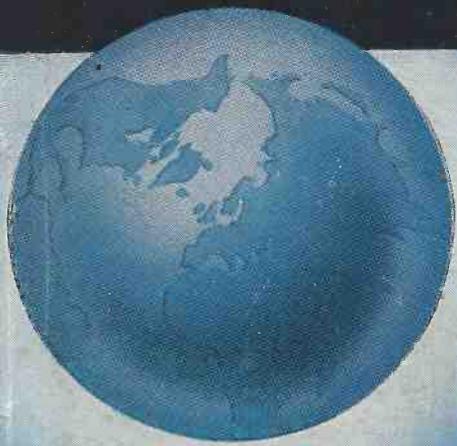


2/-

*The*

# SHORTWAVE *Magazine*



*L. O. Rogers*  

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*G2HX*  

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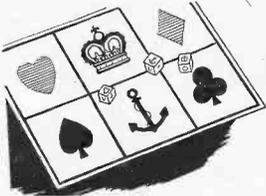
**EXCLUSIVELY FOR THE  
RADIO EXPERIMENTER &  
TRANSMITTING AMATEUR**

**VOL. VI No. 7 SEPTEMBER 1948**

# WEBB'S

BULLETIN NO.

4



The Crown and Anchor Man says:

"The more you put down — the more you pick up," and this is true of Radio Aerials. The greater the energy induced down or up the Feeders, the better the results both on reception and transmission. We supply all the necessary components for making an efficient aerial system, and we are always happy to give advice on any installation problem.

## AERIAL EQUIPMENT

### FEEDER SPREADERS

Ceramic type. Overall length 6 in. ... 1/6  
Ceramic type. Overall length 4 in. ... 1/3  
Ceramic type. Overall length 2 in. ... 1/3

### FEEDER CABLES

Belling-Lee "L.336".—Balanced twin feeder. Twin Polythene insulated Cable, 80 ohms, primarily designed for television work. Also has many applications for low power transmission, etc. With correct matching it will handle up to 200 watts, losses 1.3 db. at 7 Mc/s, rising to 4.0 db. at 56 Mc/s per 100 ft. Price per yard 7½d. Telcon 150 ohm.—Telcovin insulant, well-known flat twin feeder. Losses 0.9 db. at 10 Mc/s, 2.1 db. at 50 Mc/s per 100 ft. Price per yard 9d. Telcon 300 ohm.—Telcovin insulant, losses 0.4 db. at 10 Mc/s, 1.0 db. at 50 Mc/s. Price per yard 9d. To save time in cutting, the above three cables are normally available ex stock in 30 and 50 yard coils. Any length can be cut at a few hours' notice.

### CO-AXIAL CABLES

Belling-Lee "L.600".—Approximate outside diameter ½ in. Impedance 67-77 ohms. Losses 1.3 db. at 10 Mc/s, 4.3 db. at 100 Mc/s per 100 ft. Recognised Co-Axial Cable for Television and Transmitter work. (Stock lengths 30 yards, any other length can be cut at short notice)

Ex-Govt. Co-Axial Cable.—Outside diameter ½ in. Heavy duty Cable available in either 40 ohms or 80 ohms impedance. Price per yard 1/6

Webbs Duralumin Tubing.—Strong and light, ideal for dipole elements, reflectors, directors, etc., 8 ft. 6 in. length 4/6 (both lengths ¾ in. O.D.) 10 ft. 6 in. length 5/6  
Webbs Radio Feeder.—600 ohm Feeder in ready built lengths, spacing 3½ in. with 18 S.W.G. enamelled wire. Polythene Spreaders securely moulded into wire every 20 in. Supplied on drums, ready for winding off and immediate use.

Price per 35 ft. Drum £1/5/-  
Price per 50 ft. Drum £1/15/-  
(Packing and despatch 2/6 extra.)

### AERIAL INSULATORS

Pyrex heavy duty glass Insulators, 6½ in. long 7/10  
Pyrex Aerial Insulators, 3 in. long 1/3  
Pyrex Egg Insulators 1/3  
Eddystone No. 999 Steatite Strain Insulators, 3 in. long 2/6  
Belling-Lee "T" Strain Insulators 5/-  
Eddystone No. 946 low loss Aerial Lead, ½ in. diameter with glass tube fitted with vitreous porcelain insulator, water-tight rubber washer and wing nut. Length of glass tube behind insulator 3½ in. Price 3/3

### WIRE

7/22 stranded Copper Enamelled Wire.  
Per 100 yard Coil 9/-

Also available in 400 yard drums at

Per Drum £1/10/-

### GENERAL COVERAGE INTERFERENCE REDUCING AERIALS

Belling-Lee "Eliminoise" No. L307/T. Receiving Transformer £2/2/-  
Belling-Lee L306/T Aerial Transformer (including lightning arrester) £1/19/-  
Belling-Lee L308/K "Eliminoise" Aerial Kit, with two Transformers, 60 ft. Copper Aerial Wire, 50 ft screened down lead, earth wire and insulators £6/6/-

### SPECIAL SHORT WAVE AERIAL KITS

Belling-Lee Transmitting and Receiving Aerial Kit No. L609. Comprising "T" Strain Insulators, 80 ft. of Cadmium Copper Wire, and 80 ft. of balanced twin Feeder, with two glass end Insulators, complete with instructions £1/15/9  
"Arnine" Short-Wave Aerial, uses "folded dipole" principle, each model complete with approximately 50 ft. of 300 ohm twin down lead, No. FDA20 (for frequencies of 14 Mc/s upwards) £3/2/6

Model FDA40 (for frequencies of 7 Mc/s upwards) £3/12/6

Matching Transformer (not required with Communication type Receivers), Cat. FDA100 12/6  
Extra "Arnine" Cable .Per yard 9d.

### RELAYS

Relay aerial change-over. Double pole, double throw, for send-receive operation, band switching, etc. Heavy silver contacts, polystyrene insulation, minimum capacity and ample clearance to prevent leakage. Two types cover all power requirements up to 250 watts. Both operate from 4 to 6 volts, A.C.  
Type AEC04—Contacts take up to 4 amps R.F. approx. size 3 in. × 2½ in. × 1½ in. high. (Coil consumption 3 v.a.) £2/17/6  
Type AEC015—Heavy duty contacts for 15 amps. Approx. overall size 3½ in. × 3½ in. × 3½ in. (Coil consumption 6-8 v.a.) £5/10/-

### TELEVISION AERIALS

We carry in stock various types of Television Aerials, with and without reflectors, and for chimney wall or pole mounting. We can also arrange for the prompt and efficient erection of these Aerials.

\*Have you had your copy of Webb's 1948 Catalogue? A wealth of information for 6d. to callers, or 7½d. Post Free.

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

Telephone: Gerrard 2089

Shop hours: 9 a.m.—5.30 p.m. Sats., 9 a.m.—1 p.m.

# 'AVO' Precision ELECTRICAL TESTING INSTRUMENTS

Reg. Trade Mark

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

## The UNIVERSAL AVOMINOR

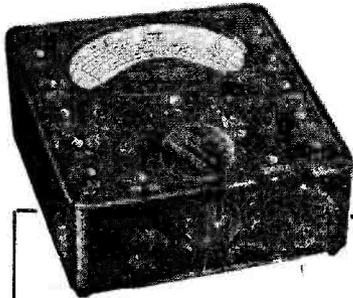
A small but highly accurate instrument for measuring A.C. and D.C. voltage, D.C. current, and also resistance. It provides 22 ranges of readings on a 3-inch scale, the required range being selected by plugging the leads supplied into appropriately marked sockets. An accurate moving-coil movement is employed, and the total resistance of the meter is 200,000 ohms.

The instrument is self-contained for resistance measurements up to 20,000 ohms, and, by using an external source of voltage, the resistance ranges can be extended up to 10 megohms. The ohms compensator for incorrect voltage works on all ranges. The instrument is suitable for use as an output meter when the A.C. voltage ranges are being used.

Size: 4½ ins. × 3½ ins. × 1½ ins.  
Nett weight: 18 ozs.

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

Price: £8 : 10 : 0



<b>D.C. VOLTAGE</b>	<b>A.C. VOLTAGE</b>
0-75 millivolts	0-5 volts
0-5 volts	0-25 "
0-25 "	0-100 "
0-100 "	0-250 "
0-250 "	0-500 "
0-500 "	
<b>D.C. CURRENT</b>	<b>RESISTANCE</b>
0-2.5 milliamps	0-20,000 ohms
0-5 "	0-100,000 "
0-25 "	0-500,000 "
0-100 "	0-2 megohms
0-500 "	0-5 "
	0-10 "

## The D.C. AVOMINOR

A conveniently compact 2½-inch moving coil precision meter for making D.C. measurements of milliamps, volts and ohms. The total resistance of the meter is 100,000 ohms, and full scale deflection of 300 v. or 600 v. is obtained for a current consumption of 3mA. or 6mA. respectively.

Size: 4½ ins. × 3½ ins. × 1½ ins.  
Nett weight: 12 ozs.

Complete as above.

Price: £4 : 4 : 0

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

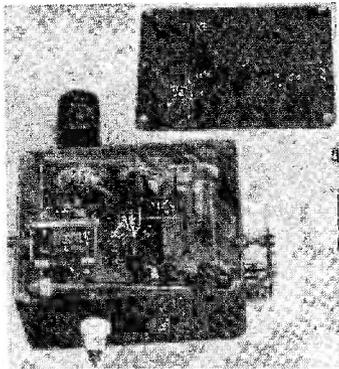
<b>CURRENT</b>
0-3 milliamps.
0-6 "
0-30 "
0-120 "
<b>VOLTAGE</b>
0-6 volts.
0-12 "
0-60 "
0-150 "
0-300 "
0-600 "
<b>RESISTANCE</b>
0-10,000 ohms
0-80,000 "
0-600,000 "
0-3 megohms



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

**THE AUTOMATIC COIL WINDER & ELECTRICAL EQUIPMENT CO., LTD.**  
WINDER HOUSE · DOUGLAS STREET · LONDON · S.W.1 · TELEPHONE: VICTORIA 3404/7

# V.F.O. HEART



Just the thing for your new exciter.  
 A stable oscillator with sufficient drive for pentode and tetrode valves.  
 Provision for direct keying.  
 Output approx. 30 volts R.M.S.  
 Power required 6-3v. .3 amps. 200-300v. 10Ma.  
 Two models—160m. or 80m. Bandsread.  
 £5.5.0 each

**Labgear Ltd**

**UP-TO-THE-MINUTE  
 TRANSMITTER TECHNIQUES  
 FOR PRECISION STABILITY  
 and  
 SIMPLICITY OF CONTROL**

Remove the need for tuning  
 buffer and doubler stages.

Provide constant drive on each  
 band with harmonic attenuation

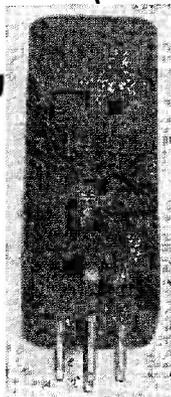
Simplify layout—small in size—  
 completely screened

Interchangeable—plug into stand-  
 ard valve-holders.

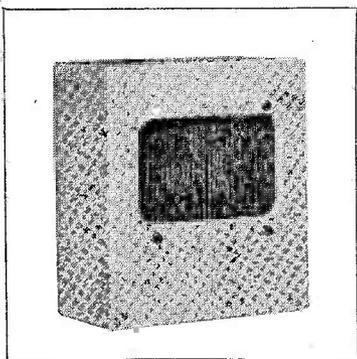
Six models—160, 80, 40, 20, 14,  
 10 metres  
 17/6 each

We shall be pleased to furnish full  
 details on application

**WILLOW PLACE  
 CAMBRIDGE** Phone 2494



**WIDE BAND  
 COUPLERS**



## CABINET MODEL CT115

Write for Brochure "S.W." It gives  
 details of all Celestion Chassis and  
 Cabinet Speakers.

# CELESTION

## SPEAKERS

The new and special magnets used in the construction of the Celestion 5" and 6½" speakers detailed below, provide a degree of efficiency hitherto unobtainable with permanent magnets. They represent the very latest method of speaker design and construction.

Chassis Model P6Q is also available as a **Cabinet Speaker** (size 9" x 8" x 4½"). The attractive cabinet is fitted with volume control. Cabinet finish in Green, Cream or Brown. Ask for Cabinet Model CT115. Price £2/17/- (without transformer), suitable for outputs 1.5 ohms; or, price £3/3/- (with universal transformer). Suitable for all receivers.

Chassis Diameter	MODEL	Voice Coil Impedance (Ohms)	Pole Diameter	Flux Density (Gauss)	Total Gap Flux (Maxwells)	Peak Power Handling Capacity
5"	P5Q	3-0	¾"	8,500	26,000	2W
5"	P5T	3-0	¾"	10,500	32,000	2W
6½"	P6Q	3-0	1"	8,500	26,000	3W
6½"	P6T	3-0	1"	10,500	32,000	3W

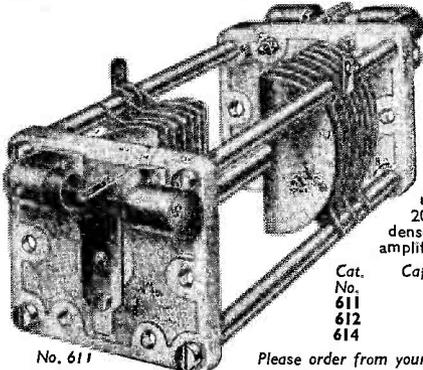
The Public are requested to order from their local Radio Dealer. Wholesalers are supplied by the sole Distributors: **CYRIL FRENCH, LTD.**, High Street, Hampton Wick, Middlesex. Phone: KINGston 2240. Manufacturers should please communicate direct with

**CELESTION LTD., SUMMER ROAD, THAMES DITTON, SURREY** Telephone: Emberbrooke 3402-5

# EDDYSTONE and the AMATEUR

## EDDYSTONE TRANSMITTING CONDENSERS

This range of Eddystone transmitting condensers is attracting considerable attention. A standard type of construction is employed in all three, the ceramic end plates being 2½ in. square. Losses are extremely small.



No. 611

The metal mounting plates supplied provide alternative methods of fitting—either directly to a metal chassis or on small stand-off insulators.

All three are of split stator type, and are therefore suitable for balanced and push-pull circuits. By strapping the stator plates together, additional capacity values are available for use in single ended or aerial tuning circuits.

The Cat. No. 611 is particularly suitable for use with modern low capacity triodes such as the 20, 4304, and 35T. The built-in neutralising condensers enable a very compact and efficient push-pull amplifier to be constructed.

Cat. No.	Cap. per Section	Effective Capacity as Split Stator	As Single ended	
611	25 pF	12.5 pF	50 pF	39/6
612	50 pF	25 pF	100 pF	32/6
614	100 pF	50 pF	200 pF	36/-

Please order from your Registered "EDDYSTONE" Retailer, as we do not supply direct.

**STRATTON & CO., LTD. WEST HEATH. BIRMINGHAM, 31**



### 18 TOTTENHAM COURT ROAD, LONDON; W.1

Tel.: MUSEum 2453

Tel.: MUSEum 4539

Shop hours: Monday-Friday 9—5.30, Saturday 9—1

The following items are extracted from our complete "TELEVISOR" list which is now available. Please send stamped addressed envelope for copy. In addition, demonstration models of the completed units are now on display for the guidance of constructors.

#### METAL WORK

- Complete chassis work of vision receiver in tin plate, drilled, etc., to original specification . . . . . 1 17 6
- As above for sound receiver . . . . . 1 12 6
- As above Sync. separator and time base steel chassis, black finish . . . . . 17 6
- As above power pack and sound stage. Steel chassis, black finish . . . . . 1 2 6

#### TRANSFORMERS AND CHOKES

- Mains transformers, STEWART 350.0.350v 250 mA, 6.3v 6A, 4v 8A, 0.2-6.3v 2A, 4v 3A . . . . . 5 5 0
- EHT transformer, SCANCO TELEVISION Type ST7, 4,000v 10 mA max., 4v and 2v 2A . . . . . 2 8 0
- Smoothing choke, 5 H, 250 mA, Stewart type . . . . . 1 3 6
- Choke, 10 H, 80 mA, Stewart type . . . . . 13 0

#### SCANNING EQUIPMENT

- Set scanning coils, SCANCO TELEVISION Type ST . . . . . 1 8 6
- Focus coil, SCANCO TELEVISION Type ST8 (Max. D.C. 40 mA, suitable for 9-in. or 12-in. CRT) . . . . . 1 17 6
- Line output transformer, SCANCO TELEVISION Type ST6 (Ratio 4.5 : 1. Max. D.C. 75 mA on primary) . . . . . 1 5 6

#### £ s. d. VALVES AND CRT. (All at NEW PURCHASE TAX of 33½ per cent.)

- |                       |                       |
|-----------------------|-----------------------|
| Mullard—              | Mazda—                |
| EA50's at 12/10 each. | T41's at 12/10 each.  |
| EF50's at 21/4 each.  | Pen 45 at 12/10 each. |
| EBC33 at 11/7 each.   | UU8 at 18/3 each.     |
| EL33 at 12/10 each.   | U22 at 18/3 each.     |
- Cathode Ray Tube GEC6501, Mazda CRM91 or Mullard MW22/7 at £11 6s. 10d. Rubber mask for above at 10/- each.

#### SURPLUS VALVES. (All tested and guaranteed.)

- EF50 at 6/- each, or special offer of 10 for £2/10/-.
- EA50 at 4/- each. HVR2A (for U22) at 10/-.
- KT44 (7 pin) at 8/6 each (for Pen 45).

#### MISCELLANEOUS

- Complete set of coils and chokes wound to specification of Fig. 8, page 29. All boxed and labelled . . . . . £1 0s. 0d.
  - Aladdin formers and cores . . . . . 10d.
  - Colvern wire-wound potentiometers 100K . . . . . 6/8
  - All other values . . . . . 5/6
  - Eric resistors, as specified, ½ or ¼-watt rating . . . . . 6d. each
- In addition we can offer the full range of TCC condensers, Belling & Lee components, and sundry items to complete the job.

Stockists of all Radio and Television Components including Valves, Batteries and Test Equipment.

## 3 GOLDHAWK ROAD, SHEPHERDS BUSH, LONDON, W.12

Telephone : Shepherds Bush 1729

### Another Valve "Special" this month

VT.62, 50 watts at 100 mc ; 7.5v at 3A, directly heated triode. Max. Va. 1250, G.M.-2mA per volt, Ra., 5,000 ohms, B4 base. Brand new. 10/6 each or matched pairs for 21/- (postage 1/6).

### Additional Valve offers

6J5, 5/- ; 6K8, 6/6 ; 5Z4, 7/6 ; 6V6, 8/- ; 6SN7, 7/6. All new and guaranteed. (Postage 6d. per valve.)

### Crystals

Brand new ex.-Govt. transmitter crystals, plug-in,  $\frac{3}{4}$ " pin spacing. Frequencies : 7810 and 8297 kc ; 12/6 each, post free.

### 0/1 Moving Coil Milliammeters

2" dia. Flush fitting. 10/6, post free.

### Mains Transformers

Input 230v, 50 cycles. Outputs 350.0-350v at 80 mA, 5v at 2A, 6.3v at 1A, 6.3v at 5A. Screened prim. 19/6 (postage 1/3).

### LF Chokes

20H at 80 mA (400 ohms DC res), 7/6, post free.

### American Radio Set, Type SCR593C

Brand new, six-valve portable push-button super-het receivers operated entirely from 2v accumulator. Frequency range 2 to 6 mcs (can be easily modified for higher frequencies). Loud speaker and vibropack housed in receiver chassis. Complete in every way and includes accumulator, full set of spare valves and vibrator, carrying straps, mounting brackets where vehicle operation is required, telescopic aerial, extra headphones, all connectors and comprehensive instruction book. Midget valves are employed and every detail has been carefully considered. Beyond charging the accumulator, nothing further is required to put this fine set into operation. Price £12/-/- (carriage paid).

### American V.H.F. Test Set

Comprises Signal Generator covering 100 to 155 mc, operating either as V.F.O. or as crystal osc. (using the 18th harmonic) and, as a separate unit, a self-contained field strength meter. Accessories include plug-in 0/1 milliammeter and battery box. Battery operated. Complete outfit. In special case. Very smart appearance. As new. £6/10/ (carriage 7/6).

## H. WHITAKER G3SJ

10 YORKSHIRE STREET, BURNLEY,

PHONE : 4924

**GOODWILL.** We take the opportunity this month to talk to our 2,000 satisfied customers. We have accumulated what is undoubtedly one of the finest and largest stocks of worthwhile ham gear in the British Isles, and we are happy to sell this to you at prices based on our buying price, not market value. That this policy pays is shown by the many complimentary letters we have received, and we thank you for your appreciation.

We scour the country for the right gear, and being active hams we know what is wanted, and are not deluded into buying material that looks attractive in price but is junk so far as the ham is concerned.

We have advertised many exclusive lines and can still offer every item from last month's full page advert except soiled Q Fivers and 72 mc Xtals. Our comprehensive stock of valves contains many items in insufficient quantity to advertise, so whether it's a button base 9001 or a 304TL, please try us. Well over 10,000 Xtals are still

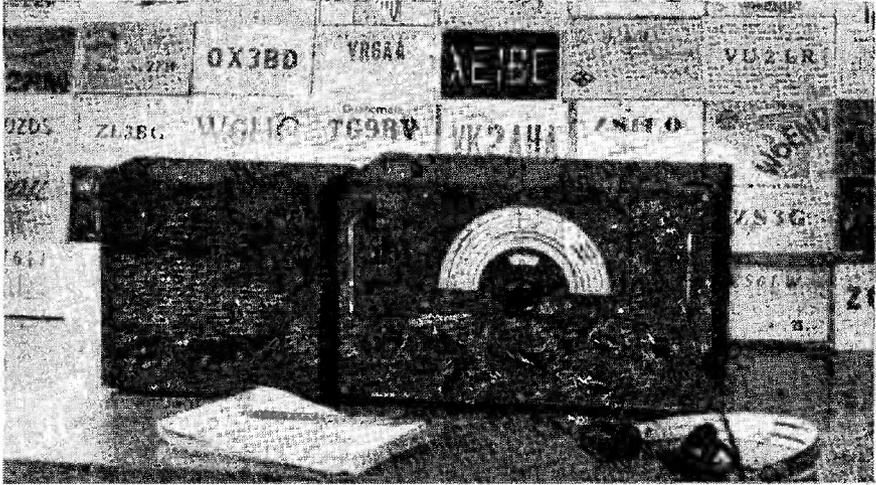
available, including many additions. 28-30 mc 30/- ; 36-37 mc, 30/- ; 72 mc are absorbed, but for really UHF chaps 60.99.5 mc, 30/- . Also available 3.5 mc band, BC610 fitting, 15/- ; 7,000-7,300 kcs, 12/6 ; 6,000-6,083 kc, 8,000-8111 kc, 15/- . We still have a number of Lionel bug keys, 50/- , and BC221s, brand new, without a blemish, £12.

For the bulk buyer and export market, we can quote most of our goods from last month's advert per 100 (even AM14/ART), and in many cases per 1,000. Quotations by return to serious buyers.

A new and comprehensive list is now ready and everyone who has dealt with or had correspondence with us will automatically receive one. Others who would like one, we shall be pleased to forward on request.

To our many staunch friends in all parts of the world we say thanks for your support in the past, and may our goodwill and friendly relations continue and grow stronger in the future.

# THE IDEAL RECEIVING STATION FOR YOU!



# £22-10-0

COMPLETE WITH SPEAKER OR PHONES

Hundreds of testimonials testify to the outstanding performance of the

ALL AMATEUR BANDS 10-160 METRES

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COMMUNICATIONS RECEIVER

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58-60, RUTLAND STREET, LEICESTER.

PHONE 20167

THE LEADING BRITISH MAKERS OF “HAM” COMMUNICATIONS RECEIVERS



## CHARLES BRITAIN (RADIO) LTD.

11 UPPER ST. MARTINS LANE, LONDON, W.C.2



(One minute from Leicester Square Tube Station. Up Cranbourne Street.)

**WE ANNOUNCE WITH PLEASURE THAT AS FROM SEPT. 1st, WE ARE OPENING MORE SPACIOUS PREMISES AT THE ABOVE ADDRESS. WE CORDIALLY INVITE BOTH OLD AND NEW FRIENDS TO INSPECT OUR VERY SPECIAL OPENING BARGAINS.**

### BEST BUY AT BRITAINS

**TYPE 26 R.F. Units Tuned 5 meter Converters.** Brand new in maker's cartons. Price 27/6 post free.  
**RADIO COMPASS UNIT Type BC433.** An American receiver which can be easily modified for broadcast reception. Complete with 15 valves. 1, 5Z4; 1, 6N7; 1, 6SC7; 1, 6J5; 2, 6B8; 2, 6F6; 2, 2051; 4, 6K7. Frequency range 200-1750 Kc/s. Brand new, very special offer at £4/17/6 each, plus 10/- carriage.

**INDICATOR UNIT Type 184.** Contains 1, 6" C.R.T. type VCR517; 1, 3" tube type VCR139A; 6, EA50; 5, EF50; 3, SP61; 3, EB34; 4, selenium rectifiers; 14, pot-meters. Many 1-watt resistors, condensers, etc. Size of case 9" x 12" x 18". Very special price, £2/19/6, plus 15/- carriage and packing. Indicator units also available. Types, 162, 182, 62, 6A, Test set 74, etc. Note all tubes are demonstrated to callers.

