

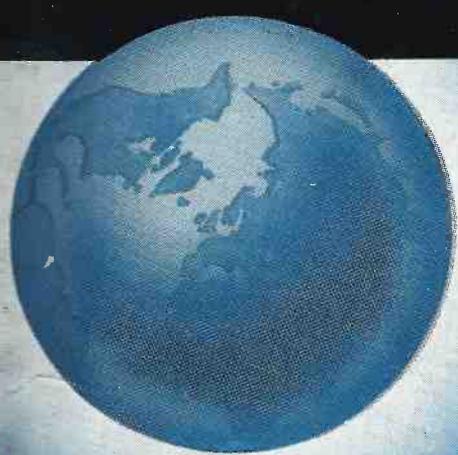
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*The*

# SHORTWAVE

*Magazine*

*CW*



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

**VOL. VII    No. 3    MAY 1949**

# WEBB'S RADIO

## Extended Payment SCHEME

Our aim in life is to give service, so creating good-will and making satisfied customers. We now further our object by offering reasonable Hire Purchase terms on a flexible but dignified basis, under which you deal directly and solely with Webb's Radio and not through a third party Finance Corporation. If you find it inconvenient to lay out a lump sum, Webb's scheme will assist you—the integrity of the best known name in radio ensures your satisfaction.

A few examples are shown below. If there is anything you require in connection with RADIO we invite your enquiries.

### AVO SIGNAL GENERATOR

The new oscillator giving high standard performance at a reasonable price combined with AVO's renowned workmanship and reliability (50 kc/s to 80 mc/s in 6 bands).

Cash Price ..... **£25**  
 (or Deposit **£5** and 12 monthly payments of **£1/16/8**).

### AVO ELECTRONIC TESTMETER

A valve-operated multi-range measuring device which covers in the one instrument almost every measurement needed in the professional or amateur Radio Laboratory.

Cash Price ..... **£35**  
 (or Deposit **£7** and 12 monthly payments of **£2/11/4**).

### TAYLOR SIGNAL GENERATOR 65C

Just released and a very worthy addition to Taylor's famous range of test apparatus. Coverage 100 kc/s to 160 mc/s in 7 bands.

Cash Price ..... **£17/15/-**  
 (or Deposit **£3/11/-** and 12 monthly payments of **£1/6/1**).

### TAYLOR VALVE TESTER 47A/P

A comprehensive valve tester, combined with multi-range test meter.

Cash Price ..... **£29/10/-**  
 (or Deposit **£5/18/-** and 12 monthly payments of **£2/3/4**).

### WEBB'S "MX50" TRANSMITTER

Professionally built 50-watt transmitter

for c.w. and telephony. Self-contained mains supply, 200/230/250 volts A.C. with internal bias supply. Covers 7, 14, 28 and 3.5 mc/s amateur bands. Built in 31½ in. standard rack form.

Cash Price ..... **£88/10/-**  
 (or Deposit **£17/14/-** and 12 monthly payments of **£6/9/10**).  
 (or Deposit **£17/14/-** and 18 monthly payments of **£4/10/6**).

A complete transmitting and receiving station comprising the 'MX50' and Eddystone '640' Communications Receiver.

Total Cash Price ..... **£116**  
 (or Deposit **£23/4/-** and 12 monthly payments of **£8/10/2**).  
 (or Deposit **£23/4/-** and 18 monthly payments of **£5/18/7**).

### WAYNE KERR COMPONENT BRIDGE B101

Gives accurate measurement of resistance, capacity and inductance. Direct indication of power factor and "Q".

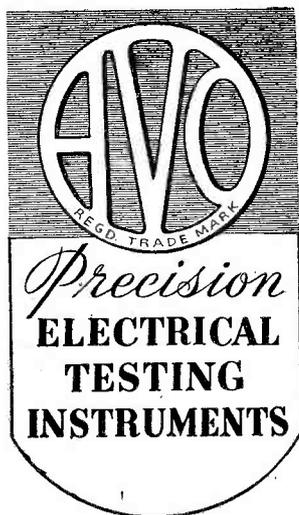
Cash Price ..... **£27/6/-**  
 (or Deposit **£5/9/3** and 12 monthly payments of **£2/-/1**).

### WAYNE KERR INDUCTANCE METER

Primarily for accurate measurement of inductances between 1 microhenry to 100 millihenries in 5 decades. Also capacity 1-25 and 25-1000 pF.

Cash Price ..... **£38/5/-**  
 (or Deposit **£7/13/-** and 12 monthly payments of **£2/16/2**).

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



BRITISH MADE

PRICE  
**£35**

*Fully descriptive pamphlet  
available on application.*

Sole Proprietors and Manufacturers:

**The AUTOMATIC COIL WINDER & ELECTRICAL EQUIPMENT CO. LTD.**  
WINDER HOUSE • DOUGLAS STREET • LONDON • S.W.1 Telephone: VICTORIA 3404/9

E.T.M. 3

This instrument, which is an up-to-date example of current instrument practice, has been developed to meet the growing demand for an instrument of laboratory sensitivity built in a robust and portable form, for use in conjunction with electronic and other apparatus where it is imperative that the instrument should present a negligible loading factor upon the circuit under test.

The instrument consists basically of a balanced bridge voltmeter. It incorporates many unique features and a wide set of ranges so that in operation it is as simple to use as a normal multi-range testmeter.

The instrument gives 49 ranges of readings as follows:—

D.C. VOLTS: 2.5 mV to 10,000 V.  
(Input Resistance 111.1 megohms).

D.C. CURRENT: 0.25  $\mu$ A to 1 Amp.  
(150 mV drop on all ranges).

A.C. VOLTS: 0.1 V to 2,500 V R.M.S. up to 1 Mc/s. With external diode probe 0.1 V to 250 V up to 200 Mc/s.

A.C. OUTPUT POWER: 5 mW to 5 W in 6 different load resistances from 5 to 5,000 ohms.

DECIBELS: -10 db to +20 db.

CAPACITANCE: 0.001  $\mu$ F to 50  $\mu$ F.

RESISTANCE: 0.2 ohms to 10 megohms.

INSULATION: 0.1 megohm to 1,000 megohms

The thermionic circuit gives delicate galvanometer sensitivity to a robust moving coil movement. It is almost impossible to damage by overload. The instrument is quickly set up for any of the various tests to be undertaken, a single circuit selector switch automatically removing from the circuit any voltages and controls which are not required for the test in question.

**R1224A. 5 VALVE BATTERY SUPERHET.** A superb ex-R.A.F. receiver covering 1-10 mcs in 3 switched bands. Circuit employs RF stage. Has Muirhead precision slow motion dial, aerial trimmer, sensitivity control, reaction control, etc., etc. Operating voltages 120v HT, 9v GB, 2v LT. Complete with valves, and BRAND NEW IN ORIGINAL MAKERS PACKING. ONLY 99/6 (carriage 7/6).

**R3084 RECEIVER.** An ideal unit for conversion to a vision receiver, and to assist intending constructors we supply with each unit full details showing how this can be done. Contains valves as follows: 2 EF54, 1 EC52, 7EF50, 1 VU39A, 1 HVR2, 1 EA50, and 30 mcs IF strip. BRAND NEW IN MAKERS PACKING. ONLY 75/- (carriage 10/-).

**INDICATOR UNIT 62A.** The cheapest way of buying EF50's and a VCR 97 tube. Besides the tube it contains 12 EF50's, 2 EB34's, 4 SP61's, and 3 EA50's, in addition, of course, to shoals of condensers, resistors, etc. Ideal for a TV constructor. ONLY 89/6 (carriage 10/-, plus 10/- deposit on transit case).

**ADMIRALTY TRANSMITTER 7AD PATTERN W4832.** First come, first served, with this "snip". Contains valves types 6V6G, VU111, CV73, transformers, small components, transmitting gear, etc., etc. BRAND NEW. ONLY 19/6 (carriage 5/-).

**EX-R.A.F. BATTERY AMPLIFIERS.** A very fine little amplifier used by the R.A.F. for intercom. on aircraft. Makes an ideal pre-amplification stage for operating a gramophone, pick-up, home intercommunication unit, etc., etc. Complete with valves QP21 and 21OLF in wood transit case. Operating voltages, 2v LT, and 120V HT. BRAND NEW. ONLY 25/- (carriage etc., 2/6).

**AMERICAN FREQUENCY METERS BC.221.** These are known to be supreme in their class. Coverage is 125 kcs-20,000 kcs with better than .01% accuracy on all ranges, each instrument being individually calibrated. They are battery operated, but there is ample room in the battery compartment for a mains power pack if required. Each instrument is complete with crystal, valves, calibration charts, instruction book, etc. A necessity for amateur transmitters, laboratories, factories, and anyone requiring extreme accuracy. An illustrated leaflet will be sent on request. ONLY 15/-/-.

**IF YOU ARE INTERESTED IN BUILDING A TV** you should send for a copy of the data showing how you can build a complete sound and vision receiver from EX-GOVT. RADAR GEAR. This consists of 26 large pages of circuits, instructions, and actual photographs of the units specified, and costs 7/6. The two radar units cost £6/10/-, the data being supplied gratis, but to intending constructors who wish to read through the data first we will credit the cost if the two units are purchased within 14 days. The power supplies are derived from a combined HT and EHT transformer costing £5/10/-, but if this is purchased with the radar units the total cost is £11/10/-, showing a saving of 10/-. Other small components not in the radar units are conveniently listed to enable constructors to see what they have available from their own stocks, but we can supply everything. As a guide, the cost of these additional components is £6/7/4, including speaker and control knobs, therefore bringing the total cost to under £18. When ordering by post please add 12/6 carriage, plus 10/- deposit on packing case.

C.V.O. Please.

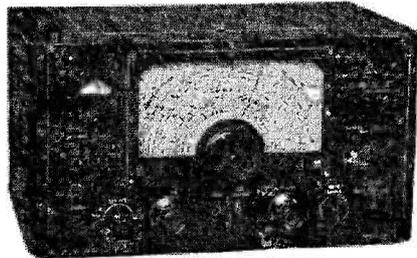
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**U.E.I. CORP,**

The Radio Corner, 138 Gray's Inn Road, London, W.C.1

(Phone: TERminus 7937)

Open until 1 p.m. Saturdays, we are two mins. from High Holborn, five mins. from King's Cross.



Model B

THE "COMMANDER"  
DOUBLE SUPERHET  
COMMUNICATIONS RECEIVER  
PRICE £48-10-0

Has already established itself as the leading communications receiver available to the amateurs all over the world.

We take pleasure in quoting from a recent unsolicited testimonial from a real old timer, George Connor, G5FY: "Please allow me to congratulate you on the production of a very fine communications receiver. The appearance of the receiver is very pleasing, the position of the controls is well balanced. The large open tuning scale is undoubtedly the finest of its kind in the world of communications receivers. The accuracy of its calibration is of a very high standard."

"The Commander's performance equals and in most cases surpasses with considerable ease the performance of other receivers under observation. You are to be highly commended for designing a receiver of this nature."

Complete operating and servicing manual available. Price 5/-.

Send 2½d stamp for illustrated leaflet and hire purchase terms.

**RADIOVISION (LEICESTER) LTD., 58/60 RUTLAND ST., LEICESTER**

Phone 20167

## HEADPHONES WHICH UPHOLD BRITISH PRESTIGE



TYPE "K"

Your local dealer can supply  
Descriptive Literature on request

Phone: WATFORD 7241

The S. G. Brown Type "K" Moving Coil headphones supply that High Fidelity Reproduction demanded for DX work, monitoring and laboratory purposes, etc.

### OUTSTANDING CHARACTERISTICS

D.C. RESISTANCE, 47 Ohms.  
IMPEDANCE, 52 Ohms at 1,000 c.p.s.  
SENSITIVITY,  $1.2 \times 10^{-12}$  watts at  
1 kc. = .0002 Dyne/cm<sup>2</sup>.

Price **£5 : 5 : 0** Per Pair



FOR DETAILS OF OTHER S. G. BROWN HEADPHONES  
(PRICES FROM 30/- TO 77/6)  
WRITE FOR ILLUSTRATED BROCHURE "S.W."

## S. G. Brown, Ltd.

SHAKESPEARE STREET, WATFORD, HERTS.

## Lyons Radio

3 GOLDHAWK ROAD,  
SHEPHERDS BUSH, LONDON, W.12  
Telephone : Shepherds Bush 1729

### Modulation Indicators (ex-R.A.F.)

These instruments are designed to measure percentage modulation depth over a frequency range of 2.4 to 6.25 mcs. They are fitted with a 2½-in. 0-500 micro-ammeter specially calibrated. Operation is from a 2v battery (approx. 0.2a). A standard type of 2v triode is used and can be supplied if required (5/-). Condition as new but outside of cases marked. Overall size, 10½" × 6½" × 7" deep. Accessories for coupling included. Price 57/6 (carriage 2/6).

### Receiver Type RI355

Very useful unit for television construction containing 7.7 mcs IF strip. Includes 10 valves (8 VR65's, 1 5U4, 1 VU120). Price (new condition) 45/-, or used, 30/- (carriage 5/-).

### Steel Deed Chests or Safes

For the safe keeping of documents and valuables, size 17½" × 13" × 12½". Fitted with strong lock (two keys supplied) and folding handles on sides. Price 30/- (carriage 3/6).

### Frequentite Ceramic Coil Formers

5" long × 2½" dia. 8 grooved ribs for winding 26 turns of up to 12 SWG. 14 holes provided for taps, etc. Suitable for transmitter coils for 3 mcs and above. Price 2/9 each or 3 for 8/- (postage 9d.)

### Receiver Type RI132A

Still available, see last month's *Short Wave Magazine* for full particulars.

### Power Unit Type 4A

These units were designed for use with the RI132A and 1481 to enable these receivers to be operated entirely from a 6v accumulator. Utilising a rotary converter, the output is 220v at 60 ma and is fully smoothed and filtered. Made for bench or rack mounting. In good condition and perfect working order. Price 45/- (carriage 11/- with 5/- refundable on transit case).

### Crystal Monitor Type 4

High-grade instrument for providing modulated RF over 100 to 130 mcs from the 18th harmonic of a crystal. (Crystals are not provided except for one we supply free.) This instrument was designed for checking the RI132A. Operates on AC mains (200-250v). As brand new and in proper working order. Price £5/10/- (carriage 6/-).

### M.C.R.1 Power Units

A neat little power unit especially useful to the experimenter. Size 8" × 2½" × 3½". Input AC or DC 90 to 250v. Output 90v at 15 ma and 7.5v at 150 ma. In perfect working order. Price 35/- (post free).

# RADIO CLEARANCE LTD.

## 27 TOTTENHAM COURT ROAD, W.I      MUS 9188

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

To clear space in our warehouse prior to rebuilding, we are offering the remainder of our stock of these well-known receivers at clearance price. Freq. range, 65-86 Mc/s, 6' S.M. Dial, 10 6-3v Valves, 2 VR65s, 4 VR53, 1 VR66, 1 VR54, 1 VR57, 1 VR67. I.F. Freq. 12 Mc/s. B.F.O. These receivers are 19" rack mounting, brand new in transit cases, with circuit diagram. £4/19/6, carriage paid.

### RECEIVERS R.U. 19

6-valve straight receiver with 3 R.F. stages, using plug-in coil packs, H.R.O. type. Valves : 3 7B's, 2 7T's, 1 1642. Black crackle case, 15" x 8" x 8". Provision for remote or local control. Dial cal. 0-100. Supplied new, complete with valves and 6 coil packs covering : O, 187-305 ; P, 281-455 ; Q, 524-844 ; E, 1285-2155 ; G, 2960-4620 ; H, 3865-6265 ; M, 5075-7780 ; K, 8750-1395 kc/s. £4/10/-, carriage paid.

### PERSONAL RECEIVERS B.C.728C

7-valve receiver with 1.4v valves, R.F. VT173, mixer VT171, osc. VT173, I.F. VT173, det. and audio VT172, output VT174, bias rect. VT174 ; covers 2-6 Mc/s, with 4 push buttons adjustable 2-2.6, 2.6-3.5, 3.5-4.5, 4.5-6.0 Mc/s respectively. Operates from 2v acc by 2v vib., with 12v vib. for charging 2v acc. Carried slung on shoulder. Supplied brand new with valves, telescopic aerial, 2v acc., 2 vib., mounting accessories and instruction book. Built-in loudspeaker. £9/9/-.

### MASTER OSCILLATORS

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

### CRYSTAL MULTIPLIERS

Wilcox Gay, Type M.I. 19468. This is a xtal osc. using 807. Freq. range 2-7 Mc/s. Also incorporates 0-10mA grid current meter, etc. Supplied brand new in original cartons, with accessories, book, etc., 40/-, carriage paid.

### MAINS TRANSFORMERS

Primary, 0-110-200/250v 50 c/s. Secondaries, 230-0-230v, 100mA, 5v 2A, 6.3v 2A, C.T. 15/6.  
 Primary 200/250v 50 c/s. Secondaries, 275-0-275v, 120mA, 4v 2A, 4v 3A, 13/6.  
 Primary, 200/250v 50 c/s. Secondaries, 460v 200mA, 210v 15mA, 6.3v 5A. 18/-.  
 Primary, 200/250v 50 c/s. Secondary, 110v. Rating, 60w. Enclosed. 19/6.

### SMOOTHING CHOKES

15H, 200mA 150 Ω, size 6½" x 4½" x 3½" ... .. 7/6	6H, 200mA, 100 Ω ... .. 6/-
20H, 300mA, 150 Ω, Weight 13 lb., size 7" x 5" x 5" 20/-	5H, 200mA, 90 Ω ... .. 7/6
20H, 40mA, 220 Ω, ... .. 3/11	5H, 120mA, 140 Ω ... .. 5/-

### ELECTROLYTICS

8mF 170v, 1/3 ; 8mF 350v, 2/- ; 8mF 450v, 2/3 ; 16mF 350v, 2/6 ; 16mF 500v, 3/- ; 8+8 450v, 4/- ; 16+16 500v, 4/6 ; 8+32 450v, 4/6 ; 16+32 450v, 4/6 ; 16+24+8mF 450v, 5/- ; 100mF 3v, 3d. ; 100mF 6v, 6d. ; 25mF 25v, 1/3 ; 25mF 50v, 1/3 ; 50mF 50v, 1/6. Special lines 16mF 350v card, 2/- ; 24mF 350v can, 2/- ; 8+24mF 350v can, 2/6 ; 16+8 350v can, 3/- ; 16+24 350v card, 3/- ; 60+100 mF 350v can, 3/-.

### LOUDSPEAKERS, P.M.

5", less trans., 10/11 ; 5", with trans., 12/11 ; 6½", less trans., 13/11 ; 10", with trans., 21/- . All brand new, boxed, with all. speech coils. Post extra.

### METERS, MOVING COIL

Metal cased, 2" circular, 0-500 micro/amp., 7/6 ; 0-15/600v (requires ext. res.), 6/6. 0-20 or 0-40 amp. (with shunts), 5/- . Bakelite cased, 2" square, 0-500 micro/amp., 9/6 ; 0-1mA, 7/6 ; 0-5mA, 6/- ; 0-50mA, 7/- ; 0-150mA, 6/- ; 0-300v D.C. (series res. supplied), 7/- . Bakelite cased, 2½" circular, 0-100 micro/amp. F.S.D., scaled megohms 4-2-5m-inf., 18/6 ; 0-500 micro/amp., 16/6 ; 0-30mA, 7/- ; 0-50mA, 8/6 ; 0-100mA, 9/6 ; 0-200mA, 9/6 ; 0-1mA, desk type, 15/- ; 0-15v, 7/- ; 100-0-100v, centre zero, 1mA F.S.D, 7/-

### MODULATORS B.C.456B

3 Valves, 1-1625, 1-1215, 1 VR150/30. Brand new, 13/6.

### R.F. UNITS

Type 24, with valves, used, good condition ... ..	8/6 plus 1/6 post
Type 25, with valves, used, good condition ... ..	10/6 plus 1/6 post

### CONTROL UNITS

With 2 2" square moving coil meters, flush mounting, 0-5mA and 0-40v, toggle SW, 5- and 7-pin sockets. 8/6. Post 1/-.

### F.M. RECEIVERS, B.C.603

10-valve receivers covering 20-28 Mc/s. Tuneable or 10 channels available by push buttons. I.F. 2.65 Mc/s. Bandwidth 80 kc/s. Power output, 2 watts to built-in 5" speaker. Provision for phones. Line up : R.F. 6AC7, Mod. 6AC7, osc. 6I5, 2 IF's 12SG7, limiter 6AC7, det. 6H6, A.F. and B.F.O. 6SL7, A.V.C. 6SL7, output 6V6. Brand new. £6/19/6.

### U.H.F. MUSHROOM VALVES. Type 717A, new, 12/6.

#### CERAMIC SWITCHES

2P 3W 1 Bank ... ..	2/-	3P 3W 1 Bank ... ..	2/6
2P 6W 4 Bank ... ..	4/6	3P 3W 2 Bank ... ..	3/-

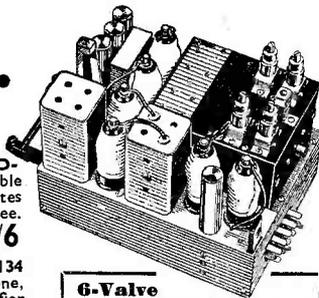
#### VIBRATOR PACKS

Input, 12v. Output, 250v 65mA, with 12v vibrator and OZ4 rectifier. Mounted on chassis 5½" x 3½" x 1½", with 8 ft. screened cable, on output. Brand New, boxed, 17/6.  
 Vibrator Packs, 6v Input 250v 60mA Output, with Sync. vib., and 10+10mF Elect. Size 8" x 2½" x 4½". On/Off Switch, 14/6.

S.M. DIALS, as used on R.F.26, etc., less Cursor, 4/11.

# INSTRUMENT CO.

244 HARROW ROAD, LONDON, W.2.



### 6-Valve

## SUPERHET

Receiving Unit of the well-known TR1196 which covers 4.8 to 6.7 mc/s. Among the many useful components are:—1 pr. standard IF transformers (460 kc/s), iron dust cores, 2, 1 MF.D, 500v working condensers; 4, 1 metal tubular condensers, 1 MIO transformer; 1 photo output transformer, 2 pot meters, 10 fixed condensers of standard values; more than 2 doz. resistors from 200 ohms to 1 megohm; 6 International octal valve holders; 2 tag boards; 1 Yaxley switch; 4 pre-set .0001 condensers and tuning coil. In fact a 6-valve superhet mounted on steel chassis, size 8 1/2" x 6" x 2 1/2". Less valves, post free, 10/-.

With valves, 28/8, plus 2/6 pkg. and ins.

Can be easily modified for All Wave Broadcast Receiver by addition of coil pack. Circuits and modification details, 2/3.

### INEXPENSIVE TELEVISION

R1355 in good condition, complete with RF25. Needs only minor modifications to give the perfect vision receiver. 42/6 plus 5/- carriage.

**TYPE 6 INDICATOR** containing VCR97, Pot/Meters, and a host of useful components including valves, etc. £3/19/6

Plus 15/- carriage, 7/6 refunded on return of packing case.

**EHT TRANSFORMER** giving 2,500 volts; two 4v tappings. Post free. 47/6

**CONDENSERS.** 8 Mfd., 450 volt working. Post free; 1/9 each

**EHT RECTIFIER H.V.U.I.** Post free, 8/-.

"INEXPENSIVE TELEVISION" BOOKLET at 1/8. Post free.

Shows how to make your television from Ex-Govt. Units listed above.

**ADJUSTABLE THERMOSTATIC SWITCHES.** Suitable for mains voltages. Operates between 30 to 90° Fahr. Post free. each 8/6

**EX-R.A.F. AMPLIFIER 1134** Ideal for use with a microphone, or can be used as an amplifier without modification. Complete with wooden transit case. Post free 16/9

**MAINS TRANS.** Stand-up type. Primary 200-250 volts. Secondary 350-0-350 100 milliamps, 5 volts, 4 amps, 6.3 volts, 3 amps. Post paid £1

**12 ASSORTED RELAYS** for experimental purposes. Post free 12/9

**INFRA-RED TUBE** 14/6 Post free

**2 1/2" FLUSH MOVING IRON AMMETER 0-25** Post free 7/6

Write for full list of bargains to Dept. "M"

**INSTRUMENT CO., 244 Harrow Road, London, W.2**

Telephone: CUN 0508

## LAWRENCE'S RADIO BARGAINS

**Receivers R4/ARR2.** Freq. approx. 148 mcs. Miniature valves: 3 6AK5, 7 9001, 1 12A6. Similar in size BC453. 65/-. Control cables, 7/6. Above sets ideal for mobile operation.

**Bendix Compass Receivers MN26.** Valves: 1 6L7, 2 6N7, 1 6B8, 2 6J5, 5 6K7, 1 6F6. Freq.: 150-695 kcs, 3.4-7 mcs. Complete with circuits, 90/-.

**New Everett Moving Iron Meters, 7".** 0-250v, 15/-.

**Genemotors Type 33.** Ideal for Car Radio. Input 12v-6v. Output 200v. Fully suppressed, 11/-.

**New Bendix Receivers BC433G,** commercially modified for 230v AC operation, push-pull 6L6 output. Wonderful fidelity. Complete with front panel, which incorporates tuning dial, illuminated tuning meter and all controls. Ready to fit into cabinet, £14.

**Special IF Transformers,** 560 kcs, for your 78 or 76 Receiver conversion. Duet cored, 3/6.

**Filter Units Type 5.** Incorporate Mains Noise Filter and quantity valuable parts. A genuine bargain at only 10/-.

**Field Telephone Sets Type F.** Feature Magneto and Bell ringing circuit, buzzer call, 60/-.

**New Control Panels for RU19 Receivers, 7/6.** Ditto, 78 sets, 7/6. Ditto, BC966, 3/6. Ditto, SCR274N, 8/6.

**New Star Identification Instruments.** American. In leather case, with instructions, 3/-.

**Receivers Type RI125.** Two valves. Freq. 30 mcs. Ceramic insulation. With circuits, 8/-.

**New American Box Kites M357A.** Large size. Employed for elevating antenna, 15/6.

**Aerial Tuning Units, Type 126.** Rotatable inductance. RF Ammeter. Tune 2.5-13 mcs, 7/-.

**New Headphones DLR No. 1.** With jackplug and long lead. In maker's cartons, 5/-.

**New Interphone Amplifiers, Type 16129.** Midget 9D6 valve. Exceptional value at 15/-.

**New Automatic Enlarger Timing Units, Type 35.** With full instructions, in case, 24/-.

**New Bomb Release Switch Panels.** 16 toggle switches. Terminal strip. Rotary switch, 6/-.

**Transmitter Receivers RDF No. 1.** Valves: 1 5Z4, 2 P61, 5 SP61, 1 EC52, 1 EB34, 1 EI323, 3 EA50. Freq. approx. 145 mcs. Tuning dial, 37/6.

**New Marconi VHF Dipole Assemblies, Type 171.** Freq. approx. 420 mcs. Chrome fittings. Moulded streamlined element support. With Feeder and 10 ft. oak mast. Maker's cartons, 30/-.

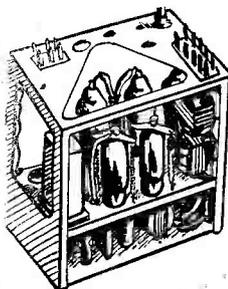
**New Valves.** At 7/6, 715B, 100TH, 211. At 20/-, 703A doorknob, 10, 205D, PT15. At 10/-, 6AK5. At 7/6, 5Z4 metal, 6AG5, 6F7, 6I7, 6G6, 6K7, 6SQ7, 6V6, 7C5, 7F7, 7Y4, 9D6, 12K8, VR150, 713A, 717A, 807, 865, EF36, EF54, Pen46, HVR2. At 6/6, 2X2, 3Q5, 6B8, 6J5, 6K7G, 6Q7GT, 6SJ7, 1625, EF50, MU14, VR105, 5U4, RL7/EC52. At 5/-, 6AC7, 6SA7, 6SL7, 6SN7, 7V7, 12A6, 12SJ7, 12SK7, 12SR7, 5P61, V950, 956, 9001. At 4/6, 6SH7, 8D2, 12C8, 12J5. At 2/9, 6H6, 7193, EA50, D1, SP41. CR Tubes, with metal screens and holders at 30/-, 2AP1, 3EP1. All guaranteed. Two or more valves post free, otherwise add 6d.

Terms C.W.O. Prices include carriage. No lists.

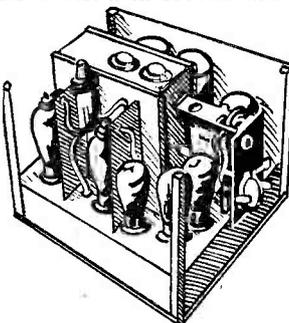
**LAWRENCE'S, 61 Byrom Street, Liverpool, 3. CENTRAL 4430**

# RADIO EXCHANGE Co. for Bargains!

9. CAULDWELL STREET, BEDFORD.



**AMPLIFIER UNIT 165**  
 A small chassis measuring  $4\frac{1}{2}'' \times 8'' \times 7\frac{1}{2}''$ , with 5 (6-3v) valves. Consists of two audio amplifiers—1, EF36 driving EL32's in push-pull 2, EF36 driving EBC33. Three inputs to unit, which easily converts for public address or modulator. Complete with circuit diagram. RADIO EXCHANGE PRICE 25/-



**T.R.9 RECEIVERS**  
 A 6 valve battery set covering 6 mc/s to 9 mc/s. Easily converts for other frequencies. Will operate a loudspeaker. SACRIFICED AT 19/6.

**RADIO EXCHANGE BARGAIN PARCEL**

Contains; 1 American IFF Transmitter/Receiver, with 13 6-3v valves, 9v dynamotor (and our mains motor conversion data); converts for 144 mc/s, or strips for a huge number of parts. 2, two metal rectifiers. 3, six plugs and sockets. 4, pair U.S.A.A.F. headphones. 5, dozen assorted wander plugs. 6, two moving coil meters (slightly chipped cases). ALL FOR 30/-.

