, 3k 30w, each 1/- . METAL RECTIFIERS : FW, 230v ¼a, 7/6 ; 48v 2¼a, 15/6 ; 12v 6a, 22/6 ; 12v 1¼a, 8/- ; 48v 1a, 5/6 ; 70v ¼a, 4/- ; HW 240v 80 ma, 5/- ; 600v 30 ma, 4/- ; 240v 30 ma, 3/6 ; 120v 30 ma, 3/6. CHOKES : 300 ohms 100 ma, 4/- ; 80 ohms 120 ma, 4/- ; Bulgin RF 4 pie, 1/- ; FUSEHOLDERS

panel, 1/- ; Ruby indicators, 1/3 ; Toggles SP, 1/3 ; DP, 1/3 ; DPDT, 2/- SPDT (one intermittent), 2/- ; Mains (chassis), plug and socket, 2-pin 5a, 1/3. VAR. CONDENSERS. Spindled, ceramic miniatures, 50 pf d'spaced with SM drive, 3/6 ; 25 pf, 1/3 ; 75 pf D.E., 1/6 ; 75 pf Twin, 2/6 ; 25 pf Twin, split-stator with trimmers, 3/6 ; 30 pf preset, 1/- . SPINDLE COUPLERS, STD. ¼ in., 9d. Epicyclic drives SM, 1/3. METERS MC 150v 3¼", 8/6 ; 0/2¼a, 7/6 ; 0/1a, 5/- ; 0/30a, 7/6 ; 0/100 ma 2" sq., 5/6 ; 0/500 µA, 5/- ; 0/500 ma Thermo, 3/6 ; Resistors, new, 40 values, 50 assorted 5/6.

VALVES—5R4GY, 6SN7, 6SL7, ARP12, AR8, 6AC7, 6B8M, KTW63, EF36, EBC33, 12SK7, 12SR7, 12SG7, 12AH7, 12C8, 9003, VT90 at 5/- ; 6SH7, SP61, SP41, 9006, 3B24, P61, at 3/6 ; 6H6, EA50, EB34, 7193, CV6, at 2/6 ; 5U4G, 5Z4M, 6X5, 12A6, 12K8, 6J7, VU111, 884, 2C26, 2X2, 6F6M, 6AG5, EF54, 5Z3, 9002, 6C4, Pen46, MU14, IT4, 154, IR5, 6K7, 6AG7, EF50 at 6/6 ; 6V6, 6L7M, 6K8M, 6F7, 807, EC52, 3Q5, CV66, at 7/6 ; 6AK5, 6J6, 6L6, 717A, at 8/6 ; 813, at 30/- . S.M. Drives, 80/1, lettered scale, 3 in. dia., 5/- . AERIAL INSULATORS—RCA991, 1/6 ; Tunecons, 1/3. STABILISERS—RCA991, 1/6 ; Tuncons, 1/3. CONDENSERS, block 4 mfd. 750v, 2/6 ; .01 1kvw, 3/6 doz., .1 350v Micamold, 2 × .1 400vw Sprague, 9d. ; 4 mfd. 600vw oil, 2/6. Headphones 2k, 8/6, Keys, 3/6, Carbon mics., 3/6. TRANSFORMERS : 230v input, Parmeko, s'rouded, 620-0-620v tapped 550, 375, 250 ma, 2 × 5v 3a, New £2.

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

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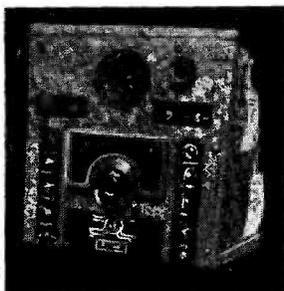
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9, CAULDWELL STREET, BEDFORD.

RECEIVER V.R.L.

Another consignment of these wonderful Rx's, this time in sealed maker's cartons, has just been obtained and are offered to Ham and commercial users at a never to be repeated price.

- ★1.5-29 mc/s (four bands).
- ★19 valves (6-3v).
- ★Variable selectivity Xtal filter.
- ★Noise limiter.
- ★R.F. gain control.
- ★A.F. gain control.
- ★Magic eye indicator with optional damping for C.W.
- ★Optional A.G.C.
- ★Built-in speaker.
- ★Full view dial.
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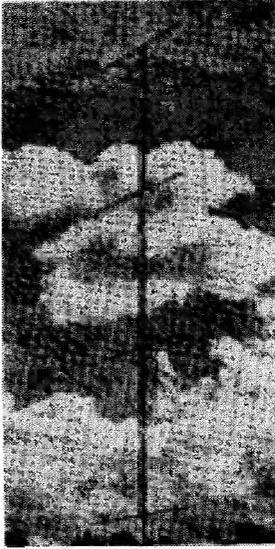
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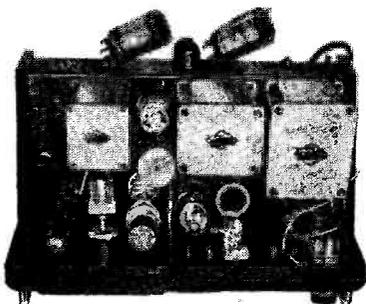
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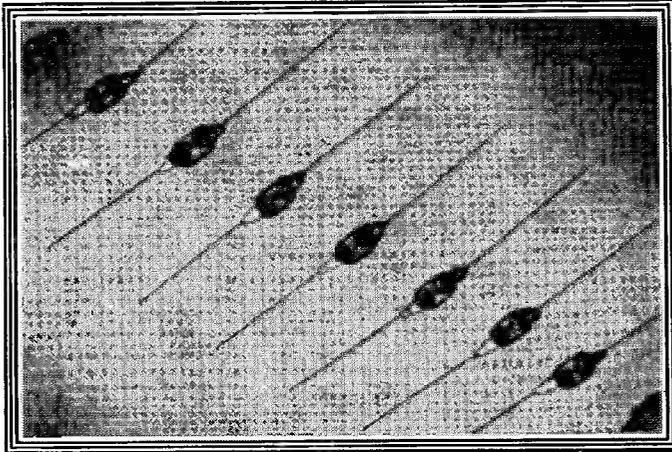
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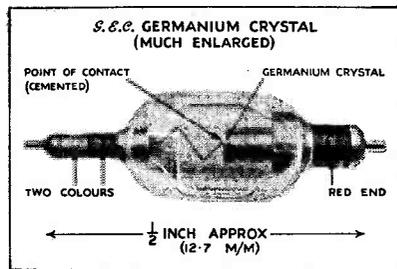
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SHORT WAVE MAGAZINE

FOR THE RADIO AMATEUR AND AMATEUR RADIO

E D I T O R I A L

Preview

This is the third issue with which the SHORT WAVE MAGAZINE has come forth in its new guise. It is an opportune moment for us to acknowledge, with grateful thanks, the steady stream of letters we are getting from readers who are good enough to express themselves as well satisfied not only with the enlarged MAGAZINE, but also with what (many say) they have always regarded as the leader in its own particular field.

If we may be permitted a brief comment on the present standing of the SHORT WAVE MAGAZINE in the world of Amateur Radio, it is that with the exception of two of our American contemporaries, we now have a world-wide circulation larger by far than any other similar periodical, in any language.

Such results, obtained comparatively quickly, are only a beginning; they do not by any means mark either the limit or a ceiling. But they are a clear indication of the widening field of interest in the art of Amateur Radio—an interest which the SHORT WAVE MAGAZINE has done so much to develop and encourage in this country during the last few years. Neither effort nor expense have been spared in the process, and so it will continue.

Those who have read thus far may well ask "So what?" To which the quick answer is that a successful undertaking, whether it be a specialist publication or a firm of boiler makers, can only progress—it can neither stand still nor go backwards. Hence, it is our readers and those who use our advertising space who become the ultimate beneficiaries by the progress the SHORT WAVE MAGAZINE is making.

*Austin Ford/R
6860*

FOUR-BAND QRO TRANSMITTER

807's in Push-Pull—150 Watts—Drive Stages Switched Incorporated Power Supply

By G. P. ANDERSON (G2QY)

This is a useful design in the orthodox pattern and can be built up in any convenient way. Provided parts of good quality are used, full power CW working will easily be possible in the range 7-28 mc. Though a modulator unit is not included in the design as presented here, telephony operation can be obtained by any of the usual methods, and the transmitter performs well on both CW and phone.—Editor.

THE transmitter described in this article is capable of being operated with inputs up to a maximum of 150 watts on any four adjacent amateur bands between 1.7 and 30 mc, but was specifically designed to work on the popular "long distance" bands of 7, 14 and 28 mc—and 21 mc when it becomes available. The circuit uses common types of valves, and band changing is achieved by turning one switch and changing two plug-in coils, while provision is made for the selection of any one of at least four crystal frequencies by means of a switch; alternatively, an external VFO drive may be used to excite the transmitter, and a description of a suitable unit will follow. A power supply with some novel features is also described.

Circuit

As may be seen from Fig. 1 the circuit consists of a low power crystal oscillator stage, followed by two frequency multipliers. Capacity coupling is used between each of these stages; in addition a link winding is provided on the anode coil units, and taken to separate positions on a ceramic rotary switch; the "pick-up" arms of this switch are connected to a link coil coupled to the grid tuning coil of the push-pull power amplifier. By this means a frequency of 7 mc may be taken from the anode circuit of the crystal oscillator, or one of 14 or 28 from the appropriate frequency doubler, and used to drive the power amplifier. Drive at 21 mc is obtained by tuning the first frequency multiplier to the third harmonic, and inserting the appropriate PA grid coil.

The Yaxley type switch fitted in the top centre of the panel allows one of several crystal frequencies to be selected and, provided the frequency difference is not excessive, such a frequency change may be made without retuning at any part of the transmitter. This facility has been found of use, particularly on Ten, where a "calling frequency" of 28010 kc

is used, communication being continued on 28150 kc in order to move away from the severe interference at the edge of the band. Such a change makes no detectable difference in signal strength at the distant end, and can be made instantaneously. In order to accommodate the crystals in a convenient position, a valve with a top-grid connection such as SP61, 6J7 or 6K7 is used; it can be connected as a triode to save a few components.

The frequency doublers follow standard design and both can use 6V6 valves, although slightly increased drive was obtained at 28 mc by substituting a 6L6G in the second FD. A negative bias of some 60 volts is required for these stages, and can be taken from the bias supply used for the PA. No instability is introduced by the practice of commoning the leads from the two FD stages to the bias power unit; this results in a simplification of wiring.

The input to the push-pull PA is link coupled to the appropriate driver stage for the frequency at which it is required to operate, and in the interests of efficiency it was decided to use plug-in coils in the grid and anode circuit, and to select the correct driver frequency for connection to the grid link coil by means of a low-loss switch. If desired, a turret form of switched coil assembly could be incorporated in both the grid and anode circuits thus making the transmitter completely "band-switched." Valves of the 807 type are used in the amplifier stage, since these require a total of less than 1 watt RF drive to achieve full output, allowing a convenient maximum input of 150 watts with a relatively low voltage HT supply of 750 volts. The valves are operated well into the Class-C condition with a negative grid bias of 200 volts, which may be obtained from batteries or from the "eliminator" type of power unit. The screen of each valve is supplied through a separate dropping resistor.

Metering is provided by means of a single meter—in the original model this was of 2 mA



General view of the G2QY transmitter. Top left on the panel is the VFO/crystal selector switch and at right the meter switch. The four knobs along the bottom end tune, and the accompanying switches select, the drive frequency; the dial at the right is for PA tuning.

full scale reading, but any meter having a F.S.D. of up to 10 mA would be suitable—with appropriate shunt or series resistors fitted in the positions shown. The circuits in which metering is provided, and the full scale reading required, are given in Table 1, and the values of the necessary resistors can be calculated from the following formulae:

Current Ranges: Shunt Res., $\frac{R_m}{n-1}$

Voltage Ranges: Series Res., $\frac{E}{I_m} - R_m$

where: R_m = resistance of meter

n = $\frac{\text{required F.S.D.}}{\text{meter F.S.D.}}$

E = required full-scale voltage reading

I_m = F.S.D. of meter in amps.

The resistor networks comprising R22-27 are designed to reduce the voltage applied to S6 to a maximum of 100 volts. Resistors R22, R24 and R25, R27 act as potential dividers, R23 and R26 being the series resistors to allow the instrument to function as a voltmeter.

Keying for CW operation is carried out by means of a relay fitted under the chassis, with the contacts in series with the HT feed to the first valve. This enables "break-in" procedure to be employed, since when the key is up no signal is present to block the receiver. Alternative methods could of course be used at the discretion of the individual constructor.

In order to provide a control for telephony

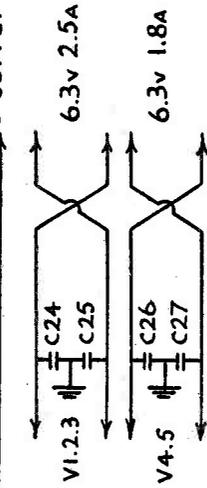
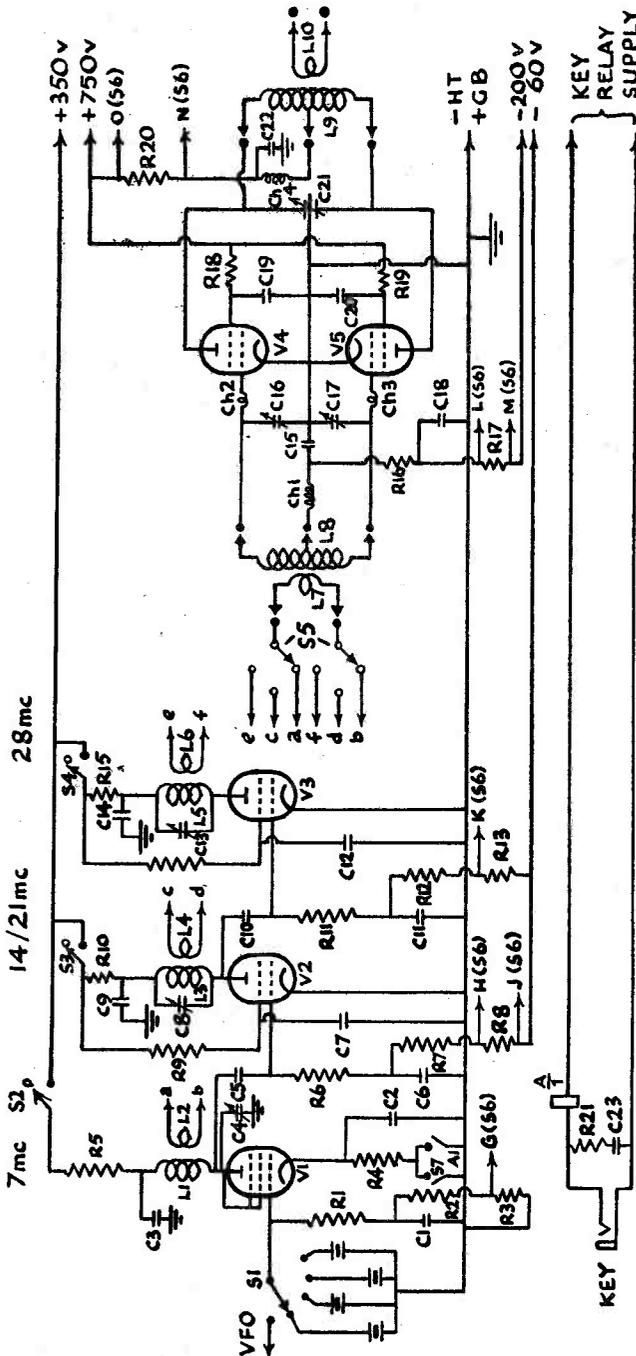
working, or when a separately keyed VFO unit is in operation, switch S7 is fitted to short circuit the relay contacts.

Construction

The original model of this transmitter is illustrated in the photographs and is designed for rack and panel mounting; although the following details refer to this type of construction, it could very easily be modified to occupy a cabinet.

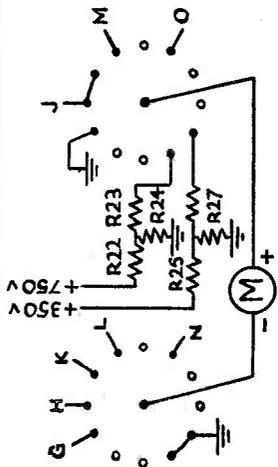
The standard panel is 10½ in. high, with a vertical extension to the plate at one end of the chassis, to provide a mounting for the tank tuning condenser; it also effectively screens the power amplifier valves. The only components mounted above the chassis are the valves, crystals, meter and associated switches, and the grid coil for the power amplifier. The tuned circuit in the anodes of the PA is assembled around the tuning condenser and is mounted on the end of the chassis. All other components, including the coils for all the early stages of the transmitter, are mounted within the chassis, resulting in a clean external appearance. The controls are arranged on the panel in as symmetrical a manner as possible, with due regard to the attainment of a good electrical layout. The plate coil shown is home-made, but several suitable manufactured items are on the market.

Terminations for the connection of power, keying and modulation equipment are provided



MT 166

Detail of Meter Switch Connections, 56



through the convenient connection strips shown in the photograph. The heater supplies are fed through 15-amp. connectors, and the remainder through the 5-amp. type, with the exception of the 750-volts supply which is provided with a separate feed through a small ceramic bush.

The choice of components is not critical provided good quality items are used, and for this reason the values only are shown in the parts list. To a certain extent the mechanical design of the transmitter will be dependent upon the components used, and attention will have to be paid to this when laying out the panel and chassis for drilling.

Power Supply

The power requirements of the transmitter are summarised as follows :

- HT to CO and FD Stages 350 volts, 100 mA
- HT to PA Stages, 750 volts, 200 mA
- LT to all Stages 6.3 volts, 4.5 amps
- Grid Bias 200 volts, tapped at -60 volts
- Keying circuit Dependent upon keying relay

A versatile power supply is illustrated in the photograph and the circuit of the sections required to operate this transmitter is shown in Fig. 2. Three completely independent supplies are used, one giving the 350 volts for the CO and FD stages, the second providing the bias voltages, and the third the 750 volts for the power amplifier. The transformer in the latter unit is tapped at 400 and 600 volts,

and facilities are provided to enable rapid selection of the desired voltage to be made from the front of the power unit panel. A switch suitable for operation with the high voltages present (at least 1,500 volts AC) would be both cumbersome and expensive, and so a system of plugs and sockets is used as shown in Fig. 2. These items are readily obtainable, and by removing contacts in order to provide as long a path as possible between high voltage points, no trouble should be experienced. The 8-way type used on the original were obtained on the surplus market, and have the advantage that the "live" points are well protected by the surrounding moulding, and although it is advisable to switch off the transformer supply before changing the voltage selection plug, such changes have been made while in operation with no difficulty.

The row of 5-amp. sockets at the top of the front panel are used to facilitate distribution of power to various items of equipment in use at

Table of Values

Fig. 1. Circuit Complete of the Main Transmitter

- C1, 2, 3, 6, 7, 9, 11, 12, 14, 15, 19, 20, 24-27 } .002 μ F
 - C4 = 100 μ F variable
 - C5, C10 = 47 μ F mica
 - C8 = 50 μ F variable
 - C13 = 30 μ F variable
 - C16/17 = 50 μ F variables, ganged
 - C18 = 0.5 μ F
 - C21 = 100 + 100 μ F variable, transmitting type
 - C22 = 0.01 μ F 1,500 volts
 - C23 = Key-click filter
 - R1 = 22,000 ohms, $\frac{1}{2}$ -watt
 - R2 = 2,200 ohms, $\frac{1}{2}$ -watt
 - R3 = to suit meter
 - R4 = 220 ohms, $\frac{1}{2}$ -watt
 - R5 = 22,000 ohms, 2-watt
 - R6 = 22,000 ohms, 1-watt
 - R7 = 4,700 ohms, $\frac{1}{2}$ -watt
 - R8 = To suit meter
 - R9, 14 = 15,000 ohms, 2-watt
 - R10, 15 = 1,000 ohms, 1-watt
 - R11 = 22,000 ohms, 1-watt
 - R12 = 4,700 ohms, $\frac{1}{2}$ -watt
 - R13 = To suit meter
 - R16 = 10,000 ohms, 1-watt
 - R17 = To suit meter
 - R18, 19 = 15,000 ohms, 5-watt
 - R20 = To suit meter
 - R21 = Key-click filter
 - R22-27 = To suit meter (see text)
 - V1 = SP61
 - V2, 3 = 6V6 or 6L6
 - V4, 5 = 807
 - Crystals = 7 mc
 - Ch 1, 4 = 2.5 mH RF choke
 - Ch 2, 3 = 14 turns, 22 E and SS wire, $\frac{1}{4}$ in. dia.
 - A/1 = Keying relay, key-click filter to-suit
- Note : Key-click filtering may also be required across the relay contacts A1.

Coil Table

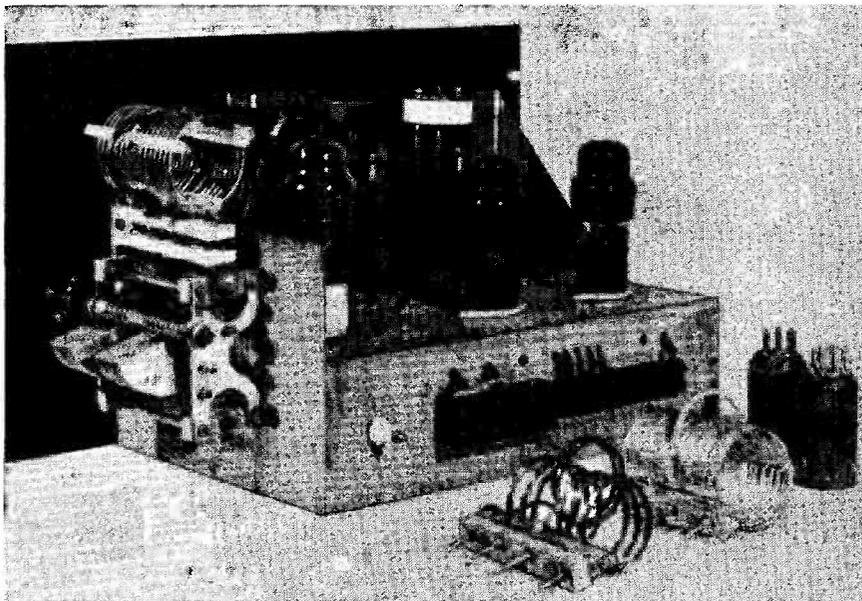
- L1 = 18 turns, 22 SWG, 1 in. dia., 1 $\frac{1}{2}$ in. long
- L2 = 2 turns, 22 SWG, same former as L1
- L3 = 10 turns, 22 SWG, 1 in. dia., 1 in. long
- L4 = 2 turns, 22 SWG, same former as L3
- L5 = 6 turns, 22 SWG, 1 in. dia., 1 in. long
- L6 = 2 turns, 22 SWG, same former as L5

	7 mc	14 mc	21 mc	28 mc	Notes
L7	1T	2T	2T	2T	Over centre of L8
L8	32T 1 $\frac{1}{2}$	16T 1 $\frac{1}{2}$	10T 1 $\frac{1}{2}$	6T 1 $\frac{1}{2}$	All CT in. dia.
L9	26T 2 $\frac{1}{2}$	14T 2 $\frac{1}{2}$	10T 2 $\frac{1}{2}$	6T 2	All CT in. dia.
L10	2T 2 $\frac{1}{2}$	2T 2 $\frac{1}{2}$	2T 2 $\frac{1}{2}$	2T 2	in. dia.

Wire : L7, 8 : 24 SWG enamel
 L9, 10 : 7 mc = 16 SWG
 14 and 21 mc = 14 SWG
 28 mc = 8 SWG

Fig. 1. Simplified circuit of the transmitter designed by G2QY, suitable for either crystal or VFO control. (A unit for VFO drive is to be described separately.)

- S1 = IP, 4W Rotary Switch
- S2, 3, 4, 7 = SPST Toggle Switch
- S5 = 2P, 3W Rotary (Ceramic) Switch
- S6 = 2P, 12W Rotary Switch



Rear view of the transmitter as described, showing all the coils necessary for operation

switch should be fitted in order completely to disconnect the mains supply from the transmitter in an emergency, and at such times as the apparatus is not in use.

Table of Values

Fig. 2. The Power Supply Unit for the Transmitter

- C1 = 8 μ F 350-volt electrolytic
- C2, 3, 4 = 16 μ F 250-volt electrolytic
- C5 = 4 μ F 450 volt
- C6 = 8 μ F 450 volt
- C7 = 2 μ F 1.500 volt
- C8 = 4 μ F 1.000 volt
- R1 = 10,000 ohms, 5-watt potentiometer
- R2 = 470,000 ohms, $\frac{1}{2}$ -watt
- R3 = 250,000 ohms, 5-watt
- V1 = 80, etc. (350 volts, 120 mA FW)
- V2 = 5R4GY, etc. (750 volts, 200 mA FW)
- MR = Half-wave metal rectifier, 200 volts, 30 mA
- N = 240-volt neon indicator lamp
- Ch1, 2 = 20-H, 30-mA choke
- Ch3 = 20-H, 120-mA choke
- Ch4 = 15-H, 250-mA choke
- S1 = 250 volts, 10 amp ; On-off Switch
- S2-5 = 250 volts, 2 amps DPST toggle switches
- F1, 2 = 5-amp fuses
- F3, 4, 8 = 250-mA fuses
- F5 = 150-mA fuse
- F6, 7 = 1-amp fuses
- DP 1-4 = 5-amp two-pin sockets
- Voltage selection plug and sockets on T3 : Modified 8-way surplus type.
- T1 = Mains/250 volts, 60 mA
- T2 = Mains/350-0-350 volts, 120 mA ; 6.3 volts, 2 amps ; 6.3 volts, 3 amps ; 5 volts, 2 amps (or to suit V1)
- T3 = Mains/750-600-450-0-450-600-750 volts, 200 mA ; 5 volts, 2 amps (or to suit V2)

Operation

The adjustment and operation of this transmitter is straightforward, and normal procedure can be followed. Care should be taken not to run the PA stage without a load on its tank circuit, or damage to the valves will result. A simple load consists of a lamp of sufficient wattage tapped across a few turns of the coil, the tapping points being equidistant from the centre-tap, and their position being current for the DC voltage applied, when it is found such that the stage is drawing the correct under drive and tuned to resonance. During initial adjustments it is recommended that the

Table I

TABLE 1. METERED CIRCUITS

S 6 pos'n	Circuit	Meter FSD
1	Grid current of V 1	10 mA
2	Grid current of V 2	10 mA
3	Grid current of V 3	10 mA
4	Grid current of V 4 and 5	20 mA
5		
6	Anode current of V4 and 5	300 mA
7		
8	HT volts to V1, V2, V3	500 volts
9		
10	HT volts to V4 and V5	1,000 volts
11		
12		

Table 2

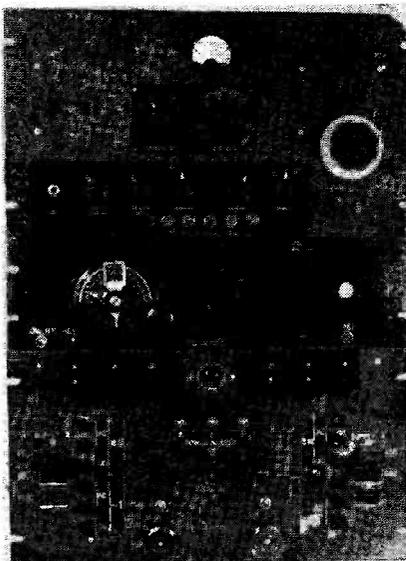
OPERATION IN 7 MC BAND (S5 to "7 mc"; 7 mc coil in L7/8)			
Operate	S6 Position	Adjust	Meter Check
1. S2 ..	1. V1 grid	C4	Max.
2. S2 ..	4. PA grid	C4 and C16/17	Max.
3. S2 ..	6. PA plate	C21	Min.