**R1132A.** Freq. coverage 124-100 Mc/s, complete with all valves, tuning meter in handsome metal case, with geared slow motion dial, less power supply. A really first class U.H.F. communication receiver in good condition for £3/5/-, plus 10/- carriage. The circuit diagram is printed inside the receiver. This job is rack mounting.

**BC454.** Western Electric Radio receiver. Freq. range 3-6 Mc/s, complete with 3, 12SK7; 1, 12K8; 1, 12SR7; 1, 12A6 and 24v dynamotor plug in. I.F.'s

used but in good condition, in metal case, limited number at 29/6, plus 2/6 carriage.

*Special bargain for callers*

**AMERICAN INDICATOR Type ID6 APN4;** Contains 26 valves, types, 3, SL7 G.T.; 14, 5N7 G.T.; 8, 6H6 G.T.; 1, 6I7 G.T.; 1, 5" C.R.T. Type 5CP1, and 100 Kc crystal. Callers only. Price £3/19/6.

**SUB CHASSIS.** Complete with 3 EF50; 2, EA50; ceramic valveholders, resistors, condensers, etc. Price 16/6 post free.

**I.F. TRANSFORMERS.** 465 K/cs adjustable iron cores, very high gain. In can; size 3½" x 1½" x 8/6 pr.

**ACCUMULATORS.** Unspillable, 2v20 ampere hour, brand new case size 6" x 3½" x 2½", price 8/6 each.

**MOVING COIL Mike and Headsets.** Brand new and boxed with 3 moving coil (Alni) inserts. Pressed switch on mike, 7/6 per set.

**BRAND NEW.** 5" speakers, less transformer, 10/6 each.

**BRAND NEW.** 8" mains energised speakers with transformer, 1,000 field, 19/6 each.

.0005 3-gang condenser, ceramic insulation, long spindle, with fixing feet, 6/6 each.

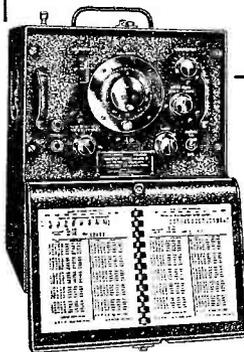
**SPECIAL VALVE OFFER!** 6V6 7/6 each, EF36 6/- each, 5Z4 7/6 each, KT33C 8/6 each, SP61 3/- each, SP41 3/- each, 6Q7 7/6 each, EA50 3/- each, 807 8/6 each. It will pay you to pay us a visit.

CHARLES BRITAIN (Radio) Ltd.

NOTE OUR NEW ADDRESS ABOVE.

Telephone: TEMple Bar 0545

Send for full  
list of bargains to ...



# INSTRUMENT CO.,

244, HARROW RD., LONDON, W.2. CUN 0508.

**BC348,** as new, 28 volt. Plus 10/- packing £18/10/-  
Fitted internal AC Power Pack.  
200-250 volts. Plus £22/10/-  
10/- packing

**2½" FLUSH MOVING COIL AMMETER 0-25.** 7/6  
Post free

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

**SCREENED FLEX.** Suitable for mikes. 10/-

**ELECTRIC ALARM BELL, A.C.** Very loud. For garages, works, etc. 24/-

**PHOTO-ELECTRIC CELL.** Dozens of applications, e.g., burglar alarms, counting, door-opening. Details on request 14/6

**28 VOLT MOTORS (new).** Can be run off lower voltages but at reduced speeds. Post free 7/6

**NUTS, BOLTS, WASHERS,** small sizes for model making. Three gross assorted 7/6

**ALL TAYLOR METERS ON H.P. AVOS IN STOCK.** 1155's, complete with Power Pack, speaker and super cabinet ready for A.C. mains £18/10/-

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

**TWIN WIRE** suitable for internal wiring, lighting points, etc. 12 yds. 5/-

## BC221 FREQUENCY STANDARD

U.S. manufacture. Accuracy .005%. Frequency range k/cs-20 mc/s. Crystal controlled and temperature compensated. Makes an excellent V.F.O. without impairing its use as a frequency meter. Perfect instrument, complete with instruction book. £15

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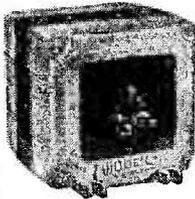
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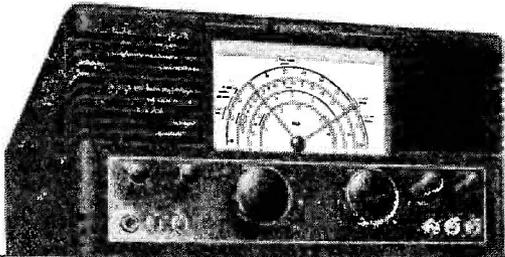
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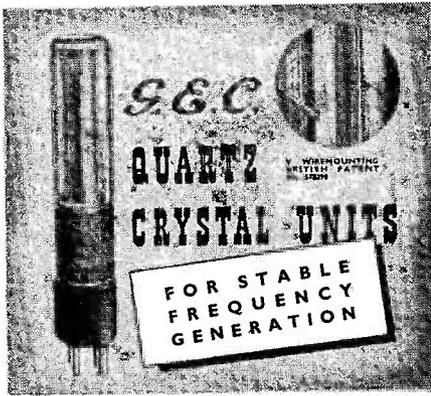
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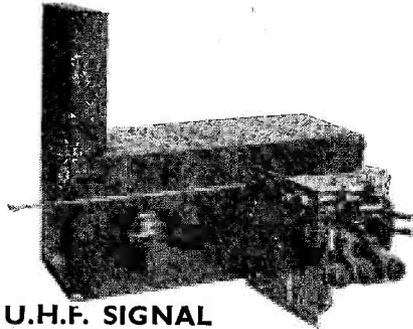
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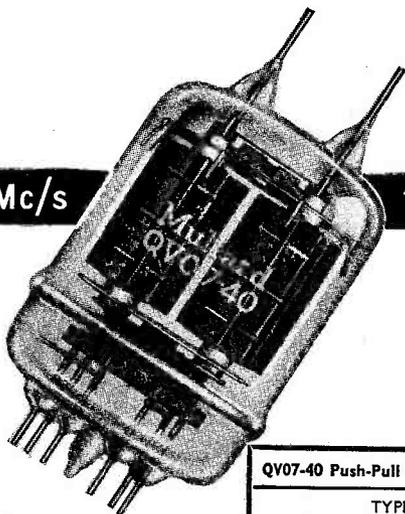
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# SHORT WAVE MAGAZINE

FOR THE RADIO AMATEUR & AMATEUR RADIO

Vol. VI SEPTEMBER 1948 No. 62

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Editor : AUSTIN FORSYTH, O.B.E. (G6FO)

Advertisement Manager : P. H. FALKNER

Assistant Editor : L. H. THOMAS, M.B.E. (G6QB)

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VALVES

## EDITORIAL

## Space

It is about this time of year that, with the winter in close prospect, the season is said to open for Amateur Radio—not that there is ever a close season for the real enthusiast, as witness the activity on all bands recorded in our pages during the past six months.

That the atrocious summer we have had this year (even the *Short Wave Magazine* must go on record with a crack against the weather!) may have had something to do with it is possible. But the fact remains that whatever the cause, what is normally a quiet period for amateur working has this year been marked by greater activity than ever before in our history.

All this heralds what for Amateur Radio in this country will be the busiest winter, on all bands, that we have yet experienced. With approximately double the number of amateurs now licensed as there were in 1939, the pressure on our frequencies will be heavier than ever—but will still be rather less than 10 per cent. of that exerted, in almost any locality, by the Americans!

From time to time, we see prophecies that Amateur Radio will choke itself to death by sheer weight of numbers; that our frequencies will get so crowded that nobody will be able to work anyone. These prophecies have been made for years but are as unfounded now and as far from being fulfilled as they were in 1930.

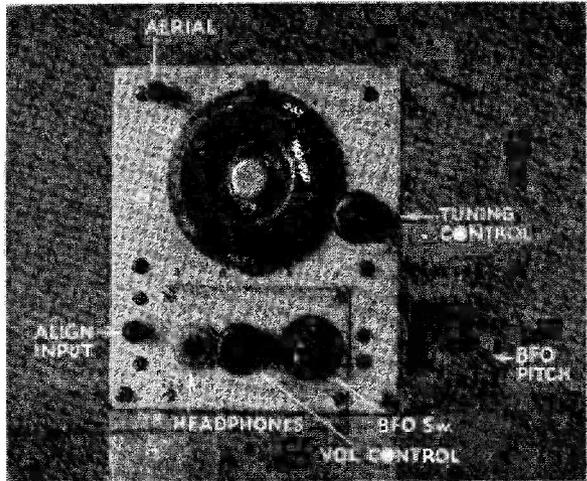
What is forgotten is that amateurs are widely spread not only by frequency and geographical location, but also in time; hence, in any locality and on any communication band, a time for working can be found when it is possible to make contacts *relatively* free of serious interference. Completely interference-free working has not been possible (except on the VHF's) for over twenty years.

This time-location-frequency factor, considering it as one must on a world-wide basis, can be exploited so much further that as things stand at present, saturation—for that is what we are actually envisaging—is still a long way out of sight.

Austin Fordy 7/2 G6fo.

# BC-453 for Better Selectivity

The "Q5'er" Idea  
in Detail



By F. E. WINGFIELD (G2AO)

## Table of Values

Fig. 1. Essential Details of the BC-453

First discussed in the January, 1948, issue of our American contemporary *QST*, the use of a BC-453 as a second IF unit off the IF output of the existing receiver will produce a very marked improvement in selectivity—the main problem on our communication bands to-day. The BC-453 is in itself a medium-long wave receiver with an IF of 85 kc. With proper adjustment and tuning of the normal station receiver and the BC-453, considered together as one receiving unit, single-signal reception is easily possible. The article below describes in full detail the modifications to the BC-453 and the operation of the system.—Ed.

It is intended in this article to describe the BC-453 in detail and to provide the necessary information for its conversion to the "Q5'er." This was described very briefly in *QST* for January, 1948, under the title "The Lazy Man's Q5'er", but as the equipment is quite well known in America, no very full details of the BC-453 were given. As a point of interest, this set covers the BBC Light Programme (LW) and the 600-metre ship band, not included in communication receivers.

### Receiver BC-453A (or B)

This receiver is part of a multi-band service installation and covers the frequency range 190-550 kc. It is a 6-valve superhet having a 12SK7 RF amplifier, 12K8 mixer and oscillator, 12SK7 1st IF amplifier, 12SK7 2nd IF amplifier, 12SR7 2nd detector and BFO, and 12A6 audio amplifier. The intermediate frequency is 85 kc and the HF oscillator coil

C1	=	11 $\mu$ F mica
C2	=	15 $\mu$ F variable
C3	=	100 $\mu$ F ceramic
C4 (A-G)	=	4-gang 346 $\mu$ F
C5	=	3 $\mu$ F elect; 300v.
C6, 7, 15 (A, B, C)	=	3 x .05 $\mu$ F, paper 300v.
C8, 24, 26	=	200 $\mu$ F ceramic
C9	=	40 $\mu$ F variable
C10 (A, B, C)	=	690 $\mu$ F total, mica
C11, 33	=	3 $\mu$ F ceramic
C16	=	3 x .22 $\mu$ F, 300v. paper
C20 (A, B, C)	=	.05 + .01 + .05 $\mu$ F, 300v. paper
C27	=	345 $\mu$ F mica, 400v.
C29	=	.006 $\mu$ F mica, 400v.
C30	=	15 $\mu$ F elect; 35v.
C31	=	.001 $\mu$ F, mica, 400v.
C32	=	5 $\mu$ F elect; 300v.
C35	=	720 $\mu$ F mica, 400 v.
C39	=	120 $\mu$ F ceramic
C12, 13, 14, 36	=	Part of 1st IF
C17, 18, 19, 37	=	Part of 2nd IF
C21, 22, 23, 38	=	Part of 3rd IF
C25, 27, 28	=	Part of BFO assembly
L1	=	Input
L2, 3	=	Mixer
L4, 5	=	RF Osc
L6, 7	=	1st IF 85 kc
L8, 9	=	2nd IF 85 kc
L10, 11	=	3rd IF 85 kc
L12, 13	=	BFO 85 kc
R1, 4, 9	=	620 ohms $\frac{1}{2}$ -watt
R2, 20	=	2 megohm $\frac{1}{2}$ -watt
R3, 14	=	51,000 ohms $\frac{1}{2}$ -watt
R5	=	150,000 ohms $\frac{1}{2}$ -watt
R6, 18	=	510,000 ohms $\frac{1}{2}$ -watt
R7, 8, 13	=	200 ohms $\frac{1}{2}$ -watt
R10	=	360,000 ohms $\frac{1}{2}$ -watt
R11, 19	=	100,000 ohms $\frac{1}{2}$ -watt
R12	=	510 ohms $\frac{1}{2}$ -watt
R15	=	20,000 ohms $\frac{1}{2}$ -watt
R16, 17	=	150,000 ohms $\frac{1}{2}$ -watt
R21	=	1,500 ohms $\frac{1}{2}$ -watt
R22, 23	=	7,000 ohms $\frac{1}{2}$ -watt



L5 has a lower inductance than L3 and therefore tunes to a frequency equal to  $F_s + F_i$ .

So as to obtain a reasonably uniform sensitivity over the tuning range, C39 across L2 serves to tune L2 to a frequency lower than 190 kc and by so doing, increases the amplification at the low frequency end of the band covered.

The intermediate frequency consists of six tuned circuits and two valves; L6 and L7, 12SK7, L8 and L9, 12SK7 and L10 and L11. In this receiver the magnetic coupling between coils in each IF transformer is variable between an over-coupled value (bakelite rod, protruding through the top of the IF transformer, "down") or an under-coupled value (bakelite rod "up"). When the receiver is purchased it will have the rods in the following positions: 1st and 3rd IF transformers, rods down; 2nd IF transformer, rod up. During alignment all of these rods should be *up*. This will be described later. Care should be taken to use a screwdriver with an insulated shank when adjusting these transformers, as the rotors of trimmers C36, C37 and C38 are not earthed.

The second detector is one diode of a 12SR7; resistance coupling is used to the input of the 12A6 audio amplifier, which has a 2:2:1 step-down output transformer in its anode. The triode portion of the 12SR7 is used as a BFO and is composed of L12 and L13, the grid and plate coils of a tuned anode oscillator. C27 and trimmer C28 are tuning capacities; C33 is connected between the anode of the 12SR7 and the grid of the 2nd IF amplifier. The junction of R15 and R17 goes to a contact on a switch in the control unit (not shown on the circuit diagram, but called Adaptor FT-260-A and it replaces Adaptor FT-230-A which will be found in the front of the receiver). The other side of the switch is connected to ground. This switch works in reverse to normal; when the switch is *closed* the BFO is off, the junction between R15 and R17 having been grounded and the HT removed from the 12SR7 anode; therefore, for CW reception, the switch is opened. The 2nd diode of the 12SR7 is grounded.

The gain control is a 50,000-ohm variable resistor; again, this is not shown on the circuit diagram as it is located in unit FT-260-A. The cathode circuits of the RF and 1st IF amplifiers are completed to ground through this resistor; as it is increased in value the cathode/ground voltage increases and therefore the gain is reduced.

V1 and V2 are small neon lamps acting to protect the receiver when exceptionally strong signals are received; they strike at about 80 volts and any increase in voltage increases the current.

The difference between (A) and (B) type receivers is a very minor one. In model B, the secondary winding of T1 has a tap for use if low impedance headphones are employed; normally, the set is received with two wires on terminal 3 of T1, for 8000 ohm impedance headphones. To convert to 600 ohms, remove these two wires and connect them to terminal 6.

The full circuit diagram is shown in the drawing.

### Conversion to Q5'er

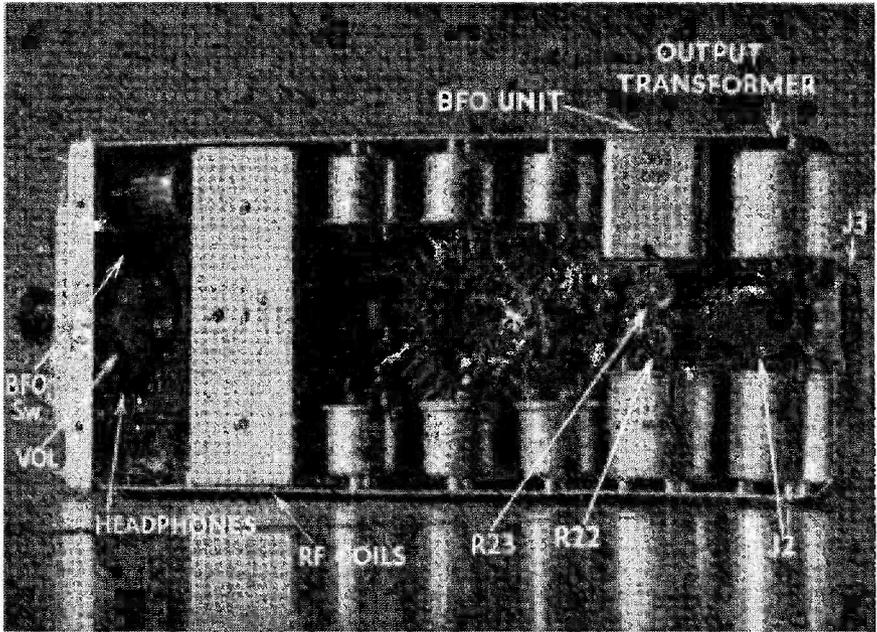
When received, this set will be wired for 25 volts, *i.e.*, the six twelve-volt valves are wired in series/parallel. As it is much easier to find 12 volts than 25 volts, the heaters were all wired in parallel. There are a few components and some wiring which are not required; while a potentiometer, switch and jack for volume control, BFO On/Off and headphones, not incorporated in the set, are necessary additions.

Turn the receiver upside down and remove the baseplate by means of 14 bolts round the sides. Now, with the set placed so that the front is towards the left, the following operations are carried out. (The photographs and drawings will assist in the location of the components mentioned).

(1) Remove choke L14 by undoing two screws at sides, replace screws to hold two soldering tags in place, remove white leads from choke; one goes to pin 6 on J3 at the rear of the chassis, the other to pin 7 on J1 at the front end.

(2) *Conversion of filament wiring to 12 volts.* Now that L14 has been removed, the 3-pin power plug to the dynamotor is visible; in the writer's case this was left as a 12-volt dynamotor was available. Black lead on pin 1 is negative, white lead from pin 2 is positive filament, going to pin 2 of V8 *via* condenser C16C. Remove white lead from pin 7 of V8 and earth this pin, replace white lead on pin 2 of V8, thereby joining positive filament to pin 7 on V7, earth pin 2 of V7. On V5 remove white lead from pin 2 and join to pin 7, earth pin 2. Remove white lead from pin 7 which goes to pin 6 on J1. On V4 remove bare wire from pin 2, cover with sleeving and join to pin 7, earth pin 2.

(3) J1 complete with can is now removed to make room for BFO switch,



Under chassis view of the BC-453, showing the very compact construction. Components are keyed with the text.

volume control and headphone jack, which will all need to be small components to fit in. The leads which are needed are : Black lead from pin 4 ; red lead from pin 5 ; green lead from pin 1 ; and a ground in place of pin 2. The leads from pin 6 and 7 have already been removed.

(4) The construction of the panel for

the extra controls is best seen from the photographs. It utilises the small front panel of FT-230 A. The circuit of Fig. 3 is drawn round J1 for clarity.

Now replace the baseplate and turn set up correct way.

(5) Normally, the dial is driven by means of a cable from the remote control

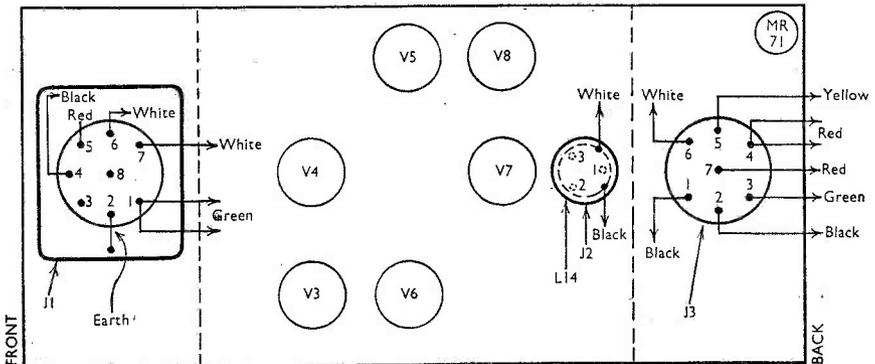


Fig. 2. Guide sketch to the general component layout, under-chassis.

unit, or by a local control unit MC-237-A, either of which may be found on the surplus market. If not, an adaptor can be made by getting a piece of ¼-in. copper tube, cutting four slots 90 deg. apart in one end and forcing this over the toothed drive visible in the hole to the right of the dial. A small ¼-in. spindle knob is put on the other end. This modification is only necessary if the set is required as a separate receiver.

(6) Remove cover to give access to valves and IF transformers. Now, as has been stated before, the IF transformers have provision for two settings of coupling, the idea being that normally the set is aligned with loose coupling and then the coupling is increased to give a broader band. Unscrew the caps from the top of each IF can and beneath will be found the bakelite rod mentioned earlier. Carefully pull these out about a ¼ in., their maximum travel. The centre transformer is already set in this way and does not have to be touched.

**Receiver Coupling**

Coupling the BC-453 to the normal station receiver depends on whether it has

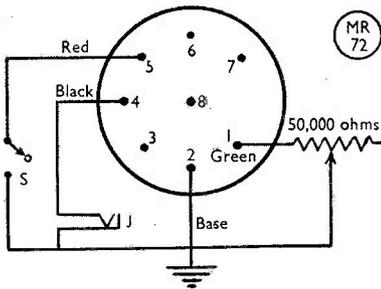


Fig. 3. Circuit diagram of the gain and BFO control.

double- or single-ended valves. If they are double-ended, twist an insulated wire round the grid lead to the last IF valve (HRO, etc.). If it uses single-ended valves the same is done to the detector diode plate pin. This lead should then be screened (to stop break-through from ships) and taken to the aerial terminal on the BC-453. Use very loose coupling, otherwise the BC-453 will overload.

Now connect, through J2, a power supply delivering 12 volts AC at 0.9a, and 200-250 volts DC at 40 mA; connections are shown in Fig. 4.

There is a choice, on CW reception, of using either the BFO in the station receiver

or that in the BC-453. It has been found that for optimum selectivity it is best to use the one in the normal receiver. At the same time, the AVC can be left on if the BFO in the BC-453 is used, and the S-meter also becomes operative.

Actually, to get the best from the AVC, the line voltage should be taken from the 12SR7 in the BC-453, but without this modification the gain is exceptional. To obtain AVC control is simple, as there is a spare diode on the 12SR7.

**Operation of the Unit**

Tune a signal in on the station receiver using the S-meter, then carefully tune the BC-453 to the IF of the receiver (crystal in "sharp" position); it will be found that with an S9 signal real single-signal reception is possible, there being *no signal* on the other side of zero after setting the "rejection notch" of the crystal to take out the remains of the signal.

It is possible to obtain a form of *selectable* single-sideband reception with this set. By detuning a telephony signal one kc from the centre position *towards* the *unwanted* signal, the wanted signal is

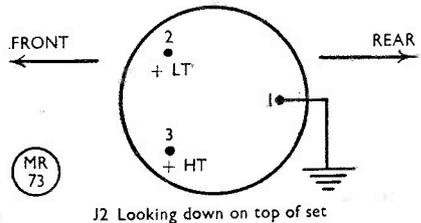


Fig. 4. The connections to entry J2.

attenuated by 5dB, but the unwanted signal is attenuated by 30dB. An audio filter in the headphone lead is used.

It is proposed at the writer's station to replace J3 with an octal socket and feed the power in there. Modifications in wiring necessitated are as follows: Same pin numbering used as on J3. Take lead from pin 3 of J2 and join to pin 6 of (octal) J3—this is positive HT. Remove red lead from pin 7 which goes to one end of L15; remove red lead from pin 5 to joint at top terminals of R22, R23; remove both red leads from pin 4—that the one which goes to C15C is cut out, the one going to the front panel BFO switch is joined to C15C in place of the one taken off.

# Eighty-Metre DX 'Phone

WAS on 3.5 mc

By H. S. SIMMONS (G8VB)

(ex-ON4HS)

*(G8VB is well known as a very active and most successful operator on the 3.5 mc band. Indeed, his DX achievements on 80-metre 'phone during last winter season—all American States, all VE call areas, and nearly 400 different W/VE stations worked—constitute a record which is probably not approached by any other European amateur. In this article, G8VB details his 3.5 mc activities and gives much useful advice to those who may wish to emulate his results—and now is about the time to be preparing for it.—Ed.)*

**M**ANY newcomers think there must be some great secret about being able to contact across the Pond on 3.5 mc. But the writer, having been working VE, W, HI, CO and VO stations on this band regularly over the past fifteen years (War period excepted), first from Belgium (ON4HS) and now from G8VB, hastens to reassure them on this point! The only precautions ever taken to ensure a successful contact on 80-metre 'phone have been to make quite sure that the Rx is right up to the mark and fully capable of receiving what one intends to work; then to ensure that the transmitter is giving of its best within the power limits and, finally, to be certain that the aerial is resonant at the frequency intended for use—also that it is installed in the right direction for the best performance under half-wave conditions.