**SCR 291A**

Fully described last month is a 13 valve communications receiver, covering 30 mc/s to 1.5 mc/s. With 2 R.F.'s, separate oscillator, 2 I.F.'s, amplified AVC, and built-in speaker, it has a performance comparable to that of the AR88! It is housed in a grey crackle finish, rack type cabinet, together with a large additional power supply, and a field telephone. In SEALED MAKERS' TRANSIT CASE. OUR PRICE, £39/10/- plus £2 carriage. Your existing Rx taken in part exchange.

**RF 25 UNITS**

No need to describe these 40/50 mc/s units, sufficient to remind you that they are ideal for London Television. In MAKERS' CARTONS. 18/6.

**SHROUDED KEYS**

A super job, with solid movement and heavy contacts. To CLEAR, 1/6 each.

**RECEIVER UNIT 184**

Chassis measures  $16'' \times 8'' \times 8\frac{1}{2}''$ , with 4 EF50's, 7 SP61's, 2 EA50's, 1 VU111, 3 neon stabilisers, and a klystron. Electrolytics, condensers, resistors, etc., and a 45 mc/s strip! BRAND NEW IN MAKERS' CARTONS for 36/-.

**DISPLAY UNIT 198**

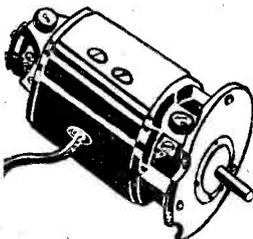
$6'' \times 12'' \times 17''$ , with a 3" CRT (VCRI38A), 4 SP61's, 1 VR54 and 3 EA50's; hundreds of resistors, condensers, etc. Ideal for building an oscilloscope. BRAND NEW, IN MAKERS' CARTONS, 35/-.

**BC221**

The finest frequency meter ever made; better than .01% accuracy! Covers 125 kc/s to 20 mc/s, but can be calibrated for higher frequencies. Every set is tested prior to despatch against W.V.V. (Washington) standard transmission. With valves, book, and crystal. ONLY £9/9/- Stabilised mains power pack for fitting internally available for £2 extra.

**FRACTIONAL H.P. MOTORS**

Small mains driven motors measuring  $4\frac{1}{2}'' \times 3\frac{1}{2}''$ , with spindle and toothed cog. A fast turning machine that can be used for many purposes. OUR PRICE, 15/-



**MOVING COIL METERS**

0/3-5A thermocouples ...	3/6
0/100mA D.C. (scaled 300)	3/6
0/300v D.C. (new) ...	5/-

**HEADPHONES**

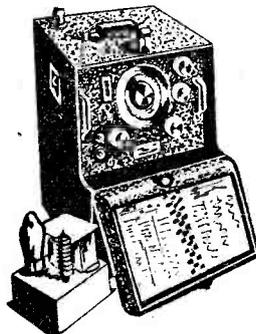
Balanced armature ...	2/6
Diaphragm type ...	2/6

**CARBON MIKES**

with long leads ...	3/6
<b>MOVING COIL MIKES</b>	2/6

**12/24v A.C./D.C. MOTORS**

Small high speed motors, with detachable fans and housings. BRAND NEW, TO CLEAR 10/-



Goods sold as used unless otherwise stated. Please include sufficient for carriage.

**RADIO EXCHANGE CO.**

9 CAULDWELL STREET, BEDFORD. Phone: 5568

**G6YA**

**WESTERN GATEWAY HEADQUARTERS  
FOR RADIO AND TELEVISION EQUIPMENT**

**G2BAR**

**ARTHUR H. RADFORD, A.M.I.E.E., A.M.Brit.I.R.E.**

Will continue to advertise his Best Bargains to you with a New Business name. See below. Your help and business in making this expansion possible has been very much appreciated.

**GENUINE R.C.A. EQUIPMENT**

**RCA PLATE TRANSFORMER.** Input 190/250v 50cps. Sec. : 2,000-1,500-0-1,500-2,000v at 800 m/a. Weight 97 lbs. net. Size 9" x 9" x 7 1/2". £6/10/- each.

**R.C.A. MODULATION TRANSFORMER.** Primary 10-400 ohms, suitable 805, TZ40, 813 in class B. Sec. 4,300 ohms, suit any P.A. up to 1kW. Weight 671 lbs. net. Size 9" x 9" x 7". £4/15/- each.

**SPECIAL OFFER.** Plate transformer and modulation transformer as above in one case available at £10 the two transformers.

**CONDENSERS, OIL IMPREGNATED**

Capacity	Working Voltage	Size	Price
4+4 mfd.	3,000	9" x 7" x 5"	25/-
4 mfd.	2,000	5" x 5" x 2 1/2"	15/-
4 mfd.	1,500	5" x 5" x 2 1/2"	12/6

**BC610 EXCITER TUNING UNITS.** Brand New, TU 61, 1-5-2-0 Mc/s, 8/6 ea. TU 62, 1-0-1-5 Mc/s, 6/6 ea., plus 1/3 postage.

**TANK COILS.** BC 610 Top Band, 5-pin on ceramic strip, swinging link, made by Barker & Williamson, 7/6 ea., 1/- postage. Sockets for above coils, 2/6 set of five.

**CHANGE OVER RELAYS.** 6-pole 2-way, as used in the 1154 transmitter, operates on 6/9v, will switch complete transmitter and receiver station, including aeriels. 7/6 ea.

2-pole 2-way c/o relay. Made by Leach, U.S.A., large positive contacts, 24v D.C. coil. Size 2 3/4" x 1 3/4" x 1 1/2". 10/- each, including post.

**TELEVISION LEAD-IN CABLE.** 80 Ohms twin co-ax cable. Any length cut. New. 9d. per yard, postage 1/- per 10 yds.

**5-PIN PLUG AND SOCKETS.** Centre locating key, excellent insulation, with plated connecting pins. 2/- pair, 20/- per dozen pair.

**5-WAY RUBBER INSULATED CABLE.** Cotton covered for use with the above connectors. 9d. per yard.

**10-PIN PLUG AND SOCKETS.** With centre locating key and 6 ft. of connecting cable. Plug fitted both ends. Complete with sockets. Brand new. 5/- per set.

**A.C. METER.** 0-1 m/a with 4" open scale, beautiful instrument. 25/- ea., 1/6 postage.

**1196 TRANSMITTER RECEIVER.** Operates phone and M.C.W. from 4-3-6.7 Mc/s. Easily modified for other frequencies. 45/- each. Transit case, 2/6. Type 12, push-button controller with trans. rec. switch. 5/- ea. Crystals 5100, 5980, 6180, 6720 kc. 4/6 each. Carriage, add 5/- goods, 7/6 passenger train in England and Wales.

**RADIO INTERFERENCE MAINS SUPPRESSORS.** Neat aluminium case, two wires in and out. 7/6 each, postage 9d.

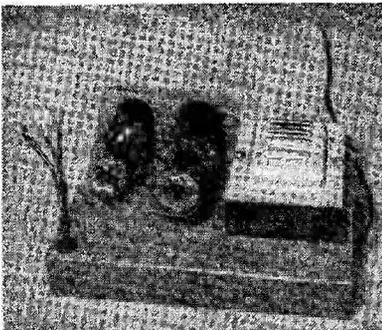
**EIMAC & JENNINGS.** High voltage vacuum condensers. 50 pf. and 100 pf. 7/6 each.

We guarantee satisfaction with all our equipment. Write to us for all your requirements.

**CABOT RADIO CO., LTD.** 28 Bedminster Parade, Bristol, 3  
Phone : 64314 Open Saturdays : 9-5.30 p.m

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RADIO**

**ELECTRONIC ENGINEERS  
76 PRESTON STREET · FAVERSHAM · KENT**



Instructions and template included

PRICE **£3 . 18 . 6**

Inc. packing and postage within Great Britain

Telephone : Faversham 2004

We apologise to the many customers who are awaiting our illustrated list of U.H.F. components. A further supply is expected within a few days and will be despatched immediately.

**Now Ready—New Production  
STABILISED POWER PACK**

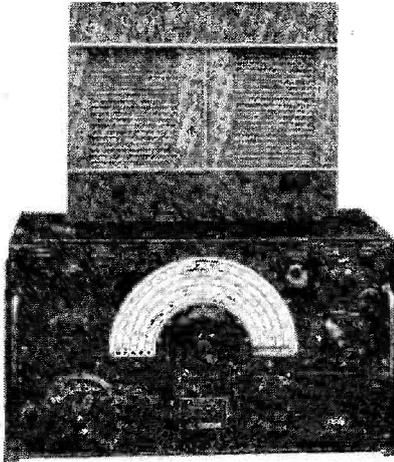
for BC221 frequency meter or similar application. Input 0-110-200/250v 50 c/s. Output 150v 5-40 ma. Regulation 5/30 ma 2v—5/40 ma 4v. Type P22/A fits the battery compartment of the BC221 and is manufactured by us using new high grade components on stove enamelled aluminium chassis.

Size 8" x 6 3/8" x 4".

## THE FAMOUS TU5B TUNING UNIT

American Made precision temperature compensated coils and condensers. This can be turned into a v.f.o. which is really stable. The A.R.R.L. gave details of the alterations and we will supply a copy of the details with every unit. Alternatively the TU5B can easily become a transmitter and this Magazine has given details of at least three other units.

Price for this month only is 19/6 plus 3/6 carriage.



**STATION RI155**

### A DUAL PURPOSE RECEIVER

This is the way we might well describe the RI155 Communication receiver, for with this you can relax and listen to the B.B.C. or you can search out the weakest station on your favourite band. Frequency range 75 kc/s to 18 mc/s, 10 valves. Black crackle case. Ex-R.A.F. Not new so we have graded them into three classes according to external condition. Class A at £12/10/- being as new, class B at £10/10/- slightly soiled, and class C at £8/10/- being rather well used. Even the class C ones, however, are in thoroughly good working order for all classes have been checked, adjusted, and serviced in our workshops. You can't go wrong by buying one of these for it will give you years of useful service. We shall be glad to dispatch a receiver to you if you can't collect, but please add 15/- extra to cover carriage charges, and wooden transit case. If you wish you may return the case, when 7/6 will be refunded.

To save you having to make any fiddling alteration to your RI155 we have developed a unit which is a combined mains power pack, loudspeaker 6W6 output stage and set switching unit. This is enclosed in a very fine cabinet and stands on top of the set as illustrated. It is fitted with two leads, one plugs into the mains, the other plugs into the receiver. Your RI155 is then mains operated, and will work right away without modification. The price of this unit is £7 carriage paid.

**STOP PRESS.**—A few "N" model RI155 receivers have just arrived. The price is £15 (plus carriage).

*H.P. terms if desired*

# W. D. SALES

3 Electron House, Windmill Hill, Ruislip Manor, Middx.

## CONSTRUCTORS' COLUMN

Here is a list of high-grade goods which are available at very keen prices.

**PLEASE NOTE.**—That unless otherwise stated all goods are new and unused, and of recent manufacture and not Government Surplus.

**ELECTROLYTIC CONDENSERS.** (Only new stock from best manufacturers.)

2 mfd. 450 v. . . . . 1/2	8 mfd. 350 v. . . . . 1/6
4 mfd. 450 v. . . . . 1/3	16 mfd. 350 v. . . . . 1/11
8 mfd. 450 v. . . . . 1/11	32 mfd. 350 v. . . . . 1/11
16 mfd. 450 v. . . . . 2/8	25 x 26 mfd. 200 v. . . . . 3/11
8 x 8 mfd. 450 v. . . . . 3/4	8 mfd. 150 v. . . . . 1/3
8 x 16 mfd. 450 v. . . . . 3/4	26 mfd. 25 v. . . . . 1/-
16 x 16 mfd. 450 v. . . . . 3/9	26 mfd. 50 v. . . . . 1/6
16 x 8 x 24 mfd. 450 v. . . . . 4/9	50 mfd. 12 v. . . . . 10d
	10 mfd. 25 v. . . . . 10d.

**PHILLIPS** wet electrolytics, standard type, can size 3in. high 1 1/4in. dia., complete with locking screw for single hole fixing with bottom plate, 32 mfd. 320 v., 3/6; 14 mfd. 450 v., 2/9

**MIDGET TUNING CONDENSERS.** 2 gang .00035, fitted with trimmers, and complete with perspex dust cover. These condensers made by "PLESSEY," are of the type used for tuning personnel receivers. Price is 6/6, plus 8d. postage.

**4-GANG TUNING CONDENSERS.** .0004 each section—fitted trimmers—ceramic insulation. These are complete in a very useful chassis, and are fitted with a drive. Government Surplus equipment but new and perfect. Price 2/9, plus 1/3 postage. Case of six units, 17/8, carriage paid.

**2-GANG .0005 CONDENSER.** Standard size—ceramic insulation. Price 4/8, plus 4d. post.

**CHEKES. IRON CORES L.F. (Surplus).** 250 m.a. 10 henry, 9/8; 200 m.a., 6/-; 70 m.a., 4/8; 50 m.a., 3/8.

**E.H.T. CONDENSERS (Surplus).** .1 mfd. 5,000 v., 3/9; .02 mfd. 8,000 v., 3/9; .02 mfd. 5,000 v., 1/6.

**PAPER CONDENSERS.** We have all types in stock up to .1 mfd., 8d. each; .25 mfd., 8d.; .5 mfd., 11d. Parcel of 36 assorted, no more than two of any value, 12/6.

**RESISTORS.** Full range in stock, 1 and 1/2 watt, 4d. each, 1 watt, 8d. each. Parcel of 100 assorted, all useful sizes, no more than two of any one type, 12/6.

**"ROLA" 5in. P.M. Speaker,** fitted standard O.P. trans., 11/3.

**"ROLA" 5in. P.M. Speaker,** fitted standard O.P. trans., 15/8.

**"ROLA" 3 1/2in. P.M. Speaker,** less output transformer, 8/9.

**PLESSEY 10in. P.M.,** fitted standard output transformer, 29/8.

**VOLUME CONTROLS**—most values in stock—good makes—with S.P. switch, 4/6; less switch, 3/6.

**TELEVISION TEST SET.** Can you be sure that your E.H.T. voltage is up to scratch, that you are not over running your condensers or ruining your cathode ray tube? You can if you own a television test set. Absolutely essential for obtaining accurate information on E.H.T. supplies. Two ranges, 0-3,000v., 0-10,000 v., at 10,000 ohms per v. A reliable instrument of modern design in a neat black crackle case, fitted with special high voltage terminals, connecting leads, and polarity reversing switch, easily portable for service jobs. Sooner or later you will want one of these instruments—why not buy now at the special price of 85/- post paid?

**TELESCOPIC DURAL RODS**—when extended these measure 3ft., but they can be cut quite easily, and as they are 1/4in. dia. (at the thick end) they make ideal television aerials. Price 7/8 each.

**TELEVISION AERIAL.** Indoor type—designed for erecting in loft or could be fixed behind the door in a bedroom, attic, etc. Price complete with fixings and instructions, 15/-.

**WHITE PLASTIC MASK.** Of correct design for 6in. tube. Will make your finished television look much more professional. Price 7/6 each.

**MAGNIFIER.** Best quality, guaranteed not to discolour. Price 39/8.

**MAINS TRANSFORMERS.** Usual 6.3 and 5 v. heaters 300-0-300 h.t. 60 m.a., 13/8; 80 m.a., 16/8; 150 m.a., 27/8; 200 m.a., 32/6.

### VALVES BARGAIN PRICES

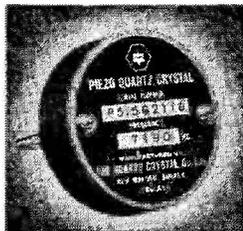
02A	13/3	6B4	9/6	6L7	9/6	12SQ7	8/6
1R5	10/8	6B7	10/2	6N7	10/-	12SR7	6/6
1S4	9/-	6B8	6/-	6Q7	6/6	14F6	9/6
1S8	5/-	6C9	9/6	6R7	6/-	25ZGT	7/6
1T4	6/-	6D6	6/6	6R87	6/6	25Y5	10/-
2A7	10/2	6F5	6/6	6SL7	13/8	25ZGTT	7/6
5T4	6/-	6GG6	6/6	6SN7	6/-	80	10/-
5U4	7/6	6HH6	3/6	6V6	7/6	83	8/-
5V4	13/8	6J6	12/6	6X5	6/6	89	8/-
6E3	13/8	6J7	7/6	7C7	7/6	807	7/6
5Z4	7/6	6K7G	7/6	12A6	6/-	84/8Z4	8/-
6A3	10/8	6K7GT	9/6	12K7	8/6	866A	15/-
6A07	6/-	6K7 MET	7/6	12K8	8/6	1239A	9/4
6AG5	6/-	6K2 MET	7/6	12SH7	7/-	9001	8/-
6AG7	6/-	6L6G	10/-	12SK7	8/-	9002	8/-



## Introduce AN IMPROVED PATTERN TYPE P5 CRYSTAL UNIT

The type P5 Quartz Crystal Unit is now fitted with a low temperature co-efficient crystal, having a co-efficient of two cycles per Mc. per degree C temperature change. It is available in an extended range of frequencies, and each crystal is acid etched finished and artificially aged for permanence of performance and calibration.

When used in the Colpitts oscillator-multiplier circuit, with a 6AG7 valve at an anode voltage of 300v, sufficient output is available on the fundamental frequency, and 2nd, 3rd and 4th harmonics to drive any of the usual tetrode valves as a further frequency multiplier or power amplifier. Details of this circuit, and an official certificate of calibration are included with each crystal.



### PRICES

\* Ground to your own specified frequency.

† Ground to a frequency from our own or your dealer's stock.

Telephone : MALDEN 0334.

Cables :  
QUARTZCO, NEW MALDEN.

The P5 unit is available in the following ranges :—

1,750 to 2,000 kc/s, for use on the fundamental frequency (1,800-2,000 kc/s) and with frequency multipliers in the 3·5, 7, 14, 21 and 28 Mc/s bands.

3,500 to 3,800 kc/s, for use on the fundamental frequency (3,500-3,800 kc/s) and with frequency multipliers in the 7, 14, 21 and 28 Mc/s bands.

6,000 to 6,083 kc/s, for use with multiplier stages (x24) in the 144 Mc/s band.

6,740 to 6,820 kc/s, for use with multipliers in the 27 Mc/s model control band.

7,000 to 7,425 kc/s, for use on the fundamental frequency (7,000-7,150 kc/s) and with multiplier stages in the 14, 21 and 28 Mc/s bands.

8,000 to 8,111 kc/s, for use with multiplier stages (x18) in the 144 Mc/s band.

8,987 to 9,093 kc/s, for use with a tripler stage in the 27 Mc/s model control band.

12,000 to 12,166 kc/s, for use with a quadrupler stage in the 144 Mc/s band.

14,000 to 15,000 Kc/s, for use on the fundamental frequency (14,000-14,400), and with a doubler stage in the 28 Mc/s band.

\*12 and 14 Mc/s ranges, £2/-/. All other ranges, £1/17/6.

†12 and 14 Mc/s ranges, £1/15/-. All other ranges, £1/12/6.

**THE QUARTZ CRYSTAL CO., LTD.**  
63-71 KINGSTON ROAD, NEW MALDEN, SURREY

## SAMSONS SURPLUS STORES

### BRAND NEW SWITCHBOARDS.

Comprising 2½" 0-300v AC. Three distribution sockets, 2 15a porcelain fuses. Mains input plug. 22/6, plus postage.

### CROMPTON PARKINSON F.G. 4½" 0-60 AC AMMETER.

Brand new. 25/-, postage 1/3.

### 6" F.G. MASTER VOLTMETER.

0-20v AC. Brand new. 17/6, postage 9d.

### R.C.A. 6v VIBRATOR POWER PACKS.

Output 275v 80 mA. Complete with vibrator, OZ4 rectifiers, 11-ft. long cable with power switch fuses and instructions. 32/6, plus postage.

### SPECIAL OFFER! VARLEY LT TRANSFORMERS

Brand new. Prim. 0-250v. Sec. 8v. 12v 3·3a, 6v ½a. 17/6, plus postage.

### UNI-SELECTOR LINE SWITCHES.

6-way, 35/-; 7-way, 37/6; 8-way 42/6.

### A.M. TANNON LOUD HAILERS.

7½" dia. in wooden case with carrying handle. As new, 22/6, carriage 3/-.

### CO-AXIAL CABLE.

30-ft. length of cable, 80 ohm. A Pye male connector each end. Brand new. 8/6, postage 6d.

### BRAND NEW RECEIVERS TYPE 184.

Containing 14 valves and 45 mcs IF strip suitable for use as television receiver. 45/-, plus postage.

### MINE DETECTOR UNIT.

Wonderful component value comprising 3 IT4 valves and bases, 9 condensers, volume control, resistors, etc. Brand new, 19/6, post 8d. IT4 valves sold separately, 6/6 each.

### R.C.A. MASTER OSCILLATORS.

Frequency range 0-10 mcs. Output sufficient to drive any PA. Uses 807 valve in extremely stable circuit. Very accurate dial calibrations with unique dial mechanism. Metering of doubler or buffer stages, grid current included. Housed in solid cast case with shock absorber mountings. Supplied brand new with accessories, including valve and operating manual. All in carton as from makers. Our price, £5/10/-, carriage 5/-, No C.O.D.

169/171 EDGWARE ROAD, LONDON, W.2

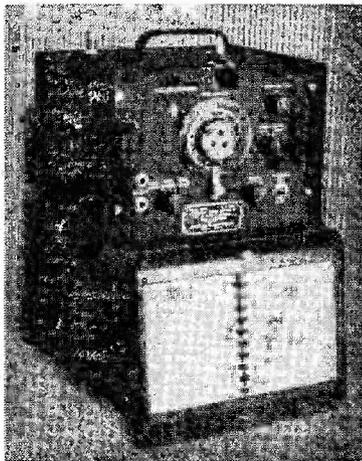
Tel : PAD 7851

125 TOTTENHAM CT. RD., LONDON, W.1

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All orders and enquiries to our Edgware Road branch, please.

## BC221's



JUST A FEW WITH MARKED  
CASES AT **£10.10.0**

SENT ON APPROVAL AGAINST CASH,  
SATISFACTION GUARANTEED

**XTALS.** Why not try the fixed osc. type of receiver using the main receiver as a variable I.F. amp? Xtals. of 8118 kc doubled will operate on the 21 mc band (receiver 4764kc) and with the Xtal. frequency trebled for 28 mc band (receiver 3646 kc); 8118.46 kcs and 8146.15 at 7/6, post free. Also 5 to 7 mcs for re-grinding, 3/6. For 144 mc 6000-6083 and 8000-8110, 12/6. R.C.A., 100 kcs, 25/-, also a few at 15/-.

**T.V.I.** Do you have trouble? Why not use the very latest methods which cure this? See Dec. 'QST' and put some W.E.50 pf vacuum capacitors rated at 5 kVA in the rig. Suppress those unwanted harmonics and make friends with your neighbours again! Only 7/6 each. We have had hundreds of delighted customers.

**XTAL MULTIPLIERS.** By the famous Wilcox-Gay Co. with 2 807's and beautiful 0-10 mil. grid meter, ideal for converting to a Clapp oscillator. Brand new and crated, 42/6. Please send for lists . . . we have thousands of new items at bargain prices, viz. :-

**VALVES.** Special, 832's, new and boxed, 22/6.

**METERS.** Special, 6 in. A.C. Master Voltmeter by Metro-Vicks, with knife edge pointer and anti-parallel mirror, 0-20v. New, 27/6. All types new and boxed.

**CHOKES.** 9H 220 ohms, 4/6; 2OH 80 mil, 350 ohms, 5/6.

**CONDENSERS.** All types, large and small, all new.

**BLEEDERS and RESISTORS.** All types and sizes. new.

**MIKES.** No. 13 m.c., with switch. New and boxed, 7/6, LET US HAVE YOUR ENQUIRIES. WE WILL GUARANTEE COMPLETE SATISFACTION IN EVERY WAY or your MONEY RETURNED at ONCE! We do NOT deal with JUNK or second-hand stuff.

**SPECIAL !!** 100 micro-amp movements for field strength meters (oil thermometers), only 7/6.

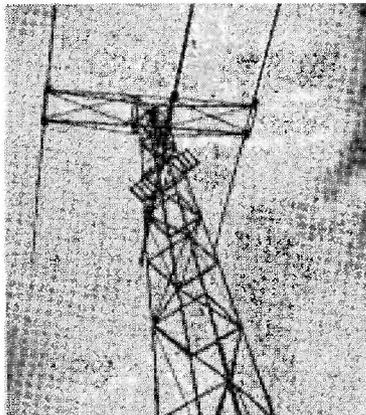
## IT'S NEW

### THE "DX PANDA" BEAM!

**EXPAND YOUR DX.** When the wind blows this cradle WON'T rock !! You put it up and forget it.. BUILT like a BATTLESHIP . . . to punch holes through QRM with BROADSIDES of RF !

10 m 3 el., as shown, £12/10/-, carriage paid. Also dual 10 and 15, 15 and 20 and a Triple Array, now being tested.

WRITE NOW for  
ILLUSTRATED BROCHURE



**THIS FB TOWER,** 32 ft. high, delivered complete and ready to assemble. £18/10/-, carriage paid. ORDER NOW ! Delivery in STRICT rotation.

WE SPECIALISE IN EXPORT ENQUIRIES and arrange freightage to ANY part of the world.

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

# CLYDESDALE

**Brand New (U.S.A. made) Transformers**

**Thermador Potted Type**

**E536 Modulation Transformer**

With ceramic stand of terminals. Pri. 6,700 ohms. C.T. Sec. 4,500, 5,000 and 5,500 ohms, max. op. 470db. freq. 10db. 400-4,000 cs. Test 5,000v, suits TZ40, T35, 813, etc., size 7" x 6½" x 5½", wgt. 22 lbs.

Clydesdale's price only **57/6** each Carriage paid

**E533 Filament Transformer**

Pri. 0-210-230-250v 50cs. Sec. 6-3v C.T., 6A, 5v, C.T. 6A. Test 2,000v, size 4½" x 4" x 5½", wgt. 8 lbs.

Clydesdale's price only **27/6** each Post paid

**E534 Filament Transformer**

Pri. 0-210-230-250v 50cs. Sec. 2-5v C.T., 10A, 2-5v C.T., 10A. Test 7,500v, ceramic S.O. terminals, size 4½" x 4" x 5½", wgt. 8 lbs.

Clydesdale's price only **21/-** each Post paid

**E535 Power Transformer**

Pri. 0-210-230-250v 50cs. Sec. 1,360v C.T., 225ma. Test 2,500v, size 4½" x 4" x 5½", wgt. 1½ lbs.

Clydesdale's price only **35/-** each Carriage paid

**Brand New**

**E537 Filter Reactor Choke**

Thermador potted type (U.S.A. made), 10 henries 225 ma. Res. 84 ohms. Test voltage 2,500v, size 4½" x 4" x 5½", wgt. 10½ lbs.

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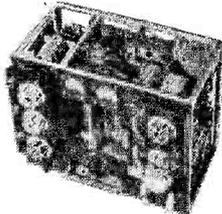
**Rock Mtg. VHF R/T Rcvr Units**

R1481 frequency, 65-86 mcs. R1132 frequency, 100-124 mcs. Each a 10-valve (plus stabilizer) superhet with precision S.M. tuning, "S" meter, etc., etc., enclosed chassis, 19" x 10½" x 11", with circuit less power pack. Tested before despatch.

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**Ex-R.A.F.**

**Aircraft XMTR-RCVR Units**



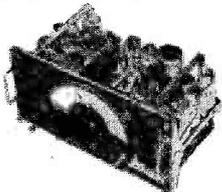
**T.1154 Transmitter**

For 'phone C.W. and M.C.W. complete with valves, etc., circuit and available plugs, in metal case 14" x 16½" x 8½", less power pack.

4-Range Model  
Clydesdale's price only **£10/10/-** each

3-Range Model  
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**R1155 Receiver**



A 10-valve communication and D.F. receiver for 18-3 Mc/s, 1,500-600 kc/s, 500-75 kc/s, in 5 W.B., complete with valves, etc., circuit and available plugs, in metal case 16½" x 9" x 9", less power pack. "Airtested" before despatch.

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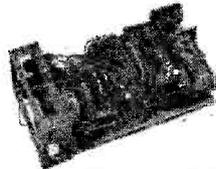
**Power Units for T.1154-R.1155**

High voltage H.T. unit, output 1,200v 200 ma. Types 32 or 32A. Input 12v, 32 amps. Type 33 or 33A. Input 23v 16 amps. L.T./H.T. unit, outputs L.T. 7-2v 13 amps, H.T. 225v 110 ma. Types 34 or 34A. Input 9-3v, 23 amps.

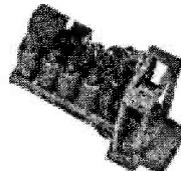
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**38 A.F.V. Xmtre/Rcvr.**



Frequency 7-3-9 mcs, with 6 valves, 4/ARP12's (VP23), 2/ATP4's (V248A), metal rectifiers, vibra-pack for 12v, in two sections, R.F. 10½" x 4" x 6", Power and I.F. 11½" x 4" x 6½", with 12-way connecting link (no spares, aerial or instruction book). Unused condition.



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1,500-600 kcs. (200-500 metres)  
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S.M. drive, BFO, AVC, MVC, etc., metal case 6½" x 9" x 9".  
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Scale	Size	M/Coil
5 m/a ... ..	*2 $\frac{1}{2}$ "	5/-
15 ... ..	†3 $\frac{1}{2}$ "	10/-
100 ... ..	†2 $\frac{1}{2}$ "	6/-
200 ... ..	†3"	6/-
300 ... ..	†3 $\frac{1}{2}$ "	10/-
2-5KV with shunt	†3 $\frac{1}{2}$ "	20/-
-5A R.F....	*2 $\frac{1}{2}$ "	3/6
1A R.F. ...	*2 $\frac{1}{2}$ "	3/6
4A R.F. ...	*2 $\frac{1}{2}$ "	3/6
15 volts. A.C. (Moving Iron) ...	*3 $\frac{1}{2}$ "	10/-

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20 watts, 1/6 each. 60 watts, 2/6 each. 200 watts, 3/6 each.