Table 3

OPERATION IN 14 MC BAND (S5 to "14/21"; 14 mc coil in L7/8)			
Operate	S6 Position	Adjust	Meter Check
1. S2	2. V2 grid	C4	Max.
2. S2 and 3	4. PA grid	C8 and C16/17	Max.
3. S2 and 3	6. PA plate	C21	Min.

voltage applied to the PA stage be reduced.

The alignment procedure to operate the transmitter on the various bands is outlined in Tables 2, 3, 4 and 5, and may be conducted with either a crystal of approximately 7 mc frequency in circuit or a VFO with an output in the 3-5 mc band. The heater, grid bias and LV HT supplies only should be connected until the last operation in each table is reached, when the HV supply can also be applied.



The G2QY transmitter assembly complete, showing (above) the Tx unit of Fig. 1, the VFO section (to be described), and the power supply deck.

Table 4

OPERATION IN 21 MC BAND (S5 to "14/21"; 21 mc coil in L7/8)			
Operate	S6 Position	Adjust	Meter Check
1. S2	2. V2 grid	C4	Max.
2. S2 and 3	4. PA grid	C8 and C16/17	Max.
3. S2 and 3	6. PA plate	C21	Min.

Table 5

OPERATION IN 28 MC BAND (S5 to "28 mc"; 28 mc coil in L7/8)			
Operate	S6 Position	Adjust	Meter Check
1. S2	2. V2 grid	C4	Max.
2. S2 and 3	3. V3 grid	C8	Max.
3. S2, 3 and 4	4. PA grid	C13 and C16/17	Max.
4. S2, 3 and 4	4. PA grid	Readjust C4, C8, C13 and C16/17	Max.
5. S2, 3 and 4	6. PA plate	C21	Min.

NOTE: When a VFO is being used to drive the transmitter, it should be adjusted with the meter switch in position 1, and should be set to produce a reading of approximately 1 mA on the meter.

Aerial

Any aerial system suitable for the frequency upon which it is desired to operate may, of course, be used with this transmitter, and the reader is referred to all the many articles that have appeared on the subject in this *Magazine*. The use of a separate tuned circuit link-coupled to the transmitter is, however, strongly to be recommended, in the interests of reducing interference in local broadcast receivers and attenuation of harmonics.

Telephony

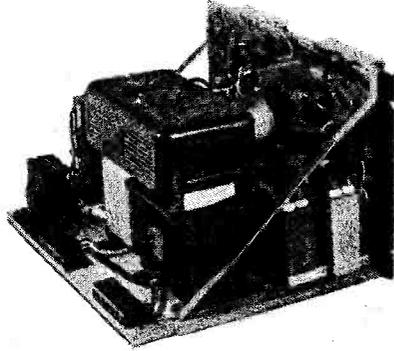
Since the circuit of the transmitter is quite orthodox, any of the usual modulation systems may be used, and no details of the amplifying equipment are given here. If it is intended to use telephony for local contacts only, low efficiency grid modulation will be satisfactory, but for longer distance communication anode or cathode modulation is to be preferred.

General

As constructed and with the coil values as shown, the transmitter is capable of handling 150 watts input in the 7, 14, 21 and 28 mc amateur bands on CW, and about 100 watts on telephony. Some adjustment should be made to the link coupling windings on the plate coils of V1, 2, and 3, and the grid coils of the PA, in order to obtain optimum drive to the 807's. Further, for efficient operation and to reduce the risk of parasitic oscillations in the PA stage, the two valves should be driven equally, and any unbalance in the grid circuit will upset this condition. It is, therefore, well

worth while to spend some time on balancing this circuit, and apart from exercising care in winding the grid coils, the following suggestions may be found helpful :

A simple indication of the amount of drive being applied to each valve is provided by comparing the screen currents ; and this may be done by inserting a suitable resistor in series with the screen supply to each valve, and measuring the voltage drop across them. Adjustments to the balance can be made either by observing the effect of connecting a small trimmer condenser across each half of the coil in turn (it should be noted that the grid tuning condenser will have to be re-adjusted after each alteration to the trimmer) or by means of a differential condenser, as described in the December, 1948, issue of the *Short Wave Magazine*.



Rear view of the power unit (Fig. 2). The HT eliminator is a commercial job used for bias supply to the transmitter.

IMPROVING THE RECEIVER

Broad-Band Preamplifier

By G. R. WOODVILLE

THIS article describes a method of improving the performance of some of the older receivers, which lack, particularly at the higher frequencies, the characteristics of more modern sets.

The four most important requirements in a receiver are : (1) Sensitivity, (2) Signal-to-noise ratio, (3) Stability, and (4) Selectivity. The order of importance of these requirements is a matter of opinion, though it is certain that weak signals will not be audible with a receiver having inadequate sensitivity and a poor signal-to-noise ratio.

Many of the older receivers, which are otherwise satisfactory, fail at frequencies above, say, 20-25 mc. This is usually due to excessive circuit capacity and the length of the connecting leads and attempts to rebuild the set to rectify these are seldom satisfactory.

If the strength of the incoming signal could be increased, the falling-off in receiver performance would be overcome. The simplest method of increasing both sensitivity and signal-to-noise ratio is by the addition, between the aerial and the receiver, of a single valve amplifier designed to cover the particular

As the author rightly remarks, the performance of many receivers, especially the older designs (and some in the surplus category), falls off on the higher communication frequencies. This article shows how a small preamplifier unit, fixed tuned, can improve matters.—Editor.

waveband required. If this waveband is comparatively narrow, of the order of 10 per cent. of the working frequency, there is no need to provide a tuning control, the circuit being pre-set to the approximate centre frequency. The use of miniature components will permit the physical size of the amplifier to be reduced and a very simple assembly results which might even be built into an existing receiver.

This article deals with an amplifier designed primarily for the 28 mc amateur band, but the principles can be applied to other frequencies.

Circuit

The circuit used is shown in Fig. 1, and consists of a triode as a cathode-coupled amplifier. The control grid is coupled to the aerial by the transformer L1/L2 which is provided with adjustable Gecalloy core to set the resonant frequency. The cathode resistor R1 performs the dual function of providing a coupling to the receiver and cathode bias for the valve.

The valve may be either an Osram type L77 or a triode-connected W77. The drawings show an L77 in use and the connections to the valve-holder will be somewhat different for a W77. The performance is identical with the exception that the W77 heater consumes 0.2A and the L77 0.15A.

(over)

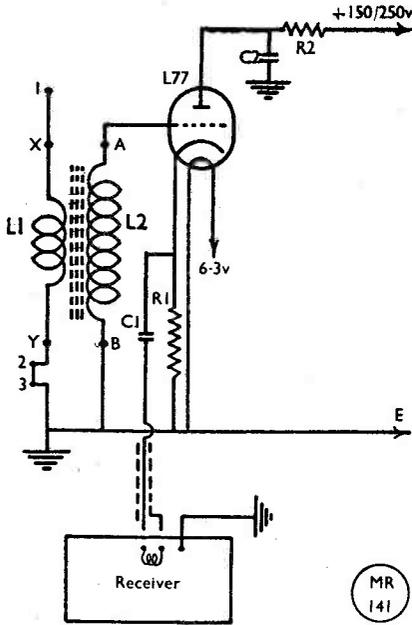


Fig. 1. Circuit of the broad-band preamplifier for Ten, suitable for any receiver. The amplifier is peaked around 29 mc and no tuning is necessary, since matters are so arranged that the gain is sensibly "flat" over the whole 28 mc band

Performance

Under the condition of operation the input impedance of the valve is increased and the effective input capacitance decreased by the degenerative action of the cathode resistor R1. The reduced capacitance allows a higher inductance to be used in the aerial transformer and provides a wide bandwidth, while the increased impedance enables a considerable voltage gain to be obtained from the transformer L1/L2.

An overall stage gain of the order of 15 dB (x5) has been obtained at 29 mc, and this is maintained within 3 dB over a frequency band of ± 2 mcs (i.e., 27 and 31 mc.). Thus the 28 mc amateur band is easily covered with the gain remaining constant within ± 1 dB.

The signal-to-noise ratio is excellent even with widely different aerial impedances. This is shown in Fig. 2 where the noise factor is plotted against resistance. As a comparison the noise factor of a commercial receiver is also shown. Some modern commercial receivers are better than the one used as an example, and some considerably worse.

Table of Values

Fig. 1. Circuit arrangement and inter-connection.

- C1 = 200 $\mu\mu\text{F}$
- C2 = .001 μF
- R1 = 470 ohms
- R2 = 3,300 ohms
- L1/L2 = See text, and Fig. 3.
- Valve = W77 or L77 (see text)

Construction

The chassis layout is arranged so that short connecting leads are obtained but is not otherwise critical; a small separate fold of aluminium sheet giving a chassis 2 in. \times 2 in. \times 2 in. is very suitable, and can be formed from either brass or aluminium.

The aerial coil construction is shown in Fig. 3. A G.E.C. polystyrene bobbin is used as a former for the coil, and has threads internally and externally, the internal threads allowing a Gecalloy radio core type S.34 to be inserted. When the resonant frequency is obtained the core position may be fixed by a small piece of wax. The external threads hold the turns rigidly at the correct spacing. Small

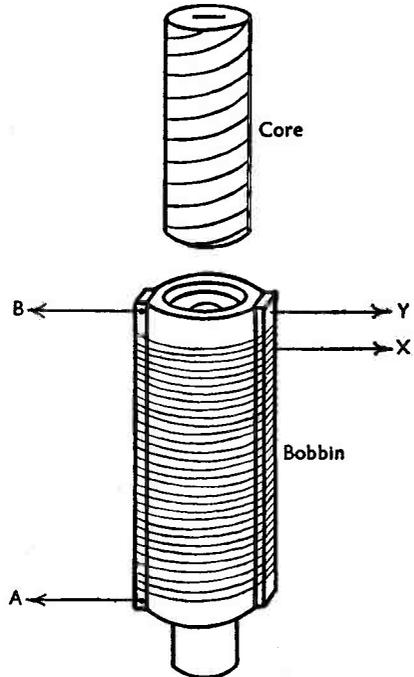


Fig. 3. Construction of the input transformer L1/L2, discussed in detail in the text. A G.E.C. bobbin type S34 is wound with 25 turns of No. 32 SSC, terminated across A-B. L1 has 3 turns, terminated X-Y.

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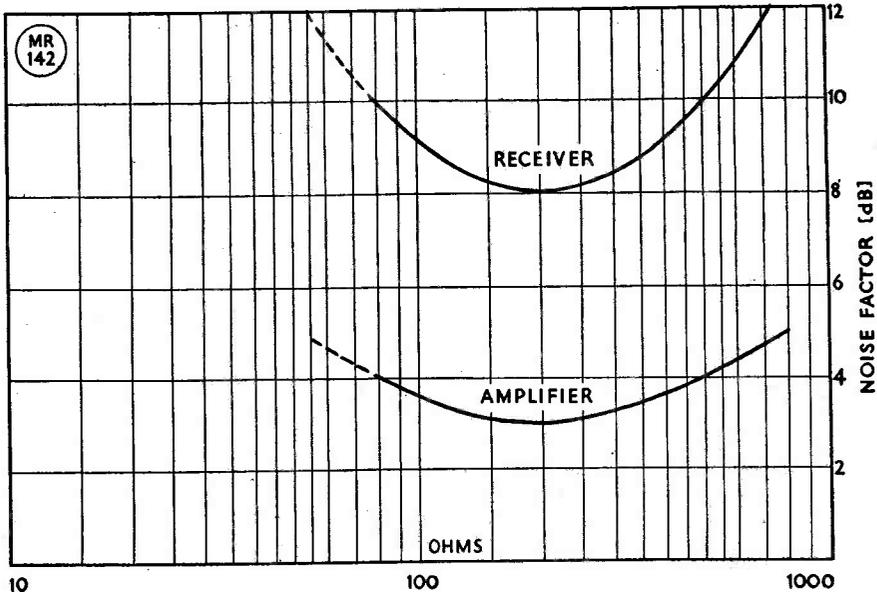


Fig. 2. Curves showing performance of amplifier and receiver at 29 mc

holes are provided on two sides of the former to enable the end turns to be fixed.

A short length of co-axial cable connects the amplifier to the aerial and earth terminals of the receiver and the heater and anode are supplied from the receiver via a three-wire cable. The required anode voltage is not critical and there is little change in gain between 150 and 250 volts.

Three aerial and earth terminals are provided so that a balanced or unbalanced aerial system may be used. A balanced aerial should be connected to 1 and 2, and link 2-3 removed.

Installation

Having connected the amplifier and receiver as shown in Fig. 1, the receiver should be tuned to the centre of the desired band, in this case 29 mc, and its aerial trimmer adjusted to give maximum signal or noise output. The core of the transformer L1/L2 should then be inserted and adjusted to maximum output with the aerial connected.

Satisfactory coverage of the waveband should then be obtained with a small re-adjustment of the aerial trimmer.

PHOTOGRAPHS

As previously mentioned, we are always glad to see photographs of Amateur Radio interest—either equipment, personalities or Club doings. Photographs can be any size, print or negative, but *must* be clear and sharp to ensure good reproduction. All photographs should be identified on the back (light marking with a soft pencil so as not to spoil the face of the print), with an accompanying note to cover the subject. Photographs accepted are paid for on appearance at good rates, and can be returned if required. The block-making process involves no damage to the face. As we necessarily hold a number of prints for use as opportunity offers, appearance is not always immediate.

SUPER VARIAC

For those who may not know, a Variac (another of those trade names now generally used to describe any similar product in the same category) is an adjustable voltage regulator which, in the Amateur Radio application, compensates for mains fluctuations. Pye of Cambridge have now produced a Super Variac capable of controlling 5 kW at any setting between 220 and 240 volts AC for input voltage variations of 170-260 volts. The regulation is automatic, the variac element being controlled through a synchronous motor which follows changes in the mains voltage. In other words, you just set it to the required output voltage, and leave it at that.

SPEECH CLIPPER UNIT

Interesting Preamplifier Design

By G. H. COX, B.Sc., A.R.C.S.
(G3CCD)

A POWERFUL carrier is of no use unless it conveys intelligence, and in telephony the intelligence lies in the modulation. Thus, any means which serves to increase the effective level of the modulation improves the value of the signal and enables the recipient to copy from a much weaker signal than would otherwise be possible. However, overmodulation and distortion must be avoided if any advantage is to be gained by increasing modulation level.

The amplitude of a speech wave varies over wide limits and with 100 per cent. modulation on peaks, the average level of modulation is something very much less than this. These peaks convey little intelligence and if they can be cut off at some predetermined level the amplitude variation in the speech wave form is greatly reduced and the average level of modulation can be increased without causing overmodulation. The diagram (Fig. 2) showing the effect of limiting amplitude variation on waveform will make this clear.

A further increase in the average level of modulation may be obtained by restricting the frequency response such that the lower frequencies (which contribute little to the intelligibility but require considerable power) are attenuated. Nor need frequencies above 3,000-4,000 cycles be retained; they are greatly attenuated by the modern communications receiver and furthermore they increase the width of the channel taken up by the transmission.

The audio peaks may readily be cut off at the desired level by using limiting diodes shunted opposite ways across the audio path. The diodes are biased and conduct when the applied voltage exceeds the bias, thereby placing a low impedance across the supply and preventing the output voltage from rising. However, since the audio peaks are squared off by the clipping, high frequency harmonics will be generated and these must be removed. It is therefore necessary to put the signal through a low-pass filter and at the same time to ensure that the following stages are reasonably linear to avoid distortion. It is advantageous to place filter condensers across

This article is a very useful discussion on the general subject of modulation limiting and describes an effective preamplifier unit incorporating speech-clip circuitry.—Editor.

the modulation transformer to resonate with the leakage inductance and remove any high frequencies generated in the modulator proper.

Since the general effect of clipping is to increase the amplitude of the weak audio signals with respect to the stronger ones, any small hum or ripple introduced in the early stages will be accentuated. Every precaution must be taken therefore to minimise hum pick up. The system is also sensitive to small noises picked up by the microphone, and if a quiet background is to be obtained then noisy transformers and chokes must be silenced. Care must also be taken to avoid acoustic feedback from the modulation transformer or monitor phones.

Description of the Circuit

The preamplifier is intended to operate from a crystal microphone, although a moving coil with a similar output could be used if provided with a suitable transformer. The output from the microphone is fed through an RF filter to an EF37 low-noise pentode which is resistance-capacity coupled to half of a 6SL7. The signal is then passed to a 6J5 cathode follower which acts as a low impedance driver for the clipping diodes. If the diodes are driven directly by the 6SL7 then distortion will be caused when they conduct and reduce the load impedance of the stage. A bias of two volts is applied to each diode and the diodes are arranged to clip both positive and negative peaks. The bias voltage is derived from a potentiometer between HT and earth, and the by-pass condensers at the lower end of the potentiometer serve to eliminate ripple and also keep down the impedances in series with the diodes. If these impedances are high, then the output tends to rise as the input increases, thereby causing overmodulation when clipping heavily. The 50,000-ohm resistor in series with the diodes forms the upper arm of a potentiometer with the diodes as the lower arm, such that the output voltage cannot exceed the voltage required to cause the diodes to conduct.

The output from the clipper is amplified by the second half of the 6SL7, and a resistance-capacity low-pass filter follows this stage. This filter was used in preference to a tuned filter since the impedance of the latter falls at frequencies higher than the resonant frequency, and this may allow audio harmonics to pass with only little attenuation. The filter coils are also liable to pick up hum and RF voltages

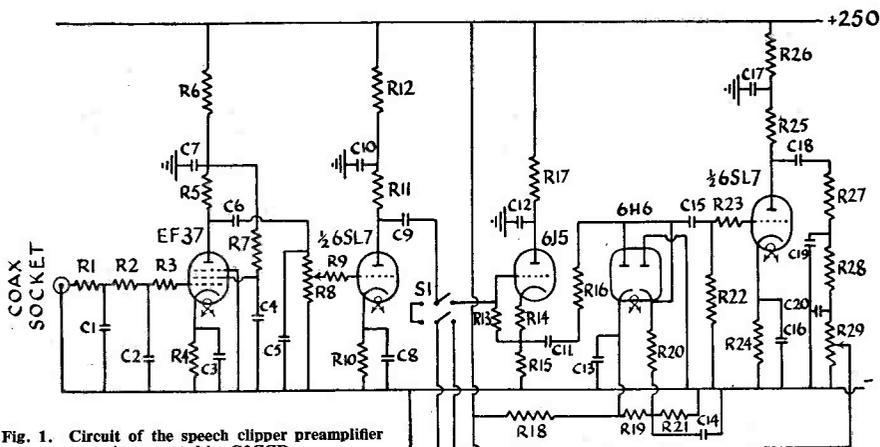


Fig. 1. Circuit of the speech clipper preamplifier unit suggested by G3CCD

Table of Values

Fig. 1. The Speech-Clip Preamplifier Unit

- C1, C2, C5 = 80 μ F
 - C3, C8, C13, = 50 μ F, 25v
 - C4, C23 = 0.5 μ F, 350v
 - C6, C9 = .006 μ F, mica
 - C7, C10, C12, = 8 μ F, 350v
 - C17, C21 = 0.1 μ F
 - C15 = .003 μ F, mica
 - C18, C22 = .01 μ F
 - R1, R2, R3, R6, = 50,000 ohms
 - R16, R23, R30 = 3,500 ohms
 - R4 = 500,000 ohms
 - R5, R25 = 100,000 ohms
 - R7 = 750,000 ohms
 - R8 = 500,000 ohms, audio gain
 - R10 = 3,000 ohms
 - R11 = 200,000 ohms
 - R12, R17, R26 = 30,000 ohms
 - R13, R20, R31 = 250,000 ohms
 - R14, R32 = 1,000 ohms
 - R15 = 10,000 ohms
 - R18 = 75,000 ohms
 - R19, R21 = 500 ohms
 - R24 = 2,000 ohms
 - R33 = 15,000 ohms
 - R29 = 250,000 ohms, post-clipper gain
 - S1 = DPTD toggle switch
- (All resistors rated $\frac{1}{2}$ -watt)

and so cause trouble in the modulator.

A triode cathode-follower using a 6J5 handles the output from the filter and drives the main modulator through some 20 ft. of coaxial cable. If desired this stage could be omitted when the preamplifier and modulator are situated close together.

A switch is fitted to by-pass the clipper, allowing the preamplifier to function in the normal way.

Power for the unit at 250 volts 40 mA and 6.3 volts 2 amps is obtained from a separate

power supply—in the author's station the power unit from an R1132 is used to supply the preamplifier alone.

Construction

The construction of the unit is straightforward, and the only precautions necessary are those required to minimise hum. A 7 in. \times 9 in. chassis is used with a front panel and the unit is enclosed in a metal box. The leads to the grids of the first two stages are screened and a screened top cap is fitted to the EF37. The RF filter in the microphone lead is mounted behind the input socket on the panel and enclosed in a valve shield. Heater leads are twisted and kept in the corners of the chassis away from grid connections. Hum from the heaters may often be minimised by using a potentiometer across them with the slider earthed. The potentiometer is then adjusted for minimum hum.

Hum loops in the wiring and earth returns must be avoided on the first stage and it is best to use single point earthing, keeping earth wires close to the chassis.

Operation

After checking wiring and operating voltages the preamplifier can be connected to the modulator and tried on the transmitter.



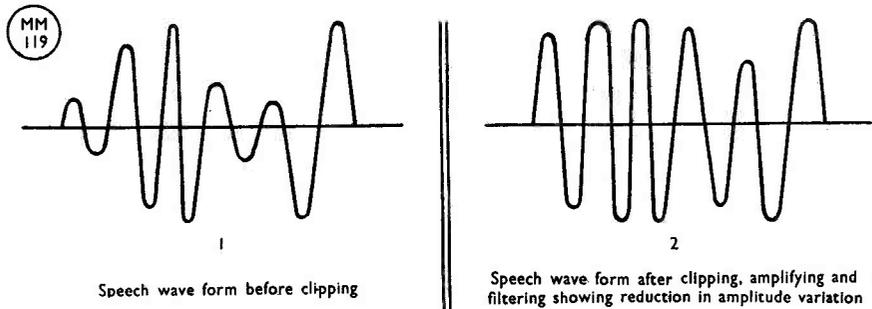


Fig. 2. Diagrams showing the effect of clipping on amplitude variation and speech waveform

A modulation measuring device such as a cathode-ray tube is almost essential if the system is to be set up properly.

The audio gain control R8 is almost fully advanced and the post-clipper gain adjusted to give just 100 per cent. modulation when speaking close to the microphone. Under these conditions the pattern (with the trapezium type of presentation on the cathode-ray tube) should be a complete triangle for most of the time. Once the post-clipper gain has been set it should not be changed unless the carrier power is altered. *With correct setting it is impossible to overmodulate, no matter what the speech level.*

The audio gain can now be turned down to give the desired degree of clipping; this can be determined by listening on a monitor or remote receiver. A further indication may be obtained by observing the proportion of time at which the modulation is 100 per cent. The apparent audio level will be found to increase as the gain is advanced until the optimum level is reached. This will give the best readability with the least distortion. If the gain is advanced further the distortion will tend to increase rapidly as the clipping becomes more severe and the readability will decrease. With this unit it is possible to clip very severely before the distortion becomes unpleasant.

Reports from local and DX contacts indicate a great improvement in readability and excellent communication quality when using the clipper. If high quality is required for local contacts the audio gain may be reduced or the clipper cut out altogether. It will then be found necessary to reduce the

audio gain considerably to avoid over-modulation.

XTAL XCHANGE

If you have a crystal you want to exchange, you can offer it in this space, free of charge—but please note that this is in respect of exchanges of crystals only. Set out your offer on a separate slip in the form shown below, and mark it "Xtal Xchange—Free Insertion" We can only accept notices in respect of crystals which are (a) On a frequency within one of the amateur bands, (b) Can be multiplied to a frequency within any band, or (c) Having fundamentals in the range 100-1000 kc, can be used as calibration standards.

G2DUD, 8 Hall Grove, Cheadle, Cheshire.

Has standard QCC unit 1807 kc. Wants 7100 kc crystal (or near) in $\frac{1}{2}$ -in. holder.

G3DDM, 29 Mill Lane, Sheet, Petersfield, Hants.

Has QCC 7076 kc crystal. Wants frequency about 1900 kc.

G3GCU, 15 Snowdon Street, Barnton, Northwich, Cheshire.

Has 7020 kc crystal, FT243 holder, no certificate. Wants frequency in phone area 80-metre band.

G3GW/A, R.A.F. Station, Swingate, Dover, Kent.

Has QCC P5 crystal 7045 kc, mounted. Wants similar type 1850-1900 kc.