Actual power input is not nearly so important as all these factors taken together. The writer's final input during the entire winter has been of the order of some 80-100 watts to a single TZ40, which has recently been exchanged for a single T55, now running at some 125 watts input. The station has lately been checked by the GPO during an actual DX contact at 1 a.m. in the morning, when the final input was found to be exactly 110 watts.

## Pre-War Results

In 1938, contact was made on 80-metre 'phone with all nine American call areas from ON4HS (claimed to be the first European station to accomplish this). It was in the attempt to equal this feat from G8VB that thoughts of a possible WAS came to mind as, when all ten American call areas had been worked 'way back in December, 1947, it was found that no fewer than 29 States had also been collected, including some difficult ones

such as Utah, California, Arizona, Nebraska, and North and South Dakota. It was then decided to risk losing a lot of sleep and to go for WAS on 3.5 mc 'phone—and it should be said, here and now, that quite a lot of valuable sleep certainly was lost over this WAS attempt! Many QSL cards confirming these contacts are not yet forthcoming, but some 45 States have been confirmed to date; though, of some 300 W stations worked, only about 75 have come through with cards, yet each and every contact has been QSL'd by G8VB.

Many operators have asked how it has been possible to work such States as California, Utah, Montana and Nebraska on 80 metres, when they are so rarely heard on the band. The answer forms the basis of the entire business of making WAS on 80-metre 'phone.

All who have listened on the 'phone band know the East Coast stations predominate, occupying the entire band for hours on end; the only calls to be heard over the normal listening period for European operators are W1, 2, 3, 4, with an occasional W5 and W8, but rarely a W9 or a WØ. Very few listeners have ever heard a W6 or W7 on 3.5 mc 'phone. Yet years of experience on this band have clearly shown that each district has a particular period for audibility in Europe, and it is only during those times that any signal will be heard from those States or call areas.

Conditions for DX on 3.5 mc were freakish all last winter, with stations like XE1TA and VP6CDI coming in at S8 for periods up to one or two hours, then quite suddenly going right out. At G8VB, the American contact has always been lost when working XE1TA or VP6CDI in a "round table" with VE and W stations; when the W's are at a peak the VE's are

well down in QRK, and *vice versa*. It would almost seem that European 80-metre signals travel up through Iceland, on through Greenland and Labrador, down through Canada and the States to South America; all signal reports go to confirm this line of thought, and working conditions change in that way, right through the night, with Icelandic and Greenland stations coming in at S8/9 when hardly another DX signal is audible. Then, a short time after, VO6J will appear, weakly at first, building up quite quickly to a good signal; later weak VE's come in and the VO6 will be on the fadeout (with OX stations already completely gone); the same applies to VE and W; W and CO/HH/VP/XE; and so on, with the fadeout always in the one direction, starting with VO. In more than 50 QSO's with VO6J last winter it was found that a "round-table" with a VE or W station was next to impossible, the one always fading out as the other came up in signal strength.

### The Best Times

Now with reference to the best times for working the various call areas of Canada and U.S.A.: Over the past 15 years (and they change but little from year to year) the author has found them to be the late evening (2300 to 0200) for VE1 and VE2, W1, 2, 3, and *some* W4's: From 0200 to 0300, the VE3's and VE4's come in, with W8's and W9's; between 0300 and 0500, the band appears to undergo a change, the noise level rising greatly, then dropping to a normal level and, about 0500, the W4, W5 and WØ areas will all be heard at good signal levels, with the W4 signals being as high as S9; as they begin to fade, about 0600, the first W6 or XE will be heard coming through, with an odd VE7; then, a very short time later, the first W7 is audible, with a few VE5 and VE6 stations. All these *real* DX signals are audible in Europe for very brief periods only at about dawn; when daylight has actually set in, nothing further can be heard from any of these far Western districts and the East Coast W and VE stations again peak up to an S9, remaining at this strength for anything up to an hour after full daylight over here; the writer has frequently remained in QSO with the East Coast W and VE's for as long as two clear hours after daybreak in Europe.

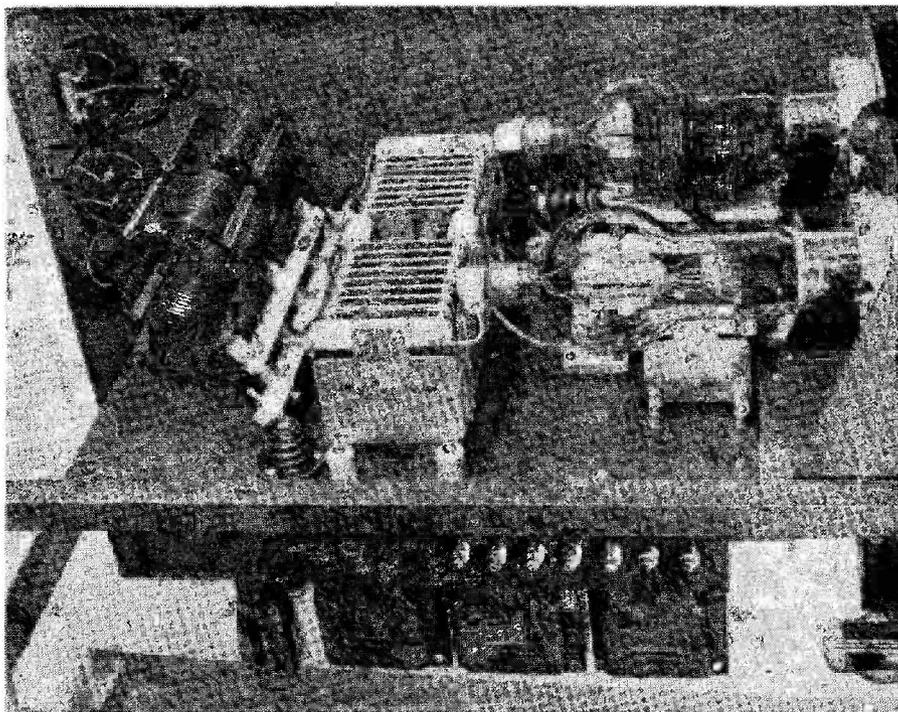
But the peak time for all DX on the 80-metre band has always been at the period just before and after dawn in Europe. During this past winter W6AEE, Pasadena, California and WØEKK, Nebraska, have been worked from G8VB

on more than fifteen occasions, with readability of the order of R5 both ways for brief periods of ten to fifteen minutes; the "wobble" found on these stations on the higher frequencies is also clearly evident on the 3.5 mc band. WØEKK has remarked on the fact that he has always to turn his receiving beam for European 3.5 mc signals directly *North*, when an S1 signal will build up to S6/7. Incidentally, WØEKK uses a vertical transmitting aerial for his 3.5 mc DX and is the most consistent signal from the Middle-West of USA on the 80-metre band.

Knowledge as above of the approximate times of working the more difficult States allowed the writer to snatch many valuable hours of sleep during the all-night watches in this WAS attempt as, when the list was reduced to requiring only Oregon and Montana for completion, almost a complete night's rest could be obtained, to come on the band around 5 a.m. and be in time to hear the first W6 and W7 coming through. As no other European station appeared to be on at those times, the entire band was available to pick a clear spot for the VFO without fear of interference, as is almost sure to be the case when trying to work DX on 80 metres in the evening over here.

Patience is absolutely essential for any European amateur who sets out to work WAS on 3.5 mc 'phone, and more necessary still is a very efficient VFO; without the latter he will be lucky in effecting a 100 per cent. contact with even a VE1 or W1. Not a night passed throughout last winter when G8VB was not requested to QSY at least five or six times, and often a 1 or 2 kc shift has proved effective.

During the past winter contact has been made on 3.5 mc 'phone with 276 American stations, covering all W call areas six times over, *plus* more than 100 VE stations, covering all VE call areas (the writer had never got beyond VE3 pre-war); other good DX worked has been OX3GC, VO6J, XE1TA, CO7CX, HH2CW and VP6CDI. G8VB has also assisted over the Pond some 80 European stations in G, GM, GW, EI, GI, GD, ON, LA, PA, OZ, HB, MB, I and D2, very many of them for their "first ever" on 3.5 mc 'phone, and many also in the QRP region of 25 watts, proving once again that it is not QRO which puts the signal over but patience, *plus* good conditions and a good aerial in the right direction. The writer has also been the first European 'phone contact on this band to nearly 200 W and VE stations, and to the six DX stations listed above.



Close-up of the output stage of the 3.5 mc transmitter at VE3HC, Guelph, Ontario.

### The Coming Season—How to Do It

To those intending to try for WAS on 3.5 mc this coming season, the writer's advice is to get in early and try to complete the whole thing between November and February, as March is a tricky month for conditions. Go all out for the West Coast states during December and January, leaving the Middle West states for February, and the East Coast states can always be worked at odd times in between. The most difficult states to work will be found to be Utah, Oregon, Montana, New Mexico, Colorado and Arizona (so rarely heard over here), and the very best month for these should be January and early February.

Having tried almost all known types of aerial for this DX on 3.5 mc, the author advises the simple half-wave dipole with 600-ohm open-wire feeder system, spaced about 6 in., cut exactly to resonate on the part of the 3.5 mc band it is intended to use, as the normal 132-ft. top will be quite a long way off resonance when tuned down to 3750 kc. At G8VB, it has been found that 124.6 ft. is the right length for the aerial flat top portion when operation is

required around 3750 kc. The optimum direction, giving reports up to two S-points better than any previous direction for the system, was found to be 30 deg. West of North for the line of the aerial.

If R5 signals are heard from the W and VE stations they are worth calling; if, on the other hand, they are only R2-3, most of the signals being heard will be from the QRO stations with inputs of 1 kW at least. Therefore, to call "CQ DX" with a QRP rig of 50/100 watts and expect to work them under such poor conditions is super-optimistic! One further point of interest is that most evenings from 2300 till about 0500 a Russian telephony station with a woman announcer will be heard on about 3830 kc. It has always been found that when this Russian station is fully R5 here in England, G signals get across to Canada and the U.S.A. quite well.

With the appearance of the Canadian and VO stations in the 3750-3800 kc 'phone band it is clear that European stations must go outside this region (3700 to 3745 kc) to be sure of avoiding the DX QRM, and this point should also be carefully borne in mind by those who aspire to 80-metre DX working.

# TU5B as Frequency-Checked VFO Driver

## Easily Adapted Surplus Unit

By T. J. Evans (G2DFX)

**T**HROUGH force of circumstances, the writer has a very poor aerial and after the initial few months on the air as an active transmitter it was realised that a VFO would be a great help; unless one's signal was of outstanding strength there were very few replies to CQ calls except in the near vicinity of the crystal frequency.

Articles on VFO control were studied, questions were asked of other operators who had been using VFO control successfully, and eventually it was decided to use a Franklin oscillator followed by an untuned buffer.

Perusal of *Short Wave Magazine* advertising for suitable components and cabinet brought the American TU5B unit to notice. This unit seems ideal for conversion to a VFO. The chassis is divided centrally by a screen, and the left-hand half contains a beautiful drive and condenser. The drive mechanism gives 2,500 divisions for a 180 deg. sweep of the condenser. Underneath this condenser are four fixed padders with temperature compensating condensers attached.

The right-hand half of the chassis contains another variable condenser and a slow motion drive, besides switches and ceramic coil former.

The unit was stripped except for the condensers, drives and switches, but the ganged switch in its right-hand compartment was removed to make room for mounting the valve holder.

### Construction

The unit was wired up as a Franklin oscillator using a 6SN7 double triode as oscillator, in the left-hand compartment. The valve holder was mounted in the corner formed by the front panel and the central screen, using pieces of aluminium as brackets. The coil was placed below, but to the left of the fixed padding condensers so as to be as far as possible from the immediate heat of the valve. This coil was made by winding 43 turns of 24 SWG DCC wire on a half-inch former.

The second stage used a 6F6 valve as an untuned buffer. This set-up worked quite well judging by the note in a monitor, and there did not seem to be any creep

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As many of our readers will already know, the TU5B is well made, full of useful parts and easily obtainable as surplus at a very reasonable price. It can be employed, by modification, for a number of purposes. As described in this article, it is very suitable for conversion to a VFO unit with internal calibration check.—Ed.

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after a warm-up period of about ten minutes.

### Frequency Checking

Now the VFO was functioning satisfactorily, it was decided to convert the Franklin into a crystal-checked frequency meter, by adding a 6K8 valve with its hexode as mixer and the triode as 1000 kc crystal oscillator.

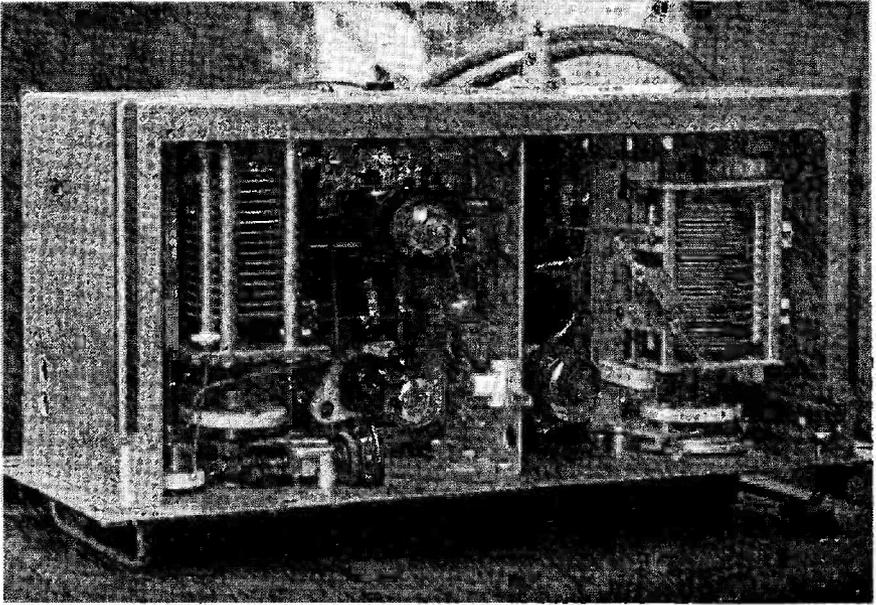
Another valve holder (for the 6K8) was fixed between the 6SN7 and the rear of the chassis and the 1000 kc crystal fitted beside it.

The crystal anode coil is one "pie" of the usual pie-wound receiver type RF choke and is shunted by a mica trimmer. This coil and trimmer were mounted close to the triode section of the 6K8.

### Table of Values

Fig. 1. Crystal Checked Frequency Meter

C1, C2, C3, C4, C5	= Included as part TU5B: temperature compensating condensers shown dotted
C6	= .001 $\mu$ F midget trimmer, zero setting
C7, C17	= 1-8 $\mu$ F concentric variables
C8	= .01 $\mu$ F
C9	= .0001 $\mu$ F
C10, C11	= 50 $\mu$ F
C12	= 2 $\mu$ F
C13	= .0004 $\mu$ F
C14, C15	= 0.1 $\mu$ F
C16	= .0001 $\mu$ F, mica trimmer
R1, R2	= 10,000 ohms, 2 watt
R3, R10	= 1 megohm
R4	= 50,000 ohm
R5	= 500,000 ohm
R6, R7	= 5,000 ohm
R8	= 47,000 ohm
R9	= 580 ohm
S1	= Switch incorporated in TU5B:
L1	= 43 turns 24 SWG DCC on $\frac{1}{2}$ -in. former.
L2	= One section of pie-wound Rx type RF choke
V1	= 6SN7
V2	= 6K8
Xtal	= 1,000 kc bar



Looking into the TUSB unit with the valves in place, as modified.

Output is taken from the frequency meter through a hole in the back of the chassis and cabinet *via* a piece of shielded wire. If greater output is needed a short stiff aerial can be added.

### Switching

The switch in this unit is arranged so

that the crystal alone or crystal and oscillator or oscillator only can be used. A small variable air-trimmer is wired in parallel with the tuning condenser to act as zero set.

The next development was the wiring of a VFO in the right-hand compartment, in place of the untuned buffer. It was de-

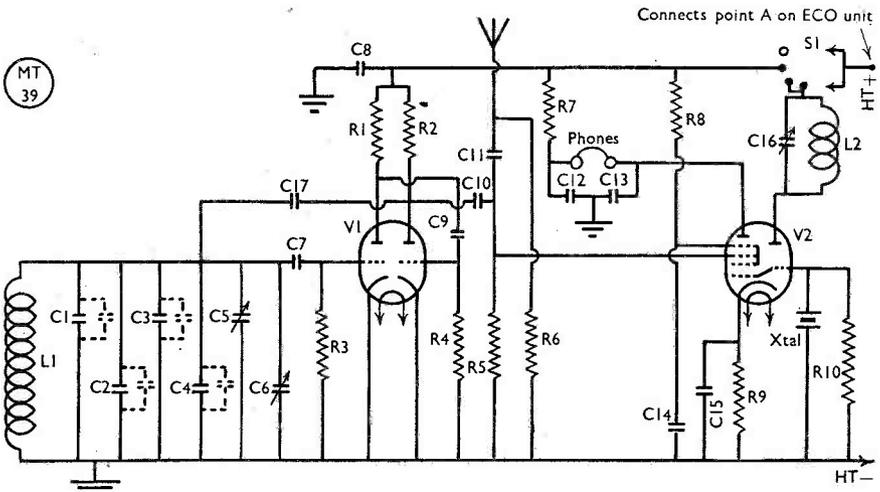


Fig. 1. Circuit of the crystal-checked frequency meter, using the TUSB tuning circuits and mechanism,

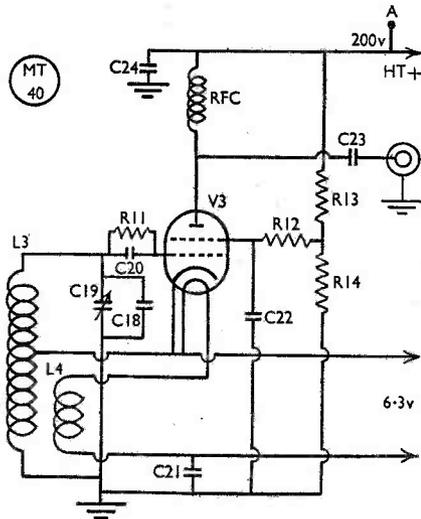


Fig. 2. G2DFX uses this 6F6 ECO circuit, in conjunction with a crystal-checked frequency meter, as a complete calibrated VFO driver derived by suitable modification of a TUSB unit.

cided to try a 6F6 in an ECO circuit, as the output would be greater than a Franklin, thus needing only the crystal

**Table of Values**

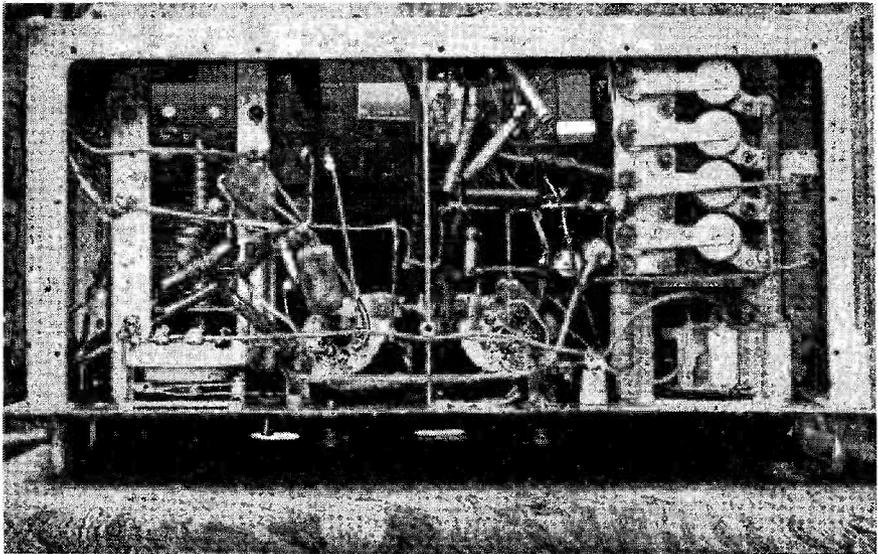
Fig. 2. ECO Unit Incorporated in TUSB

- C18 = .0006  $\mu$ F padder, in unit wiring
- C19 = 160  $\mu$ F
- C20, C23 = .0001  $\mu$ F
- C21, C24 = .002  $\mu$ F
- R11 = 1.5 megohm
- R12 = 15,000 ohm
- R13 = 47,000 ohm
- R14 = 20,000 ohm
- L3 = 30 turns 24 SWG DCC on  $\frac{7}{8}$ -in. former
- L4 = 5 turns, wound over lower section L3
- Tap = 5 turns from earthy end
- V3 = 6F6

stage of the Tx as buffer ; by using low screen voltage on the 6F6 drift and heat could be kept low.

The grid coil was in this case again fixed below the level of the valve and five turns of DCC wire wound over the lower portion, through which heater current was fed. This method tends to keep heaters and cathode at equal potential and goes a long way towards preventing RF feedback. The anode is untuned and output is taken via a coax cable to a stand-off on the back of the chassis.

The coil was wound on a piece of paxolin former  $\frac{7}{8}$  in. diameter, 30 turns being used, and 600  $\mu$ F fixed padding placed in parallel with the tuning con-



An under-chassis view of the TUSB after final conversion. G2DFX says the wiring looks a "bit untidy" because of the process of modification and re-modification which his unit has undergone !

denser. The condenser really gives too great a coverage and constructors might try a 20-turn coil and 800  $\mu\mu\text{F}$  to 1000  $\mu\mu\text{F}$  of padding. This grid circuit is in the 1.7 mc band and output can be taken there or in the 3.5 mc band—or even the 7 mc band if the buffer gives plenty of RF output.

The switch in this section is used to control HT for the ECO, and heater feeds for the meter and ECO unit are taken *via* screened leads from the power pack, which is a conventional one except that it utilises a 1,000 ohm 40 watt wirewound resistor in place of an input choke. This resistor helps to lower the output volts and also the hum content. Smoothing condensers are 8  $\mu\text{F}$  between resistor and choke and 12  $\mu\text{F}$  between choke and bleeder resistor. The latter is 25,000 ohms with a slider which is adjusted so that output is 200 volts on load.

#### Calibration

Calibration was done by using fundamentals and harmonics of crystals at hand, and also by the help of G3ARK, who gave check points by using his VFO in con-

junction with an ex-Service crystal-checked frequency meter. The meter can be calibrated by utilising beat notes from the Franklin oscillator and the 1,000 kc crystal.

#### Notes

Wire everything rigidly, and take plenty of time. Screw the feedback condensers in the Franklin almost to maximum capacity for initial test—and then unscrew each an equal amount, little by little, till the oscillator just oscillates constantly across its tuning range.

Switch connections in the meter have not been shown in the circuit diagram as they will be obvious when the unit is examined.

The untidy wiring shown in the photographs is due to the many changes rung on the units during their development. Reports indicate that the ECO note is consistently T9 or T9x.

No originality is claimed for this particular modification of the TU5B and the article is offered as an idea for others to develop further and improve.

## Grid Modulated 'Phone

### Economical Unit for Speedy Conversion

By G. W. ALDERMAN (G3BNE)

THE writer, having been operating on 14 mc CW for over a year, wished to convert to 'phone for European and perhaps some DX contacts. The equipment was a 6V6-6V6-807 transmitter running at 45 watts input and the available power supply was fully loaded. Thus, conversion to anode modulation would necessitate the construction of a modulator and an additional power supply. Due to complete lack of constructional facilities this work could not be undertaken, and it was decided to use some form of grid modulation. The system described below was developed from a suggestion by G5WC.

From the circuit, it will be seen that on switching to 'phone the PA grid leak is

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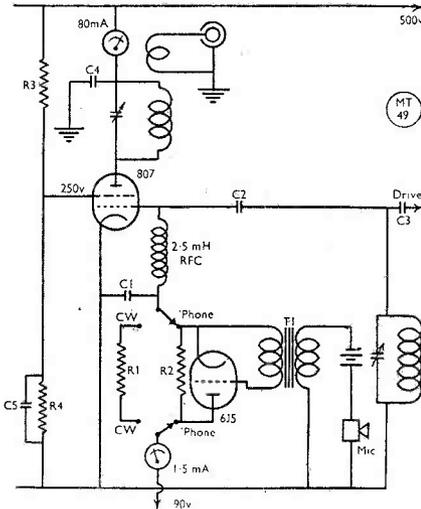
The notes below suggest an easy and simple method for going over to telephony operation with the standard 50-watt transmitter. Grid control is one of the oldest ways of obtaining modulation, and G3BNE's article shows how it can be applied to an 807, using a valve to control the PA grid current.—Ed.

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replaced by the modulator. Now, under no-drive conditions the 6J5 will be cut off, therefore R2 is introduced to complete the PA grid return to the bias supply. On positive half-cycles of drive the PA grid will try to drive grid current through R2, setting up a voltage which will cause the 6J5 to conduct and pass the grid current. On negative half-cycles of drive the distribution of voltage is such as to allow the 6J5 to conduct. Application of the modulating voltage to the 6J5 grid will vary the impedance of the latter and therefore the grid current and the working point of the PA, thus producing a modulated carrier.

#### Operating Conditions

In the circuit in use the 807 runs at 500 volts on the anode, 250 v. on the screen and is loaded to 80 mA. The grid bias is -90 v. obtained from a battery. With these supplies tests have shown that good quality telephony is obtained with the



Circuit of G3BNE's grid modulator which, with no more than the microphone input to the modulating valve, will give deep control of an 807 when adjusted as explained in the text.

drive set to 1.5 mA, with an adequate depth of control and that over-modulation is not possible. Decreasing drive results in reduction of modulation depth, and increase of drive causes distortion. It is suggested that the optimum figure of drive for any particular circuit be found by tests during QSO's.