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50 mA, 40H	10/6
100 mA, 6H	5/-
200 mA, 20H	17/6
500 mA, 20H	25/-

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FOR THE RADIO AMATEUR & AMATEUR RADIO

Vol. VII

MAY 1949

No. 70

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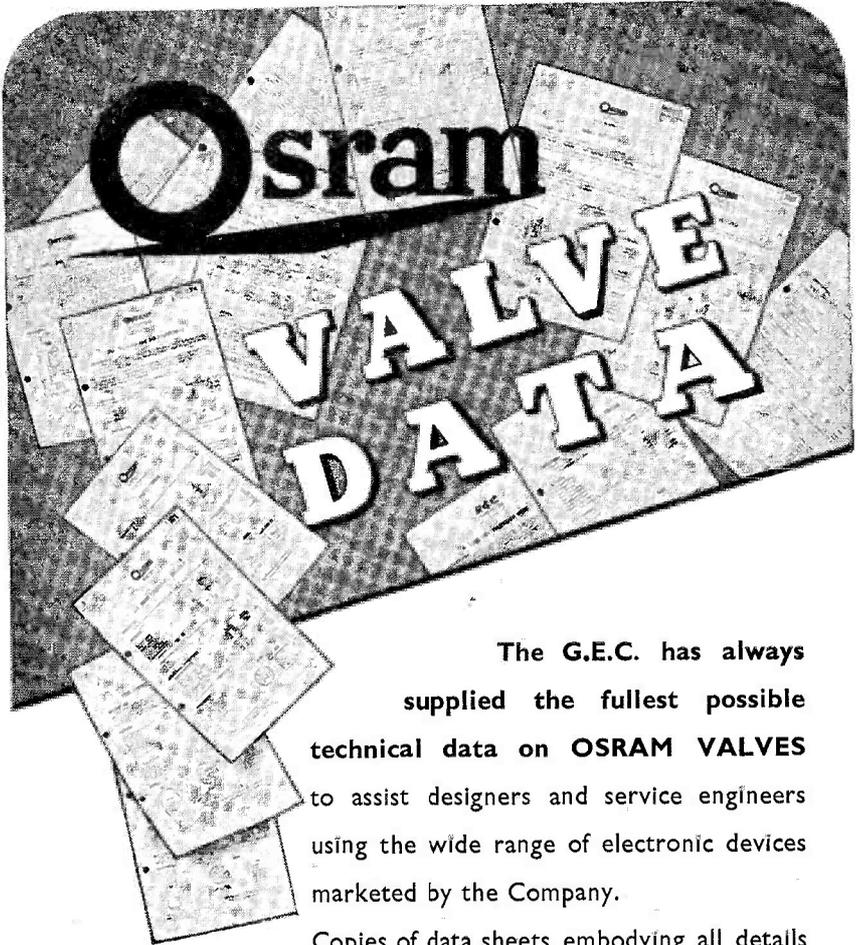
Published the first Wednesday each month at 49 Victoria Street, London S.W.1.  
Telephone: Abbey 2384. Annual Subscriptions: Inland 20s. Abroad 22s. post paid

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## EDITORIAL

## Tolerance

Listening round the bands and dealing, as we do, with a large correspondence covering every facet and angle of Amateur Radio, a certain spirit of intolerance towards the activities of others is beginning to show itself.

By the very nature of Amateur Radio, and no less by the number of stations active on the bands to-day, it is almost impossible to avoid upsetting somebody, somewhere, every time a transmission is made on our communication frequencies during the normal activity periods—that is, when most people can get on.

Listening on the frequency first to see whether it is occupied is all very well—in practically every instance it is, and will continue to be for as long as one is able to go on listening. Hence, the operator who is waiting has two courses open to him: Either to go ahead regardless (as many do) or wait till a crack appears somewhere else and then jump into it, in the hope that it is clear.

For instance, consider 14 mc when the skip is short. It is not the fault of the Europeans that their signals are coming down at S<sub>9</sub> when the DX is only S<sub>4</sub>. It is just the luck of the game. They are being annoyed to just the same extent by the G's who are S<sub>9</sub> with *them!* Then take the 80-metre phone band on a busy evening when conditions are good. There may be a five-way round-table which has been going on for an hour; the participants may feel that thereby they have booked the frequency. But by so doing they may have shut out an operator anxious to transmit who has only one crystal, *on that frequency.* The result is that one or other of the two parties must feel aggrieved—the round-tablers if the other man comes up, or the operator compelled to keep off because the frequency is occupied.

These are two simple examples, everyday occurrences, which illustrate the need for patience and a good-humoured tolerance of the activities of others.

Austin Fosdyk  
G6FO

# BC-614 Speech Amplifier

## Modifications for Amateur Use

By F. E. WINGFIELD (G2AO)

THIS is an extremely versatile unit as it has incorporated in it a modulation limiter and CW monitor. Thus, in addition to its normal function as a speech amplifier the BC-614 can be used in almost any station installation.

### Circuit

The first AF stage is a 6SQ7 running Class-A to amplify the output from a dynamic microphone (Service type T.50) or a remote telephone (Service type EE-8). So as to match the impedance of either of these inputs correctly, there is a network in the grid, consisting of resistors R101, R102, R103, R104 and R105. Microphone T-50 requires a high impedance and the remote telephone a low impedance input connection. In addition to matching, the network also provides the correct attenuation of the input audio frequency voltages, which differ considerably. In the case of the T-50, the attenuation is approximately 15 dB and for the telephone about 20 dB. The equivalent circuits are shown in Fig. 1.

The second AF amplifier is a 6J5, again operated in Class-A. In addition to this it is the input stage for the carbon microphone. The voltage from this type of microphone is developed across the secondary of transformer T101 and applied to the grid through volume control R123; the volume control for the dynamic microphone is R111. This stage is also partially biased by the modulation limiter.

The next stage is a 6SN7 connected in a self-balancing phase inverter circuit. One section works as a conventional resistance coupled amplifier, the other side giving the 180-degree phase reversal required to excite the grids of the fourth stage, which is operated in push-pull, using another 6SN7 as a Class-A amplifier, matching into a 500-ohm line which normally terminates in the BC-610 transmitter.

Excitation voltage is taken from this stage for the modulation limiter, a 6SR7. The purpose of this valve is to produce a DC control voltage proportional to the peak amplitude of the speech amplifier output voltage, this DC being used to bias the 6J5 as already mentioned. The triode section acts as an audio amplifier and the two diodes

In our issue for March last, the author dealt very fully with the BC-610 Exciter Unit. Here are his suggestions for the associated BC-614 Speech Amplifier, a fine piece of equipment incorporating some interesting design features.—Ed.

as a full-wave rectifier circuit. The limiter control is R134.

The sidetone oscillator uses a 6SN7 connected in a multivibrator circuit; the cathode of this valve is keyed with the transmitter keying relay. The sidetone amplifier is a 6J5 connected as a cathode follower to isolate

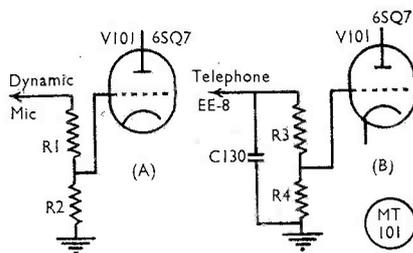


Fig. 1. Equivalent input circuits of the microphone matching system in the BC-614. The resistor values are: R1, 536,000 ohms; R2, 9,000 ohms; R3, 1,000 ohms and R4, 100 ohms.

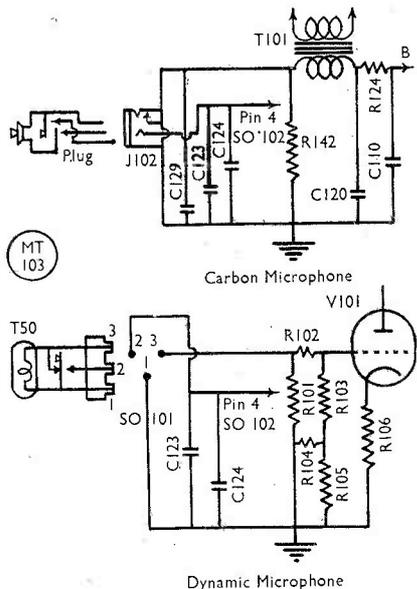


Fig. 3. The microphone circuits discussed by G2AO.

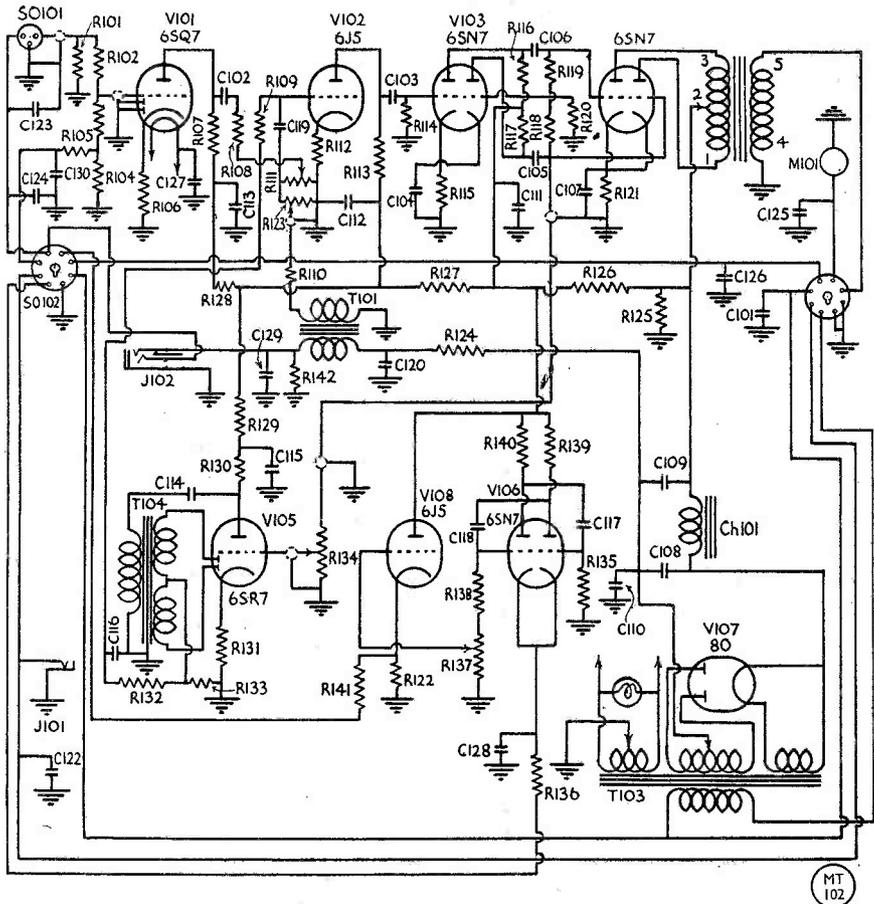


Table of Values

Fig. 2. Circuit diagram of the BC-614 Speech Amplifier, which can be modified quite easily for amateur operation, as described in the text.

C101, C102, C103, C105,	R125 = 75,000 ohms 10% 2 watt
C106, C114, C119, C121,	R126 = 20,000 ohms 10% 2 watt
C125, C126 = 0.01 $\mu$ F paper, 600v DC	R128 = 50,000 ohms 10% 1 watt
C104, C107, C110, C120 = 2 $\times$ 10 $\mu$ F, 25v DC, 2 $\times$ 30 $\mu$ F, 25v-DC, 4 section unit	R129 = 20,000 ohms 10% 1/2 watt
C108, C109 = 8 $\mu$ F elect., 475v DC dual unit	R130 = 50,000 ohms 10% 1/2 watt
C111, C112, C113, C115 = As above, in pairs	R133 = 3 megohm 20% 1/2 watt
C116, C124 = 0.35 $\mu$ F paper, 400v DC	R134 = 500,000 ohms 20% variable
C117, C118, C122, C123 = 0.002 $\mu$ F paper, 600v DC	R136 = 500 ohm 10% 1/2 watt
C127 = 0.002 $\mu$ F mica, 500v DC	R137 = 100,000 ohms 20% variable
C128 = 0.005 $\mu$ F mica, 300v DC	R138 = 150,000 ohms 10% 1/2 watt
R101, R102 = 1 megohm 20% 1/2 watt	R142 = 200 ohms 10% 1 watt
R103, R108 = 200,000 ohms 10% 1/2 watt	Ch101 = 29 H., 25 mA
R104 = 100 ohms 10% 1/2 watt	T101 = 1 : 1 turns ratio, 200 ohm to Class-A grid
R105, R139, R140, R141 = 5,000 ohms 10% 1/2 watt	T102 = 20,000 ohm push-pull to 500-ohm line
R106, R112, R131 = 1,000 ohms 10% 1 watt	T103 = Mains transformer : Primary 117v AC. Secondary (1) 500v CT at 25mA. (2) 6.3v CT at 2A. (3) 5v at 2A
R107, R113, R116, R117 = 100,000 ohms 10% 1/2 watt	T104 = Primary 10,000 ohms ; secondary 80,000 ohms
R109, R132 = 500,000 ohms 10% 1/2 watt	J101 = Closed circuit
R110, R114, R118, R119, R120, R135 = 250,000 ohms 10% 1/2 watt	J102 = 3 circuit iack
R111, R123 = 1 megohm variable 20%	
R115, R121 = 500 ohms 10% 1 watt	
R122 = 2,000 ohms 10% 1/2 watt	
R124 = 300 ohms 10% 1 watt	

the headphones from the oscillator and also to provide a low impedance source to which the headphones are connected.

The complete circuit of the BC-614 is shown in Fig. 2.

The potentiometer and jack socket marked "Carbon Mic 1" (located on the top left-hand side of the front panel) are for use with a carbon microphone fitted with a push-to-talk switch (Type T17) and three-circuit jack. Another potentiometer and a 3-pin socket immediately below, marked "Dynamic Mic 2," are for use with a dynamic microphone (Electro-Voice 600C or the T-50) which is again fitted with a push-to-talk switch. The circuits of these two microphones are shown in Fig. 3.

The modulation limiter control is fitted behind the front panel and is covered by a small plate, which, when removed, gives access to the slotted shaft of the potentiometer R134. The sidetone volume control is located on the rear of the chassis.

The 0-300 mA meter reads the anode current of the Class-B modulators in the BC610 transmitter and is not directly associated with the Speech Amplifier itself.

**Conversion**

It is proposed to outline two methods of

using this unit. (a) As a plain speech amplifier. (b) As a speech amplifier/control unit.

Before dealing with these, however, there is one important modification which is common to both. This is to the modulation limiter. Looking at the circuit diagram, it will be seen that the voltage for the limiter is obtained from one grid of the output valve, which has been found to give rise to an unbalanced drive voltage to the final valve. The screened lead should be taken off this grid and transferred to the high end of the output transformer; with this connection, excellent results have been obtained.

If it is intended to use the unit as a speech amplifier only, a large amount of circuitry can be eliminated.

As will be seen from the photograph, a new front panel was constructed and the connections made to sockets on the back of the chassis. As the unit shown is a BC614-(C) (an older version of the speech amplifier) the meter is an output voltmeter calibrated for a 500-ohm line and not the plate meter for the modulator valves in the transmitter. As M101 is not required, it is suggested that either an output meter or a modulation meter be put in its place.

Valves V106 (6SN7) and V108 (6J5), respectively sidetone oscillator and amplifier, should be removed together with their associated components; this will lighten the load on the internal power pack.

**First Operations**

**On SO 102.** Remove wire from pin 2 together with J101 and C122, then the wire from pin 3 and earth. Remove both wires from pin 4. If push-to-talk is required, bring them out to a connector on the back of the chassis; if not, take the wire from J102 to +DC volts for carbon microphone supply. Remove wire from pins 6, 7, and 8.

**SO 103** is treated in a similar manner, pins 1 and 3 being replaced by socket on the back of the chassis for 115 volt AC input. The wire from pin 6 can be brought out to a jack on the front panel or on the back of the

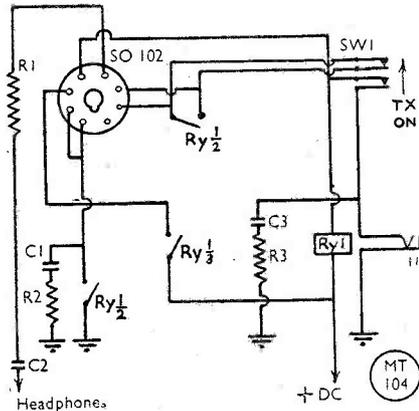


Fig. 4A. The BC-614 control circuit.

**Table of Values**

Fig. 4. Output and control circuit arrangement.

- R1 = 5,000 ohms 20% 1/2 watt
- R2, R3 = 100 ohms, 20% 1/2 watt
- C1, C3 = 0.01 μF mica, 300v DC
- C2 = 0.1 μF paper, 350v DC
- J1 = Open circuit jack
- Sw1 = 2 make P.O. lever switch.
- Ry1 = Relay, 3 make contacts, coil resistance according to DC voltage

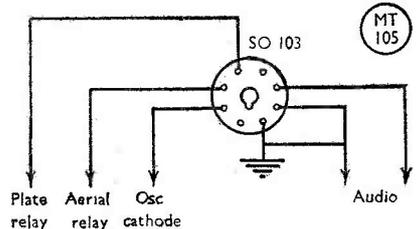
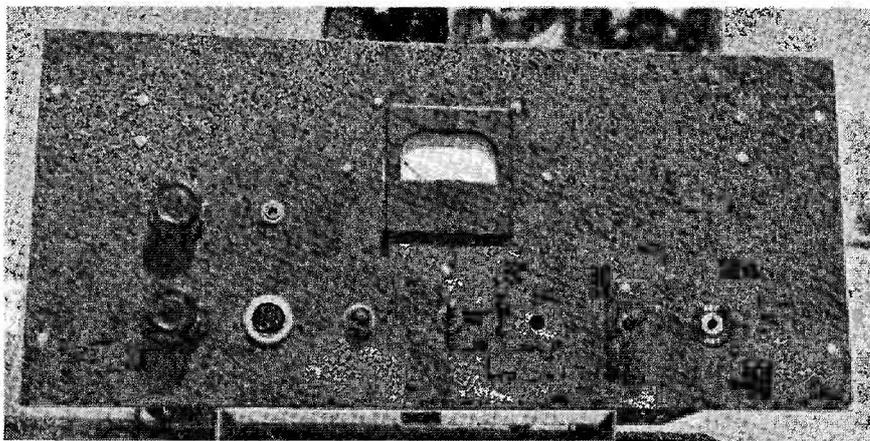


Fig. 4B. The BC-614 output circuit—see text for details.



General view of the BC-614 as fitted with a new panel—see text for details of the modifications suggested by G2AO

chassis. A switch should be included in the AC line.

After these changes only the speech amplifier section remains operative.

Use of the unit as a speech amplifier/control unit may be approached from two view points; (i) With an external box, or, (ii) Including the control circuitry in the speech amplifier itself. The wiring diagram is shown in Fig. 4A.

Again, it makes a neater job if the 8-pin octal connectors are transferred to the back and a new panel made, but this does not of course affect the operation of the unit.

The modifications which have to be made are as follows:

**SO 102.** Remove lead from pin 3 and take to earth.

**SO 103.** Remove leads from pins 1 and 3 and rejoin to separate 115 volt AC socket on the back of the chassis. Remove lead from

pin 5 together with meter. Join screened lead to pin 3 and take direct to pin 3 on SO 102.

After these alterations have been made, the control circuit from SO103 will be as Fig. 4B.

The other modification which has to be made is the one to the modulation limiter already described.

If the control circuit is to be placed inside the speech amplifier, SO 102 is not required and the connections are made direct to the components shown in the drawing; an output for sidetone will have to be provided, if this is required.

The quality of speech is very good for modulation purposes, as it is well balanced around the voice frequencies.

One final word. Adjustment of the modulation limiter should be carried out with an oscilloscope; if this is not available, get assistance over the air, remembering to keep modulation low until the tests are complete.

#### MULLARD ULTRASONIC GENERATOR

The possible applications of ultrasonics are now coming under close investigation in many branches of industry. The first commercial ultrasonic generator to be produced in this country has recently been marketed by Mullard Electronic Products, Ltd. Essentially, it is an LF oscillator producing one kilowatt of RF at nominal frequencies of 250, 500, 1000 and 2000 kc; the output is fed to a crystal vibrator which, when immersed in a tank of liquid, produces the ultrasonic power by pulsation. Of course, there is a good deal

more in it than that, and the trick is to get the maximum ultrasonic output without over heating of the crystal unit.

#### UNUSUAL!

In the minutes of the Sunderland Radio Society's third annual general meeting, it is noted that their new Hon. Treasurer, Miss Judy Bolton, has been allocated callsign G3EYO. As the report gracefully puts it, Sunderland feel that a transmitting YL as one of their officials confers great distinction on the Club.

# Standing Waves and Loading

## Getting Power into the Aerial

By W. J. Crawley (G2IQ)

MANY amateurs seem to have the impression that it is possible to judge whether or not an aerial is resonant, or the line flat, by the amount of load it takes when coupled to the transmitter. It is generally assumed that if the aerial draws well then the standing-wave ratio is low and the aerial resonant. (One refers to the untuned transmission line coupled to the plate tank by a swinging link, no auxiliary tuning apparatus being used.) Such is not often the case, however, and in fact the opposite often applies. Recent experiments with a standing-wave ratio meter have led the writer to the conclusion that the higher the standing-wave ratio, the looser the coupling needed to obtain the required "draw"!

### Some Practical Results

Tests were carried out on 28 mc with two dipoles, both fed with 70-ohm line. One was almost resonant at the frequency used, the other was purposely made slightly longer than a resonant length. The resonant dipole required a two-turn link fairly tightly coupled to the final stage in order to load the transmitter to the required input.

*The non-resonant aerial, however, loaded the final nicely with but a one turn link loosely coupled to the plate tank.*

Measurements indicated that the feeder of the resonant aerial had a standing wave ratio of only 1.7-to-1, whilst the other showed 5-to-1. The reason for this difference in loading is that a flat line looks like a pure resistance to the transmitter. This resistance may be anywhere between 50 and 700 ohms, and it is difficult to transfer power to resistances of such wide range with just a loosely coupled link coil! To obtain good "draw" with a loosely coupled link requires that both circuits have high Q, but in this case the Q of the secondary is very low and what transference there is comes about by transformer action. Therefore, to get appreciable loading the coupling has to be very tight and the ratio between primary and secondary has to be low. Just the opposite to what many of us believe.

### Testing with Artificial Load

It is quite easy to prove this contention by reducing power and coupling the transmitter through a link to an artificial load—a pure

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Are you loading up your feeder line, in which the RF is being wasted, or the aerial, where the power is wanted if the correct radiating characteristics are to be obtained? This is a useful practical discussion on the importance of a truly resonant aerial if standing waves on the feeder are to be avoided.—Ed.

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resistance equal to the impedance of the transmission line in use. If a non-inductive resistor of high wattage cannot be found, the test can be made with low power and a three- or five-watt carbon resistor, provided that the same ratio of plate voltage to plate current is maintained. It will be found that the transmitter can be made to draw the required plate current on ten and twenty metres, with 72 ohms and even 300 ohms if the coupling is made very tight, but that on the lower frequency bands even the tightest coupling will not provide sufficient transfer. In most cases it will be found that the artificial load draws very much less than the transmission line. Now if the transmission line were flat, its influence on the transmitter should correspond to that exerted by the artificial load. The fact that the transmission line feeding the aerial draws very much more than the artificial load proves, *not* that the aerial is "drawing well," but that standing waves are present. Generally speaking the more the line loads the transmitter, the higher the standing wave ratio.

### Detecting Standing Waves

In the absence of suitable measuring apparatus, how do we find if we have standing waves? The simplest method is to add an eighth of a wavelength of coaxial cable or ribbon to that already in use and note what effect this has upon the loading of the final. If the addition does not appreciably alter the "draw," add another eighth of a wavelength and test again. If the further addition does not alter the final plate current and the tank circuit requires no retuning, it can safely be assumed that the line is flat. If, however, the addition of the extra piece of transmission line causes a change in the final plate current, or if the tank circuit needs retuning each time the extra piece is inserted, then the line is definitely not flat, even though the final "loads up beautifully."

### Moral

The next time we are tempted to keep cutting pieces off our "flat" [*sic*] line until we obtain the required "draw" from the final, let us pause and remember that we are, in effect, confessing that our so-called flat line is not at all flat. It is more satisfying to have a lower final plate current knowing that the RF is really getting into the aerial!

# Another Broad-Band Exciter

## Switched Driver Stage Using EF50's

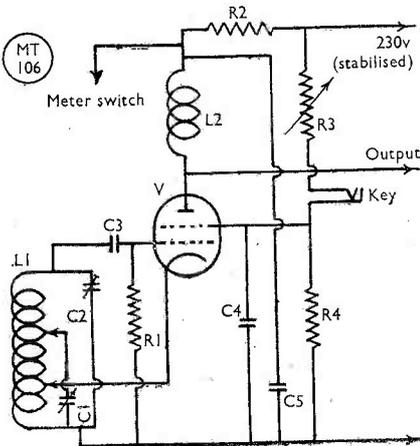
By J. B. ROSCOE, M.A. (Oxon.) (G4QK)

A RECENT article in the *Short Wave Magazine* ("Broad Band Exciter", February, 1949) tabulated some of the failings of Exciter Units. It is not proposed to repeat the list here, although it is felt that item (6), "Inaccessibility", could have been amplified somewhat. Moreover, it is considered that the Exciter described failed on item (2), "Unnecessarily large valves used for doubling". The unit discussed in the following paragraphs will probably be considered to fall short of the stipulated requirements in many respects, but it does score heavily in one way which was not mentioned in G3AAG's list—expense. This exciter was built entirely from

Table of Values

Fig. 1. ECO Circuit in the G4QK Exciter

- C1 = 60  $\mu$ F ceramic
- C2 = 500  $\mu$ F air variable
- C3 = 100  $\mu$ F, mica
- C4, C5 = .001  $\mu$ F, mica
- R1 = 50,000 ohms, 1 watt
- R2 = 1,000 ohms,  $\frac{1}{2}$  watt
- R3 = 100,000 ohms, 1 watt variable
- R4 = 100,000 ohms,  $\frac{1}{2}$  watt
- V = EF50
- L1 = 30 turns 20 SWG, 1 $\frac{1}{2}$ -in. diam., 1 $\frac{1}{2}$  in. long, tapped at 8 and 17 turns from bottom end.
- L2 = RF choke.



This article describes an efficient broad-band exciter, the design of which is of particular interest. The oscillator-doubler stages use the popular EF50, with an 807 as final buffer-doubler, making altogether a flexible unit which is cheap, easy to build and capable of excellent results.—Ed.

the junkbox (albeit a well-stocked one) with the exception of the metal work.

### Design

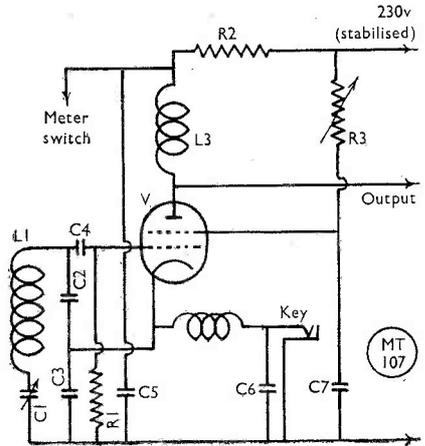
The circuit consists of an EF50 VFO, EF50 buffer, EF50 doubler and 807 buffer/doubler. Output is available at 3.5, 7 and 14 mc; provision has also been made for the inclusion of a second EF50 doubler, but this is not in use at present. The built-in power supply, consisting of an old 4-volt type receiver transformer and a 6X5G rectifier, supplies the 807 screen in addition to all the earlier stages. Two S.130 stabilisers are included, though they are probably not necessary with the existing VFO circuit.

Capacitive coupling is used between the stages, the grids being switched as required. In addition, the band-change switch cuts off the screen supply to the stages not in use, in

Table of Values

Fig. 2. The Clapp Oscillator

- C1 = 160  $\mu$ F, ceramic
- C2, C3, C5, C6, C7 = .001  $\mu$ F, mica
- C4 = 100  $\mu$ F, mica
- R1 = 50,000 ohms,  $\frac{1}{2}$  watt
- R2 = 10,000 ohms,  $\frac{1}{2}$  watt
- R3 = 100,000 ohms, 1 watt variable
- V = EF50
- L1 = 80 turns 24 SWG enam., 1 $\frac{1}{2}$ -in. diam., 2 in. long, close-wound
- RFC = Dissimilar RF choke at L3 and in keying circuit.



