

1/6

# SHORTWAVE

*Magazine*



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

**VOL. V No. 5 JULY 1947**

# WEBB'S RADIO

## EDDYSTONE '640'

### Communications Receiver

An efficient general purpose short-wave receiver, designed to meet the exacting requirements of Amateur-Band Communications



THE "SHORT WAVE MAGAZINE"  
(June 1947) said:—

"The Eddystone '640' is a beautiful receiver and no operator who understands the amateur band requirement could fail to be impressed by it from every point of view. Because it is so good and the first British design worthy of the British amateur, we are glad to devote so much space to it."

(Reprints of the report covering thorough tests made by the "S.W. Mag." technical staff available on request from Webb's).

A specimen model may be seen at Webb's and we are now taking orders for rotational supply in August/September. Write for details of our registration scheme.

Some salient features:—

Coverage  
31 to 1.7 mc/s

Electrical Band-spread  
throughout range

Eight Valves  
(plus rectifier)

One R.F. and  
two I.F. Stages

Efficient Noise-limiter  
10, 20, 40, 80 and  
160 metre Amateur  
Bands Calibrated

Crystal Filter

Beat Frequency  
Oscillator

Fly-wheel Control  
on Band-spread

The "640" has outstanding signal/noise ratio and extremely good image rejection. Provision for external connection of "S" Meter.

WEBB'S RADIO, 14 SOHO STREET, OXFORD STREET, LONDON, W.1  
Telephone: GERrard 2089. Shop Hours, 9 a.m. to 5.30 p.m., Sats. 9 a.m. to 1 p.m.



**R**ADIO manufacturers, service engineers, workshop and laboratory technicians are familiar with the precision and dependability of "AVO" Electrical Testing Instruments. Long years of successful experience in the design and manufacture of first-grade instruments have produced a consistently high standard of accuracy which has become a tradition as well as a standard by which other instruments are frequently judged.

*Write for pamphlet descriptive of the "AVO" Instruments illustrated above.*

## Announcing further Equipment

Lists TR.2. give details and prices of a comprehensive range of first grade equipment, including Transmitters, Modulators, V.F.O.'s, Power Packs, F.S. Meters, etc. May we suggest that you send for a copy.

### LONDON SHOWROOMS

32 Chiltern Street, W.1. (near Baker Street).  
Messrs. Palace Electrical Ltd. are our Distributing Agents for London and Home Counties. RAM Equipment can be inspected at the showrooms at this address.

### HARROW

Messrs. Odeon Radio, 56 College Road, have been appointed Agents for this area, and invite your enquiries.

**NOTE.** Mains, Transformers, Chokes and high wattage bleeder resistors are available for immediate delivery. As the supply is not unlimited, may we suggest that you let us have your enquiries as soon as possible.

**CONSTRUCTIONAL & MAINTENANCE SERVICE.** Many Amateurs (both Home and Overseas) are using this service. We can undertake the Construction of equipment and the overhaul and repair of existing apparatus.

We will provide a quotation upon receipt of details.

Please send your enquiries direct or to your local agent.

Our staff includes G4OO, G8ID, G3PS, G2FPP, all active Amateurs with knowledge of the problems Amateurs meet.

## Radiocraft Ltd

11 CHURCH ROAD, UPPER NORWOOD  
LONDON, S.E.19 Phone. LIVingstone 4787

**NOTE**—We have absolutely no connection with any other firm trading under the same or similar name as ourselves.

TAYLOR 1403

### ELECTRADIX BARGAINS

Here is a small selection from the varied stocks which we can offer you. Pay us a visit. We are close to Queens Road station (S. Rly).

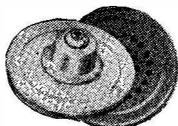
**TRANSFORMERS.** Surplus double wound 230v. 50cy. input, 4v. centre tapped 7½ amps. 2000v. test; open type, sound construction, 17/6 each.

**HEADPHONES.** Phones are needed for short wave experiments, and we can offer a special line of ex-G.P.O. double headphones, high resistance, light-weight type S.G.B., as new, double headband and Cord, 23/-; Low Resistance Single headphone with headband and Cord, 5/-; Headphone Cords, twin, 2/6; 4-way 5 ft. cords, heavy quality, 3/-.

**TELEPHONES.** G.P.O. wall type Telephone constructor's parts with wiring diagram, comprising cabinet with magneto bell, magneto hand generator, bracket mike, transformer and condenser, switch hook and contacts, single receiver, old price 30/- each, or 30/- pair. Special offer 35/- per pair.

**SWITCHES.** Dewar key panel type 8-pole C.O. flush fitting, 5/-; Yaxley 3-pole 3-way, 3/6; 8-pole 1-way, 3/6; D.P.C.O. toggle switch 250v. 1 amp. flush panel, 3/3; 8-way Lucas switch box, 3/6; 6-way, 3/-; S.P.C.O. Toggle switches, 2/3.

**HAND MAGNETO GENERATORS,** output approx. 70 volts 25 ma. A.C. perm. steel magnet wound armature driven by gearing in handle, 10/- each.



**MICROPHONE INSETS.** (G.P.O.) metal clad, 2½" dia., can be used as a home broadcaster and for amplification and detection of sound, 2/6. each. Special high ratio transformer 4/6.

**DIMMER RHEOSTAT SWITCHES.** 1 ohm 3 amps, for regulation of 6 volts; one hole fixing, hollow knob has base for miniature bulb to glow when "on," 2/6 each, plus 6d. postage.

**VARIABLE RESISTANCES.** Rotary type 4 ohm ½ amps, wire wound, with large knob, 7/6.

**VIBRATORS.** Mallory, 12 volt 60 ma., 15/-; special 12 volt transformer, 27/6, delivery ex-stock. Vibrator Contacts, thin H.F. Reed, bakelite mounted, fine thread adjustment, milled locking nut, Government type, 4/-.

**BATTERY Superseder.** H.T., D.C./D.C. for radio receivers, 6-volt input, 110v. 15 ma. output, 12 volts input, 230v. 30 ma. output, ball bearings, reduced to 55/-.

**G.P.O. CONNECTION STRIPS,** solder tags, telephone type moulded base 60-way, 3/6; 10-way R.A.F. terminal strips, bakelite, 2/9.

**ALL-METAL CASES,** ex-W.D. as above, 9" x 9" x 8", with hinged lid and loops for carrying handle; with rest for panel; make fine instrument cases, 12/6.

When ordering, please mention the "S.W.M."

### ELECTRADIX RADIOS

214 QUEENSTOWN RD., LONDON, S.W.8  
(late Queens Road)

Telephone MACaulay 2159

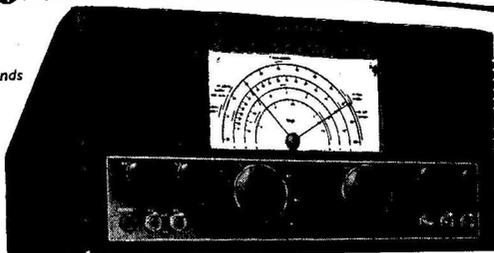


# EDDYSTONE and the AMATEUR

Covers all Amateur Bands from 31-1.7 mc/s

Separate Electrical Bandsread

Really good Signal-to-noise Ratio



High Image Ratio

Vacuum mounted Crystal filter

Adaptor for Battery Operation

## THE NEW EDDYSTONE '640'!

The Eddystone "640" Receiver has been specifically designed to fulfil the amateur enthusiast's need for a really first-class Communications Receiver. It is a Nine-valve Superheterodyne with Electrical Bandsread over the whole tuning range, the Amateur Bands being distinctively marked. Tuning range: from 31 mc/s to 1.7 mc/s. The circuit includes 1 R.F. and 2 I.F. stages, sensitivity better than 2 microvolt. Very efficient 1.6 mc/s Crystal Filter, vacuum mounted. All essential requirements incorporated. Release date: August 1947. Price. £42. P.T. £9/0/7. Order from your Dealer.



### STRATTON & Co., LTD

EDDYSTONE WORKS - WEST HEATH - BIRMINGHAM, 31

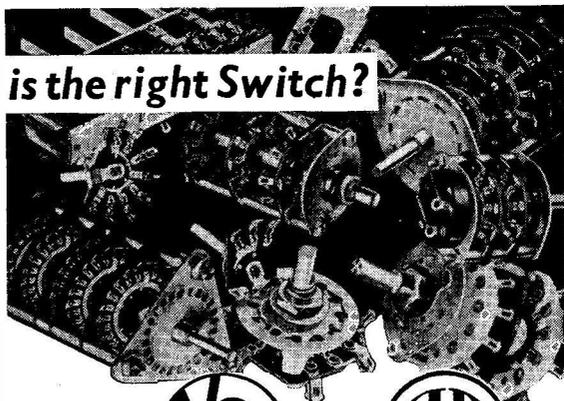


## Which Switch is the right Switch?

... is it Rotary or Push-button or Slider? Is it wanted for circuit selection, band selection, tap switching? Is it for a new design or in quantities for a well proved circuit?

Whatever it is — the answer is always OAK!

The basic design of all Oak switches is one of strength and efficient functioning, including such exclusive features as the double-contact clip, and the floating rotor ensuring self-alignment of each section.



# OAK SWITCHES

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The only Manufacturers of Oak Switches under Patent Nos. 478391 & 478392

# Lyons Radio

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

## V.F.H. Receiver Type R1132A

High grade 11 valve superhet covering 100 to 125 mc/s. with the following stages :—R.F. amp., Mixer, osc. stabiliser, 3—I.F.s., B.F.O., DET. 1st audio and A.V.C. output. Fitted with tuning meter, precision slow motion drive R.F. and L.F. gain controls, etc. Circuit diagram and component valves printed on card with each set. Beautifully made, approx. size 19 in. x 11 in. depth (over cover) 18 in. Requires power supply of about 200v. at 50 mA. H.T. and 6.3v. L.T.

In first-class condition throughout.  
Supplied in strong wooden transit cases.  
All valves included.

Price £9 . 15 . 0 (carriage 7/6)

## Potentiometers

5 watt wire wound 2,000 ohms, " Berco " type M. Brand new, 3/- each (postage, 6d.)

## V.H.F. Crystal Monitors (Type 4)

High grade instruments for operation from A.C. mains (200-250v.) Brand new. Provide a source of modulated R.F. over a frequency band of 100 to 150 mc/s. from the 18th harmonic of any one of six crystals (crystals are not included.)

Seven valves as follows are employed :— 2 triodes, 2 H.F. pens. (EF50), 1 Tuning indicator, diode rectifier and full wave mains rectifier. Built in A.C. power unit. All valves included. Circuit diagram and component valves with each.

Price £5 . 10 . 0 (carriage 6/-)

## Govt. Surplus Valves (New)

- 6J5, 7/6 each (postage 1/-)
- VR108 (equivalent to SPI3C), 7/6 each (postage 1/-)
- KT44, 10/- each (postage 1/-)
- VU111 (equivalent to Mazda VI907), 5,000v. 30 MA. half-wave rectifier, 14/- each (postage 1/-)
- CV54 Rectifiers, 12/6 each (postage 1/-)
- 6 x 5 7/6 each (Postage 1/-)

AN AMERICAN  
PUBLICATION



The Radio Amateurs' Journal

*C Q* is published monthly exclusively for the **SHORT WAVE LISTENER and AMATEUR**

- 1 Large interesting issues filled with the things you need to know.
- 2 "CQ-DX" a World review of what to listen to on the Air.
- 3 Receiver design, hints and tips.
- 4 Transmitters for fixed and mobile operation, and how to build them.
- 5 Aerials—all the latest developments.
- 6 "V.H.F.—U.H.F." all the dope on these interesting bands.
- 7 "The Amateur Newcomer," a series designed to equip the would-be Ham.
- 8 "Inside the Shack", useful new ideas.
- 9 Many photographs, diagrams, illustrations, etc., to help one to understand the text.
- 10 Advertisements of latest American gear.

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There are Candler Morse Code Courses for

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**JUNIOR Scientific Code Course for beginners.** Teaches all the necessary code fundamentals scientifically.

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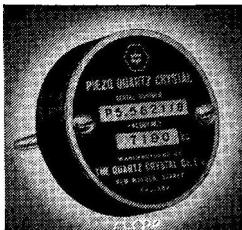
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of the value of the **Candler System of Morse Code Training** is given in the "Extracts from students' letters," included with every "Book of Facts." Send for a copy now.

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## Q.C.C. TYPE P5 QUARTZ CRYSTAL UNIT

This unit uses the well-known Q.C.C. Power type crystal, which is undoubtedly the most rugged and active crystal cut available for amateur use. The crystal is mounted in our type U dust proof holder, with standard 1/4 in. pin spacing, as illustrated above.

The P5 unit has a temperature co-efficient of 20 cycles per megacycle per degree Centigrade temperature change. Used with a 6V6 or 6L6 type beam tetrode, it will give up to 5 watts r.f. output on the fundamental frequency, and approximately 3 watts on the second harmonic in the Tritet circuit.

Available with fundamental frequencies in the 1.7, 3.5 and 7 Mc. bands for fundamental operation or frequency multiplying to any higher frequency band.

An official certificate of calibration is sent with each P5 unit, giving the frequency under stated operating conditions to an accuracy of 0.025%.

**PRICES:** Ground to your specified frequency in the above bands ... £1/17/6

Or ground to a frequency not specified by you but taken from our stock ... £1/12/6

Please note that all the leading dealers in amateur equipment now carry stocks of the P5 crystal unit. **THE QUARTZ CRYSTAL CO., LTD.** (Directors: E. A. Dadman, G2NH., N. H. R. Munday, G5MA., W. J. Thompson, G2MR.), 63/71 Kingston Road, **NEW MALDEN, SURREY.** Telephone: **MALden 0334**

# "Q-MAX" PRODUCTS AT VALLANCE'S

The "Q-Max" V.H.F. Converter is designed for operation on the 10 metre, 5 metre, and 2 1/2 metre amateur bands and is used in conjunction with any receiver covering 10 mc/s for the I.F. channel. The actual band width covered is from 27.2 to 30.2 mc/s and 54.2 to 60.6 mc/s, and a top band that can be supplied to clients' requirements up to 200 mc/s.

**Mono-Unit Plug-in Coils** are used and special provision can be made for receiving the American 6 metre transmissions. The valve line up is as follows:— R.F. Amplifier EF54, Mixer EF50 and Oscillator EF50. The I.F. Frequency is 10 mc/s.

The Converter will work off the receiver power supply or may be used with a separate power supply giving an H.T. voltage of 200/250 volts at 25 ma, and L.T. at 6.3 volts, 1 amp.

**Special Features** not found in any other converter on the British market (at the time of this production):

- (1) Three ranges above 28 mc/s.
- (2) Mono-unit plug in coils. (National H.R.O. type.)
- (3) Common electrode injection for high conversion gain.
- (4) ONE KNOB tuning on full vision CALIBRATED SCALE.
- (5) Tuned I.F. Transformer.
- (6) 10 mc/s I.F. for High Image Injection.

Price £19 19s. including one coil unit. Packing and carriage 3/6 extra.

**Extra Coil Units** £1 10s. each. Full specification free on request.

**OTHER "Q-MAX" PRODUCTS include:—**

**Combined Absorption Wavemeter and Phone Monitor.** An absorption wavemeter for checking harmonics, parasitics, oscillators, doublers and power amplifiers for correct frequencies. All amateur bands are covered by means of plug-in inductances. A Westector rectifier is incorporated with the wavemeter, and a jack for phones. Size 3 1/2" x 2" x 2". Black crackle finish £1 15s. 9d., supplied complete with one inductance covering any specified band. Separate inductances as follows:—

7 mc/s, 3/9. 14 mc/s, 3/9. 28 mc/s 3/9.

Personal shoppers please note we are Eddystone, Raymart, and "Q-Max" Stockists at 16 Leeming Street, Mansfield, and 53 High Street, Scunthorpe.

Post us your orders and enquiries. They will have prompt attention. We can send C.W.O. or C.O.D. whichever you find most convenient. When including cash with order, please send sufficient extra to cover packing and postage.

# VALLANCE'S

## 144 BRIGGATE, LEEDS, 1

Phone 29428 and 29429.

Branches (for callers only) at

53 High Street, Scunthorpe, Lincs. and 16 Leeming Street, Mansfield, Notts.  
Staff Call Signs: G2HHV, G8SX, G3ABD, G3AHV G3BDD.

## EDDYSTONE COMMUNICATION RECEIVERS

MODEL "640". A full description of this fine communication receiver appeared on pages 232 to 234 of the June issue of Short Wave Magazine. The following Magazine test report confirms our own experience:—"The Eddystone 640 is a beautiful receiver and no operator who understands the amateur band requirement could fail to be impressed by it from every point of view". For the benefit of those readers who do not possess a copy of this issue the following brief specification is given: 9 valves, R.F. Frequency changer, 2 I.F. stages, detector-AVC-1st audio, 2nd audio output, noise limiter, B.F.O. and rectifier. It is fitted with electrical bandspread, crystal gate with phasing control, adjustable B.F.O., provision for "S" meter, provision for 6-volt vibrator use. Frequency coverage 31 to 1.7 mc/s in 3 bands. In well finished black crackle cabinet, size  $16\frac{1}{2}'' \times 10'' \times 8\frac{1}{2}''$  with lift-up lid. Our demonstration model is available for test in our "ham shack" on request. The general release of this set is expected in August. We are now accepting limited orders for delivery in rotation. Model 640 for AC mains, 110v and 230v or 6v vibrator. Price, including Purchase Tax, £51 0 7

MODEL "504". This well-known 9-valve superhet communication set is now available in small quantities for immediate delivery. Specification:—2 R.F. stages, Frequency changer, 2 I.F. stages with crystal filter, detector-AVC-1st audio, 2nd audio output, noise limiter, adjustable B.F.O. and rectifier. Fitted with "S" meter calibrated SI-9 and dB over S9. Tuning range 10-500 metres (30,000-600 kc/s) in 5 overlapping bands. For AC mains, 110v and 230v. Price, including Purchase Tax, £58 18 7

If you are interested in Ex-Govt. Bargains, send 3d. for our latest list.

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## THE "UNLIMITEX" CHASSIS PUNCH AND DIE

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A precision Toolmaker's job, accurately made, well finished, and Cyanide hardened for lengthy service. Both the  $1\frac{1}{4}''$  and  $1\frac{1}{2}''$  sizes are available NOW, and every order accompanied by PO or MO is despatched on the day of receipt. Please specify which size. Price only 9/6d. including packing and postage. Illustrated instruction sheet packed with each. Please specify whether  $1\frac{1}{4}''$  or  $1\frac{1}{2}''$ .

### WIRELESS SUPPLIES UNLIMITED

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## FOR FREQUENCY SUB-STANDARDS

TYPE JCF/200, 100 Kc/s

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

### FEATURES

Low temperature co-efficient—less than 2 in  $10^6$  per °C.

Patented nodal suspension.

Mounted in vacuum; performance independent of climatic conditions.

Exceptionally high Q value.

High stability.

Small size,  $3'' \times \frac{1}{2}''$  overall excluding pins.

Fits standard miniature deaf aid valve socket.



V Wire Mounting  
British Patent No. 578290



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

## E.C.C. QUARTZ CRYSTAL UNITS

For stable frequency generation

### SALFORD ELECTRICAL INSTRUMENTS LTD.

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# RADIO CLEARANCE LTD.

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MUS 9188

SPECIAL OFFER

10-VALVE S.W. RECEIVERS. EX-R.A.F. TYPE 1481.

Freq. Band 65-86 Mc/s. Valve Sequence R.F. VR65 (SP61) Mixer VR65 Osc. VR66 (P41MOD), 3 I.F.'s V.R.53 (EF39), DET & AVC VR54 (EB34), B.F.O. VR53, AF VR57 (EK2), Output VR67 (6J5). Beautiful 5 $\frac{1}{2}$ " S.M. dial engraved, 0-180. RF and LF gain controls, Man/AVC SW, 0-5 mA Tuning Meter, I.F. 12 Mc/s, size 19" x 10 $\frac{1}{2}$ " x 10 $\frac{1}{2}$ " (fits standard 19" rack). Requires power 250v 40/50 ma, 6-3v 3A. All Brand New, packed in wooden transit case with hinged lid. Ideal for conversion to cover 5-Metre band, etc. Circuit diagram, complete with all component values, with every set. £12/12/-, including valves. Carriage Paid.

**American SW Sets**, covering 3-1 to 15.5 Mc/s in 3 bands, 4 valve superhet, complete with power pack for 6v batt. or 90/250v A.C. 50c/s, headphones, mains lead, batt. leads, etc., £8/8/-.

**Ex-Army No. 38 Set**, 5-Valve Trans-Rec., Range 7-4.9 Mc/s, complete with 2v valves and junction box 45/-; 3 spare valves in metal case, 10/-; Rod aerials, 2 sections in case 7/6.

**Main Trans.** 230v 50 c/s Primaries. 300-0-300v 200 mA, 5v 3A, 6-3v 2-5A, 6-3v 3A, 25/-, 300-0-300v 200mA, 5v 3A, 6-3v 4-5A, 22/6. 2000v 2mA, 4v 2A, 2v 2A 21/-.

**Smoothing Chokes** 2.5H 200mA, 7/6. 20H 200mA 12/6. 400mA 2500 18/6.

**Mansbridge Condensers** IMF 350v 8, IMF 1000v 1/3, IMF 3000v 3/6, 2MF 300v 1/-, 4MF 600v 4/6, 4MF 1500v 5/-, .25MF 400v 5d, 2000v 1/9, 2500v 2/-, .5MF 1200v 1/-, All Working V.

0-30mA Moving Coil Milliammeters 2 $\frac{1}{2}$ " scale 8/6.

**Telescopic Aerials** 103" when extended, 15" closed, 9/-.

**Ex R.A.F. Visual Indicators** in Bakelite case, inc. 2 complete Weston Moving Coil Meter movements, 300 microamps F.S.D. 6/11.

**H.F. Chokes** U.S.W. 1/-, SW/MW 1/6.

**Air Dielectric Variable Conds.** 30PF 3" spindle 1/-, 50PF Diff., Ceramic Base 1" spindle 2/-.

**I.F. Transformers.** Iron cored 465 Kc/s 14/- pr. 480 Kc/s 9/-.

**Volume Controls.** Carbon with SW 5K, 10K, 25K, 50K, 100K, 250K, 500K, 5/-.

**Volume Controls.** Carbon less SW. 10K, 20K, 50K, 100K, 500K, IM, 2/6. Double IM Ganged 3/6.

**Volume Controls Wire Wound.** Less SW, 3W, 2000, 5000, 1K, 2K, 10K, 20K, 50K, 2/6. 2 Gang 500/5000 4/-, 5K/50K 4/-, 15W 5000 4/6.

**Headphones.** Moving Coil slightly used 10/6 pr. **Headphones.** Lightweight High Res. (45000) 7/11 pr. Standard Low Res. 6/11.

**Metal Rectifiers** 12v 1A Bridge Type 4/6. 250v 60mA, H.W. 4/6.

**Mica Condensers** .0001-3-5 4d, .001-2-4 5d, .01 6d, .005 1000v Wkg 7d, .0001 3000v Wkg 9d.

**Silver Micas** Most values 10pF-6000pF 6d.

**Ceramic Condensers** 2pF, 6pF, 10pF, 20pF, 20pF, 25pF, 50pF, 100pF 6d.

**Resistors** Vitreous 10W 500, 2500, 5000, 1K, 1-2K 1/6. 20W with clips 1200, 2000, 2K, 8K, 2/-, 25W 3500 2/6. 40W 14K Tapped at 2K, 3/-.

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UM1 (54/-), UM2 (72/6), UM3 (90/-), DTM11 (39/-), DTM13 (55/-), DTM14 (70/-), DTM16 (82/6), DTM17 (109/6), DTF12 (39/6), DTF14 (31/6), DTF17 (37/6), DCS11 (23/-), DCS12 (31/6), DCS13 (56/-), PCS12 (45/-), PCS13 (58/6), DT1 (34/-), DT2 (39/6).