With this system, a 6J5 should be able to modulate a QRO carrier, the limitation being that the optimum figure of drive as determined above should not exceed the normal Class-A figure for the modulating valve. The microphone in use is of the carbon type, but other types of microphones employing pre-amplifiers could be used as long as the 6J5 grid is not over-driven. CW operation is possible with the modulator in circuit, but with some loss of drive. It is an easy matter to fit a 'phone/CW change-over switch.

### Results

The system has been tested over a three-week period on 14 mc; ten European countries have been worked with reports of R5, S6 to S8, and one W2 was raised with a report was R4, S6.

The modulator was built on a "U" bracket with the valve and switch mounted inside the "U" and the microphone transformer fitted in alongside the valve

### Table of Values

#### Grid Modulator Unit

C1, C3, C5	= .001 $\mu$ F (C5 750 v. wkg.)
C2	= 100 $\mu$ F
C4	= .01 $\mu$ F
R1	= 15,000 ohms 1-watt
R2	= 1 megohm, $\frac{1}{2}$ -watt
R3	= 6,000 ohms, 5-watt
R4	= 12,000 ohms, 10-watt
T1	= Ratio 100:1

holder. The heater supply was taken from the main LT feed. The unit was mounted under the transmitter chassis, to provide screening from the PA anode, the grid leak was positioned across the switch, and the connections from the PA grid choke and the bias supply were made with screened cable.

This little modulator was constructed and installed in the transmitter within two hours, and the first QSO obtained within the next hour.

## Thinking On Receiver Valves

### Why Use Several Types ?

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

VALVES for use in his equipment are not the least costly part of the amateur's outlay. Yet, on looking through any radio magazine or catalogue, it appears that the number of types of valves is legion, and is enough to give any prospective constructor fears for his overdraft. Even in a medium-sized superhet five or six different types may be used, and since for every type it is advisable to have at least one spare, the matter becomes pretty expensive.

There must be a great number of amateur operators who for reasons of economy would welcome any idea which would save them cash in the long run, and yet would have little or no effect on the efficiency of the equipment constructed. The writer is of the opinion that intelligent use of valves would help a great deal in this respect.

The standard superhet receiver circuit comprises an RF valve, oscillator/mixer, two or three IF's, a detector/AVC/1st AF, and an output valve. Here, at a minimum are four different types of valve—vari- $\mu$  RF pentode, triode-hexode or other converter, double-diode-triode and AF output triode, tetrode or pentode. By using separate detector/AVC and 1st AF, and separate oscillator and mixer, the number of types employed might well be increased.

### Rationalising Types

All these different valve types are rather unnecessary. During part of the war period the writer was engaged in examining, testing and reporting on captured enemy signals equipment, and it was noticed that a very few different types of valve were used in receivers of German origin. In fact, in practically every case, any one receiver used only one type of pentode from aerial to headphones. Power supplies being from 2, 2.4 or 12-volt battery sources only, three types of valve were all that were needed for replacements in the great majority of receivers up to 40 or 50 mc.

The valve used was a pentode. However, it must not be assumed immediately that each stage in a receiver had a pentode circuit. By connecting together the appropriate electrodes, a pentode can be made to act as a diode or triode, and such was the scheme adopted in these German sets. The performance was very good in all respects. The reader might therefore think that the valves were something special, but this was not so. It would prove interesting to construct two receivers, one using several types of valve, as is usual in British practice, and the other using one type of pentode only, the two sets being otherwise as near similar as possible. There would be little, if anything, to choose between them as regards performance, but only a couple of spares (or even one only, for that matter) need be kept for the "one valve type" model.

Let it be said that through lack of opportunity the writer has not had time to do any work on this subject, but the following ideas might well provide a means of spending a few hours trying out this and that. Since the valves used in the German receivers were RF pentodes, it is suggested that a 6K7 or EF39 or similar type be tried. In building a receiver, the RF stage would be conventional, as would be the mixer. The local oscillator, however, would be operated as a triode, that is with the anode, suppressor and screen-grid

strapped together. The IF's would be standard, but the AVC and detector diodes would be pentodes with grids and anode all strapped together. The 1st AF would be connected as a triode, and the output valve would perform its usual pentode function. Such an arrangement will give a more than adequate output to headphones and would work a small loud-speaker if required.

### Ingenuous Variations

One circuit encountered by the writer was really intriguing. It employed the same standard RF pentode as a double-diode-triode! The anode and suppressor acted as the two diode anodes, while the screen-grid, control-grid and cathode formed a triode for the first AF stage. And it worked very well. Once again, the writer intends sometime to try and use such an arrangement with a British or American pentode, but meanwhile the idea is passed on for the benefit of any amateurs who are not averse to a little juggling with components and are eager to try out unusual circuits.

Another unorthodox circuit arrangement was found in an Italian multi-band communications receiver covering 100 kc to 20 mc. This employed six valves of one type, being ECH3 triode-hexodes. The only stage in which a valve was used conventionally was the frequency changer. In all other stages the valves were "split," for instance, one being used as 2nd IF and detector. The receiver worked quite well, and with push-pull hexodes in the output gave enough audio to drive comfortably an eight-inch speaker.

It is hoped that these remarks will suggest what can be done with valves when used in unorthodox ways, and encourage experimenters to develop their ideas along similar lines.

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# DX COMMENTARY

## ON CALLS HEARD, WORKED & QSL'd

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

We have to report another very patchy month, during which the DX has been there most of the time, but has never been too easy to dig out. There were two complete black-outs, each of two or three days, and there were also, by way of relief, periods when short-skip was no worry. It was really good to hear VK, ZL, KH6 and the like coming across in the mornings without the slightest sign of European signals.

Also we have to report that on the afternoon of Sunday, August 15, the USA broke through on 28 mc 'phone. As far as we know, this was the first occasion; no one has reported an earlier arrival. Otherwise the DX world goes on much as usual, judging by the state of the mail-bag, except that rather more people are getting rather hotter under their collars than has been the case hitherto. There is no particular grievance—just general dissatisfaction with such things as bad notes, bad operating and bad manners.

Our demented friend, Arabackle Oblifork, who insists on coming in at least once while we are writing this Commentary, has made one suggestion savouring of sense. He says that we have now had an "R9-er", a "Q5-er" and a "T9-er"—all hailing from across the Pond. But he insists that someone in the other direction has designed and described a "T1-er", which would account for some of the stuff we hear. They haven't all attained perfection in the sense of a true T1, but many have achieved T4 and there are now a few T3's going, so before long we may look forward to some real coil ignition noises approaching the T1 ideal.

**None So Deaf . . . . .**

G3ATU (Sunderland) in the course of a very interesting dissertation on DX, remarks upon the sudden appearance of W6ODD/F18 on 14 mc CW. He first turned up at 1530 on a Sunday, knocking off W6's in bundles of ten. Then, after working KH6's and a KA1, he was called by an OK and G3ATU, both of whom he worked. 'ATU makes the point that this fellow was putting an S7 signal into Europe on a busy Sunday evening, and yet during two whole hours he was called by only two

Europeans, both of whom he worked. The others didn't hear him because they were too busy calling "CQ DX" to listen.

Commenting on our attempt to straighten out Zones 18 and 19 last month, G3ATU tells us that UAØPA is at Ulan, which is well and truly inside . . . Zone 23! Another of these shocking cases—on the map he's Zone 23, but in CQ's definition of Zonal boundaries he isn't. Do what you like about him, chaps, but you'll not get a WAZ Certificate on the strength of working him. 'ATU's final—the best pirate call-sign yet heard: PIIRAT!

**QSL Racket Again**

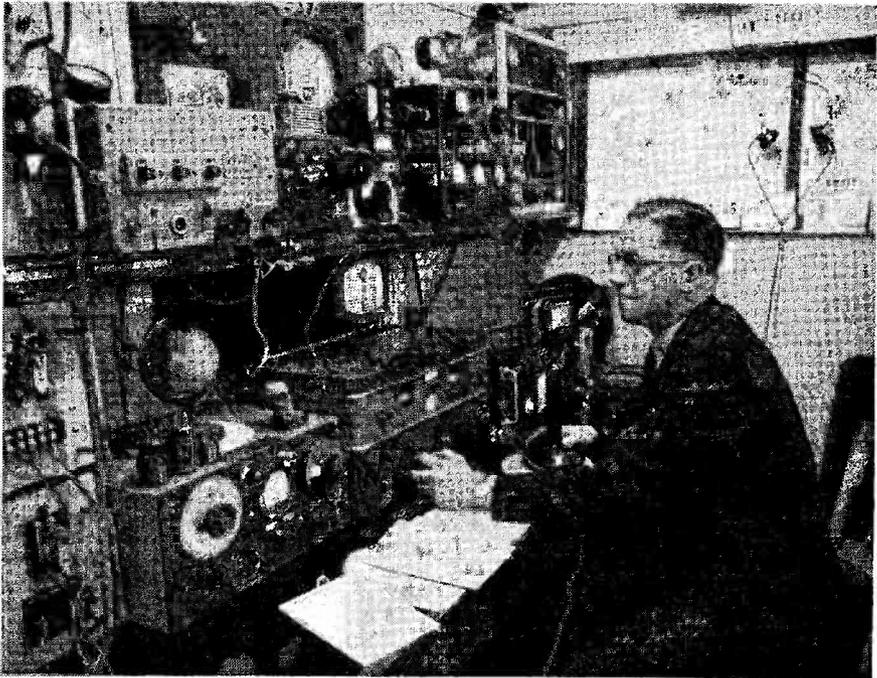
Readers who date back as far as last January will know our private opinion of QSL's (see "The Great QSL Racket", p. 670). We have, however, said that if a majority of readers want the Zones Worked list to appear in order of confirmations only, we should be willing. Now a staunch supporter of the anti-QSL side appears in the person of G2AVP (Stradishall). He says "I notice that G8KP thinks many of the gang are kidding themselves about the real figure of their DX totals—but quite a number of people *can* rake in the DX! . . . . I have worked 142 countries but have only 89 verified, through no fault of mine. But I have worked them all, and if we are going to question each other's honesty by demanding verification, then I feel all the spirit is going out of the game. After all, this is just a hobby. . . . ."

As we said ourselves, we know we have worked them, and if someone doesn't believe us, that's too bad—but it still doesn't hurt us one little bit.

Postscript on the subject, though: The form of "kidding" that *may* exist until a QSL arrives is, of course, that arising from having been completely taken in by a pirate. But not many are, surely, for most pirates stick out like a sore thumb unless you're a sadly gullible type.

**Local QRM**

Our heart bleeds for G2DDM (Romiley), who has some QRM in the form of rapid



First on the air in 1926, this is a view of the present-day station of G5IA, Shipley, Yorks, whose main interest at the moment is 3.5 mc 'phone.

clicks, at about 20" c.p.s., ending with a terrific clonk and 'some five minutes' silence. Any helpful suggestions about a possible cause? And 'DDM adds that the "OG" next door switches on her vacuum cleaner at 9 a.m. and leaves it running all the morning while she does the shopping!

G3ESP (Wakefield) has a grouse of a different kind. He quotes G5YH's remarks last month about stations sending so-called Morse, and delivers his blow against the types who always use a "Bug" screwed up at the fast end and scorn anything below 25 w.p.m. 'ESP, shortly after getting his licence, met up with one of these, and a request to "QRS" merely resulted in something unintelligible coming back at the same high speed. The request "Please QRS" brought back nothing but silence. He asks that some of these types might occasionally remember that they had to start once.

G8LO (Portsmouth) is in a quandary about rare DX stations with T1 notes and frequency drift. Should one, he asks, give them a candid report and then obviously go without their QSL, or should one

flatter them (hoping for a QSL) and then try to work them again and tell them what one really thinks of them?!

#### *A Bas les Spiés !*

G2AO (Malvern) tells us that TA3FAS—much sought after—black-lists all who call him before his QSO is finished, and will not reply to them on subsequent occasions. So some of you who can't add Turkey to your list might examine your consciences . . . 'AO says that DX is back on 7 mc again. He heard a G station call CQ on 'phone; he had a VQ4 come back to him, but he worked another G and proceeded to discuss the local pubs. Ah, well!

G2BJY (West Bromwich) mentions possible confusion between ZC6AL and ZC6LA. The latter is definitely the 1-kW station in the State of Israel. The others—ZC6AL, ZC1AL, ZC6LA/ZC1 and ZC6AL/ZC1—are referred to the local sorting office.

G5GK (Burnley) has been staying in Norway and mentions a most unusual contact. 'GK was working from LA3G

and was answered by an old friend, GW4CC, who, while reminiscing, asked if he had ever heard LA2UA. After a few seconds LA2UA/Airborne, flying over the Med., came up on the same frequency and worked them both—his home town (Bergen) and his old friend GW4CC.

### DX of the Month

G5FA (London, N.11) has worked UF6AB on 7 mc, and also says that the PY's are coming through nicely. On 14 he has collected ZP3AW, FE8AB, IS1AHK, ZD2RGY and other nice ones. G3AKU (Huntingdon) weighs in with PK4VD, VP5AK, AC3SS, FE8AB, XZ2JB, VK6DX, ZC6AO (Israel)—as pretty a bunch as you'll see for this month.

G8PL (London, N.W.3) was surprised to work ZD2RGY one morning on 14 mc (so were we, as a matter of fact!) Other DX for 'PL was ZC1AZ, ZE2JN, HZ1AW and IS1AHK. He was pleased to receive a card from ZA2AA (and so were we, as a matter of fact!).

G2WW (Penzance) has discarded his old cigar-box transmitter with parallel 807's and is starting to build something really fearsome. But before dismantling he collected ZP3AW for a new post-war one and several new 1948 countries. G8OJ (Manchester) reports working CR6AQ, HZ1AW, UL7BS, OQ5AV, OY3IG, VS9GT, UJ8AF and C7AT—all rather nice.

G2AVP (Stradishall) roped in PK4VD, ST2KR, ZC1AZ, ZD9AA and FM8AD—all new ones for him. G3BI (Seer Green), having never worked TI before, was amazed to find of *three* them calling him after a 'phone CQ. He also had his first Mexican 'phone—XE3AF. All this round about 0600 GMT. His card from C8LS has turned up, so he is now champing considerably for a VQ8 and WAZ.

GM3CSM (Glasgow) says that some of the Southern England DX'ers would have a nasty shock if they tried raising DX from Scotland during the summer. He can hear them working VK and ZL when there is no DX whatever on the band up there. He says a GI told him that a similar state of affairs holds in Northern Ireland. 'CSM worked UAØPA, who told him he was in Zone 18—see previous remark!—and also ZL3JA, LU3CM, UL7BS, EQ5W, the latter said to be using 5 watts.

G2YS (Coventry) missed W6ODD/FI8 but heard him when he was in CR8. But he couldn't break through the barrage of woves. 'YS received YN1MH at 0800 GMT, but the W's got *him* before he could get his nose in. He also heard OQ5AV

perform a neat trick by calling CQ DX at the band-edge, working someone well up the band and QSY-ing on to his frequency. The Spivs didn't know where he was going to jump to next. A QSO with AC3SS, who said he was just departing for AC4, was another nice one for G2YS. In conclusion, he wants us to bust up another inane saying: "Tuning the band for any possible call." Is it likely, he asks, that anyone would tune *outside* the band for any *impossible* call? (We find that even that terrible "Overoffanclar" is still being bandied about quite light-heartedly.)

G6QN (London, S.W.19), whose amateur experience dates from 1924, says that we should stop "lionising" the 150-watt merchants\* on 14 mc who proudly reel off lists of DX worked, but it is time that we did a little hat-raising to some of the 25-watters who achieve very fine results but don't talk about them so much. 'QN has a good total of Zones and,

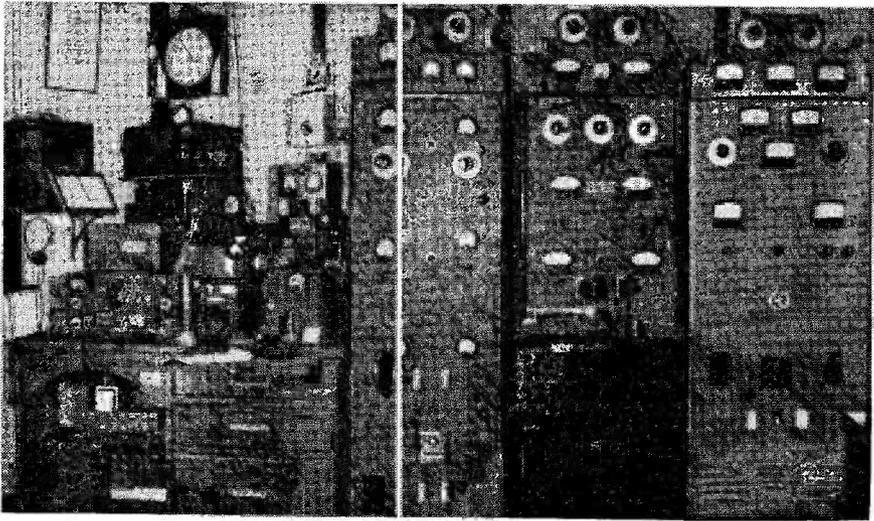
\* (Nobody is being lionised, and some at least of the leading DX operators use less than the full power. We only report the results that are reported to us, whether from 25- or 250-watt stations. And as we have frequently pointed out in this feature, many who would show as high-scoring DX operators do not report at all.—Ed.)

## ZONES WORKED LISTING

### POST-WAR

(Starting Figure: 30 Z)

Station	Z.	C.	Station	Z.	C.
<b>'Phone and CW</b>			<b>'Phone and CW</b>		
G8KP	40	179	G6BB	35	97
G2AJ	40	167	G8LO	35	94
G6QB	40	166	G3BTU	35	79
G2WW	40	163			
G3DO	40	159	G5WC	34	110
ON4JW	40	154			
G4CP	40	154	G3DAH	33	101
G2AVP	40	142	G5HH	33	92
G5GK	40	128	GM3AVO	33	85
G3AAE	40	128			
G8IP	40	114	G8PL	32	103
G2VD	39	147	G3ACC	31	99
G3BI	39	131	G2BJY	31	96
ON4MS	39	130	G2HPF	31	90
G4AR	39	128	GM3CSM	30	78
G3TK	39	126			
G5MR	39	108	<b>'Phone only</b>		
ZS5YF	39	107	G3ZI	37	128
G6PJ	39	79	G3DO	37	122
G3ATU	38	129	G2BXP	36	81
G2AO	38	114	G8QX	34	113
G8KU	38	109			
			G3DAH	31	89
G3AKU	37	117	G2VJ	30	73
G5FA	37	113			
G6XX	36	99			
G3BDQ	36	98			
G2BXP	36	95			



Composite picture of VK2AGU, Abbotsford, Sydney. Operating position at the left, with an HRO receiver and associated equipment ; beam indicator on the wall ; and Bendix wavemeter. The 14 mc 'phone transmitter runs 100 watts to a 100TH in the final, and VK2AGU has a 4-element beam for that band.

Countries, with an aerial only 33 ft. long, mostly indoors, and 5 ft. high at one end, 15 at the other.

GC2AWT (Jersey) thinks we should stop comparing results in terms of Zones and Countries, and work out a formula based on bands used, power input, type of aerial system and so on. He, too, uses a 33-ft. aerial, all in the attic. While appreciating that the lower-power users and the top-band enthusiasts should not be left out, we must say that the discovery of a fair and suitable formula would be a job for an actuary ! In our own minds we always give heaps of credit to the QRP fellows and those in poor locations, even if they don't appear at the head of the lists. (And how about those with very little time to spare on the air ? We now number ourselves among that legion.)

**News From Overseas**

G3CDR, who sent us so many letters and Calls Heard from the Far East, is now home and expecting to be on the air soon. He writes full of admiration for the results achieved by VS6AC. This station, so consistent on 28 and 14 mc until the early summer of this year, used a transmitter ending up with an 807 running from an HRO power-pack ! All circuits were tuned with twin-gang .0005 condensers. 'CDR came home on a troopship in company with VS6AY, VS1BP, VS1CB

and VS4RM ! (You can almost hear the W6's calling that ship.)

MT2E, who has been spending an

**1948 MARATHON**  
(Starting Figure : 25 Z)

Station	Z	C.	Station	Z.	C.
'Phone and CW			'Phone and CW		
G2EC	40	145	GSMR	30	43
G3AAE	40	108	G2BJY	29	89
G8KP	39	131	G2AO	29	80
G4CP	39	129	G2HPF	29	48
G3BI	39	109	GM3CSM	28	69
G2AVP	39	108	G2BXP	28	66
G3DO	38	116	G3BNE	26	62
G6QB	38	111	G6XX	26	52
G2AJ	38	110	G5HH	25	62
G3ATU	38	105	GM3AVO	25	55
G5GK	38	84	G3ACC *	25	53
G2VD	37	109	'Phone only		
G8IP	37	82			
G2WW	35	112	G3DO	34	95
G5FA	35	104	G3DAH	31	84
G8KU	34	85	G3ZI	30	62
G3DAH	33	100	G2BXP	28	65
ZC1CL	33	96	G2VJ	27	58
G8PL	32	93	G6CB	25	54
G3TK	32	81			
G4AR	31	88			

## DX QTH's

CM9AA	306 Consulado, Havana, Cuba.
G2CUR/VQ4	Capt. V. H. Thomas, 2037 (Maur) Coy. R.P.C., Box 131, Mackinnon Road, Kenya.
HH3LD	Plantation Dauphin, Cap Haitien, Haiti.
HZ1AW	via Box 88, Moscow.
KA1ABT	G. Trinidad, 50 Park Avenue, Pasay, Rizal, Philippines.
MD7QRP	AACS, USAAF, attached RAF Nicosia, Cyprus.
MT2E	H. Orrell, c/o Cable & Wireless, Ltd., Box 400, Tripoli.
SV4UN	Messrs. Litz and Joyal, United Nations Radio Station, Hotel Desroses, Isle of Rhodes, Dodecanese.
TA3FAS	U.S. Military Mission, Ankara, Turkey.
TG9AG	Box 299, Guatemala City.
TI2JC	Box 774, San Jose, Costa Rica.
TI2JV	Box 242, San Jose, Costa Rica.
TI2KW	Box 1634, San Jose, Costa Rica.
VQ4CRE	Box 1093, Nairobi, Kenya Colony.
VQ4DFP	Box 1313, Nairobi, Kenya Colony.
VS9AL	S/L E. A. Luckhurst, RAF, Head- quarters British Forces, Aden.
XE3AF	Merida, Yucatan, South Mexico.
XG6AJ	c/o G6AJ, H. W. Hamblin, Thos. Cooks' Sports Ground, Becken- ham, Kent.
ZC1AZ	RAF Amman, Transjordan.
ZC6LA	APO 150, Security Forces in Israel.
ZK2AA	W. A. Scarborough, Supt. Niue Radio, Niue Island, Cook Group.
ZC6XY	J. H. Swanson, W9HXP, Neoga, Ill., U.S.A.

enjoyable time in this country, has now returned to Tripoli for two or three years, and wants to thank all those who were friendly and helpful to him during his leave. He will be a regular correspondent of ours from MD2/MT2 from now on.

ZC1CL (RAF Amman, Transjordan), who has nearly reached his century in countries during the short time he has been on, asks why there was such a fuss about ZS2MI, with the whole band calling him every time he came on. The news got around, of course, that he was on Marion Island—which will probably be admitted as a "country." ZC1CL says he had an enjoyable QSO with KA1VVS, during which they both spent a long time saying how sorry they were not to be allowed to QSO, and passed RST and all. Stations heard, but not worked, on 14 mc CW have been ZD8B, FM8AD, AR1WW,

OY3IGO, HZ2GIZ, EL3A, W4DGW/KJ6, W6ODD/FI8, and two for Puzzle Corner—FZ1K and TS9TL.

'CL enquires about several countries and their standing for "counting" purposes. VS9GT in Trucial Oman does count; so does YA3B, who seems to be genuine. Affairs like Corsica and Sardinia are also accepted—the trouble is finding out how to raise them, when they never call anything but CQ DX.

G2CUR, who was MD5AK for a long while, is now situated in Kenya and awaits his VQ4 call. His full QTH is given in the list.

## Piracy Corner

The following calls are reported as being "pirated": G3COL, G3DLB, G6UP, G2AKI, G2AX, G3CUC. All of these genuine amateurs have been receiving reports which don't in any way check up with their activities. Our query, last month, about how to prove *over the air* that one is not a pirate, has elicited a postcard from EI8J, who says "Give full name and address, to be checked against the Call Book." But we don't see that—surely any pirate could look up his adopted call in the book and give that QTH over the air? In fact he would be asking for trouble if he did anything else!

Some time back we mentioned a case of piracy in which the offender was using a T3 note and presumably bringing great discredit on the real owner of the call. Since then a reader has written to us saying that he worked this T3 affair (evidently generated by a Wimshurst machine) and was shocked to receive a genuine and unsolicited QSL from the owner of the call-sign. Where do we go from there?

## Contests Again

With the DX season about to open wide again, we shall be leaping from contest to contest for quite a long time. One that should not be overlooked is that run by CQ. We shall be giving full details when the date is nearer, but would like to mention it now. Contrary to what we said in the little box last month (into which our old friend the Error must have Crept), the first week-end is for 'Phone and the second is for CW. Contestants will exchange five-figure groups, the first three giving RST and the next two the Zone number (14 for us). Multipliers are on a Zone-plus-Country-plus-Band basis, so total points should be practically astronomical.