SWL, 387 London Road, Appleton, Nr. Warrington, Lancs.

Has QCC Type P5 crystal 3783 kc. Wants 100 or 1000 kc bar.

The Short Wave Magazine circulates throughout the World

TWO-BAND WINDOM

Twin Feeder Modification

By H. M. HUMPHREYS (G13EVU)

A TWO-BAND modification of the Windom aerial is at present exciting considerable interest in the United States, and it is likely to achieve widespread popularity amongst amateurs who want an aerial which is simple to erect and will enable them to work both the 7 and 14 mc bands with high efficiency.

The modification has been evolved from the fundamental fact that when an aerial is in resonance the impedance at any point is a pure resistance which varies from a low value at the current maximum to a high value at the current minimum. When the top is one half-wave in length, the impedance is lowest at the centre, increasing to a maximum at each end—but when there are two half waves on the wire the point of maximum impedance occurs at the centre, decreasing to a lower value at the ends. This is shown in Fig. 1. It will immediately be apparent from this diagram that there are two points on the wire at which the impedance remains constant irrespective of whether it is used as a half wave or a full wave radiator, and by a fortunate coincidence the impedance at these points is of the order of 300 ohms.

Application

If, therefore, the top is cut at one of these points and a small insulator inserted, a length of 300-ohm transmission line can be used to feed the aerial for both bands with little mismatch. Fig. 2 gives dimensions of a system

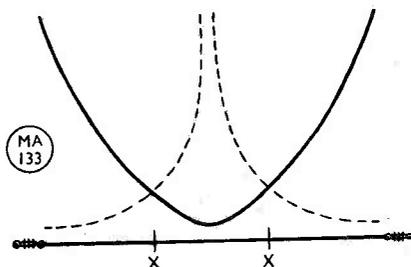


Fig. 1. Impedance of a resonant aerial in half-wave state (solid line) and when carrying a full-wave (dotted line). Points X, X, indicate positions on the wire where impedances are about the same in either case; taking the value as 300 ohms, a twin feeder line having this surge impedance could be connected to either point X to give half-wave or full-wave operation as required.

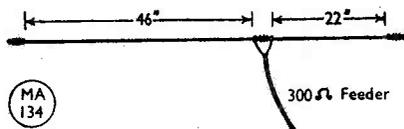


Fig. 2. Layout of a modified Windom for 7 and 14 mc operation, based on the principles discussed in the article and shown in Fig. 1.

which has proved most effective on the 7 and 14 mc bands. A critical examination will reveal that, allowing for end-effect, the top is a full wavelength at 14 mc, and it is not possible to overcome the difficulty that it would have to be some two feet shorter to resonate as a true halfwave aerial at 7 mc. As with any multiband aerial, however, a compromise has to be accepted somewhere, and it has been found in practice that if the system is adjusted to give maximum efficiency at 14 mc, where low-angle radiation is of more importance than at lower frequencies, it will behave quite well at 7 mc. This may in some measure be due to the fact that the 300-ohm twin feeder is much less critical than the single wire feeder of the original Windom as far as matching is concerned.

★ ★

DX MAN'S VIEW

G3GAJ (South Harrow), who has operated with a VQ4 callsign on both phone and CW, says a few words from the DX man's point of view, which we summarise herewith.

On CW he often wanted a QSO of decent length with someone who would be prepared to QRX while he changed aeriels; who would give critical reports; who would, in short, like something better than a rubber-stamp QSO. Even with an excellent receiver such a QSO was almost impossible for "see-sawing VFO's" and butting-in tactics.

Other times the QSO would resolve itself into "Pse QSL," repeated *ad nauseam* in reply to enquiries as to QTH or the gear in use at the other end. Or, of course, the old formula "Mustn't keep you. . . ."

On QSL's: In one week he had four asking for an air mail reply; this little lot alone would have cost 7s. 6d! G3GAJ suggests that rare DX stations should only be asked for a card if it is a first contact with a new zone or country. One OQ5 station who sent 150 QSL's to G stations without waiting for their cards received only 40 replies; hence, many DX stations will not QSL until the other man's card arrives—and fair enough at that.

CALIBRATED BANDSPREAD ON THE "640" RECEIVER

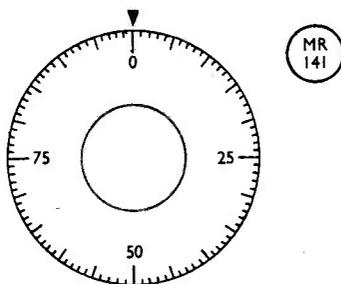
Method devised by

Rev. F. NESS, M.A. (G3ESV)

AFTER using the Eddystone 640 for nearly a year on the CW portions of the popular 40- and 20-metre bands, the writer became dissatisfied with the bandspread dial as fitted by the makers. Even with specially prepared charts plotting frequency against dial readings, it was a nuisance trying to calculate the frequency of a station heard while logging his call with one hand and swinging the VFO close to him with the other. It was even worse when one found a QRM-free spot further up the band and wanted to ask the other fellow to QSY—one could never say exactly how many kc he should move to hit the clear spot.

Modification Details

A simple modification of the receiver has practically eliminated this difficulty. The fluted bandspread knob is removed from the receiver and in its place is fitted a knob having a dial divided into 100 degrees. It is essential that the 100 divisions be spread round the full 360 deg. of the dial; and even more important, that the numbers should run clock-wise. The dial in use at G3ESV was marked in an anti-clockwise direction, so a circle of card was cut just large enough to blank out the numbers, and a new numbering put on in the desired direction. (See sketch.) A small index mark is made with paint on the finger-plate surrounding the controls at any point where it can conveniently be seen. It will then be found that (by a remarkable coincidence) the first 100 kc of each of the 7 mc and 14 mc bands occupies approximately 100 div. on this new dial; while the band 3.5 to 3.6 mc



The type of scale required for the bandspread control on the "640", enabling frequencies to be read off direct in kc—see text for description.

occupies nearly 200 div., or two full turns. Thus, it is possible to read frequency to the nearest kilocycle on all three bands direct from the dial! The maximum error (which will differ slightly in different receivers) occurs at the HF end of the band in each case. The error on the writer's receiver amounts to no more than 4 kc at either 3.6 mc or 14.1 mc. On the 40-metre band, it is worse, amounting to 8 kc at 7.1 mc, but as CW is normally confined to the lower 50 kc of this band, the maximum error is halved. In any case, it is worth remembering that there are few commercial receivers of comparable price in which the bandspread is anywhere near 5 per cent. accuracy. In the middle of the CW bands, the error can either be ignored or allowed for mentally. And best of all, at the band-edge the error is nil if the proper setting up procedure is followed.

Calibration and Checking

A chart has been made out so that the receiver can easily be set up on any of the bands. The procedure in the writer's station is as follows: While the receiver, VFO and Tx heaters are warming up, the band is looked over thoroughly, just to see how things are shaping. Then the crystal frequency standard

Range	Set Bandspread pointer on "640 dial" to read	New b/s dial now reads	One division on b/s dial equals
3.5 to 3.6 mc	27 deg.	0 deg.-200 deg. (i.e., two revs)	0.5 kc
7.0 to 7.1 mc	52 deg.	0 deg.-100 deg.	1 kc
14.0 to 14.1 mc	65 deg.	0 deg.-100 deg.	1 kc

In each case, when the bandspread dial has been set to 0 deg. the band-set is adjusted to the exact band edge frequency with the aid of the crystal frequency standard or BC221.

is coupled to the aerial lead to the receiver, the special bandspread dial set to zero with the pointer at the appropriate part of the main dial (as described on p. 8 of the Eddystone handbook) and the band-edge is located exactly on the main bandset dial. The VFO calibration is then checked (as a routine) and the station is ready for business. The frequency of any station heard can easily be read off straight from the newly fitted dial. Suppose one hears a CT3 on the 40-metre band. If the

new dial reads 12 deg., then the frequency is $(7000 + 12)$ or 7012 kc. As easy as that.

Note that there is no need to worry about calibration errors due to the string drive slipping. It is part of the system that the band-edge frequency is set up each time one goes on the air. This is no trouble; one has to check the VFO calibration every day anyhow. And being able to read frequency direct off the receiver is well worth the few minutes spent in fitting the new dial.

STABILISING THE "640"

A Simple Modification

By N. P. SPOONER (G2NS)
and P. J. TOWGOOD

A LARGE number of these receivers are now in use and some owners may be experiencing a fresh annoyance that adds itself to the already formidable conditions met with on crowded amateur bands. Due entirely to the rapid fluctuation in present-day AC mains supplies, this new bother takes the shape of a frequency jump that necessitates re-tuning.

Although the cure is obvious, not everyone will wish to intrude experimentally upon an existing oscillator circuit; first, because of the guarantee terms, and secondly for fear of upsetting general performance and calibration. But the details given here should dispel any doubts as to the desirability of carrying out a small job that needs only two resistors and one voltage-regulating valve. For reassurance, after warming-up a preliminary calibration check can be made by switching the receiver to Band 1 (32 to 12.6 mc). With the band-spread pointer at zero the band-setter should be tuned slowly across 15 mc and also 20 mc to find which frequency is free at the time from commercial interference. On the clear one and with the BFO switched off, WWV should come in at good strength and the receiver calibration should be found to correspond accordingly. In the case of the "640" under discussion this has remained spot-on throughout two years of continuous use.

Applying the Modification

When the dial reading has been noted the cabinet can be removed and the receiver turned upside down. With the help of the Fig. 7 photograph and the Fig. 1 circuit in the Eddy-

stone instruction book supplied with the receiver it will be easy to locate the horizontally-placed 16 μ F electrolytic condenser C73 and close to it resistors R15 and R3. R15 is first unsoldered at the point where it joins R3 and being unwanted is either removed entirely or tucked away. The HT side of R3 is next disconnected from where it joins the positive side of C73; from the end of the resistor thus freed a lead is extended to unused pin 2 of the external power supply octal socket, which provides a very convenient exit.

In the tuning-assembly housing a red lead will be seen protruding from the side of the compartment nearest to the receiver front panel. This red wire runs to the positive side of C73, from which it should be unsoldered. From the end of the red wire thus freed a lead is extended also to the same pin 2 of the octal socket. While there another lead can be run from unused pin 5 of this socket back to the positive side of C73.

To complete the internal work the tuning-assembly housing cover is removed. It will be seen that the red lead already mentioned, terminates in a 27,000 ohms resistor R4. This is therefore replaced by a lower value of 15,000 ohms in order to keep the oscillator at its original voltage and then the housing cover and the receiver cabinet can be replaced.

Stabiliser Unit

The external work consists of mounting a

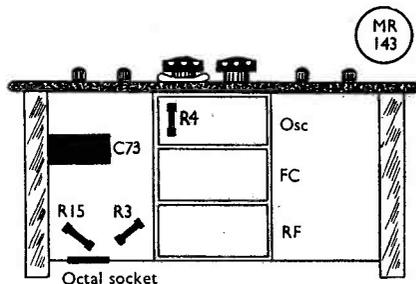


Fig. 1. Outline of underside of 640 Receiver, locating parts affected by the suggested modification.

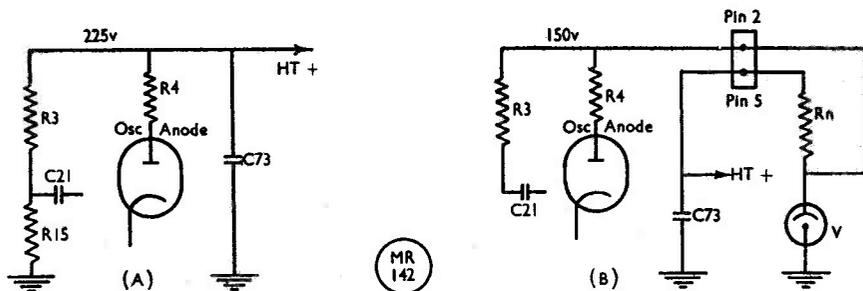


Fig. 2. Circuit of the HT feed to the 640 oscillator (A) before modification, and (B) after the stabiliser has been added.

VR150/30 with its accompanying resistor R_n of 5,000 ohms value on a wooden block that will sit conveniently outside and near to the set. From the cathode of this valve a wire is taken to receiver chassis (earth terminal at rear), the anode is branched to one side of the 5,000 ohms resistor R_n and to unused pin 2 of the plug, while the other side of the resistor goes to unused pin 5 of the plug. After switching on and warming up again a final calibration check against WWV should prove that no alteration in dial setting has to be made. The stabilisation attained should prove beneficial on all bands covered by the receiver and especially so if a two-metre converter is used

Table of Values

Adding a Stabiliser to the "640"

C21	= .01 μ F tubular paper
C73	= 16 μ F electrolytic
R3	= 15,000 ohms, 1 watt
R4	= Original 27,000 ohms changed to 15,000 ohms, 1 watt
R15	= 22,000 ohms, 1 watt
Rn	= 5,000 ohms, 5 watts
V	= VR150/30

in conjunction with the "640." The slight extra oscillator HT smoothing obtained is also helpful on 28 mc, in that the actual tone of incoming CW signals on that particular band can be evaluated more accurately.

MODIFIED COLPITTS DRIVER

Discussing the Clapp

By C. S. FRANCIS (G3AVI) and
D. A. V. WILLIAMS (G3CCO)

AT the present day, VFO technique has advanced to the stage where the building of a stable VFO, capable of giving a good note, is not difficult. A quick look round the bands will show that most stations (excluding certain Europeans and a few that do not care anyway) are equipped with quite tolerable VFO's. It is only upon some of the finer points that improvement is called for and the two main problems seem to be the keying of the

The great majority of operators on our bands to-day are VFO-conscious, even if they are not VFO-equipped. We thought the subject of VFO circuitry had long since been exhausted, but this very consciousness of the importance of the driver unit in a variable frequency transmitter inspires a steady flow of ideas on the design, construction and operation of VFO's.—Editor.

VFO for BK operation and freedom from drift. Both these difficulties derive to a large extent from the change in valve internal capacity that results from the heating of the electrodes due to current being passed through the valve.

An article by J. K. Clapp, to whom the writers are indebted for the idea, recently appeared in *Proceedings of the I.R.E.*, the journal of the American Institute of Radio Engineers. This article described an oscillator which overcomes the problems referred to above and which also appears to possess all the desirable characteristics of a VFO.

An oscillator on these principles was built and has been successfully operated on the air, with reports of T9 or T9x on all occasions, and the following notes show how it may be used as a VFO in an amateur station, and mention some of the points to be watched and snags to be avoided.

Theory

The basic theory is as follows: Fig. 1 shows the grid circuit of an electron-coupled Colpitts oscillator. The input capacity of the valve is in parallel with the tuning capacity C2 and has an appreciable effect thereon. It is, however, possible (provided that the Q of the inductance is high) to replace the tuned circuit L, C1, C2 by the tuned circuit L, C1, C2, CX, and still obtain oscillation. In this circuit, C1 and C2 are made very large, each having a reactance of about 100 ohms and CX is made as small as possible. It can be seen that the effective total capacity across L is of the same order as CX. Thus the effect of change of valve input capacity C_{gr} is virtually eliminated, for not only is C_{gr} negligible when compared with C2, with which it is in parallel, but C2 itself has a very small effect upon the total effective capacity across the coil.

The final circuit is as shown in Fig. 3. The frequency determining circuit is tuned to 1.75 mc and the output is taken from the 6V6 at 3.5 mc. This has two advantages: first, it is possible, by using a buffer, to hear a signal from the oscillator up to and including 28 mc, with the switch in the "Tune" position. Due to very low harmonic content of this oscillator, it was found to be impossible, without a buffer, to hear any harmonic higher than the second without the receiver gain turned abnormally high. With the circuit as shown, a comfortable signal is obtainable with the switch in the "Tune" position, by

means of which the VFO can be spotted on, or brought adjacent to, a given frequency. The second advantage is that there is no tendency towards instability; it was found difficult to keep a good note with the output of the PA tuned to the fundamental.

The most important part of the VFO is, of course, the tuned circuit. There is a minimum of total series capacity ($C3 + C4 + C5$), and a minimum value of Q, without which oscillation will not occur. However, excessive total series capacity will vitiate the desirable characteristic of the circuit, i.e. that such series capacity should be small compared with C1 and C2. Furthermore, keying seems best with as little capacity as possible.

The screen is fed from a potentiometer and maximum output occurs when the screen voltage is about two-thirds of the anode voltage. Too high a screen voltage may cause oscillation to cease. Unlike the ECO, there is no critical screen voltage and in fact, the frequency hardly varies with a change in screen voltage of from 50-90 per cent. of anode voltage.

A voltage regulator is shown, but provided a well smoothed power pack is used, it is hardly necessary and its absence cannot be noticed even on 28 mc. It is of use solely when large changes in line voltage are encountered.

Construction

So much has been said about the construction of VFO's that little more need be said here. It will be appreciated, however, that a condenser of excellent mechanical stability must be used for the tuning capacity and, in this connection, a point of interest occurred which is worthy of note. This VFO was constructed upon a long, deep chassis; coils were placed at right angles at opposite ends of the chassis, but

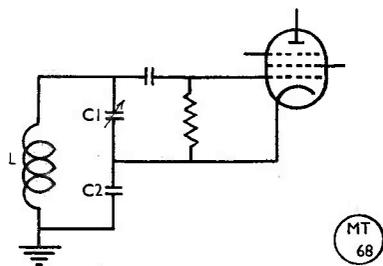


Fig. 1. Basic electron-coupled oscillator circuit.

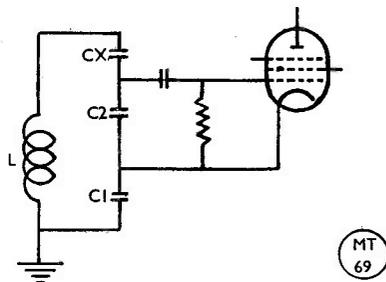


Fig. 2. The Clapp modification to the basic ECO circuit.

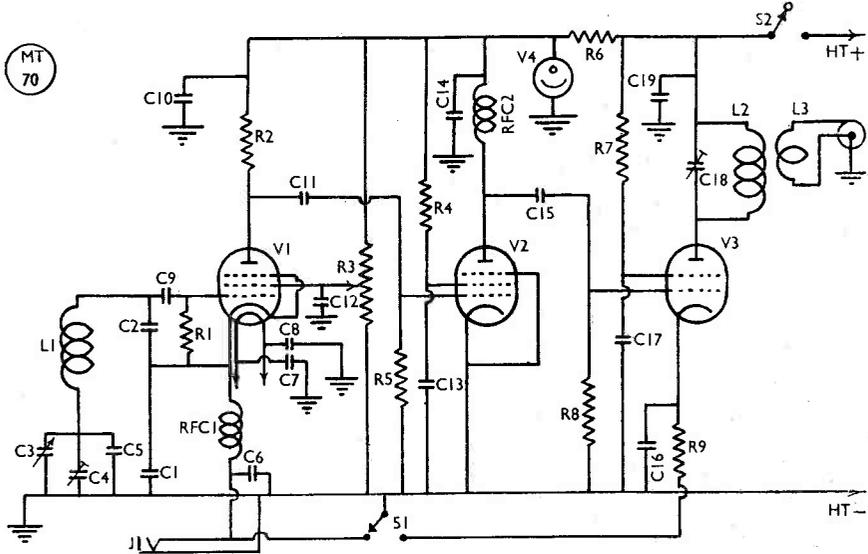


Fig. 3. A practical circuit complete, with values below. It is the Clapp oscillator, followed by a buffer (V2) and wide-band amplifier (V3).

no screening was employed as it was desired to have all components continuously accessible. The most stable tuning capacity proved to be a neutralising condenser from a TU5B, but size necessitated this being mounted on top of the chassis, with a comparatively long grid lead. This caused a definite hum, discernible on 28 mc, which was not present when smaller condensers had been used. So take heed, all ye who despise careful screening of VFO's !

The procedure for aligning the tuned circuit is as follows : Set C3 at minimum and C4 at maximum. At these positions, oscillation should occur, but it should be at a frequency considerably lower than at the desired frequency. Reduce C4 as far as is possible without the signal becoming weak, and if necessary, increase slightly so that fairly strong oscillation is obtained. If C3 is now set at maximum capacity, the second harmonic of the signal should, by a judicious blend of good management and good luck, be somewhere near the low end of the 3.5 mc band. If it is too high, C4 can be increased ; if too low, a turn or so can be taken off the coil. All that now remains to do is to adjust C18 to resonance, when ample drive should be obtained *all over the band*. The above procedure for

Table of Values

- Fig. 3. The Modified Colpitts Driver
- C1, C2 = .001 μ F, silver mica
 - C3 = 20 μ F, air-spaced
 - C4 = 50 μ F, air-spaced
 - C5, C11, C15 = 50 μ F, silver mica
 - C9, C10 = .01 μ F, mica
 - C6, C7, C8, C12, C13, C14, C16, C17, C19 } = .01 μ F
 - C18 = 100 μ F, air-spaced
 - R1, R8 = 47,000 ohms, 5 watt
 - R2, R4 = 20,000 ohms
 - R3 = 250,000 ohms
 - R5 = 100,000 ohms
 - R6 = for correct operation of V4, 10-watt
 - R7 = 15,000 ohms
 - R9 = 560 ohms
 - RFC1 = 4 μ H
 - RFC2 = 2.5 μ H
 - L1 = 80 turns 28 SWG, close-wound on 1 in. former
 - L2 = 30 turns spaced to take 2 in. on 1 1/4 in. former
 - L3 = 5 turns on cold end of L2
 - S1 = Tune switch
 - S2 = On/off switch
 - V1 = 6SJ7
 - V2 = 6SK7
 - V3 = 6V6
 - V4 = Any voltage stabiliser
 - J = Keying jack

lining up the oscillator may appear complicated in print, but no difficulty should be experienced in practice.

The point to be borne in mind is : If

there is no oscillation, increase the capacity in series with the tuned circuit. Then having obtained oscillation, reduce this capacity so that no more capacity than is necessary is being used. The minimum capacity necessary will of course depend upon the Q of the coil and it will be seen that the Q should be made as high as possible.

So there you have it—yet another VFO, but one that is T9 (even on 28 mc), keys perfectly and has negligible drift. But this is not the “last word” in this type of VFO.

There is obviously much more which can be done on the subject by those interested in VFO's. The author of the original article has himself drawn attention to other work on this “series-tuned Colpitts” circuit.

There are, in fact, many variations of the circuit and the purpose of this article is to do no more than start the ball rolling. The writer of an article in *QST* for May, 1948, hazarded a guess that this oscillator may well become the standard amateur VFO circuit. It certainly looks like it!

MEETING LU3BG

President of Radio Club Argentino

WE have recently had the pleasure of a personal QSO with Commandante Marcelo Barbieri, LU3BG, the President of the Radio Club Argentino, who is over here on a short visit. Major Barbieri, to give him his equivalent British rank, is one of the Old Timers of Argentina, having obtained his licence in 1929, when he was only 16 years old. He is here in his official capacity as Chief of Telecommunications to the Gendarmeria Nacional, the body responsible for the safety of the land and sea frontiers of Argentina, which has its own network of 350 fixed and 150 mobile radio stations. LU3BG was unfortunate enough to leave behind, at the airport in Buenos Aires, a small suitcase containing all his photographs and other items of Amateur Radio interest. But we were able to have a long talk with him and obtain the latest information about the LU's.

Licensing System

There are at present over 3,000 licensed amateurs in Argentina, a large proportion of whom are in the city and province of Buenos Aires. At two Amateur Radio conventions held at Tucuman and Mendoza in 1948 and 1949 respectively, a memorandum was drawn up and presented to the Argentine Parliament; as a result of this, legislation is now in hand for a law recognising the activities of radio amateurs. It is anticipated that the number of licensed operators will increase considerably in the near future as a result of this official recognition.

Licences in Argentina are granted as follows: *Class III.* To juniors between the ages of 12 and 18, who are required to pass a simple

examination consisting of nine questions, and a Morse test at 10 w.p.m. Operation is permitted in the 3.5 mc band and in the VHF region above 50 mc with a power limitation of 10 watts and a maximum anode supply of 350 volts.

Class II. CW and Phone operation on all bands except 14 mc. Technical examination and Morse test at 12 w.p.m.

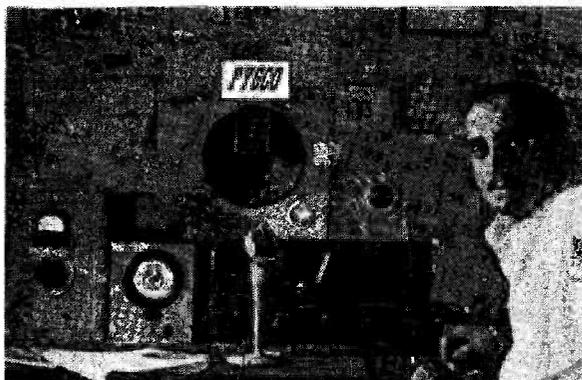
Class I. Operation on all bands with 1 kW input.

That LU1ZA Call!

LU3BG will be remembered by many for his operation of LU1ZA in the South Orkney Islands during the years 1933-34, when he had over 1,700 QSO's with this attractive call. In 1934, he operated the MF D/F equipment on a small vessel which was sent to “Little America” to bring back Admiral Byrd who had fallen ill. The sky in this part of the world is practically always overcast and navigation had to be carried out entirely by the D/F equipment, an operation which was complicated by the fact that the only three radio stations that could be heard—namely in South Georgia, the Falkland Islands and the South Orkney Islands—were virtually in a straight line. By steering a zig-zag course LU3BG was able to bring the ship safely to Byrd's base at “Little America,” and after a voyage of 17 days land was sighted only a few hours before the estimated time.

Major Barbieri is returning home at the beginning of May, travelling on the new 10,000 ton *s.s. Eva Peron*, which has just been built in this country for Argentina. He will be operating on 14 mc CW during the trip with the call LUØBD, by special licence granted him by the Director of Telecommunications of the Argentine Post Office—none other than Antonio Navatta, LU5AQ.

We wish LU3BG *bon voyage*, and send to the members of the Radio Club Argentino our 73 through their charming President.