RECTIFIERS 80 (11/-), 83 (15/3), 866 (20/-), 5U4G (18/3), OTHER TYPES IN STOCK INCLUDE DA41, 807, EF54, 6L6G, 6S17, 6SK7, 6SG7, 6F6, 6F6GT, DET19 (RK34), QVO4/7, 6V6, 5Z4.

RESISTORS INCLUDE DUBILIER 30 WATT at 4/6 IN 1000 ohms, 1500 ohms, 2000 ohms and 10000 ohms. ERG 100 WATTS 50000 ohms 10/9, 50 WATTS 50000 ohms 8/9, 25000 ohms 8/6.

SPLIT STATORS CYLDON 50 + 50 30/-. LABGEAR 22/6. LABGEAR NEUT. CONDS. NI 10/6. N2 12/6.

ALL EDDYSTONE COMPONENTS IN STOCK. BELLING LEE 70 OHM FEEDER (200 WATTS) 7 $\frac{1}{2}$ d. PER YARD.

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## BROOKES CRYSTALS LTD.

EST. 1929

HIGH PERFORMANCE  
AMATEUR CRYSTALS

AMPLE DRIVE  
LOW DRIFT  
STABLE OPERATION  
ACCURATE FREQ. CAL.  
DUSTPROOF HOLDERS  
ROBUST CONSTRUCTION

A SUPERB CRYSTAL GIVING EVERY SATISFACTION

OBTAINABLE THROUGH YOUR DEALER AT 32/6 (ADD 7/6 FOR SPECIFIED FREQ.)

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SINGLE—BANDPASS  
AND FREQUENCY REFERENCE  
UNITS

(LET US KNOW IF YOUR DEALER CANNOT SUPPLY)

51/53 GREENWICH CHURCH STREET,  
LONDON, S.E.10

GRE. 1828



Type "F"

# ...DEPENDABILITY

## IS Essential

Reception conditions range from excellent to very poor; signal strength from strong to very weak, and to cope successfully with all such conditions you need a pair of highly sensitive and dependable headphones. If you want maximum reception results you should insist that your local dealer supplies you with a pair of the rightly famous S. G. BROWN headphones. Sea, land and air W/T operators, servicemen, experimenters and radio amateurs all vouch for their dependability

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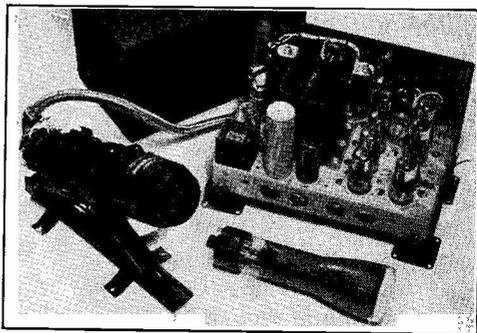
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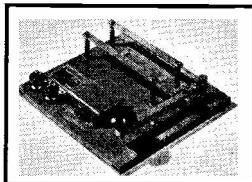
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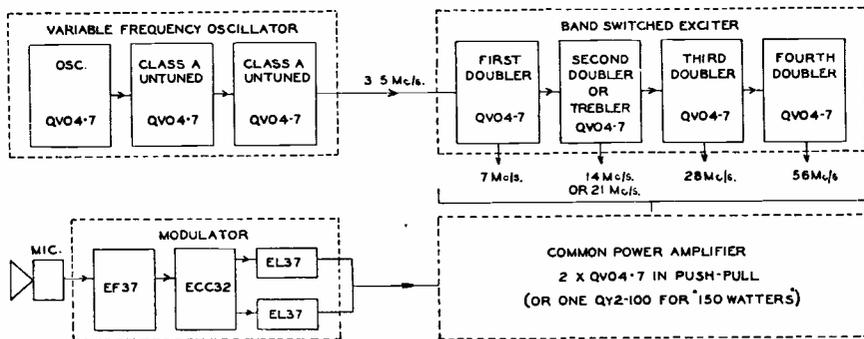
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# SHORT WAVE MAGAZINE

FOR THE RADIO AMATEUR AND AMATEUR RADIO

Vol. V.

JULY 1947

No. 48

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## EDITORIAL

## Home-Cooked

In the earlier days of Amateur Radio—say, in the period 1922-1933—it was axiomatic that all the apparatus in any amateur station should be home-constructed. To do otherwise was to be regarded rather in the light of a man wearing a bowler hat with plus-fours ; it was hardly the accepted thing.

With the appearance from across the Atlantic of the manufactured receiver specifically designed for amateur-band reception, the fashion changed. People would excuse themselves, half apologetically, by explaining that (a) they had not the time to build a good superhet, and (b) it was cheaper in the long run to buy a receiver which was more efficient than anything the average amateur could build—all of which was quite reasonable.

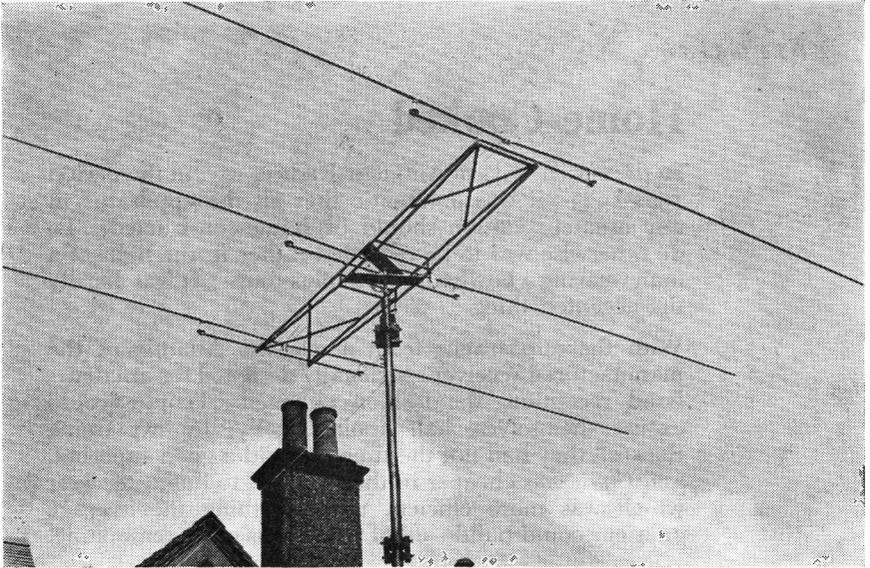
Having thus established the principle of using a commercial receiver, it was an easy matter—on the “haven’t time, more efficient” argument—to justify buying the transmitter and auxiliary apparatus as well.

Though it is widely supposed that the Americans set the pace in this respect, we know of G stations where the whole installation has been put out to contract. Indeed, there is at least one instance where the owner, using commercial equipment throughout, actually employs an engineer on maintenance, doing nothing himself but the operating.

While this may not be Amateur Radio in the accepted sense, it is inevitable and even desirable that in the general development of the art there should be these wide divergences in practice. Nevertheless, the true amateur will always be he who designs and builds his own gear—in which there is unending satisfaction for its own sake.

And it is demonstrable that among the best amateurs are those who, with all their years of experience, still apply themselves to the practical problems of their hobby.

*Austin Fordyke G6FO.*



## Twenty-Metre Signal Squirter

### *Design, Construction and Alignment of a 14 mc Rotary Beam*

By F. E. STALLWORTHY (G8WS)

**A**LTHOUGH excellent results were being obtained at the writer's station on a long-wire aerial, early this year it was finally decided that the acquisition of a 3-element rotary beam for operation on 14 mc was next on the list. It must be confessed that this decision was largely influenced by the fact that 4 out of 5 of the DX stations worked were using this type of aerial, and were without exception very well satisfied with the results.

The final decision was taken one evening when in QSO with TRIP in Tripoli, who came across with the information that by dint of "long-term scrounging" (which apparently included the careful "examination" of wrecked aircraft!) he had at last assembled the necessary bits and

pieces for a rotary beam. What could be accomplished in the remoteness of North Africa could surely be done in the wilds of Surrey!

The next stage—and not an easy one—was to decide on the details and to examine the possibilities of various types of structure, always with a careful eye on the availability of materials required. It was at this time that, during a QSO with W2PPS, the hopes of erecting a beam were mentioned. The outcome of this and many other QSO's was that W2PPS went to a great deal of trouble in preparing drawings and sketches of the beam he was using, and these were mailed to G8WS. His array is based on the American "Mimms 3-Element Dual Signal Squirter," and the original design provides for 10- and 20-metre

operation using the same cradle. The method of feed used is known as inducto-stub, and details of this were also forthcoming from the ever helpful W2PPS.

### Assembling Material

The design was now finally settled, and a high pressure search for the necessary materials was undertaken. The cradle or supporting structure used in the original was of wooden construction, and a very cursory glance at this was enough to show that the necessary timber would be almost unobtainable; furthermore, rough calculations indicated that the final all-up weight of such a structure would be quite considerable, requiring a really substantial mast or tower to support it—neither of which were in existence.

A bicycle-frame type of construction, using thin walled light-alloy tubing, seemed to the writer to be the best solution and a design was "roughed-up" with this in mind. Enquiries and visits to various aircraft scrap merchants showed that very suitable tubing of 1-in. outside diameter could be bought for a reasonable figure, and a quantity of this, together with a number of aircraft type  $\frac{1}{4}$ -in. Whitworth nuts and bolts of various lengths up to 2-in., was procured.

The main structure and all the elements consist of 1-in.  $\times$  20-gauge tubing, but three 6 ft. lengths of 1-in. tubing with a much heavier wall were used for the horizontal supports for the 3 elements. A 12 ft. length of  $1\frac{1}{2}$ -in. heavy-gauge tube was required for the centre-post, and this also was laid on. As the necessary lengths for the elements could not be obtained, a careful search was made, and this produced some tube which was a perfect sliding fit over the 1-in. size—a small quantity was, therefore, added to the purchases. A supply of  $1\frac{1}{2}$ -in. wide  $\times$  18 SWG aluminium strip (offcuts) was also procured, and this enabled the element lengths to be built-up on the telescopic principle. These materials completed the list on the first sortie.

### Construction

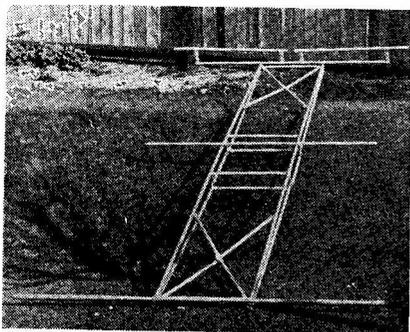
The mere thought of actually having to work out the stresses and strains to be encountered in such an array brought beads of perspiration to the writer's brow. So a start was made on the construction of the cradle which was tested for rigidity and strength at every stage—in other words, a trial and error method of stage-by-stage construction was employed!

The dimensions of this cradle are given in Fig. 1, and the photograph of the partly finished cradle also shows the stand-off insulators which support the elements. The small aluminium tie-brackets are made by "forming" them in a vice, using a spare piece of 1-in. tube and a piece of wood as a wedge, so that before use there is a  $\frac{1}{4}$ -in. space between the flats (where a bracket has to accommodate two pieces of tube this space should be increased to about  $\frac{3}{8}$ -in.), as shown in the drawing.

Where tubes are bolted together the ends are flattened in a vice and then drilled for the fixing bolts, but care should be taken not to flatten them too much, otherwise the tube will very easily crack. No suggestion is made that the design used is the "last word," and considerable variations of this shape and size are feasible.

Much further simplifying of the structure is no doubt possible, but as this short article is intended to describe the beam which was actually made, modifications of the design should provide interesting material for anyone else deciding to undertake something similar.

Many methods of mounting the array on its vertical support were tried and discarded; that finally adopted does provide a very solid support and shows no signs of wobble in any direction. Two pieces of  $\frac{1}{4}$ -in.  $\times$  6-ins. wide light alloy were obtained, and these were bolted diagonally across the centre square as shown in Fig. 3. A  $1\frac{1}{2}$ -in. clearance hole was first made at the centre of these members and two ordinary  $1\frac{1}{2}$ -in. cast iron gas-flanges (obtainable from



The cradle, of 1-in. duralumin tube, for carrying the beam elements.

any good ironmonger) were bolted on to the cross pieces so that the holes lined up. The vertical  $1\frac{1}{2}$ -in. heavy-gauge tube was slid into position through these flanges before any of the fixing bolts were tightened down, and when completed the whole assembly was found to be perfectly rigid and of great strength.

### Mounting

The method used to fix such an array to a mast or tower is largely a matter of personal choice. The beam at this station will eventually be rotated by a small motor and a reduction gear chain which is at present in course of construction—once again simplicity will be the key note. The vertical shaft supporting the structure here is fixed to a stout 35-ft. pole by ordinary plumber blocks. The bearings in these blocks take a  $1\frac{1}{2}$ -in. diameter shaft, and although ball-races are the ideal, no trouble has been experienced to date. Though here again the individual will no doubt prefer to use his own ideas, Fig. 4 gives details of the method of mounting in this particular case.

It should be noted at this stage that the very last job before erection was carefully to examine the whole structure, and any part of the assembly which it was thought could slide or move under the strain, was secured by drilling through and inserting short self-tapping steel screws. This is most

essential where elements consist of two lengths joined together. All tie-brackets were also fixed in position by the same method.

### The Elements

The spacing and length of elements is given in Fig. 5, and these dimensions hold for any frequency in the 14 mc band; it may, however, be found that if the frequency chosen is at the HF end of the band, slight shortening may be required. Due to space considerations, the writer turned up the last 2-ft. of each of the reflector elements, and so these are actually 15-ft. 6-ins. long with a 2-ft. vertical extension of heavy-gauge wire bolted to the ends.

### Feeding

The method of feeding the system is depicted in Fig. 6. It has proved admirable, although no comparisons can be given as other methods were not tried out. The recommended spacing between the rings is  $\frac{1}{2}$ -in., but it has been found that this is not critical, and the array will load up very well when the spacing is as much as 1-in. A transmission line of about 465 ohms characteristic impedance should be used, and this is connected directly to the open end of the primary stub. The feed system should be roughly resonated before tuning the elements and any type of indicating device employed to show maximum RF in the elements when the  $160\ \mu\mu\text{F}$  condenser is slowly rotated. With the aerial taking power the elements are lined up by the following procedure:

1. With the reflector stub out of circuit and the director in the forward position (i.e. with the beam pointing at the field strength indicator) tune the director stub for maximum reading by sliding the shorting bar.
2. Rotate the beam through 180 deg.—connect the shorting bar in reflector stub.
3. Apply power and tune the reflector stub for minimum reading on field strength meter.
4. As a final check rotate again through 180 deg. and again check the

All material is 1" x 20 gauge tubing except the element supports A, B, C which are heavy gauge tube. The cross struts should be bolted together at X & Y

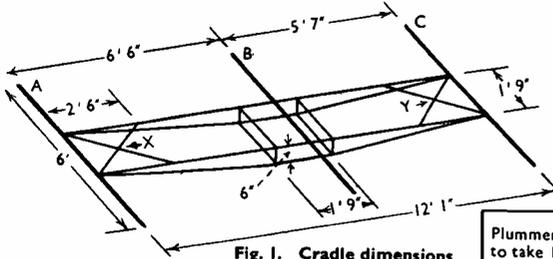


Fig. 1. Cradle dimensions

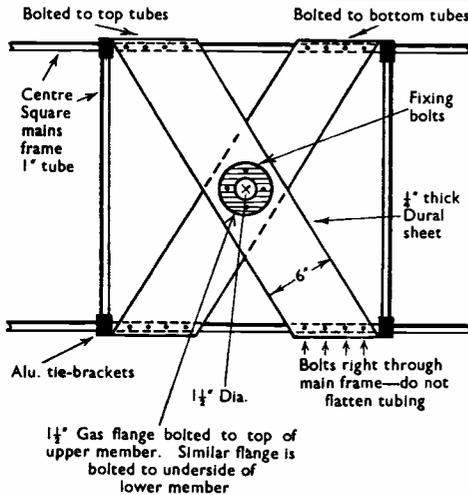


Fig. 3. Method of mounting gas flanges to take vertical support

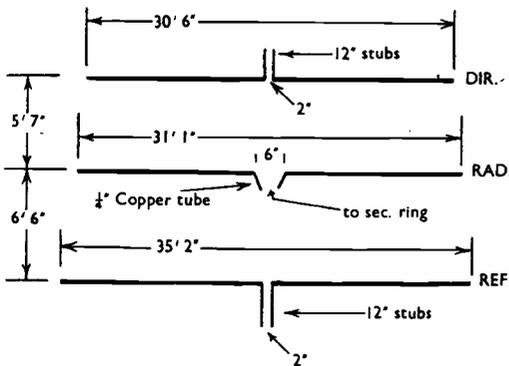


Fig. 5. Element lengths & spacing.

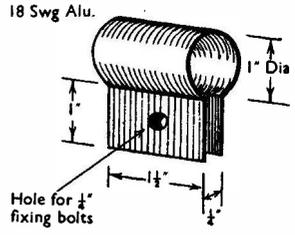


Fig. 2. Aluminium tie-bracket

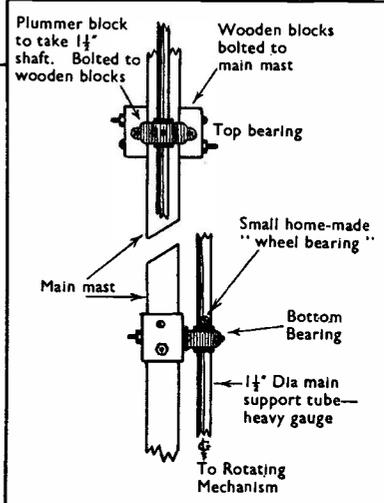


Fig. 4. Support bearings

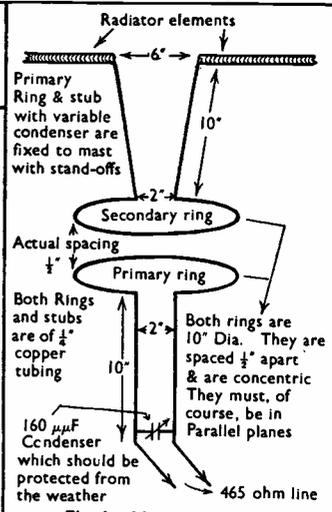


Fig. 6. Method of feeding

forward reading by a further slight adjustment of director stubs.

In many cases this procedure will have to be carried out with the beam fairly near the ground, but of course if it can be done in the raised position, so much the better. However, the tuning does not seem to be greatly affected when the beam is raised if the method given is used.

### Line Matching

Finally, the transmission line should be matched into the inducto-stub system. The condenser should be rotated to any position giving minimum standing waves on the line, and any of the usual methods may be used to check this. One way would be to replace the shorting stubs of, say, the director, by a thermo-ammeter and tune for maximum reading.

It is quite easy to calculate the current which *should* appear in the transmission line, but this will mean assessing the power output of the Tx.

Using the formula:—

$$\text{Power} = I^2 R, \text{ then } I \text{ may be obtained}$$

$$\text{Power} = \text{Tx output in watts}$$

$R$  = the characteristic impedance of the line into which the Tx is looking, i.e. 465 ohms.

An output power of 90 watts with the same feeder suggested will give a line current of .44 amps. The transmission line may be coupled to the final tank by a simple link of 2 or 3 turns.

All initial tuning or lining up was done here with the array about 12-ft. from the ground and supported by the centre tube which was guyed for the operation. During this time it was subjected to the very high winds prevalent during March/April, and it came through them without suffering in any way.

The writer has been amply repaid for all his trouble by the results so far obtained, although at the time of writing no rotating mechanism is in use. Many new countries have been worked, and it is already obvious, over quite a short period of operating, that it will now be really possible to "go places and do things!"

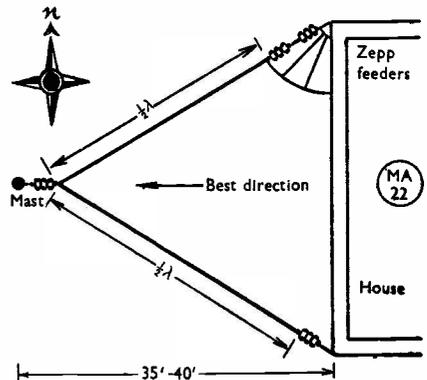
## Overcoming Site Restrictions

Idea for an Omni-Directional Aerial

By H. BRABROOK (G6BB)

ONE of the most difficult locations met by the writer was one which permitted the erection of only some 35 ft. of wire in an east-west direction. It was desired to secure complete DX coverage on 14 mc but, as was expected, a dipole made contacts even with east coast U.S.A. districts obtainable only under good conditions.

Many different aerials were tried—some conventional, others queer—but by far the best was the "array" illustrated. For



General arrangement of G6BB's omni-directional aerial for a restricted location. It is worth trying if space is limited.

proper phasing, feeding at the apex seemed desirable, but no results could be obtained in that way. Later, a quarter-wave phasing stub was added at this point, but once again all calls drew blank. As shown, however, results were good.

All necessary details are included in the diagram, and it is hoped that others who are in a similar location will find the design a good one for all-round DX. In 1939, with a 6L6 tritret running at only 8 watts input, WAC was easily secured, and the number of U.S.A. contacts, embracing all districts, proved that low angle end-fire radiation was present in good measure.

# Combined Monitor/Break-In Unit

CW Monitoring and BK Operation without Relays

By R. A. DELAHUNT (G4QD)

*(This extremely ingenious but simple arrangement is in effect a side-tone keyer and break-in control unit in combination. Though it does not permit of listening on the actual signal transmitted, as in the case of a heterodyne monitor, it produces an audible tone which follows the keying while providing BK reception, irrespective of the frequencies to which transmitter and receiver are tuned.—Ed.)*

IT has long been felt by the writer that a device to enable both the hearing of one's own CW signals from an audio oscillator and, during the spaces between the keying, any "break-in" signals from the station being worked, would be a considerable asset to any amateur station.

With this idea in mind, a CW monitor with facilities for break-in operation was constructed and now occupies a prominent place in this station.

## Circuit Details

The monitor consists of five distinct circuits, namely (1) RF Input, (2) Rectifier, (3) RF Filter, (4) Audio oscillator and (5) Audio mixing amplifier circuits.

The RF energy originates from the final tank coil of the transmitter. It is transferred by erecting a small rod about 4 inches long close to the PA coil and connecting it in series with the fixed condenser C1 and the strapped anodes of the 6H6, V1. This condenser C1 is quite critical as to value and the best was found to be .001  $\mu$ F. The distance between the rod and the PA coil is adjusted until sufficient RF energy is available. Once the optimum position is established, the rod can be bolted into place on the transmitter chassis.

The RF input could also be obtained from the aerial feeders by running a length of wire, say 2 feet, parallel to the feeders, the distance being varied until sufficient RF energy is transferred. It was found here that the former method gave the better results; but the problem of providing effective RF input to the monitor unit affords ample scope for experiment.

## Rectifier

This circuit consists of a 6H6 (V1) in a half-wave rectifier circuit. The induced RF energy from the transmitter is applied to the anodes of the 6H6 and as rectification takes place DC voltage will be present across the resistor R1. The anode end of

the resistor will be negative and the cathode end will be positive. This DC voltage will vary proportionally to the applied RF and thus when there is RF energy there will be DC voltage and when there is no RF across V1, no DC voltage. Then, with "key-down," RF energy is generated and hence DC voltage; with "key-up," no RF is produced and hence no DC voltage. This then constitutes the "make-and-break" of the circuit.

To obviate any further RF break-through, a filter circuit is arranged consisting of an RF choke (2.5 mH, pie-wound type) and a .001  $\mu$ F condenser.

## Audio Oscillator

As explained, DC voltage appears across resistor R1 during "key-down" periods. This DC voltage is used as the supply to the anode of the 6C5 (V2) as audio oscillator and by virtue of the polarity of the rectifier circuit it is obtained from the cathode side of the resistor R1. This stage is purely an audio oscillator such as is used for Morse practice.