The times, in GMT, are as follows :

'Phone Contest : Oct. 30, 0200 to Nov. 1, 0200.

CW Contest : Nov. 6, 0200 to Nov. 8, 0200.

Blank log-sheets will be available before the Contest and we will keep you posted on the subject next month. Sufficient to say, for the moment, that the scoring system favours the man who can work on 3.5, 7, 14 and 28 mc. Even stations in your own continent will swell the multiplier provided that they are in a different country, although such contacts give only one point against three points for stations in other continents. Next month we will publish a summarised version of the rules. It seems to us, from this distance, that they make it essentially an endurance test ; by which we mean to say that there should be no difficulty in filling up the entire 48 hours with point-earning contacts. Should there be a dull period on the DX bands, the odd OZ and SM on 3.5 mc, and almost any Europeans on 7 mc will all swell the multiplier. In fact they *must* be worked, because the additional multipliers will be so much more worth while than just another string of contacts with W's or even VK's.

### Competitive Stuff

From our readers we receive, in almost equal proportions, appeals for more and more contests on the one hand, and requests to soft-pedal this competitive nonsense on the other. This, of course, is just as it should be ; there are several ways of being a good amateur, and lots of them don't involve using a VFO, or a bug, or even calling DX. (We can hear the DX-chasers breathing hard at this moment, but we are not worried.)

So we propose to inaugurate yet another gentle competition to find out who makes the best use of the bands allotted. Those who like competitive stuff can send us their answers on a post-card ; those who don't can keep silent, and we shan't think any the less of them.

The idea is simple. Just tot up the number of countries you have worked on each band from 3.5 mc to 28 mc, CW and 'Phone together. Send us the answer, on a card, like this :

Call	3.5	7	14	28	Total	Power
G9BF	15	36	102	65	120	150 W

Note, however, that the column headed "Total" means what it says, which is the total number of countries worked. *Not,*

please note, the total of the figures in the various columns, which might well run well into the 200's in some cases.

Now we propose to do a bit of funny business here. We will not say beforehand which band is going to decide the order of precedence. We shall change them around, so that one month the fellow who has worked 150 countries on 14 mc but never uses 3.5 may find himself at the bottom of the list. But he'll have his fling on another occasion, when 14 mc is selected as the deciding column.

This will be interesting as a display of versatility. Those who use their bands thoroughly will show up. Specialists will also show up—and all credit to them, too. But we intend to separate the 25-watters from the 150's, not by giving them a separate list, but by indicating their power in brackets with their entries. Thus we shall see that some of these 25-watt lads have been doing their stuff, even if it doesn't show up as hundreds of countries



"... It's all I can get when that fellow starts his CallinCQTwennyMeterFone ..."

worked on 14 mc. *All figures, of course, will be for Post-War operation.*

If you don't like these competitive outbursts, just don't put in a claim. But don't say that we're going too far with it—why, even the 5-metre boys have more "rolls of honour" in their own feature\* than we DX-hounds have in this one!

We await next month's mail with interest

\* (All right, all right, we know!—Ed.)

(and we have a lot of work to do on our own log-book to see how many countries really have been worked on each band!)

Date-line for all this, as for all letters, news and claims, will be first post on September 15, by which date our electronic ready-reckoner and sorter-outer should be at least in the breadboard stage. We have to find some use for all those pre-war LSS's and things, anyway. So, for now, 73 and BCNU.

## G CALLS HEARD OVERSEAS

### 7 mc

G3CEI, s.s. "Chrysanthemum," 250 miles N.W. of Bermuda.

**CW:** G2FHM (45), 3BRU (56), 3DHE (56), 3HK (57), 3SN (57), 6KW (56), GM3AUQ (55). (July 16, 0001-0700 GMT.)

Position: 41° North 44° West.

**CW:** G2AQI (56), 3AEV (57), 3AZZ (57), 3BCA (57), 3BHE (57), 3CNS (57), 3CSB (57), 3CUN (45), 3DFV (58), 4ZZ (57), 6LD (57), G12DHB (57), 3CHB (56), GM3CCT/A (56).

**\*Phone:** G5JO (58), GD3UB (57). (July 21, 2220-2355 GMT.)

Position: 43° North 40° West.

**CW:** G3BCA (56), 3CEG (55), 3DGB (55), 3DNI (56), 3DQU (55), 3DTF (56), 3DYG (56), 3WN (45), 3WY (55), 6AT (56), G15OY (44), GM3AUQ (45), 5JK (55).

**\*Phone:** G2ABD (56), 2HAP (57), 3BWH (55), 3SM (55), 5IX (56), 6GA (35), GD3UB (45), GW3UO (57). (July 22, 2040-2250 GMT.)

Position: 44° North 36° West.

**CW:** G2AUZ (55), 2BZO (55), 2FDT (55), 2FSC (55), 3AEP (56), 3AEV (58), 3BEH (55), 3CAZ (56), 3CEG (55), 3CNS (56), 3CPM (56), 3CPT (56), 3CVG (57), 3DAW (55), 3DFL (56), 3DOO (56), 3DRT (56).

3DWM (56), 3SJ (57), 4RA (55), 5CI (57), 5LP (58), 6AT (56), 6PJ (57), 8TK (55), GD3UB (58), G13SG (55), GM2BNG (56), 3BBW (56), 3BWG (56), 3CCT/A (55), 3DGD (57), GW3DIZ (56), 3DXP (55), 5AB (56).

**\*Phone:** G2DPZ (57), 3QZ (45), 5BM (56), 5GL (57). (July 23, 1820-2300 GMT.)

### 3.5 mc

Position: 44° North 36° West.

**CW:** G2HIA (55), 3AJO (56), 3BAE (56), 4KO (55), 8MU (55), GM3AX (55). (July 23, 2205-2230 GMT.) (Rx: 1-V-1.)

## FIRST CLASS OPERATORS' CLUB

PRESIDENT: GERALD MARCUSE, G2NM

HON. SECRETARY:

CAPT. A. M. H. FERGUS, G2ZC

The first F.O.C. Club Dinner will take place on Saturday, November 20, at the Strand Brasserie. Accommodation is very limited, so that members who wish to attend (not already having done so) are asked to send a card to G3ACC, who is registering the bookings. The response has already been so heavy that, regretfully, no guests can be booked, nor can seats be held for those who are doubtful as to attendance. The event is for *Club members only*, and even they must register without delay! Those who are still doubtful about attendance are asked to let G3ACC know, and they will be accommodated if there are any late cancellations.

### Contests

The Club's own Marathon Contest starts on October 1, and ends when some-

one has worked 75 F.O.C. members on CW only. The rules for this Contest appear in the Club By-rules, and a full membership list, in alphabetical order, will be circulated to all members in time for the Contest.

In view of the Low-Power Contest to take place on 3.5 mc during the period September 20-25, F.O.C. members are asked to avoid using the 3500-3635 kc area of the band during that week—unless of course they are taking part in the Contest.

### Election Notice

The Club membership now exceeds 160 active operators, and since the last election notice, the following have been accepted in accordance with the Rules:

W. F. Limehouse, G2FDF (Walton-on-Thames); E. Whiteley, G2DAN (Rolleston, Staffs.); G. F. Grenyer, G3BGF (Haywards Heath); E. S. Chapman, G2CFMV (Jersey, C.I.); N. McL. Cameron, VK3NC (Victoria); K. Ruesch, HB9ET (Oberwinterthur); E. Crouch, G2HDT (Burton-on-Trent); and J. W. Swinerton, G2YS (Coventry).

# Aerial Design and Installation

## PART II

By I. E. HILL (G6HL)

**D**URING 1946/47 one Lazy-H array was erected and it was found to give excellent results compared against a 132-ft. Zepp erected 60-ft. at one end and 55-ft. high at the other. Even in directions favourable to the long wire and within the 60 deg. arc of coverage of the Lazy-H the latter gave 3 to 6 dB gain on both receive and transmit. With this encouragement a second Lazy-H was erected orientated 100 deg. to the first and this arrangement gave complete coverage. It was, however, found that contacts were sometimes difficult in the directions in which the aerials overlapped.

A move to the London area, mid-1947, delayed progress, but at the new site a fair amount of space was available and two Lazy-H arrays were suspended from 32-ft. poles. Results were excellent, but it was decided to go a stage further and have three arrays with switched change-over

---

The first part of this excellent article appeared last month, covering the design of a good multi-band system and the installation of a Lazy-H for the 28 mc band.—Ed.

---

instead of the earlier plug-and-socket scheme.

In order to operate 14 mc as well as 28 mc a change was made to 8JK aerials (single section at 14 mc). Performance of the 8JK's was about equal to the Lazy-H on 28 mc, but on 14 mc they were on a par with the long wire. The major difficulty, however, was in arrangement of the feed system so that switching between the aerials did not affect the PA loading. This problem was not solved when a halyard broke and the whole contraption was spread over the flower beds and lawn. That was the end of the 8JK's; with their bamboo spreaders they did give rather a Christmas tree appearance anyhow.

The next move was to erect three Lazy-H arrays in the form of a Y. Pole height was increased to 42-45 ft. to permit the experimental addition of more elements. 28 mc operation only was decided as the requirement and tuned feeders selected. RF was fed from the transmitter in coaxial cable to a matching box which effected feeder tuning and included a remotely-operated switching motor for the feeder change-over. This arrangement worked very satisfactorily and exactly according to plan until a contact on the switching motor failed. Rather than change it, the whole feed scheme was renovated and each aerial fed separately by coaxial cable through a switching unit at the operating position to matching units under each array.

Fig. 6 shows the present complete installation which gives satisfactory results on all bands 28 mc and below. It would, perhaps, be expected that the close proximity of aerials not in use would considerably upset the directional properties of the one being energised; but in practice the only ill effect noticed is reduced directivity within ground-wave range.

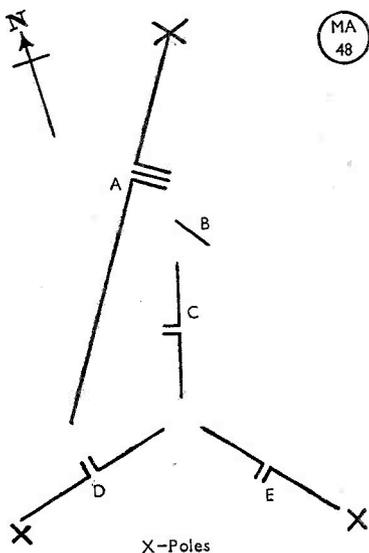


Fig. 6. (A) Aerial layout at the author's station. Key A, 66 ft/33 ft. Zepp fed; B, Vertical Rx aerial; C, D, E, Lazy-H arrays; X, indicating positions of 45-ft. poles.

### Constructional Hints

Such an elaborate array required a fairly

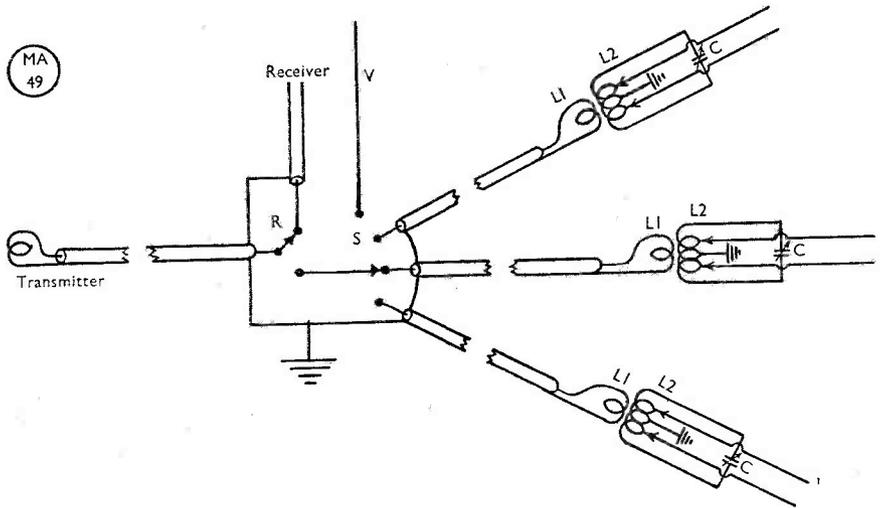


Fig. 6. (B) Aerial change-over switching and matching units at G6HL. R, aerial change-over relay; S, selector switch; L1, link coil, one turn, 2-in. diameter; L2, aerial coil, 6 turns, 2-in. diameter; C, 30  $\mu$ F double-spaced; V, vertical check aerial for 28 mc, and reception.

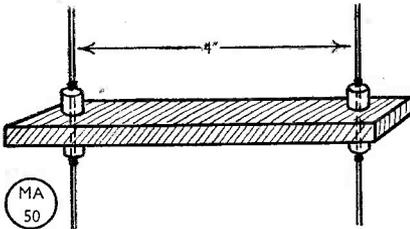


Fig. 7. Feeder spacing method, using coaxial insulating material carried on strip bakelite.

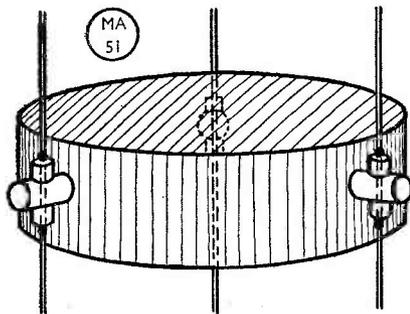


Fig. 8. Three-way feeder spacing, using sections of bakelite coil formers.

large number of spreaders, but these were all made from the scrap box. The Lazy-H spreaders were made from 5-in. lengths of bakelite and/or ebonite rod and sheet, holes being drilled in each end to take a short length of insulating material from scrap coaxial cable. The spreaders were located in position at 3-ft. intervals along the feeders by means of short lengths of 20 SWG wire also threaded through the coaxial insulator as shown in Fig. 7.

The three-way spreaders for the omni-purpose aerial presented a little difficulty, but were eventually made from 1½-in. lengths sawn from a junk paxolin coil form. Short lengths of scrap ebonite rod were screwed round the circumference of the former and small pieces of coaxial insulating material used to insulate the feed lines at 6-in. spacing as in Fig. 8.

The quantity of wire required was fairly considerable, but the omni-purpose aerial and feeders were made by twisting together a number of strands of 22 to 18 SWG enamelled wire rescued from scrap transformers. No. 12 SWG copper wire from a scrap power transformer provided the Lazy-H elements and the insulators are all cheap egg or shell type.

### Suggestions

Few amateurs make an exact copy of another's design and local conditions usually dictate a different approach. It might, however, be profitable to suggest a

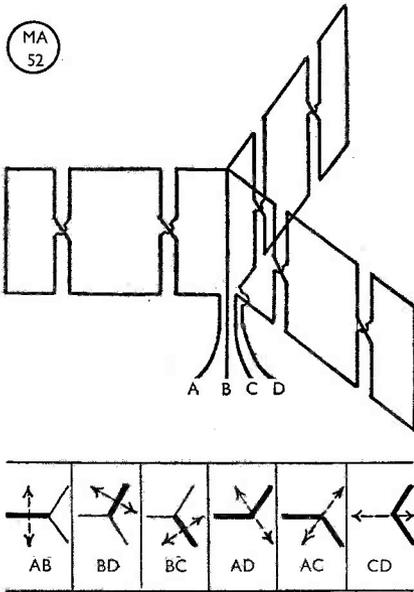


Fig. 9. Sterba array, showing horizontal radiation patterns and directivity for various feeder connections. Patterns AD, AC and CD are estimated.

few possible developments which would be of interest.

The Sterba curtain gives almost identical results to the Lazy-H and might be adaptable to giving greater gain in some directions. An assembly of three Sterba curtains could be fed with 300-ohm line at the focal point, thus simplifying the feeder change-over scheme. A further development might be to use a common vertical member at the focal point and arrange switching so that each Sterba curtain could be used individually, or two combined in V-formation to give additional angles of increased directivity. Arrangement of these curtains and resultant radiation angles are shown in Fig. 9.

The bi-directional aeriels, Lazy-H or Sterba, can be made uni-directional by erection of a similar array spaced one quarter-wave behind and fed in or out of phase *via* a DPDT change-over switch. This, however, becomes rather elaborate and the effective width of horizontal coverage would probably be reduced below 60° and the complete 360° coverage thus lost.

Investigation of vertical directivity laboured earlier might be interesting and could profitably proceed by stacking six

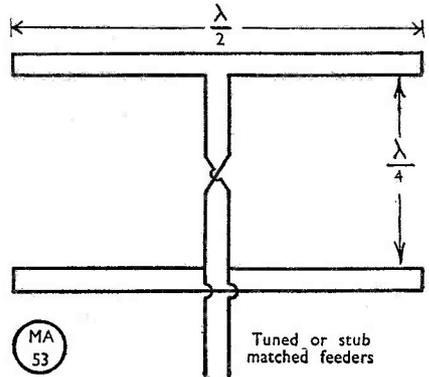


Fig. 10. Two dipoles stacked to these dimensions will lower the vertical angle of radiation.

elements, two over two over two, spaced quarter-wave and fed in phase by crossing over the feed line between each pair. The bottom elements could be removed at will by use of a DPDT switch and their effect on signal strengths noted. The position of the switch connecting the bottom elements would give the lower vertical angle of radiation.

Lack of space may in many cases preclude the erection of the full Lazy-H array, particularly for frequencies below 28 mc. An interesting improvement on the dipole and one which will also give lower vertical angle radiation comprises two folded dipoles spaced one-quarter wave vertically and fed in phase (Fig. 10). The horizontal radiation pattern will approximate to that for the single dipole, but power will be concentrated in a lower vertical angle dependent on height above effective earth.

Finally, it must be emphasised that there is *no* super aerial system. A dipole at a given height will give the same results, however it may be fed, provided the feed is correctly adjusted and is non-radiating. Increased directivity in vertical and horizontal plane can be achieved by varying the height above effective earth or stacking a number of dipoles. Design is a compromise between requirements and local conditions; the best answer in one location does not always apply in another owing to local geographical conditions or obstructions. However, there are a few simple factors which must be considered and it is thought that vertical radiation angle is perhaps one often forgotten in the race for a narrow beam and high front-back ratio.

# A 420 mc Coax Wavemeter

*Designed and Constructed by G4LU*

*(As the author points out, the first requirement on the centimetre wavelengths is some reliable method of measuring them. His article explains how this can be done. It also points the need for the amateur constructor to be equipped for working accurately in metal, in order to be able to make up the parts which will be required at these frequencies. This is where amateur model makers, with their own sort of specialised knowledge and experience, can be of great assistance, as a visit to the recent Model Engineering Exhibition has shown.—Ed.)*

THE amateur interested in the 420, mc band will quickly discover that a means of measuring wavelength is absolutely necessary before any serious experiments can be carried out. Lecher wires can of course be used for this purpose but they are not always very convenient to handle since if a good degree of accuracy is required they must be at least four or five half-wavelengths long. This means that at 420 mc a length of about 6 ft. is required and the wires become unwieldy if made up in a permanent form. The greatest disadvantage of Lecher wires, however, is that whereas they can be used for measuring an unknown frequency, they cannot be used for setting a piece of apparatus on a given frequency without carrying out a series of trial and error adjustments.

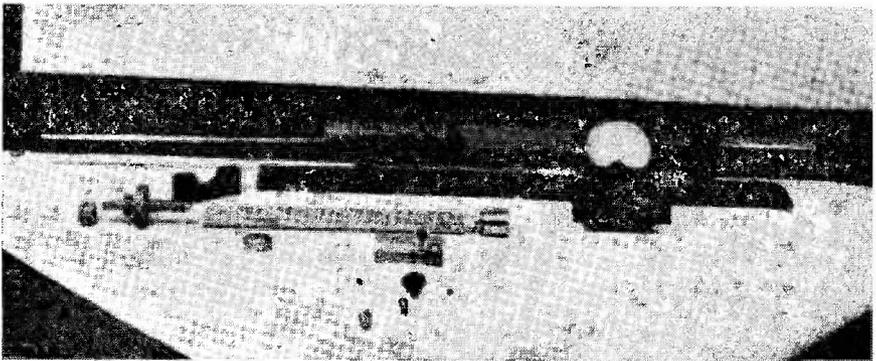
A wavemeter does not suffer from these disadvantages and can usually be calibrated directly in centimetres or megacycles. A VHF wavemeter differs from its lower frequency counterpart in that a coil and condenser resonant circuit is not normally used, these being replaced by a section of

transmission line with the advantage that a very robust construction is obtained.

## Design

The wavemeter described in this article uses an adjustable coaxial line working in a half-wavelength mode. Coupling to the source being measured is provided by a small loop which is connected to the inner conductor of the line at a low impedance point and resonance is indicated on a micro-ammeter connected in series with a crystal detector and another small loop. The circuit of the wavemeter, shown in Fig. 1, is quite conventional and would appear quite normal if the coaxial line were replaced by a tuned circuit.

Fig. 2 shows the constructional details of the wavemeter and its component parts. No particular magic is attached to the dimensions shown since in most cases they were dictated not by any technical requirement but by the sizes of available brass stock. The length of the body, of course, determines the maximum wavelength which can be measured and the



Component parts of G4LU's wavemeter for the 70 cm band. Construction for these frequencies involves a certain amount of accurate machining and access to a model engineer's workshop would be very helpful to those not accustomed to mechanical detail of this kind.

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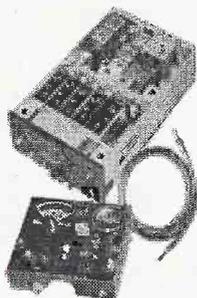
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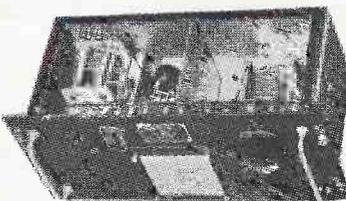
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For that "Transition V.F.O. Unit." Each having Vernier tuning dial. Variable capacitors. Tank coil unit on Ceramic Former. Ceramic switch, R.F. Chokes, etc., in metal cabinet 17½" x 7½" x 8", finish black.

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Carriage paid

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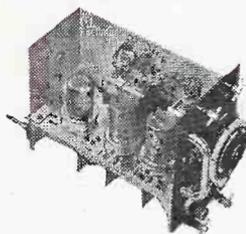
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for 5-6 metres. 65-50 mcs.

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for 3.5-5 metres. 85-65 mcs.  
Complete with valves.

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Two Stages Two-Valves, VR21 (PH2HL), VR35(QP22B), with Mic, QPP input and output transformers, for inter-com, pre-amp or mod. unit. Complete in metal case 7" x 5" x 4½", finish black. With circuit.

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### Slow Motion Dial

With Vernier 200-1 reduction. Calibrated 0-100 black with white numerals. 6" dia., front panel mtg.

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With dial 180-0, and indice dia. knob 3" overall, 4" as used in R1224, wave meters, etc.

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in maker's cartons



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#### Type 29

A MAINS MOTOR, for 200-250v, A.C., by simple wiring, data supplied.

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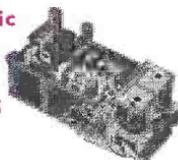
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FOR BARGAINS IN EX-SERVI

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## BRITISH EQUIPMENT

### Magnetic Keying Relay Type 85



For 6v operation, 3 Solenoids, 6 pole C/O, would make a fine aerial C/O relay. Size  $7\frac{1}{2}'' \times 3\frac{1}{2}'' \times 3\frac{1}{2}''$ , bakelite insulation. Ask for D200.

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### BRAND NEW 12 Volt 72 a.h. Accumulator

Standard car type construction. Moulded case, height  $8'' \times 14'' \times 7''$ . Wing nut terminals.

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### Meters. Moving Coil

Cat. No.	Range	Resis. Ohms	White Scale	Price Post paid
Microammeters. D18	0/500	75	$2\frac{1}{2}''$ round	25/-
Milliammeters. D28 ...	0/10	5	$2''$ square	5/6
with internal shunt for 100 ma. marked "Mag. Feed" 0/300 ma.				
D33 ...	0/150	3.5	$2''$ square	8/6
Ammeters				
MCM20E ...	0/20	.00375	$2''$ round	8/6
with external shunt. Projecting.				
MC21E ...	0/40	.00187	$2''$ round	8/6
with external shunt. Projecting.				
Thermo. Coupled Ammeters				
D36 ...	0/0.5	0.7	$2''$ square R.F.	7/6
TCM1E ...	0/0.5	0.7	$2''$ round R.F.	7/6
Plug-in Bakelite Case, $3\frac{1}{2}'' \times 2\frac{1}{2}'' \times 1''$				
D37 ...	0/4	0.06		7/6
Voltmeters				
MCM30E ...	0/300	15	$2''$ square	8/6
5 ma. FSD. with ext. 60K. W.W. res.				
MCM31E ...	0/600	500	$2''$ round	8/6
500 microamp movement, requires ext. res.				

Don't miss this EXCEPTIONAL Bargain!! All-metal (tubular) construction. Lightweight. Rigid, for TV., VHF., or F.B./D.X.

Half-wave Dipole Aerial  $9' 3''$ , with reflector  $9' 7''$ , and crossarm  $4' 11\frac{1}{2}''$  for approx. 6 metres, either vertical or horizontal mtg. to existing mast or wall bracket with  $39'$  or  $80$  ohm, 12 mm. co-axial cable and co-axial plug.