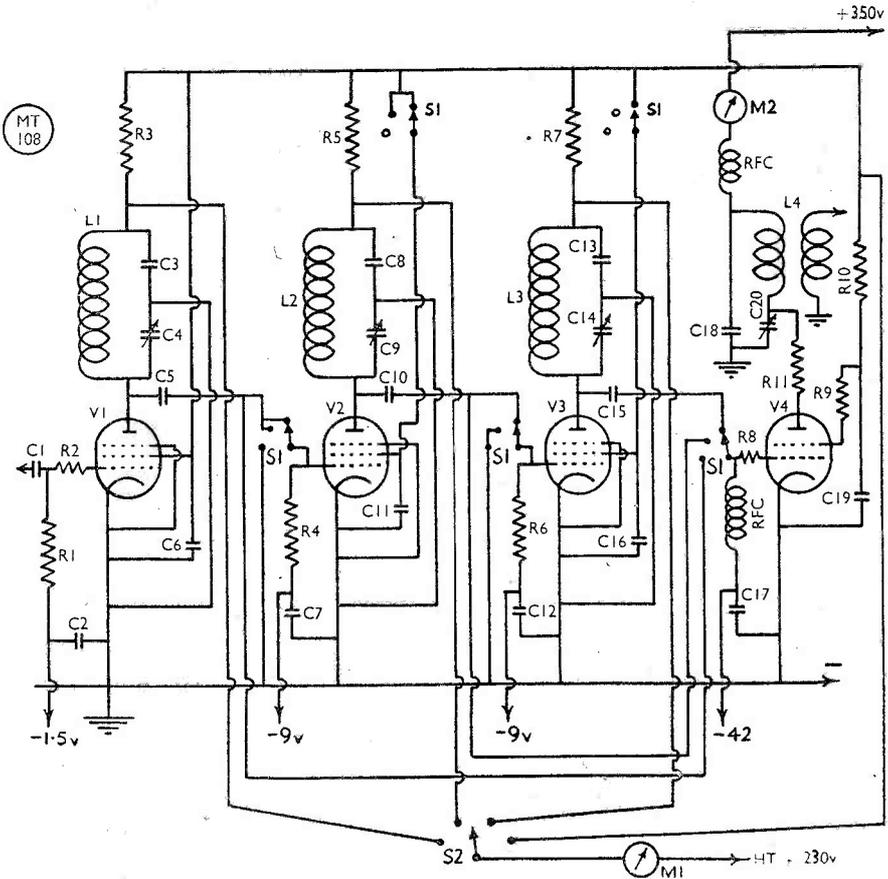


Fig. 3. Circuit of the G4QK Exciter complete. EF50's are used in the oscillator-doubler stages, with an 807 as output driver ; the circuits are arranged to give level excitation, without re-tuning, over each band.

accordance with B.V.A. recommendations. To simplify mechanical construction (and since the 807 is required to give output at five frequencies for input at only three) a separate band-switch is used in the 807 tank.

All the tuning is done on a 0-150 mA meter in the 807 anode circuit ; a 0-15 mA meter is also fitted, which can be switched across 1,000-ohm resistors in the anode and screen leads, but this fitting really comes under the heading of "accessibility", since it is only used to check the performance of the circuits. A spare pair of contacts on the meter switch is connected across the key, for telephony use and testing.

Since the EF50's require but a few volts bias, this is derived from a battery. A bias pack is already in use in the station for the PA stage (push-pull 807's), and bias for the 807

**Table of Values**

Fig. 3. Circuit complete of the G4QK Exciter

- C1, C5, C10 = 100  $\mu$ F, mica
- C2, C3, C6, C7, C8, C11 = 50  $\mu$ F, mica
- C12, C13, C16, C17, C19 = All .001  $\mu$ F, mica
- C15 = 50  $\mu$ F, mica
- C18 = .002  $\mu$ F, mica, high-voltage
- C20 = 40  $\mu$ F, variable
- R1, R4, R6 = 50,000 ohms,  $\frac{1}{2}$  watt
- R2, R8, R9 = 50 ohms,  $\frac{1}{2}$  watt
- R3, R5, R7, R10 = 1,000 ohms,  $\frac{1}{2}$  watt.
- R11 = 100 ohms 1 watt.
- L1/C4, L2/C9, L3/C14 = See text.
- S1 = 5-pole 3-way.
- S2 = 1-pole 6-way 1-pole on-off.
- M1 = 0-15 mA (0-5 mA, shunted).
- M2 = 0-150 mA.
- V1, V2, V3 = EF50.
- V4 = 807.

is obtained from this. A combination of battery (18v.) and grid leak bias has also been tried for the 807, but is not considered so convenient. The 807 anode supply is taken from the PA stage screen supply, so the voltage normally used is 350; however, the components are adequately rated for using the full 750 volts, so that the exciter unit can be operated as a complete transmitter if desired.

### Construction

It is built on a standard rack-mounting 2-in. deep chassis, with an 8½-in. panel. The construction is from left to right, more or less as set out in the circuit diagram. The band-change switch is located near the 807, so that the longer leads are confined to the lower frequencies. The wiring is straightforward, and no screening has been used anywhere. The 807 tank circuit is mounted above the chassis, and no feed-back is experienced.

### Oscillator

Two types of oscillator, the ECO and the Clapp, have been tried, and the difference in performance is not remarkable. The original ECO, which accounts for the presence of the S.130's, was fitted with bandspread and calibrated. It was found, however, that in practice this calibration was never used. The Clapp oscillator, therefore, was fitted with the minimum amount of slow-motion required to tune to a given frequency in comfort, thus obviating a lot of "knob-twiddling" when going from one end of the band to the other. The oscillator output can be varied by means of a variable resistor in the screen lead; this produces a slight frequency shift, but over the range of control used the effect is not noticeable. The author is not quite sure whether this particular variant of the Clapp deserves that name or not: it is a pity that the B.B.C. did not see fit to release this circuit to the amateur world ten years ago!

### Buffer Stage

The circuit of the buffer stage is perfectly straightforward; the exact value of the bias is not important, as it seems to make little difference to the output if the valve is operated Class-A or Class-C. The choice of valve has been discussed elsewhere; the EF50 performs well in this circuit, and has been chosen for the sake of standardisation, but there are better valves.

### Frequency Doublers

These, again, are straightforward. No component values are given for the tuned circuits, since these are not all, in fact, known! The tuning condensers came out of the receiver of a TR1196, and the coils were made on

the "cut and try" method. They are wound on 1½ in. × ½ in. formers mounted under the chassis; the wire used is 24 gauge DCC, and the windings are bunched to prevent the Q getting too high! When changing bands it is necessary to retune these stages slightly to compensate for changes in capacity, but it is not necessary to retune within one band. The tuning condensers are, therefore, mounted on the front panel—which will distress some people.

### Output Stage

Small stopping resistors are fitted in the grid and anode circuits of the 807: these may not be necessary but do no harm. The switch in the tank circuit consists of a 6-pole 3-way ceramic switch, with the poles connected in two groups of three. Even with this precaution the loss in the link switch can easily be detected by connecting a bulb straight across the link winding and through the switch in turn.

### Operation

In operation all tuning is done on the 807 anode current meter. With the grid switch set to 3.5 mc the buffer is first tuned. Then, with the switch in the 7 mc position the buffer is only slightly detuned, so that the doubler stage can be brought in, followed by any correction that may be required in the buffer stage. The unit is normally set up for the centre of the band in use and left there; a slight touch on the oscillator "throttle" control (R3) will bring up the output at the band-edge, if required. The unit is normally used in the 14 mc CW band, admittedly only 150 kc wide, and all the tuning is done on the

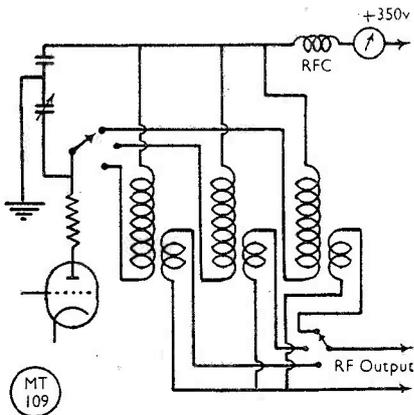


Fig. 4. Switching at the output end of the G4QK Exciter.

oscillator control, unless the utmost is required, when the aerial tuning is altered.

### Performance Figures

Those who use 6L6 doublers may be a little doubtful about the capabilities of the EF50 in this capacity: Accordingly, the following figures have been measured carefully, in order to leave no room for doubt. Two sets of figures are given, the normal operating condition, for driving the PA stage to 150 watts, and the maximum obtainable. For comparison purposes the maximum ratings of the EF50 are also included.

### Conclusions

Since the 807 is being driven harder at 7 mc than at 3.5, it is apparent that the EF50 is quite large enough for general use as a frequency-doubler, with a consequent saving in

	Normal	Maximum
Line voltage	230	230
Oscillator screen, volts	30	230
Oscillator anode current	∇1	9 mA
Oscillator cathode current	0.8	14 mA
Oscillator anode input		2.1 W
Oscillator screen input		1.15 W
Buffer anode current— key up	∇1	4 mA
Buffer anode current— key down	∇1	12.5 mA
Doubler anode current	∇1	9.5 mA
807 grid current, 3.5 & 7 mc		> 5 mA
807 screen current, 3.5 & 7 mc	2.5	> 15 mA
807 anode current, 3.5 mc		112 mA
807 anode current, 7 mc (807 operating at $V_{g2}$ 230v, $V_{g1}$ —42v)	39	126 mA
EF50: $W_a$ max		3.0 W
$W_{g2}$ max		1.7 W
$I_k$ max		15 mA

power and reduction in harmonic radiation compared with other types frequently employed.

## Your Signal Report

### CW Operating Standards

#### *A Brass-Pounder's Plea*

**E**VEN a short listen round on the amateur CW bands will raise doubts in the minds of Old Timers (and certainly in those of the authorities concerned with amateur interests) as to the technical standards tolerated and accepted by the present-day amateur.

Be he addicted to 'phone, CW or both, the amateur is very largely judged by the quality of the noises he emits. If he modulates his carrier by speech—the quality and character of the spoken word may to some sensitive ears be an irritant for which many amateurs find the only panacea to be the key. Of this aspect, however, more anon. It is the CW noise with which we are presently concerned.

Now to a critical ear a CW signal is judged by the following characteristics, in this order:

- Stability and tolerance.
- Morse characteristics.
- Ancillaries, e.g. clicks, rambling phraseology, and so on.

Of these (a) reflects the technical knowledge and experience of the operator and (b) his operating experience and personal character. Deficiencies in the one or the other are immediately apparent, and—except when the transmitter is sited in some far-away land much coveted by the seekers of rare countries

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The author of this article is a well-known DX operator of long experience, who has special reasons for wishing to remain anonymous. His comments and criticisms will be read with great interest by all, New Timers and Old alike, who are willing to help raise the general standard of British amateur CW operating, at one time the best in the world.—Ed.

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—result in that station being politely shunned by the brotherhood of hams.

### Signal Standards and—

In the majority of cases, unfortunately, the wretched operator so cold-shouldered is ignorant of the cause. He is uninformed because his fellows have become less critical and tend to accept this lowered standard. So he continues on his perplexed and lonely way.

Now as regards stability and tolerance: In the "good old days" the amateur worth his salt, aided by his allies high-C, stolid construction, and modest demands on his power packs, battled greatly against opponents Chirp, Drift and Yoop. In most cases he won, for he was striving after a much-valued prize, the report "PDC very stable OM". Furthermore, he had to continue to strive, for the prize once gained would often slip away.

Then along came the friendly piece of quartz to ease his burden and to help his worries. As has been the way through all history with empires and civilisations which cease to strive because of ease and plenty, the grip is lost. Now, faced with a problem similar to that which the amateur of twenty years back overcame successfully with nothing like the

components and literature available in 1949, the present-day amateur is lacking. In defence, he now uses the term VFO and not Colpitts, Hartley or TPTG. But the resultant noise is still the criterion.

If, therefore, you work a station whose signal is *not absolutely perfect*, tell him so in plain words and remember that stability and tolerance are the main target for criticism—there are a few T7 and T8 signals on the bands which are a delight to listen to.

#### —Keying Standards

As regards the second point, the character of the Morse, the cure is more difficult, for here we are faced with a condition in which the operator at the key may have been long at the game and criticism of his Morse (unless one is confident) may reflect on one's own copying ability! There are two points, however, which should be appreciated. First, no good operator ever objects to being asked to send more slowly. Secondly, there is an alarming number of experienced amateurs whose Morse is quite appalling and, in the vast majority of cases, inflicted on our ears by that insidious instrument, the bug key—though good Morse *can* be sent on a bug. Acceptance of these two points is a necessity if we are to clean up the standard of British amateur Morse and CW operation generally.

The International Code specifies a certain relationship between the lengths of the dot, the dash, and, more importantly, the space between those characters when sent successively to form an alphabetical symbol.

#### OLD TIMERS' DINNER

This is the last opportunity we shall have to remind you, once again, that we must have your reservation for the Dinner on May 20 next before May 14. All B.O.T.C. members have had a notice giving the details—so fill up that tear-off slip and send it in right away, with your 10s.

#### TAYLOR PRICE REDUCTIONS

Five instruments in the Taylor range of radio test equipment have been reduced in price with effect from April 1, varying from £1-1s. on the 70A (now £10-10s.) to £1-9s. on the 85A/P (now £18-10s.). Write Taylor Electrical Instruments, Ltd., 419-424 Montrose Avenue, Slough, Bucks.

#### CALL BOOK—SPRING 1949

The latest (Spring 1949), issue of the *Radio Amateur Call Book* runs to 348 pages, and lists well over 5,000 current British call signs. All that have appeared in "New QTH's" up to and including our issue for February last



“ . . . One or two of the locals came round for the evening . . . ”

These space-and-time relationships apply equally at 5 through 90 words per minute and in the writer's opinion, failure to observe these spacings is the primary cause of the scrambled nonsense which otherwise extremely likeable operators would have us believe is the Morse code. The cure lies with each one of us. First, let us all be introspectionists and then, if we find and have it confirmed that all is as it should be, for goodness' sake let us not be ashamed of saying "I can't copy your Morse, OM". If he is a good ham, the recipient of this crack will take no offence—but if the cap fits then let it be worn, and worn closely.

are in this edition of the Call Book, which is obtainable as advertised regularly in the *Short Wave Magazine*.

#### CARDS IN THE BOX

If your call is here, it is because we have not got your full postal address for sending on cards held for you. Please forward a large stamped addressed envelope, with name and call sign, to BCM/QSL, London, W.C.1. If you would like your call to appear in "New QTH's", and subsequently in the *Radio Amateur Call Book*, mention that at the same time.

G2ANL, 2BAT, 2COC, 2HJQ, 2HM, 3BDK, 3BKX, 3CDM, 3CXY, 3DBD, 3DBP, 3DKB, 3DPD, 3DVE, 3DWI, 3DZR, 3EEL, 3EFT, 3EGL, 3EHK, 3ETU, 3ETW, 3EXG, 3FCY, 3FGU, 8RA, 8WP, GM3CSQ, GW2UN.

# Ten-Metre Beam

## Design and Construction of a Simple 28 mc Rotary Array

By L. J. J. MORGAN (G2HNO).

**M**OST 28 mc operators recognise the very great advantages of using a rotary beam aerial, but there are no doubt many who are deterred from erecting such a system by the apparent expense and complexity of its construction. Some of the constructional articles appear very forbidding and seem to demand resources beyond the reach of the average amateur. This article will, it is hoped, show that a rotary beam is no longer a luxury, but an inexpensive item of equipment simply and quickly built.

The writer claims no originality for the type of array here described and the mechanical details are capable of much interesting variation, depending on the peculiarities of any particular QTH.

The idea for this beam was born from the purchase of a surplus R.A.F. rotary loop aerial gearbox and a reversible fractional horse-power AC motor of the induction type. Both these items are available cheaply from *Magazine* advertisers. It was at once obvious that the motor and gearbox would make the foundation of a fine rotary array. The gearbox carries at the top a socket ideal for the fitting of a pipe mast and it was decided to mount the array on a rotatable mast of relatively short length.

### General Layout

At the writer's QTH the gearbox and motor assembly were bolted to the side wall of a one-storey kitchen and the rotating mast is held further up the wall by two radial bearings fastened by clamps to the wall. This assembly is under cover of a glass-house through the roof of which the pipe mast is carried. If no such shelter is available the gearbox and motor may easily be housed in a waterproof cover.

The mast itself consists of

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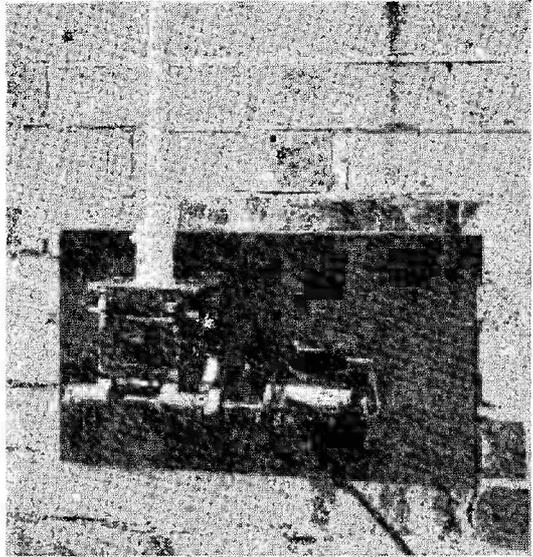
On the higher frequencies beams are easily possible and very desirable. Not only do they increase signal strength in the desired direction on both transmission and reception, but a beam also helps to some extent in reducing interference in other directions. This article gives all the necessary information for a practical system.—Ed.

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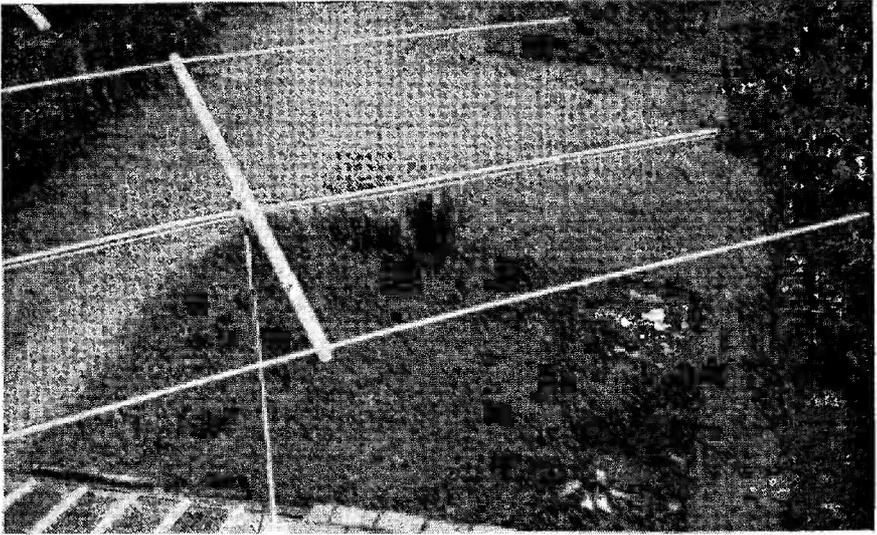
two short lengths of galvanised water pipe. The lower section, which fits into the socket on top of the gearbox, is 1-in. in diameter, and the upper section (which likewise fits into the lower) is  $\frac{3}{4}$ -in. in diameter. Each section of pipe is about 6 ft. long, the idea being to have the beam array about 16 ft. up, or one-half wavelength above ground.

Some readers will object that such an array is too low, but the lower it is the easier the system is to erect, and we are told in the books that a beam one-half wavelength above ground will give the required low angle of radiation. The writer has certainly had fine results with the array described, even though it does not tower above the house.

The top of the  $\frac{3}{4}$ -in. length of pipe carries a standard flat circular flange about 4 in. in diameter and to this flange the boom holding the beam array is securely fastened with two U-bolts.



Gearbox and motor assembly for rotating the beam at G2HNO. The box has slip rings for use with a coaxial feeder taken up inside the supporting mast.



Top view of the G2HNO 28-mc beam ; the light and easy construction is well suggested in this view.

The mast may be guyed near the top with a slip ring to which conventional guys are fastened, and this will be found essential in exposed locations.

### The Beam

The beam aerial itself is a conventional three-element close-spaced array consisting of a director spaced 0.15 wavelength in front of the driven element and a reflector spaced 0.1 wavelength behind it. The elements are of  $\frac{3}{4}$ -in. dural electrician's conduit piping which is light and strong and easily obtainable. These elements are supported entirely by a boom of good knot-free 2-in.  $\times$  2-in. deal or pine approximately 9 ft. in length.

As the centre of each element is at earth potential and is supported by the boom at that point, no insulation of any kind is needed. A hole is drilled through the boom at the appropriate point (ascertained by measurement) and the element is securely fastened there at its centre point by two grub screws.

For optimum results on 28.300 mc the director is placed  $62\frac{1}{2}$  in. in front of the driven element and the reflector is 42 in. behind it. None of the three elements is interconnected in any way, and it is, of course, only the centre, or driven, element which is coupled to the transmitter.

The length of the elements in feet is calculated from the usual formulæ :

$$\begin{aligned} \text{Director} &= \frac{444}{\text{Frequency in megacycles}} \\ \text{Radiator} &= \frac{462}{f \text{ mc}} \\ \text{Reflector} &= \frac{495}{f \text{ mc}} \end{aligned}$$

The writer's array is intended for optimum performance on 28300 kc and the lengths of the elements are therefore : Director, 15 ft. 8 in. ; Radiator, 16 ft. 4 in. ; Reflector, 17 ft. 6 in. For best results the length of director and reflector should be capable of adjustment, but it has been found that an array constructed to these dimensions gives both excellent forward gain and a high front-to-back ratio.

It should be mentioned that as dural conduit is not obtainable in lengths greater than 10 ft., each element must be made by joining two pieces with a strong galvanised coupler at the centre point.

### Matching and Feeding

The final problem is to decide the method of matching the radiator to the feeder line in use. The centre impedance of the half-wave radiator in a three element array of this type is of the order of 5 ohms, and it cannot therefore be matched to any standard feeder line unless it is multiplied many times by some transformer device. The reader may make his choice between delta matching, T-matching or a folded

dipole, and each of the popular handbooks contains a wealth of detail from which the appropriate radiator may easily be built.

The writer decided to construct the radiator as a folded dipole, the second element of which is  $\frac{1}{4}$ -in. copper rod fastened 1 in. (centre to centre) below the  $\frac{3}{4}$ -in. dural top. The upper and lower elements are electrically and mechanically connected at the outer ends and the inner ends of the lower rod are connected to the 80-ohm feeder line. This arrangement steps up the centre impedance of the radiator by about 15 to 1 and makes a satisfactory match for standard 80-ohm coaxial cable. The  $\frac{1}{4}$ -in. rod is of course 2 in. shorter than the length of the upper conductor as calculated above. The inner

ends of the lower conductor are bolted to terminals on a paxolin strip fastened across the underside of the boom, and the coaxial feeder is soldered to these terminals.

The ends of the dural elements should be sealed with corks and the whole array given several coats of good white lead paint before erection.

The beam is controlled from the operating desk by two push-button switches and it is planned to add a direction indicator shortly. By relay switching the array is used also for receiving.

The total cost, including motor and gearbox, is less than £10 and the array has been giving most successful results.

## More About Scatterbacks

### Checking the G2CDI Theory

By R. L. CASTLE (G6CB)

EVER since the article introducing "The Scatterbacks" by G2CDI (now VP6CDI) in the July 1947 issue of the *Short Wave Magazine*, the writer has taken an active interest in this particular phenomenon.

It so happened that the appearance of the article mentioned coincided with the erection of a ten-metre three-element close-spaced beam at a height of 35 ft., which was motorised and controlled from the operating position with an indicator giving the major points of the compass, thus permitting a fairly rapid 360-deg check on any signals heard.

The first step seemed to be to agree (or otherwise) on the observations made by G2CDI, namely that the signals produced by this phenomenon were of three types, *i.e.*

- (A) Those with marked horizontal directivity (by far the most common).
- (B) Those with little or no horizontal directivity but otherwise sounding very like those of Case A.
- (C) The genuine all-the-way-round signal having a noticeably delayed echo (comparatively infrequent).

This was ultimately accomplished and the results obtained showed them to be as defined.

#### Beams

It must, of course, be realised that the

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The original article on what he called "The Scatterbacks," by F. J. North, VP6CDI (ex-G2CDD), aroused a good deal of interest—his investigations were made before he left Buckinghamshire for Barbados. Here are some notes on independent observations made since which support G2CDI's theories—Ed.

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receiving aerial heights were markedly different—G2CDI having been, it is believed, some 600 ft. a.s.l. and that at G6CB only 60 ft. (usually when rare DX is about felt to be at a somewhat lower level than the Thames mud !).

The aerial also varied in so far as G2CDI apparently concentrated on a good back-to-front ratio, whereas the writer endeavoured to steer a middle course so as to be able to hear reasonably loud DX signals off the back.

There was one seemingly important common aspect and that was that the forward lobes of both aeriels were approximately the same at 40-deg. width (not the spearhead sharpness that many owners seem to think their beams possess !).

This similarity proved useful in the actual results obtained, the dissimilarity in height a.s.l. and front-to-back ratio not apparently affecting the issue.

#### First Tests

The first definite transmitting check was obtained when during regular signal strength observations with ZD2KC, G6DL (120 miles distant NW) was heard R5S5, and as it had till then proved futile calling G stations at such distances—they either did not hear or possibly said, "What is that chump calling me for when DX is around?"—ZD2KC was asked to call him ; G6DL went back and a three-way QSO resulted.

This not too satisfactory contact (due to

G6CB being only R3-4 S4-0) proved to be in the nature of Case B above, since rotation of the beam had very little effect on the S5 signal of G6DL—it was fairly evidently not Case C, since G6DL reported not the slightest trace of echo, he being in a much better position to judge, not having South London QRM with which to contend!

This incidentally gave G6CB his best inter-G contact up to then, and made him restore one or two "stripes" to the Tx and aerial, since at least it was now known that signals from G6CB were capable of being heard by G stations outside a 30-mile radius.

The next real chance of a check came when a complete QSO between GM3COE and a VK was heard, but despite desperate efforts to raise either or both stations after the contact nothing came of it.

That same evening produced a crop of signals from Coventry to Liverpool all up to S7, all being perfectly readable (beam firing NW), but breath might just as well have been saved since there were far too many S9+20dB W2's coming through.

#### Further Results

At last patience was rewarded and good use made of the "Might-Come-Back" layer.

While in QSO with AP2R, interference from GM3COE was reported; AP2R was promptly asked to give the GM a call and ask for his co-operation in a series of checks.

Once again the trick worked and a three-way QSO followed. This seemed to indicate the existence of a fairly extensive ionised mass, since it took a full 45-deg. rotation of the beams at both GM3COE and G6CB away from the ENE direction in which both beams had been firing before any appreciable difference was noticed in the signal strengths, GM3COE being S6 and the writer S5.

This contact with GM3COE finally petered out due to a comparatively local G continually coming up in the middle of the transmissions when there were at least 25 kc either side quite clear.

Just after the aforementioned contact G2XX (Defford, approximately 100 miles distant) was heard at R5, S5 and called. He came back to the call with an R5, S4 report and co-operated for a period of 15 minutes in a series of checks which once again showed it to be a Case A contact, *communication only being possible when both beams were firing in the same direction.*

The next day, after these most interesting tests, G6TD (Coventry, 100 miles NW) was heard R5, S6 when the beam was again pointing ENE. A short call brought him back with an R5, S5 report and resulted in a QSO lasting about 45 minutes in which G5PP at

R5, S7 (also Coventry) joined for the last 30 minutes.

Once again it was found that the area of reflection was apparently quite large and that the signals were horizontally directive, in other words they came under the Case A heading. All three stations were using three-element rotatable beams with indicators and approximately the same power inputs.

There remains Case C—something rare and difficult to check for "Scatterback," but it was particularly interesting that on the day the above tests were made AP2R called attention to a certain D4 station who had a pronounced echo, who, unfortunately, it was not possible to contact.

#### The Cause

While at present the writer is inclined to agree with the theories of ex-G2CDI, he cannot help wondering why it has usually been during times of unsettled weather—that is, mild with considerable rain cloud areas extending across England and the European continent as a whole—that the phenomenon appears. Can the same form of temperature inversion which has such considerable effect on VHF reception also cause "Might-Come-Back" conditions on 28 mc?

#### Conclusion

The whole-hearted co-operation of the stations mentioned (all of whom can and do work all the DX that may be going) was greatly appreciated, particularly as DX was about; they certainly helped to fortify the author's belief that all "CQ DX" operators are not necessarily thinking purely in terms of DX.

G6CB offers no apologies for endeavouring to effect G-GM contacts when the band is open for DX, since the requisite conditions seem to exist only when the 28 mc band *is* open—apart from his belief that such contacts are often more interesting and quite as hard to achieve as those with R9YL on Rainbow Island.

Unlike G2CDI, the writer does not object to these "Scatterback" conditions prevailing, for apart from making interesting QSO's possible, they also can be very useful in showing if one's intended frequency of operation is clear; under certain conditions it could save quite a lot of QRM.

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#### WANTED FOR WAS

We hear that the Mayor of Coventry, active on 28 mc, requires only Arizona and Wyoming for his post-war Worked All States—his call sign is G6WX, and we hope this note may help to bring them in.

# DX COMMENTARY

## CALLS HEARD, WORKED & QSL'd

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

At last we seem to be slipping off the peak of DX conditions. Judging by what everyone says, as well as by our own findings, the latter part of March and most of April have been rather poor for consistent DX working. The 14 mc band has been far too unreliable to count on, day by day, and short skip has been a considerable nuisance. True, many particular days have been very good, with VK and ZL in the early mornings, Asia in the early afternoons, South Africa in the evenings and thousands of W's late at night. But the real stuff has been either down in the third layer or completely missing.

On 28 mc, conditions have been surprisingly good, but, again, unreliable. One has never known whether the band, in the mornings, would yield masses of Pacific DX or very little at all. Later in the day, it has been impossible to predict whether the USA phone band would be the usual howling cacophony or just a wide expanse populated by a few KP4's, W4's and West Indies stations.

In other words, all very interesting still, but hardly thrilling. And just what we should be expecting by now. We are going down the slope, which means, in all probability, that next winter will be terrific for 7 and 3.5 mc, but not exactly colossal for 14 and possibly quite poor for 28 mc.

### DX on 3.5 mc

No one expected Eighty to yield quite so much DX this spring, but it continues to be very lively. G8VB (Ealing) remains the uncrowned king of the band, and, of course, handsomely heads the Four-Band DX Table this month. He says that there has been no rush to claim his 813 (see p. 112, *April*), and is now prepared to double the offer. He will present a pair of 813's (new !) to any amateur, anywhere, who can produce proof of contacts with more than fifty countries, post-war, on 3.5 mc. We shall be glad to see a claim, with cards!