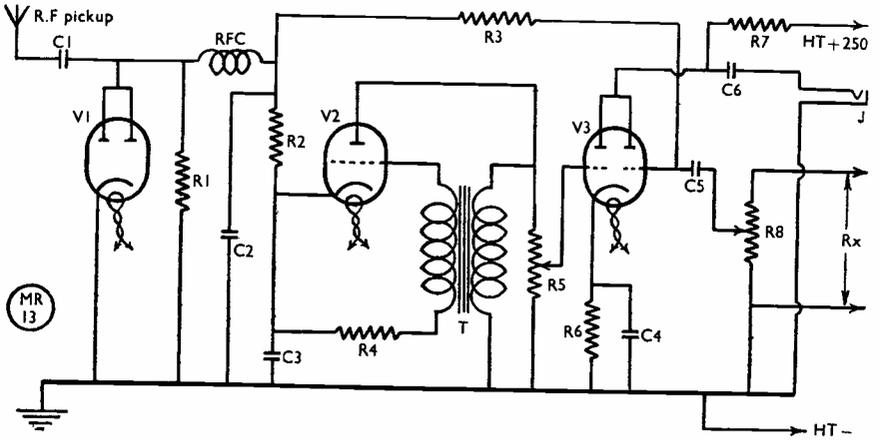
The "make-and-break" is effected by the DC voltage available to the 6C5 anode in the "key-down" position and no DC voltage during "key-up" periods. The transformer used is of the ordinary inter-stage type of 1 : 1 or 2 : 1 ratio.

## Audio Mixing Amplifier

This stage consists of a 6N7 (V3) as an audio mixer amplifier. The input from the audio oscillator is fed through a 500,000-ohm potentiometer R5 to the grid of the 6N7, and the input from the receiver is fed through another 500,000-ohm potentiometer R8 to the other grid of the 6N7. The anodes of the 6N7 are strapped together and the common output taken from the jack J.

## General

It can be seen, however, that some form of receiver "muting" must be used to



Circuit of monitor/break-in unit devised by G4QD. The transmitter provides the energising voltage, rectified by V1 and appearing as DC across R1. This is then used in the manner described in the text.

prevent the signals from the receiver being heard whilst keying. After trying a relay with some success and muting the grid to earth on the RF stages of the receiver a further idea was considered. The DC potential available was applied through a grid-stopper resistor of 100,000 ohms R3 to the grid of the second half of the 6N7.

Thus, in the "key-down" position the audio tone is on the 'phones and the signal input from the receiver is blocked by the excess DC potential applied to the 6N7 grid.

With the key up the signal from the receiver is heard in the output and of course nothing from the transmitter.

It will be found that the best position for operation is when the induced RF energy produces a DC potential of about 60 volts across the resistor R1.

The 250 volts needed for the anodes of the 6N7 could be obtained from the receiver power pack, or if it was decided to have a completely self-contained unit, a small power pack delivering 250 volts at 10 mA could easily be built on the same chassis. Such an arrangement has been

**Table of Values**

**Monitor Break-In Unit**

- C1, C2 = .001  $\mu$ F
- C3, C6 = 0.1  $\mu$ F
- C4 = 10  $\mu$ F
- C5 = .01  $\mu$ F
- R1, R4 = 50,000 ohms
- R2 = 20,000 ohms
- R3 = 100,000 ohms
- R5, R8 = 500,000-ohm potentiometers
- R6 = 1,700 ohms
- R7 = 10,000 ohms
- RFC = 2.5 mH RF choke
- T = Inter-stage transformer (up to 5 : 1)
- V1, V2, V3 : 6H6, 6C5, 6N7 respectively

described has more than repaid the time and expense on its construction and will be found invaluable in checking irregular operation of the transmitter as well as affording break-in operation without expensive relays.

**VARIABLE INDUCTANCE TUNING**

In the VHF field, the move is towards varying inductance rather than capacity to obtain tuning range. In a particular model, three inductances wound on ceramic forms are ganged and screened; they are rotatable on a shaft passing

through each. Engaging with one turn of each coil is a contact which slides in a groove as the coil turret is rotated, the contact being pushed along the groove by the spiral action of the coil winding.

# Frequency Halving Circuit

Using the Pierce Oscillator below the Fundamental

By O. J. RUSSELL, B.Sc., A.Inst.P. (G3B.HJ)

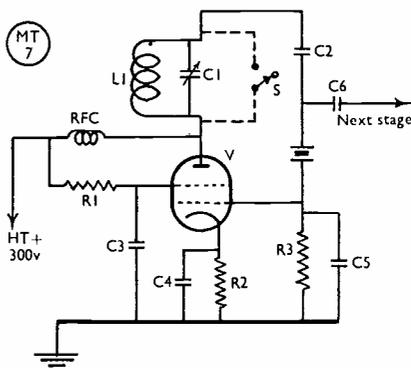
THE circuit described here provides a simple means of obtaining transmitter output on half the normal crystal fundamental frequency. It is often that the need arises for operation in a band for which one has no crystals. Even if a VFO is in normal use, it may be desired to work on, say, the top band, when the VFO operates in the 80-metre band, as a case in point. If a 3.5 mc crystal is available, then this circuit gives the possibility of 1.7 mc operation with it. Those who have crystals of limited use on their fundamental and harmonic frequencies will be able in many cases to obtain at half-frequency output useful spots in the desired band. For example, with so many 40-metre crystals now submerged under the BBC it is possible to become CC on 80 metres.

The writer's 5-metre crystal with 7,386 kc fundamental provides him in this circuit with a useful frequency in the 80-metre 'phone band at 3,693 kc. It was in fact the need for 3.5 mc operation with only 7 mc crystals available that led to experimentation with the circuit shown. If the oscillator is tuned up in accordance with the procedure outlined, it will be found a simple matter to "frequency halve" without difficulty.

## Circuit

The circuit is shown in the accompanying diagram. It is almost identical with the popular "Two Valve Job," originally described by G6KR in the August, 1946, issue of the *Short Wave Magazine* with further details in the October, 1946, and May, 1947, issues. The only addition is the tuned circuit L1C1, inserted in series with the crystal. Normal Pierce oscillator operation is obtained by shorting out this tuned circuit by a switch. The artifice of bending one of the moving vanes, so that with the plates fully meshed the bent plate contacts the moving vanes, thus eliminating the need for a switch, has been found a useful and reliable method. It must be realised, however, that in this circuit both sides of the condenser are "hot" with RF, not to mention high tension, and it should therefore be mounted on a bracket, and controlled by a short extension spindle or flexible coupler.

The coil L1 is not required to handle a large amount of RF power and can be wound on a short length of cardboard tube, or if desired on a standard plug-in receiving type 1½-in. former. The only point to watch is to make sure that it is possible comfortably to tune to the desired frequency, i.e. half the actual crystal frequency, on the circuit L1C1. This may readily be checked by shorting out the crystal, when the oscillator becomes self-



The circuit is the Pierce oscillator with L1/C1 in series with the crystal. As the latter is subjected to considerable electrical strain under these conditions, the plate voltage should not exceed 300. Switch S can be obtained by bending one vane of the condenser so as to make contact with a fixed plate when in the maximum-capacity position.

## Table of Values

### Frequency Halving Circuit

C1	= 160 $\mu$ F
C2	= .01 $\mu$ F
C3, C4	= .001 $\mu$ F
C5	= 100 $\mu$ F
C6	= 50 $\mu$ F
R1	= 20,000 ohms
R2	= 200 ohms
R3	= 100,000 ohms
V	= 6V6
L1	= 1.7 mc : 40 turns on 1½-in. former
	= 3.5 mc : 20 turns on 1½-in. former

excited. The unstable self-excited fundamental can easily be picked up on a receiver or by a coupled absorption wavemeter, and the fact that L1C1 tunes to the desired frequency checked. If the oscillating range covers the appropriate frequency band, then the oscillator can be adjusted for frequency halving. It is unnecessary even to short out the crystal to check the tuned circuit, as it will operate self-excited unless it is accidentally tuned to the half-frequency of the crystal, when it becomes crystal-controlled.

### Tuning Procedure

As the circuit is capable of self-excited operation, the following simple setting-up procedure eliminates any possibility of incorrect adjustment. First of all run the CO as a Pierce oscillator by shorting out the tuned circuit L1C1. If the reader adopts the easy method of bending a condenser vane, it is merely a matter of turning the condenser tuning control so as fully to mesh the vanes. With a crystal in the holder, press the key and locate the crystal fundamental on the receiver. Adjust the BFO to give a comfortable beat note.

The next step is to obtain half-frequency output. Rotate the condenser C1 slowly from the shorting condition, keeping the key down. As the short is removed from L1C1 by unmeshing the condenser vanes, the crystal beat note disappears until the tuning of L1C1 reaches the crystal half-frequency. At this point the crystal suddenly picks up, the beat note appearing again, and L1C1 locks in to the crystal half-frequency. This locking action is definite, and holds L1C1 to frequency over a very slight tuning range.

In practice L1C1 suddenly jumps from self-excited to crystal-controlled when its setting is still a little way from the half-crystal frequency. It is therefore a simple matter to check the operation by keying the oscillator, ensuring that the crystal beat note follows and picks up smoothly. If the receiver is now tuned to half the crystal frequency, the monitored note will be absolutely T9x, and so can be put on the air with complete confidence. Monitoring in the usual way will detect any departure from the correct "locked" operation, as should the adjustment be disturbed the note changes to a rough self-excited tone. However, if correctly adjusted the condition is stable. The use of a monitor is in any case a feature of station operation that is desirable under all conditions.

While the above oscillator, with a

following 6L6 amplifier, was originally constructed purely to meet a sudden need for 80-metre operation in a locally organised network, it was realised that by the simple expedient of shorting out L1C1, the transmitter became identical with the "Two Valve Job" described by G6KR. It was accordingly tested out with inputs ranging from 10 to 20 watts on 7 mc as well. The results were most encouraging, and served to convince the writer that even to-day excessive power is not necessary for useful work on 40 metres. With the set-up as described a QSY from 3.5 to 7 mc was purely a matter of a rapid twist of C1 fully to mesh and short the vanes, occupying a fraction of a second!

For those who have constructed 6KR's original version, the idea of frequency halving is offered in the hope that it may be of assistance where it is required to operate upon a lower frequency band without purchasing additional crystals, or to make some use of crystals unusable on their fundamentals.

As a small receiving type variable condenser and a coil are readily available, if you are in the same fix give it a trial! Incidentally, perhaps it is well to refer those starting from scratch to the articles by G6KR, and to point out that it is advisable not to exceed the figure of 300 volts on the oscillator. It is possible to use more, but 300 is a safe maximum.

### QSL BUREAU

Cards are held for the G's listed here, whose full addresses we do not know. If you feature in the list, please send a stamped addressed envelope of a suitable size, with your name and call sign, to BCM/QSL, London, W.C.1. Cards will be forwarded on the next clearance.

G2APP, 2AUF, 2AXN, 2BJF, 2DBW, 2DLX, 2DOJ, 2FFX, 2HAV, 2HCA, 2HN, 3ACP, 3ADD, 3ADK, 3AEF, 3AGC, 3AGV, 3AGY, 3AHH, 3AJF, 3AJL, 3AMC, 3AP, 3APV, 3AWK, 3AXC, 3AXT, 3AYT, 3AZE, 3AZS, 3BBJ, 3BCM, 3BDN, 3BFN, 3BJJ, 3BLO, 3BLR, 3BMJ/VS7, 3BMO, 3BNQ, 3BQB, 3BQJ, 3BRE, 3BRT, 3BTS, 3BTV, 3BUD, 3BUE, 3BYR, 3BZK, 3BZU, 3FBC, 3FW, 3GG, 3OD, 3WH, 4IS, 4MX, 5BS, 5PS, 6PQ, 6PW, 6SB, 6SP, 6SQ, 8CJ, 8MM, 8WB, G14QY, 5UW, GM2DRD, 3BCI, 3KD, GW3AZQ, 5BX.

# The EF50 TRF Receiver

Last Words

By J. HUM (G5UM)

(In view of the continuing interest in this design and the large number of enquiries still coming in concerning it, we are reproducing the original circuit diagram and coil data with the notes appearing below. It is hoped that this, with the additional information in "First Steps on Five" in November, and the article "More on the EF50 Receiver" in December, will finally satisfy all enquiries!—Ed.)

THE "All EF50 TRF Receiver," described in the August, 1946, issue of the *Short Wave Magazine*, continues to interest many readers.

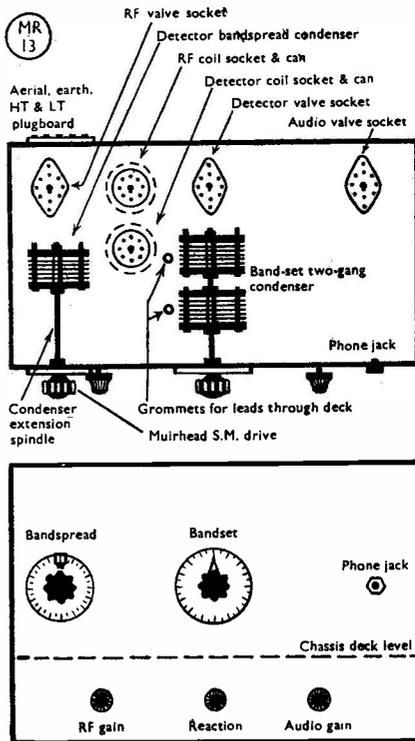
Most of the enquirers are those who, having heard about the receiver from other amateurs, are anxious to build it themselves but are unable to do so by reason of the fact that the August issue of the *Short Wave Magazine* has long been out of print. The writer's file copy of that issue is now so tattered and torn through its journeyings on loan to many of those enquirers that he refuses to part with it any more! However, it is hoped that the circuit diagram repeated here will meet what is evidently a "long felt want."

Queries continue to arise about the value of the anode decoupling resistor to the RF valve, not given in the original drawing. This is not at all critical and may be anything between 10,000 and 30,000 ohms. Nor need the RF cathode bias resistor be of the low value originally specified if constructors feel safer by putting the more usual value of 300 ohms in that position. The writer now has a 300-ohm resistor there himself, resulting in a slightly smoother gradation of RF gain when the screen voltage control is varied.

### Constructional Points

Numerous enquirers, informing the writer that they are beginners at radio, request full constructional details of the receiver and ask particularly for the best layout to be employed. This is practically an impossible question to answer without going into full-scale blue-print details—and that it is unfortunately not possible to do. In any case, a certain standard of knowledge is a pre-requisite, and it has been assumed that most readers of the *Magazine* are experimenters who can work these things out for themselves. However, as a matter of interest a plan is given herewith

of the top-chassis layout of the original receiver. The RF section, as can be seen, has been arranged to permit leads to be as short as possible. A front panel drawing is also included.



Sketches showing suggested general layout for the receiver. So long as the principles of the electrical design are understood, the mechanical arrangement is a matter of individual choice.

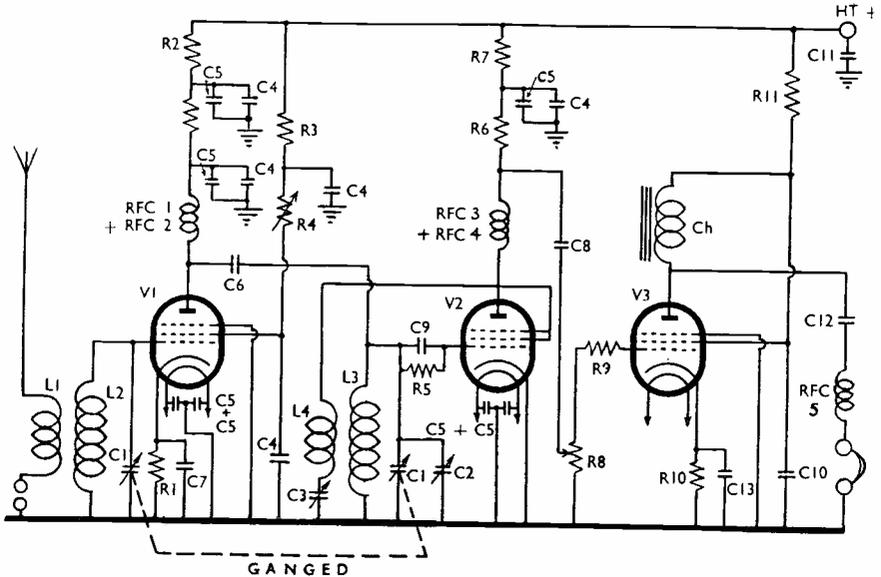


Fig. 2. Circuit of GSUM's straight receiver, fully discussed in the text. The use of the high-gain EF-50's, in a standard circuit with some refinements, ensures much improved performance over a similar receiver using ordinary valves. The form of construction adopted is a matter of taste, but a metal chassis and cabinet are desirable. Note that all components having the same values are numbered similarly. The value of the V1 anode resistor, under R2, can be as for R2 or up to 30,000 ohms.

Frequency Coverage	COIL DATA					SWG Gauge
	L1	L2	L3	L4		
15-32 mc ..	2½	3	3	2	18	
7-15 mc ..	3	6	6	3	18	
3-8 mc ..	10	20	20	10	30	
1.6-3 mc ..	10	45	45	10	30	

Note:—All coils close wound on 1½ in. formers, ¼ in. between windings.

Table of Values

- C1 = 150 μF variable gang band-setter.
- C2 = 20 μF variable bandsread.
- C3 = 75 μF variable regeneration.
- C4 = .05 μF decoupling.
- C5 = .001 μF decoupling.
- C6 = 20 μF coupling RF to detector.
- C7 = .001 μF cathode by-pass.
- C8 = .25 μF coupling detector to audio.
- C9 = 100 μF grid condenser.
- C10 = .25 μF screen decoupling.

- C11 = 2 μF HT decoupling.
  - C12 = .04 μF audio output condenser.
  - C13 = 25 μF audio by-pass electrolytic condenser.
  - R1 = 300 ohm RF cathode bias resistor (see text).
  - R2 = 10,000 ohm RF anode decoupling.
  - R3 = 50,000 ohm RF screen decoupling.
  - R4 = 50,000 ohm gain control.
  - R5 = 2 megohm detector grid leak.
  - R6 = 25,000 ohm detector anode load.
  - R7 = 50,000 ohm detector anode decoupling.
  - R8 = .5 megohm audio gain control.
  - R9 = 5,000 ohm audio grid stopper.
  - R10 = 300 ohm audio cathode bias.
  - R11 = 10,000 ohm audio anode decoupling.
- RFC1 RFC3 } Short-wave choke in series with 200 turns  
 + RFC2 RFC4 } scramble wound on  
 + } IMO resistor or similar  
 + } suitable former  
 + } about ¼ in. diameter.  
 RFC5 } As RFC2, 4.  
 Ch. } Small audio choke, value not critical.

Unless the constructor has had some experience in handling high-slope television pentodes of the EF50 type he would be advised to go cautiously when building a set of this description. It is strongly recommended that the receiver be "built backwards," commencing with the audio stage and proceeding next with the detector stage. When those two have been got working and thoroughly tamed the RF stage can be added.

The coil data given are approximate and will vary according to the layout employed in each individual receiver. It is desirable to wind the coils slightly too large and then to trim them down until the amateur bands appear on a convenient position of the bandspread scale. Needless to say, each of the coils for any frequency range must be identical if ganging is to hold—though minor variations can be taken up by a small trimmer across each of them.

#### VHF Working

If all leads are kept short a high maximum working frequency can be achieved with the "All EF50 TRF Receiver." Using a single-turn coil the writer's version goes up to 80 mc or higher. For 5-metre work the inductances comprise 4 turns of 14-gauge solid copper wire, with a single turn for reaction, all half-an-inch in diameter, close-spaced, with "banana-split" pins soldered to their ends for insertion in the 5-pin valve socket coil holders.

Further details on the subject of operating the receiver on 58 mc will be found in the November, 1946, issue of the *Magazine* in the writer's article "First Steps on Five." Two points have arisen since that was written which may be of interest.

The first was that an attempt was made to employ the EC52 VHF triode as a detector in place of the EF50. No advantage at 60 mc could be discerned—though that is a low frequency to the EC52, so perhaps no advantage was to be expected anyway. But two other factors persuaded the writer to revert to the triode-connected EF50 in preference to the EC52, namely that regeneration was much fiercer and hum pick-up was appreciable on the EC52 (which, of course, has an unscreened bulb). These factors may, of course, have arisen solely on account of peculiarities of layout in the writer's receiver, and a little juggling of component positions and values would doubtless have tamed the EC52, which as local oscillator in a VHF superhet is probably unsurpassed.

The second point referred to above was the remarkable improvement in performance at 5 metres that occurred when a neon stabiliser was installed. Minute fluctuations on an unstabilised power supply can cause signal flutter in a reacting detector at 60 mc. With neon-stabilising all signals are rendered as steady at 60 mc as at 1.7 mc, and residual traces of mains hum are finally removed.

It is hoped to go into the whole subject of neon stabilisers at a later date.

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#### FIRST CLASS OPERATORS' CLUB

The Letter Budget has been started and is reported to have swollen to gigantic proportions in the course of its travels. G2ZC still finds it necessary to put round his Circular Letters, which discuss those matters relating particularly to the management of the Club.

Two Contests have been arranged. A members' only affair starts on August 1, and another—open to the general public—on November 1, 8 and 15; further details regarding this will appear later.

Club periods are now 1200-1330 on Sundays and 2000-2200 DST on Wednesdays. The Club wave remains the 3500-

3635 kc section of the 80-metre band, and another period on 1.7 mc is under review.

In accordance with the Rules, the following have been elected to membership:

H. E. James, G5JM (Southall, Middlesex); C. T. Wakeman, G4FN (Westcliff-on-Sea, Essex).

All applications for membership and correspondence regarding the F.O.C. should be addressed to the Hon. Secretary, Capt. A. M. H. Fergus, G2ZC, 89 West Street, Farnham, Surrey (Tel.: *Farnham Surrey* 6067).

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*Mention the Magazine when writing to Advertisers—It Helps You,  
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# Muting the AR88

## Control System Protecting the Receiver

Devised By N. P. SPOONER (G2NS)

From advertisements appearing in this *Magazine* and elsewhere during the past six months it would seem that, like many other war-time productions, quite a number of AR88's are now passing into amateur possession. Not every communications receiver lends itself readily to break-in muting and even with those that can be adapted there is usually the expense and complication of additional components and circuits.

The AR88, however, is a notable exception and while many ex-Servicemen are fully acquainted with its features the suggestions put forward here by an operator who handled these excellent sets during the war may be of interest, and a help not only to present and future owners but also to readers who have not yet met this receiver.

### The Muting Circuit

Amongst the terminals at the rear will be found one intended for diversity reception which, in amateur hands, would normally remain idle. If as an experiment the positive of an HT battery is connected to receiver chassis and a lead from about 50 volts negative is touched on this terminal, the receiver is immediately muted through the grid-blocking of all valves along the AVC line. Better still, the return to full sensitivity occurs directly the external negative bias is removed.

Here then is an excellent and very simple way of obtaining the full benefits of CW break-in working and push-to-talk telephony if at the same time the aerial terminals ("A" and centre unmarked one) are shorted across.

The two operations of biasing and aerial shorting can be simultaneously accomplished by one relay that will work off some such source as an old LT charger. To actuate this relay in conjunction with the transmitter a pair of auxiliary contacts should be fitted to the key. While the main key contacts, either directly or *via* a keying relay, are concerning themselves with, say, the grid-blocking of the CO or the keying of a VFO, the auxiliary contacts added to the key are controlling the receiver muting relay. For push-to-talk the key can either be held down while speaking or a push-

button can be wired across it to give the same result.

### Operation of the Relay

Should a relay, preferably slugged for slow release similar to the popular Type 3,000, be unobtainable then the muting relay can quite well be made from an old car cut-out\*. The required contacts are "make" (single-pole single-throw; contacts close when relay is energised) for applying and removing the external bias, and change-over (double-pole double-throw; moving spring breaks from one contact before making on the other when the relay is energised) for swinging the aerial terminals. A and centre unmarked one on the receiver, between a separate receiving doublet and a shorting link. In the de-energised position the bias is removed and the aerial terminals are connected to the receiving aerial.

The circuit diagram shows the extreme simplicity of the whole scheme, nothing whatever in the receiver itself being touched.