Clydesdale's Price only **21/-** each Carriage paid

or packed in a wood case **28/6** each. Carriage paid



**Ex-U.S.A.A.F.  
Jefferson-Travis  
Synchronous Vibrapack U.F.1**

BRAND NEW, in maker's sealed wrapper. Complete and self-contained vibrator power unit for 12v input, outputs 150/120v 30/50 ma., choke/capacity smoothed, also L.T. and Bias, plus 4½ feet screened input lead fitted with crocodile clips, with circuit in metal case 7" x 4½" x 6", finish black.

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A few only. BRAND NEW

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For 115v or 230v 50/60 cps. Comprising :- 2 units, C-112 and C-113. In individual wooden carrying cases. Size 13½" x 12" x 9". Ready for immediate use. Includes, light-weight h'phones (earfitting), 2 mics. and L.S., etc. Complete with Instruction Book and Circuit.

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Magnetically-operated rotary switch SP/DT and 3-point ON/OFF, etc., in metal box 4" x 4" x 2".

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Antenna Tuning Unit**

As used with BC-375 Tx. containing C.O. switch. Coil 9" x 4½" dia. Drive, etc., in metal case 13½" x 8" x 8".

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A midget s'het, in metal case 5½" x 4½" x 4½" for 200-400 kcs, with 6 valves: 6SA7, 6SF7, 6SK7, 6K7 metal, 2/25L66T for 24v, miniature 3-gang condenser, dial and knob, V/control W/switch, I.F. trans.

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NEW—UNUSED

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exactly as above, but with all-glass valves.

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Input 12v, output 150/120v 30/50 ma. Complete unit, totally enclosed and fully screened. Dim. 5½" x 2½" x 5".

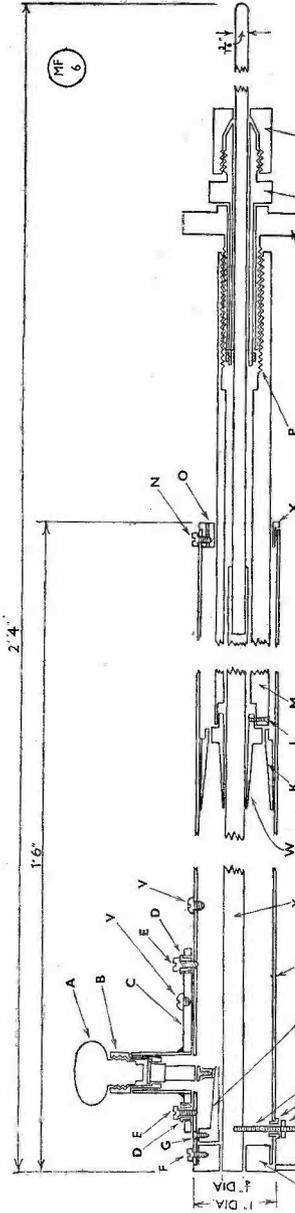
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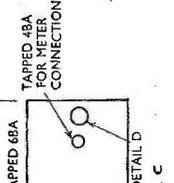
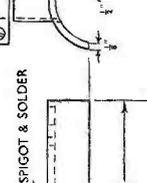
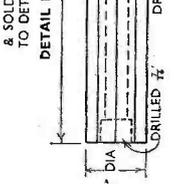
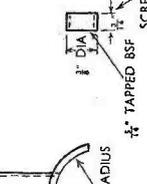
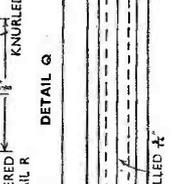
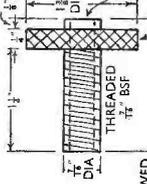
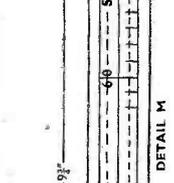
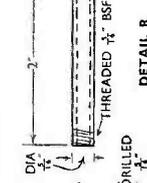
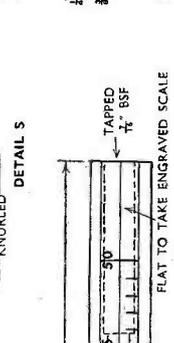
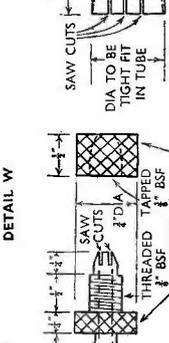
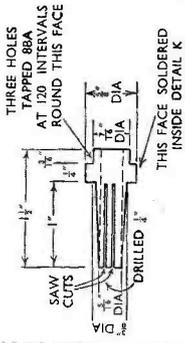
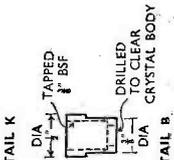
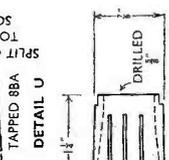
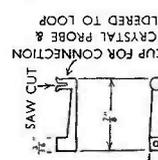
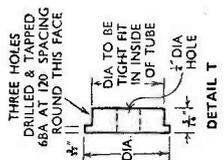
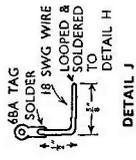
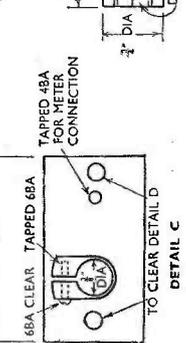
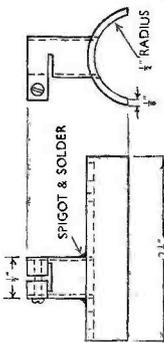
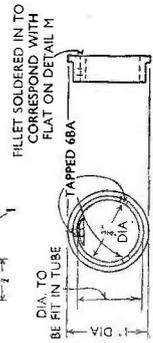
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- F 68A BOLTS, TWO OFF
- G 68A BOLTS, THREE OFF
- H 68A COUNTERSUNK BOLT
- I 68A NUT
- J PICK-UP LOOP
- K OUTER CONTACT OF SLIDING SHORT CIRCUIT
- L 88A COUNTERSUNK BOLTS, THREE OFF
- M BARREL
- N 68A BOLTS, THREE OFF
- O FILLET
- P LOCKING RING
- Q TUNING SCREW
- R LOCKING TUBE
- S LOCKING NUT
- T END PLUG
- U CRYSTAL LOOP
- V 48A BOLTS, TWO OFF FOR METER CONNECTIONS
- W INNER CONTACT OF SLIDING SHORT CIRCUIT
- X END RING
- Y INNER CONDUCTOR
- Z BODY



length of the barrel the minimum. In the latter case the length was governed solely by the length of the longest available drill used for boring out the centre hole.

Unfortunately, some lathe work and other machining is involved in building this wavemeter which it is hoped will be no serious obstacle for the intending constructor. To the amateur not familiar with file and hacksaw and other paraphernalia of the workshop, one can but make the suggestion that the aid of local model engineers be sought for the machine work.

### Construction

Referring to Fig. 2, the body (Z) of the wavemeter is made from a length of 1-in. diameter copper tube. The inside of the tube should be well cleaned and polished. The inner conductor (Y) of the wavemeter comprises a similar length of  $\frac{3}{8}$ -in. diameter brass rod. A length of  $\frac{3}{8}$  in. brass rod is soldered into the end of the inner rod and forms an extension for use in conjunction with the slow-motion tuning device. The inner conductor is soldered into a brass plug (T) which is a tight fit in the end of the tube and is fastened to it by three 6 B.A. screws. The crystal loop (U) is filed up from a piece of brass strip and is then screwed and soldered to the body as near to the end as possible. A small split cup, soldered to the tip of the loop, receives the probe end of the crystal detector. The crystal detector is fitted in a tubular holder (B), to allow easy replacement, and is retained in position by the clamping tube mounted on the condenser plate (C). The condenser plate could be a section of brass tube about  $\frac{1}{8}$  in. thick but in the model shown a suitable piece of tube was not available and the plate was made from sheet brass. The method was first to bend a piece of brass round a 1-in. diameter rod, then to fasten it to the rod by two screws and finish the surface and edges in the lathe. When in position the plate is separated from the body by a thin mica sheet and the fixing screws are passed through polystyrene bushes (D). The pick-up loop (J) connects to the inner conductor by means of a short length of 6 BA studding and the other end terminates on a soldering tag under one of the screws retaining the end plug in position. The studding is insulated, where it passes through the body, by a small polystyrene bush.

The sliding short circuit is made in two pieces (K and W) which are soft-soldered together. Both pieces are split for almost their full length by a number of saw cuts

spaced at equal intervals round their circumferences, and the "fingers" so formed are sprung so as to make a good rubbing contact on the conductors of the coaxial line. For adjustment purposes the short circuit is fastened to a barrel (M) made from a length of  $\frac{3}{8}$ -in. brass rod. The calibration scale is scribed on a flat about  $\frac{1}{2}$  in. wide which is milled along the length of the body. The wavelength being measured is read off the scale against the outer surface of the end ring (X), in which a small fillet is soldered to prevent the barrel from turning during adjustment. The wavemeter can be tuned merely by pulling or pushing on the barrel but owing to the high "Q" factor of the line, which makes the response of the instrument very sharp, this method is only used for rough adjustments.

### Slow-Motion Control

A slow-motion head consisting of two concentric brass tubes (Q and R) is provided for precise tuning. The outer tube is threaded to screw into the end of the barrel and the inner tube is arranged so that it can be locked on to the extension rod of the coaxial line inner conductor. The locking device is made by splitting the end of the inner tube in the form of a collet which can then be tightened by the locking nut (S). The outer tube is retained on the inner tube by a locking ring (P) which is tightened sufficiently to allow the outer tube to rotate on the inner tube but should not allow any relative lengthwise movement or else backlash will be experienced during tuning.

### Calibration

Lecher wires were used to calibrate the wavemeter. The wires were made long enough to accommodate about five half-wavelengths at the lowest calibration frequency. The average distance separating the current antinodes then gives the actual half-wavelength with a good degree of accuracy. Six calibration points were taken, one being the lowest frequency and one the highest frequency which the wavemeter was capable of measuring and the remaining four points were chosen so as to appear at roughly equal intervals on the barrel. At each point the barrel is marked in pencil and the corresponding wavelength given by the Lecher wires is noted. The barrel can then be removed and placed along the base line of a sheet of graph paper, and a graph is drawn connecting wavelength against barrel length. If care has been taken with the measurements the

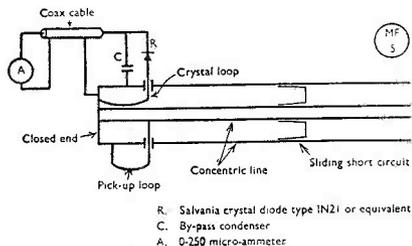


Fig. 1. Circuit of G4LU's 420 mc wavemeter. Its design and construction are covered in the text and the accompanying detail drawing MF6



The 420 mc wavemeter in its cradle.



Close-up of the adjustable end of the 70 cm wavemeter.

graph will be a straight line falling along all six points. From the graph it is then an easy matter, by interpolation, to mark on the barrel the required wavelength scale at 1-centimetre intervals. Alternatively, by plotting a graph of frequency against barrel length the wavemeter can be

calibrated directly in megacycles. The scale marks and figuring can be scribed or engraved on the barrel and then filled with black paint. It should be borne in mind that the wavemeter is actually measuring half wavelengths and therefore centimetre wavelength intervals correspond with half-centimetre intervals on the barrel. Similarly, with the Lecher wires the wavelength is *twice* the distance between two adjacent nodal or antinodal points.

The wavemeter described can be used not only for setting the transmitter on frequency but also has a sensitivity great enough to permit its use in lining up the local oscillators in receivers. No startling degree of accuracy is claimed for the instrument since this will vary model-to-model depending on the care taken in the construction and calibration. But it should be sufficient to allow "in the band" operation with safety. The wavemeter has been mounted in a paxolin cradle for convenience in handling.

PHOTOGRAPHING AMATEUR EQUIPMENT

We are always glad to see good photographs—any size, print or negative, so long as they are clear and sharp—of amateur stations or individual items of equipment. In special cases, we are prepared to reimburse the cost of obtaining such photographs professionally, but in such instances reference should first be made to us with a few notes on the subject.

Articles are nearly always improved, and their value enhanced, if accompanied by good photographs; too often, however, we receive prints which are not good enough for block-making. It always pays in the end to get professional assistance for the photography, and any local studio photographer can provide good pictures if the apparatus is taken to him for photographing. In such cases, the size asked for should be half- or full-plate, depending on the subject, and the prints finished glossy black-and-white.

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It is because we are holding card(s) for you in our QSL Bureau, and have not got your address. Please send a large stamped self-addressed envelope, with name and call-sign, to BCM/QSL, London, W.C.1, and the cards will be forwarded on the next G clearance. Should you wish your address to appear in our "New QTH's", mention it at the same time; republication in the *Radio Amateur Call Book* in due course will be automatic.

- G2ALV, 2AZW, 2BLZ, 2CST,
- 2CUJ, 2CYV, 2FBD, 2FBX, 2HBH,
- 3AJB, 3AKA, 3ALQ, 3AYC, 3AYS,
- 3BQP, 3BYI, 3BYW, 3COP, 3CQC,
- 3CUA, 3CVI, 3CVV, 3CWJ, 3DAC,
- 3DGO, 3DHL, 3DHV, 3DLU, 3DSB,
- 3DTG, 3DXI, 3EFQ, 3FGX, 3IU,
- 3UN, 3WK, 3XI, 4HT, 4RT, 6KL,
- 8PT, 8C3DKL, G13DHB, GM3CCT,
- 3SF, 4AA, GW3DCY, 3DIZ.

# THE VHF BANDS

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

BY the time these notes reach you the first contacts on 145 mc will doubtless have been made, and a fresh field for Amateur Radio achievement will have opened.

We shall of course be covering developments in this new part of our spectrum in a manner similar to our treatment of 58 mc activity during the past several years. To begin with, please let us have full details of all that you work. If you are running schedules or intend being active at regular times a mention of it in this column will bring co-operation from others. We shall also be awaiting claims for 145 mc GDX records, and Counties Worked.

In addition to these Achievement Tables, during the first few months—and possibly permanently—we are hoping to produce a Table showing which stations have worked over 25, 50, 75, 100 miles and so on, using the 2-metre band exclusively.

May we also ask all active stations to let us have their national grid reference (see *Short Wave Magazine*, July, p. 343). The Ordnance Survey, New Popular Edition, One-Inch Maps from which the N.G.R. can be obtained are on sale at 2s. 3d. all over England and Wales.\* If we have these references we can very quickly check GDX distance to within a few hundred yards. For those who may want to know, G2XC's own reference is 41/670069.

Our personal views on the possibilities of 145 mc remain much as they were earlier in the year and in this connection we would refer you to pp. 748-749 of the *Short Wave Magazine* for February, 1948. It is interesting to see from CQ for August 1948 that WØZJB appears to be in agreement with us regarding propagation on these frequencies—namely, that ducting is not the complete answer, and much of our GDX is due to grazing reflections at air mass boundaries. The reflection method, however, becomes less effective as frequency is increased while ducting becomes more important.

And about the ridiculous power limitation the authorities have seen fit to impose on a band on which reasonable inputs of

Two Metres Open Sept 1—  
Aurora Results, August 8—  
G5MA/GM2DAU Establish  
New GDX Record, 363 Miles—  
VHF Bands Contest, November

100-150 watts can do less harm than on any other—the less said the better.

## That Aurora !

At 1400 GMT on Saturday, August 7, your commentator dropped everything to leave for a short holiday—and within 24 hours, as we might have guessed, the excitement began! A summary of the remarkable results of the afternoon of August 8 is given in an accompanying table, but we would like to quote here a report from G5WP (Woking), who went to his radio room just to get a book and by chance switched on the Rx. And there were GM2DAU and GM6XI with notes like saw-mills!! To quote G5WP: "Watch opened at 1430 GMT when the condition was already present. All reflected signals were very distorted. By careful listening it was possible to deter-

### Tropospheric DX Contacts

Over 200 Miles Only

CONTACT	DISTANCE
July 19	
G2AJ/GM3OL	280
G6CW/G5BY	225
G3ABA/GM3OL	200
July 20	
G6CW/G2BMZ	202
July 26	
G5BM/GM3OL	225
July 29	
G8JO/G3BLP	255
G8JO/G6VX	255
July 30	
G2XC/G5YV	202
July 31	
G2XC/G6YO	205
August 1	
G6CW/GI6YW/P	210
G5JU/GI6YW/P	205

\*Local branches of W. H. Smith & Sons, Ltd., stock or can always obtain these particular maps.—Ed.

mine that the signals did have slight DC characteristics but gave impression of 25-75 cycle notes. Local signals such as G5MA (10 miles east), G6LK (10 miles south) were heard at times T9 on direct path with interfering T2-T7 signals, the latter being at a comparable intensity, indicating a very effective reflection.

"The reflecting medium was found to lie at bearing 355° to 360°. Bearing was quite critical, pointing to small reflector or remoteness of reflector. All signals came in on this bearing. It was thought that signals making a 360° reflection suffered more distortion than those making lesser angles, e.g. Belfast stations G13ZX, G15SJ had quite noticeable DC component whilst Scottish and North English stations' notes were very rough.

"The opening had all the characteristics described at various times as being Aurora Openings. It is known that a marked temperature inversion existed over the Scottish/English border at the time, also that electrically-charged rain deposit was widespread over England.

"The opening terminated at 1615 GMT as far as identifiable signals were concerned, but weak T2-T4 carriers were audible on the band until 2230 GMT, and at 2215 GM2DAU heard G5WP in contact with G5BD."

A second Aurora Opening occurred on the evening of August 10 and details of this are also given in the Summary. In this country, previous instances of propagation of this type were in March and April 1947 (See *Short Wave Magazine* April 1947, p. 104). There is a chance of a recurrence after 27 days, so watch the band around September 4.

Counties and countries worked "via Aurora" of course count for the Tables and some operators have accordingly gone up more than somewhat. G5WP made six new ones in one hour and a half!

The matter of the GDX record is, however, not so easily decided, as we feel that this has until now been a record of tropospheric propagation working, and there is every reason to believe that the contacts made on August 8 were due to an ionospheric phenomenon. Hence, while placing on record that the contact between G5MA (Ashtead, Surrey) and GM2DAU (Cupar, Fife) over a distance of 363 miles is the longest inter-G (or GDX) contact so far made, and congratulating both operators on this fine new record, we consider the G3BLP/GM3OL contact still to be the tropospheric GDX record; hence, we are still willing to accept claims for such contacts in excess of 296 miles.

For the benefit of any to whom this Auroral phenomenon is something new, we would explain that the occurrence which has been so well described by G5WP is believed to be due to reflection from an Auroral "curtain." It is always found that beams must be aimed at the curtain and not

## THE AURORA

### SUMMARY OF OBSERVATIONS

AUGUST 8, 1948

#### South

G2CIW (Brentwood) heard GM6JH calling PAØJH at 1450. Later worked G13ZX and heard G3APY, 4LX, 5TH, 6CV, GM2DAU, 3BBW, 6JH, 6KI, G15SJ, G2HLF (Heat field) worked G4LX, heard G13ZX. G3BLP (Selsdon) worked G4LX, G13ZX, GM5XL. G3CGQ (Luton) heard Solar hiss at 1000 GMT, louder at 1300. Heard G4LX (1400) with "note like bottom register of an oboe," and then G6CV, 8VV, G13ZX, 5SU, GM2DAU and 3BBW. Condition cleared, at 1600.

G3COC (Newton Abbot) heard G3APY, 6CV, 6TF, G15SJ (1530-1540).

G5MA (Ashtead) worked G3CYY, 4LX, G13ZX and GM2DAU (GDX distance record).

G5VB (West Ewell) worked G13ZX and GM3BBW and heard G8VV, GM2DAU and 6JH (beam north).

G5WP (Woking) worked G3CYY, 4LX, 6LC, 8JO, G13ZX, GM2DAU, 6JH, 6XI and heard G3APY 6CV, 8VV, GM2CID and G15SJ (*see also text*).

G6LK (Cranleigh) worked G13ZX, 5SJ, GM3BBW (1450-1600).

#### Midlands

G6CW (Nottingham) heard only few weak signals but worked GM3BBW and GM6XI.

G3ABA (Coventry) worked GM3BBW (2200)

G6TF (Sheffield) heard all G, GI and GM with his beam N.E.

GW6OK (Colwyn Bay) heard G5MA and G5WP with his beam SE but signals still readable with beam North. Heard no GI or GM.

#### North

G4LX (Newcastle) worked 6 southern G's and heard others with beam N.W. Also heard G4LU and G8WC at 2000 GMT.

G15SJ (Belfast) worked G3APY, 3CCV, 6LK, 6OH and heard G2KF, 3ALY, 3CUJ, 3CYY, 5MA, 5WP, 6NF (1525-1613) beam NNE. Also heard G6OH at 2010.

GM2DAU (Cupar) and 2CID, heard or worked G2CIW, 2KG, 3ALY, 3APY, 3DA, 4LX, 4MH, 5BD, 5MA, 5NA, 5WP, 6CV, 6LK, G13ZX, 5SJ.

GM6XI (Edinburgh) worked G3ALD, 3APY, 3BLP, 3CUJ, 3DCV, 5WP, 6TF, and heard 2CIW, 2KF, 4CG, 5MA, 6TF, G13ZX.

AUGUST 10

G4LX (Newcastle) worked G5WP and heard G2OI and 6LK (1915).

G5WP worked G4LX and 8VV (1900-1945) and heard G2OI, 2TK and 3CUJ. Stations beamed correctly. Surges of hiss noted between 1700 and 1800, which D/F'd on the sun.

G6LK heard G4LX and 8VV.

G2OI heard G6LK (beam NNE).

directly at the station with which contact is desired. The signals are usually badly mutilated, the sound being a kind of burble or sometimes a rough hiss. The Aurora itself is caused by particles ejected from sunspots, hence the tendency to recur after 27 days.

### FIVE-METRE COUNTIES WORKED LIST

Starting Figure, 14  
From Fixed QTH only

Worked	Station
41	G5WP
40	G3BLP (214), G6CW (158)
39	G2ADZ
37	G3DCV (140)
36	G2AJ (297), G2OI (171), G3APY (186), G3ABA (156), G5BD (195) G5MA
34	G2CIW (200), G2RI (150), G5VB, G5BM, G6LK, G6VX
33	G2MR, G5BY, G5GX (147), G5YV (171), G6OS (150), G6XM (260), G8UZ
32	G2XC (313), G3IS (141), G4LU, G5BJ (114)
31	G3BXE (126), G5PP, G5RP (161), G6MN (136), G8KL (145)
30	G2NH (251), G3WW (113)
29	G2IQ, G4AP, G5JU (144), G5PY (231), G8WV
28	G3PZ, G5MQ, G6OH (195)
27	G2KI (147), G4IG
26	G6HD (157), G6YU (126), G8SM (157)
25	G2AOK/A, G3KX/A, G4RX, G8UR
24	G8GX
23	G3BOB, G3DA (104)
22	G2ATK, G2HLF (134), G4RO (136), G5IG
21	G2KF (121), G2QY (124), G3BBA, G5LC, G6KB (109), G6NF (140), G6VC (121), G8KZ
20	G2BMZ, G2KI (114), G2YL, G3BW, G3CWW (168), G5LQ (168), G6LC, G6TF, G8AL, G8PX, G8VN, G8WC
19	G2NM, G5CP, G6ZQ
18	G2ADR, G3BK, G2HDY (135), G5HN, G5MR, G6UW
17	G3WS, G5UM (127)
15	G2AUA, G3AEZ, G6CB, G6VD, G8TS (170), G8UR, G8VN
14	G3CGQ, G3COJ, G8JO

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

### Conditions in General

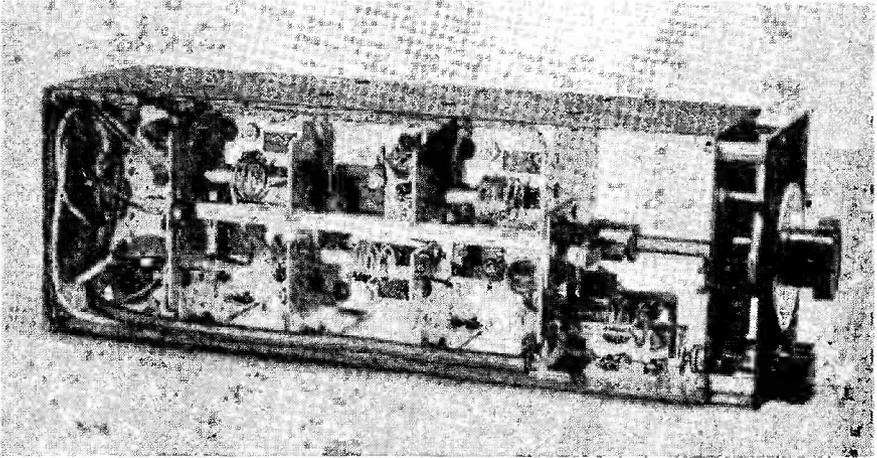
While the Aurora party produced more excitement than could possibly have been anticipated, sporadic-E conditions fell short of expectations and no major openings of that type were experienced. The length of the European Activity Summary this month gives proof of that fact. Tropospheric conditions were excellent during the fine-weather period at the end of July and a number of contacts over the 200-mile mark were made. Details are given in the accompanying table.