DX COMMENTARY

CALLS HEARD, WORKED & QSL'd

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

LAST month we started with a little homily on the subject of DX and a message of cheer for those DX workers who may have acquired, quite unnecessarily, something of an inferiority complex. This time we have no such words of encouragement, but a disapproving remark or two for those who keep writing to us to decry or disparage what others have done, as reported in these columns.

Now, years of experience have taught us never to take the slightest notice of these tales. But it is true to say that we *have* received an awful lot of letters suggesting that all scores in our tables should be verified; that checks should be made on all sorts of claims; that even our Dozen DX Contest was all wrong because there was no means of checking what contestants claimed to have worked.

Well, what of it! We are not interested in hearing that though G6** *says* he works an awful lot of DX, he hasn't had cards from so-and-so yet (as reported by G2**); or that G3** *thinks* G5** uses a kilowatt because all the DX comes back to him; or that G8** *considers* W2** is a stinker (a view heartily reciprocated by W2**). And we positively refuse to write a Commentary that looks like this: "G6QB, it is alleged, worked FB8XX, who is said to be on Kerguelen Island; a certain G claims to have worked 105 countries on 7 mc but we haven't yet seen the cards; two or three other G's state that they have worked all

counties on the Top Band, but we really cannot confirm until they have forwarded the cards to prove it." . . . and so on, and so on.

Oh, no! We shall continue to take people's word for what they are doing, for we know that in the main they claim no more than is their due. If there is anyone who gets a huge kick out of claiming to work DX that he hasn't worked, we shall be very surprised. There *is* still such a thing as that "Ham Spirit," and it comes out, sometimes, in the most surprising ways. Curiously enough, the cut-throat competition on the DX bands is not, as some may think, a complete negation of that spirit. A lot of this rivalry consists of give-and-take in good part, although, we must admit, the game has been known to get a bit dirty at times. But then, again, so often the aggrieved party really hasn't appreciated what went on. (Why, you'd hardly believe it, but we ourselves have been called all manner of names for breaking into someone else's QSO; and all we did to deserve it was to answer a CQ.) If you want a moral, here you are: Keep it clean, but don't take things too seriously. If you do, you are likely to get hurt. And remember, too, that the volume of mail for this feature tends, in the end, to cross-check the veracity of practically every claim we receive—this is quite apart from the mass of data with which our SWL's provide us.

Conditions on the Bands

The DX bands have been through a very trying period, but at the time of writing it seems that they might be picking up again. The bane of everyone's existence is the continued short-skip on 14 mc; but even that disappears once in a way. On recent mornings the W6's and 7's have been coming through in fine fettle as late as 0930 GMT, without much trace of the usual competition from UB5's and the like.

The 28 mc band, we should say, is now just about closed for East-West working, but there have been pleasant manifestations of VQ3, VQ4, ZS and the Far East on many days when one wouldn't have expected them.

Of course the 3.5 mc DX (if any) will be very chancy from now on, but we predict a marvellous season for that band next winter. The chief difficulty will be the enormous strength of other G's, compared with what happens on 7 and 14 mc. For this reason we *must* get organised before the winter, even if we only go as far as agreeing among ourselves not to use the band 3500-3510 kc. More of this later.

The good old reliable Top Band always provides something of interest. In fact one of its charms is that the odd burst of DX is an event, rather than something that we expect to continue. Without the DX it is still an

interesting band, chiefly because of the low powers used. And there's a moral there, too.

The "Dozen DX" Contest

It was a great pity that we struck such a very poor spell of conditions for this first contest, but, after carefully scrutinising the entries and the large number of letters concerning it, we are inclined to regard it as a successful try-out of what was, after all, a new idea. Many more people would have entered if they had received a little encouragement from Old Man Conditions, for quite a number honestly say that they started off full of enthusiasm but went to bed after the first hour!

1st :	GW3ZV (Rhigos)	33 points
2nd :	G2WW (Penzance)	29 points
3rd :	G2VD (Watford)	22 points

The first three in the March "Dozen DX" Contest are shown in the accompanying panel. The next five, in order of scores, were G2DC, G8OJ, G3BDQ, G3FNJ and G5YN. When one remembers that even a dozen "five-pointers" would have given a score of 60, the low scores of the leading stations make it plain that conditions were quite abnormally poor. (And, harking back to what was said



W2TAF of Long Island, New York, uses a pair of 807's running at 125 watts, into a 3-element beam on Ten. The receiver is an HQ129X.

earlier, wouldn't we have more than raised the eyebrows if someone had been foolish enough to claim, say, 55 points, which on the face of it would have seemed quite a reasonable score?)

The DX stations that gave the points were as follows: *Five-Point QSO's*: FM8AB, KV4AA, MP4BAO, PJ5FN, PJ5RE, VP3FD, CR4AF, YI2UW, ZS3Q and a highly doubtful

"VS5CA" or "VS5KEA" who, we would swear, is more like one point than five! However, as his deletion would make no difference to the order of scoring, we have left him in. *Two-Point QSO's*: CE4AD, EA6AM, HZ1HZ, I1YAT/Trieste, IS1AHK, KG6HA, PK1RI, MD7JW, UA9KSB, UG6AB, VQ3JTW and 3V8AB.

Apart from one-point QSO's with W's and ZS's, these few stations represent the total of DX worked on the band. Our army of SWL's were also active on a receiving contest tied in with the event, and the only other plums that they pulled out were KC6WC, TI2OB (phone), YS1JR (phone) and a doubtful VR4AA. All the transmitting entries were for CW.

Had conditions been good this Contest might have provided some real fun. We will repeat the dose in the autumn, probably with a scoring system modified in accordance with the many helpful and constructive suggestions received. Meanwhile, our thanks to all those who sent forward such ideas and also to those who put in check logs. (You see, the system is working all the time!) If nothing else, there was at least a surprising unanimity about the DX that *was* on the air during those six hours.

Congratulations to the high scorers—and full marks for their "sticktoitivity."

DX on 14 mc

G3CIZ (Wakefield) tells us that VU2DH, VS7SV and AP2N are *all* on 14262 kc phone and looking for G's; he himself runs a sked with them every day at 1630 GMT. VS2BS is on 14250 kc phone at 1700 and is often S9 plus. 'CIZ has found the band marvellous lately, and in addition to the four mentioned has worked KL7, VE7, ZS, VQ2, ZE, CR7, ZL, HZ, EA8, HK, YV and many of the commoner ones—all on phone. He did, in fact, work 45 countries in 10 days on 14 mc phone.

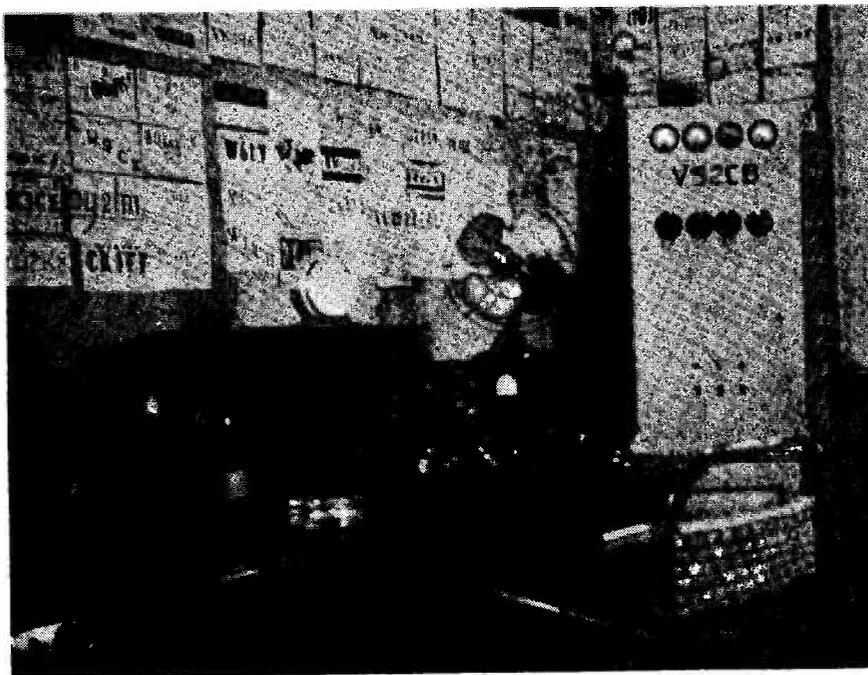
Good ones for G5FA (London, N.11) were KR6CA, HL1BJ, KH6IJ, VS1DB, VP4TS and 4TR, VQ3BNU, VE6's and VE8's. G8OJ (Manchester) raised VU2MQ, VS1DL, KR6CA, UAØVB and VE8SM—all CW.

G4QK (now at Harpenden) has started up again, with a much better aerial than before, slung from what he describes as a magnificent TREE. New countries for him were VQ3AK, MD7CP, UP2KBC, VQ2GW and UAØVB. G6AT (Hampton Hill) worked a DU for another country and Zone, and also raised SP1CM and OY3IGO for new ones.

G3FXB (Hove) boosted his score with TF5AS, VP8AK, ZS3R, YU1CBE, UR2AE, YO2BF, EA6AM and others. He comments on the variability of things; some nights one can call everyone with no results, and the next

FOUR BAND DX

Station	Countries Worked					Power
	3-5 mc	7 mc	14 mc	28 mc	Total	
W2QHH	70	62	183	98	189	35
G3EIZ	36	23	39	15	54	25
G3AKU	31	66	136	58	152	100
ZB1AR	31	45	99	43	112	150
G2VD	29	60	161	98	168	150
G6BS	28	107	175	4	185	150
G3FGT	28	33	85	41	102	25
G3ATU	26	70	177	100	185	150
G6BB	25	57	108	48	125	10/85
G3FNJ	24	45	114	71	135	150
G3DO	23	37	161	103	191	150
G2YS	23	32	113	34	127	150
G3ABG	22	51	103	8	110	45/50
G3FXB	22	46	55	12	68	25
G2WW	21	46	168	100	178	150
GW3CBY	21	29	48	19	66	15/30
G6AT	20	46	89	1	94	100
G5FA	19	95	130	68	146	35/150
G2DHV	19	21	83	4	88	25/60
G3BOC	17	25	34	72	83	15/60
G6QX	16	29	104	45	117	30/150
G8PW	14	60	100	49	113	25/100
G8IP	13	42	115	66	132	3/150
G6TC	11	43	88	17	97	20/75
G8KU	9	43	131	68	146	50/120
G2FYT	5	31	120	31	128	150
G2BJY	4	24	95	104	138	25
G5WC	1	50	120	12	122	45
G6CB	1	6	42	94	112	20/150



VS2CB, Kuala Lumpur, in the troubled country of Malaya, operates on Twenty with 75 watts to a pair of 807's, and uses an HRO receiver.

night raise VP8AK "just like that" without even a queue. G3BNE (London, N.W.3) agrees that the band has been very changeable

and that it has been quite hard to work the better stations. His scalps included HP1LO, FM7WE, EA9BB, VP8AK and some YI's. Using 35 watts of grid-modulated phone he raised YK1AC, YI2BJ and ZE2KS, apart from the more usual stuff.

G3ABG (Cannock) has been pretty active, with results in the shape of FM8AB, HC2JR, PJ5TR, PX1E (?), VP5JB, ZD2JHP and hosts of PY, VQ, OQ and ZS. His cards from HC2JR and PJ5TR arrived pronto, by air mail.

G2WW (Penzance) enjoyed himself on 14 mc phone, with AR8BS, EA6AP, HP1LA, MD7AR, OX3BF and UG6AB. His CW activity was rewarded with CE4AD, HZ1HZ, MD4AR, UAØKFD, ZS3Q and the rest. Those that got away were AC4KK (!), CR4AF, CR10AA, FD3RG, FQ8HC and VK9JC. GM3CSM (Glasgow) didn't like conditions but collected MI3DX, VQ3SS, VP7NM (?), FK8AC, TI2PZ and "ZZ9XY" (QTH Sierra Leone, *No QSL OM*!).

G2BJY (West Bromwich) added Zone 19 to his collection with UAØKFD, and also worked SV100, ZS4CT, OQ5LY, VQ4BC and ZD2LMF.

Interesting stations known to have been on Twenty but, for some reason, not reported by

DX QTH's

AG2AG	Capt. S. L. James, Jr., HQ Trust, APO 209, c/o PM, N.Y.C.
AR8PO	Box 682, Beirut, Lebanon.
EA6AP	} Box 135, Palma de Mallorca, Balearic Islands.
EA6AM	
HP1EA	Box 828, Panama City, Republic of Panama.
HP1GR	Glickenhau, Box 135, Panama City, R.P.
HP1LO	Box 1616, Panama City, R.P.
HR1RL	H. R. Lagos, Fuerza Aerea Honduras, Tegucigalpa.
KR6AF	} APO 239, Unit 1, c/o PM, San Francisco.
KR6DW	
OE 13 LL	AP0 777a, US Forces in Austria.
PK1RI	c/o Factory Djakarta, Indonesia.
VQ5AI	82 (PR) Squadron, RAF, Masindi, Uganda.
ZD2JHP	c/o Posts and Telegraphs, Lagos Airport, Ikeja, Nigeria.

anyone, include KC6WC (Palau Is.), VK1RD (Macquarie Is.), VR1A (rough note, 14085), VR5PL (14092) and VR4AA. The latter has been heard many times, both mornings and evenings, and sounds too good to be true; can anyone give us the gen? KC6WC only made short appearances, as he was portable; there is no permanent station on the islands. VK1RD was sending QLM and QHM and then answering stations on his own frequency—procedure guaranteed to infuriate those who whizz about the band trying to do as they are bid.

Ten Metre Gossip

G3WH (Droitwich) has recently unearthed PK5HL, CR4AC, HP1GR, YN1VN, HR1AP,

KV4AC, CR5UP and VR1RF (Kuwait)—all on phone. He had a four-way with MP4BAO, SV0AJ and VP5FR, and just as they were signing XE2AC joined in on the frequency.

GM2DBX (Methilhill) reports for the first time; he started up on Ten early in March and found almost every contact gave him a new country, which seems pretty decent. On March 31 he worked out a WAC in eight hours, with JA5AA, KG6SC, ZB1AJX, VQ4RF, VE1ZT and VP3CW. He encloses a local newspaper cutting concerning this WAC, from which we learn that VP3CW was in "British Indiana" and that 'DBX is sitting back waiting for the "QSZ" cards to arrive!

Peculiar conditions on March 19 are reported by G6QX (Hornchurch), in the shape of ZS's and LU's arriving at terrific strength at 1710-1730 GMT. They are expected before noon, but at the later time one usually hears only W's working them.

28 mc phone brought in nice ones for G2WW, such as KG6FX, OQ5AO, PK1WW, PK3JF, PK4KS, VS7GD, XZ2PM and ZD4AF. On CW he scored with UD6AH and VQ3AK; phones that got away were AR8MR and 8PO, FF8AH and VT1RF. G2BJY found VS9AA (he is ex-VU7JU), PK1UA, ZD2JHP and ZE3JJ—also ON4FT for a new one on the band!

GM3CSM worked VQ3's, VQ5's, VS6, XZ, VU, AP, HC and CE on the key, with the mike bringing him ZS9F, MP4's, MS4A, OX3GE, XZ2SY, PZ1QM, VP6JC and ZD4AC. He finds that he has worked 70 countries on 28 mc with his NBFM phone, so is going out for a phone DXCC on the band (and he's a CW man!) 'CSM is not looking forward to the day when Scotland has TV—the frequency will be 56.25 mc.

Forty Metres

Very little news of this band, as one might expect. G3ABG reports YU3FME and EA9BB for new ones; G3FXB had some luck and added KP4KF, CN8, CT3, UA9, SP and GD. In six months' operation 'FXB has worked 46 countries on Forty using 25 watts and a half-wave aerial 30 feet high.

G4RZ (Harrow) during his first year back on the air, has used only 12 watts input and has worked ZL, PY, UA9, OX and all W except 6 and 7. He has now gone QRO with 25 watts and has added KZ5ES and OX3BR (Pearyland). New ones for G6AT were GD3GMH, YU3FME and 4X4DF.

G5FA (London, N.11) worked nothing new but did raise W6SA, VE4RO and VK3MC, among others.

Miscellany

G3GJR (Sutton Coldfield) worked FKS8AR who said he was a French amateur in Vienna

TOP BAND LISTING		
Starting August 1, 1949		
Station	Countries	Countries
G6AB	59	16
G2YS	59	15
G4LX	58	14
GM2HIK	57	13
G6ZN	55	10
G3GDW	55	8
G2AJU	52	12
G6HD	51	11
G2AOL	49	10
GW3CBY	49	10
G3FZW	47	8
G6VC	47	7
G5XF	46	8
G3AGQ	44	9
G3EJF	43	7
G3BTP	42	11
GM3FBA	42	5
G2BON	40	9
G2CZU	39	7
G8NF	38	10
G3BOC	38	7
G3ATU	37	8
G3BEX	37	7
G3NT	36	8
G2ABT	36	6
G3FGT	34	8
G3GGN	28	10
G3ALE/A	28	4
G6OM	21	5
ZBIAR	12	4

when working other G's on the DX bands, should make Top Band schedules—not only for collecting counties but for clearing the DX bands. 'GGN is on every night from 2300 to 0100 and would like an appointment with GI.

ZBIAR (Malta) is still around on the band, and is very anxious for his first contacts with EI, GC, GD and GI. G2CZU (Bath) has pushed his total up a bit, but is allowing the other bands to interfere with his Top Band work!

GM3FBA (Dumbarton) has been a "BCL/MM" on the Norfolk Broads. He says he thinks G3ART (Carlisle) is the only active one on 1.7 mc from Cumberland, but he is by no means a county-chaser, so treat him gently.

GC2CNC asks how it is that most of the well-known operators on the band have signals that vary from S8 to S2 in accordance with conditions, but others have a habit of putting out a consistent S9? Maybe it's due to aeriels? Otherwise we wouldn't know.

G2YS has worked ZBIAR twice, with a bit of help, and remarks that this mutual assistance is still a pleasant feature of Top Band activity, rather in contrast with the cut-throat tactics that can be heard elsewhere. He (and, of course, G6AB) are only one short of WAEC. In 'YS's case the missing one is Westmorland.

G6VC (Northfleet) has gone over to QRP

and finds it great fun, using just a CO with a 6J5 and 100 volts. On this he has worked LA2CC, as well as some GI and GM stations. So he enters the Counties Worked list and is showing interest.

The Monthly Bun for QRP must, however, be reserved for G6ZN (Horbury). He worked G6BQ (210 miles) with $2\frac{1}{2}$ watts, and with this "QRO" he was reported 599, so down he went. With half a watt he was still 589, so he tried 9 volts of HT (0.0063 watt) and was 559; 6 volts (0.0024 watt), 439; and finally 3 volts (0.0006 watt) gave him a report of 229. If our arithmetic is correct this represents 350,000 miles per watt—equivalent to working ZL with 0.03 watts. Any questions? During June or July 'ZN will be portable in Westmorland with G8TP/P—further details later.

We are still chasing last month's report that G8OK (Halifax) has been heard in ZL! As yet, no confirmation; we can't find the man who met the man who said he knew the man who heard it. We shall keep on trying.

Overseas News

G3CHN (s.s. *African Prince*) reports from Auckland, where he has had a nice personal QSO with ZL1MP and also met G3DWI/ZL1ABI. 'CHN says 80-metre conditions were good out there (during March) with frequent break-through of W6 and 7. And he adds that there seems to be more phone than CW from ZL on that band, including some of the best phone transmissions he has ever heard, anywhere.

The obituary notice of MD7GR comes from G. H. Rathbone, the erstwhile operator, who hopes that if the ban is lifted in Egypt he will be one of the first MD5's to be on the air. He can be contacted at Sgts. Mess, RAF Abyad, MEAF 15.

Harold Owen of ZD4AM (Tafo) is another who is packing up; he is leaving the Gold Coast for good and hopes to stir the ether as G2HLU from Reading. His final score from ZD4 was 36Z, 119C, 44 States, and he is just waiting for the last few cards to give him his DXCC.

W2QHH (Hamilton, N.Y.) heads the 3-5 mc column of the Four Band table this month and is flat out for his century on the band. Recent acquisitions have been SV, EA and PJ. He has "deals hanging fire" with CE, CX, VP3, FY7, OA, HR, PZ and YN, all of which might be easily worked if they would only show up.

ZB1IH (Malta) explains why he likes VFO's so much. After working a DX station he received a long call from a G, who was 229; he told him he was too weak, QSY'd and called CQ. Back came another long call from the same station; he tried to QSO again, but



"... What a lovely necklace—pure quartz, of course
... Yes, darling, all bands Top to Five...."

explained the poor conditions and closed. Another QSY, and another five-minute call from the same G; so 'IH told him he was RST 229 (10 times), and fixed a schedule (four times) for a better time of day. Ten minutes later the same G was still calling him. All this was on 14 mc, and 'IH then switched to 3.5 mc, where he found the G's 579. At the time appointed for the schedule he called and listened, but nothing happened.

G3AAT (Rottingdean) reports that when signing KV4AAT, a call now allotted to him, he was unable to raise a single G on 7, 14 or 28 mc when he was out there recently—though of course, the W's were lining up.

80-metre News from ZL

The following items were collected by David Mitchell, ZL1MP: ZL1HM has worked LU3EL, DL1, FA8 and two new G's—G2BGG and G3ELZ, neither of whom had been heard in ZL before; 'IHM also heard many other interesting countries on the band. ZL1CI raised ZM6AK (who is ex-ZL1FT) and heard KR6CK and F9VA. The openings ZL/USA have been quite remarkable for high QRK's, signals often being S7 to 8 both ways. At a distance of 6,000-8,000 miles this is good going.

And so we come to a close once more, with nothing left but to remind you that next month's closing date will be May 15. For the benefit of overseas readers, the one after that will be June 13. Please get everything in punctually by those dates, otherwise it will



Fourth anniversary of a Top Band party which commenced on April 30, 1946, taking place at noon daily between G2NM, GC4LI, G5MR and G5PB, has just been celebrated. This photograph of G2NM, GC4LI and G5MR (right to left) was taken in Jersey last summer, when G2NM was over there in his yacht, *Eirene II*.

assuredly be a month late. Address it all to "DX Commentary," *Short Wave Magazine*, 53 Victoria Street, Westminster, London, S.W.1.

LONG WAY ROUND ON FORTY

18,000-Mile DX, G/W6

By W. I. Orr (W6SAI)

"ON January 10, 1950, a new 7 mc DX record of 18,500 miles was made when W6SAI worked G8—the long way around. Time of QSO was 1500 GCT. This is believed to be the greatest distance ever covered by amateur communication on this band."

Sounds nice, doesn't it? Too bad it isn't true! It could have been. W6SAI heard the G8 working a VS1 station and called him when he was clear but failed to raise him. And W6SAI's signals were reaching England at the

This will be of great interest to all who have the feel of Forty as a DX band, and suggests another very useful application of the ground plane aerial, in this country not much used on the communication bands.—Editor.

time, as an SWL card received later furnished ample proof.

The point of this sad tale is this: The 7 mc band is open the long path from Europe to the Western United States and Oceania area practically every day during the winter season! DL, UA, UB5, UO5, HA, SM, G, GW, and OZ signals have been heard here, coming across New Zealand, via Suez and the Mediterranean Sea, a distance of some 18,000 miles!

The path is reliable, too. Last season (winter 1948-1949) ZC1CL and ZC8PM were workable for periods up to an hour and a half on 7 mc. They both worked many W6 and W7 stations. This season, HZ1KE has been furn-

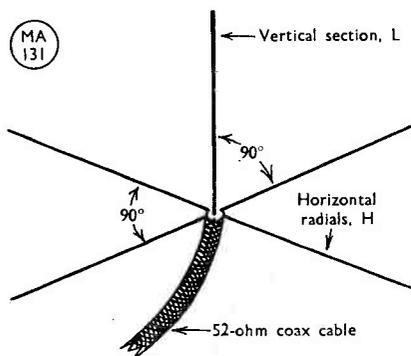


Fig. 1. Layout of a ground-plane aerial: value for L is given by $234/F$ (mc), and for H by $240/F$ (mc). W6SAI explains in his article how a ground-plane arrangement such as this reduces short skip (high angle) signals, helping 7 mc DX on both transmission and reception.

ishing the Middle East QSO for us. Many other signals at strength equal to these fellows are heard, ranging from Wales on the West to UL7 on the East, but practically no contacts are being made by them with the West Coast W stations—the boys are too busy working “local DX” to bother looking for us. They just aren’t hearing the long path DX, although they are being received 100 per cent. here! What is wrong? QRM? Yes, partly, but the main drawback seems to be the lack of a good 7 mc DX sky-wire! Such an antenna is almost more important for receiving than it is for transmitting. You can’t work ‘em if you can’t hear ‘em!

DX Antenna Requirements for Forty

The requirements for a good 7 mc antenna may be summed up in one short phrase: Low angle radiation. To be sure, gain would be a nice thing to have, but it is not needed, and is hard to come by on 7 mc unless you own a large area of ground. For consistent long distance (over 2,500 mile) contacts on 7 mc, the optimum radiation angle should be between five and 20 deg. The only way to achieve this is with a vertically polarised antenna.

This fact was forcibly proven to the writer a few months ago. Hearing some weak European’s signal on 7 mc at about 2359 GCT, he transferred his receiver from a vertical antenna to a horizontal dipole, 45 ft. above ground and well in the clear. The signals instantly disappeared into the background noise. Connecting the receiver to the vertical antenna immediately brought the signals into audibility.

Suggested 7 mc DX Antenna

A very simple and effective DX antenna is the $\frac{1}{4}$ -wave vertical ground-plane, used on VHF with great success for many years. Expanded in size it becomes an excellent low angle radiator for 7 mc. Unfortunately, it is practically useless for contacts other than ground-wave within a radius of some 1,600 miles. This is because of the lack of high angle radiation. However, this can be a help rather than a hindrance as it tends to keep down the signal strength of stations within this radius, giving the weak DX stuff a better chance. The electrical configuration for such an antenna is shown in the diagram. The terminal impedance is about 28 ohms and for short runs it may be fed directly with 52-ohm coaxial line. For longer runs of line a 72-ohm cable can be used in conjunction with a $\frac{1}{4}$ -wave transformer made of 52-ohm line.