An additional advantage is provided by two other terminals intended for controlling a transmitter HT switching relay. This functions when the front panel send-receive switch is moved to "Transmit," which at the same time also switches off receiver HT but leaves the filaments running. By wiring an on-off toggle switch across these two terminals the transmitter HT can, for break-in working, be thus kept on in readiness for the application of drive by keying, while the receiver can be also kept running if the send-receive switch is left in the "Receive Mod" or "Receive CW" position, the latter automatically bringing in the BFO.

For checking, the output of a CW monitor can be fed into one side of a 1-to-1 transformer, the other side being connected to headphones and receiver output; this not only gives one the distant breaking-in signal besides one's own keying but it also obviates an extra relay for swinging the headphones between receiver and monitor.

### Break-In

For break-in working a separate receiving aerial has been mentioned in order to avoid an aerial change-over relay capable of following one's keying. If, however, the advantages of any directional or beaming properties possessed by the transmitting aerial are desired for recep-

\* (See the author's article on p. 693 of the January issue.—Ed.)

tion also these can still be had during ordinary "over-to-you" communication. An aerial change-over relay will still be needed, but it can be of simple construction as it is only operated at the start and finish of listening and sending periods. In such a case the transmitting aerial should be connected, *via* the change-over relay, close up to the receiver aerial terminals and in parallel with the separate receiving aerial (used only during break-in working).

In conclusion, another feature of the receiver may be mentioned—the protection of the aerial coil primaries by a gas-gap valve that breaks down under an applied potential of about 50 volts RMS. In view of the present-day difficulties of obtaining genuine American spares and replacements there is certainly no harm in employing one suggested function of the muting relay during ordinary change-over working as apart from break-in operation—that of shorting the aerial terminals without the application of bias. Many amateurs will, because of the thorough shielding of the AR88, pronounce this measure to be totally unnecessary. But it can again be pointed out that with normal change-over working the filaments are still running with the HT off, so that the additional kindness of cutting the aerial input is all to the good with a receiver so worthy of considerate handling.

**ERROR CREP' IN DEPARTMENT**

We have managed to avoid this sort of thing for several months now, but a few sticky ones got into G2DVY's article—"Noise Limiter for the HRO"—on pp. 218 and 219 of the June issue.

In Fig. 1 the AVC off-line should go to the diode end of the 6B7. In Fig. 2, S1 should be directly across the 6H6 (anode to cathode) and C2 connected as shown in Fig. 1. The un-numbered resistor from the cathode of the 6H6 in Fig. 2 is R7.

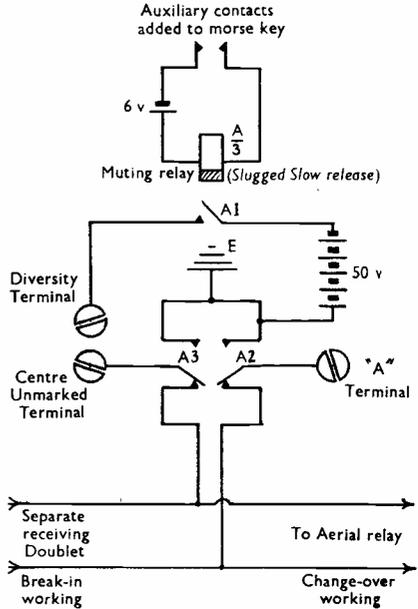
Sorry about these—they were avoidable mistakes and in the circumstances should not have passed unnoticed.

Incidentally, in case anyone has wondered what the letter-number combinations mean now appearing in small circles on our drawings, they are solely for internal reference purposes and are of no significance to anyone but ourselves. We sometimes make mistakes with them, too!

★ ★ ★

**FIRST LICENSED ?**

WIZE, Mattapoissett, Mass., U.S.A., claims to be the first licensed amateur in America. His card is dated 1901.



The arrangement worked out by G2NS for muting the AR-88 and shorting the aerial input terminals while keying. See text for discussion.

**DX MAP**

Have you ordered your copy of the wall-mounting version of the Great Circle DX Zone Map described in the May issue? It gives all the information required on the Zones, and beam alignments, times and distances with London as the centre. All these values are applicable to the whole of the British Isles. The price of the Map is 3s. 9d. post free, size 21-ins. by 35-ins. for wall mounting.

**"PRINCIPLES OF SHORT WAVE RECEPTION"**

This is a 32-page booklet consisting of receiver articles reprinted from early post-war and some pre-war issues of the *Short Wave Magazine*. Divided into four chapters, a great deal of practical data is given covering the design and construction of receivers and converters for all wave ranges down to 5 metres. Price 1s. 8d. post free from us at 49 Victoria Street, London, S.W.1.

# DX COMMENTARY

## ON CALLS HEARD, WORKED & QSL'd

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

We used to think there was a closed season for DX ! And by rights we should just about be in it now. But either something has happened to the sunspot generator, or else receivers, transmitters and aerial systems have improved considerably, because we see no sign whatever of a slackening off in real DX working.

Everyone seems to have managed to find some choice piece or other during the month of June (barring your commentator, who has been too busy to get on the air, except at times when UA and SM were the high-spots !)

Take one look at the WAZ listing, and you will see that the DX fraternity have been doing their stuff in no mean way. From four thirty-niners the number has now risen to eight ; the thirty-eighters total the same figure ; and in that "All-Time Zones" column you will even see a 40. Very fine work all round, and when CQ amalgamates this list with its own, the G's will really have given the W's something to think about. On current form G6ZO (London, N.20) leads the world.

G6ZO and G2PL (Wallington) continue to head the British list, and it is hard to see how anyone can ever catch them on a country basis, although it is just possible that someone else will be first to score a "40." But a special word should be put in here about G8IL (Salisbury), who, if his card from UAØKQA turns up, should be the first "all-time" WAZ to attain this height since the war. (There were only three before the war—the late G2ZQ, ON4AU and J5CC.)

G8IL worked 39 zones in the period 1937-39, and has cards for all of them, including AC4YN. UAØKQA recently gave him his fortieth, and also made his post-war total 38. G8IL has not come into the limelight before, because he has been busy working the DX ! There may well be others to whom the same thing applies.

Touching on the delicate question of UAØKQA, we should mention softly here that G5BD (Mablethorpe) has thrown a small spanner in the works by telling us that he heard the latter station working a KH6 and giving his QTH as 73°30'N.,

80°24'E., which puts him well and truly in Zone 18—in fact almost in 17. This gave us a bad half-hour until we came across a letter from G2CDI (Stokenchurch) giving UAØKAA's position as just those same figures—and we all know he is in Zone 18. So can it be that G5BD was hearing UAØKAA ? At all events, 'KAA's QTH is Dickson Island (north of the Yenisei Delta) and 'KQA's is Tiksi Bay, Lena Delta. We have looked up the latter spot and make the position roughly 73°N., 128°E., which is a very different story. Let us hope we can announce next month that the spanner-in-the-works department has been closed down.

### 14 mc DX

The 14 mc band has carried the bulk of the DX traffic, as usual, although 28 mc is far from dead (we picked out a new one ourselves there, to wit ZD2K). But 14 has been really exciting, what with VR6AA, ZD6DT, VK9BI, MX3PA, VR5PL, CR6AI and UL7BS (all worked by G6ZO). And, by way of a small thrill, the Isle of Man now calls itself GD and becomes another country once more. Jim has duly obliged even in this one, with GD3BBS. But his score of 166 will stand for a while, as he is off abroad by now. No doubt we shall hear him from someone's station, if not with a portable rig of his own.

Apparently the W6RWQ/VR6 episode shook the Pitcairn Islanders to such an extent that ZL2FR, who did most of the operating, was forthwith given the official call of VR6AA. The rest you know—he has been working G's every evening. His first G QSO was with G2PL (Wallington) and his second with G6ZO.

While talking of G2PL, Pete sends in a list just about as impressive as G6ZO's, and rather thinks he has the first G/ZD6 'phone QSO. Any claims prior to May 18 ? 'PL mentions a "record" of a different kind. He thinks he must have spent the greatest amount of time on record in trying to raise a PK4 ! His signal falls all round them—VS7, VS1, PK1, VS4 and so on—but never a PK4 comes

back: (We will gladly exchange one for a VR5 or even a KS4.)

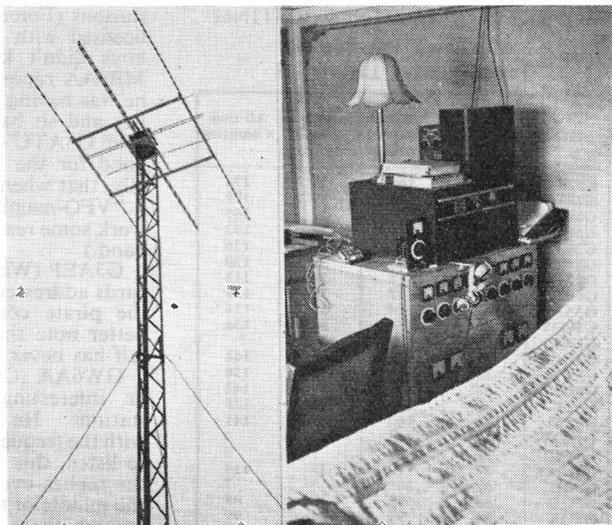
G8IL (Salisbury) has worked EP1AL, ZD1KR CR7AD, ZS3F, KS4AC, W3EKK/VK9, VK4NK (Papua) and PK4HB recently. He also seems to have collected just about all the Russian prefixes, and, to show his versatility, has achieved WAS post-war on 28 mc 'phone. He has cards from all States except Nebraska.

G5WM (Blackpool) is ex-SUIWM, and his score of 39Z, 12OC has been attained since last October on 14 mc CW only. G8KP (Wakefield) says he has not been on much, so has only managed to work things like VQ2JC, CR7AL, HP4Q, MD5AA, CM2CT, TF3EA, VE8NA, ZK1AB, OA4AK and some WØ's and 7's for both all-time and post-war WAS! We should like to see some of these boys in action when they really have some spare time.

G6BB (Streatham) repeats our former plea for adoption of QTHR, meaning "My QTH OK in book." It used to be QRAR, if you remember, which reminds us that a good friend of ours once actually received a card addressed to "Mr. Q. R. A. Okinbuk." Well, this same Mr. Q. R. A. Okinbuk has suddenly come to life again, not as an active transmitter, but as a far-from-passive listener. We thought we knew how to be rude, but you should hear the things he says about some of the offenders with spitch, VFO's, bad notes and sloppy sending. Ill-mannered VFO's he has aptly dubbed "Spivs of the Air," and we can hardly add to that. So when you hear or read in print the phrase "The Spivs got him" you will know just what we mean.

Reverting to G6BB (who, we hasten to add, was not connected with the preceding paragraph in any way but for his suggestion about QTHR), he mentions that he has worked ZC4PD, LI2JC, MD5AK, HZ2AC CIAN, YL5CO (who's he, 'BB?), all on 14 mc.

G2CDI (Stokenchurch) has pulled up to 39 zones with the help of UAØKAA in



When G4NT, Princes Risborough, Bucks, was laid up for some weeks recently, he improved his total of countries worked on 28 mc by installing the gear beside his bed

Zone 18, and put his country total up considerably by touring the USSR on CW. He also raised VR6AA. CDI suggests that the honour of the low-power fellows should be upheld by starring those in the WAZ Listing who have used 25 watts only throughout. We will think seriously of this one if those who qualify will duly certify the same. CDI is bound for Barbados shortly and hopes eventually to settle there; meanwhile he will probably be heard from a VP6 station. For the benefit of the large number of amateurs using the RAF Oscillator Units Type 145 as VFO's, he mentions that if one keys the buffer instead of using the FVO screen keying as provided, there is no difficulty in collecting T9x reports.

G8QX (Malvern) is not worried about AC4YN, having worked C8KY and C8YR, both in Zone 23. G2VV (Hamp-ton), using yet another aerial (see last month), has collected KL7BH, NY4LM, EK1TF, UD6AA, CX4CZ and a lot of the more commonplace DX. As he remarks, conditions on 14 are rather poor after midnight, but when they are not, the QRM is horrible.

G3VA (Minehead) sends a beautiful list of DX QTH's, many of which appear in the panel, and makes a point when he says that his gear may be of interest as it is all "homebuilt haywire," including the

## WORKED ALL ZONES LISTING

Maximum Possible 40  
Total Prefixes Listed 215

Station	Post-war Zones Worked	Post-war Countries Worked	All-time Zones	All-time Countries
G6ZO	39	166	39	174
G2PL	39	158	39	179
G8KP	39	135	39	159
G6QB	39	130	39	152
G2CDI	39	126	39	126
G5WIM	39	120	39	120
DZKW	39	118	39	118
G6BS	39	117	39	138
G3AAK	39	114	39	114
G2WW	38	136	38	136
G2AJ	38	130	?	?
G3DO	38	127	38	141
G5YV	38	123	39	136
G8IL	38	115	40	142
G3ZI	38	107	38	115
G5RV	38	106	39	141
ON4JW	38	103	?	?
G5VU	38	?	?	?
GW3AX	37	110	37	114
G8RI	36	101	?	?
G3OD	36	98	36	98
G8QX	34	99	34	99
G2CIN	34	98	34	98
G5MR	34	74	35	87
GM2UU	33	79	36	105
G8FF	32	78	33	87
GW4CX	32	76	32	76
G3VA	31	101	31	102
G2AO	31	77	31	77

receiver. It's rather a shocking admission for us to make, but that is a rarity nowadays. We really ought to reserve the term "amateur" for stations that are entirely home-constructed in the accepted sense and think of a new name for some of the others. (Would you like to be called a "private radio station"?) VA has scored 31Z and 101C since the war.

G3AAK (Broad Hinton) is the first 3-plus-three to score 39Z. His month's DX has included C1DK, UI8AA, HH2CW, YN1HB, VS4VRA, XE1RU, OA4M and all the others!

G2HKU (Sheerness) has been on 14 mc, as a change from 40 metres, and one recent morning worked three W6's and a VK3 in a row. One of these contacts was W6BWO/6 who was using 30 watts from a tent on the beach at Santa Ana, California; on being queried about the /6, W6BWO said that it meant he was portable.

G3ATU (Sunderland) sends a nice list of DX. He has worked 18Z (including Zone 23!) and 47C in two months, with an input of 10 watts. He remarks that the spivs lessen one's faith in human nature, but adds that some people know how to use VFO's without doing that. And he mentions the great "MB9" joke. It is common knowledge now that the OE9

stations (Forces in Austria) have been relicensed with the prefix MB. The VFO boys didn't know this, of course, and MB9AA reported what a wonderful time he was having. He only had to press the key and sit back. Unfortunately he was near G3ATU's frequency, which was not good for the latter. (We find, incidentally, that when a new station comes up as a "VFO-magnet" it is extremely easy to work some really nice DX elsewhere in the band.)

G3AEP (Whittlesey) has been receiving cards addressed to G3AEP/M, and wishes the pirate concerned would put out a better note than T7, because 'AEP himself has never fallen below an 8.

GW6AA (Colwyn Bay) comes up with an interesting suggestion for the DX stations. He says that if they signed off with the frequency on which they proposed to listen, this would automatically spread the replies over some 20 kc, especially in the middle of the band, because, strangely enough, there is a lack of unanimity in the matter of calibration! As 'AA says, most people are very good at marking the band edges (they have to be) but a station signing off "AR 14100 K" would probably hear replies from 14090 to 14110 and would stand a chance of picking out a clear one. DX press please copy.

G6GH (Boston) worked W6RWQ/VR6 at 1900 GMT on May 15, which is the earliest claim in our files. Was he the first? G5SR (Harrow) contacted at 1927 GMT on May 16, and G6Z0 slightly later on the same day.

G6FU (Surbiton), who had his call extensively pirated once and therefore has a personal interest in the matter, reports hearing an S9 station signing VK2KK, ZL2KK and PK2KK. He also encloses an envelope returned from HE1B, Liechtenstein, who gave a full address but nevertheless turned out to be a phoney.

Bob Craig, our old friend of VU2AP, now has an address in Carmarthenshire and hopes to prefix it with a GW call very soon. He is anxious to contact ex-VU2HI, if the latter is in England by now?

### How to Get QSL's

An interesting letter from GW3ZV (Rhigos) tells us what we all want to know—how to ensure the follow-through after working that elusive DX. GW3ZV has received cards from over 100 countries worked during the past eleven months, so he should know. Here is his recipe: First make sure you have the full QTH, then send your card direct by air mail. Then keep on working the chap on every

possible occasion till he produces the card !

'ZV doesn't tell us how many Zones he has worked, but he claims 141 countries, running a push-push 807 doubler with 80 watts and a four-element rotary adjusted for 14100 kc. He lives on top of a 700-ft. mountain with a clear view except to the S.W. The rotary is driven by a 3-HP motor and controlled by "Left-Right-Stop" buttons in the shack. A commutator device on top of the mast actuates a meter as a bearing indicator at the operating position.

G2DY (Enfield) reports an R5 S9 *plus* contact on 14 mc 'phone with J2AAR/Airborne, in a Skymaster over Okinawa. The QSO lasted thirty minutes and the airborne operator was W1LIM. Very nice work, this. On a smaller scale, G6QB had a CW contact with FBBDO/F8NB in an aircraft over the South Atlantic. Others now report FBBDL, so maybe the habit is spreading.

G4QC (Liverpool) suggests that we extend the WAZ scheme to cover the bands separately. It is undoubtedly a good idea, but this, together with segregation of 'phone and CW, would involve such a lot of tables each month that the WAZ claims would crowd this feature right out ! But perhaps someone thinks that's also a good idea . . . .

GW3ALX (Swansea), who sent in some very useful lists of Calls Heard when he was afloat recently, is now *en route* for Montreal, and has promised to listen regularly on 1.7 mc, as well as the other bands. This should be a definite incentive to the top-band fraternity to put out some CW calls on the chance. Unfortunately 'ALX doesn't give any clue regarding times, but we imagine that 2200-midnight DST would produce some results.

G3BDQ (Hastings) is a successful member of the Windom Club, and favours the method of tapping exactly one third of the way along, using 7/22 for the aerial and 3/22 for the feeder. This, with a top



Key, old man ? Don't be shilly, old man, I'm on 'phone.

of 68 ft. 5 ins., draws well on 28, 14 and 7 mc and seems to work everything going on 14 mc—such as PK2DL, UI8AA, YU2QX, ZS1EO, W4IKC/KP4, W7KLG/J9. All this, by the way, with 25 watts or less.

Harold Owen (Tafo, Gold Coast) sends another list of Calls Heard, and he has a grouse. It's not even VFO's this time, but people who make their overs without giving their calls, or at least their prefix. And he spares a line or two for some rudery about commercials who merely occupy a chunk of one of our bands for the purpose of sending strings of dots.

G5CI (Richmond) forwards a list of DX which includes VS7IT, C3YW, KV4AA, TI2AJ, VS6AD, OY5GS, OX3GG, KH6BM, FB3AC, KA6FA and many others, all on 14 mc CW. He has also heard HS1SS in Bangkok (full QTH in list).

Arising from the comment in this space in the May issue about G6MC's TP-TG, G2OU (Derby) is another station using a straight transmitter of this type. His runs a pair of 210's bought for 4s. 6d. each. Most work is on 1.7 and 3.5 mc, but all reports have been T9. It *can* be done—but let's hope the spivs don't take

#### WORKED ALL ZONES LISTING

If you have worked 30 or more Zones, send in a claim for listing in "DX Commentary." Claims printed here will be re-published in their "WAZ Honour Roll" by our American contemporary CQ. Documentary proof is not required unless 40 Zones are claimed. See the May issue for details on how to make your claim.

## DX QTH'S

CR7AD	Luiz Rodriguez, Box 276, Lourenco Marques, Mozambique.	OQ5AS	De Mey, Box 9, Usumbura, Ruanda Urundi, Congo.
EA7A	Pedro Franco, Box 101, Cabo Yubi, Rio de Oro.	VE8MA	Yukon A.R.C., Box 268, Whitehorse, Yukon.
FL8AE	Radio FL8AE, Djibouti, French Somaliland.	VO6V	c/o TCA, Goose Bay, Labrador.
FQ3AT	Base Aerienn, Fort Lamy, Tchad, French Equatorial Africa.	VQ2BI	B. W. Isaac, Mufulira, Northern Rhodesia.
HS1SS	U.S. Military Attaché, American Embassy, Bangkok, Siam.	VS4VRA	81 Squadron, R.A.F., Labuan, British North Borneo.
J2AHA	APO 343-2, c/o P'master, San Francisco, Calif.	W6VTO/C1	Pacific Division, APO 933, c/o P'master, San Francisco.
KZ5AY	P.O. Box 75, Howard Field, Panama Canal Zone.	YN1HB	Box 272, Managua, Nicaragua.
MD5AB	Capt. Garbutt, 18 A.F. Signal Rest., M.E.L.F.	YN1HT	American Embassy, Nicaragua.
NY4AB	Box 35Q, Navy 115, c/o Fleet PO, N.Y.C.	ZA1F	Radio ZA1F, Tirana, Albania.
		ZC6DD	Postal Unit, 3 Brigade, 6 Airborne Divn., M.E.L.F.
		ZD6DT	Royal, Signals, Zomba, Nyasaland.

it up : (Come to think of it, though, it might be a good thing if some of them did—they would soon find their call-signs gone.)

G5WC (Upper Norwood) remarks sagely that after seeing some of the DX scores he doesn't think one should really make DX a life work. A writer in CQ recently apologised for his relatively low score by saying that Amateur Radio was his hobby and not a "full-time obsession."

Strange thing is, though, that most of the leading DX operators are quite content to keep it as a hobby, and many of them can talk very intelligently on subjects which have nothing to do with radio! It's all a question of knowing how to spend your time on the air to the best effect. G5WC bemoans the poor returns of Russian cards, and sends some useful QTH's.

D. Gill (Luton), ex-VS6DG, warns all concerned to beware of calls not in the

## DX FORECAST FOR JULY 1947 (ALL TIMES GMT)

	7 mc	14 mc	28 mc
<b>NORTH AMERICA :</b>			
East and Central .. .. .	0001-0600	1300-0800	Erratic
West Coast .. .. .	?	0300-0600	?
<b>CENTRAL AND SOUTH AMERICA</b>	2300-0300	2100-0800	0800-1900
<b>AFRICA :</b>			
North of Cancer .. .. .	All day	All day	0800-1700
South of Cancer .. .. .	?	1400-2100	1100-1900
<b>ASIA :</b>			
West of 75° E. .. .. .	1600-2300	0700-2200	0900-1700
East of 75° E. .. .. .	1800-2300	1000-2300	1200-1600
<b>OCEANIA :</b>			
VK, ZL, ZK, VR etc. .. .. .	?	0700-2200	1000-1300
PK, KA, KG6 etc. .. .. .	?	1200-2100	1000-1300

NOTE.—The times given above are the most likely periods during which signals may be expected from the parts of the world indicated. Under unusual conditions, signals may be heard outside these times.

sequence VS6AA-AB-AC and so on ; he has recently returned from Hong-Kong, where he says that there are many pirates and only six or seven call signs officially allotted. His own VS6DG is a pre-war call sign, not reissued and never on the air since the war. G2CBN (Southall) draws attention to the misprinting of his call as G2CBW on p. 228 of the June issue. Sorry!

### 7 mc DX

G3AAE (Bournemouth) remarks that 7 mc has usually been pretty dead recently, but in stray periods he has managed to work W1 2, 3, 4, 8, 9, VE, ZL, UJ8, UB5, UR2 and EA5 ! He has also collected FA8BG on 3.5 mc. On the subject of that band, G6ZN (Horbury) reports hearing KV4AA up there recently.

The other 7 mc specialists seem strangely quiet these days. Can it be that we have been too rude about the band ? Or is it becoming too hard to work the DX now that summer is upon us ?