### The Type 27 Converter

Further to the remarks of last month on the subject of the tendency of the Type 27 Unit to produce T7 notes from T9 signals, we are grateful to several owners of these converters who have written us on the subject. It now appears that the oscillator valve itself may be the cause of the trouble, and that the wartime VR-137 is the worst offender. Changing this for the more modern EC52 frequently solves the problem. G2UJ gives the helpful hint that in several instances placing the converter so that the valve is horizontal cures the trouble completely. It might be remarked here that we once had the same difficulty with a 6J7, which necessitated turning the Rx upside down to get T9 notes! Sometimes a slight tap on the valve may cure the effect, which is presumably due to faulty electrode assembly. But whether you tap it, or turn it upside down, sideways or inside out there is always G—— and G—— who will remain T7! Many thanks to all those who have written on this topic.

### November Contest

It had been proposed to run a 5-metre contest in October in lieu of the usual M.A.W.E., but in view of the release of the 145 mc band for amateur operation from September 1 and the possible migration of many to the new band, we have decided to cancel the event and to substitute a combined 5- and 2-metre Contest in November. If by any chance five metres should have been lost by then, the Contest can quite easily become a one-band affair. The dates will probably be November 12 to 14 and the rules will appear in these pages next month. The general idea is to have three categories of winners—one for each band and a *Victor Ludorum*. A receiving contest for SWL's will be run in conjunction with the Transmitting Contest and the rules for that will be given in our *Short Wave Listener* for October.



**G6VX**, Hayes, Kent, has a Western Electric unit modified as one of his several converters for the 145 mc band. The IF of this one is 6 mc, and the performance is good.

### Station News

Among the southern stations **G3BLP** (Selsdon) has worked some excellent tropospheric and Aurora DX finding the evenings of July 29 and 31 particularly good for the former. **G6CB** (Wimbledon) has heard little outside London but did manage an hour's chat with **G5YV** (Leeds). He asks some of his local stations at the top of the tables to give him a contact sometimes as a change from working DX ! He also wants Oxon and Cambs. **G2QY** (Pinner) and **G6HD** (Beckenham) both comment on the consistent signals **G2IQ** has been putting into London and the South. **G3AEZ** (Dorking) has a convertor (GGT-RL7-EF50-EC52) into a BC-348 and this, with a 3-ele. c.s. beam 21-ft. high, produces results which exceed his anticipations. His locality is badly screened. **G6VC** (Northfleet) still seeks **G2XC**, in spite of a new Type 26 being installed, but northern DX has been worked.

**G2AJ** (Hendon) found the August Bank holiday week-end excellent and worked 24 counties, as well as hearing **G16YW/P** on August 1 at 2010. He also made his Cheshire contact during that week-end. **G3CGQ** (Luton) has worked his 100 stations in three months, mainly at week-ends, and now has the rather more difficult task in front of him of collecting the QSL's !

**G3KX/A** (Banwell), who made the first G/OE contact on "five", now has the QSL for it. He says **G4GR** is active in Newport, Mon. (a town in which there used to be much 5-metre activity before the war !) and **G6TO** in Bristol. **G6LQ** is ready for

### SUMMARY OF EUROPEAN ACTIVITY AND RESULTS

July 16 to August 12

#### July 17

**G8KL** heard loud harmonics from IRL and others (0930-1100).

#### July 19

**G2HLF** and **G4AP** worked **OK3IT** (2010 and 2025). **G4LU** worked **OK2MV** (1940). **HB9BZ** worked **OH2OK**, 2PK on 50 mc (1645).

#### July 20

**G2ADZ** worked **OK2MV** (2010).

#### July 21

**G2ADZ** heard **OK** and **OE** (1900-2010).

#### July 24

**OE-359** heard **G2CIW** and **6XM** (1020-1030).

#### July 26

**G2ADZ** heard **SM7**, **G3KX/A** heard **SM5** and **7**, and **OZ** (1810-1900).

#### July 28

**G4LU** worked **SM5VL**. **G2ADZ** worked **SM5AB**, **5ABC**, **5VL** (2000-2100). **G2XC** worked **SM5AI** and **5VL** (1850-1920).

#### August 2

**G15SJ** worked **SM5VL** (1703) and heard **LA6J**. **HB9BZ** worked **LA6J**.

#### August 11

**G2CIW** worked **OK1VW**, **2MV** and heard **SM7** (1000-1200). **G4LX** heard **OK** (1740). **HB9BZ** worked **LA7Y** on 50 and 58 mc (1740).

#### August 12

**G8KL** worked **F3HL**, **9OM**, **OK1VM**, **2MV** (1000-1100). **G8WC** heard **I**, **OK**, **OZ**. **HB9BZ** heard **SM7** (1150).

**FIVE-METRE  
COUNTRIES WORKED LIST**  
Starting Figure, 3

Worked	Station
16	G6LK (D, F, FA, G, GI, GM, GW, HB, I, LA, OE, OK, OZ, PA, SM, ZB1)
15	G5BY (D, F, FA, G, GW, HB, I, LA, OE, OK, OZ, PA, SM, ZB1, ZB2)
14	G5YV (D, F, FA, G, GI, GM, GW, HB, I, OE, OK, OZ, PA, SM)
13	G5WP
12	G2XC, G5BD, G5MA
11	G3KX/A, G5CP, G6XM
10	G2ADZ, G2AJ, G2AOK/A, G2MR, G3BW, G5GX
9	G2NH, G3IS, G2OI, G5BM, G5VB
8	G2CIW, G12HML, G3COJ, G3YH, G5MQ, G15SJ, G6CW, G6DH, G6LC, G8GX, G8TS, G8UZ
7	G2ADR, G2QY, G3APY, G4AP, G4LU, G6MN, G8SM, G8UR
6	GM2DI, G3ABA, GM4JO, G4RO, G6TF, GM6XI, G8KL
5	G2BDO, GM2DI, G2KF, GM3BDA, G3BXE, G2RI, G4IG, G4LX, G5BJ, G5IG, G5PY, GM5VG, G16VU, G8LY, G8WV
4	G2DBF, GM3AXO, G3CWW, GM3NH, GM3OL, G3TP, G3WW, G5MR, G6OH
3	G2HLE, G3CYY, G8JO, G8VN, G8WC

420 mc and 3KX has the Rx under way. G5BM managed some good GDX including GM3OL. G2BJS (Redruth) claims the first G/LA.

### Midlands

G3DCV will be QRT from end of September until Christmas, but hopes to provide us with a 2-metre signal from Cambridgeshire in the meantime. G3WW (Wimlington) was unfortunate enough to choose August 8 to modify his convertor, and by the time he had located the band once again, all the Aurora fun was over. He is erecting a 52-ft. steel pylon for his beams. G2RI (Leicester) draws our attention to the long CQ calls emanating from some quarters, usually accompanied by a scarcity of callsign. This becomes particularly bad in the case of directive CQ's, say, CQ SW or even CQ DX, as the listener wants to know the *source* of the

signal before the direction has any meaning. But perhaps the operators concerned really believe their beams are uni-directional!

In Nottingham G6CW has reached his 40 counties, only using the Aurora for one of them. This is a fine piece of work. G8KL (Wolverhampton), on holiday in Devon and Dorset, has been surprised at the extent of activity in the South. He visited G3HW/P, a fine battery-operated portable station at Teignmouth. G3HW was, of course, a well-known 5-metre station in pre-war days.

G4LU (Owesity) managed to contact GW5SA (Neath) for his long-awaited G.W. It is surely remarkable how the latter's signals get out through the mountain barriers to the East and North of Neath. GW2AVV has also been heard in Oswestry, and G4LU in Cornwall (possibly by scatterback). G2ADZ (Oswestry) found July 18, 26 and August 1 best days for tropo-GDX.

G5YV (Leeds) now has an 829B final with improved efficiency. G6XT is active in the same area with P/P 807's and a 3-ele. rotary. G6TF (Sheffield), on holiday in the South, has listened to some of his home stations in London and comments once again on the London area stations engaged in local QSO's while the northern GDX is coming in well.

### North

G4LX (Newcastle) tells us the Northumberland stations are sticking to 5 metres until the end of the year. G4LX, who was there for the Aurora, is on 58.9 and QSL's 100 per cent. but depletes the poor response. G3CYY (also Newcastle) uses a push-push DET-19 with 23 watts, and a *crystal-controlled* Type 27 into a BC-348, tuning being on the 348. He can place the Rx on any frequency to within 2 kc. G8JO (South Shields), on 58.896, enters the Counties Table and has worked some good southern GDX by tropo.

### GM and GI

The first GI/GM 5-metre contact was made on August 1 at 2220 GMT between G16YW/P (Killinchy, Co. Down) and GM3BDA (Airdrie). The former, a combined station with G15SJ/P (each operator with his own call), used 25 watts to an 807, power being obtained from 12v. batteries *via* motor generator. The Rx, a Type 26 into a straight receiver, used vibrator supply, while the aerial was a 3-ele. c.s. beam. Stations worked included G2ADR, G2OI, G3BW, G4MH, G4OS, G5CP, G5JU, G6CW, G6MN, GM3BDA,

while G2AOA, G3APY and G3BY were heard, and a report received from G2AJ (London). GM3BDA was using 25 watts to an 832 and an Rx consisting of CV53 GGT, into a modified Type 26 unit, into an 1155. A 4-ele. c.s. beam completed the rig. During the last few weeks he has worked G2OI, G4OS, G5CP, G5JU, G5MQ, and G6WR. GM3BDA and SWL Miller supply us with the following GM frequencies:

GM2DI	58608	GM5VG	59600
GM3BDA	59300	GM6KH	59120
GM3NK	58950	GM6SR	58600
GM3OL	59200	GM8AH	58720
	GM4JO	58505	

In Edinburgh GM3BBW, 3UM, 6SR and 6XI are active, much of their enthusiasm being due to GM6SR, who has been on for a long time from a poor location. He has a 4-ele. beam, and is now preparing for 145 mc. GM6XI is using 15 watts input and a folded dipole aerial made from 300-ohm line. His Type 26 with stabilised volts gives him T9 notes.

During the July Field Day G4JO/P, whose home QTH is now Dumbreck, Glasgow, was using an 832 PA and a 4-ele. beam. This information fills the gap in last month's list of GM QTH's and at the same time we must apologise for an error; "GM3DAU" should be GM2DAU and his QTH Cupar. GM2DAU is using a home-built converter with EF54 RF, EF50 mixer, and a 2-element rotary. The Tx finishes with an RK-34 power doubler.

#### Some 145 mc News

The following details of stations ready, or preparing, for the new band may be of assistance. In Malvern, G2HX, G2XX (SCR-522 and 3-ele. beam), G3BJB (SCR-522 with 829 final), and G8QX (similar) hope to be active, as well as G2AO who will have a six-element beam, and 829 final and will use NBFM and CW. G2OI

#### VHF CENTURY CLUB

##### NEW FULL MEMBERS

G3CWW	A. Timme (Hendon)
G5LQ	J. Tovell (Chiswick)
G8GX	G. A. Dodd (Pinner)
G2RI	L. Ridgway (Leicester)
G2CIW	J. Moseley (Brentwood)
G3ABA	L. J. Kennard (Coventry)

Total: 21 Full Members

#### VALETE

*It is with deep regret that we record the death of Enzo Sala, HB9CD, at his home in Zurich on July 27, after a severe illness. HB9CD was a keen VHF operator, and was the first HB to work G on five metres, when he contacted G5BY on August 22, 1946. He also made the first HBW contact on 50 mc, using the call HB8VX, on November 22, 1947. Aged 40, he was married and also leaves a little boy of three. We know our Swiss VHF friends will miss him greatly, as indeed will the many G's who worked HB9CD during the sporadic-E seasons of the last two years.*

intends to be on 145350 from Manchester, and can QSY from 58 mc in 30 seconds.

G6PG (Dartford) will be on 145.5 and 145.8 mc, his Tx being 6V6G tritet (5th harmonic), VR65 amp, 7193 doublers, and 832 PA. The Rx is 3-stage converter (CV66-EF54-955) into BC348A. G5RP (Abingdon) is ready with 815 final and a converter. G2MR (Surbiton) will be on 145.032, G2XC will be on 145.260 and G2AOK/A on 145.068.

In Rugby, G8VN hopes to get a ZB2 adaptor working, while G4AP (Swindon) has a converted 1147 and 15 watts to an 832 all ready. Reports requested. G2AJ (Hendon) has his Tx ready.

In Scotland most of the 5-metre stations are preparing for 145 mc. GM6XI has a SCR-522 lined up as Tx.

#### In Conclusion

A Circular has gone out to all Fiveband Club members, to relieve pressure on space in these columns—our thanks to all those who have already responded to points in the Circular. We hope to be able to give next month the winners of the Fiveband Club Contest. Please note all entries for this must reach us by September 12. The closing date for next month's VHF news for this column is September 17 *latest*. Please keep your five- and two-metre material quite separate so that we do not get them muddled; it would help a lot if the sheets are clearly headed "FIVE" and "TWO" in large letters! And send in some 2-metre Calls Heard\* lists, any distance. Good luck on 145 mc, and our address is still E. J. Williams, G2XC, *Short Wave Magazine*, 49 Victoria Street, London, S.W.1. CU on October 6.

\*We must apologise for having had to drop some excellent Calls Heard lists during the last few months, space taken by the other summaries and tables being the factor. Calls Heard on the new 145 mc band will of course be of the greatest value and interest and will be sure of appearance.—Ed.

# Putting Equipment SCR-522 into Operation

Notes on Design, Construction, Modification and Setting-up for Amateur Use

By A. J. SCHOFIELD, A.M.I.E.E.

*(The SCR-522 is an aircraft VHF transmitter-receiver equipment of advanced design. It is of the greatest interest from the amateur point of view because, as this article shows, it can be modified for operation on the 28, 50 and 58 mc bands, besides being directly adaptable to our new 145-146 mc band, either for portable or fixed station working. The final valve on the transmitter side is an 832, a double beam-tetrode giving about 22 watts RF output.—Ed.)*

**T**HE excellent performance of this 100-156 mc aircraft radio-telephony set on the new amateur 144-146 mc (two-metre) band is becoming well known in America. As can be seen from the photographs, both Transmitter (left) BC-625A, and Receiver (right) BC-624A are beautiful examples of modern crystal-controlled VHF technique.

At present prices the units shown are excellent value for money, whether for purposes of experimental study, for stripping down or for operation on the amateur bands.

As, however, with much other ex-Government equipment, knowledge of the purpose and limitations of the original design is necessary both to obtain the best results in amateur use and to link up with other available equipment.

The transmitter is designed to radiate the 18th harmonic ( $2 \times 3 \times 3$ ) of the crystal in the channel (A, B, C or D) selected. In the receiver, the harmonic of the receiver crystal (in the Rx channel selected to correspond to the distant transmission) is amplified and beats with the signal to give an input of 12 mc to the three IF stages; the harmonic used varies between the 11th for signal frequencies of 100-108 mc and the 17th for 148-155 mc signals. For 140-148 mc operation, the 16th harmonic is selected.

Receiver crystals with fundamental frequencies between 8260 kc and 8370 kc give reception channels within the new amateur 144-146 mc band. Corresponding transmitter channels require transmitter crystals calibrated between 8010 kc and 8110 kc approximately. Reference to the block diagram should make the details clear. Later models of the receiver, e.g., BC 624-AM, have noise suppression and AVC delay, and in the BC 624-C

further improvements in the squelch and in the audio amplifier stages. It should be noted that all transmitters have a bridge circuit input to the modulator and also to the aircraft amplifier. This was to confine the crew to interphone speaking while permitting both facilities to the pilot.

## Remote Control

Normally, both transmitter and receiver channels are selected by remote control only. The set is designed to use Pilot's Radio Control Box BC 602-A (or BC 602-B) for press-button channel selection and the ratchet motor (406) located on Rack FT-244A then actuates the selected frequency shifter slide. Similar 5-button switch boxes are available on the surplus market with other numerical designations.

The A, B, C, D channel selector sliders of both Tx and Rx may, however, be made hand-operated without difficulty.

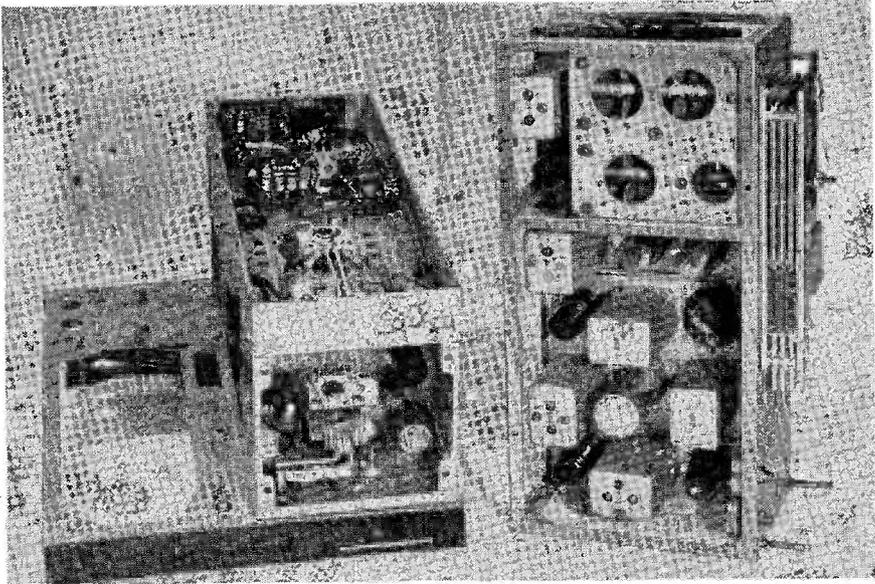
Alternatively, the two chassis can be separated and each chassis altered quite simply to front panel control.

With a further hour or so's work the transmitter can be modified temporarily to work almost as well on either 28 mc, 50 or 60 mc, as it does unmodified on 144 mc. When the new band is open the transmitter can be returned to 144 mc operation with only a few minutes' use of a soldering iron.

Full details of modifications and of experiences in getting the set going with the help of the ex-Government test gear and a modified ex-R.A.F. Receiver R1147B follow below.

Ratchet Motor (406) is carried on the Rack FT-244A just behind, and above, the large aluminium dial of Admiralty Test Set S.E.2.

This Test Set embodies a receiver, an oscillator and a noise generator as well as



In the transmitter, the aerial coils (front low-left) and the ceramic condensers (central top-front) are modified for 28 or 58 mc operation. In the receiver unit, the channel selector sliders, the gang condensers and the four IF transformers can be picked out in this photograph. The receiver uses 9000-series valves in its RF stages.

a sensitive diode volt-meter-micro ammeter. The other test equipment required is a VHF wavemeter with a similar valve-controlled micro-ammeter.

### Getting Going

The first step is to consider the power supply, the aerial, and the general installation and adjustment arrangements most likely to prove efficient at an amateur station. In all these details there is rather less flexibility than there is in the choice of frequency output and other modifications that can be arranged for the transmitter and the receiver units themselves.

It should also be remembered that even over level country the relative heights above ground of the two ground station aeriels is important. As practical work shows, an aircraft transmitting at 1000-ft. altitude has a direct range to a station on the ground of some 30 miles, whereas at 20,000-ft. altitude the range is increased to 180 miles both ways.

### Power Supply Arrangements

The full requirements of the SCR-522 as a transmitter are:—

- (1) 260 mA at 300v., HT.
- (2) 10 mA at—150v., negative grid bias.
- (3) 5 Amps. at approximately 13v., LT.

A grounded power supply system is preferable, but the equipment will operate from an ungrounded source.

The valve heaters may of course be run off either AC or DC, but the relays are designed to be operated by DC only. Therefore, if AC is used, the idea of remote control must be given up and panel switches fitted where needed.

In aircraft the set is powered by a Dynamotor PE-94, which draws 11.5 amps. at 28v. for transmission and 11.1 amps. at 28v. for reception—in both cases from the aircraft battery. This dynamotor is fitted with efficient input and output filters and is switched by a relay. The LT output is regulated to between the limits of 12.35v. and 13.52v. by a round-cased carbon pile for any input within the limits of 21.8v. and 29v. For portable work, the dynamotor can therefore be run by two 12v. car batteries by those who have 12-volt systems on their cars, or home-charging facilities.

The best alternative for the amateur with AC mains supply is probably to use a medium-heavy duty HT/LT power transformer. One well-known make has two or more 6.3v. 4-amp. windings; while another good quality low-price transformer giving 500-0-500v. at 250

mA output, has two 4v. 5-amp. windings, a 6.3v. 4-amp. winding with 5v. 4a. C.T. and can be slightly over-run without harm. With a 5R4GY rectifier (or two in parallel) it will also give, by use of a circuit similar to Fig. 2, the 150v. needed for transmitter grid bias.

Suitable LT heavier duty transformers and selenium rectifiers are available on the surplus market quite cheaply, either to charge four 6v. car accumulators or even to give the 11-30 amps. (momentary) current at 28v. needed to work the dynamotor economically from house power sockets. In considering the most suitable arrangement it must be remembered that the accumulators will provide the heavy starting current without risk of damage, whereas direct drive from a rectifier, though successfully used by the writer, needs constant and careful attention. It would not, for example, be advisable with the constant starting and stopping of full remote control by push-button nor with old or sub-standard house wiring.

### Aerials

The RF energy is transferred to the aerial through the coupling between the transmitter PA plate coil (two sections) and the central aerial coil, as can be seen in one of the photographs. The degree of coupling is adjustable by a control which takes the form (in later models) of meshed gears, and in the BC-625A Transmitter of a screw sliding along a slot.

For reception RF energy picked up by the aerial is transferred, when the change-over relay operates, to the grid of the receiver signal frequency amplifier valve (first 9003). The coupling is by a fixed one-turn No. 14 gauge tinned copper wire coil and a similar (but tuned) two-turn coil connected across the grid and cathode of this valve. Coaxial cable with corresponding plugs at each end joins the "aerial" socket on Rack FT-244A to the base of the external aerial.

The aircraft aerial designed for the set was a dagger-like solid metal mast (or wide-band aerial) with one straight and one tapering edge,  $21\frac{1}{2}$ -in. long by  $2\frac{3}{8}$ -in. wide at the base, shaped to reduce head resistance; this shape and its solidity had some effect in increasing band-width properties. In the earlier models, a sliding brass tube made the aerial length variable, but this feature was dropped.

Providing the coupling, looking into both aerial and coupling coil, is impedance matched (a) to load the transmitter properly—that is, enable it to deliver power output at as high efficiency as the

transmitter design will permit—and (b) to fit the aerial to accept and radiate the RF energy fed into it, the actual length of the aerial within reasonably close limits is not critical. Some 19-in. of tube is found in practice to suit  $\frac{1}{4}$ -wave working at 144-146 mc.

### Setting-up and Adjusting

The main problem is to know exactly what is actually happening in each individual circuit under operating conditions. This makes a preliminary check of the operation of both transmitter and receiver desirable before the set is fixed as a whole in its final location. This check was intended to be carried out with the following equipment, and, of course, with the rack covers raised to give full access to controls but with all other shielding in position.

#### For transmitter tuning :

- (1) Test Equipment IE-36, which consists of :
  - (a) A control box (BC-1303) plugging into the 18-contact socket of the rack and providing direct manual switch control of the set and a buzzer-tone signal generator.
  - (b) A Test Set I-139-A, which is similarly inserted into the transmitter meter socket (171) to give visual indication of results.
- (2) Either Microphone T-17 (carbon) or T-44 (magnetic).

It is not known whether these particular test equipments have yet been released to the surplus market. Fortunately, an ordinary moving coil 0-1 mA meter of some 100 ohms resistance proves satisfactory as a visual indicator under the following conditions :

- (1) Meter switch to position "1". Adjust oscillator plate tuning for a maximum reading.
- (2) In position "2". Adjust the first harmonic amplifier plate tuning control for a maximum meter reading.
- (3) In position "3". Adjust the second harmonic amplifier (if used) plate tuning for maximum reading and at once adjust the PA plate tuning control for a minimum meter reading.  
If the readings for "2" or "3" are more than 0.63, then the actual currents in mA are too great for efficiency and the aerial coupling should be decreased; if less than 0.63 then the coupling can be tightened, taking care not to exceed that figure or early valve failure may follow.
- (4) Tune all four channels (A, B, C, D) in turn, if required, without changing the aerial coupling unless a reading greater than 0.63 on one channel necessitates change. Even then it is preferable to readjust the second harmonic amplifier plate tuning control of that particular channel, if the output test (5), below, proves low.
- (5) In position "5" the meter reading for all channels should be full scale, but half scale is the minimum that can be satisfactory.
- (6) In some of the earlier Transmitters BC-625A, the 6G37 RF diode has not been removed and in position "4" of the meter switch a purely relative indication, without any quantitative significance, can be obtained of RF voltage across the final amplifier tank inductance. This is equivalent to a neon-bulb indication.