The physical construction of this antenna is very simple. A 25-ft. wooden frame mast with a 12-ft. whip lashed to the top and 21 ft. of copper antenna wire run down the mast to a nail at the base will perform superbly. The radials can be made of stranded wire, and run as nearly horizontal as possible. Bends are permissible, however, in either horizontal or vertical plane. If you are particular, the whip may be mounted on insulators, or the whole vertical section can be made self-supporting using aluminium tubing. Try to get the vertical portion of the antenna as high and as in the clear as possible. If you can mount it atop your roof, you will be a lucky man indeed! Don’t forget to put the radials on! They establish the ground point for the whole system.

Coupling to the Receiver

The usual amateur receiver has a high impedance input of the order of 200 to 600 ohms. If you are fortunate and already have coaxial input to your receiver you may read no further! Otherwise, here is a simple tuner that will provide you with 4 to 6 dB. gain in signal-to-noise ratio when used with this antenna.

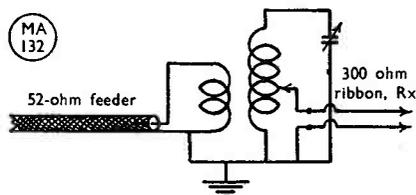


Fig. 2. Recommended coupler for the ground-plane aerial line. If the receiver is arranged for a high-impedance aerial input. Values for 7 mc are: Condenser, 100 μ F; primary, 3 turns, 1 1/2-in. diam., close coupled to earthy end. Secondary, of 25 turns, 1 1/2-in. diam.

(See Fig. 2.) The coaxial line is coupled to a tuned circuit and the receiver is tapped across this at the optimum matching point for the particular receiver. This point is found experimentally by feeding a small signal into the antenna from a nearby signal generator. Then, watching the S-meter on the receiver, the tap is moved up and down the coil until the maximum reading on the meter is obtained. Very simple—and very effective, too! When

this tuner is operating properly it may be tuned to resonance at any point in the band merely by listening to the background noise of the receiver. It will peak sharply at resonance.

So there it is! Put one of these antennas up this coming summer and build a tuner, and next winter you will be able to join in the fun on 7 mc around 1500 GCT. W6-W7-KH6-VR2-FO8 will all be there, waiting for you "the long way."

Portrait Gallery

GM6LS

IN the year 1922, the South London ether was shaken by hefty signals from "5LS"—no "G" in those days!—heralding the fact that Ralph Bloxam was on the air. He had been known as an enthusiast for some time before that, having in 1913 put up the first aerial on a private house in Gravesend. This led down to a crystal detector and enormous hand-wound slider inductances, just tuning to 600 metres at the HF edge! Then came the 1914-18 war and service in the RFC as a pilot.

Having, in 1919, received R/T from Croydon and aircraft in flight, Ralph's doom was sealed, and 1922 was the fateful year. He joined the Burndept Co. at about that time, together with Don Knock, now VK2NO. First DX from 5LS was the U.S.A. on 95 metres, using a battery-driven generator which caused much domestic QRM in the small hours; but the breakfast could be cooked on it by 0600. The first phone contact with the States was with NU-1BES (now W1BES) in 1925.

In 1932, G5LS joined Western Electric, and the next year moved to Scotland, where he was licensed as GM6LS and was active, mostly on 7 and 14 mc, until the war. From



1940-45, the job was strictly radar, at home, in West Africa, and in Egypt.

The second op. of GM6LS also deserves a mention, although Wallace was not born when the OM first went on the air! He is now officially licensed as 2nd operator of GM6LS, and is a geology student; his war service was with the Merchant Navy from 1942-44, and he was hove-to by an XYL in 1948.

GM6LS's activity nowadays is chiefly on 7 mc, 28 mc and 144 mc phone, and he is also interested in magnetic tape recording, having constructed his own outfit for the purpose. We have heard it in action and vouch for its excellence.

TELCON RF CABLES

At the request of the users of Telcon RF cables, the manufacturers, The Telegraph Construction & Maintenance Co., Ltd., have produced a comprehensive range of connectors and sockets suitable for use on communications equipment. One of these, of interest to amateurs, is a matched-impedance waterproof coaxial plug and socket (Type 53A) suitable for UHF. A range of small coaxial and twin feeders for short-wave reception, television

reception and interference-reducing installations is now available at economic prices. Many amateurs who have used the well-known "Telcothene" 300-ohm ribbon for their feeders will be glad to know that the 300-ohm line can now be had in tubular form (Type K35) with improved characteristics in adverse weather conditions. "Telcothene," the low-loss dielectric used in most of the Telcon cables, is polythene processed.

CONVERTER FOR 430 Mc

Successful 70 cm. Design

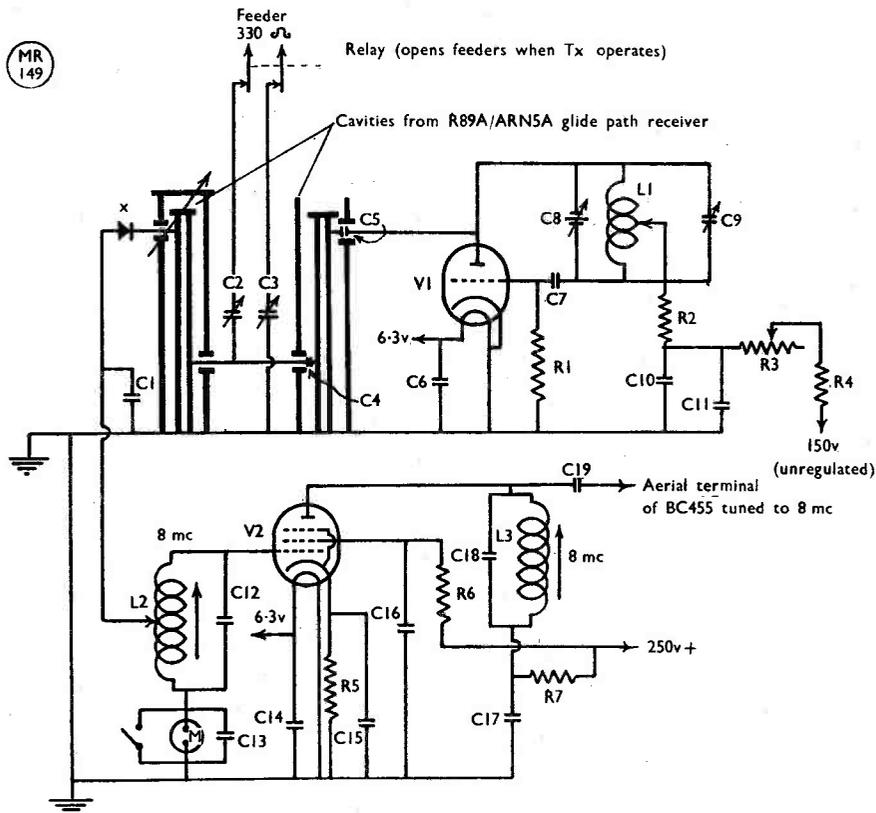
From Notes by

H. L. O'HEFFERNAN (G5BY)

IN our issue for November last, a practical design for a converter for the 430 mc band was described in some detail by G3MY. The heart of this assembly was the concentric line tuning system used in the R89A/ARN5A glide path receiver, covering the range 330-340 mc, readily available on the surplus market.

A number of converters have been built to G3MY's design, with varying degrees of success, by those of the VHF fraternity who wished to get going with a practical receiver for the 70 cm. band. One of those to produce, very successfully, a modified version of this design is G5BY, whose results with it were described in the April *Short Wave Magazine*. Since then, as reported elsewhere in this issue, he and G3EJL have brought off two-way contact over their 119-mile path with high signals levels at both ends.

The G5BY version of this converter differs markedly from the original, and the notes following are based upon details given by G5BY when discussing his converter with us. A circuit diagram and necessary values are shown herewith, and should be carefully followed if comparable results are to be achieved. The converter is designed for an IF



The G5BY converter for 430 mc, with its 1st IF stage. The range covered is 431-439 mc—see photograph on p. 133 of the April issue for general constructional details, and accompanying text for design data. Further information on this converter can be obtained from the article by G3MY in the November 1949 issue of the *Short Wave Magazine*.

of 8 mc, and the general construction adopted by G5BY is shown on p. 133 of the April issue.

Oscillator Section

The rotor of the tuning condenser C8 is left floating, with only one 3-30 $\mu\mu\text{F}$ trimmer C9 used, right across the tuning coil. The third harmonic is obtained by direct connection to the oscillator anode through a very small coupling capacity C5 to the inner conductor

Table of Values

The G5BY Converter for 430 mc

C1 = 7.5 $\mu\mu\text{F}$
 C2 = 3-30 $\mu\mu\text{F}$, set at 10 $\mu\mu\text{F}$
 C3 = 3-30 $\mu\mu\text{F}$, set maximum
 C4, C5 = 3 $\mu\mu\text{F}$
 C6 = 200 $\mu\mu\text{F}$, button
 C7, C19 = 10 $\mu\mu\text{F}$
 C8 = Split-stator, each section 3 plates double-spaced, about 5+5 $\mu\mu\text{F}$.
 C9 = 3-30 $\mu\mu\text{F}$
 C10, C14 = 500 $\mu\mu\text{F}$, mica
 C11 = 8 μF , electrolytic
 C12, C18 = 25 $\mu\mu\text{F}$
 C13 = .002 $\mu\mu\text{F}$
 C15, C16, C17 = 0.02 μF
 R1 = 15,000 ohms
 R2 = 1,000 ohms
 R3 = 20,000 ohms, variable
 R4 = 6,000 ohms
 R5 = 270 ohms
 R6 = 10,000 ohms
 R7 = 4,700 ohms
 V1 = Half 6J6 (elements other half earthed down)
 V2 = 6AJ5 or 6AK5
 M = 0-1 mA DC meter
 X = CV102 crystal diode

COIL TABLE

L1 = 2 turns 16g. silver-plated copper, $\frac{3}{8}$ in. i.d., $\frac{1}{2}$ in. long.
 L2, L3 = 36 turns 30g. enam. on $\frac{3}{8}$ -in. diam. slug tuned former, with L2 tapped seven turns from earthy end.

line of the smaller cavity; as no tripler stage is used the grid-plate pins of the "other half" of the 6J6 are strapped direct to earth. Another point to notice in this section is that the variable capacity (produced by the screwed cap) at the end of the tripler plate is not used.

Feeder Connection

One side of the aerial feeder is taken, through the 3-30 $\mu\mu\text{F}$ trimmer-type condenser C2, to the junction between the inner conductors of the cavity, and not to the end to which the crystal is connected. The other side of the feeder goes to chassis through a similar 3-30 $\mu\mu\text{F}$ variable capacity C3.

Injection Adjustment

In his version, G5BY has carried out very careful checks on oscillator injection, which is a vital factor in getting the best results. He finds that when using a CV102 crystal diode, the best signal-noise ratio is obtained with a rectified diode current of 0.15 mA when feeders are connected; reducing the value of R3 towards zero will result in this current increasing to 0.65 mA, naturally with an accompanying variation in voltage at the plate of the 6J6, V1.

A very interesting point is that G5BY has found that the use of a stabilised HT supply to the oscillator tends to *spoil* the note—with the arrangement shown in the circuit diagram, signals from G2BMZ, G3AVF and G3EJL are absolutely T9x. In fact, they sound rather better than on the 145 mc converter!

With the original article and the foregoing notes, our many readers interested in practical work on the VHF bands have something definite and of proven worth on which to proceed in the matter of 70 cm. converters.

BRITISH OLD TIMERS' CLUB

The following nine new members bring up the Membership figure to a total of 180:

G2FS	L. Kenneth Winsor, Highmore, Hillcrest Avenue, Hessle, Yorks (1929).
G2XG	J. M. Davie (ex-FD-A8H), 7 Cranworth Crescent, Chingford, London, E.4 (1926).
G2ZI	R. C. Simmonds (ex-G5UO), 164 Footscray Road, Eltham, London, S.E.9 (1922).
G4SA	E. J. W. Ahier (ex-G6PU), 104 The Camp, Hanney Road, Steventon, Berks (1924).
G4SC	D. G. Scott (ex-G2SC and VQ5KAA), 5 Wood End Lane, Kempston, Beds (1926).
G5DF	J. D. Pinchbeck, 32 Church End Lane, Tilehurst, Reading, Berks (1929).
G5FN	S. A. Howell, 39 Broadway, Gillingham, Kent (1930).

G5ZN	P. Nicoll, 35 Reedley Road, Burnley, Lancs (1929).
G2SA	H. A. Savage, 53 Station Road, Burnham-on-Crouch, Essex (1929).

All holders of British amateur licences issued not less than 20 years ago, who are still active to-day, are eligible for membership of the British Old Timers' Club. Thus, month by month, more potential recruits come into the zone of eligibility, and we hope they will make themselves known to us. The B.O.T.C. exists only to maintain a register of Old Timers, and it costs nothing to join—the annual meeting is the Old Timers' Dinner, arrangements for which are now in hand and will be announced in an early issue.

TWO METRES WITH THREE VALVES

Construction and Operation, Final Details, Testing

PART II

By G. ELLIOTT, B.Sc., A.R.I.C.,
(G3FMO)

It is not proposed to describe a suitable power supply as this can follow conventional lines. For the transmitter alone about 350 volts at 150 mA should be available, together with about 110 to 120 volts at 30 mA, for the bias supply. At the low voltages used it should be possible to employ 16 μ F smoothing condensers in the power-pack to give a ripple-free supply. If a separate power pack is used for the transmitter, the bleeder resistor R13 should be used, to minimise current surges when keying. The installation at G3FMO actually employs the same power pack for both transmitter and receiver, and as part of the receiving equipment is always running, there is no need to use R13.

The receiver is a CV66-6J6-VR150 converter (similar to that described by G2IQ in the August 1948 *Short Wave Magazine*), working into an R1155. The power-pack incorporates LF amplifier and output stages. The main switch on the transmitter controls all the change-over from transmit to receive, though this arrangement can obviously be varied to suit individual requirements. The heaters on all valves are kept running all the time; on reception, the HT is simply cut from the transmitter; on transmission, the HT is cut from the R1155 and the RF stage of the converter, but left on the oscillator-mixer stage and on the LF output stages. By keeping the converter oscillator running, any frequency drift on returning to reception is eliminated, and the current taken, together with that flowing in the LF stages, acts as a bleeder current across the power supply (about 50 mA). A block diagram of the installation is shown in Fig. 5. The power-pack for transmitter and receiver in this case has to supply a maximum of about 200 mA at 350 volts, and this has been obtained from a 425-0-425 volt 200-mA transformer with a 5V4G rectifier. The heaters require about 6.5 amps at 6.3 volts, and two separate heater windings can be used. No modulator is in use at the

The first part of this article appeared in the previous issue and covered the design and many of the main constructional details. The final result is a Two-Metre transmitter which is probably more economical in valves than anything that has yet appeared in print. It also has the merit, if constructed on the lines suggested, of allowing a full-power 145 mc PA stage, or a tripler-amplifier unit for 430 mc operation, to be added with the minimum of complication.

—Editor.

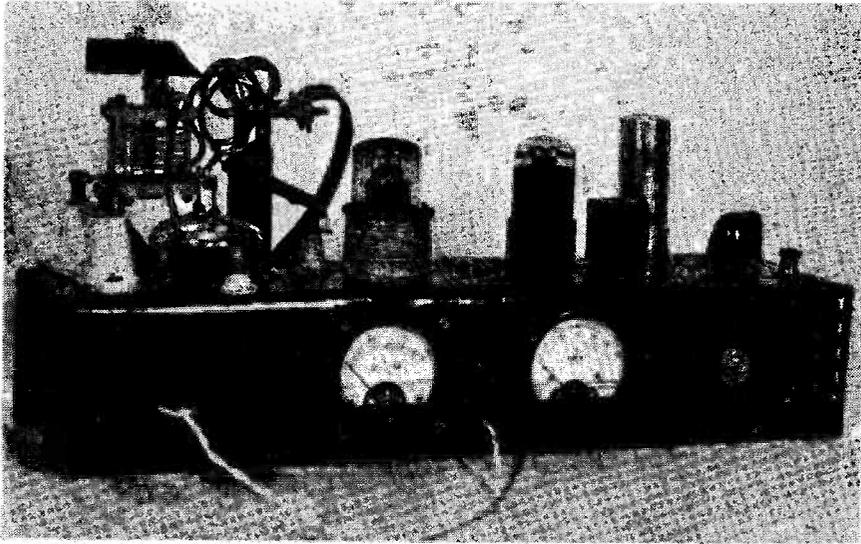
moment as G3FMO is not yet licensed for phone operation.

Tuning Up the Transmitter

After checking the wiring and the connections to the Jones plug, turn the control switch to "Stand By" and switch on the power-pack, leaving the heaters a short while to warm up. As a protection, increase the bias on the PA to the maximum value of 110-120 volts by the screwdriver adjustment potentiometer R9. Connect A1 into the crystal oscillator grid circuit by J1 and adjust R2 to about the halfway position. It may be helpful in the preliminary stages to use a 0-1 mA meter in place of A1 to read grid current, if it is low. Turn the control switch to "Tune," when R12 limits the voltage applied to the circuit. On rotating C1 to give a capacity of about 15-20 μ F the resonant point should be found, with a reading on the grid meter indicating oscillation. With the values of coil and condenser given, the grid current should be about 1 mA with R2 set at about 400 ohms, using an active crystal. If the output is low, R2 can be decreased. Plug A1 into J2 and rotate C8 near its minimum position, when current should appear in V2. If a resonant point is not found, try squeezing together the turns of L2, or opening them out, to alter the inductance. Tuning the anode circuit of V2 should now result in a dip in the cathode current and a rise in the anode current of the 832. When the PA tank circuit is tuned to resonance a sharp dip will be observed in the anode current, with the link coil swung out. The transmitter has now been roughly tuned, and before applying full power, the neutralisation of the 832 should be checked.

Neutralisation of the 832

Insert the key jack in J2, so removing the drive from the PA. Adjust the bias on the 832 to about 40 volts by means of R9, and plug A1 into J3 to read grid current. Turn the control switch to "CW" and rotate C22 about the resonance point. Self oscillation in the 832 or parasitic oscillations will be in-



General view of the transmitter as constructed and described by G3FMO in the accompanying article
 This photograph should be compared with the sketches on pp. 100 and 103 in the last issue

indicated by a grid current reading of a few milliamps and a kick upwards on the anode meter A2—it may also be possible to strike a neon on the tank coil. Complete neutralisation was obtained on the author's transmitter with a solder tag fixed to each feed-through insulator and bent at right angles, distances being as shown in Fig. 4. To increase the neutralising capacity, the size of the tag can be increased by soldering on a short piece of metal, which can be bent towards the anode. Alternatively, a short piece of wire can be screwed to the insulator and bent backwards or forwards to vary the capacity. The capacity

can be reduced by removing the tag and the second lock nut on the insulator.

If no oscillation is observed, then the stage is roughly neutralised. The method of checking the adjustment by removing the HT from the PA, applying grid drive and noting whether there is any change in grid current on tuning the anode circuit through resonance, is not sufficiently sensitive for the 832. The valve can be badly out for neutralisation without this test giving any indication of the fact. The 832 can be a difficult valve to neutralise due to its very low anode-grid capacity, and some prefer to make no provision for neu-

COIL WINDING TABLE

Coil	No. of turns	S.W.G.	Diam. (external)	Length of winding
L1	17 Tapped at 6½ T.	16 enamelled	0.8"	1.5"
L2	3	16 enamelled	0.8"	0.8"
L3	2	14 enamelled	1"	0.8"
L4	1	16 enamelled	1½"	0.2"
L5	2	12 enamelled	1¼"	1¼" Split in centre of 0.6" for link coil
L6	2	14 enamelled	1"	½"

tralisation. However, it seems that unless it is operated with a bias of about 65 volts or higher, it is liable to self-oscillation at 145 mc, although undoubtedly no neutralisation at all is preferable to incorrect neutralisation.

The final check used on the present transmitter is to apply full drive with the control switch on "CW" and with the key removed from J2, adjust R9 so that the PA is driven to about 70 mA off resonance with the link coil L6 swung out. On slowly tuning the tank circuit through resonance, the current should remain steady until the resonant point is reached when it dips sharply. On passing this point the current returns to the same steady value. If the neutralising capacity is too small, the current will kick upwards just before the dip on one side of the resonant point, and if it is too large the current will kick upwards on the opposite side of the resonant point. Very small changes in capacity, brought about by bending the neutralising tag or wire, are needed in this adjustment. Each test should be performed quickly to avoid overheating the valve anodes, switching off the HT between each neutralising adjustment.

Operating Conditions

With the neutralisation completed the transmitter is now ready for operation. With the control switch at "CW" and key removed,

adjust R9 to give about 42 volts on the grids of the 832. Then completely tune the drive circuits to resonance—the adjustments of C1 is quite sharp for maximum power output. Adjust R2 to drive the PA to about 70 mA off resonance, then tune C22 for the resonant point. The current passing through the 832, as indicated on A2, should now be about 30-35 mA. Swing in the link coil, with 300 ohm feeder and aerial connected, which will give a reading on the RF thermocouple meter A3, and increase the coupling until a maximum feeder current is obtained. It may be necessary slightly to re-tune the tank circuit for maximum RF output. The setting at which the link coil presents the optimum load to the PA anode circuit, with maximum RF output, is quite critical. When so adjusted, no dip can be observed in the PA anode current on tuning through resonance. The operating conditions are then as shown in the table.

Most RF thermocouple meters give high readings on VHF due to the skin effect, and the meter used on the author's transmitter reads about 0.27 amps with the PA fully loaded. This value is too high for the actual RF output obtainable (about 15 watts), but the meter is still very useful for adjusting to optimum loading and for observing changes in RF output when tuning up. By using a separate 400- or 500-volt supply for the 832

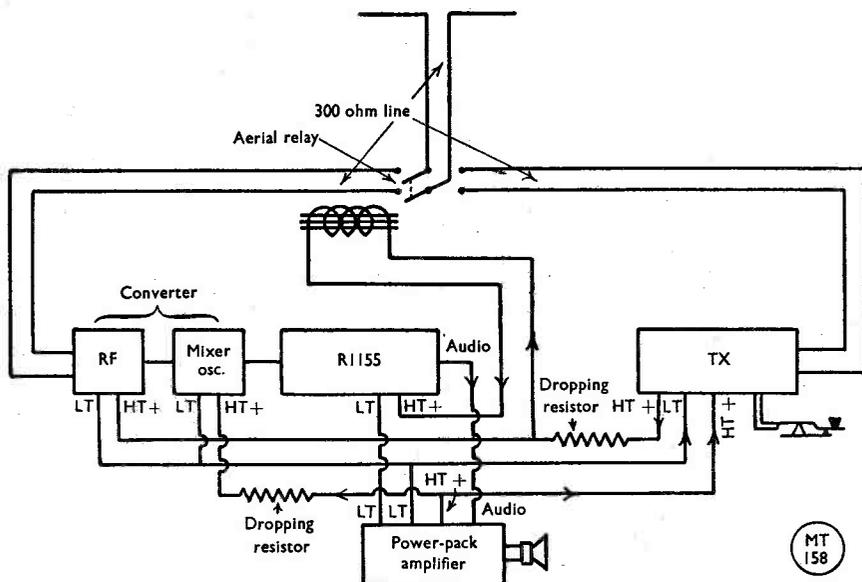


Fig. 5. Block schematic of the station layout at G3FMO, to show how the units mentioned in the text are employed

OPERATING CONDITIONS

CO Grid current 1.5 mA
 CO Anode current 15 mA
 FT Grid current 0.8 mA (very approximately)
 FT Anode current 13 mA
 FD Grid current 0.5 mA
 FD Anode current 20 mA
 PA Grid current 1.8 mA
 PA Anode current 70 mA

a full 36 watts input is obtainable, for those who are not limited to 25 watts.

With the coils and condensers specified it is not possible to operate on the wrong harmonics with an 8-mc crystal, as all the tuned circuits resonate at one point only. However, the final output from the PA should be checked with a calibrated absorption wavemeter.

It is important to watch that the crystal oscillator takes off only on the crystal harmonic. It is not sufficient to remove the crystal from its socket, as self-oscillation may occur as a result of the crystal capacity, especially with large crystal plates. The best check is to note that no grid current flows in the CO

except for a limited range of the condenser C1 in the vicinity of resonance setting.

For efficient operation the correct heater voltage should be maintained at the valve-holder tags—not simply at the mains transformer winding. The performance of the circuit depends largely on the peak emission from the cathodes under Class-C conditions, and this is reduced by low cathode temperatures. The voltage should be kept at 6.3 volts at least, and to take care of mains fluctuations it is best to run at about 6.5 volts. It has been noted that a drop to 6.0 volts in this circuit gives about a 20 per cent. reduction in RF output.

This little transmitter works very satisfactorily and proof of performance can always be had by contacting G3FMO on the Two-Metre band.

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Simple Crystal Control on 144 Mc. by Johnson, W2UXA and Bernstein, W2PAT, *QST*, October, 1948, p.22.

So It's Hard To Get on V.H.F.! by Tilton, W1HDQ, *QST*, November, 1948, p.44.

GERMANIUM CRYSTALS

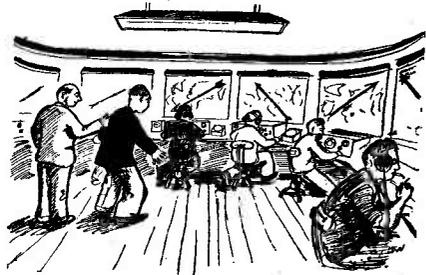
The G.E.C. now have available crystal rectifiers in a very useful range of four different types, from the GEX.33, for use as an instrument rectifier and in low impedance circuits generally, to the GEX.99 for use as a current limiter. As is well known, germanium crystals have considerable advantages over the silicon type, in particular their capacity to withstand large reverse voltages.

"RADIO AMATEURS' PROGRAMME"

Readers may like to be reminded that a weekly 15-minute programme of "international interest to radio amateurs" is broadcast over the *Voice of America* transmitters of the U.S. Department of State. The programme takes the air at 2045 GMT on Saturdays, on the 13, 16, 19 and 25-metre broadcast bands, with relays by the BBC in their 25 and 31-metre European Service transmissions. The producers of the programme are anxious to interview in the studio British or other European amateurs who happen to be visiting New York. Our correspondent over there, Peter Lovelock, ex-G2AIS, (Telephone No. : New York Trafelgar 6-6000) will be very glad to make the necessary arrangements. He has already been heard in the "Radio Amateurs' Programme."