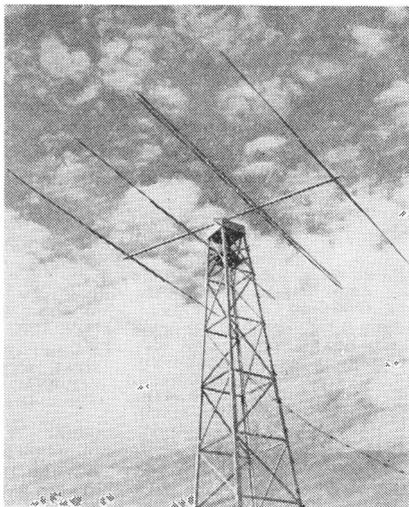
### Notice

Here is Amendment List No. 1 to the Alphabetical List of Country Prefixes given on p. 230, June, and also where applicable to the Zone Map.

For "CM9CO" read CM(CO). Add GD, Isle of Man (Zone 14), and ZD6. In Zone 2, add Labrador with prefix VO6. In Zone 5, add note "VO6's not in Labrador." In Zone 35, delete prefix ZD4 for Ivory Coast. For OE read OE (MB).

### 21 mc ?

We view the fairly rosy prospect of a band at 21 mc with considerable favour. Such a band should be lively when 28 mc has gone dead, and when the MUF is around 20-21 mc the new band should be much better than 14 mc. At the moment it looks as though we might get it. Then for the rush on frequency-treblers and multi-band aerials ! A 67-ft. top will be a useful thing, being three half-waves



Remotely operated rotary beam at VE3HC, Guelph, Ontario.

long, but it will *not* be very nice with a Window feeder a third of the way along ! And so saying, we must leave you and go and buy some wire.

Deadline for next month is July 18, *certain*. WAZ claims well before that if possible. Thanks and acknowledgments to all correspondents, and Keep Chasing !

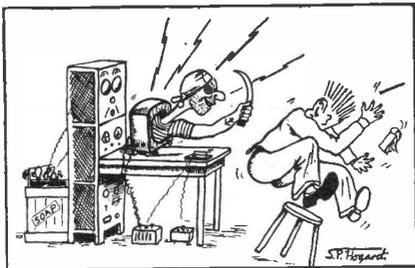
### Stop Press

G6ZO has just worked EA7A, Rio de Oro (14115 kc), and G6QB raised FQ3AT (French Equatorial Africa—same frequency). Both QTH's are in the panel.

### SUBSCRIPTIONS AND RENEWALS

Direct subscriptions, at 20s. for 12 issues of the *Short Wave Magazine* starting with August, can still be accepted if addressed to the Circulation Manager, The Short Wave Magazine, Ltd., 49 Victoria Street, London, S.W.1. A direct subscription ensures despatch of a copy by post on the day of publication, the first Wednesday in the month.

If your subscription is due for renewal, the notice was in the envelope bringing you your last copy. It is only necessary to return the completed form with your remittance.



He had a dream one-night.

# CALLS HEARD

Please arrange all logs strictly in the form given here, in numerical and alphabetical order and on separate sheets under appropriate headings, with call sign and address on each sheet.

## 14 mc

Harold Owen, B.Sc., West African  
Cocoa Research Institute, Tafo,  
Gold Coast Colony.

GW F2DFK (56), 2LA (45), EI9N (44), G2ACZ (45), 2A1W (44), 2B0Z (44B), 2CBA (54), 2C1X (57), 2CLL (56), 2CNN (55), 2DDR (55), 2DLJ (55B), 2DLO (44B), 2DFC (56), 2DFD (557), 2FMC (44B), 2FMM (55), 2HAJ (43), 2BAO (44), 2HJV (55), 2HN (55), 2HK (55B), 2KM (55), 2NK (55B), 2QO (56), 2SB (55B), 2TT (55), 2UT (44), 2VZ (33), 2WG (55), 3AGR (45), 3BAE (54B), 3BCS (44), 3BGT (33), 3BH (32), 3BIQ (34), 3BLG (55), 3BNW (33), 3BO (55B), 3GX (45B), 3IQ (44), 3IV (35), 3OF (45), 3QV (55), 3RO (55), 3SR (55), 3VO (55B), 3VP (54), 3WL (45), 3WN (44), 3YT (56), 4CP (44), 4DH (457), 4DN (44), 4JZ (56), 4KI (45), 4NU (337), 4OM (44B), 5AQ (45), 5BZ (55), 5CV (55), 5DV (44), 5FF (55B), 5JF (55), 5KJ (54), 5LJ (55), 5MU (55), 5OB (55), 5P (54), 5RF (55B), 5RM (447), 5UM (43), 5VB (55B), 5WI (55), 5XW (45), 5YV (55B), 5ZA (44), 6CJ (55), 6KP (56), 6NB (55), 6NV (44), 6PS (44B), 6RC (55B), 6SG (55), 6UF (44), 6WI (54), 6X (55), 8AX (57), 8FC (44), 8FF (44), 8GG (44), 8GP (55B), 8HX (55), 8II (557), 8NV (55B), 8OP (44B), 8OU (46), 8PB (56), 8PF (56), 8OY (55), 8OZ (55), 8RA (55), 8RC (45B), 8TT (44), 8IUR (55), 6YM (44), GM3AHO (54), 3AVO (44), 3AXR (44), 3UM (55), 4RF (55), 5SC (44), GW3ZV (55B), 8CT (56). (May 1-31: RS values in brackets: T9 unless otherwise stated. Receiver: O-Y-1.)

## FIVE METRES

HB9BZ, Uster, Nr. Zurich, Switzerland.

**Worked:** F3YZ (May 26), GW5YB (June 7).

**Heard:** G2NI (?), 3DA, 5BD, 6VX, 6YQ, 8DM, 8SI, 8UZ, GM3BDA, 8MJ, OZ7G (all June 7, after 2100 DST.) (Rx: 3-stage converter, with SX17. Aerial: 3-element beam.)

G3YH, 24 Hall Street, Bristol.

**Worked:** F9BG, G3AAK, 4AP, 5BM, 5MA, 5XV, GW4FW.

**Heard:** G2NH, 2ZG, 5BY, 6LK, 6LQ, 6VX, 6YU. (May 15-June 17. Rx: R1132A modified. Aerial: 3-element indoor beam.)

G3AAK, Gable Cottage, Broad Hinton, Wilts.

**Worked:** 2AOK, 2MR, 2NH, 2NM, 2XC, 3PW, 3YH, 4AP, 5BD, 5BM, 5BY, 5JU, 5MA, 5PY, 5WP, 5XV, 6LK, 6RB, 6VX, 6XM, 8DM, 8DV, 8QX, 8RS, 8UZ, GW4FW.

**Heard:** G2AAW, 2AK, 2BMZ, 2DWI, 2IQ, 2MV, 2PY, 2ZG, 5RP, 5VM, 6YU, 8LY, 8WV. (Period April 27-June 3.)

G8UZ, 29 Columbia Avenue, Sutton-in-Ashfield, Notts.

**Worked:** G2ATK, 2MR, 2TK, 3AAK, 3ANN, 3APY, 3AUH, 3ZK, 4BB, 4BI, 4LU, 5BD, 5BM, 5BY, 5GS, 5GX, 5JU, 6VX, 8QX, 8IAY, HB9CD.

**Heard:** G2HX, 2MC, 2NH, 2RI, 2XC, 3CC, 3IS, 3KH, 3AFZ, 5IG, 6AG, 6FO, 6IM, 6YO. (Period May 10-June 14.)

GW5YB, 80 Penrhos Road, Bangor, Caerns.

G2IN, 3TN, 3DA, 5BY, 5MQ, 6YQ, GW5TC, 5UO, 1IAY, 1IRA, 1DA, HB9CD, 9BZ. (Heard or Worked.)

G6LK, Warham Lodge, Bridge Road, Cranleigh, Surrey.

**Worked:** F8IH, G2AOK, 2BMZ, 2FBU, 2GG, 2HX, 2IQ, 2KF, 2NH, 2VH, 2XC, 2YL, 3AAK, 3BXE, 3FP, 4AP, 4MR, 5BD, 5BM, 5BY, 5IG, 5LJ, 5MA, 5US, 5WP, 6FO, 6VF, 8DM, 8LY, 8QX, 8RS, 8TS, 8WL, 8WV, 1IMK, 1XW, ON5G PAØPN.

**Heard:** F9BG, 9AQ, G2AAW, 2XF, 2ZG, 4LU, 5GX, 5XV, 6YQ. (Period May 16-June 16.)

SWL, 122 St. Andrews Road, Coulsdon, Surrey.

F8IH, G2AOK, 2BMZ, 2IQ, 2XC, 5BY, 5IG, 5MQ, 6DH, 6YU, ON5G, PAØPN. (All stations over fifty miles distant: May 27-June 15. Rx: Modified HRO. Aerial: 4-element rotary beam.)

GSIG, 14 Milton Road, Cambridge.

**Worked:** G2MR, 2NH, 2PU, 2WS, 2XC, 2YL, 3BK, 3BXE, 3CC, 3CO, 3NR, 3PW, 5BD, 5KH, 5MA, 5MQ, 5PY, 6AG, 6DH, 6LK, 6OH, 6PH, 6VX, 6YU, 8SK, 8SM. (All May 16-June 15. Rx: 3-stage converter. Aerial: 4-element beam.)

G5BM, Berriville, Arle Drive Cheltenham, Glos.

**Worked:** G2AK, 2AOK, 2ATK, 2BMZ, 2DWI, 2MR, 2MV, 2NH, 2NM, 2XC, 2YL, 3BY, 3CC, 3PZ, 3YH, 5BD, 5BK, 5BY, 5GX, 5JU, 5JU/P, 5LJ, 5MA, 5MQ, 5US, 5VM, 5WP, 5XV, 6TO, 6LK, 6VX, 6XJ, 6YU, 6DM, 8DV, 8QX, 8UZ, 8WL, 1IXW.

**Heard:** F8JB, G2AAW, 2ZG. (Period June 4-16.)

G6YU, 14 Bourne Road, Copsewood, Coventry, Warks.

**Worked:** F9BG, G2AK, 2ATK, 2HX, 2MR, 2MV, 2NH, 2NM, 2PU, 2XC, 3ABA, 2FD, 3IS, 5BD, 5BM, 5BY, 5IG, 5JU, 5LJ, 5MA, 5PY, 5WP, 6OH, 6VX, 8DV, 8QX, 8VN, 8WL, 8WV.

**Heard:** G3AFZ, 4DN, 4LU, 6LK, 8SM. (All month ending June 17.)

OK4IDT, Brno, Czechoslovakia.

**Heard:** F8GH, G2MR, 2NH, 2XC, 5BD, 5BY, 5MP, 6DH, 6LK, 6VX, 8DM, 8VB, ON4TD (All during evening June 7.)

G2NH, 75 Woodlands Avenue, New Malden, Surrey.

**Worked:** F8IH, G2AOK, 2ATK, 2KF, 3BTC, 3BK, 3BXE, 5BM, 5FP, 5SD, 5XV, 6AG, 6GR, 6OT, 8DM, HB9CD, ON5G, PAØPN.

**Heard:** F9AQ, 9BG, G2XS, 4LU. (First time contacts May 1-June 13.)

G2TK, 41 Newborough, Scarborough Yorks.

F9AQ, G2FZX, 2MA, 2MV, 3ALY, 3APY, 3CC, 3TZ, 4JJ, 5IG, 5BD, 5GS, 5GX, 6BX, 6DH, 6OS, 6VX, 8IV, 8SI, 8UZ, 1IDA, 1XW, PAØPN. (Heard or Worked.)

GSXG, 39 Corby Park, North Ferrisby, Yorks.

**Worked:** F8IH, G2MA, 2MR 3NR, 3TZ, 4LU, 5BD, 5BM, 5BY\* 5GS, 5JU, 5LJ, 5MA, 6BX, 6VX, 6YO, 6YQ, 1IXD, 1XW. (All month ending June 19, \*GDX record.)

## The Editor Wants

- ★ Photographs of amateur stations, with brief descriptive notes.
- ★ Short articles on practical problems connected with Amateur Radio.
- ★ Photographs of amateur built equipment and club meetings.

Material accepted in the categories mentioned above will be paid for at good rates. Cards and photographs can be returned if required, as the block-making process involves no damage.

# The Scatterbacks

Discussing a 28 mc Propagation Phenomenon

By F. J. NORTH (G2CDI)

**A**NYBODY who has been at all active on 28 mc must have noticed—and have been bothered by—the numerous ghostly G signals which appear on the band whenever it is open for DX. Not only have they a very distinctive “hollowness” about them, but they contribute quite considerably to the ever-growing QRM on this band.

These signals have an eerie round-the-world quality that has given rise to widespread speculation amongst active operators and some remarkable theories have, on occasion, been put forward to account for their presence and character. The writer in particular has often been reported as having been heard “all the way round” but must reluctantly admit to the firm conviction that there is a somewhat less flattering explanation for the pronounced echo which appears on his signal from time to time.

Whilst the possibility of round-the-world signals is not denied, the phenomenon does not occur as frequently as is sometimes supposed and another explanation must be sought.

After some months of observation and conjecture the conclusion has been formed that the “echo signals” are of three distinct types :

(A) Those with very marked horizontal directivity (by far the most common).

(B) Those with little or no horizontal directivity but otherwise sounding very like those of type A.

(C) The genuine “all the way round” signal having a noticeably delayed echo (comparatively infrequent).

In view of the many discussions overheard on 10-metre ground-wave it is thought that a few comments, together with conclusions as to the possible cause of the type A signal, might prove to be of interest. No conclusion as to the cause of the type B signal has yet been formed.

## Theory

The writer uses a very effective close-spaced 3-element rotary beam at a height of roughly 50 ft. It has a formidable back-to-front ratio on reception and a forward lobe of approximately 40 degrees

width. Its performance over some nine months with a 2-stage Tx (6L6 CO 807 FD) running 25 watts input on 10-metre 'phone, has been eminently satisfactory, with some 116 countries worked.

Early on, when the band first really opened for DX, a number of 'phone signals emanating from G stations located throughout the British Isles were noticed as having a marked echo and fluttery QSB, quite unlike the normal short-skip signals with which the writer was familiar. In a particular instance, CE1AH was heard working GM8MN. The beam of course was aimed towards the south-west. A few kc away in frequency GM8MN was heard with considerable echo and QSB. The first thought was, naturally, that it was a case of simultaneous long and short skip conditions, but turning the beam to the north (the writer's QTH is in Bucks) quickly disposed of that, for GM8MN disappeared completely when the beam was moved more than a few degrees from the south-west !

Since that first occasion many Scottish, North Country, Welsh and Irish stations have been heard—*always coming in from the direction of the country with which they are working*. Incidentally they have been called without much avail, though it has been proved possible to work them under these conditions. (G3LV Portsmouth, due south, was worked with both aërials firing west).

A moment's reflection will show the improbability of these signals having been “right round.” It is known that most, if not all, of the stations heard, have beams and unless these beams are very inefficient and radiating strongly off the back—or unless conditions are so vastly different between, say, Scotland and Bucks that GM8MN must fire N.E. to contact CE1AH while at the same time G2CDI in Bucks must fire S.W.—it is impossible for G2CDI to hear these stations coming in “round the world.” For, if GM8MN is firing S.W. over G2CDI's head, he will surely come in to the latter station from

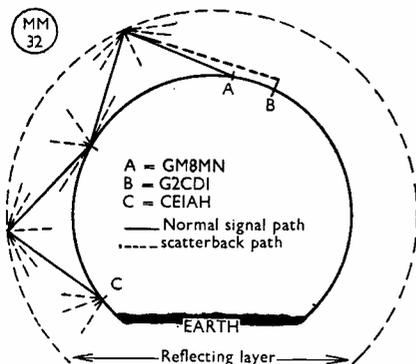


Diagram illustrating G2CDI's discussion. He argues that tests show a marked tendency for 10-metre signals to be reflected back in the direction of their source, thus making possible the reception of "local" 28 mc stations out of normal ground-wave range.

the N.E. if the signal has been all round, and not, as he did, from the S.W.

### Scatterback

No! It is thought far more probable that some of GM8MN's radiation is being reflected back from a point somewhere between CEIAH and G2CDI. The sketch will illustrate the theory. GM8MN's signal will not, of course, follow the curvature of the earth at these frequencies, but will reach CEIAH in a series of hops, layer-ocean-layer. If, at the first point of impact with the layer and/or at the point of impact with the ocean, some of the signal is reflected or "scattered" back towards the British Isles, G2CDI may well receive some of this "scattered back" signal and both the echo and the peculiar QSB are explained.

At any rate, this is considered to be a more probable explanation for the phenomenon than that the signal has been all round or that CEIAH's aerial is re-radiating GM8MN, radar fashion!

There would, of course, be an infinite number of variations and degrees of "scatterback" and it seems likely, for instance, that the echo and flutter on very local G stations is due to a combination of groundwave and scatterback. So much for the type A signal.

So far as the type B signal is concerned, as stated, no definite conclusions have been drawn as to cause. Nevertheless, a few comments may be of interest. It seems fairly certain that some other factor or factors cause the phenomena since these signals exhibit no horizontal directivity.

Moreover they seem to be almost exclusively produced by Continental European stations.

### Test Result

An interesting test was carried out on December 7 with D4ADT in Wiesbaden, Germany. This station was heard calling CQ with typical "scatterback" characteristics. He was called and contact was established, he being a peak S7 signal while the writer was peaking S5. It transpired during the QSO that he was using the customary BC-610 to a 3-element beam which, due to a mechanical defect, was fixed firing S.W.

At the time of contact the writer's aerial was looking east but subsequent rotation of the beam through 360 degrees made no difference at all to the reception of D4ADT's signal. Nor, as it was reported, did rotation of the aerial affect the writer's transmission as received in Germany!

It would therefore seem that the signals in this case were coming down vertically. This appears decidedly queer, particularly as the effectiveness of the writer's aerial has always been thought to be due, at least in part, to its low angle of radiation!

It should be particularly noted that DX conditions were prevailing at the time of this contact, with VU2's and XZ stations coming in strongly. Also D4ADT was *not* typically short-skip but rather was quite definitely exhibiting "scatterback" characteristics. Although this is the only contact of the kind made so far, many similar PAØ's F8's, LX's, D4's and ON's have been heard.

Whatever the cause of these freak signals, the writer, in common with many others, wishes that they wouldn't do it!

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### THE CALL BOOK

The latest issue is thicker than ever, and must contain quite 100,000 amateur QTH's. The Australians are in at last, taking some four pages. The G lists have been sub-divided into England, Scotland, Wales, Northern Ireland and Channel Isles, and show about 2,600 British stations; all G's up to and including those given in "New QTH's" in the December issue are shown. The Call Book is still about 2,000 behind on G QTH's!

### FM TESTS

The Australians now have a 2 kW FM transmitter on 91.1 mc, located near Melbourne. The deviation is 75 kc and the audio band width being transmitted (for test purposes) is 30-1,500 cps.

# Another Noise Limiter Design

Adaptable to Most Communication Receivers

By J. H. CLARKE (G2AAN)

**T**HERE are many communication receivers in use to-day which lack the benefit of an effective noise limiter. Whilst the simple series diode type is easily added, the results obtained do not always justify the mechanical and electrical modifications that have to be undertaken on the already overcrowded chassis. The alternative is to construct an external noise limiter and connect it by means of screened cables to the main receiver. This again has many disadvantages, not the least of which is the addition of more equipment around the operating position!

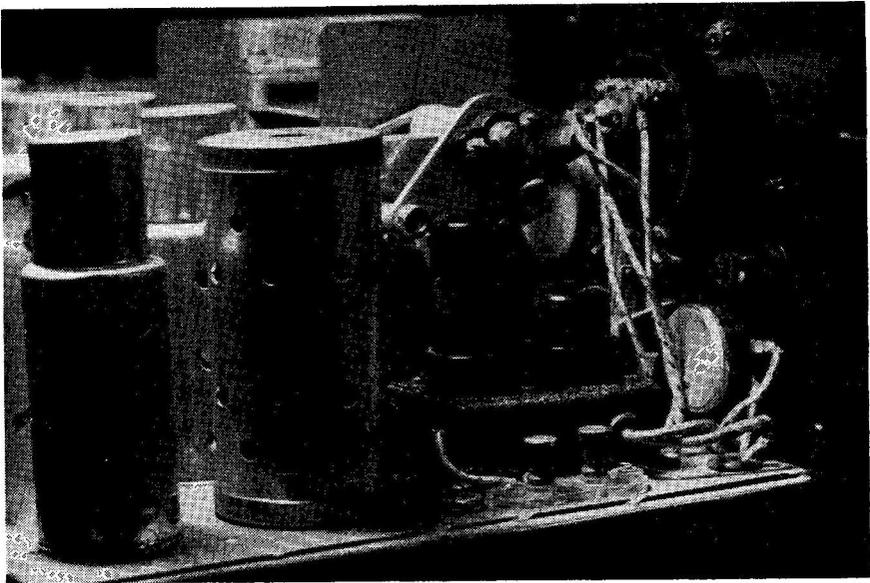
During the war, the National Company (of America) designed a simple and effective noise limiter which was intended to be used with the HRO-5 series of receivers. A technical supplement was issued, and full details were given of electrical theory and wiring. The physical position of the valves was indicated on a small line drawing. The writer, being owner of an HRO, set about

the job of fitting the noise limiter, but was confronted with many mechanical difficulties, which, in most cases, meant movement and consequent rewiring of components. After a good deal of spade work, the unit was finally constructed on the smallest sub-chassis possible, and fitted in the indicated position, without any change to the receiver other than additional under-chassis wiring.

## Circuit

The circuit and unit as a whole being so simple and effective, the writer feels that the details may be of interest to owners of communication receivers other than the HRO. The power required for the unit is so small that it may safely be taken from the receiver main supply. The only extra knob involved is the "threshold" control, which is mounted on the panel.

The complete circuit is shown in Fig. 1. The noise limiter components are indicated



Close-up of the mounting of the noise-limiter on the HRO chassis.

by bold lines, whilst those of the main receiver are shown in light lines. The demodulated signal is taken from the second detector, and instead of going direct to the volume control in the grid of the first audio, it is connected to the grid of the first noise amplifier, a 6J5. The 6H6 noise limiter is connected to the cathode of the second detector and first AF valve, and the amplified signal is applied *via* a fixed condenser to the plate of one diode, whilst the other plate is connected to the volume control in the first audio grid circuit. The threshold control, R9, is connected to the HT positive line, and the moving contact adjusts the potential of the diode plates. This control enables the potential to be critically adjusted, so that the normal signal will just pass, but the signal *plus* the noise pulse will make the diode become almost non-conducting, thus suppressing the noise pulse. The time constant of the circuit is good, and no recovery lag is noticeable after the noise pulse has finished.

The unit was designed to connect to a conventional second detector, AVC and first audio valve, such as the 6SQ7 or 6B7. The normal cathode resistor of such a valve is about 800 ohms, and when the limiter is added, this is replaced by a 470- and a 330-ohm resistance in series. The 6H6 cathodes are then connected to the junction. For other types of valves, the two resistances may be calculated by taking the ratio of each to the whole.

Care should be taken to ensure that the threshold control, R9, has the spindle insulated from the moving contact. A certain proportion of Government surplus potentiometers on the market to-day have

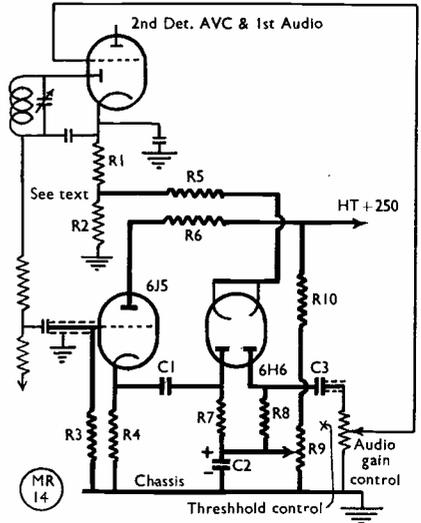


Fig. 1. The noise limiter, shown in bold lines, designed by the National Company for the HRO series of receivers. As explained by G2AAN, this arrangement can be adapted to other receivers.