'VB's new one this month was VP2KM, phone on 3845 kc. The VP2 was systematically jammed out by a Spiv with a T4 carrier, and for this reason the other stations standing

by were not able to work VP2KM. All those who rushed to work VP2KR (S9 *plus* on 3755) caught a crab, as G8VB says that there definitely is no "VP2KR" on 3.5 mc. One of the high-spots of the month's activity on the band was a Round Table with four continents involved! The "members" were MT2E, GD3UB, G3AUO, GW3CYB, VO2BL, W1IIM and PY4BR, with G8VB in the chair. As a tailpiece, G8VB has now received his WAS Certificate for Eighty-Metre Phone, surely one of the outstanding achievements of post-war Amateur Radio.

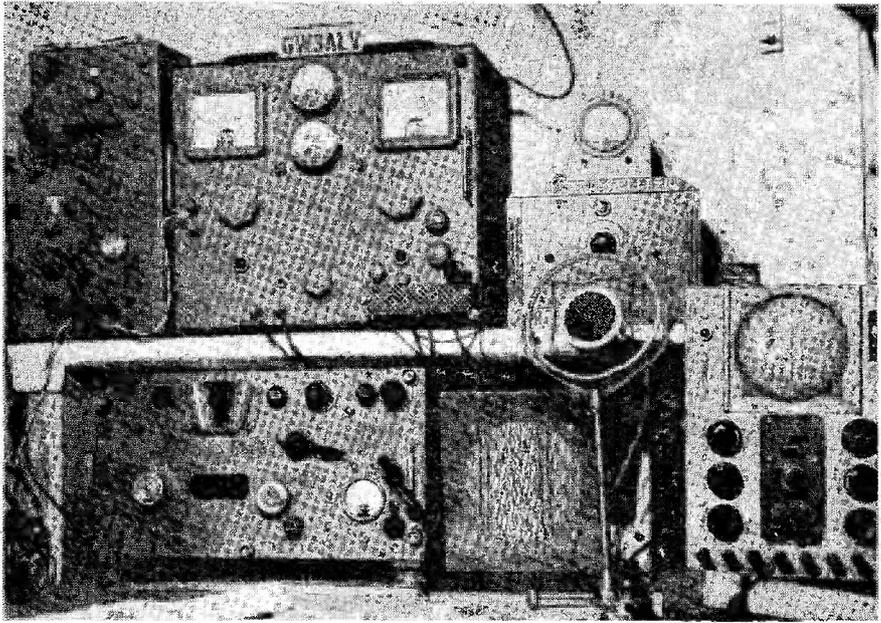
G3EIZ (Liverpool) is a 3.5 mc specialist, too—witness his score for a few months on the air. His best lately have been VP2AJ (3557 kc at 0515), KP4DJ (3550 at 2330) and VE3AGX (0605). A pirate was heard, using the calls EA4ZR, IIKRM and EA4RS in quick succession—but it seems hardly worth while!

W2QHH ("The QRP W") tells us that he has now worked 51 countries on 3.5 mc with his 17 watts to a 6L6. When he gets all the cards through he'll have a pair of 813's! No less an achievement on his part, though, is to have worked 164 countries post-war, of which 153 are confirmed. He says it is the lack of response from UC, UG, UI, UP and UR that "drags his percentage down." And ZD9AA is patiently awaited, too. Seems to us that W2QHH is nearer to 100 per cent. confirmations than anyone else we know.

### 14 mc DX

Nothing frightfully sleep-losing has turned up this month. G3ATU (Roker) heard HS1SS, W8QOH/HS and W6YNK/HS all on the same afternoon, but the latter two are both MM's and won't do for country-counting. Other new ones for 'ATU were HB1EO/HE, HH2G and EA8MC.

G5FA (London, N.11) unearthed VU7BU, MD7RGS, VS7PH and ST2PP. G3BMM (Burton-on-Trent) found a funny one in the person of "CB1A," who gave his QTH as "Bouvet in the Atlantic Ocean." He was RST588 with a slight flutter but nothing further was extracted from him. Can anyone help on this?



**GW3ALV**, Whitchurch, Cardiff, has a completely rebuilt T.1154 as Tx, with the usual PT15's driven in push-pull on 14 and 28 mc by two switched 6L6 doublers; suppressor modulation is used with a 6SN7-6F6 arrangement. Other gear at this station (located in a corner of his garage) comprises a CO and VFO driver, to the left of the transmitter on the top shelf, and a BC-312 as receiver, modified for AC operation.

G2VD (Watford) explored the HF end of Twenty and had a W back to him at once. This W said that AC4YN had been known to show up there occasionally to escape from the QRM. As 'VD remarks, before the war the DX congregated round *both* ends of 14 mc, and the fact that it is now all at the low end is only a matter of custom. But as a reasonable Band Planning scheme, with some chance of success, appears to be coming into action at last, and by this it is suggested that 14000-14150 be kept for CW only (for the present) we cannot possibly expect freedom from phone up the other end. No reason why we shouldn't explore a little on CW, though!

New ones for G3BNE (London, N.W.3) were KZ5IP, XE2FG and CT3AA. A funny one was W2HPJ/AC, giving his QTH as 600 miles N. of Hong Kong. Prefix slipped, surely? G2ALN (Manchester), who is a newcomer to these columns, has raised YSIGM, VP7NU, OX3MC and CT3MN (all 14 mc phone). He uses a 3-element close-spaced beam.

G8PL (London, N.W.3) worked CR10AC, giving QTH as Koe pang (but QSL Box 400, Rotterdam). This was on 14 mc at 1645, the signals being 578 with QSB. Let us hope, with 'PL, that he is genuine.

G2WW (Penzance) divides his time between working 14 mc phone and persuading his XYL—*cum*—2nd Op that Amateur Radio is a Good Thing. 'WW suggests that a British section of the YLRL should be inaugurated; let's hear from all the YL's and XYL's on *this* subject! G2WW managed a couple of very snappy WAC's on 14 mc phone, one in 90 minutes and one in 115 on two successive evenings. He also gave VE8MA (Ellesmere Island) his first phone QSO with Europe.

G8KP (Wakefield) figures more prominently in the 28 mc section, but in four nights on 14 mc CW he collected four new ones—VP8AI (2210), VP8AK (2210), ZD9AA (1820) and MD4BPC (2120). G2AVP (now at Mildenhall) has installed himself nicely with a 348-ft. long wire N/S and a 418-ft. wire E/W; from these he contributes a very fine list of DX which includes C3HF (1430), HP1PL (2320), VP9CC (2040), CE7AA (2315), VP8AI (0110), FO8AC (0820)—all on CW.

G3ETI (Wirral) asks how one gets out on 14 mc, his efforts up to date being rather unsuccessful. However, being a mere 18 years of age, he adds philosophically that he has another 60 years to play with aeri-als, and doubtless *one* of them will work! While working ZB2A, he noted a prowling tom-cat

## FOUR BAND DX

Station	Countries Worked					Power	Station	Countries Worked					Power
	3.5 mc	7 mc	14 mc	28 mc	Total			3.5 mc	7 mc	14 mc	28 mc	Total	
G8VB	48	42	117	57	137	150	G5FA	17	82	115	28	129	100
G6QB	32	67	159	115	182	150	G6XL	15	41	105	35	127	35/100
G3EIZ	32	23	28	14	44	25	G8IH	14	57	171	30	178	7/150
G6HL	29	80	141	124	170	150	GC2CNC	14	55	134	61	163	10/50
G3AKU	29	44	126	13	134	30/60	G8IP	13	34	110	62	127	3/150
G2AO	29	34	111	32	120	150	G8QX	12	18	101	67	124	150 Phone
ZB1AR	29	37	70	31	86	25	G3CBN	12	44	97	24	108	50/150
G6BS	28	93	150	4	164	150	G2DHV	12	19	63	2	68	25/60
G2AVP	28	55	151	32	158	25/120	G5GK	11	88	116	26	183	150
G3ATU	26	60	154	63	160	10/150	GW3CBY	11	19	33	3	43	15/30
ON4JW	24	68	190	4	191	35/75	G8PG	11	28	28	1	40	14/14
G2VD	24	41	157	75	163	150	G8LO	10	29	110	14	111	140
G2WW	21	31	155	76	165	60/150	GW3ECH	10	9	37	13	46	25
G3DO	19	37	145	96	175	150	G2HIF	6	9	42	34	66	150 Phone
G8VG	19	51	101	24	117	60/75	G2BJY	4	24	61	85	112	25
G3ACC	19	5	102	2	102	150	G2VJ	4	12	66	41	85	25/150 Ph.
G3FNJ	19	24	85	36	100	150	G4CP	3	45	178	64	178	150
G4QK	19	26	77	3	81	150	G3DOG	3	24	33	1	42	25
G3BDQ	18	26	107	9	109	25/150	G8KU	1	23	116	36	123	?
G6BB	18	34	89	28	017	10/70	G6CB	1	5	21	80	88	?

sniffing at the end of the transmitting aerial ; when he pressed the key a long scream was heard and the cat has not been seen since ; evidence that he has *some* RF up there !

G6AT (Hampton) has now got going on 14 mc and is piling up such DX as ZD4AB, MI3GH, JA4AF and SU2CR, who was much sought after by all and sundry.

#### From Overseas

A nice strong overseas contingent, as usual, with some very interesting news. To start with, VK9NR (Norfolk Island) says he is impatiently awaiting the arrival of an ex-ZL amateur out there, *so that he can work Norfolk Island!* Noel says there are so many FOC members in the Pacific area now (including himself, of course) that they want to arrange a get-together over the air, probably on 7 mc.

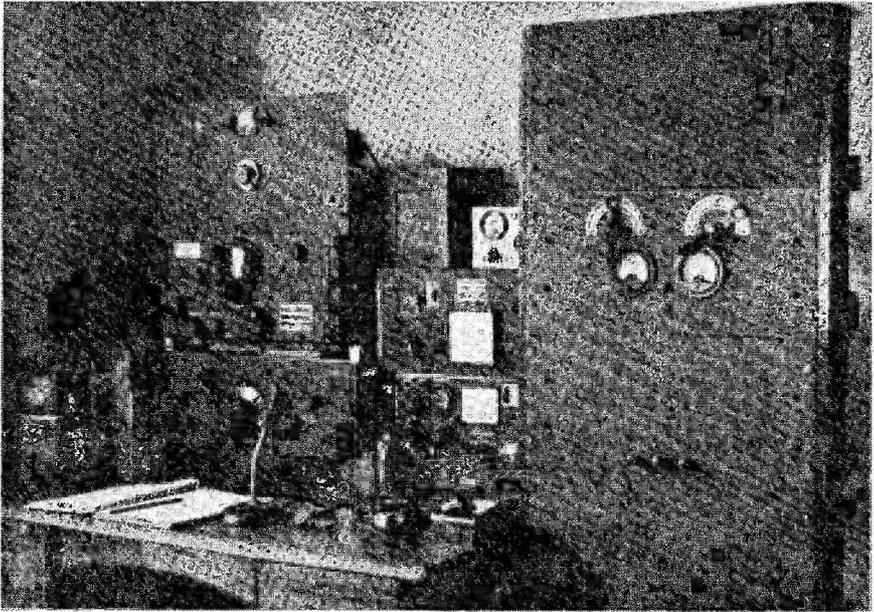
Harold Owen of ZD4AM (Tafo) has found conditions none too good, but has worked his first XE and has managed to hear ZD9AA for

the first time. VK2AKV (ex-G3PO) hopes to be active very shortly and will of course be looking for G's. His QTH is in the list.

Waldmar F. Kehler (Husum/Nordsee), who used to write us as an SWL, is now DL1IX and hopes to be active at once. G3DJD (formerly of Brighton) is off to VE6 very shortly and is another who will be chasing G's vigorously.

The state of married bliss has not interfered with Jules Elias of ON4JW, who still heads our Zones Worked list with his phenomenal score of 191 (190 of them on 14 mc !). On 28 mc he has worked only four countries with his 5-watt bantam, but one of the four is VR2 (VR2AQ on CW). Other new ones (on other bands) have been SP5BA, AC4RF, MD4BPC, EA8MC and VK9NR.

ZC1CL (Amman) is past history by now and will soon be "just another G." He managed to squeeze in all 40 Zones during his sojourn in ZC1, with XE1A and AC4RF recently filling



G3AST, Luton, Beds., is operated on 7 and 14 mc. The Rx with an HRO dial is a 16-valve home-built communications superhet with plug-in coils, and a BC-348 is also available. The Tx is 807-35T, with an RC-coupled speech amplifier-modulator running a pair of 845's in Class A.

the two remaining gaps. He adds that the DX world has been rippled recently by VS7AD/VS9 in the Maldive Islands; unfortunately he was operating from a Sunderland flying boat and was *not* on dry land. ZC1 activity will be upheld by ZC1AZ, a club station with three operators.

Then there's our old friend VQ4CUR (Mackinnon Road, Kenya Colony), enquiring "What *is* this DX that is waffed so much about in your columns?" Harry continues that it certainly is no longer a matter of distance, because W6 is about as far as you can get from Kenya, and he's worked more than 500 of them with less than 50 watts. Then every time he works G he is told it's good DX, but he's worked more than a thousand of *them*. On the other hand, relatively next door to him is VQ9, and he has never worked one yet—so *that* is DX! (What have we always said? "D for *Difficulty*.")

G3ESG (S.S. *Ashantian*) did some listening on 3.5 mc CW and 7 mc phone when he was between Gibraltar and the Canary Islands. Thirteen G's were heard on Eighty, and two on Forty-Metre phone. He had a lot of trouble with QRM from Spain and Portugal, but points out that too many G's call CQ about a dozen times, and by the time they arrive at their call they are lost in QRM.

From Earl Roberts (an SWL in Indianapolis) come one or two interesting points. First, he says TI9BR is a gold-hunting expedition to Cocos Island—28400 phone. Next, VP2SS (St. Vincent) is reported to be on 7110 phone. Thirdly, XE1CQ was heard working ZC2AA. The rest of his DX is too numerous to mention and includes practically everything we ever hear on this side!

#### The DX on Ten

G2XK (Defford) reports for the first time. He uses 28 mc phone only, and has the very excellent score of 38Z and 126C therewith. Some of his better ones recently have been VP2GE (1900), PK4KS (1400-1600), ZS8A (1700), VU7AF (1300), AC4RF (1100), ZP9FA (1830), DU1AK (1500). Very nice work, too, we should say.

And the same remark applies to G8KP, who lists VP2KM (1730), VP9DD (1400), YN1HB (1450), KH6QV (1850), HC1KV (1440), XE2W (2030), OA4DI (2359), ZS8A (1740) and plenty more. All 28 mc phone.

G2AKR (Manchester) reopens the subject of this mysterious Pietermaritzburg DX Club. If you work five members you are presented with a certificate and some mystic gift. All very intriguing, but we can't yet find anyone who has worked five members!

From G2ALN (Manchester) comes the remark that 28 mc has been very interesting, with VK and ZL coming in the long way round between 2200 and midnight. New contacts for him have been FF8FP, W3CHH/Iwo, ZD2S, HP2RO, ZS3O, ZP5BL and plenty more interesting stuff.

G2VD thinks he picked himself a really nice piece of DX on 28 when he worked his first GW. The latter was a watery S7 in Watford, with 'VD's beam due East, and hardly audible with the beam looking West. 'VD hopes that the CW men will spread out more on 28, and use all frequencies up to 28200. This is precisely what is recommended in the Band Planning scheme already referred to, so let's see some upward creep, please.

G5FA has been trying a vertical folded dipole on 28 and quite likes it. New ones it has brought in are FE8AB, VS9AL, LU8NA, UA9CC, PY4TI, VP2AJ—and 'FA is well off towards his WAS on the band.

G3ATU remains mostly faithful to 14 mc, but on 28 he raised HR1MB on phone and three HC's on CW.

#### What about 7 mc ?

Very few notes about 7 mc this month, and mainly moans at that. First, from G2FXA (Stockton-on-Tees): A station on 7131 kc calling "CQ, CQ, CQ, Test, Test, Test." Long pause. Then more of same. Pause. Then still more. 'FXA says this continued from 1102 until 1150 without a break! He just sat there listening, hypnotised by the performance, and wondering who was mad—the fellow transmitting, or himself for listening.

Another moan from G2FXA—these nets and the behaviour of some of their members. They seem to regard the frequency (which they have appropriated and made unusable by anyone else) as their sacred territory. So if, during a gap, another station innocently wanders on to or near the frequency, such a chorus of imprecations greets him that he is probably scared off the band for weeks. As 'FXA says, it's a bit hard on a fellow with one crystal, who can't wait for hours because some senseless multi-way natter happens to be on the same frequency.

Now to quote from G6XY (Bigbury-on-Sea): "At the HF end is a round table of over-modulated phone stations carrying on a contact which features several giggling females and consists mainly of comments in very bad taste. The subject of radio is not mentioned. Tuning down the band I hear one or two stations trying to carry on a contact in the face of suchlike opposition, and to crown it all I have just heard some fool announce, after ten minutes' whistling, singing, chimes, hooters and so on, that he is going to call 'Canada Quebec.'" We agree with G6XY that this is a moan that one simply has to air.

Our old enemy "Phone-Phoolery" has crawled out of the mud and is raising its ugly head in no mean fashion once more. It is one of the worst and most insidious enemies of the true spirit of Amateur Radio; all sorts of people hear it going on, and their idea of amateurs is conditioned by what they *hear*—not by all the useful stuff that they *don't* hear. For Heaven's sake, some of you sensible types get cracking and lam in to these lids—on the spot, on the air—and tell them what you think of them. It's the only way of producing any effect.

The only other news of 7 mc is from G5FA, who worked MP4BAD and Y1IFC one evening, and managed to find W6PUZ and W6BVM between 0645 and 0700 one morning.

#### Miscellany

G2PL (Wallington) is to be congratulated

#### DX QTH'S

CE3IO	Maj. H. L. Hart, Corps of Engineers, US Army, Santiago.
CP6FB	Adam Gutierrez, Santa Cruz, Bolivia.
CT3MN	P.O. Box 176, Funchal, Madeira.
CR7IZ	Rutilio Graca, Box 579, Beira, Portuguese E. Africa.
HH2W	Box 117, Port-au-Prince, Haiti.
HP2RO	Box 481, Colon, Panama.
JA2AF	APO 328, c/o PM, San Francisco, California.
LZ3SD	Box 49, Sofia, Bulgaria (?).
ST2WB	John Birch, Juba, Anglo-Egyptian Sudan.
VK2AKV	L. A. Kelsall, Corner Page and Collins Streets, Botany, N.S.W.
VK9FD VK9GM VK9YT	c/o Dept. of Civil Aviation, Norfolk Island.
VP3MCB	H. McCombe, Mackenzie City, Rio Demerara, British Guiana.
VP3TR	APO 857, c/o PM, Miami, Fla.
VP6PC	Box 116, Barbados, B.W.I.
VP6SD	Box 252, Barbados.
VS9AH	J. B. Halton, No. 8, Bungalow, Ras Morbut, Aden.
VU4CN	Sgt. Forsyth, Nicobar Det., via RAF Changi, Singapore.
W3CHH/Iwo	APO 264, Unit No. 1, c/o PM, San Francisco.
W4AXC/C6	R. E. McLarney, 3961 Illinois Street, San Diego, California.
YS1A	J. E. Alcaineh, Calle Arce 136, San Salvador.
YU5RP	Post Box 180, Ljubljana, Jugo-Slavia.
ZD2S	Radio Officer Sherwood, c/o West African Airways, Lagos, Nigeria.

on his terrific achievement of 200 *Post-war Countries Confirmed*, which he reached with the arrival of cards from VU7AF and KH6VP/VR4. Peter says he hopes this is the first in Europe; so far as we know, no one else is anywhere near it.

The previous holder of G6KQ writes a sarcastic little note saying that pirates will no doubt be interested to learn that the call is now "vacant"—so we may even hear a G6KQ working a G6KQ with other G6KQ's lined up!

G3BEX (Southwick) writes to say that after G3PU's Transatlantic on 1.7 mc he hopes that the DX aspirants will keep some sort of order up there. On the same subject, we hear from W2QHH (Hamilton, N.Y.) that he intends to work some of us next season with 10 watts at his end (same old 6L6!) and that he has his 270-ft. wire ready for the fray. Likewise W1BB, of pre-war Top-Band fame, has his rig all tuned and tested and ready to start up again; but *not* with 10 watts in his case!

GW3CBY (Swansea) hopes we will turn the Four Band Table into a Five Band affair, to encourage more use of the Top Band. This is really a two-edged sword, you know—lots of happy users of the Top Band have a dread of finding it suddenly invaded by DX-hunting spivs. We'll see what happens when the winter DX season starts. If W's and VE's are workable we shall just *have* to include it.

A long letter from G5LH (Horbury),

**ZONES WORKED LISTING  
POST WAR**

Station	Z.	C.	Station	Z.	C.
Phone and CW			Phone and CW		
ON4JW	40	191	G2BJY	35	112
G6QB	40	182	G3FNJ	35	100
G4CP	40	178			
G8IH	40	178	G8PL	34	109
G3DO	40	175	G3BNE	34	92
G2WW	40	165	ZBIAR	34	86
G3ATU	40	160			
G2AVP	40	158	G2FYT	33	100
ZCICL	40	136			
G8IP	40	127	G3CVG	31	106
			G3ACC	31	102
G2VD	39	163	Phone only		
VS2CH	39	153			
G3AKU	39	134	G2ZB	39	160
G2AO	39	120	G2XK	38	126
G5MR	39	116			
G6PJ	39	87			
			G3DO	37	141
G5FA	38	129			
G8KU	38	123	G8QX	35	124
			G2ALN	35	120
G6FB	37	102			
			G6CB	32	88
GC2CNC	36	163			
G6BB	36	107	G2VJ	31	85
GM3CSM	36	107			

chiefly on the subject of 3.5 mc, of which he is very fond, laments the promiscuous spreading of foreign phones on the band. Only about the first 50 kc seems to be immune, as he says. 'LH has received his cards from VK5KO, ZC8PM and ZBIAR, and his country total on Eighty is now 34.

G8QX (Malvern) takes us up on the numbers of VK's and ZL's worked; on phone only he claims 201 VK's and 50 ZL's. 'QX was lucky enough to wrinkle out VU7AF on 28 mc, also ZS8A, VK9GW, PK4KS and other nice ones.

G3BMM (Burton-on-Trent), commenting on the fact that Newfoundland is no longer a separate country, asks whether contacts made prior to the "fusion" are still counted. We just don't know the answer to that one yet, and it's not a thing we can settle with a masterly stroke of the pen—so wait a bit. The ZC6/ZC8/4X4 business also wants sorting out.

GM3CSM (Rutherglen) has managed a 28 mc WAC on NBFM phone, but is building a new transmitter for next season with 150 watts AM, complete with 2500-cycle filter, clipping and all that. His two chief moans are (a) lack of CW activity on 28 mc and (b) "key-sitters" on 14 mc.

**Ode to a Pirate**

Heart-cry from G3ELO (Droitwich):  
*OM, your sigs are quite FB,  
 I've heard you 579,  
 But, most disturbing fact of all,  
 The call you used was mine!*

**Good Old Days**

A very interesting letter from C. A. Wood (Preston Brook) invokes memories of the early days. He has kept a pile of old periodicals, and has dug out from them all sorts of reports of early first contacts and other historical events. For instance . . . *November, 1924*: G2OD heard working Australian A-3BQ (90-metre CW). A listener, F. Walker, reported receiving A-3BQ and A-3ME, in addition to 200 US amateurs, his best being U-7FR in Medford, Oregon.

*April, 1925*: U-1XAM and U-1ANA announcing high-frequency tests on 21 metres to test a new theory of high-angle radiation. *October, 1925*: G2NM reporting first UK-India contact, on 90 metres. *December, 1925*: G2OD reporting first UK-China contact, on 44.5 metres, both phone and CW. *July, 1926*: Report of a "three-continent talk" by G2LZ, U-1AAO and Z-4AM (New Zealand) at 0500 GMT—probably on 45 metres. *March, 1927*: Announcement that a station in Tristan da Cunha had been licensed with the call GO-9ZZ.

And so on, and so on. . . Happy Days ! In a recent chat with G2KF (Edenbridge), he reminded us that one used to think nothing of listening all night without hearing a single signal of any kind, on the off chance that one wee sound would suddenly appear, and might turn out to be an Australian or something equally exciting. We would rather care for a Time Machine—provided we could take our

present-day Rx and Tx back with us !

So that's about the size of it for this month. Please note that the deadline for the June issue is rather early ; to be precise it is first post on May 11. So please have those letters, claims and everything in by then, addressed DX Commentary, *Short Wave Magazine*, London, S.W.1. Good Luck, Good Hunting—and may you hear all that you work ! 73 and BCNU.

## FIRST CLASS OPERATORS' CLUB

Reference in "DX Commentary" in the *Magazine* to some of the achievements of members of the Club shows that FOC activity is by no means confined to the 3.5 mc band, as some would suppose. And now comes news that the first two DXCC awards made by the A.R.R.L. to G3's go to G3AAE and G3ATU, both FOC members, who hold the only two such certificates yet issued to G3's.

### FOC Emblem

The Club's own emblem, as appearing on this page, has been in use for some two years and the design has been registered. It can now be obtained in three forms—as a rubber stamp, as a block for printing QSL cards, and as a lapel brooch. Members wishing to obtain the emblem for any of these purposes are referred to Circular Letter No. 22 and the Club by-rules, which should be in the hands of all members.

There has been some unavoidable and much regretted delay in getting out the new full list of members with their QTH's, but it will be distributed as soon as it is received from the printers.



President :

**GERALD MARCUSE, G2NM**

Hon. Secretary :

**Capt. A. M. H. FERGUS, G2ZC**

### DX Membership

This is increasing steadily, and there is talk of a Pacific Net on 7 mc for FOC members in those parts. VK9NR, on Norfolk Island, is particularly anxious to work G's, but his task is to penetrate the screen of W's all busily engaged in trying to work *him*—these "lucky" rare DX stations !

### Club Dinner—1949

Provisional arrangements are now in hand for the second annual FOC Dinner in the autumn of this year ; it will be held on the Saturday of the Amateur Radio Exhibition, in London. From the volume of support already promised, it is beginning to look as if a

venue with more accommodation will have to be sought. So that the necessary enquiries can be made members are asked to notify the Honorary Secretary if they think they have a reasonable chance of being there on Saturday, November 26, in order that a rough estimate can be obtained well in advance. Last year, accommodation was stretched to the limit.

### Election Notice

In accordance with the Rules of the Club, the following are declared elected to the active membership list of the FOC :

G. Haylock, G2DHF (London)  
 P. Sawyer, G3BYF (Croydon)  
 G. Openshaw, G2BTO (Bolton)  
 F. Aughtie, G6AT (Hampton Hill)  
 H. Scar, G3CSH (Chipping Norton)  
 J. C. Egerton, G8MU (Ipswich)  
 H. T. S. Jeal, G8HH (Reigate)  
 E. Orchard, G3PU (Weymouth)  
 T. Arnold, G3AW (Oldham)  
 E. Karlsens-Klevfoss, LA5B (Sarpsborg)  
 P. B. T. Cutler, G3DAO (Beaconsfield)

All correspondence regarding the First Class Operators' Club should be addressed direct to the Honorary Secretary, Capt. A. M. H. Fergus, G2ZC, 89 West Street, Farnham, Surrey.

*The Short Wave Magazine covers  
 the whole field of Amateur Radio*

# Building a Fifty-Footer

## And Raising It !

By W. R. JOSS (G2AJ)

WHEN the great awakening took place in 1946, the writer decided that, although only being in possession of an average suburban garden, something a little more ambitious than the usual 30-35 ft. pole was required to support the various aerials which were bound to be needed.

A steel sectional mast will give 50 ft. and more, but this requires guying ; as the space available from the house to the bottom of the garden was only 75 ft. and all this would be wanted for roof-length, the possibility of having a number of guys was out of the question.

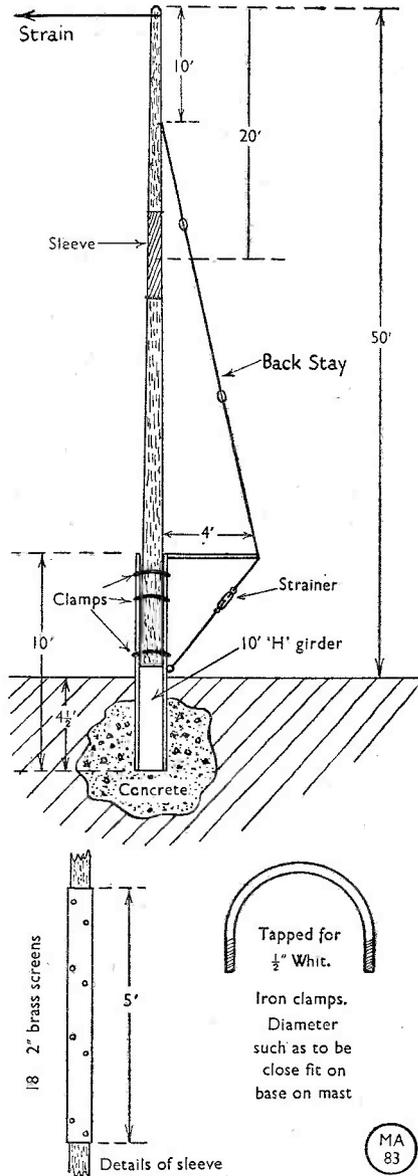
Two other schemes appeared to be practicable : Either to find a suitable 50-ft. pine which with adequate base fixing might be self-supporting (hence no guys) ; or to construct a lattice tower. The latter would undoubtedly be the ideal solution, but with only 75 ft x 35 ft. of space available, a 50-ft. tower appeared rather unwieldy. Apart from the probability of arousing comment by the neighbours it tends to be rather expensive, even if the necessary material is available (this being 1946, it was not) ; so this idea was forgotten.