ARE YOU COVERED ?

TV enthusiasts are reminded that they need a licence costing £2 (which also covers sound BC reception) before they are in the clear from the point of view of the authorities. A rebate at the rate of 1s. 8d. per month can be claimed on the unexpired portion of the 20s. sound licence when the TV permit is taken out. As at the end of January last, there were some 285,500 TV licences current in the U.K. Our transmitting tickets no longer (as in the old days) cover all BBC services.



"... As you see, OM, for contest work I find it better to operate on all bands simultaneously..."

VHF BANDS

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

**More Seventycem News—
Two-Metre Conditions—
Station Reports and Results—
Increasing VHF Activity**

LAST month's 70 cm. news has acted as an effective spur to many to start work on that band. With "Seventycems" the chief topic of discussion over the air on 2 metres, at least so far as the South of England is concerned, it has been encouraging to hear everyone agreeing on the need for stable transmitters and receivers. It is obvious that 70 cm. is now being tackled seriously and in the right manner. Progress and new records are bound to follow.

The G3EJL-G5BY path has been found to be open on several occasions and a number of two-way contacts have been made, including one in which S9 phone reports were exchanged. The 430 mc log for the Easter period at G3EJL is of interest and runs as follows :

- | | |
|------------|--|
| (March 28) | 1910 GMT QSO G5BY, 559 CW
1940 Crossband QSO G3RI R5, S9 |
| (April 6) | 1925 QSO G5BY R5, S7 phone
2305 G2BMZ heard, and worked crossband, 559 CW |
| (April 7) | 1810 QSO G5BY, 559 CW
1923 QSO G5BY R5, S9 phone for one hour
2200 Crossband QSO G3ABH R5, S8 |
| (April 8) | 1845 Crossband QSO G3ABH, 559 CW
2045 Crossband QSO G3CFR, 559 CW
2105 Crossband QSO G3BHS, 549 CW |
| (April 9) | 2240 Crossband QSO G3CFR, 559 CW
2310 Crossband QSO G3BHS R5, S5 phone. |

The crossband contacts were all made with G3EJL doing the listening on 70 cm., which proves the efficiency of his receiver. G2BMZ has heard G3EJL while the latter was working G5BY. The locations, and distances of the stations mentioned from G3EJL are : G2BMZ, Torquay, 102 miles ; G3ABH, Sandbanks, 35 miles ; G3CFR, Bournemouth, 25 miles ; G3BHS, Eastleigh, 3 miles. It is worth noting that G3CFR was using his 2-metre beam on

his 70 cm. transmitter ! Tests, so far unsuccessful, have been made between G3EJL and G6LK, and G3EJL and G5TP. The path between Southampton and Sandbanks/Bournemouth is believed to be open at all times, though it crosses the New Forest, including hills up to 250 feet, and is by no means line-of-sight. G3EJL is about 200 feet a.s.l. while G3ABH and G3CFR are very nearly at sea level.

Full details of the receiver now being used at G3EJL will be published in the *Short Wave Magazine* next month. It employs a crystal-controlled oscillator section with two 6J6 stages, and a linear input circuit to the crystal diode mixer ; G3EJL considers his new design to be at least 6 dB better than the converter he had in use when G5BY was first heard on March 5. G3EJL asks that credit be given to G3LV for very valuable assistance and encouragement, particularly in the initial stages, and for the modifications to the converter, the photograph of which appeared in this column last month. Your conductor would like to add his personal appreciation of G3LV's work ; though his call is little known to the amateur VHF world, G3LV has actually done an enormous amount of experimental work on VHF equipment during both pre-war and post-war periods, and it is a pleasure to be able to pay this tribute to him. The only regret is that it was omitted from the story last month.

A report from G5BY confirms the contacts with G3EJL on March 28 and April 6 and 7. On April 6 G5BY heard G3ABH at RST 559 calling G3EJL, the beam at G3ABH being pointed at Southampton. Later in the evening, at 2030, crossband contact was made with G3ABH with his beam still in the opposite direction. On April 7 signals from G3EJL were only S3 and suffering from fading at 1810 GMT, but by 1923 were peaking at S9 on phone, readable 18 feet away "with headphones on table." At about the same time G3ABH was heard RST 559 calling G2BMZ and with his beam now in the right direction. At 2210 G3ABH was S3 working G3EJL.

G5BY has tried a comparison between his 24-element beam and a five-element Yagi

3 feet higher up. The former was about 3 S-points or more better, the improvement seeming more marked than on G2BMZ at 23 miles.

In the Midlands, G3ENS (Loughborough) has a 70 cm. schedule with G5RW, 17 miles away, every Sunday at 1100 and every Tuesday at 1930. This has been in operation very successfully for the past six weeks. G3ENS is using crystal-control with a modified RF Unit 105 as tripler; the input is 2 to 3 watts. The transmitter at G5RW is SEO and the receiver, built by G3DRG, is after the G3MY pattern, but has a 446A RF stage. At present the schedule is like a private radio link, but the privacy is not desired and they would like a little QRM!

Round Ilford way (London) G2BRH, G3EIW and G3FNL maintain a successful 430 mc schedule and would be glad of outside contacts, or reports from anyone hearing their signals.

News reaches us that there is much 70 cm. preparation going on in South London, and, with your conductor about to appear on the band as well, a new VHF link on 70 cm. between the metropolis and the Dorset and Devon areas should soon be possible. However, given suitable conditions it is highly probable that the contact will be made direct, the way things are going.

PAØLU (Voorburg) found last month's 70 cm. news and photographs of great interest. Both PAØZZQ and PAØLU are ready with their 430 mc converters and first tests on the band with them should have been made by now. PAØPN is also active and will be after contacts with G's in South-East England this summer. One of our PA correspondents reports that it is possible to squeeze 30 watts out of a Philips QQE 06/40, which is similar to 829B but with smaller internal capacities.

Two Metres

Conditions, which had been showing a marked improvement in the first few days of April, slumped badly again as the Easter week-end gales arrived. Activity seemed to show no marked change, although one or two well-known calls made a welcome reappearance on the band. On the South Coast, the most regularly received DX has been from Norfolk, with the Oswestry stations and G2OI from Lancashire heard occasionally. The Banwell-Llanymynech path continued open and produced the usual consistent results. It is hoped that before long there may be a revival of interest in the North and the Midlands, for it is there that activity seems to be at its lowest ebb.

Station News

Apologies to G8QC (Chalfont St. Peter). He wrote so early last month that his report

TWO METRES

BEST TWENTY

March 1950

Station	Total Miles	Best Contact "Call"	"Miles"
GW2ADZ	3470	G2CPL	205
G2OI	3279	G3ABH	195
G4HT	3056	G3AHT	154
G3EHY	2896	G2OI	150
G6NB	2767	G5BY	175
G2CPL	2073	GW2ADZ	205
G3ENS	1896	G5PY	110
G2XC	1848	G2OI	190
G8IL	1750	G2XS	153
G2FNW	1705	G2AJ	120
G8QC	1645	G2BMZ	153
G3CGQ	1308	G2IQ	114
G3GBO	1010	G3VM	110

(G3GBO made 12 contacts only)

For this Table send details of date, mileage and callsigns of best 20 contacts made during previous calendar month. No station to be counted more than once per day (0600 to 0600 GMT).

was filed away with the previous month's correspondence! Your conductor's mind must have been on that 70 cm. converter he is making! However, to make amends G8QC comes first this time. He started on Two in January, using a stack of 3 pairs of colinear half-waves, and except for a few weeks overseas has been active ever since. His location is on the top of a 300-foot ridge and the stack is a further 25 feet up. The Tx is a 522, with no modulation applied to the tripler screen. For reception there is a modified 624A with 6AK5's in the RF and mixer stages. One stage of IF is used in the 624A and it feeds into an AR88.

In the same county, G3GBO (Denham) reports for the first time. He has done very well to reach 100 stations worked, but mentions the fact that several stations in his area who work phone only and continually complain of lack of activity have been called by him many times on CW without result; they just come up and call a phone CQ again! As he points out, newly licensed stations such

as himself are not permitted to use phone, but he is quite willing to QRS for those who have let their code get a little rusty! His Tx uses an 832A PA with about 18 watts and the beam is a 4-over-4 fed with 300-ohm line. He hopes to try 430 mc soon.

Down in the South, G5MR (Hythe) is once more regularly on 145-152 mc. (He wrote kc but we think he must mean mc!) Two hours' listening on March 5 produced just two signals, G3ENS (Loughborough) and F80L (Paris)! Both of these are over 150 miles from the Kent coast and in opposite directions.

Neither was worked; he has heard and worked G3AFV (Sittingbourne). The Tx at G5MR is still 30 watts to an 832A, but he promises higher power very soon using an 829B. Further West, on the Sussex coast at West Wittering, G2JU has been busy at week-ends; his frequency is 145.21 mc and he can be found there from 1900 on Saturdays. He has a crystal-controlled converter under construction, and at the same time is doing some extensive modifications to an 1132A to make it into a good 10-metre Rx which is presumably to be used as the IF amplifier for

TWO-METRE ACTIVITY REPORT

G3ENS, Loughborough, Leics.

WORKED: G2ANL, 2MV, 2OI, 3CC, 3CGQ, 3CXD, 3DA, 3DCC, 3EHY, 3FXG, 4HT, 4LU, 5PY, 5RW, 5TP, 6LK, 6NB, 6YO, 8QC, 8SJ.

HEARD: G2CPL, 2IC, 2XC, 3GBO. (March 3 to 29.)

G3EHY, Banwell, Somerset.

WORKED: G2AU, 2CIW, 2MV, 2NH, 2OI, 2XC, 2XS, 3CGQ, 3DA, 3FD, 3FXG, 3GBO, 4GR, 4HT, 5MA, 6NB, 6OH, 6UH, 6VX, 6YP, 8IL, 8LG, 8QC, 8SM, GW2ADZ, 2HH, 3EJMJ.

HEARD: G2AHP, 3FKM, 4CG, 5SD, 5TP, 5UD, 6LK, GM3OL, GW2DUR. (March 12 to April 11)

G6CI, Kenilworth, Warwickshire.

WORKED: G2AJ, 2FWW, 2MV, 2OI, 2WJ, 2XS, 3ABA, 3CGQ, 4HT, 4RK, 5SK, 6NB, 6VX.

HEARD: G2CIW, 2IQ, 2XC, 3EHY, 5BM, 5TP. (March 13 to April 7.)

G4HT, Ealing, Middlesex.

WORKED: G2ANT/P, 2CPL, 2FAB, 2IQ, 2MR, 3ABA, 3ABH, 3AHT, 3DIV/A, 3EHY, 3EYV, 4FC, 5SK, 5UD, 6CI, 6KB, 6LO, GW2ADZ.

HEARD: G2FNW, 2OI, 3EBW, 3ELJ, 5BY, 5MI, GW3EJM. (March 13 to April 11.)

G3GBO, Denham, Bucks.

WORKED: G2AHP, 2ANT, 2CPL, 2DD, 2MV, 2XC, 2YL, 3ABH, 3BPM, 3CGQ, 3CVO, 3DAH, 3EBW, 3EEI, 3EFX, 3EHY, 3FXG, 3GHS, 3SM, 3VM, 4DC, 3FC, 5AA, 5MI, 5UD, 6JK, 6LO, 6UH, 6VX, 6WU, 8IL, 8LG, 8NB.

HEARD: G2XS, 5QB, 5SK, GW2ADZ.

G8IL, Salisbury, Wilts.

WORKED: G2AJ, 2BMZ, 2CIW, 2MV, 2NH, 2NS, 2XC, 2XS, 3ABA, 3ABH, 3CGQ, 3EBW, 3EHY, 3EJL, 3FAN, 3FD, 3FKF, 3FMO, 3GBO, 3RI, 4DC, 5BY, 5TB, 5MA, 5TP, 5UD, 5JK, 6NB, 6UH, 6WT, 8KZ, 8LG, 8LY, 8QC, 8SM, GW3EJM.

HEARD: G2AHP, 2ANT/P, 2CPL, 2OI, 3AUS, 4GR, 6WU, 6YP, GW2ADZ. (March 4 to April 7.)

G8QC, Chalfont St. Peter, Bucks.

WORKED: G2ANT, 2ATK, 2BMZ, 2CPL, 2OI, 2UJ, 2WJ, 2XC, 2XS, 3ABH, 3AHT, 3BHS, 3BOB, 3CFR, 3CGQ, 3EBW, 3EHY, 3EJL, 3ENS, 3FAN, 3RI, 5BY, 5MI, 5SK, 5TP, 5UD, 6LK, 6VX, 8IL, 8SY, GW2ADZ. (Mid-January to April 11.)

G2OI, Eccles, Lancs.

WORKED: G2AJ, 2XC, 2XS, 3ABH, 3AGS, 3AHT, 3BLP, 3BW, 3CSC, 3EHY, 3ELT, 3ENS, 3GMX, 5SK, 6CI, 6LK, 6NB, 6VX, 8QC, GM3OL.

HEARD: G2ADK, 2MV, 2NH, 3BY, 3CXD, 3DA, 3GHS, 5RW, 5TP. (March 8 to April 7.)

GW2ADZ, Llanymynech, Montgomeryshire.

WORKED: G2CPL, 2MR, 2MV, 3ABA, 3ABH, 3AHT, 3DA, 3EEZ, 3EHY, 3VM, 4DC, 4HT, 5SK, 5UD, 6JK, 6NB, 6YP, 6VX, 8SM, 8QC, GW3EJM.

HEARD: G5TP.

G5SK, Coventry, Warwickshire.

WORKED: G2AJ, 2FNW, 2FWW, 2MV, 2OI, 2XS, 3ABA, 3BLP, 3CAZ, 3CGQ, 4DC, 4HT, 4RK, 6CI, 6LK, 6NB, 6VX, 8QC, GW2ADZ.

HEARD: G2WI, 2XC, 3DAH, 3FD. (March 1 to April 10.)

G6NB, Aylesbury, Bucks.

WORKED: G2ANL, 2ATK, 2BN, 2FNW, 2FPP, 2FWW, 2MV, 2OI, 2WJ, 2XC, 2XS, 2YL, 3ABH, 3AHU, 3AVF, 3CVO, 3EBW, 3BEI, 3EHY, 3ELT, 3FXG, 3GHS, 4DC, 4FC, 4HT, 5MA, 5PY, 5TP, 5UD, 6CB, 6JK, 6LK, 6OH, 8IL, 8IP, 8QC, 8SM, 8WV, GW2ADZ, 3EJM.

G3VM, Norwich, Norfolk.

WORKED: G2CPL, 2IQ, 2MV, 2XC, 2YU, 3CAZ, 3ENS, 3GBO, 3GHS, 5RW, 8IL, 8QR, GW2ADZ.

HEARD: G2AJ, 2XS, 2XV, 3AFV, 3DAH, 3DEP, 3EHY, 3FIJ, 3FXG, 4MV, 5MI, 6WU, 6YP, 8QC.

G6TF, Chapeltown, Sheffield.

HEARD: G2AJ, 2CIW, 2FNW, 2HQ, 2IQ, 2MV, 2XC, 3BLP, 3BW, 3CGQ, 3EHY, 3ENS, 4DC, 5FP, 5RW, 6CI, 6CW, 6LK, 6NB, 6YO, 8QX, GW3EJM. (March 20 to April 12.)

G2KF, Edenbridge, Kent.

WORKED: G2UI, 3EBW, 3DIV/A, 4HT.

HEARD: G2YL, 6LL, 8QC. (April 6 to 14.)

G2CPL, Lowestoft, Suffolk.

WORKED: G2CIW, 2NH, 2XC, 2YU, 3CGQ, 3DIV/A, 3FIJ, 3FXG, 3GBO, 3VM, 4HT, 6OH, 6WU, 8QR, GW2ADZ.

HEARD: G2MV, 2XS, 3ABH, 3AFV, 3AHP, 3ANE, 3DAH, 3EHY, 5IB, 5MI, 5TP, 5UD, 6LL, 8QC. (March 13 to April 12.)

G2XC, Portsmouth, Hants.

WORKED: G2ANT, 2ANT/P, 2CIW, 2CPL, 2DSW, 2MC, 2MR, 2OI, 2XS, 3ABA, 3ABH, 3AHT, 3BHS, 3BNC, 3CGQ, 3DEP, 3EBW, 3EHY, 3EJL, 3FAN, 3FD, 3FXG, 3GBO, 3GHS, 3VM, 4DC, 4HT, 5BY, 5IB, 5PY, 5UD, 6CB, 6KB, 6LK, 6NB, 6VX, 8IL, 8IP, 8KZ, 8LG, 8QC, 8SM.

HEARD: G2AHP, 2IQ, 2XV, 3ENS, 5SK. (March 18 to April 15.)



The station of G2XS, Kings Lynn, well known as an active operator on Two Metres, and DX to many now on the band.

the converter. G3FAN at Ryde, Isle of Wight, has recently raised his beam a few feet and is finding results to be much improved. He has a G6VX type converter, and a 522 as Tx. G2MC (Brighton) has a new beam ready for erection, and then hopes for contacts beyond the Portsmouth area.

G4HT (Ealing) followed up his success with G3EHY in Somerset by raising G2CPL (Lowestoft), to give him Suffolk at long last. Things are improving, for it only took 1 hour 40 minutes to attract G2CPL's attention, which is over an hour better than his experience with G3EHY! Hopes now run high of knocking off Staffordshire in record time. A little co-operation from G8KL and it will be done! Two new stations in the Ealing area are G3GMZ (Tolworth) and G3EYV (Clapham). The Ealing-Oswestry path suffered a temporary black-out during Easter, but otherwise has been reliable. G3BLP (Selsdon) found March 25 excellent with good signals from the Midlands; he is comparing a Yagi four-element beam alongside his stacked array. G3BLP hopes to have a 4-over-4 up shortly and that should provide some interesting comparative data; he has a new converter in use and finds it a little better than his previous one, while on the Tx side he has been experimenting with higher power but has been disappointed so far with the lack of power out compared with that put in!

It has been very pleasing to hear yet another of the old five-metre regulars come on to Two at long last. G6KB (Checkendon) has been putting out a good signal on 144.72 mc from a 522 and a 5-element c.s. beam; he is not far from G5TP. Wiltshire continues to be represented by G8IL (Salisbury), who found the outstanding dates to be March 26 and 28 and April 6. He has worked G3VM (Norwich) for his best DX so far, and heard G2OI several times in spite of bad local screening in the Lancashire direction. G8IL reports working G3FMO (Chard) and hearing G4GR (Newport, Mon). Commenting on helical arrays, he says that obviously G4IX (whom we quoted last month) and himself have been reading the same references. Some of the gain figures given in these references are obviously impossible, but he points out that there should be an improvement in range and a reduction in fading due to the elimination of destructive ground interference when circularly polarised aeriels are used at each end. (It is understood G2BMZ is considering some tests with this type of aerial on 430 mc.) G3ABH of Sandbanks, Dorset, reports hearing G3BW (Whitehaven) on March 26. This is an excellent DX distance and will be very heartening news to G3BW, who is DX to practically everyone on the band!

G3EHY (Banwell) considers March lived up to its promise and brought improved

TWO METRES ALL TIME COUNTIES WORKED LIST Starting Figure, 14 From Fixed QTH only	
Worked	Station
43	G3BLP
40	G2AJ (225), G5MA, G5WP
39	G2OI (136)
38	G2IQ, G2NH (212)
37	G3ABA (126)
36	G5BY
35	G3APY, G5GX, GW2ADZ
34	G2XC (220), G3CUJ, G3EHY (124), G4DC (188)
33	G4HT (186)
32	G8WV
31	G2KG (110), G2XS (130), G4LU
30	G4AU (123)
29	G3DMU, G5RP (114), G6NB
28	G2CIW (169), G2HDY, G3VM, G5BD, G6VC
27	G3BKQ, G3DAH, G5JU, G8QX, G8SM (106)
26	G2RI, G3CGQ (116), G3VM, G5MI
25	G2AXG, G2CPL (111), G6LK, G6PG (109), G6UH (184), G6WT
24	G5NF, G3FXG (100), G8QC
23	G2NM, G3BOB, G8IP (138), G8QY
22	G3WW
21	G3CCP
20	G3FD, G8IL, G8KZ
19	G3EJL, G5ML
18	G3GBO, G6DT, GM3OL
17	G3AUA, G3FIJ, G6CI
16	G5PY, G8KL
15	G2ANT, G2FLC, G3AKU, G3CWW, G4RK, G5SK
14	G3BW, GM3BDA

NOTE: Figures in brackets after call are number of different stations worked, starting figure, 100.

conditions such as one expected. With the exception of the first four days, DX was heard and activity satisfactory throughout the month. In April, the 6th and 7th were particularly good in Banwell; contact was made with G2XS, with GM3OL heard. G3EHY's new converter, with two 6AK5 RF stages, a 6AG5 mixer and 9002 oscillator is working well, and its noise level is superior to anything else yet tried. He has tested a crystal oscillator but finds the note from the 9002 so good that, with the advantage of being tunable, he prefers the new arrangement to a crystal circuit. He emphasises the desirability of keeping the heater voltage well up and stabilising the HT at 90 volts to ensure a good note. Your conductor would add as an extra point that the oscillator should be loaded as lightly as possible consistent with good injection to the mixer.

The Midlands and North

G3ENS (Loughborough) reports activity in the North Midlands as *very* poor indeed. G2FNW, G2IQ and himself constitute the total activity most nights. G3BVW and G2ANL (Leicester) have appeared more recently, but the calls of those of the district who used to be on are absent. G3ENS is using an 829B with 100 watts, while his converter has a CV139 GG RF stage built into an RF27 unit and working with an AR88; the beam is two stacked 5-element Yagis, spaced $\frac{1}{2}$ -wavelength and only 10 to 12 feet off ground.

G5UD (Kings Lynn) is keen on the idea of activity evenings and will fall in with the Thursday evening suggested by G5UM last month. He would also like to see more activity on Saturday afternoons and Sunday during daylight hours. Some gale damage was sustained by his beam during the recent bad weather period.

Coventry seems to be one of the few centres of activity in the Midlands and G3ABA, G5SK and G6CI all report themselves this month. G3ABA nearly missed the good conditions of March 25, but got on in time to work G3CGQ (Luton) at S9 plus; after that he had 1½-hour contact with G3BLP for a piece of nice DX. March 28 was also good with him and provided an Isle of Wight contact. G3ABA is preparing for 70 cm. with a pair of 8012 triplers and a G3MY converter. G5SK has been using a 522 Tx and Rx, much modified of course, since December; his aerial, a 4-element Yagi, is at 25 feet and in the clear. He also found March 25 an excellent night with strong signals from the South, and remarks that the temperature in the Midlands was 7 degrees higher than in London that evening. At present G5SK is working outside his zone frequency, but

intends to correct this very shortly. G6CI further confirms the excellence of March 25, describing it as the most outstanding day this year ; signals from 100 miles or more were \$9 plus with him and fading was conspicuously absent. He asks us for an explanation of this occurrence. Although the meteorological data for March 25 is not to hand there is not much doubt that there must have been a layer of comparatively warm dry air overlying much cooler and damper air down below, the layer being about two or three thousand feet up. This is the invariable cause of such propagation conditions. G6CI hopes to erect a 16-element stack shortly, and also plans to operate on 430 mc.

GW2ADZ (Llanymynech) found March a good month, by and large, with March 26 to 28 the best period ; he hopes to change his frequency to 144.208 mc in the near future, which will place him near the other Northern stations. Although this does take him out of his correct zone, your conductor approves the move. While activity in the north of both England and Wales remains at a low level there is much to be said in favour of temporary local rearrangements. It is not proposed, however, to make any permanent changes in the zone boundaries at the present moment. G4LU (Oswestry) is busy on 430 mc receivers.

G2OI (Eccles) confirms March 26 to 28 as the peak period of conditions, when he worked G3ABH (Dorset) twice. G6NB (Aylesbury) has been worked 22 times during the month and G3EHY 16 times. G2OI mentions G3BW, G12FHN and GM3OL as all active. G2DCI (Speke) also writes to say he is on the band, although doing more listening than calling. He has added two reflectors, one above, and one below, his original 4-element beam, and hears G3EHY regularly, but calls to him have been fruitless so far ; G2DCI's frequency is about 144.3 mc, VFO controlled.

In Brief

A number of reports reached us after the main story above had been written, and so can only be mentioned in brief. G2CPL (Lowestoft) missed the good things on March 25, and asks whether another Frequency List such as G2NH and G6VX prepared last year for the Fiveband Club could be published and circulated to members. The matter will be investigated. G2CPL still wants cards for the VHF Century Club, including some from members ! G3CGQ (Luton) has at long last been able to work his own county ! G3ELV provided the contact. He has spent many hours calling G2OI and G3EHY all in vain ; he thinks they only search Zone J. G2KF (Edenbridge) reports active most evenings after 2230 and on Sunday mornings with a 522 Tx and a 6J6 converter ; beam is a

TWO METRE ACTIVITY BY ZONES AND COUNTIES

ZONE A (144 to 144.2 mc)

Dumfries : GM3OL

ZONE C (144.2 to 144.4 mc)

Cumberland : G3BW

Lancashire : G2DCI, G2OI, G3BY, G3DA, G3ELT

Yorkshire : G2IQ, G3CC, G6YO, G8SJ

ZONE D (145.8 to 146 mc)

Antrim : G12FHN

ZONE E (144.4 to 144.65 mc)

Derbyshire : G5RW

Leicestershire : G2ANL, G2FNW, G3BVW, G3ENS

Staffordshire : G3CXD

Warwickshire : G2FWW, G3ABA, G4RK, G5SK, G6CI

ZONE F (145.65 to 145.8 mc)

Glamorgan : GW2HH, GW3DUR, GW3EJM

Montgomery : GW2ADZ

Shropshire : G3AHT, G4LU

ZONE G (144.65 to 144.85 mc)

Bedford : G3CGQ, G3ELV

Buckinghamshire : G3GBO, G6JK, G6NB, G8QC

Hertford : G3FD

Norfolk : G2XS, G2YU, G3VM, G5UD, G8QR

Suffolk : G2CPL

ZONE H (145.25 to 145.5 mc)

Berkshire : G6OH, G8LG

Dorset : G3ABH, G4OZ

Gloucestershire : G5BM

Hampshire : G2DSW, G2NS, G2XC, G3BHS, G3BNC, G3CFR, G3CGE, G3DEP, G3EJL, G3FAN, G3RI, G6XM, G8LY

Oxon : G5TP, G6KB

Wiltshire : G3FKF, G8IL

ZONE I (145.5 to 145.65 mc)

Devonshire : G2BMZ, G3AUS, G5BY, G6WT

Somerset : G3EHY, G3FMO

ZONE J (144.85 to 145.25 mc)

Essex : G2CIW, G2WJ

Kent : G2AJ, G2KF, G2UJ, G3AFV, G3CAZ, G5MR, G6VX

London : G3DCC, G3EYV, G3FXG, G3GMZ, G4AU, G4DC, G5PY, G6WU, G6YP, G8KZ

Middlesex : G2AHP, G4FC, G4HT, G8IP

Surrey : G2ANT, G2MR, G2MV, G2NH, G3BLP, G3GHS, G4CG, G5MA, G6LK

Sussex : G2JU, G2MC, G3EBW, G3DIV/A

Note : The frequencies shown above are those recommended by the Two-Metre Zone Plan but some stations are not conforming.