**Table of Values**  
Noise Limiter

- C1 = 0.1  $\mu$ F, 400-volt
- C2 = 0.01  $\mu$ F, 350-volt
- C3 = 8  $\mu$ F, 250-volt
- R1 = 470 ohms
- R2 = 330 ohms
- R3 = 1 megohm
- R4 = 5,000 ohms
- R5, R7 = 50,000 ohms
- R6 = 33,000 ohms
- R8 = 250,000 ohms
- R9 = 10,000 ohms, 3-watt
- R10 = 50,000 ohms, 2-watt

All resistors  $\frac{1}{2}$ -watt rating except where stated.

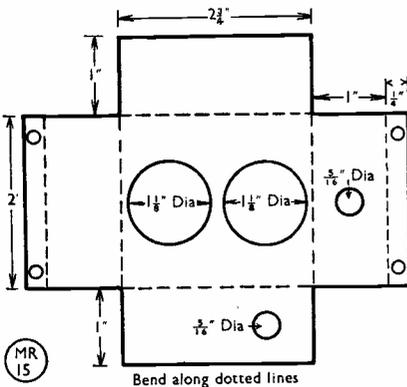


Fig. 2. A suitable chassis assembly for mounting the noise limiter as a unit on any receiver.

uninsulated spindles, thus making the bushing of the panel hole a necessity.

**Construction**

The sub-chassis dimensions are shown in Fig. 2 and the position of the unit, as fitted to an HRO receiver, is illustrated in the photograph. The overall size of the chassis (2 in.  $\times$  2  $\frac{3}{4}$  in.) makes it a fairly easy matter to fit it in the space between the end of the tuning condenser gang and the aerial terminals of the HRO. Most other receivers will be able to accommodate this size chassis somewhere amongst the mass of screening cans that adorn the modern set!

It is desirable, if possible, to place the unit as near to the receiver volume control as possible, as this will reduce the possibility of grid hum.

The chassis may be constructed from 16-18 SWG aluminium or steel—which ever is handy, and after drilling and bending it may be painted a suitable colour. The three fixing holes in each mounting lug are shown to suit various positions, but owing to the lightness of the unit, it is quite practicable to mount it rigidly by a single bolt at either end.

### Wiring

The position of the wiring is not critical, except perhaps the output leads, which should be kept as short as possible and screened. All resistors except R1, R2 and R10 can be mounted beneath the sub-chassis, and all the condensers except C2. These are mounted in the main wiring beneath the main receiver chassis.

When wiring up the sub-chassis, the resistors should be mounted first, care being taken to ensure that they are well down in the chassis and placed in the corners as far as is possible. The remainder of the sub-chassis wiring should then be completed, all external leads being left as long as possible. The output and input leads are made with screened cable, and are taken through the side grommet to the volume control. The three unscreened leads to the threshold control are taken from the end grommet, and may be left long and uncut until the unit is finally mounted.

Finally, the condensers C1 and C3 should be mounted in the sub-chassis, and a suitable hole drilled in the main receiver chassis to enable all the power and feeder leads to be passed from the sub-chassis through to the main receiver wiring. This hole should obviously locate directly beneath the sub-chassis.

After feeding the uncut leads through this hole, the unit can be placed in position on the main chassis and fixed by suitable bolts. The screened leads may now be soldered to the volume control, and the threshold control connected and mounted to the main panel. The uncut leads protruding through the main chassis can now be trimmed and soldered to their respective points.

### Operation and Performance

The threshold control may be advanced until the CW or AM signal just begins to reduce in volume, and the interference drops considerably. If the interference increases, the control may be advanced

even farther. When receiving AM signals, it will be found that their quality will be rather poor at the maximum position of the threshold control. CW signals will, however, not be affected to such an extent. If the limiter is not required, the threshold control may be returned to the zero position, and all signals will be passed normally.

The unit has been found to be most effective in all kinds of interference, and even does a fair job with precipitation static. Users of HRO receivers (all models) are advised to change the BFO screen by-pass condenser from 0.1  $\mu$ F to 0.01  $\mu$ F when fitting the limiter.

The writer is indebted to G2DFR for his assistance in the preparation of this article.

### AUSTRALIAN 27 MC BAND

The VK's have obtained an allocation over 27155-27455 kc, which is in line with the American assignment in this region. In spite of the fact that the band is shared with "industrial users"—a euphemism for such fearful things as plastic heaters and diathermy apparatus—the W's say they are not much troubled by interference of this nature.

### THE AMATEUR BANDS

*Following are the bands now open for British amateur operation:*

1715-2000 kc	10 watts (A) and (B)
3500-3635 kc	25 watts (A),
3685-3800 kc	150 watts (B)
7000-7300 kc	25 watts (A), 150 watts (B)
14000-14400 kc	25 watts (A), 150 watts (B)
*28000-30000 kc	25 watts (A), 150 watts (B)
*58500-60000 kc	25 watts (A) and (B)
460.5 mc	5 watts (for radio control of models and only by special applica- tion)
*2300-2450 mc	25 watts (A) and (B). *FM permitted.

*"A" licences are all three-letter calls issued post-war, and are for CW operation only; licensees in this category are not normally allowed the use of telephony and full power till they have had twelve months' experience. Class "B" licensees are holders of reissued pre-war two-letter call signs, and are allowed the unrestricted use of CW, MCW and 'phone with power as given above.*

# FIVE METRES

By A. J. DEVON

*New GDX Record,  
G5BY/G5GX, 285 Miles—  
Many European Contacts  
on Sporadic-E—  
W5BSY/MM Worked—  
Summary of Activity—  
Discussing Propagation*

**W**HAT a month! Since the end of May, 58 mc has certainly produced, and in no ordinary fashion. And while your A.J.D. is busy preparing the material for these pages, no doubt even more exciting things are happening on the band.

We have had distant Continentals and GDX with near-Europeans almost daily since May 23. A new GDX record has been established, as many as nine European countries have been worked, and stations like F9BG, FA8IH and W5BSY/MM (s.s. *Crest of the Wave*, well known on the other DX bands) have provided many operators with their first outside-G contacts on five metres.

The new GDX record came at 2320 DST on June 1, when G5BY/G5GX had a good two-way QSO over the 285-mile path Bolt Tail-North Ferriby, Yorks. Reports were 569/559 respectively and G5BY's 'phone was solid copy at G5GX. This is excellent work indeed and all 5-metre operators will join us in congratulating them both. A word should be dropped in here for SWL Bower of Hull, who it was who rang G5GX to tell him G5BY was coming in, and also for G5BD, who as near as a toucher got in before G5GX that same evening; the distance Mablethorpe-Bolt Tail is only three or four miles short of the new record.

Another particularly interesting result, also on the night of June 1, was the first-time reception of G5BY by GW5YB (Bangor); the path of over 200 miles lies right through Snowdonia. G5BY was solid copy at S6/7 between 2140-2210, and was audible with QSB till 2340.

## European DX

As to the European working in which so many stations have had a part, we have summarised all results known to us in a sort of "catalogue of activity," which appears under a separate heading with this article. In effect, the daily state of the band is shown, and by thus filtering the detail out of the body of the text, we

think that it perhaps makes for easier reading of these notes.

It will be seen from this summary that the outstanding days were May 30, June 7 and June 13, though there were also good openings on several other occasions. These openings occurred mainly between 1700-2200 DST, though on some days DX could be worked as early as 1400, and on one day at least, June 13, the band was open for nearly twelve hours. Lack of activity before about 1700 DST (due for most of us to the necessary preoccupation of earning a living!) tends to obscure the fact that such openings often do come much earlier.

A critical analysis of all the reports received (and your earnest conductor would like gratefully to acknowledge the assistance of no less than 45 correspondents this month) shows that the days upon which sporadic-E openings actually occurred were May 24, 26, 30, June 4, 6, 7, 10, 13, 14, 16 17, 22. The near-European working (PA and ON by G's up to 200 miles or so distant) was due to ducting, which of course also produced the GDX.

## Propagation Conditions

There is a point of great interest and importance about the occurrence of sporadic-E. As mentioned by G6DH and noted by other observers, the effect can be quite localised. We have already seen that on May 14 the path GM/I was good, but nothing was heard of Europe in the South of England. The most southerly station to report results on this occasion is G2TK (Scarborough) who was received by F9AQ and F9BG, both of Toulon in Southern France. Similarly, there have been instances of even more selective propagation—G2XC has worked FA8IH when the FA was quite inaudible at G5BY; and G5BY has worked F's who could not be heard even by G2BMZ (Torquay). The reason for this particular effect is the formation of an ionised patch, perhaps moving, which at any given time is good only for providing paths over a particular area.

The general propagation conditions as applying to 5-metre working can be stated as follows :

(a) Ground wave, which need not be discussed.

(b) Temperature inversion or ducting effects, which can give GDX results either over the country as a whole, or in particular areas only ; at this time of year it tends to give E-W working as far north as the Midlands in the early evening, bringing the more northerly stations in from about 2230 DST onwards for those operating from the South.

(c) Sporadic-E, an ionospheric effect which, while producing European working can also be markedly localised, as already mentioned.

(d) Intense ionisation of the lower reflecting layer, associated with Dellinger fade-outs on the other bands, and capable of giving opportunities for real long-distance working.

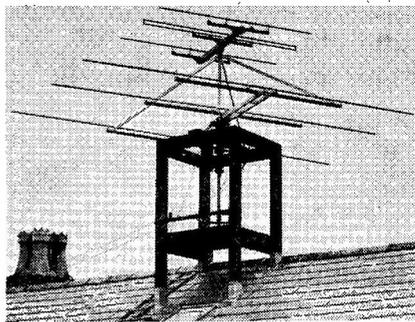
Condition (d) is of particular interest. During periods of unusually copious emission from the sun, such as produce the hiss phenomenon and the Dellinger effect on the other bands, a layer capable of reflecting 50-60 mc and higher frequency signals can be formed over almost the whole area of the earth visible to the sun. It is this sort of condition which produced what was without doubt a good Trans-Atlantic 50/58 mc opening on May 24 last.

#### More Prognosis

Underlining the foregoing, we have some very interesting predictions for the present period, made by Ferrell of *CQ*, which reached us by special arrangement with

#### FIVE-METRE FIRSTS

France :	G2FA/F8NW, March 29, 1936.
Italy :	G5MQ/IIIRA, July 2, 1938.
Holland :	G2AO/PAØPN, August 17, 1939.
North Africa :	G5BY/FA8B, June 24, 1946.
Switzerland :	G5BY/HB9CD, August 22, 1946.
Belgium :	G6DH/ON4KN, May 23, 1947.
Sweden :	G5TH/SM5FS, May 24, 1947.
Denmark :	GM6KH/OZ7G, May 24, 1947.



In our issue of May last, we showed the 5-metre rotary beam at G2IN, Southport. Here is the assembly complete with 5- and 10-metre arrays on the same mounting. Rotation is by remote wire control from the operating position.

WØZJB. According to these prognostications, in America 50 mc should have been very good between June 25-30, with practically continuous openings producing two-hop skip. The outstanding day, however—the “day of the year,” in fact—is given as July 3, about the time many of you will be reading this, which of course is being written several days in advance of these dates. Good openings are also expected by Ferrell to occur on July 11 and 12.

The striking thing about Ferrell's prediction is that when writing us dated June 5, he gave June 13 and 14 as good days—see the Summary of Activity. Note that predictions are for 50 mc over the N. American Continent—they do not necessarily mean that there should be a Trans-Atlantic opening right up to 58 mc ; but July 3 will be worth watching in this respect !

So much for theory ; we look forward to being able to comment further on all this next month.

#### W5BSY/MM

The appearance of W5BSY/MM naturally gave everyone a great kick, and as at the moment the *Crest of the Wave* (what a lovely name for a ship) is headed west for the Gulf of Mexico with W5BSY still pounding away on the band, we may well get some record distances, with W5BSY/MM acting also as a link between the W's on 50 mc and ourselves. Again, we are indebted to WØZJB of *CQ* for the advance information about W5BSY ; it reached us just after the June issue had been cleared for press. So we passed the

news round by card and radio to a number of regular operators with the request that they QSP to their own contacts. We shall try and do this sort of thing whenever the occasion arises.

### Individual Reports

G6DH has been doing good work in getting the PA's and ON's interested in the band, and G6DH himself made the first post-war G/PA contact. As will be seen from the summary, certain PA and ON stations are now being worked quite consistently by the regulars in the South of England.

Another consistent but much more distant station is FA8IH (Algiers) who has been putting in a remarkably regular appearance, often on what appears to be a dead band, and can be quite easily worked. FA8BG (Oran) has been doubling with him and several operators report the extraordinary fact that FA8IH often fades down as FA8BG comes up in strength, and *vice versa*. This is not in

the sense of ordinary quick fading, but a gradual relative change over a long period of perhaps an hour or more.

June 13 was the big day for G5BD, who started up at 1125 DST and was on till 2130, getting eight European contacts in that time; it would have been nine, but an unknown station got away! In the course of the G5BD/I1DA QSO, the Italian remarked that he also works on 225 mc when sporadic-E is about.

On this point, OKIAW reports the reception, by OK1KAX on May 26 at 1330 DST, of unidentifiable English-speech transmissions on 112 mc; the procedure was non-amateur and they were thought to be "military or airplane" stations. It certainly is interesting! While with the OK's, we might mention that OK2MV (Prague) is there almost daily from 1500 DST onwards, with 50 watts ICW and 'phone, and that over the week-end July 5/6, the OK's are running a 56-112 mc field day.

OK2MV was worked by G5BY on

### SUMMARY OF EUROPEAN ACTIVITY AND RESULTS May 23-June 22

#### May 23

ON4KN worked G6DH and heard G2QV; ON5G received G6DH.

#### May 24

G5TH worked SM5FS; GM6KH and GM8MJ worked OZ7G.

#### May 26

FA8IH worked G5BY, G6DH, G8RS and ON4T; PAØPN worked G5IG and G6DH. ON4KN worked G6DH and heard G6LK.

#### May 28

PAØPN worked G5IG and G6DH.

#### May 29

G6DH worked ON5G, PAØPN and PAØUM. G2NH worked ON5G and PAØPN.

#### May 30

PAØPN worked G5BD, G5IG, G5WP, G6DH, G6LK and G6VX. ON5G worked G2NH and G6DH. I1XW worked G5BD, G5BM, G5BY, G8LY and PAØUM. G2TK worked I1DA. G6DH heard I1DA and I1XW; G5BD heard I1DA, I1XD and F9AQ; I1ZZ heard G5MA and PAØUM; G5BY heard I1AY and I1DA.

#### June 2

G5BD worked PAØPN.

#### June 4

G5BY worked F3JB, F9AQ and F9CV. G2TK heard F3JB. G5BD worked FA8IH.

#### June 6

G2NH worked FA8IH and HB9CD; heard HB9BZ. HB9BZ heard FA8IH.

#### June 7

GM3BDA worked I1DA (first GM/I contact). GW5YB worked HB9BZ (first GW/HB contact) and heard HB9CD, I1DA, I1AY and I1IRA. HB9CD worked OZ7G. G2TK worked FA8IH and HB9BC. G8UZ worked HB9CD and I1AY. G6MI worked I1XW and G8JV worked I1AY. G5BD heard F9AQ, FA8IE, HB9CN and HB9BZ. G5BY heard HB9CD

and I1DA; OK1GA heard G5BY. G5MP heard I1DA. HB9BZ received ten G stations on CW or 'phone (see Calls Heard); OK4IDT heard 13 stations—including G's, F and ON—between 2100 and 2359 DST (see Calls Heard).

#### June 10

FA8IH worked G2TK, G2XC, G5BD, G5GX and G6LK. G5BD heard PAØPN.

#### June 12

G5BD worked PAØPN.

#### June 13

FA8IH and W5BSY/MM (off S. Coast of Spain) between them worked or heard numerous stations, including G2MV, G2XC, G5BD, G5BY, G5CP, G5MP, G6DH, ON4T, ON5G, ON4KH, PAØPN and PAØUM. F9BG worked G2BXL, G4MH, G5BD, G5BY, G5MP and G6YU. G5BD worked I1DA, and G5BY I1IRA. F9AQ worked G5BD and G5BY. G5MP heard FA8IH and W5BSY/MM; G6YQ received F9AQ and F9BG.

#### June 14

G5BY worked W5BSY/MM (off Gibraltar). G6XM worked FA8IH. G5CP heard I1IRA. G5MP received FA8IH, and OK1GA heard G5BY. H.M.S. *Ouan*, at Tripoli, received G5BY. RST579.

#### June 16

G2XC worked FA8IH and W5BSY/MM.

#### June 17

FA8BG worked G5BM and G5BY. G5BM heard FA8IH. G5MP received FA8IH and F9BG.

#### June 22

G5BY worked OK2MV, 2054 DST (first contact if no prior claim). OK2MV heard G6XM. FA8BG worked G2BMZ, G2KF, G2MV, G4DN and G8RS. FA8IH worked G2NH, G5IG and G5MA. OK2MV worked G6LK. OK3ID and OK4IDT heard G5BY.

June 22, reports being 554/588 respectively—and Hilton says T4 was generous! The OK has an AC note about 5 kc wide.

G2NH (New Malden) suggests, and we agree, that this DST business is losing us a lot of good GDX working. It is near midnight by the time the band is really open for North-South operations, by which time most people have quite properly turned in. He also remarks that GDX and the near-Europeans on ducting are much more satisfying contacts than those made on sporadic-E. Certainly, some of the Europeans appear to be using concrete-mixers in the PA, with rock-crusher modulation, and can be chased over a megacycle or more of the band. But this is how it always was. Because someone with a squish receiver and a flip-flap oscillator for a transmitter is able to work a thousand miles by going up in a balloon, that only means that for serious work under normal conditions one must have the best of equipment (not necessarily in the sense of elaboration) in all three departments.

On this theme, we feel that readers of "Five Metres" will agree with us that the only GDX records that can count as such in the strict sense are those made between stations operating from their home locations. Everyone knows that by working, say, from an aircraft at 15,000 ft., distances of 400 miles should be covered with certainty using the most elementary apparatus. But this is not the thing about 5-metre operation—it is the development of point-to-point working from one's own backyard that we are all after.

A welcome line from G3AAK (Broad Hinton, Wilts) who came on the band in January and has a 6L6-6N7-870-RK34-DET12 transmitter, with a 3-stage converter feeding into a home-built superhet; he has several aeriels, and also a beam fixed to fire S.E. Though not yet in on the European stuff, G3AAK has worked or heard a lot of GDX. He, with many others in Eastern England, wants to know why that bunch of stations in the West Country—who are frequently well heard at DX distances working 'phone amongst themselves—do not listen for GDX and use CW more often! Come on Bristol, Cardiff and Weston—you are all being received and lot of us want the counties!

It is widely held in the North that G2TK (Scarborough), now putting out a fine signal, will be one end of the next GDX record. G2TK, who has added an EF54 RF stage to his S27 with greatly improved results, has been doing well with

FIVE-METRE COUNTIES WORKED LIST Starting Figure, 14	
Worked	Station
26	G6VX
24	G2MR(154), G2XC(124), G5MA, G6LK(165)
23	G2NH(132)
22	G6YU
20	G5BY
19	G2YL, G5BD
18	G4IG, G5IG, G8UZ
17	G6CW
16	G2NM, G3AAK G5MQ, G6OH
15	G5PY, G6FO
14	G5BM, G6KB

*Note: Figure in brackets after call is total of different stations worked; starting figure, 100.*

some of the Midlanders and has worked G2MV (Coulsdon, Surrey) for a good 200-mile contact.

Recently, the Editor enjoyed a short stay with G5BY; a feature of the visit was the working of 11 GDX contacts in a row on the evening of June 16, when conditions were exceptionally good, with 'phone working possible in most cases. G5BY was using a new 4-element wide-spaced beam, 45 ft. high, with a tilting head, all controllable from the operating position. It was very noticeable how the northerly stations started coming in as darkness fell. G6LK was the outstanding signal among many good ones from South-Eastern England; he was the first of a series of excellent contacts. It has been mentioned previously in these pages that all G5BY's gear is entirely home-built; what is not so well known is that he operates under considerable difficulties in that he has 12 miles to travel to the station. Yet he is there every evening and most afternoons.

The site is a magnificent one, with clear views in all directions and 19 acres on the headland of Bolt Tail available for the erection of aeriels. It can be said that G5BY works extremely hard for his results, which are a great personal credit to him.

G6XM (Farnborough) on the subject of initial sallies on VHF (see last month's note regarding G3BTC) sends proof that

his first licence, issued in January 1933, was for 5 metres *only*! This is certainly a facer. He made his first contact with G6NA in Guildford nearly two years later! G5BY was worked in 1938, and others in action in those days were G2NH, G5MA, G6FO, G6GS and G6VA, to mention only a few. G6XM is very busy on the band now, having worked 46 stations and heard over 100 others since February last.

G6LK (Cranleigh) has been doing very well during the recent sessions and with 16 different Europeans in the log, now has seven different *countries* worked. See Calls Heard for latest results.

HB9BZ (Zurich) in an interesting letter bringing us up to date with affairs in Switzerland—see Calls Heard and the Summary of Activity for his own results—reports that HB9CD recently worked three countries in six QSO's. HB9BZ's transmitter is a 3-stage MO-FD-PA with 40 watts into a pair of 6L6's; receiver is a 3-stage converter with an SX17 and the aerial a 3-element beam. The HB's are running a special test on the 58-60 mc band during the period 2100-2300 DST on July 13.

G5IG (Cambridge) has a 4-element wide-spaced beam and a 3-stage converter using EF54-EF50-RL16, with 1.6 mc IF; the transmitter is a line of three 6L6's driving an 807. He is getting out well to the north now and as well as having worked some Europeans, has brought his county total up to 18.

### Counties and Countries

The latest Counties Worked list is here,

#### COUNTRIES WORKED

In view of the number of Europeans now showing up on sporadic-E and long-range ducting, it is proposed to start a Countries Worked listing. This will be separate from and additional to the existing *Counties Worked* scheme.

Countries count by prefixes and three countries worked two-way in the 50-60 mc frequency range is the starting figure, on post-war results only.

If you qualify, send a claim to A.J.D. giving date, time and callsign for each country claimed. Written confirmation is not required. The first list will appear in the next (August) issue.

with G6VX (Hayes, Kent) still well in the van with his 26. Several stations have moved up one or two, and four new callsigns appear. All operators who have worked 100 or more different stations are asked to let us have the score, for showing in Countries Worked.

There is also a panel announcement regarding Countries Worked, which we feel is another record of results well worth preserving. So please send A.J.D. your details for this, too.

Some readers may feel that what might be called the competitive element is now being a little overdone. We almost began to think so ourselves, but the fact is that all these results will not only be of great interest in the future, but also represent solid achievement on the band—which is what really matters. The keeping of records of this kind is therefore well worth while, and if in so doing the spirit of friendly competition is encouraged, so much the better. In any case, with starting figures of 14 Countries and three Countries practically everyone has a good chance of a showing in the lists.

### The Contest

A particular query has arisen on the rules, appearing on p. 239 of the last issue: Can all the 12 originated messages be passed to one station? The answer is Yes!—If you can raise and hold a distant station long enough to make such a tactic worth while, good luck to you. Remember, too, that in this Contest 'phone traffic is worth 50 per cent. more in points than a message passed by CW.

In point of fact, the Contest will call for quite a high level of operating skill, and if the support is what we hope it will be (and if Ole Man Condx does his stuff), the leading stations will certainly have what it takes.

So do not forget to have everything ready for 1800 DST on July 19. Send in your score whatever results you obtain, and let us look forward to an interesting and profitable event.

### Shorts

Good to hear G2KF, G2NM, G5VM and G6RB on the band; real old-timers, with a wealth of experience behind them and a long record of service to Amateur Radio. . . . G2KF and G2NM, pioneers of the 1,000-metre days of long ago, recently had a 'phone QSO on 5 metres via G5MA, their first for nearly twenty years! . . . . G6YU logged more than

20 G's on the evening of June 16. . . . G2MR, on holiday in GC, is trying to get them going over there; GC4LI (Jersey) has heard G5BY. . . . G8UZ, still using very simple but most effective equipment, is doing very well with 18 Counties worked. . . . G2XC worked 14 stations in 13 Counties at one sitting on June 16, 1730-0015 DST; on that evening, G2IQ and G5BD were coming down in Portsmouth as early as 1930. . . . G6OS (Hull) modulates the sound track at his cinema when he fires the beam south;

"Hullo CQ Five" takes a lot of laughing off with the audience! . . . It is worth having a good look over Calls Heard in this issue; the 5-metre lists are extremely useful and interesting.