Efforts were next made to find a suitable 50 ft. pine, but even this proved difficult and the only ones discovered were scaffold poles belonging to a local builder who, in spite of much persuasion, would not part ! Thoughts were now turned to other possibilities, and eventually it was decided that it should be possible to get the extra height required with an extension on top of, say, a 30- or 35-ft. pole, the question being in what way a secure joint could be made. After much thought the following method was evolved, and as the mast is still standing after three years the writer feels that it can now be recommended to readers whose circumstances are similar.

### Construction

The accompanying sketch shows the final arrangement and little description is necessary. Two separate pine poles were obtained, one 30 and the other 20 ft. long. The base of the larger was about 7 in. in diameter, whilst the top of the shorter one was about 3½ to 4 in. Junk yards were searched and a 5-ft. piece of 4½ in. diameter steel sleeving was unearthed. This was used to effect the joint. This sleeve was found to be a tight fit over the top end of the 30-ft. section and it was forced on to a

depth of 2½ ft. Next the bottom end of the 20-ft. section was planed down so that it also was a tight fit in the sleeve. Prior to assembly



Illustrating G2AJ's ideas about building a 50-ft. mast to be capable of standing without an extensive guying system.

MA  
83

the sleeve had 18  $\frac{1}{4}$ -in. holes drilled in it, spaced equally in spiral fashion throughout its length, and after connecting the sections together 18 2-in. brass screws were inserted to complete the joint.

### Mounting and Erection

As no guys were to be used it was essential to have a really secure foundation for the base and with this in view another junk-yard search was undertaken. This eventually produced a 10-ft. length of "H" girder which appeared to weigh some tons and required a lorry to move it to the writer's QTH. However, it was just the thing for the job. A five-foot hole was dug, the end of the girder inserted and the hole completely filled with concrete, the girder being steadied and checked with a spirit level before the concrete hardened. Prior to this the girder had been drilled to carry the U-shaped clamps which were to secure the mast after erection.

Having allowed plenty of time for the concrete to set (a week in the writer's case) everything was ready for erection of the mast itself. It may be recorded here that this task took place one very cold Sunday afternoon in January, 1946, with snow on the ground! Furthermore, apart from the anxious author of this note, none of the eight people who assisted were the least bit interested in Amateur Radio! The erection was not an easy job, especially in a small garden, and eight helpers were certainly not too many. Five of them remained in the writer's garden, while three went into the garden behind and controlled

two ropes attached to the mast ten feet from the top; these were to prevent any tendency on the part of the mast to sway sideways whilst it was being raised. The raising was carried out by the five operators with the aid of an extendable ladder and two clothes' props lashed together in the form of scissors. The "scissors" were inserted under the mast first, and then as they were progressively moved along towards its base the ladder followed in a similar manner. As the mast approached the vertical position the three helpers on the back ropes were able to play a more effective part in the proceedings and finally supplied the last amount of effort to get it vertical. As soon as this happened, the U-clamps were quickly inserted and made secure.

Some time later a back guy was added to counteract the pull of the aerial and the final set-up is shown in the sketch, a piece of angle girder being attached to the top of the "H" girder to provide an anchor point for the guy. This guy is just sufficient to prevent the top of the mast tending to bend when an aerial is pulled fairly tight.

### Conclusion

The mast has now stood for 3 years to all the weather that a location 200 ft. up can provide, although the writer will not deny that the sway observed at the top during some of the early gales did give rise to certain misgivings! However, it continues to stand and weather well, no doubt partly due to the many coats of creosote which it received before erection.

## Checking His Modulation

### Receiver CRT Connection the Easy Way

By H. F. BURTOFT (G8LO)

ONE of the most fascinating things to have in the station is a cathode-ray tube connected to the receiver, so that the modulation percentage and general characteristics of incoming telephony transmissions may be observed. This is easily done if one has available an oscilloscope complete with a suitable amplifier. Note the term "suitable amplifier." It must be one capable of handling frequencies of the order of 455 kc with negligible phase shift. This requirement is met by a number of commercial instruments, (though by no means all!) and suitable amplifiers can be constructed. The writer,

however, thought it would be a good thing to dispense with the amplifier altogether, and after a number of experiments the arrangement shown in the diagram was evolved.

### Receiver Connection

The tube used is a G.E.C. E/4103-B-4 with a  $1\frac{1}{2}$ -in. screen, though of course other tubes may be used quite satisfactorily. With an HT supply of 400 volts the Y-plate sensitivity of this tube is 4.5 v/mm, so that for adequate deflection an IF voltage of the order of 30 or more is required. The voltage available across the secondary of the last IF transformer of receivers of the kind normally used is only a few volts, and when applied directly to the Y-plates does not give enough deflection to form a trapezoid of reasonable size. The additional tuned circuit LI/CI overcomes the difficulty, and a deflection of up to 1 cm. can be obtained, depending on the efficiency of this circuit. One winding of a standard IF transformer, with the normal trimmer or iron-dust core, is used and the output is fed

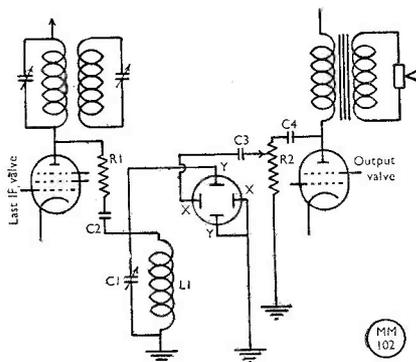
to the 'scope by means of coaxial cable, though standard screened lead is also quite effective. In the writer's case, a Pye socket was fitted to the side of the receiver (an HRO), and the additional components fitted in the receiver itself, so that a neat arrangement resulted. The last IF transformer should, of course, be retrimmed.

A trapezoidal figure is obtained, but it is not proposed to discuss the interpretation of the pattern which will be observed, as this subject has been adequately dealt with in the *Magazine* (December, 1948).

In addition to the HRO, this system has also been tried and found completely satisfactory on a CR100, an SX28, an AR88D and AR88LF (but remember that the IF of the latter receiver is 735 kc).

**Precaution !**

One word of warning ! You are unlikely to meet with any snags in connecting a 'scope to your receiver using this system, and when giving a report to another station, be very honest—but *very* tactful. Far better to be a station which others like to work for an accurate report from your 'scope, than one which they avoid for the same reason !



Connecting a cathode-ray tube into the receiver for observing the characteristics of an incoming signal ; G8LO explains this circuit in the accompanying text.

**Table of Values**

**CR Tube Connection to the Receiver**

- C1/L1 = See text
- C2 = 300  $\mu$ F
- C3, C4 = 0.1  $\mu$ F
- R1 = 50,000 ohms
- R2 = 500,000 ohms

**EDDYSTONE SPEED KEY**

*Magazine Report*

**T**HE semi-automatic or "bug" key has long been accepted by the keen CW man as more of a necessity than a luxury. Even hardened brass-pounders may be heard sending Morse which, while it cannot be criticised from the point of view of sending, has that slight trade-mark which characterises the "bug."

For this reason we welcome the fact that a very good one—the Eddystone Speed Key—is available on the home market, and competes extremely well in quality with the best that have hitherto found their way into this country from America. It possesses, in fact, certain features which are absent from the American keys, notably its smart stream-lined case with a chromium-and-crackle finish. It is the only enclosed semi-automatic key that we have come across.

Contacts are of the heavy-duty type ; the parts of the movement are all of good heavy brass (brass-pounders please note !); and the paddle or handle has an unusual but very comfortable feeling about it. It is so designed that either left-handers or right-handers may feel comfortable on it.

We experimented with the weights, of which

there are one large and one small, and found that with the small weight *only* we could obtain a speed range of 12 to 28 w.p.m. With the large weight added there is hardly any limit to the slowness of sending ; and with the two weights removed the upward limit must be well past the ability of even a competent wielder of bugs. Thus, from the speed point of view, the flexibility leaves nothing to be desired.

The shorting switch, incorporated in the side of the key, is a great convenience, and the whole instrument weighs enough to stand firm on its rubber feet without being screwed down to the bench or table. Altogether a worthy addition to the well-equipped modern station.

**SALFORD CRYSTALS**

The latest list of G.E.C. Quartz Crystal Units, issued by Salford Electrical Instruments, Ltd., Peel Works, Silk Street, Salford, 3, Lancs., shows a wide range in eleven different types for frequencies between 800 cycles and 15 megacycles, in mountings ensuring permanence and a high order of accuracy. Of particular interest to amateurs are types BA, DA and EA for the range 5-15 mc, which can be obtained in six different mountings, including international octal and B7G, B8G style bases.

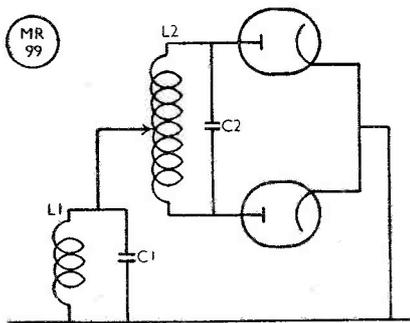


Fig. 1. Two diodes connected to an asymmetric circuit L1/C1 and a push-pull circuit L2/C2.

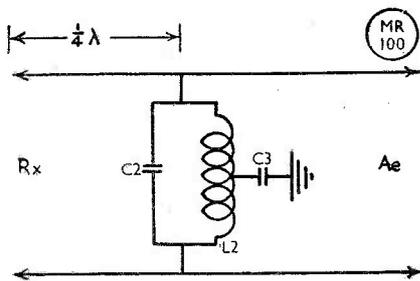


Fig. 2. Using part of the aerial feeder line as a blocking filter for the unwanted asymmetric voltage.

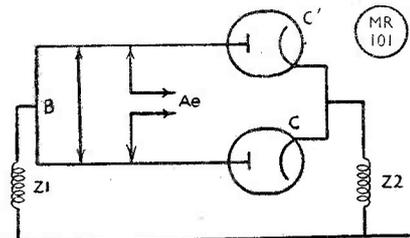


Fig. 3. A variation on Fig. 2., where the aerial feeder connection is taken from points on the input circuit having minimum asymmetric voltage.

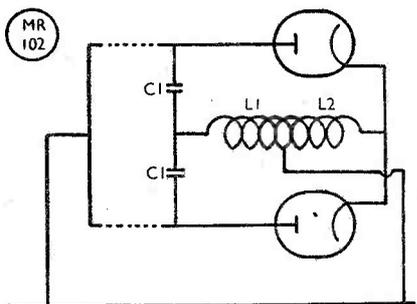


Fig. 4. A basic converter circuit with Lecher wire input, free of asymmetric voltage.

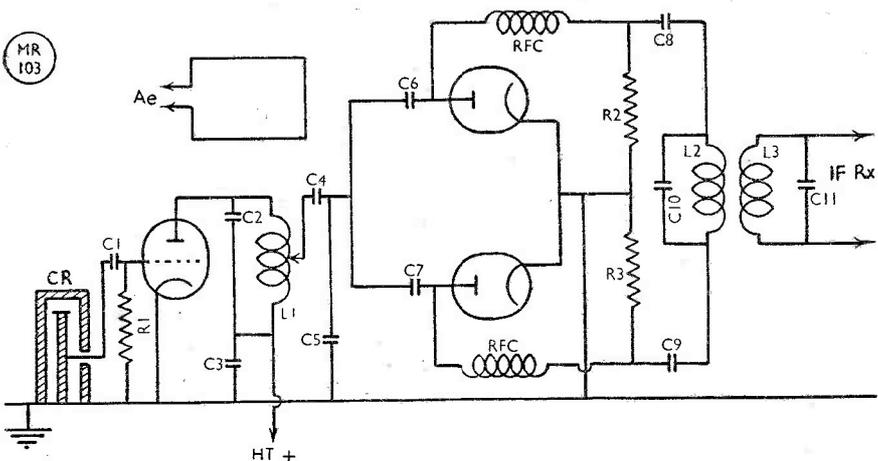


Fig. 5. Complete practical circuit for a diode converter stage, using a cavity resonator (CR in the diagram) in the grid of the oscillator, an arrangement very suitable for frequencies around 300 mc.

An excellent article in a recent issue of "Philips Research Reports" discusses, with a full mathematical analysis, some VHF converter circuits which will be new to amateurs. A precis of this article appears below, with due acknowledgements to the source and the original author, A. Van Weel, of Philips, Eindhoven, Holland.—Ed.

## VHF Mixer Circuits

### Diode and Triode Push-Pull Converters

Précis by E. J. WILLIAMS, B.Sc. (G2XC)  
from Philips Research Reports, Vol. III, No. 3

AMONG the advantages of push-pull mixer stages at VHF are smaller input capacity, higher input resistance due to shorter inter-electrode leads, and easy coupling to a symmetric aerial system. Three frequencies are involved in any mixer stage—signal, local oscillator and intermediate—and for push-pull mixing two of these must be applied in push-pull and the other asymmetrically, *i.e.* in parallel. In diode and triode mixing valves both signal and oscillator voltages must be fed to the same electrodes, and for good efficiency it is desirable to tune the input to both these frequencies. This can be done by applying the signal voltage in push-pull and the oscillator voltage in parallel (Fig. 1).

#### DIODE MIXERS

In the case of diodes three circuits tuned to different frequencies must be connected to the same electrodes, but as the IF circuit does not affect the signal-frequency circuit it will be omitted in the initial considerations.

#### Aerial Coupling

Coupling the aerial to the signal-frequency circuit presents a problem as unless precautions are taken the aerial will become part of the local oscillator circuit and, besides radiating the oscillator frequency, can cause instability of this frequency. If symmetry is sufficiently maintained, inductive coupling of the aerial will prevent this, but in practice this may be difficult to achieve and other means have to be employed.

A filter to pass the signal frequency, but block the oscillator frequency can be included in the feeder. This can consist of coils and condensers, but more neatly, part of the feeder may be used as a  $\frac{1}{2}\lambda$  system ending in a virtual short-circuit. This is shown in Fig. 2, where L2C2 is tuned to signal frequency and C3 tunes the leakage inductance of L2 to oscillator

frequency. The filter can be repeated for better effect.

Another method is to connect the feeder to points of the input circuit which carry no local oscillator voltage to earth. Thus in Fig. 3, which uses a Lecher wire tuning circuit at signal frequency, the impedance Z1 must

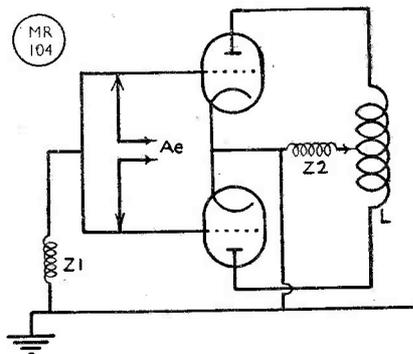


Fig. 6. Circuit for a push-pull triode converter, as discussed in the text.

tune so that the circuit to the left of AA' is series resonant at oscillator frequency. Z2 is then required to tune the whole asymmetric circuit to oscillator frequency. This means that the circuit to the right of AA' is also series resonant. Z1 will be capacitive but Z2 will depend on the inductance between AA' and C, and the capacity of the diodes.

Yet another method is to free the whole input circuit of local-oscillator voltage by making the input electrodes of the mixer valves free of this voltage. A suitable circuit is shown in Fig. 4, where the ratio C1 to Cd (diode capacity) equals the ratio L2/L1. This

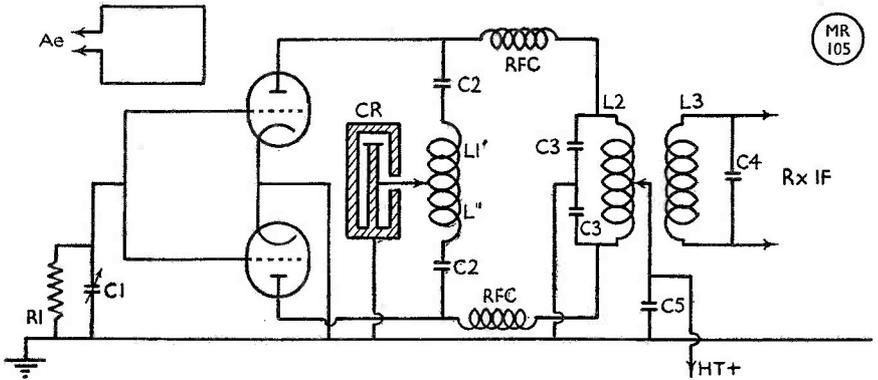


Fig. 7. Complete circuit diagram for a triode converter, using a cavity resonator for frequency stability

method has the advantage of being independent of frequency.

**Coupling Oscillator and Mixer**

Although either inductive or capacitive coupling may be used between local oscillator and mixer, with the former it may be difficult to prevent undesired coupling between the oscillator and the push-pull input. This results in the oscillator voltage being applied symmetrically to the diodes and a consequent reduction in efficiency. With capacitive coupling screening is simple and adjustment easy. A complete circuit for such a mixing stage is given in Fig. 5. The coupling condenser  $C_4$  is tapped well down the oscillator circuit, as only a small amount of coupling is

required. The oscillator is stabilised by using a cavity resonator in the grid circuit. The signal frequency circuit is a parallel wire type and is connected to the diodes via  $C_6$  and  $C_7$  which block the IF. The chokes RFC pass IF but block VHF.  $L_2C_{10}$  is the IF circuit,  $C_8$  and  $C_9$  being DC blocking condensers.  $C_5$  tunes the asymmetric circuit to oscillator frequency. To avoid any appreciable symmetric voltage input at this frequency, the IF should be not less than  $\frac{1}{20}$  of signal frequency.

**TRIODE MIXERS**

Much of the foregoing applies equally well to triodes, but triodes present several additional possibilities. Positive feedback at signal frequency may be introduced to improve

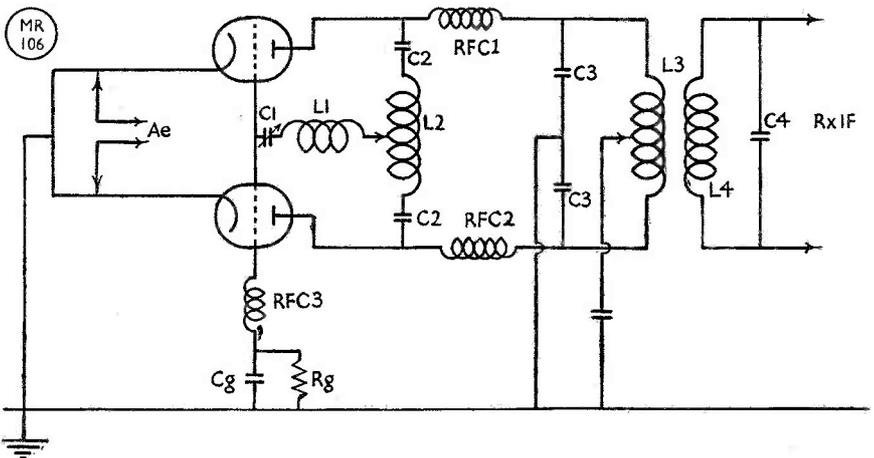


Fig. 8. A grounded-grid triode converter stage, some points regarding which are covered in the article.

signal-to-noise ratio in the output. This can be achieved by inserting a suitable inductance in the anode circuit. Such feedback must not be sufficient to cause oscillation at the signal frequency. If, however, feedback is arranged for the asymmetric circuit then the mixing stage can become its own local oscillator. Fig. 6 shows feedback in both circuits, L being that for the signal frequency, and Z2 for the oscillator frequency. The same idea may be employed using grounded-grid triodes.

In Fig. 7 is given a complete circuit for self-oscillating grounded cathode triodes. C1 tunes the oscillator frequency, while C2 blocks the IF and L1 provides feedback at signal frequency. The chokes RFC block the VHF and the split condenser C3 acts as VHF by-pass. Fig. 8 is a grounded-grid circuit in which the chokes RFC1 and RFC2 are of such values that their ratio equals the ratio  $C_{ak}/$

$2C_{gk}$  of the triodes. This results in no oscillator voltage appearing between cathode and earth, and hence none in the aerial.

#### Noise Level

Local oscillators may cause an increase in the noise level of a mixer stage due to the generation of noise voltages over a wide range of frequencies. These will obviously be greatest at frequencies near the oscillator frequency and will be impressed on the mixing valves together with the desired oscillator voltage. Components of noise voltage in the signal, image and intermediate frequency bands will all add to the noise level in the output of the mixer. The effect will be more pronounced when signal and oscillator frequencies are close. In the self-oscillating mixer stages there is no separate oscillator valve, so this additional source of noise does not exist.

## Frequency Areas on Two Metres

### Plan for Easier Band Searching

By I. PAUL (G3CYY)

**M**OST operators working on 144 mc will agree that it is difficult to tune carefully through the 2 mc width of the band after a CQ call. Finding stations is also made more difficult by the fact that the uni-directional beam aerials in use at most stations make it necessary to point the beam in one direction, search the band for signals, then move it about 30 or 40 degrees and search the band again. All this, of course, takes time, mainly due to the fact that there is two megacycles to be covered. Consider how much easier it would be if the station operator knew the part of the band in which to look for stations from a given direction. That then is the basis of the suggestion made here.

#### The Plan

It is that the British Isles be divided into ten zones, each zone having an allocation of 200 kc within the two-metre band limits. An operator would thus be able to beam in a certain direction and know in what part of the band to look for stations in the zones at which his beam was pointing, e.g. a station in zone J desires to contact stations to the north in

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Our contributor puts forward an ingenious and carefully thought out band-planning suggestion to solve the present difficulty—likely to become more acute in the future—of searching the 145 mc band quickly enough and sufficiently well to ensure that no call is lost due to the time factor. His plan has several obvious advantages and provided the co-operation of the majority can be secured, should be workable to mutual benefit. VHF operators are invited to express an opinion to G2XC of "VHF Bands," saying whether they would fall in with this arbitrary division of the band if the plan is generally accepted.—Ed.

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zones G and E. He would aim his beam in that direction and call CQ G/E, searching for replies in the band 144·6 to 145·0 mc. Similarly, a station in Devon would call CQ H/J when looking for contacts from the East and would search from 145·0 to 145·4 mc. A glance at the map will make this clear.

Supposing you hear G3—calling a DX station; provided you know the location of the station being called, instead of searching the whole band you have only 200 kc to cover in order to find the distant station.

A list of the proposed zones and the counties they include is given herewith.

Zone A : 144·0 to 144·2 mc	Inverness, Aberdeen, Angus and all counties farther North.
Zone B : 144·2 to 144·4 mc	Argyll, Perth, Fife and all counties South to the Border.
Zone C : 144·4 to 144·6 mc	Cumberland, Northumberland, Durham, Westmorland, Lancashire, Yorkshire and the Isle of Man.
Zone D : 145·8 to 146·0 mc	Ireland.
Zone E : 144·6 to 144·8 mc	Cheshire, Derby, Notts, Lincolnshire, Rutland, Leicester, Warwick and Stafford.

<b>Zone F : 145.6 to 145.8 mc</b>	Flint, Denbigh, Shropshire, Worcester, Hereford, Mon- mouth and all counties to the West.
<b>Zone G : 144.8 to 145.0 mc</b>	Northampton, Bucks, Hertford, Bedford, Hunts, Cambridge, Norfolk and Suffolk.
<b>Zone H : 145.2 to 145.4 mc</b>	Dorset, Wilts, Gloucester, Ox- ford, Berks and Hants.
<b>Zone I : 145.4 to 145.6 mc</b>	Cornwall, Devon and Somerset.
<b>Zone J : 145.0 to 145.2 mc</b>	Essex, Middlesex, London, Surrey, Kent and Sussex.

In drawing up the plan several points had to be taken into account: It was necessary to provide adequate frequency space to accommodate all the stations in one zone without causing mutual interference locally. Accordingly, the zones in Southern England are smaller than those in the North. It was also desirable that all zones in a certain direction should fall in a straight frequency run to avoid having to hop from one part of the band to another when searching for stations in that direction. The geography of the British Isles helped this to some extent, but obviously it is not possible to provide a straight frequency run in every direction from any point in the British Isles. However, the plan is a fair compromise and necessitates a minimum of frequency hopping. The zone boundaries have been decided on a county basis in order that there will be no confusion about the zone in which a station is located.

#### The Snag

Obviously the big difficulty will be in acquiring a crystal for use in one's particular zone. The answer is to grind the present crystal if possible, or to exchange crystals through the "Xtal Xchange" column of the *Magazine*. A further alternative may be the use of the G.P.O. "rubber crystal" circuit,



G3CYY's proposal is shown in this sketch map, giving the geographical areas by frequencies. As explained in the text, county boundaries are taken for each area.

with which it is possible to change the fundamental by some tens of kc.

#### Conclusion

That is the plan. It may not be perfect but at any rate it offers a much more workable system than the present one. Any ideas you may have, whether for or against, will be welcome, but please don't read this and say "Oh well, let's wait and see what the others do about it." Make your views known to the *Magazine* because any plan, if adopted, will have to be agreed upon by the majority of VHF operators in these Islands.

#### THE COMMANDER MANUAL

For those interested in the Radiovision Commander, an excellent booklet (of course supplied to purchasers with the receiver itself) is being made available to prospective customers who may wish to have full details of the Commander before ordering one. This booklet is offered at 5s. and can be obtained on request, with remittance, to Radiovision (Leicester), Ltd., 58-60 Rutland Street, Leicester, who also inform us that they are getting excellent reports on the Commander from readers who already own one.

#### BRITISH INDUSTRIES FAIR

This great Exhibition of British manufacturing resource and scientific achievement, which has become the world's leading trade

fair, is being staged in London and Birmingham during May. It will attract buyers from every part of the globe, and big business will be done in many languages. As usual, there will be a large radio section, with most of the leading firms in the industry represented.

#### ULTRASONIC RESEARCH

In an interesting note on ultrasonics as an aid to science and industry, Mullards outline the several ways in which an ultrasonic generator can be employed. Under the heading of chemical change, it has been found that the normal 10-year period for maturing whisky can be "considerably reduced." It is much to be hoped that the practical application of this important development will be pressed forward with the utmost vigour.

# VHF BANDS

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

*Improved Conditions—  
Increased Activity—  
New Distances Covered—  
Two-Metre Achievement Tables*

WITH the general improvement in propagation conditions for 2-metre working, more and more reports of its peculiarities are coming in. For instance, GM3OL (Dumfries) remarks that during the good spell at the end of March, he found fading much more prevalent and deeper on stations at 100 to 150 miles than on the Cheltenham stations at 230 miles. In the same circuit, G2OI (Manchester) says that in spite of beaming on GM3OL he was unable to hear him, even though at the same time he could read signals from G5BM, G5JU and other southerners off the back of his beam, while these stations were working GM3OL. G3BY (Ashton-under-Lyne) reports the same. G2OI wonders whether the Cumberland Hills are responsible, the atmospheric bending being insufficient to bring the signals down into the Manchester area, although capable of getting them to Cheltenham. In support of this he mentions that G3DA, in Liverpool, who has a run to G3BW and GM3OL clear of the hills, is able to receive them.

Farther south, G2NH (New Malden) overheard G3DEP (Ryde, Isle of Wight) working G2IQ (Sheffield) and giving the latter an S8 report; but in spite of turning his new 8-element stacked array, which is 60 ft. up, on to G2IQ, the latter's signals were *inaudible* in New Malden! It might also be added that they were *inaudible* at G2XC. While not being too familiar with the topography around New Malden, so far as our own location is concerned we are becoming more convinced every day that the South Downs are doing for us just what the Cumberland hills are doing for G2OI and the Manchester group. And in fairness to G2NH's new array we must record that he hears G2CPL (Lowestoft) at

S5 when G6VX (Hayes) cannot hear the slightest sign of the East Anglian—so there is nothing wrong with that beam!

As will be gathered from the foregoing, some very interesting new GDX contacts have been made on Two. GM3OL reports that the first sign of the improved conditions came when G5BM (Cheltenham) replied to his CQ on the evening of March 28. The path remained open until April 1, on which date GM3OL also worked G2MA (Sheffield) and G5JU (Birmingham). On March 30, the contact with G5BM was made on 'phone at S6. G4LX has also heard GM3OL in Newcastle.

G3EHY (Banwell) provided a much-needed Somerset contact for many during the same good period, and a series of tests with G2NH showed that the path to London was open at all hours of the day, and, in fact, was sometimes better during the day than at night.

G5BM found the London path so good that on one occasion he counted no less than five stations calling him after a QRZ? So the two-metre band is well away again.

### Station News

DL2CH (ex-G2HIL) writes from Bückeburg, where he has a good VHF location. He is hoping to put a signal into this country before long. Two transmitters are available;

### TWO METRES COUNTIES WORKED LIST Starting figure, 14 From Fixed QTH only

Worked	Station
26	G3BLP, G5MA
25	G2AJ (101), G2AXG
23	G2ADZ, G2IQ, G2MR (110), G2NH (122), G3APY, G4LU
22	G5MI (108)
21	G2CIW, G5BM, G6NB
20	G2NM, G5NF
19	G5RP
18	G5BY, G6PG
17	G2XC
16	G8SM
15	G2FLC, G8QX
14	G3DMU, G6LK

Note: Figures in brackets are number of stations worked, starting figure, 100.

one a modified TR1143 with an extra 832A output stage, and secondly, an SCR522. On the receiver side he has an S36, slightly modified, and a modified R1132A. He is listening daily from 1630 to 2000 GMT. We are glad to welcome him as the first DL2 in the Five-band Club.

G3LK, who has been EP3H, and G3LK/VS1 in the past, has now shifted QTH to Rome, and hopes to be active there on the VHF bands in a few months' time.