VHF CENTURY CLUB

LIST OF CERTIFICATED MEMBERS

G2AJ	G3CWW	G5RP
G2AOK	G3DA	G5TP
G2AXG	G3DCV	G5UM
G2CIW	G3EHY	G5YV
G2HDY	G3FD	G6CB
G2KI	G3IS	G6HD
G2MR	G3WW	G6KB
G2MV	G4AP	G6LX
G2NH	G4CI	G6MN
G2NM	G4DC	G6NB
G2OI	G4IG	G6OS
G2RI	G4RO	G6UH
G2XC	G5BD	G6VX
G2XS	G5BM	G6XM
G3ABA	G5BY	G8GX
G3APY	G5GX	G8KL
G3BBA	G5JU	G8QX
G3BLP	G5LQ	G8SM
G3BOB	G5MA	G8TS
G3BW	G5MR	G8UZ
G3CGQ	G5PP	G8WV
G3COJ	G5PY	GM3OL
		GW2ADZ

All stations listed here are members of the "Short Wave Magazine" VHF Century Club by reason of the fact that they have shown QSL cards for 100 or more stations worked two-way on the VHF bands only, from 50 mc up.

4-ele. c.s. type. He asks for more signing on CW after phone QSOs. G3FMO (Chard) is on 145.64 mc (Zone I) and would welcome contacts from anywhere. (G2XC has called him several times!) G3FMO is experiencing queer results with G4OZ (Sherborne); he can hear the latter station at S6 but G4OZ is unable to receive G3FMO. He hopes to be on 70 cm. soon. G3VM (Norwich) has been receiving tremendous signals from G3EHY on some of the good dates, and has worked G8IL. He reports G2YU active in Norwich, as well as G8QR. G3CNF (Wanstead) hopes to be on Two again shortly and wants information on Magslip Motors

Transmitting Type Mk. III. G6TF (Sheffield) is nearly ready to start on 2 metres, and also hopes to be on 70 cm. in the not too distant future; he is using a 6J6 converter and sends a log of stations heard. G6NB provides his most consistent signal. March 25 was the best day with G6TF, and he logged 16 stations between 2200 and midnight.

On two metres, DL1FV has started to build the G2IQ 6J6 converter, while DL1FT is at work on the construction of a transmitter for the band. DL1LC also promises to be ready by late summer. DL4ZC (Munich) is active on 146.5 mc but has only a super-regen receiver. Tut, tut!

The Tables

The re-introduction of the Activity by Zones and Counties Table has been generally welcomed. Every endeavour is made to keep this up to date and to make it as complete as possible. Much of the information has to be obtained from the calls heard and worked lists which are sent in each month, but in these lists appear quite a number of calls which are unknown both to your conductor

TWO METRES

COUNTIES WORKED SINCE SEPTEMBER 1
1949

Starting Figure 14

Worked	Station
34	G3BLP
31	G2AJ, G2XC, G4HT
29	G2OI
28	G6NB
27	G3ABA, G3EHY, GW2ADZ
26	G2CIW, G5UD
25	G2XS
24	G3VM, G3FXG, G6VC, G8QC
23	G3CGQ
20	G2CPL, G8IL
19	G3EJL
18	G3GBO
17	G6CI
16	G2FNW, G3FUJ
15	G5SK
14	G3BHS, G3CWW, G3DCC

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

and to the latest edition of the Call Book. This means that they cannot be inserted in the Activity List under the correct county and Zone. At least a *dozen calls* have had to be omitted this month for that reason. Correspondents could help us greatly if when they write they would give the QTH of any station active in their area whose call has not previously appeared in the Activity List. Lists of local stations active, with their town and county, would be invaluable in compiling the complete list for the country as a whole.

The "Best Twenty of the Month" idea seems to have gained in popularity and there are some thirteen entrants this month. It is noticed that some stations have scored their distances off one or two stations only. This is what we feared would happen when the "once in seven days" rule was dropped! Comments from contestants on whether or not they think the rule should be reintroduced would be welcome.

Thanks to those who set out their claims in the same form as they appeared last month, and our apologies for having altered things somewhat this time.

There has been much approving comment

on last month's suggestion that stations no longer active on Two should be deleted from the Counties Worked table. It is therefore proposed to revise the list for the June issue of *Short Wave Magazine*. The basis for the revised listing will be the Activity Reports which have appeared in this column since January, and general observation on the two-metre band in recent months. If neither of these is likely to result in *your* remaining in the Table, and if you feel you have good reason to be shown in it, a letter to G2XC is suggested! The whole usefulness of these Tables is lost if they do not truly represent current activity, as all will agree.

In Conclusion

The mail has been heavier again this month, and that, no doubt, is a sign of the increased interest on both Two and Seventycems as the summer approaches. The latest date for next month's reports is May 17, which is a Wednesday, instead of the usual Thursday. This is due to the Whitsun holiday break, which means we have to be a little forward with copy. The address is E. J. Williams, G2XC, *Short Wave Magazine*, 53 Victoria Street, London, S.W.1. BCNU on June 9.

PROTECTING TETRODE RF AMPLIFIERS

The Absorber Valve

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

USERS of beam tetrode and pentode final RF amplifier stages will probably have noticed that if the drive is removed and modulation applied, some anode current will flow and a very distorted signal is radiated, usually blocking nearby receivers.

There are several ways in which this can be caused and it is the writer's intention to suggest a way of overcoming the trouble. By stopping it, the need for breaking the HT supply to the final or modulator for break-in voice operation is removed and the oscillator can be switched.

Cause and Effect

The most important cause for the PA valve to pass anode current on positive peaks of modulation (although supposedly biased to

When a valve such as an 813 is run with its screen supply taken through a dropping resistor off the plate HT feed, all sorts of things can happen when the drive goes off, particularly if the stage is being operated as a modulated RF amplifier. This article discusses the subject in some detail and suggests remedies.—Editor.

cut off) is where the screen is fed from the anode supply through a dropping resistor so that modulation affects the screen as well. When the drive is removed, no screen current flows and the screen rises to full HT potential. With the correct Class-C bias still applied, the additional screen voltage is usually not quite sufficient to allow the valve to conduct, but the valve is only just beyond cut-off. Thus, any increase of anode voltage will cause anode current to flow; the modulator supplies this increase on positive half cycles and anode current does flow. Even if there was some anode current already passing in the quiescent state, it will be cut off during negative half cycles of modulation.

It is this cutting on and off of anode current which shock-excites the PA tuning circuits into oscillation, causing a distorted signal to be radiated at sufficient strength to interfere with reception.

A further contributory factor is that the modulator is off load, or at any rate very lightly loaded, during no-drive conditions;

the voltage output will thus be higher than when it is correctly matched, especially with pentode or Class-B audio stages.

Prevention

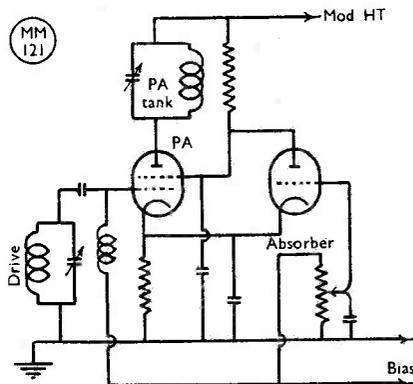
The suggested way of preventing this is to use an absorber valve to limit the rise of screen potential. This valve must pass current during no-drive conditions but must not under full drive and modulation, when the screen rises to almost twice its mean potential. One could use a triode, with its anode tied to the screen of the PA valve biased so that conduction just commences at twice the mean screen potential—but it would allow the screen to rise to this potential during no-drive conditions, and thus would only be a partial solution to the problem.

Most users of expensive output valves install a protective cathode bias resistor of a low value, so that if the bias supply does fail, the valve will have some chance of survival. If the cathode of the absorber triode is returned not to earth, but to the cathode end of this resistor, we shall have a more satisfactory arrangement. If the PA stage draws 150 mA, then a potential of 15 volts will be developed across a 100-ohm bias resistor, raising the cathode of the absorber by this amount. This tends to cut off the absorber, together with the negative bias on its grid and the fact that the screen is drawing current. By a suitable choice of the grid bias, it can be ensured that the absorber never conducts, even when the screen momentarily reaches twice its mean potential.

During no-drive conditions, the cathode potential would be zero, but for the fact that the absorber valve may draw current. It will not draw 150 mA, on account of the screen dropping resistor, and so we assume that the cathode will be less positive, say 2 volts, due to 20 mA through the triode. Thus the bias on the absorber valve is reduced by 13 volts, allowing it to conduct for an anode voltage reduced by an amount approximately equal to the amplification factor of the triode multiplied by 13 volts. This will be about $20 \times 13 = 260$ volts, which is a workable amount. Take for example an 813 as the power amplifier with a mean screen potential of 400 volts, giving a peak of 800 volts: This means that the screen potential will not rise above 540 volts during no-drive conditions. The exact state of affairs is determined graphically or verified experimentally.

Application

The writer used a Mazda ACP4 to control an 813, the only reasons for the choice of this valve being its easy availability, top cap anode, reasonable amplification factor and the fact that its heater requirement of 4 volts happened to be convenient. Any valve which can pass



Circuit of the absorber-valve arrangement to prevent excessive rise of screen voltage when the PA is undriven, as discussed in the article.

the full screen current of the PA at a low anode voltage and can stand twice the normal PA screen voltage will be satisfactory; a pentode could be used if preferred.

The rise of gain of the modulator may be troublesome, especially if the AF output stage is a pentode, for it may damage the modulator transformer—the old bogey of pentodes on no-load. There is a way of preventing this undesirable state of affairs, namely by applying negative voltage feedback. This attempts to stabilise the output voltage against variation with changing load. There is another benefit to be obtained from applying negative feedback and that is the reduction of distortion.

A suggested circuit is shown, being the arrangement used with the voice-controlled transmitter at G3AAT/A. One is entirely relieved of the need to do any high voltage or high current switching; the absorber valve also saves a bleeder resistor and an HT relay, all for the use of one additional valve only. The carrier can be switched at the master oscillator end at very low power level. At G3AAT/A, the modulator is Class-B and is very heavily fed back to prevent dangerous rise of voltage under no-load conditions. This is absolutely essential, for with conventional PA arrangements, the PA draws current if the modulator produces output under no-drive-to-PA conditions, thus acting as a form of "safety valve" for the modulator. No such protection can be obtained with the circuit shown, and it would be very easy to flash over the windings of the modulation transformer. But with feedback, one can apply full AF input to the modulator without causing any anode current to flow in the PA or flashing over anywhere, when under no drive conditions. Naturally the system cannot as it stands be used where the PA is grid leak biased.

Here and There

And Now Television

In order to bring the subject of Television into the orbit of our activities, we have enlarged the *Short Wave Listener* by an additional eight pages and changed its title to the more comprehensive *Short Wave Listener and Television Review*, the cover price (1s. 3d.) and subscription rate (16s. a year) remaining as before. The enlarged publication now runs 40 pp., or with the *BSWL Review*, 52 pages.

The underlying intention of this new move is not only to make TV comprehensible to all who can read a circuit diagram, but also to give detailed information of the kind likely to be of practical value to the amateur building (or thinking of building) his own TV receiver. For instance, one of the articles in the May issue of *Short Wave Listener & Television Review* deals with the conversion of the surplus Type 3515 Unit as an IF amplifier for TV reception.

Apart from this, the general character of the paper as the only specialist SWL periodical in the world, developed during the last four years, remains unchanged. The same issue also contains an illustrated constructional article giving full details of the modifications required to an RF-27 Unit to make it into a useful converter for operation on the two-metre band. And there are of course all the usual DX features.

Short Wave Listener & Television Review can be ordered through any bookstall—or by direct subscription from us at 16s. for a year of 12 issues; copies of the May issue are available at 1s. 4d. post free. Order on the Circulation Manager, Short Wave Magazine, Ltd., 53 Victoria Street, Westminster, London, S.W.1.

Correction—"Coaxial Cable Measurements"

In the article by G6TV in our March issue, the expression for K in Lines 16 and 26 on p. 34, under the cross-head "Propagation Velocity Constant", should have been given as $1/\sqrt{K}$. It is a little matter of a dropped square-root sign, and we can only apologise to those who may have been misled by an odd result.

R.E.C.M.F. Exhibition

This was again a very lively and well-organised event, drawing a large attendance at the Great Hall, Grosvenor House, where the exhibition was held during the period April

17-19. With over 100 exhibitors, the show covered all types of materials, components, valves and test gear for the radio, television, electronic and telecommunications industries. The emphasis was mainly on export, and this section of our great radio industry, now doing business all over the world, is making a very important contribution to the Narrowing of the Gap.

Club Note

The *Short Wave Magazine* has always given a lot of space to the interests and activities of local Amateur Radio clubs. Indeed, many Clubs owe their start (and a steady flow of new members) to publicity in our "Month with the Clubs" feature. Taking out some figures the other day, we found about 100 local organisations on our Active Club Register, averaging 40 members each, giving a total membership of 4,000. That there is still scope for considerable expansion in Club memberships is suggested by the fact that the public (bookstall) circulation alone of the *Short Wave Magazine* at home is now about five times this figure. Assuming that for one reason or another half these readers are unable or unwilling to join a Club, it still means that the potential interest is there for the formation of new Clubs and a large increase in the membership of those already established. And clearly one of the best ways of bringing in this new membership is to make sure your Club reports appear regularly in the *Short Wave Magazine*! Of course, no charges of any kind are made for appearance and, in fact, we make a small donation to Club funds by way of payment for any suitable photographs used in "Month with the Clubs."

Spring Call Book

The Spring 1950 issue of the *Radio Amateur Call Book*—listing amateur stations by call, name and address, throughout the world—shows in the British section all G's appearing in our "New QTH" feature up to and including those published in the *Magazine* for February.

Prefix List Reprint

Have you had your copy of the Prefix List as offered on p. 916, February? On a stiff folding card for wear-and-tear use at the operating position, it is the latest available list, and costs but 6d. post free.

NEW QTH's

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

- E14A D. K. McCrossan, Curragh-Camp P.O., Co. Kildare, Eire.
- E18Z J. D. Upton, 88 Eugene Street, Donore Avenue, Dublin, Eire.
- G2CMH R. T. Henley, 158 Upper Lewes Road, Brighton, 7, Sussex.
- G2COX B. D. Alexander, West Winds, Well Road, Otford, Kent.
- G2DOT K. Clark, Oak View, Guisborough Road, Great Ayton, N. Yorkshire.
- G2DSW E. J. Watts, Clavinia, Thornhill Park Road, Southampton, Hants.
- G2FON F/Lt. L. D. Coombes (ex-Y12XG/XAFH/MDSFC/ZC6JJ), Langbury Lane, Ferring, Sussex.
- G2FON/A F/Lt. L. D. Coombes, Officers' Mess, R.A.F. Station, Watton, Norfolk.
- G3AIE P. J. Clements, Melbury, Down Road, Portishead, Bristol.
- G3BDZ Lt. Col. W. E. Dennis, M.I.E.E., Gable House, Woodside Park Road, London, N.12.
- GW3CDE Dr. G. A. Jackson, 3 Dryburgh Avenue, Whitechurch, Cardiff.
- G3CKF G. G. R. Mason, 117 Park Road, Loughborough, Leics.
- G3CMQ S.E. London Technical College Radio Society, Lewisham Way, London, S.E.4.
- G3CRJ B. J. Shaw, Staveley, Kendal, Westmorland.
- GW3DPO D. D. Gay, 2 St. Fagans Street, Caerphilly, Glam.
- G3DQR York Amateur Radio Society, Community House, Falsgrave Crescent Burton Stone Lane, York.
- G3DWH E. Lindop, 10 Maveen Grove, Woodsmoor, Stockport, Cheshire.
- G3EBV W. J. S. Squire, 6 Fairspear Road, Leafield, Oxon.
- GW3ERW J. Lines, 11 Llanbedr Road, Fairwater Cardiff.
- G3ESF A. R. Harrower, 21 Boswell Road, Thornton Heath, Surrey.
- GM3EWL J. Good, 24 Moreuden Park Drive, Edinburgh 9. (Tel.: 74137).
- G3EZZ/A J. Eaton, c/o 4 Church Street, Eastwood, Notts.
- G3FDO T. Dodd, Poplar Vale, Foster Street, Penrith, Cumberland.
- G3FIK K. W. Perfect, 21 Pelham Road, Alum Rock, Birmingham, 8.
- G3FIV D. Kelly, 52 The Drive, Seedfield, Bury, Lancs.
- GW3FJD R. Wood, 112 Penybont Road, Pencoed, Glam.
- G3FMC J. D. Soans, c/o 39 Northumberland Road Leamington Spa, Warks.
- GI3FNA K. Yeastley, 66 Williamsons Lane, Bangor, Co. Down.
- GW3FQZ D. Ireland, 12 Burton Terrace, Aberthaw, nr. Barry, Glam.
- G3FST E. C. Woods, 30 Ferry Street, Northfleet, Kent.
- G3FTD S. Ogdan, 10 Dugdale Avenue, Blackley, Manchester, 9.
- G3FTH J. S. Hale, 182 Grand Drive, Raynes Park, London, S.W.20.
- G3FVU Bournemouth Radio and Television Society, Hon. Sec.: F. G. Hamshere, 99 Elmes Road, Winton, Bournemouth, Hants.
- G3FYE G. R. Phillips, 7 German Buildings, Buxton Road, Stockport, Cheshire.
- G3FYF P. R. Acke, 7 Warren Drive, Kingswood, Surrey.
- G3FY5 J. L. Hooper, 5 Seaton Grove, Moseley, Birmingham, 13.
- G3FYT Mrs. D. Kelly, 52 The Drive, Seedfield Bury, Lancs.
- G3FZH H. A. J. Cross, Brown's Farm, Stubbington Lane, Stubbington, Fareham, Hants.
- G3GBC G. D. Johnson, 41 Westbourne Avenue, Cannock, Staffs.
- GM3GCA A. W. Dunsire, 99 Whyterose Terrace, Aberhill, Methil, Fife.
- G3GCW B. A. Jones, Cruachan, Branksome Close, Preston, Paulton, Devon.
- G3GDO A. N. Janson, 10 High Street, Ventnor, Isle of Wight.
- G3GDO R. C. Coppell, 119 Lakenheath, South gate, London, N.14.
- G3GDY W. F. Ord, 25 Earls Drive, Newcastle-upon-Tyne, 5.
- G3GEA D. C. Callender (ex-XACY/ZC6NC), 255 Prince Consort Road, Gateshead-on-Tyne, 8, Co. Durham.
- G3GFU W. H. Otley, 42 Geneva Crescent, Darlington, Co. Durham.
- G3GHL F. Kimber, 48 Shrub Hill Road, Worcester.
- G3GHY C. T. Smith, 39 Heather View Road, Bournemouth West, Hants.
- G3GIL P. Forrest, 68 Collingwood Road, West Hartlepool, Co. Durham.
- G3GIS Bristol and District SWL Club, Sec. N. G. Foord, 71 Brynland Avenue, Bristol, 7.
- G3GJA D. A. Reynolds, 63 Makenad Avenue, Faversham, Kent. (Tel.: Faversham 2127).
- G3GJH V. J. Tomlin, 37 Hawkins Crescent, Harrow, Middlesex.
- G3GJL Worcester and District Amateur Radio Club, c/o City Library and Museum (Basement), Foregate Street, Worcester
- G3GJO D. A. Hembury, 49 Frankley Avenue, Quinton, Birmingham, 32.
- G3GJX E. B. Grist, Oakways, Domewood, Copthorne, Sussex.
- G3GJZ H. D. Rodman, Lincoln Cottage, Rayes Lane, Newmarket, Suffolk.
- G3GKD H. A. Kearsey, 27 Becch Lane, Earley, Reading, Berks.
- G3GKF E. Honeywood, 105 Whytecliffe Road, Purley, Surrey.
- G3GKG G. B. Horsfall, Oaklands House, Stamford Road, Lees, Oldham, Lancs.
- G3GKI V. Kershaw, 72 Hewson Road, West Parade, Lincoln.
- G3GKM Hon. Sec.: Babcock & Wilcox Staff Association Radio Society, Babcock House, Farrington Street, London, E.C.4.
- G3GKN R. T. Bowler, 180 High Street, Uxbridge, Middlesex.
- G3GKT J. R. Buswell (ex-XAFP/ZB1AM), 133 New Fosseway Road, Bristol, 4.
- G3GKZ M. D. Fowler, 169 Queslett Road, Streetly, Sutton Coldfield, Warks.
- GM3GLM R. Lamb, 110 Airbles Road, Motherwell Lanarkshire.
- GW3GLN M. Collins, 31 Evelyn Street, Barry, Glam.
- G3GLO K. G. Cass, 28 Weymans Avenue, Kinson, Bournemouth, Hants.
- G3GLR A. R. Whitelegg, 19 Hope Road, Sale, Manchester, Lancs.
- G3GLT F. Webb, 40 Essex Street, Forest Gate, London, E.7.
- G3GLV D. A. Burns, A.I.L.(Fr.), 4 Vogan Avenue, Crosby, Liverpool, 23.

- G3GMC** R. H. McVey, 46 Holcombe Avenue, Elton, Bury, Lancs. (Tel.: Bury 2778.)
- G3GMP** D. M. Brown, 10 Hibernia Gardens, Hounslow, Middlesex.
- G3GMI** G. Smith, B.Sc.(Lond.), 3 Hungerford Avenue, Slough, Bucks. (Tel.: Slough 22879.)
- G3GMT** J. W. Knox, Jnr. (ex-VP8AK), 26 Bailey Avenue, Ellesmere Port, Cheshire.
- G3GNN** R. S. Hollings, 9 Cliffeston Drive, Morton, Bingley, Yorkshire. (Tel.: Bingley 2839.)
- G3GWT** G. W. Taylor, M.Coll.H., 124 Beverley Road, Hessel, E. Yorkshire. (Tel.: Hull 40092.)
- G3YA** C. Smith, 25 Rotherham Road, West Melton, nr. Rotherham, Yorkshire.
- G4KK** R. T. O'Neill, 41 Catesby Road, Rugby, Warks.
- G4WG** J. G. Carlson (ex-G6GC), 20 Bewick Street, South Shields, Co. Durham.
- G4WH** C. G. Newman (ex-VS9AN), 1a Biarritz Court, Crowstone Road, Westcliff-on-Sea, Essex.
- G5QB** E. J. Reid, 35 Colville Square, London, W.11.
- G6PK** W. G. Pyke, Heatherwood, Hordle, Hants. (Tel.: New Milton 98.)
- CHANGE OF ADDRESS**
- DL2LZ** Sgt. A. W. Weatherly, 2325880, Royal Signals, att. Royal Horse Guards (Blues), B.A.O.R. 11.
- G3AIZ** C. C. Olley, 157 Wanstead Park Road, Ilford, Essex.
- G3AJM** C. Coulborn, Maesgwyn, Ruff Lane, Ormskirk, Lancs.
- G3ARD** F. V. Bellamy, 84 Acacia Avenue, St. Paul's Estate, Spalding, Lincs.
- G3AW** T. Arnold, 212 Coppice Street, Oldham, Lancs.

- G3BSX** C. C. D. Field, Cotswold, Swanland, E. Yorkshire.
- GM3DOC** C. H. Robertson, Dunnottar, Academy Road, Rothesay, Island of Bute.
- G3DWP** R. E. Marsters, 23 Station Road, Manca, nr. March, Cambs.
- GM3DXJ** T. Holbert, Alton, Causewayend, Biggar, Lanarkshire.
- G3DXJ/A** T. Holbert, c/o Sergeants' Mess, Army Apprentices School, Arborfield, Reading, Berks.
- G3EAC** H. Pratt, Wenslea, First Row, Ashington, Northumberland.
- G3EEK** E. R. Greenwood, 50 Park Road North, Chester-le-Street, Co. Durham.
- G3EJR** J. B. Armstrong, No. 54 Married Quarters, R.A.F. Station, Berryfields, Melksham, Wilts.
- G3FBI** C. Dunkerly, 26 Lord Lane, Failsworth, Manchester, Lancs.
- G3FQG** J. R. Ankers, 5 Mill Street, Whitchurch, Salop. (Tel.: Whitchurch 160.)
- G3GAJ** H. C. G. Burt (ex-VQ4AJ), Groveley Green Lane, Prestwood, Great Missenden, Bucks. (Tel.: Gt. Missenden 386.)
- G3GHQ** D. Metcalf, 16 Valentia Road, Liverpool, 15.
- G3GKA** G. Matheo, 23 Haydon Road, Ashington, Northumberland.
- G4CT** E. J. Hewines, 20 Nelson Way, Stafford Staffs.
- G5ZH** C. W. Plimmer, 25 Walsingham Road, Southend-on-Sea, Essex.
- G6YD** F. J. R. Taylor, 8 Cedar Road, Cricklewood, London, N.W.2.

CORRECTION

- G2CZ** C. T. Atkinson, 15 Greenland Avenue, Humberstone, Leicester.
- GM3PK** J. W. Dunsire, 18 Allison Street, Buckhaven, Fife.