#### August — Closing Date

So with that, good luck in the Contest and BCNU in the August issue. Closing date is July 22 certain. Please write, wire or 'phone A. J. Devon, c/o *Short Wave Magazine*, 49 Victoria Street, London, S.W.1. (ABBey 2384.)

## VHF and the Lower Atmosphere

Discussing the Mechanism of Anomalous Propagation and Explaining the Nomenclature

By R. F. C. BRAKE (G8QR)

THE recent article by O. J. Russell, G3BHJ, has evoked considerable interest in anomalous propagation in waves of the order of five metres. It is thought that the absence of a standard nomenclature has given rise to some confusion. The purpose of this article is to clear up the situation by setting out the appropriate terms as used in the Services.

### Ducting

Under certain conditions of temperature and humidity an atmospheric duct may be formed at the horizon. Such a duct is composed of a layer of air enclosed on its lower side by the surface of the earth and on its upper by an air mass above.

Under normal conditions of atmospheric refraction the top of this duct leaks copiously and the greater part of the electromagnetic radiation leaks out just beyond the horizon; thus, little or no propagation takes place down the duct.

If the refractive index of the atmosphere is such as to give an accentuated downward curve to the radiation, leakage from the duct will be reduced and, under certain conditions, may be suppressed altogether. In this case, energy is contained within the duct and may be propagated down it much in the same fashion as energy in a waveguide. The propagation follows the curvature of the earth and hence signals may be transmitted beyond the quasi-optical range. When these conditions obtain *anomalous propagation* is said to occur.

The refractive index of the atmosphere within the duct is not constant, but changes with height. The rate at which this occurs is known as the *lapse rate*. There is a lapse rate for temperature and humidity, and when either produces a downward curvature of the ray which is equal to or greater than the curvature of the earth, then at certain radio-frequencies leakage does not occur and propagation takes place. This condition is known as *super-refraction*.

As has been stated, the effective of atmospheric refraction is a function of wavelength. At 10 cms. the effect is considerable, at 1 metre appreciable, at 5 metres less frequent and at 10 metres virtually negligible. Above 100 metres it is almost unknown.

### Measuring Lapse Rate

It is customary to measure the lapse rate of temperature in degrees F/100 ft., and the symbol T is used to indicate it. The lapse rate of humidity is measured in millibars/100 ft., and the symbol E used. The resultant lapse rate of the refractive index is given the symbol K. It has been found that these terms are related approximately as follows:—

$$K = K_0 (1/5E - T/9)$$

( $K_0$  represents the curvature of the earth.)

For super-refraction K must be greater than  $K_0$ . These conditions are usually the result of advection by an air mass which has been warmed up and passes over a surface at a lower temperature. Such con-

ditions occur when an air mass which has been uniformly heated during the day moves out in the evening over the sea, the surface temperature of which is considerably lower. As a result, the temperature of the air layer contiguous to the surface is lowered and may result in the phenomenon of *temperature inversion*, i.e. the temperature rises with increased height to a level  $h$ , after which it falls in the normal manner. In the same manner, there will also be an increase in humidity at the surface.

The difference between surface temperature and the representative temperature of the air mass immediately above is the *temperature excess*, and is measured in degrees F/100 ft. In a similar way, *humidity deficit* is the deficit of the specific humidity of the same air mass compared with the humidity at the surface and is measured in gms./Kgms. of moist air/100 ft.

#### Wet and Dry Ducts

Either temperature excess or humidity deficit may give rise to the formation of a radio duct. A duct formed by humidity deficit is known as a *wet duct*. Its width is the height at which the humidity deficit lapse rate exceeds  $\frac{1}{2}$  gm./Kgms./100 ft. Below this rate the downward curvature of the ray is insufficient to contain the wave, and leakage occurs.

#### Temperature Inversion

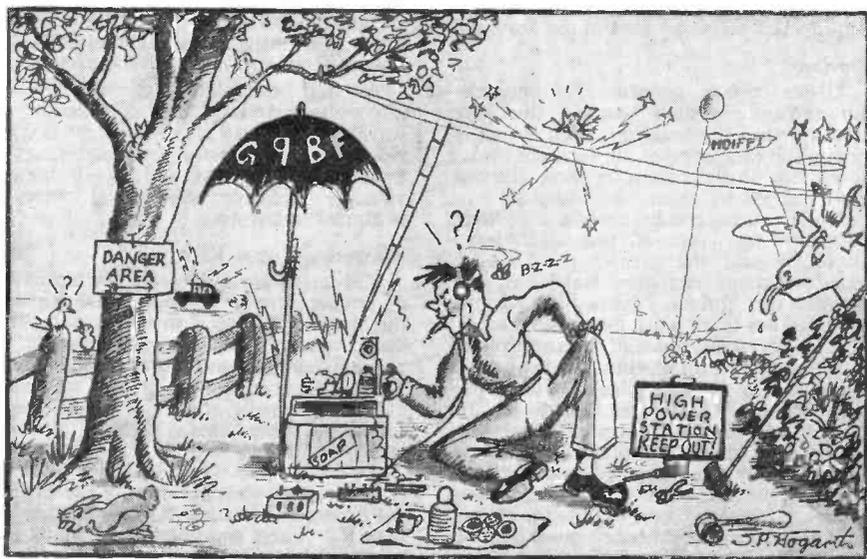
When temperature inversion is responsible for the production of ducts, they are called *dry ducts*. A temperature excess of more than 8 degrees F/100 ft. is necessary to produce sufficient refraction to contain the wave. Such a condition occurs on the lowest portion of the inversion layer, hence this is the portion which is able to act as a duct.

Both temperature inversion and humidity deficit can be negative and positive, i.e. a reversal of the conditions already stated. In these cases the refractive index is still modified but the resultant curvature of the wave is upward and *away* from the earth.

#### Duct Width

For propagation in an atmospheric duct to take place the duct widths must exceed the track width of the energising wave at the point at which it enters the duct. The track width of the wave is the space necessary to contain a single loop of the wave in use. For propagation to occur at  $1\frac{1}{2}$  metres the duct width must be at least 1,000 ft.

It is suggested that since the above terms are used in the Services for describing the effects recently discussed in the *Short Wave Magazine*, the amateur fraternity might do well to adopt them.



G9BF/A/P/? on Location

# Here and There

## The Zone Map

The initial print is well on the way to being exhausted, so that if you want a copy it should be ordered immediately. The Map was described and illustrated in our issue for May. The price is 3s. 9d. post free, obtainable either from Amateur Radio supply houses or direct from us at 49 Victoria Street, London, S.W.1.

## Crystal Exchange

This scheme seems to have languished a bit, so instead of making a feature of it, we shall simply print exchange notices in rotation as space permits in this section. Insertions are free but must be strictly on an exchange basis; negotiations should be conducted direct and notices sent us in the form shown below. These are the latest offerings:

G2TG, 40 Netherburn Road, Sunderland, Co. Durham.

Has 1875 kc. Wants 7 or 14 mc crystal, no holder.

GM2BWF, 4a Newton Terrace, Glasgow, C.3.

Has 7119 kc crystal in holder. Wants 7020 kc or near for doubling into 14 mc CW band.

## Contact

G2HKU, 27 Unity Street, Sheerness, Kent, is on DC mains and would like to hear from others in a similar predicament. He has a motor-generator giving 25 watts for the final.

This is at least one stage better than the condition of having no mains at all. Quite a number of stations in remote country districts are run from car batteries, charged either from a small petrol-electric generating set or a wind-charger—or are simply lugged round to the local garage.

## Amateur Radio and UNO

It seems that the IARU (International Amateur Radio Union—a rather vague federation which is intended, through their national societies, to represent the amateurs of the world) has concluded a pact with the United Nations Organisation to provide a world-wide network for the distribution of news via Amateur Radio. Though schemes of this kind are admirable in theory, they seldom succeed in practice

unless they are operated in such a way as to catch the imagination of the average amateur; apart from this, so far as G's are concerned, there are the conditions of the licence to be considered.

However, since the IARU has apparently pledged the support of about 100,000 amateurs for a scheme which is typically American in conception, let us hope it will be a success. In any case, UNO backing for the cause of Amateur Radio may well be of great value to us at Atlantic City.

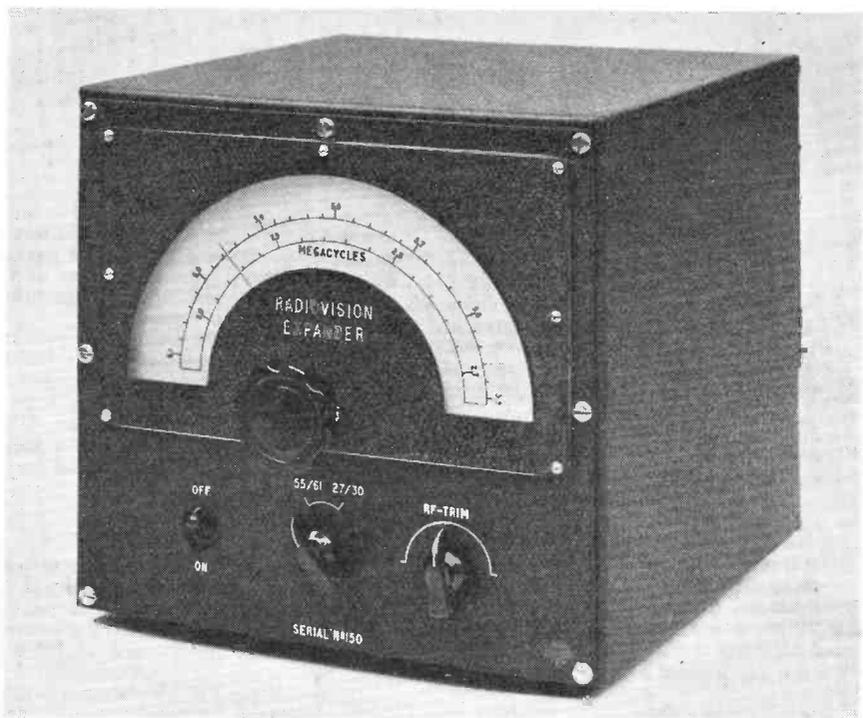
## "Pse QSL"

Every month our *Short Wave Listener* carries a full page of requests from amateurs throughout the world wanting SWL reports on their transmissions. About 200 such notices have so far been published.

If you want reports, give band or band(s) upon which they are required, whether for CW and/or 'phone transmissions, any particular details as to coverage or direction for reports, normal operating periods and the QTH for QSL's. Insertions are made on the clear understanding that all correct reports received will be acknowledged by QSL card. Address your request to "Pse QSL," *Short Wave Listener*, 49 Victoria Street, London, S.W.1. Those received as a result of this notice will appear in the September issue of the *Short Wave Listener*, published on August 21.

## Taylor Instruments on HP

We are informed that it is now possible to obtain Taylor apparatus under hire-purchase terms over either 6-month or 11-month periods. Their list covers thirteen different instruments in the test and measuring instrument category upon which HP facilities are available. For example, the Multi-Range Universal Meter Type 70A can be obtained for £1. 1s. 6d. down and eleven payments of £1 or six of £1. 18s. 6d. The Type 30A Oscilloscope costs £2. 13s. 2d. down and eleven monthly payments of £2. 12s. 8d. or six of £5. 0s. 10d.



## The Radiovision 5/10 Expander

### *Magazine Test Report*

**I**LLUSTRATED is a very useful piece of equipment for those who, without receiving facilities for 28 and 58 mc, wish to operate in those bands.

This unit is a three-stage converter intended to team up with the V55R (the amateur version of the well-known R.A.F. R.1155 receiver, as modified by Messrs. Radiovision), but can be operated equally successfully with any receiver capable of providing an IF channel of 1.6 mc.

The circuit of the Expander is RF stage-mixer-oscillator, using EF50's and a 6J5 as oscillator. A very well smoothed built-in power supply is incorporated in the unit, with the input side of the transformer tapped 200-220-240 volts. Scaled frequency coverage is 27-30 mc and 55-61 mc.

#### Tuning Unit

Entirely separate coil assemblies are used for the two bands and this necessitates changing over the aerial when going from band to band. Selection of the wave-range required is by a switch on the front panel. A twin-section tuning condenser is employed for mixer and oscillator, with an additional condenser for peaking the RF stage; the tuning of the latter is, of course, relatively flat.

A wire pointer driven through a slow-motion control travels across a semi-circular scale, separately marked for the bands covered. The actual scale coverage on the 28 mc band is approximately 110 degrees, and on 58 mc (58.5-60 mc) it is about 60 degrees.

The Expander is a self-contained unit housed in a smart black crackle metal cabinet 9 in. wide  $\times$  9½ in. deep  $\times$  8½ in. high. The panel controls are main tune, RF trim, band switch and power on-off. The aerial-earth terminals are on the rear sub-panel, and twin shielded cable is provided for IF connection to the receiver with which the Expander is to work.

#### Test Results

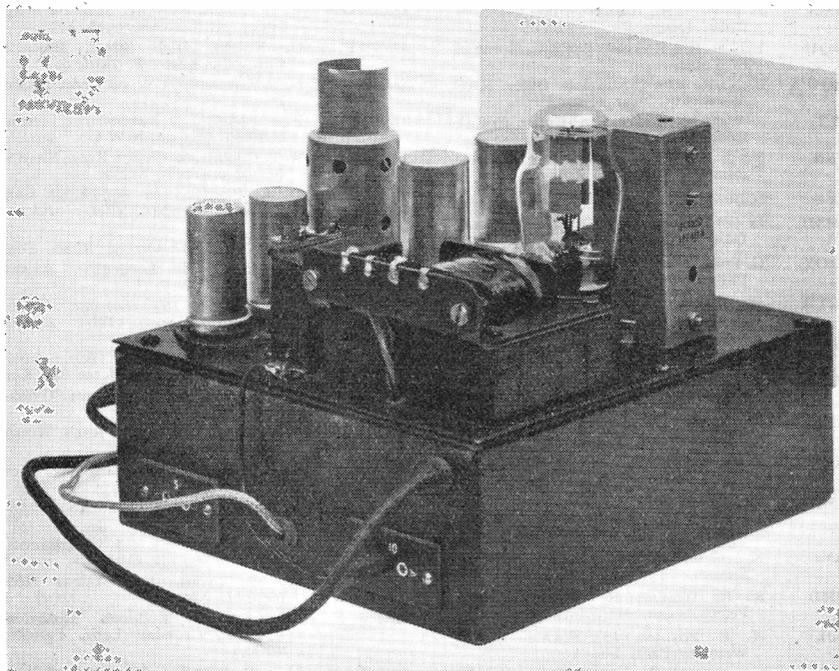
Receivers used with the Expander in the course of our tests were an AR-77, an SX-24 and an R.1155. In each case results were equally satisfactory as regards general operation and signals audible in the 10- and 5-metre bands with the standard equipment were all there on the Expander.

After the initial warming-up period only slight creep was noticeable on 58 mc, necessitating a little re-touching of the main tuning control between transmissions. On 5 metres, the RF trimmer tends to pull the main tuning, and peaking of the RF stage thus calls for re-adjustment

of the tuning; this is not, however, in any sense a serious failing and the procedure involved is simply a matter of ordinary tuning skill.

The dial calibration should be regarded as approximate only on both bands; on 5 metres it was found to be almost exactly 200 kc out on the scale marking. In use, therefore, a datum point for both bands should first be found against a frequency standard of known accuracy. The main tuning control is smooth and positive and the switching noiseless. Under normal conditions, gain would be adjusted on the RF and AF gain controls of the main receiver, the BFO of which also provides for CW reception.

For comparative purposes, the Expander Unit with an AR-77 was run against an S-27 and tests carried out on both the 28 and 58 mc bands. In general, the results obtained over a considerable period showed that on the score of sensitivity, selectivity and noise level there was very little to choose between them.

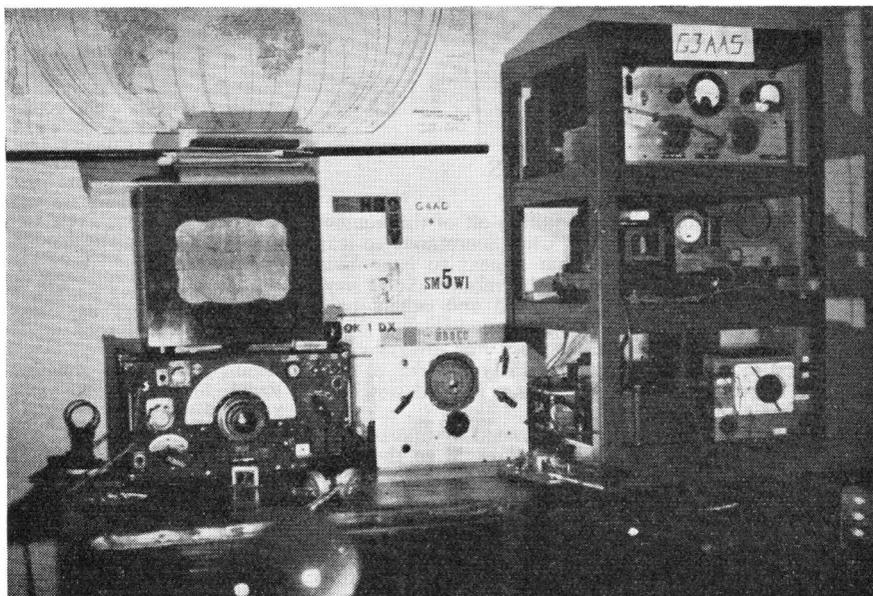


Chassis view of the Radiovision Expander. Separate A-E connections are necessary for 5- and 10-metre working.

## NEW QTH's

Only those which have changed since the appearance of the September, 1939, issue of the Call Book or were not included in it for fully licensed operation, or are now licensed for the first time, can be published here. All that do appear in this column will automatically be included in the next Call Book, now in preparation. The number of QTH's we can print each month depends upon space available. QTH's are inserted as they are received, up to the limit of the space allowance. Please write clearly and address to QTH Section.

- G2AFB B. H. Douthwaite, A.M.I.E.E., 54 Park View Gardens, Hendon, London, N.W.4.
- G2AKT S. C. Keville, 25 Walmington Fold, Woodside Park, London, N.12.
- G2AMX C. Bailey, 34 Torrington Toad, Ruislip, Middx.
- G2BAG A. G. Boon, Gordon Villa, Ash Lane, Rustington, Littlehampton, Sussex. (Correction.)
- G2BBU G. Smith, 46a Oxford Road, Birkdale, Southport, Lancs.
- G2BIM L. W. J. Leask, Carlton, Long Park Hill, Maidencombe, Torquay, Devon.
- G2BWP H. W. Palmer, Albion House, Mortimer Street, Herne Bay, Kent. (Tel.: Herne Bay 667.)
- G2CAT Maj. W. C. Alcock, 36 Netley Street, South Farnborough, Hants.
- G2CBH W. W. Turner, The Knoll, Beech Lane, Romiley, Stockport, Ches.
- G2CIW J. F. Moseley, 23 Tower Hill, Brentwood, Essex.
- G2CMK c/o Mrs. Cooper, Byways, Meigham Grove, Norwich.
- G2DHV G. V. Haylock, 63 Lewisham Hill, London, S.E.13.
- G2DMS F. E. Williams, 102 Crosswood Crescent, Roby, Lancs.
- G2DQU B. N. R. Rix, Kirkgate, Eastgate, Hornsea, E. Yorks.
- G2DQU/A B. N. R. Rix, C.M.T.T.B. Office, RAF Marsworth, Near Tring, Herts.
- G2FFT J. Weaver, Methersgate, Upper Grange Road, Beccles, Suffolk.
- G2FXR North End, Darsham, Suffolk. (Tel.: Bramfield 200.)
- G2FZB J. Bevan, 121 Stroud Road, Gloucester.
- G12HML Lt. (E) T. D. Aidwell, R.N., 21 Shrewsbury Gardens, Belfast, N.I.
- GM2OY G. Pollock (ex-VK2YU), 122 High Street, Falkirk, Stirlingshire.
- GM2TW H. Leishman, Woodside, Redding, Polmont, Stirling.
- G3AIU K. A. H. Rogers, Goring Lodge, 21 Links Road, Epsom, Surrey.
- GW3ALE B. Randall, Holmestower, Wellwood Drive, Dinas Powis, Glam., S. Wales.
- GM3ANO I. O. Shaw, 167 Perth Road, Cowdenbeath, Fifeshire.
- G3ARK D. Barnard, 47 Nursery Road, Ross-on-Wye, Herefordshire.
- GM3AUD R. A. Reid, M.A., The Schoolhouse, Kyle of Lochalsh, Ross-shire. (Tel.: Kyle 61.)
- G3AVF K. J. Grimes, 3 Clarendon Park, Torquay, Devon.
- G3BHD R. H. Whitley, 56 St. Pauls Road, Peterborough, Northants.
- G3BJK H. E. Poynter, 132 Barnhill Road, Wembley Park, Middx.
- G13BKG F/L K. C. B. Field, R.A.F., Joint Anti-Submarine School, Londonderry, N.I.
- G3BNS R. A. Catmur, Farnborough Grange Hostel, Hawley Lane, Farnborough, Hants.
- G3BNW J. E. Bailey, 9 Heywood Road, Alderley Edge, Ches.
- G3BRA O. C. Doley, Norham-on-Tweed, Northumberland.
- G3BRW R. G. Wyatt, 43 Laver Road, Colchester, Essex.
- G13BTE J. R. Hall, 16 Farnham Park, Bangor, Co. Down, N.I.
- G3BUB A. Hubbard, The Barn, Springfield Avenue, Telscombe Cliffs, Peacehaven, Sussex. (Tel.: Peacehaven 3131.)
- G3BUH B. Hughes, Ardua, Belmont Road, Rugby, Warks.
- G3BUI H. Cox, 4 Boardman Road, Higher Crumpsall, Manchester 8.
- G3BUJ J. H. Barrance, M.B.E., Trenba, 49 Swanage Road, Southend-on-Sea, Essex.
- G3BUN J. C. Gregory, 8 Vernon Road, Hornsey, London, N.8.
- G3BWC H. C. Bostock, 1 Grange Road, Hayes, Middx.
- G3BWM W. H. Moore, 15 Osborne Road, Broadstairs, Kent.
- G3BWO R. J. Knight, Belmore, Seagrave Road, Sileby, Nr. Loughborough, Leics.
- G3BWP C. Knight, High Street, Boscastle, Cornwall. (Tel.: Boscastle 55.)
- G3BWR N. B. Greenall, 31 Wood Lane, Prescott, Lancs.
- G3BYC E. H. Major, 9 Ravenshurst Avenue, Hendon, London, N.W.4.
- G3BZB R. T. Cunliffe, 68 Church Road, Stretton, Burton-on-Trent, Staffs.
- G3BZG D. A. Findlay, 126 Whitchurch Lane, Edgware, Middx. (Tel.: Edgware 3204.)
- GM3BZP I. A. Bates, 37 Craigie Road, Perth.
- G3CAS R. Ridley, 149 Lessingham Avenue, Tooting, S.W.17.
- G3CJS F. J. Smart, 169 Highgate, Heaton, Bradford, Yorks. (Tel.: Bradford 43050.)
- G3DAH S/L A. H. Dormer (ex-VS1BD), Summerleigh, Beltinse Road, Herne Bay, Kent.
- G4CP C. R. Perks, 7 Poplar Avenue, Tividale, Nr. Dudley, Wors.
- G4RO A. E. Read, 7 Blakemere Road, Welwyn Garden City, Herts.
- G5KC G. W. Kelley, 123 Kingsway West, Acomb, York.
- G6PO H. Hillgrove, 125 Ashington Grove, Whitley, Coventry.
- G8CV T. McL.Galloway, 5 Marlborough Gardens, Stanwix, Carlisle.
- G8GT W. O. Lyons, 123 Malpas Road, Newport, Mon.
- G8TS J. St. C. T. Ruddock, Stoneyford, Byworth, Crondall Lane, Farnham, Surrey.
- G8UP J. G. B. Bransom, 108 Gledhow Wood Road, Leeds 8.