GM3BDA (Airdrie) has noted the following stations as active in the West of Scotland, GM2DI, GM3EDQ, GM3OL, GM5VG and GM6KH. GM2DI, using a CV53 (GGT) in front of an Eddystone convertor, has worked G3BW, while GM3EDQ has worked GM3OL with a 1,800-ft. hill in between. GM5VG is experimenting on 420 mc. GM3BDA, himself, has contacted G3BW (Whitehaven) as well as having some good 'phone QSO's with GM3OL; 'BDA fails to hear the DX which GM3OL has been pulling in and suspects his convertor as being the trouble. He is hard at work on a new one using 6J6 RF stage (neutralised) and a 6J6 push-push mixer. The aerial is two 4-element wide-spaced beams stacked 0.6 wavelength and fed in phase from a point midway between them; the Tx is of the miniature variety, 6V6 CO, 6V6 tripler, QV-04/7 tripler, QV-04/7 doubler, 829 final. GM3BDA's location is 500 ft. a.s.l. and his beam is 60 ft. up, with an excellent view to the South. However, the Southern Uplands, rising to 2,000 ft. are 25 miles to the south of him.

G2ATK (Birmingham) is active most nights from 1900 onwards. He has a modified P38 (1392A) with two EF54 RF's, EF50 mixer, and three EF39 IF's on 9.7 mc. He can accept FM on this Rx and asks for anyone using such modulation to give him a call. We must point out here, however, that for some reason unknown to us, *only* amplitude modulation is permitted on the 144 mc band. (The word "only" is underlined by the GPO!) The beam at G2ATK is a five element close-spaced type at but 20 ft. while the Tx is a modified 1133.

G3EHY (Banwell) has been finding all his 2-metre DX reports about 2 points better than he got on five metres. He puts this down to increased efficiency of both Rx and Tx gear, resulting from the experience he gained on Five. He, and others, are also using rather more elaborate beams—six elements against three, for instance. However, a 3-element beam is in use at G3EHY for the Rx and a 6-ele for Tx, thus saving any possible losses from change-over relays. G3EHY's experiences confirm our remarks of last month that most of us are radiating quite a bit off sides and backs of beams, and that the front-to-back

## TWO-METRE ACTIVITY

### BY COUNTIES

#### *The South*

- Berks.  
G5DF, G5RP, G6OH
- Bucks.  
G3AHB, G8WV
- Cambs.  
G2FLC, G2PU, G2XV
- Devon.  
G2BMZ, G3AUS, G5BY, G5QA, G6WT
- Essex  
G2CIW, G2KG, G2WJ, G6DH
- Glamorgan  
GW5SA
- Glos.  
G3YH, G5BM, G6ZQ
- Hants  
G2XC, G3DEP, G3EJL, G3LV, G3RI, G4QL, G5PB, G6DT, G8BD, G8JB
- Herts.  
G3FD, G5UM
- Kent  
G2AVR, G2UJ, G2WS, G3BWS, G3DAH, G4DC, G4IG, G6VX
- London  
G5DT, G6OT, G8KZ
- Middlesex  
G2FMF, G3CWW, G3QK, G5LQ, G6SB, G6UH, G8GX
- Moumouth  
G4GR
- Norfolk  
G2XS, G5UD
- Northants  
G2HCG, G3BBA, G3DUP
- Oxon.  
G5TP
- Suffolk  
G2CPL
- Surrey  
G2MV, G2MR, G2NH, G3BLP, G4CG, G5MA, G5MI, G5US, G6NB, G6VA, G6SM, G8TS
- Sussex  
G2JU, G2NM, G5MR
- Somerset  
G3EHY, G6LQ

#### *Northern Counties next Month*

ratios are not, in general, as great as may be thought. The frequencies in use at Banwell are 145.216 and 145.3. The beam points south-east from 1930 to 2030 and 2230 onwards.

G5BM (Cheltenham) gives us GM3OL's frequency as 145.29 mc, and says the band was open for DX on 14 days out of the 19 he

was able to be on. G5BM still wants Hampshire for a new county. Well, G2XC is on 144.9 at present, and has called you times without number, OM! There are also plenty of others active in and around Portsmouth. (See Activity List.)

G8KL reporting from Wolverhampton, gives news of G3TF and G6FK, two new stations active. The former has SCR522 (modified) and a 4-ele. c.s. beam, while G6FK has an 815 PD. His Rx, which is ex-RAF, has 4 mc bandwidth which is hardly suited to amateur requirements, although it does save having to tune the Rx, and there's not much chance of losing the weak DX due to oscillator drift! However, that's five stations active in Wolverhampton. G3EEZ has called G2OI many times without success. G8KL has a new 5-ele. beam up. Director spacing is  $\frac{1}{2}\lambda$  and reflector  $\frac{1}{4}\lambda$ ; he asks "Where are all those Coventry stations reported active last month?" G3EEZ and G8KL are on every evening from 1900 to 2330 with a supper break around 2200.

G3COJ (Hull) is active once again, after a spell on the DX bands. He has 829B PA on 145.22 for Tx, although inadequately driven, and probably running Class-B. The Rx is the G6VX converter (*Short Wave Magazine*, February, 1949), using an old 5-metre crystal (14.7 mc) into an AR88 tuning 26 to 26 mc. The aerial is 4-ele. w.s., 33 ft. up, and G3DEP has been heard at over 200 miles—so everything is working all right. G3COJ will be away in Cambridge from mid-April to mid-June, after which he will be on Two again from Hull.

G5MR (Felpham) will shortly be moving QTH to Hythe, Kent. He says he agrees with our remarks of two months ago regarding crystal-controlled converters, but at the same time suggests that a "permanent" crystal oscillator is a most useful basis for experiments with other stages. From some comments heard over the air it appears that one or two people misconstrued our remarks as meaning that we disapproved of CC converters. This was not intended. What it was intended to stress was the need for efficient RF and

### TWO-METRE FIRSTS

G/PA	G6DH/PA0PN	September 14, 1948
G/ON	G6DH/ON4FG	September 25, 1948
G/F	G6DH/F8OL	November 10, 1948
G/GM	G3BW/GM3OL	February 13, 1949

mixer stages *whatever* type of oscillator was in use. G5MR's present line-up is 6AK5 RF, 954 RF, 6J6 mixer. He uses the 6AK5 in the first stage to obtain good signal-noise ratio, but thinks the 954 gives him more gain in the second stage.

G5MI (Wimbledon) suggests the use of MCW as a help to identifying weak carriers. He would like reports on his low-power transmissions on 144.72 mc. When he is on frequencies above 145 mc the normal transmitter will be in use and reports are not required. He also hopes to be operating /A in Ipswich.

G4LU (Oswestry) has been working the Wolverhampton group, and also a new station in Stoke, G3UD. G5RP (Abingdon) lost his 16-ele. beam in one of the gales, but hopes to have it up again soon. G2FLC (Cheveley) was another to suffer in the gale, but is on nightly 1900 to 2000. G2NM was yet another whose beam came to earth! G5QA (Exeter), badly screened to the East, has been heard in Southampton, but so far has only worked G3AUS and G6WT in Torquay.

G2ADZ (Oswestry) believes he heard a GC on phone on the evening of April 12, but the signal went down in QSB when the call was being given! He has found conditions good, but still has great difficulty in working the London stations; they are received quite well. G2ADZ has worked G2CPL (Lowestoft) at 215 miles and is another to remark on the extraordinary propagation conditions during the GM3OL-G5BM contacts; the former was not audible at Oswestry.

### The Two Metre Tables

This month we are introducing a "Two Metre Activity List" so that you can see at a glance who is on the band. The panel is divided into two sections, North and South, and these will appear in alternate months. The tables will include only those stations known to have been active during the month preceding the date on which we compile the table. That is, stations known to have been on during May will appear in the June list, irrespective of whether the callsign has already been shown in an earlier list. The object is to make the table a record of present activity and not "six-months-ago" working. Your call *may* get into the list because someone else has reported hearing or working you during the

### Two-Metre DX Working

Worked	Station
Over 350 miles	G2IQ, G5BY
300 to 350 miles	G2ADZ, G2BMZ, G2MA, G3DMU, G4LU, G6WT
250 to 300 miles	G2XC, G6OS, G8DM
200 to 250 miles	G2AJ, G2CIW, G2OI, G3DEP, G5BM, G5MQ, G5RP, G5TZ, G6DH, G6PG, G6ZQ, GM3OL

past month, but if you want to make *sure* of its appearance then either work G2XC or better still drop us a line. May we ask for your assistance in keeping the other tables up to date by staking your claims for them promptly? Further, if possible, please put such claims on a separate sheet of paper and not in the middle of a letter, nor on the same sheet as you claim your Zones Worked and Four Band DX for colleague L.H.T.'s column!

### Seventy Centimetres

G3CU sends an account of recent activity in South London. On March 19, G2WS/P worked G2FKZ (10½ miles), G3CU (11 miles) and G3AHB/A (22 miles). This outstanding event actually produced QRM on the band, with as many as six stations all on the same frequency! Another occurrence of note has been an S8 contact between G6HD and G3CU through (or over) a 245-ft. hill. G6HD has his beam up at 50 ft.

The South London Group have been experiencing an increasing amount of interference due to harmonics from Alexandra Palace, police and BBC FM, and, as all these transmissions are vertically polarised, it has been decided to change to horizontal polarisation with effect from May 1. The position will be reviewed again at the end of the year. It is hoped that others will be able to fall in line.

The same group are also hoping to organise frequent portable expeditions in an endeavour

to link with the Birmingham and South Coast stations. Several new stations in the London area have become discouraged and consequently inactive due to lack of contacts, and G3CU suggests that any such should write to him and arrange schedules.

We should like to present a 70-cm Activity Table each month, as we are doing for two metres, so will those of you who are busy on 420 mc send us your call for insertion next month?

### No DL4 QSO Yet!

Nobody was more surprised than G2FMF (Hillingdon) to find himself credited—not in the *Short Wave Magazine*—with a two-metre QSO with DL4OK, a station which he had only been calling on schedule; it was earlier reported to us that G2FMF had been receiving DL4DD, but on checking with him, G2FMF said that this was the first *he* had heard of it! So that settles that one, too.

### Six Metres

An interesting report comes from G6DH (Clacton) regarding reception of South African signals on 50 mc during the past few weeks. ZS1P received the French and British television transmissions well on many occasions during February and March, and it is possible that the MUF may have been as high as 50 mc, but unfortunately no regular tests were made on that frequency. On March 29, ZS1P heard signals right up to 50 mc, 0920 to 1130 GMT. On March 30, G6DH

## TWO-METRE ACTIVITY REPORT

### G2CIW, Brentwood, Essex.

**WORKED:** G2HCG, 2XC, 2XV, 3BBA, 3DEP, 3EHY, 4LU, 5BM, 5HN, 5RP.

**HEARD:** G2CPL, 2IQ, 3ABA, 3APY, 3CGQ, 3DUP, 5JU, 6YO.

### G2FLC, Cheveley, Cambs.

**WORKED:** G2XS, 3APY, 3BWS, 4DC, 5BD, 5IG, 5UD, 6PG, 6YP.

**HEARD:** G2CPL, 2NH, 2XV, 3DMU, 5MA, 5DB, 6YT.

### G2NH, New Malden, Surrey.

**WORKED:** G2CPL, 2FJD, 2UJ, 2XV, 3DJQ, 3DUP, 3EHY, 3GW, 3LV, 4LU, 5UD, 6YO, 8QY.

### G2OI, Eccles, Lanes.

**WORKED:** G2ADZ, 2JT, 2MA, 3A0O, 3AYT, 3BLP, 3BY, 3DA, 3DH, 3ELT, 4LU, 4OS, 5BM, 5CP, 5JU, 5MB, 6DP, 6LC, 6TL, 6ZQ, GW3ELM, 5UO.

**HEARD:** G3EEZ, GM3OL.

### G3BLP, Selsdon, Surrey.

**WORKED:** G2ADZ, 2ATK, 2BMZ, 2CPL, 2OI, 2XS, 3ABA, 3DA, 3DJQ, 3DUP, 3EHY, 4LU, 5JU, 5LJ, 5UD, 6BX, 6CW, 6YO, GW5SA.

### G3COJ, Hull, Yorks.

**WORKED:** G2IQ, 2MA, 2TK, 3APY, 3CUJ, 3DMU, 5BD, 5UD, 6BX, 6DP, 6YO, 8SJ.

**HEARD:** G2XS, 3DA, 3DEP, 3DMK, 4JB.

### G2ADZ, Oswestry, Salop.

**WORKED:** G2ATK, 2CPL (215 m.), 2MR (165 m.), 2NH (165 m.), 2OI, 3AEX (170 m.), 3ASC, 3BLP (165 m.), 3DA, 3DJQ, 3EEZ, 3EHY (120 m.), 3FD (160 m.), 4DC (160 m.), 4LU, 4OS, 5BM, 5DF (140 m.), 5JU, 5MA (165 m.), 5MI (160 m.), 6DP, 6NB (160 m.), 6VA (170 m.), 6ZQ, 8KL, 8QY, 8SM (170 m.), 8WV (130 m.).

**HEARD:** G2JT, 2KG (175 m.).

### G3EHY, Banwell, Somerset.

**WORKED:** G2ADZ, 2CIW, 2MR, 2NH, 3AHB, 3BLP, 3YH, 4DC, 4LU, 5BM, 5BY, 5MA, 5MI, 5RP, 5XA, 6LQ, 6NB, 6UH, 6YP, 6ZQ, 8SM, GW5SA.

**HEARD:** G3APY, 4GR, 4OS, 5DF, 5JU, 8UZ, 8WV.

### G4LU, Pant, Salop.

**WORKED:** G2ATK, 2JT, 2NH, 2OI, 3AHX, 3ASC, 3BLP, 3BY, 3DJQ, 3DUP, 3EEZ, 3EHY, 3TF, 3UD, 4OS, 5BM, 5JU, 5LJ, 5MI, 6DP, 6ZQ, 8KL, 8QY.

**HEARD:** G2MR, 2MV, 4DC, 5MA.

### G6NB, Chertsey, Surrey.

**WORKED:** G2ADZ, 2CPL, 2IQ, 2XS, 3APY, 3DJQ, 3EHY, 5JU, 5LJ, 5UD, ON4FG.

### GM3OL, Dumfries, Scotland.

**WORKED:** G2MA, 3ACY, 3BW, 5BM, 5JU, 6DP, 6ZQ, 8DP, GM2DI, 3BDA, 3EDQ, 5VG.

*The above reports refer, in general, to the month ending April 10, 1949.*

received ZS1P on 50.07 mc at 1240, strength being variable between S7 and S3. At 1309 ZS1AX was heard, but rather weaker than ZS1P. ZS1AX faded out at 1430, but the latter was audible until 1620; ZS1P was using 35 watts input with a 3-element beam, and a similar array was in use at G6DH. The same conditions prevailed the following day, ZS1P's signals appearing at 1209, fading out at 1332, but reappearing at 1437 and finally going out at 1545. ZS1AX was heard from 1310 to 1320 only. ZS1T, who was also transmitting on March 31, was inaudible in spite of use of higher power. This can only be attributed to a less suitable location, his station being at a lower altitude than ZS1P. No 50 mc signals were heard from April 1 to 4, although the London vision on 45 mc was received in Capetown each day, and ZSB3 on 44.6 mc was logged at G6DH on April 4 from 1235 to 1315. April 5 produced weak and intermittent signals from ZS1P, and on April 6 signals were heard for a few minutes only. ZS1P was again heard by G6DH on April 11.

An interesting point is that the South Africans frequently find the A.P. sound transmission noticeably stronger than the BBC's Overseas Service on lower frequencies! The vision transmission is often of real programme value. G6DH notes that the days when high southerly MUF's have occurred have also shown disturbed conditions to East and West with much lower MUF's in those directions. He suggests this may be due to absorption at a lower region than the F2. The evidence to support this is that under these conditions signals are sometimes received around 35 mc but nothing is audible on 30 mc. Absorption would, of course, be more effective at the lower frequency.

#### Oxford VHF Meeting

There was an attendance of 40 at the Fiveband Club meeting organised by G5RP, the area representative, held in Oxford on April 23. Several members made long journeys to be present, coming from as far as Wolverhampton, Cheltenham and the West, while there were also strong contingents from the South London and High Wycombe areas.

Altogether, it was another most successful affair, and there was much useful and stimulating discussion on matters of interest to VHF men at the Roebuck Hotel that Saturday evening. Several of those attending took the trouble to bring items of VHF equipment, all of which helped to add to the success of the second such meeting to be held under the auspices of the *Short Wave Magazine*.

Several photographs were taken; those who would like prints are asked to send a

#### VHF CENTURY CLUB

##### NEW FULL MEMBERS

G2ADZ	H. W. Parker (Oswestry)
G3TS	N. W. White (Rugby)
G6UH	H. E. Smith (Hayes)
G8WV	N. H. Sedgwick (Henslope)
G2NM	G. Marcuse (Bosham)
G5UM	J. H. B. Hum (Knebworth)
G5MR	V. G. Mellor (Felpham)

Total : 50 Full Members \*

G5BD now has over 200 cards

##### NEW ASSOCIATE MEMBERS

G6CB, G8UR

card to G5RP (Old Goal House, Abingdon, Berks), who will pass their orders to the photographer.

#### In Conclusion

May we remind you that there is a Two-Metre Activity Week End on May 7/8. Full details were given last month, but in any case, be on the band as much as possible from Saturday evening until Sunday night. A Fiveband Club meeting in the Midlands is being arranged for July 9. We hope to give full details next month. In the meantime, any who can make it are asked to contact G3APY direct.

Latest date for next month's reports is May 13. This is rather earlier in the month than usual so don't forget it. Let us have all your claims for the Tables in good time. Past experience has proved that claims given to us over the air during QSO's have a habit of getting lost, so please send them in writing! The address is E. J. Williams, G2XC, *Short Wave Magazine*, 49 Victoria Street, London, S.W.1. CU on June 1.

#### GIFT SUBSCRIPTIONS

If you have a contact abroad to whom you would like to make a useful present, why not buy him a year's subscription to the *Short Wave Magazine* or the *Short Wave Listener*? The cost is 22s. (*Magazine*) or 16s. (*Short Wave Listener*), post paid for twelve issues, despatched on publication day. Things like the *DX Operating Manual* (2s. 8d.) and our five-colour Zone Map (6s.) are also welcomed by overseas amateurs.

# QRP Oscillator- Transmitter

## High-Stability Single-Valve Unit with Good RF Output

By W. OLIVER (G3XT)

THIS little oscillator is simplicity itself to construct. Its stability compares very well with that of the Clapp oscillator, its output with that of the Hartley and its "tone" with that of a crystal.

The circuit is rather unconventional, based on the results of practical experiment rather than theory. In the process of evolving it, almost every possible variation of existing conventional oscillator circuits was tried, gradually eliminating the "frills" until the utmost simplicity combined with efficient performance was achieved.

Let the results speak for themselves: With an input of 18 mA at about 300 volts (5.4 watts QRP), reports received from distances up to 800 miles average S6, and three-quarters of the total reports show a readability of R5.

Tone reports are mainly T9, a small proportion being T9x, and a negligible percentage T8. The latter were chiefly during the gale which blew the *Queen Mary* aground off Cherbourg, tossed a double-decker bus into the river at Shoreham—and swayed G3XT's aerial!

A few reports have mentioned a very slight chirp, and in this respect the G3XT oscillator does appear to be slightly inferior to the Clapp. Its RF output, however, is enormously superior to that of the Clapp; and on the 80-metre band the G3XT unit is ideal for local "cross-town" chat, as it gives an S9 plus signal at all times of the day and night on that band up to a distance of three or four miles across fairly flat country.

At greater distances, the signal varies from S3 to S9, the latter strength being reported at a distance of 140 miles. Reports of 559 to 579 have been received from a number of European countries, such as F, ON, PA, D, OZ and so on.

### Choice of Valves

In the original model at G3XT, a 12J5 is used as the oscillator valve; but several other triodes with similar characteristics can be substituted if desired, so the transmitter is easy in this respect.

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Our contributor is a well-known exponent of the art of QRP, which has many adherents even in these days of high-power working. He describes here an ingenious oscillator unit of unconventional design, for which he claims exceptional performance. In the three weeks to mid-January, the transmitter as illustrated had produced contacts with some 90 different stations in nine countries.—Ed.

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If the oscillator is to be used as a driver rather than as a complete transmitter, it could be run at a much lower HT than the 300 volts actually put on it. In fact, about 150 volts would be plenty, and the supply should preferably be stabilised.

Of course, even batteries can be used if desired, and the extreme compactness of the unit makes it exceptionally handy as an ultra-low-power portable transmitter. It has not yet been tried for working portable, but there is no doubt it would give good results if one slung up a fairly efficient aerial!

A glance at the circuit diagram, Fig. 1, shows the extreme simplicity of the circuit. The only components needed are a home-made coil, a split-stator variable condenser, two silver mica condensers (.001  $\mu$ F each) and a third one of the same capacity, which can be ordinary mica type but should be of a high working voltage as, in the event of the tuning condenser shorting, this fixed capacity would have to withstand the full HT voltage; a grid resistor; two RF chokes, which must be of suitable type and good quality; a keying jack; octal valveholder (preferably ceramic); and chassis or screening box. A panel and slow-motion dial are not essential but are very desirable.

In fact, the high stability of the oscillator justifies the cost of a good, precision-type slow-motion dial, as it can then be calibrated accurately, and if suitable precautions are taken to ensure rigidity, the calibration should hold good for long periods; though it should be checked regularly against an approved type of wavemeter, to comply with the regulations.

For the original model shown in the photographs, an aluminium screening box was used, with tight-fitting lid, removed from an ex-Government surplus airborne transceiver. This box was very nicely made, and just the right size. The layout of the various components will be evident from the photographs, and it will be seen that wiring is reduced to a minimum.

### Making the Coil

The coil seems to be the most critical item of the whole transmitter. Let it be said at the outset that all you know about the number of

turns normally specified for the tank circuit in an oscillator must be forgotten! With the G3XT unit, a coil that one would normally consider correct for the 7 mc band will bring your signal into the 3.5 mc band—so if you tried a normal 160-metre coil in this oscillator, you would find yourself competing with the BBC's Home Service!

The best advice to give is to find the exact number of turns and spacing required to cover the desired frequencies, with the actual condensers to be used. With this oscillator half a turn too much or too little may throw the signal right outside the band, so no attempt is made to give any exact data. It is far better to adjust the winding by "cut and try" methods, checking carefully with an *absorption wavemeter* and a fairly accurately-calibrated receiver to make sure that the finished coil will tune to the desired band of frequencies with the individual condensers in the particular model made up to this design.

The coil *must* be rigid, low-loss and should not be too small in diameter. If it is required to work on one waveband only, the winding can be connected direct to the stators of the variable condenser, through suitable feed-through insulators (since the coil is outside the screening box and the condenser inside). But if more than one band is to be covered, the addition of either a wavechange switch or of a simple plug-in coilholder, with interchangeable coils, will be needed. At G3XT, a suitable holder was made simply by mounting two small sockets on a strip of polystyrene,

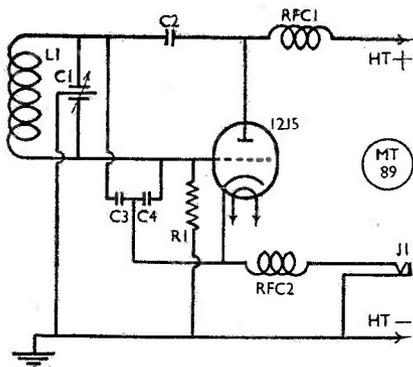


Fig. 1. Circuit of the oscillator unit suggested by G3XT. The essential feature is a high-C tank circuit to ensure maximum stability.

Table of Values

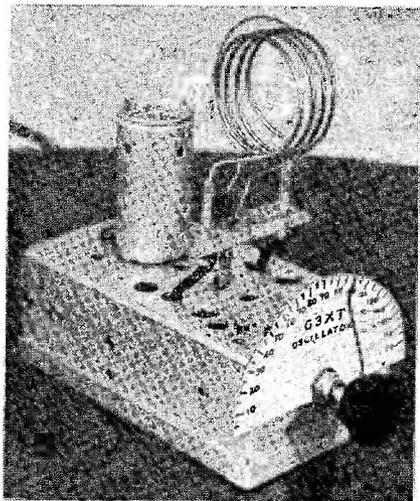
Fig. 1. Circuit of the G3XT Oscillator

- C1 = 80  $\mu$ F per section, split-stator variable
- C2 = .001  $\mu$ F mica or silver mica
- C3, C4 = .001  $\mu$ F silver mica
- R1 = 20,000-100,000 ohms 1 watt.
- RFC1, RFC2 = RF chokes (see text)
- J1 = Keying jack
- V1 = 12J5 or similar (see text)

raised above the surface of the screening-box on a small metal bracket.

Unlike the ECO and Hartley circuits, the G3XT oscillator is free from the complication of an adjustably-tapped coil. If the oscillator is to be used as a transmitter without driving any following stages, link-coupling will be needed to feed the output to a tuned aerial circuit. If, on the other hand, the unit is to be used as a driver, the type of coupling—link or capacity from cathode—will depend on the design of the next stage.

A grid resistor of about 20,000 ohms seemed



The G3XT oscillator-transmitter, on which good results have been obtained in the 7 mc band.

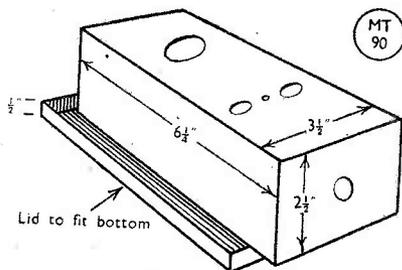
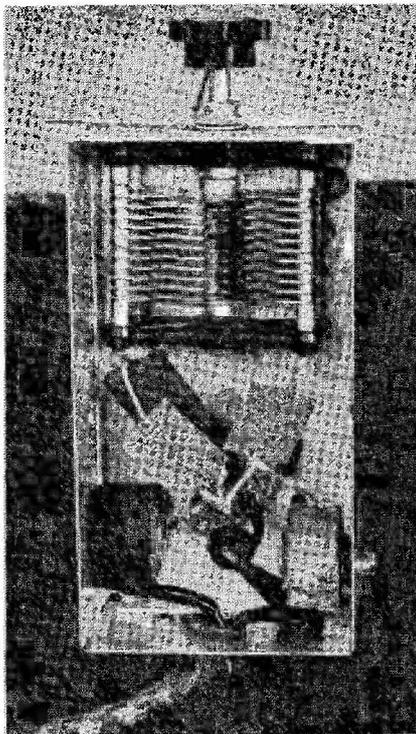


Fig. 2. Dimensions of the chassis-screening box, as actually used; they can be varied to suit individual requirements.



Inside the G3XT oscillator—construction could hardly be simpler!

to give best RF output, but increasing the resistance to 100,000 ohms seemed to improve the quality of the note and remove any slight tendency to chirp; so there is scope for experiment here. A grid condenser of 50 to 100  $\mu\mu\text{F}$  can be inserted in the usual position in the grid lead, but the circuit seemed to oscillate better *without* this capacity, and a loop lamp held near the coil glowed even more brilliantly when the grid condenser was shorted out, so it was eliminated.

Incidentally, the whole cost of the original model, using ex-Government surplus components, was less than ten shillings (including the valve); but even if all the components were purchased otherwise the cost would be very low—less than that of a single condenser or transformer in a QRO transmitter. So this is one of the most economical transmitters one could possibly devise—apart, of course, from the power pack, which would cost another pound or so from ex-Government surplus sources.

### Operating the Transmitter

Adjusting and operating this unit is as simple as the circuit itself. A little experimenting with the link coupling, and careful tuning of the aerial circuit, should give optimum results.

If desired, the transmitter could be fitted into a small wooden cabinet. At this station, it was found more convenient to leave it out of a cabinet, to facilitate rapid coil-changing, the valve being covered with a small cylindrical screening-can (made out of the case of an old aqueous electrolytic condenser) with ventilation holes drilled in it. This metal can protects the glass "envelope" of the valve from possible breakage, and also helps to dissipate heat, as it is in contact with the cold metal chassis.

The transmitting aerial used for the tests was an end-on type, full-wave for 7 mc, about 35 ft. high, running North and South. This QTH is only 50 ft. above sea level, and at a higher elevation it is probable that even better results would be obtained.

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 G2CUJ J. B. Jones, 91 Eland Road, London, S.W.11.  
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G3FEX	B. C. Oddy, Bonigen, Maudlyn Close, Bramber, Sussex. (Tel.: Steyning 2218.)	G3BAB	F/Lt. A. S. D. Burke, R.A.F. Station, Dishforth, Thirsk, Yorks.
GM3FFJ	H. H. Foulds, 150 Fergus Drive, Glasgow, N.W., Scotland.	G3BOT	A. B. Reeder, 14 Station Road, Histon, Near Cambridge, Cambs.
G3FFL	J. Oxy-Parker, Acomb Vicarage, York. (Tel.: 78106.)	GM3DXJ	T. Holbert, 4 M. Qrs., Forthside, Stirling, Scotland.
G3FFM	H. Simpson, 80 Redesdale Gardens, Isleworth, Middlesex.	G3VB	P. W. J. Gammon, 15 West Avenue, Heath End, Farnham, Surrey.
GM3FFQ	W. Donaldson, 38 Allan Park Road, Edinburgh, 11.		<b>CORRECTION</b>
G3FFV	J. S. Scott, 137 Fulford Road, York.	G2VJ	A. E. Wybrow, 54 Lordship Lane, East Dulwich, London, S.E.22.
G3FGB	J. T. Winson, 12 Eversley Avenue, Wembley Park, Middlesex.	GW3VL	P. R. Jenkins, Troedyrhiwgroes, Lower Groeswen, Near Toffswell, Glam.
GM3FGH	D. R. Leah, 14 Hillwood Terrace, Rosyth, Fife, Scotland.	G8VJ	D. J. Evans, 220 Station Road, Lower Stondon, Henlow, Beds.
G3FGI	A. Rigby, 264 Newton Road, Louton, Warrington, Lancs.		