FESTIVAL OF BRITAIN 1951

At no time previously will science and technology have had such great opportunities for display in Britain as in the summer of 1951 during the Festival of Britain. Addressing a special conference on January 26 this year, Sir Edward Appleton, G.B.E., K.C.B., F.R.S., stressed that the scientific displays on the South Bank of the River Thames and elsewhere are designed to tell a series of stories to which everyone can listen and which anyone can understand—the stories of British scientific achievement, and of the way that achievement has influenced the life and work of every one of us.

All forms of telecommunications will be dealt with in the Transport and Communications Pavilion, commencing with the pioneer work on long-distance cables, up to the present day when messages and pictures can be transmitted to any part of the world, and when one can speak to many foreign lands from one's own telephone.

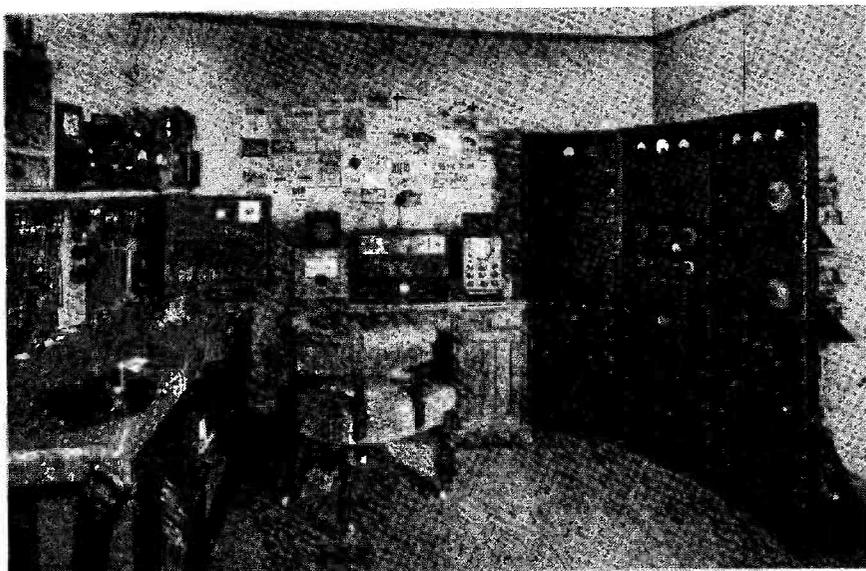
Sound broadcasting and television, including the short-wave radio links, will be demonstrated, together with the latest developments in radar and radio-navigation. In addition to the pavilion displays of television, there will be

a tele-cinema where the public will be able to see television programmes projected on to a full-sized cinema screen.

CARDS IN THE BOX

As we want to get them cleared, if your call appears here, please let us have a large S.A.E., with name and call sign, addressed BCM/QSL, London, W.C.1, and the cards will be forwarded on the next G clearance. Your address can also appear under "New QTH's," and subsequently in the *Radio Amateur Call Book*, if you care to let us have a note to that effect when sending for the cards.

G2AJJ, 2ATC, 2BPZ, 2CRO, 2PM, 2XW, 3ABF, 3AFC, 3AWQ, 3AYS, 3BBV, 3BCC, 3BJY, 3CKC, 3COM, 3CQP, 3DGX, 3EAY, 3ECT, 3EFT, 3EQW, 3ETV, 3FTX, 3FUM, 3GBB, 3GGI, 3HDW, 3HSX, 6DD, 6LO, GM2BRD, 3AZN, 3CI, 3FBU, 3FYD, 3GMD, 3GME, GW3EPF, 3FEQ.



The other man's station G6XM

This is the very fine station—recently completely rebuilt—owned and operated by W. James, 67 Osborne Road, Farnborough, Hants. G6XM was first licensed in 1932 and, with the exception of the war years, has been continuously on the air ever since. As main interest has always been the VHF's, after being licensed G6XM operated exclusively on Five for the first two years, before venturing on to the LF bands !

Activity is now almost entirely on 430, 144, 28 and 7 mc, although gear is available to cover all bands. On the VHF's, CC equipment is used, and there is a portable rig for 144 mc ; this can be operated on 430 mc by the addition of an 832A tripler. The main transmitter for Two Metres runs a pair of DET-12's, with 100 watts input.

The LF gear is driven from a band-switched VFO through suitable FD stages, the two PA units being located in the right-hand rack. A single 813 performs over 3.5-14 mc, with a pair in push-pull for Ten ; both PA's run at 120-150 watts input. The modulator in the left-hand rack consists of a high-gain preamplifier feeding a "Williamson" unit, this in turn driving a pair of TZ40's in Class-B ; the output of the sub-modulator can be switched from the TZ40's when audio control of the low-power equipment is required. The microphone commonly used is a D.104.

Several receivers are available, including the

AR77 shown in the picture, with which the VHF converters are operated ; these are of the 6J6 RF-and-6J6 mixer type, with a superhet for 430 mc—though receiving arrangements for that band have not yet been finalised.

Aerials up at the moment are a $\frac{1}{2}$ -wave dipole for 7 mc, a three-element 'delight for 28 mc, and for 144 mc a 16-element stacked array placed 3 ft. above the 10-metre beam. The aerial arrangements are all controlled from the operating position.

As some 90 per cent. of the gear is home-built, much thought has gone into the arrangement of the work bench—as indeed is evident from the picture. The test equipment is permanently wired and is on a shelf above the bench, with all tools held in clips, ready to hand. This has the obvious merit of leaving the work-bench clear for *work*, rather than as a space for temporarily unwanted gear !

The station record to date shows well over 100 countries QSO'd post-war, no less than 15 of these being on the VHF bands from 50 mc up ; the cards shown are for such VHF contacts only.

G6XM's greatest interest is still in the VHF bands, problems relating to their propagation and experiments with aerials. Contests, field days and an occasional DX chase vary these researches with, as G6XM himself puts it, "a good spell at the work-bench to round off"—and very nice, too !

The Month with the Clubs

FROM REPORTS RECEIVED

This month the total of Clubs reporting is 37; a large total by previous standards, but falling short of last month's record. Many Clubs are thinking along outdoor lines for the summer, with D-F Field Days and portable expeditions of all kinds. We ask all those who have original ideas of this sort not to hide their light under a bushel but to publicise the schemes for the benefit of others.

Next month's deadline for reports will be **first post on May 15**; and for the July issue, it will be June 12. Address them to "Club Secretary", *Short Wave Magazine*, 53 Victoria Street, London, S.W.1.

Leek & District Amateur Radio Society.—This Club has had a very busy winter season which culminated in the AGM on April 17. At the end of March they ran a large stand at the local Rotary Club Exhibition, showing a transmitter, receivers and a television set, all in operation. The Club is now applying for a licence and hopes to go on the air very soon.

Edinburgh Amateur Radio Club.—Lectures and demonstrations on Oscilloscopes and 420 mc work have interested the members and raised much discussion. The Club Tx is the fortunate possessor of the call-sign GM3HAM, and is on the 3.5 mc band with CW every Wednesday evening, looking out for other Clubs. Arrangements for field day events are more or less complete.

Aberdeen Amateur Radio Society.—Still working under difficulties without a permanent clubroom, they meet every second Friday in the YMCA. Members are making a combined effort to find suitable accommodation. Note change of Secretary—new QTH in panel.

Babcock & Wilcox Staff Association Radio Society.—During March there was a lecture-demonstration on VHF Radio Communication. Members went out with walkie-talkie and mobile equipment and reported back to the meeting, one enterprising party interviewing the driver of an arriving train at Liverpool Street Station, to prove their position! G2CD, G2DGO, G5LC and G8IP were among the guests.

Barnsley & District Amateur Radio Club.—Recent lectures have been on The Use of Surplus Meters, Aerial Design, A Practical Two-Metre Receiver, and Receiver Design. All have been well attended and new members have been enrolled. Until the end of July, the meetings will continue on the second and fourth Fridays—after that there will be a break until September.

Coventry Amateur Radio Society.—The annual dinner was held on March 24, with G3DO and G6DL among the guests. Mrs. F. Miles (wife of G5ML, Vice-President) presented cups to the winners of the various contests—J. H.

Whitby, W. Montgomery, and G3FAB. At the April meeting two members will be "Answering Questions" in preparation for the next R.A.E.

Derby & District Amateur Radio Society.—Meetings continue on Wednesdays at 7.15 p.m. in the Clubroom, School of Art, Green Lane, Derby. Members are now hearing a series of lectures on "Electronics in Science and Medicine." The Club Tx is being assembled in a rack prior to permanent installation in the clubroom. Lectures on Basic Radio will be given for junior members during the summer months. The annual dinner during March was attended by 55 members and friends.

Midland Amateur Radio Society.—At the March meeting G2RQ, who is a well-known surgeon, lectured on Human Hearing, and gave demonstrations with an extensive array of apparatus. This unusual lecture proved of great interest to a crowded audience. It is hoped that further lectures of the kind may be arranged for the future.

Rhigos & District Radio Club.—Club HQ are now at the Black Lion Hotel, Victoria Square, Aberdare, and meetings will be on the second Thursday of the month. The old clubroom at Rhigos is being kept as a station HQ and workroom. Rhigos held their Hamfest, Annual Dinner and Concert, and an Exhibition on Sunday, April 30. Unfortunately details of this event reached us after the April issue had gone to press.

Slade Radio Society.—The programme for the immediate future includes the following: April 14, lecture on the *Wireless World* Television Receiver; April 21, Special D-F Meeting; April 28, Talk and Demonstration on Magnetic Tape Recording. The Club meetings begin at 7.45 p.m. and visitors will be cordially welcomed.

South Manchester Radio Club.—Recent meetings have been well attended with an average of 40, and new members arriving each time. R.A.E.



Committee of the South Manchester Radio Club. Left to right : G3EGH, G3EON (back), G2HNR, G3FSW (back), Old Timer G6DN, G3YB and the SWL representative.

classes are drawing to a close, but a small Morse group continues to work and makes good progress. There is only one meeting in April—on the 28th. During May, the regular meetings will be on the 12th and 26th, with a D-F Event on the 27th.

Stourbridge & District Amateur Radio Society.—At the recent AGM the new committee was elected, and it was reported that membership at the end of February totalled 60. G3DO was the visiting speaker and dealt very ably with questions from members. At the April meeting G2YM gave a talk on the Past and Future of Amateur Radio. Meetings are on the first Tuesday and third Friday of the month.

Sutton & Cheam Radio Society.—This Club's annual competition for home-built gear was judged by members of the Thames Valley Club, and the winners were E. F. Owen (Television Receiver), R. L. Harvey (Frequency Meter) and B. W. Dadson (Grid Dip Oscillator). The VFO section was won by F. R. Scott. Prizes were presented at the annual dinner on March 11, to which about 85 sat down.

West Cornwall Radio Club.—From *The Radio Link* we gather that all is flourishing in

this widely-dispersed area. There is considerable transmitting activity in Penzance, St. Agnes and Falmouth, which is reported monthly in the journal; this month, however, there is a description also of a personal QSO with Mars, which should give Cornwall the DX record for some time!

West Somerset Radio Society.—Meetings continue to be held at both Taunton and Minehead. A recent meeting at the former town brought in 20 new members. There is no Minehead meeting during April, and the Taunton meeting occurs, unfortunately before our publication date.

Worthing & District Amateur Radio Club.—Meetings are held on the second Monday of the month at 7.30 p.m. at the Adult Education Centre Worthing. A monthly news-sheet called *Rag-Chew* is circulated to members, giving details of forthcoming meetings, the Club Net activity and so on.

Bournemouth Radio & Television Society.—This club now has a technical library in its shack at the Cricketers Arms Hotel; it has proved a great boon to members in search of "gen." Next meeting will be a Junk Sale on May 4, and on

May 18 there is to be a talk on *The Early Days of Radio*. Visitors are invited to these gatherings at the Cricketers Arms Windham Road, Bournemouth.

Bradford Amateur Radio Society.—During the summer, meetings will be on the last Tuesday of each month. All visitors and friends will be welcomed at Cambridge House, 66 Little Horton Lane, on these days at 7.30 p.m.

Brighton & District Radio Club.—The weekly club night (Tuesdays at 7.30) will carry on throughout the summer, and holiday visitors to the district will be heartily welcomed. The HQ is The Eagle Inn, 125 Gloucester Road, Brighton. Many members are hoping to get out on portable work during the summer months; the May programme includes talks on Aerials and an informal ragchew.

Cambridge & District Amateur Radio Club.—At the next meeting (May 26) G5RV will be giving a talk on TVI. He is well known for his work in this direction and it is hoped that he may be confronted with a full attendance. This and the following meeting (June 23) will be at the regular venue, The Jolly Waterman, Chesterton Road, Cambridge.

Clifton Amateur Radio Society.

—The club's first outdoor event this season is on May 7, and will be a D-F Contest held in the Farnborough, Kent, area. New members keep arriving but there is still room for any interested transmitters or listeners at the New Cross clubroom every Friday.

Eastbourne & District Radio Society.

—At a recent meeting Lt. Noel (RNVWR) gave a talk on the development of the Reserve, training methods, equipment, activities and problems. An invitation was given to members to visit the RNVWR HQ at Newhaven. Next meeting is on May 5 (G6QB on Twenty-Five Years of Amateur Radio).

Grafton Radio Society.—The committee is busy with field day problems and the Hon. Catering Manager is organising hard! Last year's experience of lots of visitors has led to the creation of an Hon. Reception Manager. Meetings continue every Monday, Wednesday and Friday at 7.30 p.m.

Hounslow & District Radio Society. — The Quarterly Meeting and AGM was held at the end of March. On May 10, the Hon. Sec. will expound further on Oscillators, and on May 24 members will give

Lectures. The Club Tx, G3FHD, is on the air every Sunday on 28 mc, between 1030 and 1300. Reports will be welcomed.

Hull Radio Group.—A Yorkshire Hamfest is being organised at Bridlington on Sunday, July 9, at the Cosy Corner Hotel. Tickets will cost about 7s. 6d., and further details are available from G3ADJ (see panel for QTH). Wives, families and friends will be welcomed. The Hull Group now meets at the REME Barracks, Walton Street, 7.30 p.m., on the last Wednesday of the month.

Isle of Man Amateur Radio Society.

—The AGM was held on March 29, and the officers and committee duly elected. Finances are reported to be in a fine state, so the Club Tx, GD3FLH, will be retained and will be operating throughout the summer and autumn (probably on phone by autumn). After the dinner the whole company repaired to the Douglas Head Hotel to inspect the television installation. That, at least, was the intention, but reception was reported as somewhat unstable!

Kingston & District Amateur Radio Society.

—Fortnightly meetings continue to be well

attended. Recent events included an excellent lecture on Crystals. A trial Field Day is to be held on Sunday, May 7, and the regular May meetings will be on the 10th and 24th at Penrhyn House, 7.30 p.m.

Newbury & District Amateur Radio Society.

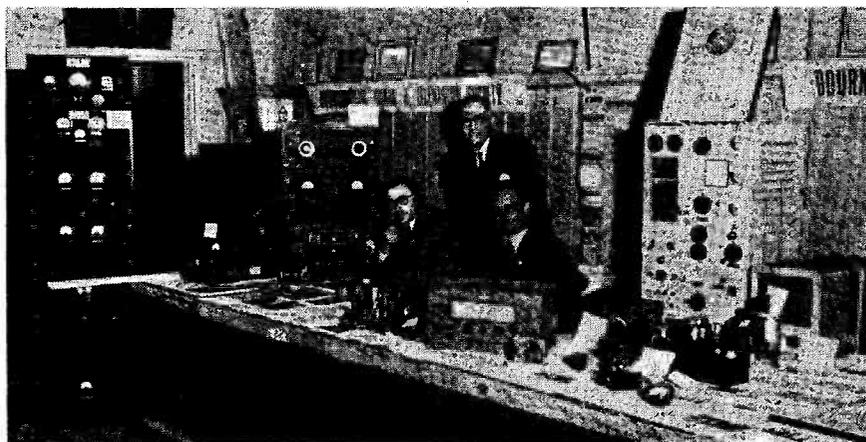
—Meetings are held on the last Thursday of the month at the Railway Hotel, Greenham Road. Future events will include talks and demonstrations on Aerials, and it is hoped that a Morse class will shortly be in action. If there is sufficient demand in the locality G3CJU will inaugurate slow Morse transmissions. Newcomers will be welcomed at all meetings.

Poole & District Amateur Radio Club.

—At the last meeting of the VHF Group a two-metre converter was demonstrated with the Club's BC-348; the transmitting licence is still awaited. Meetings are held on the first and third Mondays in the Rechabite Meeting Room, Cranbrook Road, Upper Parkstone.

Reading Radio Society.

—Officers and committee were elected at the AGM on March 25; please note new Secretary's QTH in panel. Other recent meetings included a talk on Valve Voltmeters and another



The show laid on by Bournemouth Radio & Television Society at the local Hobbies and Craftwork Exhibition. At the microphone is G2DBF, with F. Hamshire (honorary secretary) seated beside him and W. Coleman (standing).

on Time-Sharing Multiplex Communication. Main meetings in May are on the 11th and 27th, with the Instructional Section getting together on the 13th.

Romford & District Amateur Radio Society.—A series of TV lectures by a member will be given at the last meeting of each month. There will be about 12 in all, and they should prove interesting to many who have built their own TV receivers. Plans are complete for field day activity, though there may be some last-minute changes. New members are still sought and will be welcomed by the Hon. Sec. (see panel).

St. Albans Radio Society.—This Club, though reporting for the first time, has been in action since January 4. Meetings are held every other Wednesday, 7.30 p.m., at The Beehive, London Road. Membership is 22 and newcomers will be welcome. Next

meetings are May 10 (talk on VHF Aerial Arrays), May 24 (Getting Down to 70 cm), and in June, there will be a Brains Trust and a talk on Oscilloscopes.

Sheffield Amateur Radio Club—Excellent attendances at ordinary meetings are reported, but a little more support is wanted for the technical lectures. The next is on May 10. The Club is another with preparations in hand for field day work.

Southport Radio Society.—At the next meeting (May 15) it is hoped to present a Film Show. This will be at 8 p.m., in the club premises, 38a Forest Road, Southport. As the Club has recently been presented with two receivers, it is intended to start a Club Night on the Top Band.

Thames Valley Amateur Radio Transmitters' Society.—A talk on AVO Measuring Instruments was heard by a large

gathering at the April meeting. The former Hon. Sec., Major A. Eden, is departing for VS1 and hopes to be on the air from there; see panel for new Secretary's address.

Warrington & District Radio Society.—Last month the members were guests of the local Model Engineering Society and saw a demonstration on controlled models. The Club Tx is well under way and will soon be on the air regularly with the call G3CKR.

Watford & District Radio and Television Society.—The next meeting will be at the Clubroom, Cookery Nook, The Parade, Watford, on May 16, when a Transmitter Demonstration will be given. Instructional lectures continue, as does the maintenance scheme for the receiving equipment at the Watford Peace Memorial Hospital. It is hoped to cover other hospitals in the Watford area.

NAMES AND ADDRESSES OF CLUB SECRETARIES :

ABERDEEN : G. M. Jamieson, 66 Elmfield Avenue, Aberdeen.
BABCOCK & WILCOX : L. E. J. Manders, G2CRD, B. & W. Staff Assn. Radio Society, Babcock House, Farringdon Street, E.C.4.
BARNSELEY : J. A. Ward, G4JJ, 44 Northgate, Barnsley.
BOURNEMOUTH : F. G. Hamshere, 99 Elmes Road, Winton, Bournemouth.
BRADFORD : V. W. Soven, G2BYC, Rushwood, Grange Park Drive, Cottingley, Bingley, Yorks.
BRIGHTON : L. Hobden, 17 Hartington Road, Brighton.
CAMBRIDGE : T. A. T. Davies, G2ALL, Meadow Side, Comberton, Cambridge.
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COVENTRY : K. Lines, G3FOH, 142 Shornccliffe Road, Coventry.
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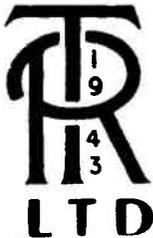
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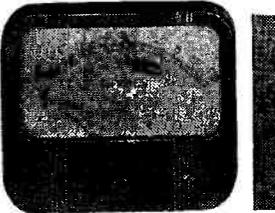
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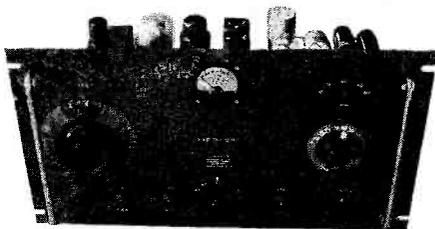
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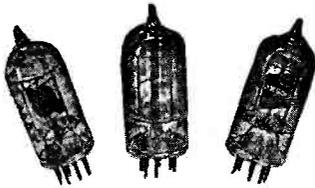
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WANTED URGENTLY, brand new, the following items: Indicating Units Type 6E, RAF. Ref.: 100B/141; Type 62 or 62A, 10Q/13000 or 10Q/37; Type 233, 10QB/6294; Control Units Type 222A, 10LB/6010. Transmitter/Receivers TR.3173C, 10DB/8452; TR.1464; Microphones T.17. Transmitters Type T.11331A. Transmitters Type BC.640A/B. Field telephones Type F.—Advise condition, quantity, prices, etc., to Box No. 742.

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SMALL ADVERTISEMENTS

READERS'—continued.

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EDDYSTONE 640, S-meter and manual, good condition, £20 carriage paid.—James, Mossley Corner, Congleton, Cheshire.

AR77E, good condition, £25. R.M.E. Carrier £2/10/. Vidor portable battery set, as new, £8. Collins T.C.S. transmitter, receiver and aerial tuning unit; 1.5 mc to 12 mc, as new, complete station less power supplies, nearest £30. Complete set spares, enough build new AR77, less valves and cabinet, £15.—123 Hamil Road, Burslem, Stoke-on-Trent.

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SALE—set genuine RCA spares for AR88LF—Crystal (735 kc), IFT's, wavetrap, etc. New, boxed, £3. S.A.E for list.—Box No. 749.

FOR SALE. MCR1 communications receiver complete with coils, power pack, phones, in good condition, £6.—Box No. 747.

FOR SALE. Two new 58 Sets, complete with vibrators and accs., and all spares, wire, rod and telescopic aerials, two sets phones and mikes. Offers about £12 for the pair.—Reid, Schoolhouse, Kyle, Ross-shire.

FOR SALE. Space required: 150 watt Tx P/P 35T, exciter, 6L6, 6L6, 807, 807, Mod: Pair TZ40. Speech amp, 6J5, 6SJ7, 6L6. Power supplies two 1,250v choke input, one 750v choke input, 350v choke input. Relay controlled 145 VFO and power supply. All in 6-ft. rack of dural. Not Government surplus. Complete set spare valves, also 2,500-0-2,500 1 amp, and condensers and gear. Offers?—Box No. 750.

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WANTED: Pair of valves, type DET12 (VT62), or equivalent. Must be brand new. Any reasonable price paid. G3MI, The Meades, Chesham, Bucks.

WANTED urgently: loan or purchase of QST August, 1948. G2FQH, 51 Pontefract Road, Ferrybridge, Yorks.

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We pay Carriage on all items above.

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THIS IS THE SALE OF THE YEAR

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A 10-valve VHF Superhet for the Range 100-120 Mc. Full vision dial. Stabilised local oscillator, BFO, Tuning Meter, IF 12 Mc. Easily converted for 144-146 Mc, or with greater modification will give basis for a de-Luxe all-wave communications receiver.

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UNIVERSAL AVO MINOR List Price **£8.10.0**
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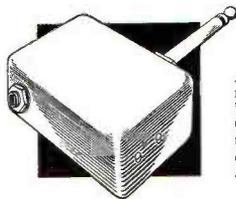
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16 mfd. 450v tubular can electrolytic condensers. 2/11 each (postage and packing, 9d.) or 6 for 15/3 (postage and packing 9d.).

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Brand New MOVING COIL MIC./HEAD- PHONE ASSY.



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Clydesdale's **12/6** Post paid
Price only

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E987. 12 mm. 52 ohms. solid core at 6d. per yard; minimum 20 yds., 10/-, post paid.

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H.61. 5 way, 14 mm., screened and rubber covered, with cotton and rubber insulation at 1/- per yard. Minimum 12 yds., 12/- post paid.

Special Offer

H61X. Carton containing a 250' (83 yds.) coil of above 5-way cable for 49/6, carriage paid.

Brand New in original wood case

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The unit consists of three complete power supplies, one of which provides various stabilized L.V. supplies. All are fed via double choke, condenser input circuits.

8 valves : 4/866-866A's, 5Z3, 6SJ7, 2/6A3's, plus IV time delay and VR150/30 stabilizer.

Other components include : Power trans. 2,100-500-0-500-2,100v; Power trans. 450-0-450v, 15v ct., 6.3v ct., 6.3v. Fil. trans. 2.5v ct., twice; Fil. trans. 6.3v (thermal starter) chokes, 2/156. 375 ma., 15H., 450 ma., 2/15H, 110 ma., 20H, 162 ma., plus various H.V. condensers, resistors, etc. The complete unit mounted in metal case with lid, 2' 6" x 1' 6" x 1'; finish olive-drab crackle with shock-absorbing feet. Wgt. 420 lbs.

Clydesdale's
Price only

EX-ARMY. WS-18 RECEIVER UNIT

A 4-valve superhet chassis. Range 6-9 mcs. (50-33.3 metres), with ARP12 (VP23) F.C. 2/ARP12's L.F. and AR8 (HL23DD) audio loc. osc., 2nd det. and A.V.C. slug-tuned I.F. trans. 465 kcs., etc. The complete receiver mounted on a chassis 8½ x 5 x 1", all control front panel 9½ x 5½". Unused, good condition.

Power requirements approx. 3v 0.2A.L.T., 120v 15 ma. H.T., 1.5v bias.

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Each having a Vernier tuning dial; variable capacitors. Tank coil unit on ceramic former; ceramic switch; R.F. chokes, etc. In metal cabinet 17½ x 7½ x 8". Finish black.

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Price only
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Comprising three lengths copper tubing, tapering from ¾" to ¼", each section sleeved, into the other, alternative top sections with insulated base.

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Tested before despatch, vtg. data supplied.

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Enclosed type with knee straps, dimensions 5½ x 2 x 2", with lead and jackplug, easily removed from case.

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