## The other man's station

### G3AAS

Here is a view of station G3AAS, M. D. Glynn, 40 St. Martin's Grove, Leeds, 7. The top panel carries the transmitter assembly, a 6V6 quadrupling from 3.5 mc to drive the 807 final on 14 mc. The centre meter reads current to either stage. Cathode-break keying is used, with an input of 24 watts to the 807, at 400 volts.

The main receiver is an R.1155, with a home-built superhet as standby; this uses a 6K8 FC, with 1.6 mc IF feeding a triode detector and output stage. A 250-volt power supply is provided for the receiving side of the station.

Separate aerials are used for reception and transmission. The former is

a single wire for 20 metres, and the transmitting aerial a 14 mc half-wave, centre-fed with low-impedance line, inductively coupled to the PA tank.

The lower panel of the rack contains miscellaneous test equipment, including a signal generator and a 100 kc crystal frequency standard. The rack itself is interesting in that it is a very solid job in steel, made by the Roneo people as a tool rack; it cost but 27s. free of purchase tax!

G3AAS is getting very satisfactory results with this outfit—the first “G3-plus-three” that we have yet featured—and he not only QSL's 100 per cent. but welcomes SWL reports, which are acknowledged by return.

# THE MONTH WITH THE CLUBS

## FROM REPORTS

Last month's comment on the falling-off of the number of reports seems to have caused Club Secretaries to leap into action, for several clubs that appear to have been lying dormant have reported again this month. Some have been re-established, some reorganised and others have just come back as if nothing had happened!

In general the summer weather does not always cause a falling-off in attendances, and clearly where a club can offer a live programme of events, it need not be a seasonal affair at all.

Reports for the next issue are requested by first post on July 15, *certain*. They should be addressed to the Club Secretary, *The Short Wave Magazine*, 49 Victoria Street, London, S.W.1. And don't forget those photographs we mentioned in the May issue.

**Grays & District Amateur Radio Club.**—Meetings are now held at Baird's Cafe, Orsett Road, Grays, on alternate Fridays as from June 6. Several members are active on the bands, and the President, G2YH, operates by remote control on 1.7 mc and can QSY to six spot frequencies by dial telephone.

**Exeter & District Radio Society.**—Considerable re-organisation has taken place, including the adoption of a new name for this Club. There are some 33 members, and they meet at Mount Pleasant Chapel Schoolroom, Thurlow Road, on Thursdays at 7 p.m. Holiday makers in the Exeter region will be warmly welcomed. Recent meetings included a Radio Quiz, a lecture on X-Rays, a talk on "How to QSL" and a visit by a representative of the Acoustical Manufacturing Co. Ltd., of Huntingdon.

**Midland Amateur Radio Society.**—A recent meeting was attended by 62 members to hear a talk by G2ZV on "New Designs in UHF Equipment as used in Civil Air Lines." This was followed by a talk on "Gee." Meetings are held at the Imperial Hotel, Birmingham.

**Bradford Short Wave Club (G3NN).**—Meetings are still well attended, in spite of the rival claims of fine summer evenings. The club was recently visited by VE3XZ, who gave some interesting comparisons between British and Canadian prices! A very successful auction sale was held during May, and these sales will continue as monthly events.

**Worcester & District Amateur Radio Club.**—This club is a newcomer to our pages, and we are glad to hear from them. Meetings are held at Worcester Public Library on the first Thursday of the month at 7 p.m. Members will be welcomed, and all details may be obtained from the Secretary (see panel for QTH).

**Birmingham & District Short Wave Society.**—Meetings continue on the first Monday of the month (but the August meeting will be on the 14th). It is hoped that they may become fortnightly affairs before long. Members' logs for May were discussed at the June meeting and some excellent DX performances showed what straight receivers can still do. A Quiz also contributed some useful information and much amusement.

**Cheadle & District Amateur Radio Society.**—They held their first Annual Ball during May. At this very successful function, demonstrations of Amateur Radio were given, and recordings were made and played back during the evening. Members are bringing Amateur Radio before the public and creating widespread interest; the local Press co-operates with regular reports of activities, and local people have given generous support. The Club is active on 3.5, 7 and 58 mc every day (and most of the night too).

**Romford & District Amateur Radio Society (G4KF).**—A very comprehensive programme of events has been arranged, covering the entire season. June meetings covered a D/F Contest and a lecture on Micro-Waves; July events will include a Sale (July 14), Amplifier and Speaker tests (July 21) and a talk on "Maths applied to Receiver Design" by G3BKD (July 28).

**Doncaster & District Amateur Radio Society.**—A Club transmitting licence has been granted, and the call sign is awaited; the transmitter and receiver are being built, and Doncaster will be on the air very soon. Meetings are well attended, and Morse classes are given every Wednesday evening. Some interesting tests between the ten transmitting members are also planned. Meetings are at 73 Hexthorpe Road, every Wednesday at 7.30 p.m.

**Bradford Amateur Radio Society.**—The last lecture was by Mr. P. Denison (G8OK), who entertained members with reminiscences of "Forty Years on the Air." The society was represented on June 9 at the ceremony in which their President, Sir Edward Appleton, was admitted to the Roll of Honorary Freemen of the City of Bradford, Mr. C. A. Sharp (G6KU) and Mr. J. H. Macdonald (G4GJ) attending.

**Grafton Radio Society (G3AFT).**—Grafton has started a 58 mc section under the leadership of G2AAN, and hopes to be working on that

band very soon. A series of lectures and demonstrations on Television has been planned, and Morse instruction continues on three evenings a week. Grafton would also like contacts on 1.7 mc with other Clubs — Mondays, Wednesdays and Fridays from 1930 onwards.

**Harrogate & District Short Wave Radio Society.**—Two interesting talks have been arranged for July. On the 9th Mr. F. Dalby deals with "Converters," and on the 23rd Mr. J. Hammond covers "The Propagation of Wireless Waves." The latter talk is the first of a series on Fundamentals.

**East Surrey Short Wave Club.**—This club was restarted last February and is now firmly established once more. The President is G8HH and the Chairman G6JF. Meetings are at present held monthly, alternating between the last Tuesday and last Thursday in the month, at the Toc H Rooms, Station Road, Redhill. Films, demonstrations and a lecture by G2MV have recently been enjoyed by the membership, and new members and visitors will be warmly welcomed.

**Hounslow & District Radio Society.**—Recent meetings have been well attended and the membership is still increasing. The summer programme is being arranged, and the next meetings are on July 9 and 23. A recent debate on "Air-spaced versus Iron-cored Coils" proved very successful.

**Thames Valley Amateur Radio Transmitters' Society.**—The society recently organised two stations for field day operation, both of which appear to have done very well. The most recent meeting (July 2) took the form of a Question and Answer Evening, in which much useful knowledge was disseminated.

**West Middlesex Amateur Radio Club.**—This club proposes to erect a hut as workshop and shack; as soon as something suitable has been located, the club transmitter will be installed. Meetings are held at present in the Labour Hall Room, Uxbridge Road, Southall.

#### **Wirral Amateur Radio Society.**

—In view of the holiday season, only one meeting has been arranged for July—YMCA, Whetstone Lane, Birkenhead, at 7.30 p.m. on the 9th. Recent events have included a talk on the early days by Mr. G. L. Flint, and a paper by G6VS on "Tracking," dealing with the calculation of values of padders, trimmers and so on in superhet circuits. The Friday night 1.7 mc net still operates under the leadership of G2AMV and G6VS.

#### **West Bromwich & District Radio Society (G3BWW).**

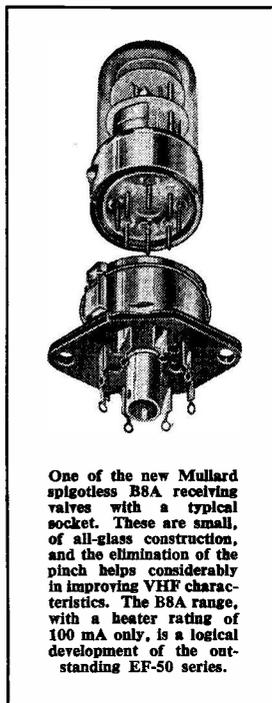
—Meetings are held every Monday at 7.30 p.m., alternately at the Gough Arms Hotel, Jowetts Lane and the Udall Engineering Co., Mill Street, Great Bridge. The club transmitter operates from the latter address, at which most of the practical work is done. The Gough Arms Hotel sees most of the talks and discussions, and Morse classes are held at both addresses. At present a series of talks on Radar, by G8NC, is under way.

#### **Liverpool & District Short**

**Wave Club.**—Morse classes are in full swing, and well attended; two sessions, Advanced and Elementary, are organised. Plans are also in hand for an exhibition of short-wave components, and members recently visited Speke Airport, to look over the radio equipment used in the aircraft. Meetings are held every Tuesday, and the Club Transmitter is on the air on the first and fourth Tuesday of each month.

#### **Cray Valley Radio Trans-**

**mitting Club.**—Membership, which is restricted to licensed amateurs, now comprises 75 per cent of the amateur strength in the district. Meetings are held at Lamorhey Park Education Centre, Halfway Street, Sidcup, on the third Thursday of the month at 7.30 p.m. Recent sessions have included lectures on Propagation (Mr. T. W. Bennington) and Transmitter Design (G5OH). A monthly magazine, "QRM," is published, and carries technical articles, station descriptions, a DX review and Club Notes.



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**Jersey Radio Club.**—This club continues to meet every Tuesday evening at Monaco, St. Saviours Road, at 7.30 p.m. The first Tuesday is devoted to "rag-chewing" and the others mostly to Morse. GC3GS is chief instructor, assisted by GC2FMV and GC2CNC. Several others are active on the air, including GC4LI on 58 mc. He hopes to be the first GC to contact G on that band. All visitors to Jersey are asked to look in at Monaco during a meeting, when they will be assured of a welcome.

#### **T.R.E. Amateur Radio Society**

(G3ETR).—With so many active amateurs on the staff, it is not surprising that Telecommunications Research Establishment, Malvern, has formed a club. The club transmitter will eventually operate on all bands but is at present only on 7 mc. Members up to date include G4KB, G2HIF, G3BJB, G2CKR (ex-VS1BZ) and G8QX, the latter being the Hon. Secretary.

**Wigan & District Amateur Radio Club (G3BPK).**—This club has recently held a General Meeting and is now on a firm basis. The club transmitter is operating regularly on the 7 mc band, and all reports will be welcomed.

**Smethwick & District Wireless Society (G2GX).**—Meetings are to be held throughout the summer, at The Hut, Langley Baths, Moat Road, Langley, on the first Tuesday of each month. New members are asked to attend on July 8 or subsequent Tuesdays, or to communicate with the Hon. Secretary (QTH in panel). This society was formed in

1921 and held the callsign G2GX before the war.

**Aberdeen Amateur Radio Society (GM3BSQ).**—Activity has fallen off recently on account of fine weather and long evenings rather than because of lack of enthusiasm. The club transmitter will be on the air by the time these notes appear.

**Wanstead & Woodford Radio Society (G3BRX).**—Membership still increases, with weekly attendances round the 35 mark nowadays. During June the club tried a Brains Trust, which went down very well, and the bi-weekly technical talks are continuing. A Ladies'

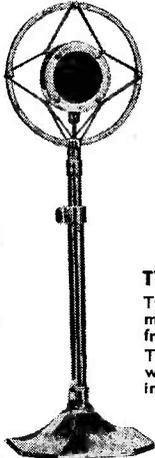
Night has been arranged for July 29. More members would be welcomed, especially for the Tuesday Morse classes at 7 p.m. Normal meetings are on Tuesdays at 8 p.m.

**Thanet Amateur Radio Society.**—Membership now totals sixteen, including nine licensed amateurs. No permanent headquarters have yet been located, but the club meets every Sunday evening at the British Legion Headquarters, Ramsgate, and in the various shacks round the coast. Lectures and Morse classes have been arranged, and a series of "skeds" with Dutch amateurs in the Hilversum area is also in the offing.

In this panel are the names and addresses of the Club Secretaries whose reports appear in this issue. They will be pleased to welcome new members and to give every assistance on Club matters.

- ABERDEEN (GM3BSQ).** A. D. J. Westland, GM3BQU, 17 Beaconsfield Place, Aberdeen.
- BIRMINGHAM.** N. Shirley, 14 Manor Road, Stechford, Birmingham, 9.
- BRADFORD (Amateur Radio Society).** J. H. Macdonald, G4GJ, Mayfield, Wagon Lane, Bingley, Yorks. (Tel. : Bingley 965.)
- BRADFORD (Short Wave Club, G3NN).** V. W. Sowen, G2BYC, Rushwood, Grange Park Drive, Cottingley, Bingley
- CHEADLE.** V. E. Hughes, G3AVG, 52 Greenhill View, Black Lane, Cheadle, Staffs.
- CRAY VALLEY.** G. Miles, G2CXO, Cotswold, Mottingham Lane, London, S.E.9.
- DONCASTER.** H. Flintham, 73 Hexthorpe Road, Doncaster. (Tel. : Doncaster 49155.)
- EAST SURREY.** L. Knight, G5LK, Radiohme, Madeira Walk, Reigate, Surrey. (Tel. : Reigate 3001.)
- EXETER.** E. G. Wheatcroft, 7 Mount Pleasant Road, Exeter.
- GRAFTON (G3AFT).** W. H. C. Jennings, G2AHB, Grafton LCC School, Eburne Road, Holloway, London, N.7. (Tel. : Stamford Hill 3891.)
- GRAYS.** R. F. Read, 26 Hillside, Little Thurrock, Grays, Essex.
- HARROGATE.** K. B. Moore, Spinney Cottage, 2a Wayside Crescent, Harrogate.
- HOUNSLOW.** A. H. Pottle, 11 Abinger Gardens, Isleworth, Middx.
- JERSEY.** E. Banks, GC2CNC, Lorraine Guest House, 8 Havre des Pas, Jersey, C.I.
- LIVERPOOL.** T. W. Carney, G4QC, 9 Gladeville Road, Aigburth, Liverpool, 17.
- MIDLAND.** W. J. Vincent, G4OI, 342 Warwick Road, Solihull, Birmingham. (Tel. : Solihull 0413.)
- ROMFORD (G4KF).** R. C. E. Beardow, G3FT, 3 Geneva Gardens, Whalebone Lane North, Chadwell Heath, Essex.
- SMETHWICK (G2GX).** Maj. G. A. Swinnerton, G6AS, 23 Hawthorn Croft, Quinton, Birmingham, 32.
- THAMES VALLEY.** D. R. Spearing, G3JG, Thurston, Orchard Way, Esher, Surrey. (Tel. : Esher 3369.)
- THANET.** A. J. Jeffrey, Rutland House, 9 Lloyd Road, Broadstairs, Kent.
- T.R.E. (G3ETR).** K. Hopkinson, G8QX, 15 Malvern Lane, Abbey Road, Great Malvern, Worcs.
- WANSTEAD (G3BRX).** R. J. C. Broadbent, G3AAJ, 24 St. Margarets Road, Wanstead Park, London, E.12.
- WEST BROMWICH (G3BWW).** R. G. Cousins, G3BCS, 38 Collins Road, Wednesbury, Staffs.
- WEST MIDDLESEX.** H. C. Bostock, G3BWC, 1 Grange Road, Hayes, Middx.
- WIGAN (G3BPK).** H. King, 2 Derby Street, Spring View, Wigan.
- WIRRAL.** B. O'Brien, G2AMV, 26 Coombe Road, Irby, Heswall, Ches.
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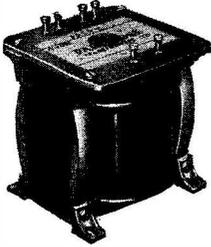
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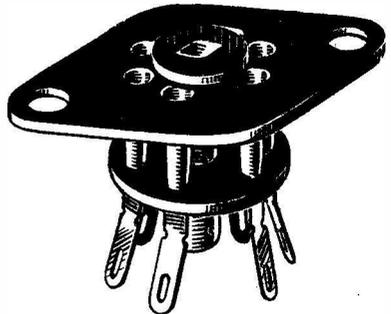
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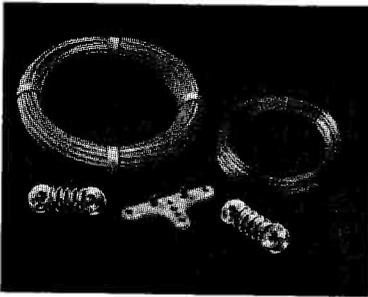


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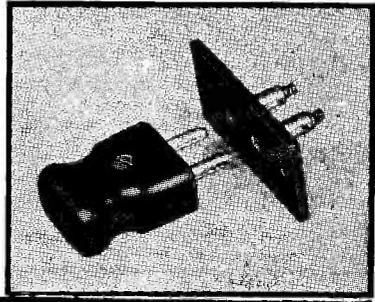
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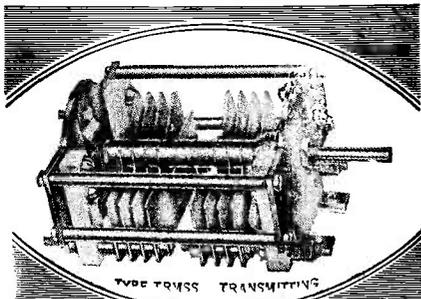
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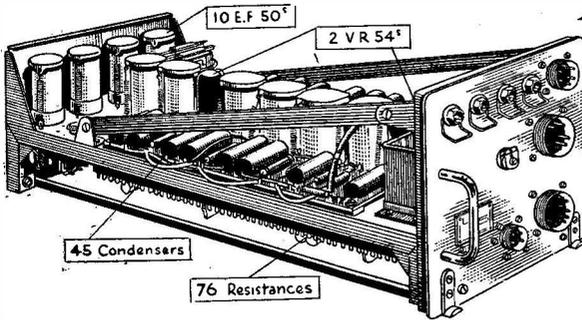
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Telephone: Stepney Green 2760, 3906

## BRAND NEW—NOT EX-GOVERNMENT “SURPLUS”

<p><b>A</b>bsorption Wavemeter &amp; Phone Monitor 35/-            Avominor D.C. Meter .. .. 4/4-            Avominor Universal .. .. 8/10-            Avominor No. 40 Univ. .. .. 17/10-  <b>B</b>rown's Earphones "A", 57/6; "F", 23/6            Bulgín Test Prods .. .. 2/6            Ball Drives (6-1) .. .. 3/3            Butterfly Split stator 3-13 pf .. 3/9  <b>C</b>hassis Cutters 1½ in., 10/6; 1¼ &amp; 1½ in. 12/6            Crystal Mike (D.104) .. .. 5/5-            Crystal Pick-up (Rothermel) .. .. 52/6            Ceramic Valvebases, 4 &amp; 5-pin.. 1/3            Octal &amp; Button Base, 1/6; Acorn, 2/6            EF50 .. .. 2/6  <b>D</b>elay Switches (Varley Thermal)            4v, 5v and 6.3v .. .. 10/-            Dials 8-1 Slow Motion (Compl.) .. 15/6            Dials 50-1 Slow Motion (Compl.) .. 66/-            Dial 3-band Slow Motion (Compl.) .. 11/9  <b>E</b>lectrolytics (T.C.C.)            2 mfd/450, 3/3; 4 mfd/200, 3/-; 8 mfd/200,            3/3; 8 mfd/450, 4/6; 16 mfd/450, 6/-  <b>F</b>lexible Drives, 5½ in., 6/-; 8½ in., 6/6            Filament Transformers from 24/6 to 32/6            Fuseholders, Single, 2/9; Twin, 4/-  <b>G</b>rid Caps, screened .. .. 9d.            Glass Insulators (Pyrex) .. .. 1/3  <b>H.F.</b> Chokes, U.H.F., 2/3; S.W. 3/3            All Wave, 4/6; Transmitting, 6/-  <b>I</b>ntervale Transformers 3-1 .. .. 8/6            Parafeed 4-1 .. .. 6/-  <b>J</b>acks 2/6; Jackplugs, 2/3  <b>K</b>nobs and Dials            2½ in. with Knob, 4/-; 4 in., 6/9            2 in. Metal Dials, 0-100 .. .. 9d.            Nameplates (TX) .. .. 6d.  <b>L.F.</b>-Chokes. 10H 60mA .. .. 8/6            20H 160mA .. .. 27/6  <b>M</b>etal Cabinets            7 in. × 8 in. × 8 in. (Comp.) .. 39/6            19 in. × 10 in. × 10 in. (Sliding            Chassis) .. .. 94/6            12 in. × 7 in. × 7 in. (Comp.) .. 45/-            13½ in. × 8½ in. × 9 in. .. .. 73/6            Miniature I.F.'s (465 Kcs and 1.6 Mc/s) 10/-            Mains Transformers            6.3v 3A, 5v 2A, 350v or 250v .. 30/-            4v 4A, 4v 2A, 350v or 250v .. 29/6            2000v 5mA, 4v 1.5A, 2v 1.5A, 4v 2A 73/6</p>	<p><b>N</b>eutralising Condensers 1-8 pf .. 11/6  <b>O</b>ctal Plugs, 1/9; Sockets, 2/6            Output Transf. P/P 6000 and 10000            A. to A. .. .. 55/-            Output Transf. 2 6L6's in P/P .. 35/-            Output Transf. Multiratio            (Impregnated) .. .. 11/3            Output Transf. Midget speaker .. 8/6  <b>P.</b> Coils (Wearite) .. .. 3/-            Potentiometers, 5/-; With Switch, 6/-            Polystyrene Octal formers 4-pin.. 2/6            Polystyrene Octal formers 6-pin .. 3/-  <b>Q</b>-MAX Tank Units, Mk. I .. .. 69/6            Q-MAX Tank Units, Mk. II .. .. 6/13-  <b>R</b>aymart Coils, 4-pin, 4/-; 6-pin, 4/9            Resistors ± 1% (up to 2 meg) .. 2/6            Resistors Carbon ¼ and ½ watt, 6d. 1 watt 1/6  <b>S</b>wiches. 2p 6w, 5/-; 2p 4w 6b, 10/6; 1p            9w, 4/11; 4p 3w, 4/11; SP/ST, 3/-;            SP/DT, 3/6; DP/ST, 3/9; DP/DT, 4/-            Speakers from 5 in., 23/6 to 12 in., 6/15/-            "S" Meters for AR88's .. .. 59/6  <b>T</b>ransmitting Condensers, 34 plus 34 pf, 17/3;            60 plus 60 pf, 30/-; 90 plus 90 pf, 15/3;            100 plus 100 pf, 37/6; 150 plus 150 pf, 17/-            Trimmers 3/30; 30/80; 50/150 pf .. 1/-            Trimmers, Midget air dielectric 15 pf, 4/6  <b>U</b>tility Microdial (100-1) .. .. 10/-  <b>V</b>alves. All types including:            4304CB, 4/2/6; DA41, 55/-; EF50, 21/4;            GTIC, 25/-; S130, 7/6; KT8C, 25/-;            PT15, 32/6; 866, 35/-; 4274A, 25/-            Variable Condensers            .0005 mfd, Single, 5/9; Twin, 13/3; .0005            mfd, Triple, 17/6; Four Gang, 21/-; .0001            Twin, 13/3; .000135 Triple, 17/3            V.H.F. Converter (Q-MAX) .. .. 19/19-            V.H.F. Extra Mono-Unit Coilblocks, 30/-  <b>W</b>estinghouse Metal Rectifiers            1mA, 5mA and 10mA .. .. 10/9  <b>X</b> Cut Q.C.C. Crystals .. .. 32/6            Band Pass Units .. .. 45/-  <b>Y</b>ellow, Black and Red Systolflex .. 3d.  <b>Z</b> on your pad to remind you of the address            for Quality Components.</p>
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**RELEASE DATE JULY 21.**

**THE "Q-MAX"  
 FOUR BAND FORTY  
 TRANSMITTER.**

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 additions. If not, send 6d. stamp for  
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(OPPOSITE CHANCERY LANE). TELEPHONE: HOLBORN 6231