#### R.C.M.F. EXHIBITION

This year's Radio Component Manufacturers' Exhibition, the sixth of the series, was held early in March at Grosvenor House, Park Lane, and once again was an impressive and interesting show of a wide range of radio and electronic equipment and parts. No less than 106 exhibitors took stands, covering between them every aspect of the industry, and there was much to be seen of interest in the Amateur Radio field. In this respect, we spent some time at the stands of Bulgin, Woden, T.C.C., Pullins, Sydney S. Bird, Avo, Belling & Lee, Erie, Mullards and the G.E.C.

#### FOUNT OF ALL KNOWLEDGE

A remarkable pronouncement which seems to have escaped general notice is the report that the Moscow Academy of Sciences has now decided to accept the teachings of Lenin and Stalin as the inspiration of modern science. If this report actually means what it appears to say, it is one of the most ludicrous examples of the paralysis of the human mind that the OGPU has yet been able to achieve.

#### NEW QTH's

With those appearing in this issue, once again we are almost abreast of the back-log. Certainly, any still in hand, or which may have been received before April 30, will be in the June issue. It should be noted that we only publish an address at the direct request of the owner of the callsign. All that do appear are automatically reprinted in the *Radio Amateur Call Book*, to the publishers of which we also supply lists of corrections to the G section on the appearance of each issue of the Call Book.

#### C & G TELEVISION SERVICING

The City & Guilds of London Institute has recently announced a new examination in the servicing of TV receivers; the first one will be held in 1950 and, like the Radio Servicing Certificate examination, will be conducted jointly with the Radio Trades Examination Board. Application for entry and other details should be made to the Secretary of the Radio Trades Examination Board, 9 Bedford Square, London, W.C.1.

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# Here and There

## Public Schools Net

A number of schools and cadet organisations are running a regular net (Tuesday, Thursday, Saturday and Sunday, 1600-1830) on about 6000 kc, using call signs in the sequence QEA-QEZ. These are not amateur stations, but are operated in connection with the Junior Training Corps, and as such are on a military basis.

Some of the units taking part are Rugby, Cheltenham, Glasgow Academy, Loretto, Repton, Sedbergh, Sherborne, Uppingham and Victoria College, Jersey. A different station assumes control of the Net for each period.

## Mullard News Letter

The first of a series of regular news letters inaugurated by the Transmitting and Industrial Valve Department of Mullard Electronic Products, Ltd., has appeared, dated March, 1949. Issued by their Technical Publications Dept., the intention is to provide a service of advance information in tabloid form, enabling valve users to select what current Mullard Technical Publications are of particular interest to them.

Issue No. 1 announces, among other items, application reports on various electronic developments resulting from Mullard research. Since these have a relatively restricted field of interest, limited editions only are printed, circulated to a selected mailing list. Titles of these papers will be announced in the *Mullard News Letter*, and copies sent free of charge in response to requests on business note-headings.

## German Licences

From March 24, licences were granted to 748 German nationals in the sequence DL1AA-DL1ZZ and DL3AA-DL3DU; of course, as time goes on, further calls will be issued beyond the DL3DU mark, through DL6AA to DLØZZ. Licences are in two categories: Class A, for 20 watts anode dissipation; and Class B, for 50 watts dissipation—which is a new way of rating power for amateur licensing purposes.

These arrangements apply at present only to the British and American Zones of Occupation in Germany. No licences are yet being granted to German nationals in the French Zone or in the Western Sectors of Berlin.

## Error Crep' In

On p. 105, April, line 23 in the left-hand column should read "... wattage figures is the power loss," and not as given.

In the caption under the circuit diagram Fig. 1, on p. 109 of the same issue, for C9 read C29; it is the top section (in the drawing) of that switch which should be marked S1B.

## Absorption Frequency Modulator

Truly, there is nothing new under the sun. A recent issue of one of our American contemporaries describes a system of obtaining FM which amounts to nothing more than applying absorption control to the drive oscillator of the transmitter! And, provided proper precautions are taken, a very simple and effective system it should be, too.

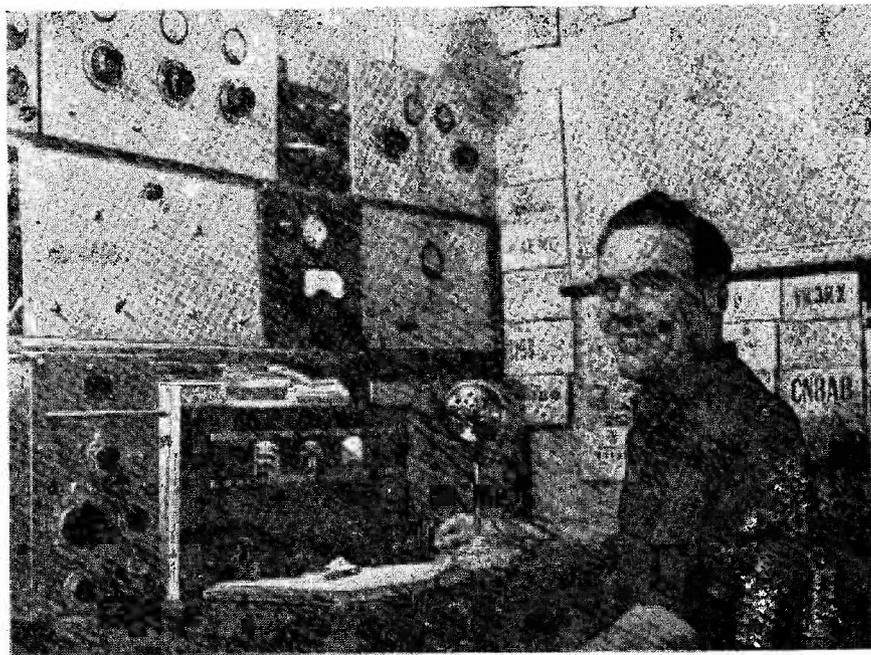
Until about 1925-26, absorption modulation was a favourite method of working phone with low power; all you did was to connect a carbon microphone in series with a few turns loosely coupled to the tank of the oscillator, adjusting the degree of coupling until reports of "BBC quality" were obtained! Another way of adjusting this was to set the coupling till a slight RF burn could be taken off the metal mouth-piece of the microphone. The depth of modulation was also controlled by varying the linkage between oscillator and modulator coils. And in case anyone is smiling at this, we worked all Europe on 45-metre phone with 10 watts to an LS5, using just such a system—with reports of "BBC quality," of course!

## The Q-Max B4/40

We are informed that the list price of the B4/40 Transmitter remains at £75, as advertised on the outside back cover of our January issue.

## Not Radio but Wireless

Some very interesting correspondence in *The Sunday Times* for April 3, 10 and 24 draws attention to the claims of the Scot, J. B. Lindsay, of Dundee (1799-1862), who, as early as 1854, patented what is described as a "wireless system of transmission"—but Lindsay's method depended, fundamentally, on the use of the waters of the River Tay as a conductor! It is worth mentioning that Marconi's first results were not obtained till 1899, and that Hertz was only five years old when James Bowman Lindsay died.



## The other man's station G4KG

This is G. Spriggs, G4KG, at 28 Almorah Road, Heston, Middlesex, who was first licensed in May, 1938.

His gear is fitted in an alcove in the living room. The transmitter, which can be seen on the top shelf, is four-stage arrangement: A CO which can be switched to VFO, 807 buffer or frequency doubler, and a pair of T55's running at 140 watts input. On the second shelf are the power supplies for exciter unit and PA, and also the modulator. The latter consists of 6SJ7-L63 into a pair of 6B4's in push-pull driving the TZ40 modulator unit; a moving coil microphone is used. The large dial in the central panel is the S-meter, above which can be seen the rotary beam indicator. On the desk are the VFO unit (a Type 145 oscillator), the AR88 receiver, and the power supplies for the speech amplifier and modulator.

Associated equipment includes a Class-D wavemeter, a phone monitor and a field strength meter.

On the aerial side, G4KG has for 10 metres a three-element close-spaced beam, which is remotely rotated electrically, with a 136-ft. long-wire aerial for operation on 20 and 40 metres. Both CW and phone are used, but G4KG's preference is for telephony. He remarks that the nature of his work enables him to be on the bands more than a lot of people, so that he can pick up the odd DX during those quiet periods when many of us can only wish we could be on! At any rate, G4KG has an excellent record of 126 countries worked, with 104 confirmed—and apart from that his outfit is a good example of a modern amateur station designed for comfort and operating convenience.

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# THE MONTH WITH THE CLUBS

## FROM REPORTS

The level of activity appears to be higher than ever before. At all events a long-standing record has been broken this month, with reports from no fewer than 41 Clubs appearing herewith. Most active organisations seem to be planning something interesting in the way of outdoor events this coming summer season, and we suggest that those who are running Field Days and QRP Contests should notify us in plenty of time, so that we can give them advance publicity and so make it possible for other Clubs to co-operate by listening or by making contacts.

Next month's deadline for reports is rather earlier than usual, being first post on May 11. This is on account of the fact that the June issue appears on the 1st of that month. Please note this early date and get your story in on time, addressed to Club Secretary, *Short Wave Magazine*, 49 Victoria Street, London, S.W.1. And now for this month's reports.

**Worcester & District Amateur Radio Club.**—At the April meeting, attended by 15 members, the Chairman gave the first of his talks on Aerials, using a QRP transmitter to demonstrate the different types. Members are asked to note that future meetings will be held on Thursdays, 7 p.m., in the basement of the Public Library, and that the date of the Droitwich visit has been altered to May 29.

**Worthing & District Amateur Radio Club.**—At the April meeting two members gave a talk and demonstration on 420 mc gear; the May meeting will consist of an exhibition of members' own handiwork. The Club's library of technical books is flourishing, and a good attendance for the weekly Morse classes is reported. These are held at the Adult Education Centre, Union Place, at 9 p.m. A Club journal, called *Rag-Chew*, is in regular circulation.

**Morley Radio Club (Wymondham).**—This Club has been very active on the air, over G3ABG/A and G3FDA. Members have built a Clapp VFO, a frequency meter and an 813 PA. Talks on the various aspects of radio are given to the College Youth Club, and plans have been made for a considerable amount of outdoor activity this summer.

**Reading Radio Society.**—On March 12 the President described the circuitry for Pulse Transmission. The AGM was held on the 26th, and when the normal business was completed, he followed up the former talk with a demonstration of Pulse Transmission. G2FZJ was elected Hon. Sec. at the AGM—note new QTH in panel.

**East Surrey Radio Club.**—In connection with a local Hobbies Exhibition the Club staged a three-day demonstration of Amateur Radio, in which great interest was shown by the public. Those in attendance included G5LK, G6KD, G8HH, G8MP and G3CDG.

**Slade Radio Society.**—The April programme included a lecture on FM, a Short Range DF Test, a Film Show, and a talk and demonstration on 145 mc gear by two well-known members. On May 13, Mr. F. J. Hyde will talk on Wave Interaction ("Luxembourg Effect"), and on May 27, the President, Dr. W. Wilson, will lecture on Electronic Music. The June meetings are booked for the 10th and 24th.

**Stoke-on-Trent Radio Society.**—The AGM was held at the end of March, and two Film Shows in April were a great success. There is a "solid"

membership of 35, but newcomers will always be welcomed. The new Headquarters are at The Cottage, Oakhill, Stoke, and the Club is usually open on Tuesday, Thursday and Sunday. A licence is hoped for very shortly. Secretary's QTH in panel.

**South Manchester Radio Club.**—Membership is still increasing—it is now more than 50—although the attendance at meetings represents only about fifty per cent, probably on account of the long distances which some members have to travel. Plans are going ahead for the building of a Club station and the acquisition of a permanent call instead of G2BLA/P, used at present. A visit was recently paid to Kemsley Newspapers, and another to the Manchester Fire Station to inspect the radio gear and see the workings of the service.

**West Cornwall Radio Club.**—From *The Radio Link*, this Club's journal, we read that a fortnight of April was occupied by a DX Contest, arranged by the Falmouth Group but open to all Cornish amateurs. Some interesting features of the rules were that *two* bands were to be selected from the five available; that multipliers of 2 were awarded to stations using (a) under 25 watts or (b) crystal control only; and that "dividers" were applied to operators who did *not* work most of the local stations also taking part. It seems a very interesting form of contest and one which might profitably be adopted by many other clubs.

**Pontefract & District Amateur Radio Club.**—At the March meeting G3ADH gave a talk on The Valve Oscillator, and the April meeting took the form of a Junk Sale. A Club magazine (editor G3ADH) is now published, and Club notepaper is available to members. Meetings are on alternate Thursdays, 7 p.m.,

at The Travellers' Rest, Purston.

**Wirral Amateur Radio Society.**—A talk was given recently by G3CDW on the Radio Amateurs' Examination, and successful visits were organised to Lancaster House, Liverpool (GPO Telephones) and the Seacombe Ferry Radar Station. May meetings are on the 11th and 25th, 7.30 at YMCA, Whetstone Lane, Birkenhead.

**Radio Society of Guernsey.**—Welcome to this recently-formed newcomer—which extends a hearty invitation to all amateurs visiting the Island during the Summer. Meetings take place on the first Wednesday, and the April gathering, held in St. John's Schoolroom, St. Peter Port, heard a lecture entitled "Negative Look Back" by GC8OK. This was illustrated by slides and proved very popular.

**Brighton & District Radio Club.**—The April programme comprised four meetings, at which G3DEU's 50-watt DC mains gear was on show; G3YY talked on the use of various supply mains in the area; G3HP spoke on the Berne Convention; and hints on receivers were given at an "SWL Night." Note new Secretary's QTH, in panel.

**Sutton & Cheam Radio Society.**—Activities have included a visit to the Thames Valley Club, a discussion on NFD arrangements, and a lecture on Television by a representative of E.M.I., Ltd. The Monday evening Top Band Net is still active, and a lively news sheet is produced by the Hon. Sec.

**Leek & District Amateur Radio Society.**—Formed a year ago, this Club has had a very successful season. Weekly meetings have been held throughout, and membership is now about 35. The Club HQ comprises a meeting room with an equipped workshop, and members are busy building the Club Transmitter. A group of members interested in television is collecting gear in readiness for the opening of the Midland station.

**Cray Valley Radio Transmitting Club.**—At the meeting on May 19 (7.45 at the Station Hotel, Sidcup), Mr. Morgan of the GEC will present a film lecture on VHF Valve Technique. Preparations are in hand for NFD and for a local Exhibition to be held in September. In spite of the fact that this club is limited to holders of transmitting licences, membership now numbers 40.

**Wolverhampton Amateur Radio Society.**—Recent activities have been lectures on Loud Speakers, and Television. Forthcoming talks will be on Magnetic Recorders and Carrier Telephony. The programme also includes the Annual Dinner (May 9) and a Social Outing (June 22). Meetings are on alternate Mondays and new members are welcomed.

**Association of Midland Radio Committees.**—A general "Get-Together" is planned for Sunday, May 22 at Wellington, Shropshire. Intending visitors and Affiliated Societies are asked to contact the Association Secretary, Mr. H. Porter, G2YM, 221 Park Lane, Fallings Park, Wolverhampton. The tentative programme for the summer includes a Field

Day and Jamboree, and probably a Top-Band contest.

**Blackpool & Fylde Amateur Radio Society.**—Club meetings still take place on the third Tuesday, at the Chamber of Trade, 53 Queen Street, Blackpool. The Top-Band transmitter for NFD, using a Clapp oscillator, is already on the air; the meeting on May 17 will take the form of a Film Show, with films of general radio interest including two on Radar. Note new Secretary's QTH, in panel.

**Lothians Radio Society.**—Meetings continue regularly on the last Thursday of the month at the Chamber of Commerce Rooms, 25 Charlotte Square, Edinburgh, and prospective members will be heartily welcomed, either at these meetings or by the Secretary.

**R.A.E. & Farnborough District Amateur Radio Society.**—Recent meetings have included talks and demonstrations on Frequency Measurement, The Oscilloscope, A Two-Metre Transmitter, Audio Equipment, and Reminiscences of Amateur Radio, together with a popular series of talks on Receiver Design.



At a recent exhibition locally, Oxford & District Amateur Radio Society put on a show of mainly home-built equipment, with G8PX/A in operation over the air as one of the other attractions.



On March 18, Cray Valley held a social evening attended by 50 members and friends, including 20 holders of transmitting licences.

On May 9 there is a talk and demonstration on Servicing Radio Equipment, by the Hon. Sec. A monthly news letter is being prepared; meetings are on alternate Mondays at 7.30 p.m., in the Common Room, R.A.E. Assembly Hall, Farnborough.

**Edgware & District Radio Society.**—Sixteen members said "farewell" to the 5-metre band in a DF Contest on March 27. All the contestants eventually located the hidden transmitter. During April members of the Wanstead Station were welcomed, and ZLILD (a blind amateur) was among the visitors. On May 4 there is to be a lecture by a member of the Air Ministry Ionosphere Research Group, and on May 7 there is a Top-Band QRP Contest.

**Romford & District Amateur Radio Society.**—Thoughts are turning to outdoor events and two NFD stations are being organised. A very interesting talk on Sweden was given recently by G3CXU, just returned from that country. A VHF Transmitter was demonstrated, and a gramophone

amplifier demonstration turned out successfully despite the opposition from the YMCA Orchestra next door! The Club is still awaiting the arrival of some really good "junk" on the "Junk Nights."

**Solihull Amateur Radio Society.**—Members joined in a discussion on Oscilloscopes during April, and a home-made "Scope" was demonstrated by a member. The Club is now about 50 strong, and is getting ready for the outdoor season with DF receivers and portable work.

**Oxford & District Amateur Radio Society.**—The first Oxford Hamfest was held at the end of March, and was a highly successful event with an attendance of about 140. G5JU gave a talk on Two-Metre Equipment, and an interesting demonstration of very low temperatures and their effects was given by Mr. Olsen (Clarendon Laboratories)—what time the ladies were shown round Oxford by G4QK. Forthcoming items include talks on Stabilised Power Supplies, Panoramic Receivers and Oscilloscopes.

**Hyde, Glossop & District Radio Society.**—This Club, formerly styling itself "Glossop and District," has now acquired headquarters at the CWS Reading Room, Market Street, Mottram-in-Longendale. A transmitter and receiver have been installed. A contest is in progress for home-built apparatus, and some members are to sit for the forthcoming amateur examination. Television gear is also in course of construction.

**Enfield Radio Society.**—This Club continues to make good progress, and on May 10, there is a talk on Transmitter Design by G2BCA; on May 24, the subject is "From Coal to Power Pack," by W. J. Willmott.

**Kingston & District Amateur Radio Society.**—Meetings have been well attended, and an interesting lecture on Superhet Receivers was given by Mr. C. Cox. In future the society will meet on Wednesdays. Next meeting, at the Kingston Hotel, May 11, at 7.30 p.m.

**Gravesend Amateur Radio Society.**—The Club is taking a stall at an Exhibition arranged by Combined Gravesend Societies, at the Town Hall from May 14 to 21. A transmitter and receiver will be in operation. NFD plans are under way, and many interesting talks and lectures are being laid on.

**Barnsley & District Amateur Radio Club.**—Two recent lectures have covered a Five-Band-Switched Exciter Unit (G5KM) and "Taming a Push-Pull 807 PA" (G4JJ). In anticipation of an increased membership, negotiations have been opened for a larger Clubroom. Amateur Radio was given a good write-up in the local press, thanks to one of the Club members, G5IV.

**Birmingham & District Short Wave Society.**—At the April meeting G3CXT gave a talk on Loud Speakers. At the May meeting (on the 9th) G2BON will talk on equipment for HF working. A Field Day is arranged for May 8.

**Barnet & District Radio Club.**—This Club now holds the call G3FFA and will soon be active with 25 watts of CW. The NFD transmitter is also under construction. Morse classes continue and RAE lectures are going ahead. Recent talks have covered Radar, D/F, CRT's, and future items are on AF Filters, Transformer Building and other subjects of general interest.

**Grafton Radio Society.**—Fifteen members of the Barnet Club visited Grafton during March; the visitors showed great interest in Grafton's gear, and then acquired four of the seven prizes in a raffle! Any other Club interested in a visit should get in touch with the Hon. Sec. at the Club, any Monday, Wednesday or Friday evening.

**Southport Radio Society.**—Meetings are now held on the third Monday in each month at 38a Forest Road, 8 p.m., but the headquarters are also open every Monday and Wednesday for Morse classes

and talks. The Club Tx is ready for operation and the call-sign is eagerly awaited.

**West Somerset Radio Society.**—This Club has been very busy during April with its part in the Festival of the Minehead Arts and Crafts Guild. Club premises and workshops are available at the Hon. Sec.'s new house, and it is hoped to make an early start in getting them ready for use.

**Thames Valley Amateur Radio Transmitters' Society.**—At the April meeting a large gathering heard a lecture by the Mullard Radio Valve Co. on Ultrasonics, and their use in many branches of commerce and industry.

**Radio Society of Harrow.**—Recent doings have included a two-metre demonstration, with a fixed station working a walkie-talkie. The Club transmitter is being rebuilt, and Morse classes have restarted. Future events include a demonstration of a television receiver built from surplus



View of the Exeter Society's stand at a recent exhibition locally, with G6JN/A in action.

gear, a talk on Time Bases, and a Bring-and-Buy Sale, Membership continues to increase.

**Hayes, Middlesex Group.**—Forthcoming events include a Hamfest at the Regal Cinema, Uxbridge, on May 22. Talks will be given by G6OT on TVI, and by G6CJ on Aerial Apertures. Other attractions will probably include a Morse receiving competition (occasionally by members' "trumpet blowing"!) and an exhibition of members' equipment. There is a Thursday night Top-Band Net in action from 8.30 p.m. onwards, into which other local amateurs will be welcomed.

**Warrington & District Radio Society.**—Meetings continue to be held fortnightly, 7.30 p.m. at the Crown and Sceptre

Hotel. On April 21, the subject was Television Receivers from Government Surplus. Other recent activities included talks on Audio Amplifiers and Power Packs, and a Junk Sale. The search for more commodious premises continues.

**Coventry Amateur Radio Society.**—Events scheduled for May include a talk on Frequency Control and Measurement, by G3FAB (May 9), and a Discussion on NFD (May 23). An extremely successful Dinner took place on March 25, at which a presentation was made to John Swinerton, G2YS, whose efforts as Hon. Sec. have been so valuable to the Club during the post-war period. He has now departed for Cheshire, taking with him

the good wishes of all C.A.R.S. members.

**Teignmouth Radio Club.**—This Club, a newcomer to our columns, co-operated with the Teignmouth Model Club at a recent exhibition by running a stand with a complete Amateur Radio station (G3HW) in operation. The station performed on 14 and 3.5 mc with 150 watts of phone and CW.

**Lincoln Short Wave Club.**—A recent talk, by a local GPO engineer, was entitled "A Child's Guide to Aerials." As there is plenty of equipment available in the Technical College, where the Club meets, a contest has been arranged, and it is hoped to form a library.

#### NAMES AND ADDRESSES OF CLUB SECRETARIES :

BARNET : C. J. Spencer, 31 Byng Road, Barnet.  
 BARNESLEY : J. A. Ward, G4JJ, 44 Northgate, Barnsley.  
 BIRMINGHAM : N. Shirley, 14 Manor Road, Stechford, Birmingham.  
 BLACKPOOL AND FYLDE : R. G. Jack, G3BKE, 40 Angers Hill Road, Blackpool.  
 BRIGHTON : L. Hobden, 17 Hartington Road, Brighton.  
 COVENTRY : K. Lines, 70 Stepping Stones Road, Coventry.  
 CRAY VALLEY : G. Miles, G2CXO, 33 Silverdale Road, Petts Wood, Kent.  
 EAST SURREY : L. Knight, G5LK, Radiohme, Madeira Walk, Reigate.  
 EDGWARE : R. H. Newland, G3VW, 2 Albany Court, Montrose Avenue, Edgware, Middx.  
 ENFIELD : F. Tickell, 10 Cowdrey Close, Enfield, Middx.  
 FARNBOROUGH : R. J. Corps, B.Sc., Armament Dept., R.A.E., Farnborough, Hants.  
 GRAFTON : W. H. C. Jennings, G2AHB, Grafton LCC School, Eburne Road, London, N.7.  
 GRAVESEND : R. E. Appleton, 23 Laurel Avenue, Gravesend, Kent.  
 GUERNSEY : W. E. Butt, GC2FZC, Meo Voto, Green Lanes, St. Peter Port, Guernsey.  
 HARROW : S. C. J. Phillips, 131 Belmont Road, Harrow Weald.  
 HAYES, MIDDX. : A. W. Watkins, G3CRK, 2 Cranleigh Gardens, Southall.  
 HYDE AND GLOSSOP : H. Buxton, G2AJP, 11 Walker Street, Hadfield, near Manchester.  
 KINGSTON : R. K. Sheargold, G6RS, The Avenue, Sunbury-on-Thames.  
 LEEK : W. L. Woodcraft, 35 The Crescent, Leek, Staffs.  
 LINCOLN : G. C. Newby, G3EBH, 35 Chaucer Drive, St. Giles, Lincoln.  
 LOTHIAN : I. Mackenzie, 41 Easter Drylaw Drive, Edinburgh 4.  
 OXFORD : R. H. Clifton, G3CGU, 86 Victoria Road, Summertown, Oxford.  
 PONTEFRACT : C. H. Gould, G2FQH, 51 Pontefract Road, Ferrybridge, Yorks.  
 READING : F. Hill, G2FZI, 997 Oxford Road, Reading.  
 ROMFORD : D. L. K. Coppendale, G3BNI, 9 Morden Road, Chadwell Heath, Essex.  
 SLADE : C. N. Smart, 110 Woolmore Road, Erdington, Birmingham 23.  
 SOLIHULL : G. Haring, 121 Bradbury Road, Olton, Birmingham.  
 SOUTH MANCHESTER : M. I. Wilks, 57 Longley Lane, Northenden, Manchester.  
 SOUTHPORT : F. H. P. Cawson, G2ART, 113 Waterloo Road, Southport.  
 STOKES-ON-TRENT : K. H. Parkes, G3EHM, 159 Belgrave Road, Longton, Staffs.  
 SUTTON AND CHEAM : L. Seaton, 8 Croft Road, Sutton, Surrey.  
 TEIGNMOUTH : A. R. Drake, Powderham House, The Den, Teignmouth.  
 THAMES VALLEY : Maj. A. Eden, 31 Chatsworth Crescent, Hounslow.  
 WARRINGTON : W. R. Murray, G3CUB, 56 Crow Wood Lane, Widnes.  
 WEST CORNWALL : R. V. A. Allbright, G2JL, Greenacre, Lidden, Penzance.  
 WEST SOMERSET : T. C. Bryant, G3SB, 16 The Parks, Minehead.  
 WIRRAL : R. A. Browning, 24 Norbury Avenue, Bebington, Cheshire.  
 WOLVERHAMPTON : H. Porter, G2YM, 221 Park Lane, Fallings Park, Wolverhampton.  
 WORCESTER : J. Morris-Casey, c/o Brookhill Farm, Ladywood, Droitwich.  
 WORTHING : F. J. Tooley, 62 Becket Road, Worthing, Sussex.  
 WYMONDHAM : Morley Radio Club, Wymondham Teachers' Training College for Men, Morley St. Botolph, Wymondham, Norfolk.

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1. 175 to 525 k/cs.	4. 5 to 15 m/cs.
2. 515 to 1,545 k/cs.	5. 10.5 to 31.5 m/cs.
3. 1.67 to 5.0 m/cs.	6. 30 to 52 m/cs.
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White	and White
3-9 each	4-0
Green	Green
4-9 each	5-0
Ranges 6 and 7, Blue-	Ranges 6 and 7, Blue-
Yellow-Red	Yellow-Red
3-3 each	3-6

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Mutual Conductance	6mA/V.
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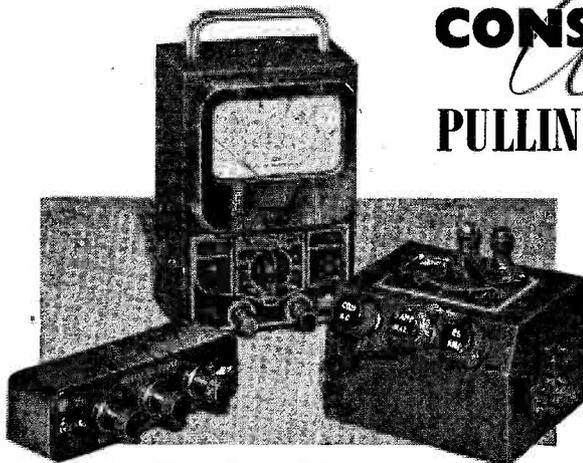
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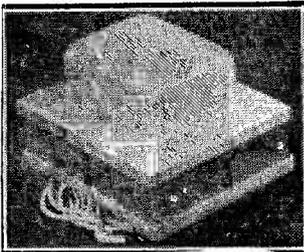
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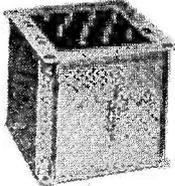
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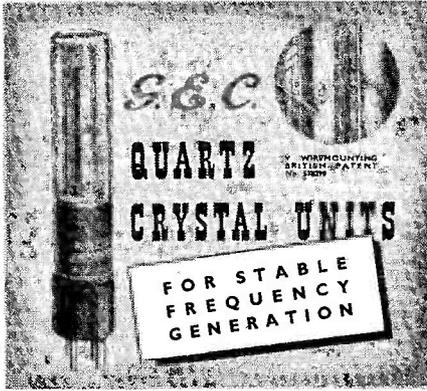
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**N**ATIONAL NC.100 Receiver for sale, with auto transformer and speaker, perfect condition, £25 or nearest offer.—G2BKZ, 41 Alcester Road, Studley, Warwickshire

**R**ECEIVERS—R1116/A, £5; 68R, 30/-; 4-valve mains TRF, 50/-; 8 valve v/het., £6. Amplionette, £5; 6-in. V.C.R.517, 10/-; Key, 2/6; Phones, 2/6; Hand Mic., 2/6; £15 Televisor, any reasonable offers accepted.—Details from Warwick, 19 Church Road, Roffey, Nr. Horsham, Sussex.

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