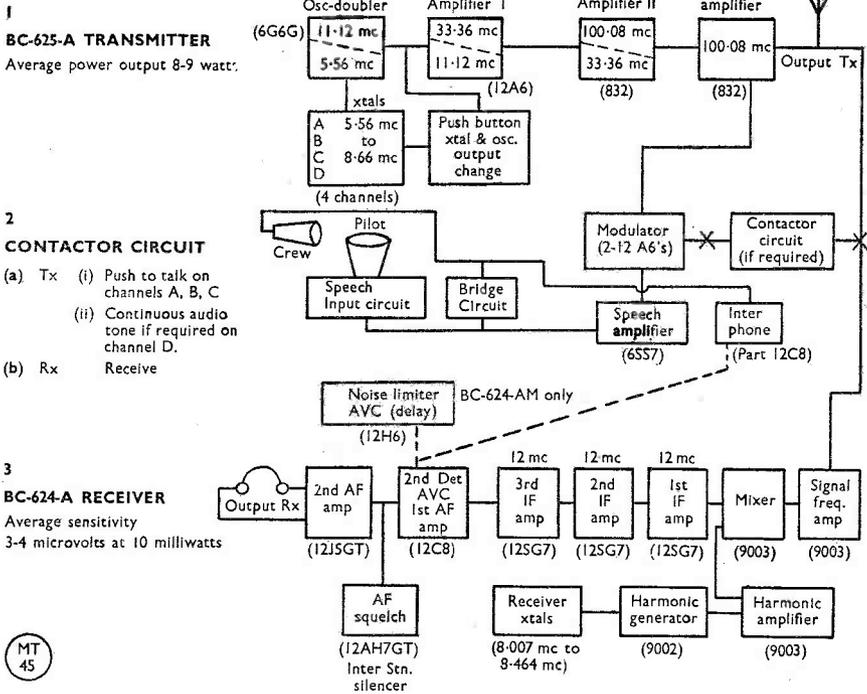


Fig. 1. Block schematic of the SCR-522 electrical layout and inter-connection. The equipment would be received with the units arranged in this way.

**Modulation Check**

If available, Phantom Antenna A-29 should be connected, in place of the aerial, or an equivalent circuit to the aerial with a pilot lamp or neon tube. If the carrier wave is being modulated properly the brilliance of the light should increase when a sustained note is whistled into the microphone.

Some models of the transmitter contain a variable gain control, in others it has been replaced by a fixed attenuator network. The correct adjustment is that which gives maximum volume in a second receiver without trace of distortion and is good for all channels. If locked, the gain control has been set permanently correct by the factory.

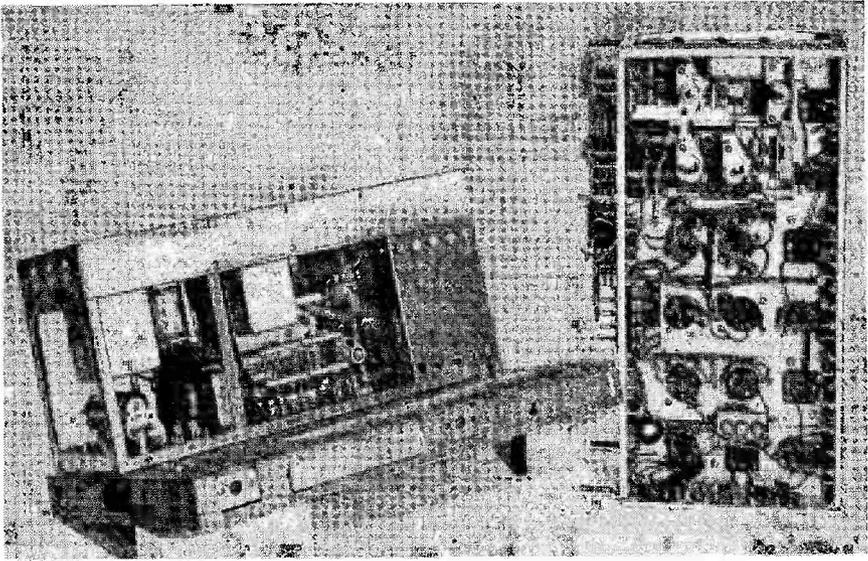
**Alignment of the Receiver**

First, make a simple operating test of the receiver with the buzzer tone signal generator, if available. Only relative output of the receiver can be judged by the intensity of the corresponding signal in the 'phones. If no reasonable result is ob-

tained first check the condition of the valves before attempting the next easiest adjustment, which is IF re-alignment.

Any signal generator giving an output of about one volt at *exactly* 12 mc and having a terminated transmission line output is usable for IF re-alignment. Modulate the RF voltage about 30 per cent. at 400 to 1,000 cycles. Short leads must be used (under 1½-in.) or the IF amplifier may feed back and oscillate or be hard to tune. Connect the signal generator output to the receiver mixer-valve (2nd 9003) grid leads on the right side of the receiver, and its ground terminal to the frame of the receiver three-gang condenser. Do *not* allow the output lead to touch the plate terminal (7) of the mixer-valve socket. If no output-power meter (or AC voltmeter) is available, a DC meter in the signal generator can be used as a tuning indicator or the IF transformers adjusted for peak output in the headphones, readjusting the signal generator attenuator to give no more than "comfortable" headphone volume as





The transmitter (left) and the receiver (right) of the SCR-522, one of the finest equipments yet offered on the surplus market.

calibration dial plates. A difference of more than 3 mc may mean that the receiver is working some 8 mc removed from the desired frequency. The oscillator plate coil tuning screws will be seen on the right centre of the receiver front panel, and are marked A, B, C, D. The higher the crystal frequency, the further the plate-coil screw of that channel must be backed out (counter-clockwise) of the coil-mounting to obtain the inductance to permit the oscillator to start. An additional three-quarters of a full counter-clockwise turn is necessary for a stable adjustment of the crystal oscillator, but further unscrewing to the next 'phone-signal peak may be an improvement in strength. Choose the loudest of these two positions.

#### Surplus Test Equipment and Special Generators

Direct reception of the 146 mc signal may be possible on some R.1147 ex-R.A.F. receivers without drastic modification. As, however, that receiver has peculiarities, and can be converted to other uses (including that of a car receiver) space considerations suggest a separate article at a later date.

Three very useful ex-Admiralty Wavemeters and Test-Sets are now obtainable at bargain prices.

Wavemeters G56 (15 kc-24 mc) and

G79 (150-200 mc) are absorption type which can be used to clarify the situation in adjusting the SCR-522 as they do not generate or accept harmonics. Their indicators (of resonance) are diode voltmeters embodying 0-0.5 mA meters with sensitivity adjustment controls, thus assisting discrimination.

If required as a signal generator of wide coverage, the G56 can be converted to dynatron or thyatron untapped coil operation. As modulated test oscillators both wavemeters—the G56 using a 6A8G and the G79 an acorn valve with a high-resistance grid leak to induce "squegging" with a super-regenerative effect—can retain 0.1 per cent. of accuracy.

The Admiralty Test Set S.E.2 is of 1944 manufacture. It uses an EC52 valve in its oscillator, a CV172 in its noise generator; both sections can be used with slight modification to adjust the sensitivity as well as the tuning of the SCR-522 receiver. The full possibilities of the test receiver in the S.E.2, embodying a 6D1 diode, and of its input diode and separately jacked microammeter, are still under investigation. This test set has a self-contained stabilised power supply, and two 6J5G valves and potentiometer control. Its heavy construction, with double shielding and wood-covered copper containing box, are ideal for extending its application by

modification. Factory markings, and Admiralty Signal Establishment hand calibration cover 170-240 mc but, as in the G79, dial scale divisions exist to extend the lower frequency coverage.

### Converting the BC 625A Transmitter

As purchased the transmitter was deficient of one 832 valve. This immediately suggested temporarily cutting out the second harmonic amplifier (832 second tripler) and fitting plug-in coils such as the Eddystone 601-605 three to ten turn  $\frac{3}{8}$  in. diameter VHF coils for 5-, 6- and 10-metre working. Coils of  $\frac{3}{8}$ -in. diameter serve well for the 5- and 6-metre bands, but for 28 mc output, crystal frequencies of 7-7.4 mc or 14-14.8 mc (being more popular than 9.3-9.9 mc crystals whose harmonics also fall in the 10-metre band) will necessitate either  $1\frac{1}{4}$ -in. coils or more than one 10-turn  $\frac{3}{8}$ -in. coil on either side of a 3-turn  $1\frac{1}{4}$ -in. (or a 5 turn  $\frac{3}{8}$  in.) aerial coil in the PA plate circuit (last 832). For 28 mc working, some 12  $\mu\text{F}$  of additional capacity is required in the 12A6 plate tank circuit (condenser 115 and inductance 119). A ceramic trimmer condenser is suitable.

Cutting out the first 832 valve is accomplished by unsoldering the output ends of the 20  $\mu\text{F}$  ceramic condensers to be seen in one of the photographs; that is, (a) those between the 12A6 (harmonic amplifier I) tank condenser 115 and the first 832 valve socket grid terminals, and (b) by similarly unsoldering the identical coupling condensers between the first 832 plate circuit and the second 832 grids clear away from the hairpin tank. A small loss of automatic drive increase on modulation peaks will result from removing the first 832 valve, as in the unmodified transmitter a form of cascade modulation is used through the screen of that valve being modulated simultaneously with the plate and screen of the PA (second 832). To complete the modification for 10-metre working, use two identical lengths of No. 12 gauge wire, symmetrically run, to connect the ends to the PA grid coupling condensers, freed from the hairpin tank to the stators of the 12A6 tank condenser.

For 6- and 5-metre work, three or four turns must be removed from the 15 turns, tapped at the 8th turn, of the 12A6 tank coil. Remove turns symmetrically from each end to leave the tapping roughly central. Alternatively, use Eddystone, Denco or equivalent home-made high "Q" coils to leave the 15-turn coil intact for quick return to 2-metre working.

The oscillator coil will cover most of the 6-metre band unchanged, but for 58-60 mc one or two turns must be removed. A possible solution is to short out temporarily unwanted turns by very small clips, at least in the case of the 15-turn coil which is  $\frac{3}{8}$ -in. diameter and of No. 10 gauge bare copper wire, but the oscillator coil is  $9\frac{1}{2}$  turns of No. 24 gauge enamelled copper.

### XTAL XCHANGE

Insertions in this space, which are free of charge, can only be accepted in respect of exchanges of crystals. Buy-or-sell notices cannot be inserted under this heading. Please set out your request in the form shown below, on a separate slip headed "Xtal Xchange—Free Insertion," and note that all negotiations should be conducted direct.

**G2FCI**, Little Pleasance, Western Road, Ashburton, S. Devon.

Has frequencies 100/1000, 1740, 7275 and 7300 kc.  
Wants frequencies 3500-3565 or 7005-7065 kc.

**G3DFS**, 20 Oakwood Road, Sutton Coldfield, Warks.

Has 8180 and 8410 kc crystals, mounted. Wants 100 kc bar, or any frequency in amateur bands.

**G4RS**, 17 Tudor Avenue, Bebington, Cheshire.

Has 1000 kc bar mounted in standard holder.  
Wants 14 mc crystal.

**G6QN**, 1 Boundary Road, Colliers Wood, London, S.W.19.

Has 7106, 7140, 7173, 7206, 7240, 7273, 7306, 7340 and 7406 kc crystals in American-type,  $\frac{3}{8}$ -in. spaced holders. Wants frequencies 7015 7020, 7025, 7035, 7045 and 7055 kc, holdered.

### NEW SOLDERING IRON

We have recently had a sample of the new Acru 25 iron for light work. Having many special design features—detachable copper bit, a carefully shaped handle, and a totally enclosed air-tight heater element—the Acru 25 is exceptionally light and easy to use; also, it can be left lying about on the bench when working since the balance is such that the bit is always held clear. Three different bit shapes are available, everything comes to pieces should repairs or replacements be necessary, and the instrument is absolutely safe in use.

The Acru 25, with 3-core cable and bakelite handle, and a heater for 50-watts loading in any voltage from 6 up to the usual mains pressures, costs 34s. complete. Acru Electric Tool Manufacturing Co., Ltd., 123 Hyde Road, Ardwick, Manchester, 12.

# Here and There

## Box 88, Moscow

No operator on our communication bands needs to be told that all QSL cards for our "Soviet Allies" must be passed both ways through this address. It would seem more than likely that Box 88 functions not only as a QSL Bureau but also as a recording centre for all the details given on their cards by trusting foreign amateurs—G's, VE's and W's in particular.

With the peculiar attitude of our "Soviet Allies" toward anything emanating from the West, it is even possible that those foreign amateurs who do QSL *via* Box 88, Moscow, are assumed by the Russians to be either fellow-travellers or at the very least sympathisers with Communism; it would be quite beyond our "Soviet Allies" to grasp the simple truth that Russian amateurs are worked (by the vast majority of foreign operators) only because they *are* amateurs and in spite of the fact that they are Russian!

Anyway, what is certain is that nothing in the world of Amateur Radio goes unnoticed by our "Soviet Allies", even if the conclusions they may draw from their observations are quite wide of the mark.

## "CO MCC"

During the period December 4-December 12, there will be taking place the *Short Wave Magazine* Third Annual 1·7 mc Club Transmitting Contest; an advance note appears in this month's Club Section, and later the rules will be circulated to all Clubs known to us to be active. Last year's first three were West Cornwall, Warrington and Coventry, and in 1946 Coventry, Cheltenham and Grafton were the leaders.

## German Licensing—September 1

An official notification from our authorities in Germany discloses that the Military Governors of the British and American Zones have directed that an ordinance be issued by the German Economic Council to provide for the licensing of German nationals in the Bizonal Area.

It is expected that licensing will take effect from September 1, that the power

limitations will be 50 and 25 watts, and that our own regulations will be used as a guide by the licensing agency, the Deutsche Post.

And it is worth adding that these arrangements were put forward in a joint U.S./U.K. proposal, the result of which is that for the first time in a great many years, Germans will be freely and officially licensed. It is to be hoped that they will appreciate what has been done for them, while amateurs throughout the free world welcome the D's back again into the fold of Amateur Radio.

## Eddystone Overseas Competition

The winning essays in the Overseas Section of the Eddystone "640" Competition were those by W. G. Collett, Dunedin, New Zealand ("Relative Merits of British and American Communications Equipment"), C. Holmes, ZL3DK, Christchurch, N.Z. (the same subject), and H. Owen, ZD4AM, Tafo, Gold Coast Colony ("Band Planning").

As in the case of the Home entry, the standard was high and the views of the competitors on the subjects set for the essays extremely interesting and instructive.

## Old Timers' Club

Membership of the British Old Timers' Club now stands at 123, the latest to be admitted being D. B. Knock (VK2NO), 6XG in 1923; R. Baker, (G6QN), 1924; S. Ince (G6LC), 1926; and G. M. Whiteley (G5IA), 1927. It is hoped to give some information about the B.O.T.C. Dinner in our next issue.

## Reproducing Magazine Articles

While we are practically never able to find odd copies of past issues for those who may wish to refer to particular articles, we can always supply reproductions of any article at the standard charge of 3s. 6d. per *Magazine* page, including all illustrations. When wishing to make use of this service, please give the fullest possible information regarding the material required—though we can sort it out if you only know that at some time we printed the article you want; and we always quote the charges involved before you are committed.

## NEW QTH'S

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

EI4W	P. Joyce, Post Office House, Tuam, Co. Galway, Eire.	G3CAX	N. H. Willis, 8 Skerne Grove, Preston Road, Hull, Yorks.
EI8W	J. Gaffney, Aeradio, Shannon Airport, Co. Limerick, Eire.	G3CCH	J. H. Stace, (DLZY, ex-MB9AM/XAFD), 270 Frodingham Road, Scunthorpe, Lincs.
G2ADR	E. Parvin, 19 Fellbrook Avenue, Beckfield Lane, Acomb, York.	GW3CDT	D. R. Jones, 28 Edgehill Road, Aberystwyth, Cards., Wales.
G2AIQ	H. Barnet, M.Brit.I.R.E., (ex-SV1WE), 1 The Crescent, Sea Front, Hayling Island, Hants.	G3CGE	R. Gardner, Coniston, Parkside Avenue, Millbrook, Southampton, Hants.
G2AKI	A. J. Sargent, 18 Sea View Road, Leigh-on-Sea, Essex.	G3CJB	C. A. Limbrick, Aeradio, Bovingdon Airport, Herts.
G2AVD	W. H. Rawlings, Grey Timbers Cottage, Kingsland Road, West Mersea, Essex.	G3CPT	D. A. Capp, 97 Duncombe Street, Bletchley, Bucks.
G2AVK	R. Marshall, 99 Dale Street, Ossett, Yorks.	G3CSF	J. W. Redfearn, 45 Lancaster Avenue, West Norwood, London, S.E.27.
G2BJW	R. A. Lucas, 97 Milton Road, Gillingham Kent.	G3CSN	L. Robson, 4 Lowden Road, Scunthorpe, Lincs.
G2BW	L. C. Snowden, Sandy Bank, Mayfield Road, Weybridge, Surrey.	G3CTR	R. L. Whorwell, (ex-XAGW), 29 Aspinden Road, Rotherhithe, London, S.E.16.
G2DCV	P. Goudime, St. Ann's Hill, Chertsey, Surrey.	G3CTU	R. Wilson, Main Street, Bushmills, Co. Antrim, Northern Ireland.
G2FRP	C. V. M. Bamsey, 33 Craven Hill Gardens, Bayswater, London, W.2.	G3CUD	F. E. Naylor, 1 Council Houses, Ryhall, Stamford, Lincs. (Station in Rutland).
G2HDO	H. R. Butterworth, 5 Pennant Street, Oldham, Lancs.	G3CUF	H. Ashworth, 73 Rosehill Road, Burnley, Lancs.
G2HFD	H. Reeve, The Angel Inn, 21 Rotherhithe Street, London, S.E.16.	GM3CVZ	H. J. Connell, 16 Munro Street, Kirkcaldy, Fife, Scotland.
G2HL	J. Woodage, 68 Windsor House, Nash Street, London, N.W.1.	G3CWH	R. B. Rogers, 25 Queen Margarets Road, Canley, Coventry, Warks.
G2HMJ	J. S. Wheatley, 208 Prospect Road, Scarborough, Yorks.	G3CWL	G. R. Haynes, 89 Ash Road, Sutton, Surrey.
G2MM	M. H. C. Lewis, 6 Corby Avenue, Swindon, Wilts.	G3CWP	557 Fletchamstead Highway, Coventry, Warks.
G3AFV	W. E. Atkinson, Sewage Works House, West Lane, Sittingbourne, Kent.	G3CYU	J. D. Wilson, Aeradio, Bovingdon Airport, Herts.
GW3AHN	T. Higginson, 13 Penylan Place, Penylan, Cardiff, S. Wales.	G3CZG	A. Couser, c/o Roydon, Kimberley Park Road, Falmouth, Cornwall.
G3AJP	J. D. Baker, 3 New Villas, Fritton, Great Yarmouth, Norfolk.	G3DDC	W. R. Walls, 18 Castillon Road, Catford, London, S.E.6.
G3APP	J. A. Rozier, Hill Barn, Icomb, Stow-on-the-Wold, Glos.	G3DFS	T. A. Egerton, 20 Oakwood Road, Sutton Coldfield, Warks.
G3ART	E. A. Thorne, 23 Scawfell Road, Carlisle, Cumberland.	G3DGB	E. Batty, 7 Burley Wood Lane, Leeds, 4, Yorks.
G3AUA	H. B. Morton, 35 Park Road, Dartford, Kent.	G3DGS	Bovingdon Airport Radio Club, Bovingdon Airport, Herts.
G3AWU	C. A. White, 6 Phillip Road, Cheriton, Folkestone, Kent.	G3DHP	D. E. Crabbe, 1 Maybush Road, Southampton, Hants.
G3BED	A. F. W. Bennion, 8 Monks Close, S. Ruislip, Middlesex.	G3DHZ	R. F. Penfold, 90 Surbiton Road, Kingston-on-Thames, Surrey.
G3BFG	G. F. Grenyer, 21 Sydney Road, Haywards Heath, Sussex.	G3DIH	J. W. Bull, Woodland Glen, Clewer Hill Road, Windsor, Berks.
G3BJU	L. C. Spalding, 46 Millgate, Aylsham, Norfolk.	G3DJH	D. W. Drage, 34 Second Avenue, Newhaven, Sussex.
G3BPJ	R. Shepherd, 8 Duke Street, Shaw, Oldham, Lancs.	G3DKA	G. Taylor, 6 Springfield Drive, Blackheath, Birmingham.
G3BRK	J. E. Bell, (Hon. Sec : I.E.M.E. Technical Society, Amateur Radio Section), Walsingham, Manor Park, Chislehurst, Kent.	G3DKO	J. W. Stevenson, 27a North Street, Bingley, Yorks.
G3BSA	D. Aitchison, 8 Coach Road, Astley, Manchester, Lancs.	G3DMO	C. Earnshaw, 18 Cattle Street, Great Harwood, Blackburn, Lancs.
G3BSA/A	Sgt. D. Aitchison, S.H.Q. Signals, 204 A.F.S., R.A.F. Driffield, Yorks.	G3DNA	C. J. E. Shears, 66 Tavistock Street, Bletchley, Bucks.
G3BTQ	J. B. Staker, 54 Glencoe Street, Anlaby Road, Hull, Yorks.	G3DOP	307 St. Georges Road, Coventry, Warks.
G3BTQ/A	J. B. Staker, c/o Greenwood, Hope, via Sheffield, Derbyshire.	G3DRC	G. W. Morton, 42 Southfarm Road, Worthing, Sussex.
G3BUS	A. A. Crouch, 347 London Road, St. Leonards-on-Sea, Sussex.	G3DSA	R. R. Wilkinson, 2 Nunmill Street, York.
G3BVE	W. H. Bell, 12 Forster Street, Blyth, Northumberland.	G3DTF	T. C. Bone, Flat 4, Batchwood Hall, St. Albans, Herts.
G3CAB	L. J. Dunnaway, 118 Orchard Street, Chichester, Sussex.	G3DUA	C. F. Binks, 9 Morris Street, Dumers Lane, Radcliffe, Manchester, Lancs.
GM3CAP	R. Pearson, 17 St. John's Cottages, Montrose, Angus, Scotland.	G3DUK	G. D. Taylor, Ophir, Marlborough Crescent, Latchford Without, Warrington, Lancs.
		G3DUU	G. Woad, Dutton Hospital, Preston Brook, Warrington, Lancs.

- |        |  |       |  |
|--------|--|-------|--|
| G3DWA  | H. L. Clarke, Lyndale Nursery, Newton-with-Scales, Kirkham, Lancs.                 | G2CDN | R. J. Toby, ( <i>ex-SU1CX/ZC1AR</i> ), 16 Southside, Dalmeny Avenue, London, N.7.  |
| G3DWW  | G. E. Cripps, 115 Bushay Road, Raynes Park, London, S.W.20.                        | G2COU | C. Page, 100 Graham Gardens, Luton, Beds.  |
| G3DXA  | C. J. Godden, 26 Westways, Eden Bridge, Kent.                                      | G2FZU | S. Eyre, 18 West End Crescent, Ilkeston, Derbyshire.                               |
| G3DXO  | R. J. Lewis, 5 The Pippin, Calne, Wilts.   | G2HKU | E. H. Trowell, 4a Clyde Avenue, Sheerness, Isle of Sheppey, Kent.                  |
| G3DXS  | L. H. T. Butler, 102 Farrington Road Buildings, Clerkenwell, London, E.C.1.        | G3AAJ | R. J. C. Broadbent, 385 High Street North, Manor Park, London, E.12.               |
| G3DYY  | R. G. Cary, ( <i>ex-VS9ET</i> ), Field House, Wainfleet St. Mary, Skegness, Lincs. | G3AMF | K. G. Thompson, 18 Mouralt Road, Woodford Green, Essex.                            |
| G3DZH  | G. Hope, Ashleigh, Church Hill, Shepherdswell, Dover, Kent.                        | G3AQN | J. S. Goodworth, 29 Chestnut Avenue, Oswestry, Shropshire.                         |
| G3DZS  | H. Fudge, 16 Burleigh Road, Sutton, Surrey.  | G3ATF | C. B. S. Seaman, 24 Oaklands, Constance Road, Whitton, Middlesex.                  |
| G3DZY  | A. W. Allen, Cliff House, Drayton Lane, Portsdown Hill, Cosham, Hants.             | G3BZO | M. A. E. Brown, Resthaven, Queen Street, Kirton-Lindsey, Lincs.                    |
| G3EAZ  | E. M. Wills, 18 Salisbury Road, Ringwood, Hants.                                   | G3CNF | J. H. Hurd, 3 Burnham Crescent, Wanstead, London, E.11.                            |
| G3EBE  | H. G. Wells, 30 Coombe Wood Hill, Purley, Surrey.                                  | G3KX  | W. T. Gould, 3 Spring Vale, Locking Road East, Weston-super-Mare, Somerset.        |
| G3EEE  | J. E. Cordeaux, 34 Craven Hill Gardens, London, W.2.                               | G3UH  | L. T. Manton, 14 Alexandra Mansions, Kings Road, Chelsea, London, S.W.3.           |
| G3FQ   | F. W. Skinner, 37 Victoria Road, Headingley, Leeds, 6, Yorks.                      | GI4NU | L. Frank, Byron Street, Holywood, C Down, Northern Ireland.                        |
| G3KX/A | W. T. Gould, Arundel, Knightcott, Banwell, Somerset.                               | G5GC  | G. A. H. Eckles, 108 Lye Copse Avenue Hawley Lane, Farnborough, Hants.             |
| G3YM   | P. Simons, A Coy., A.A.S., Arborfield, Reading, Berks.                             | G5HB  | H. Biltcliffe, 1 South Street, Watchfield, Swindon, Wilts.                         |
| G4PI   | G. Taylor, 325 Windmill Lane, Sheffield, 5, Yorks.                                 | G5KW  | Maj. K. E. S. Ellis, M.B.E., ( <i>MD5KW</i> ), 14 Teign Street, Teignmouth, Devon. |
| GI4RY  | R. V. E. Walsh, Rockport, Cushendun, Co. Antrim, Northern Ireland.                 | G6XD  | J. J. G. Taylor, 111 Mount Gold Road, Plymouth, Devon.                             |
| G5LQ   | J. Tovell, 12 Cambridge Road, Chiswick, London, W.4.                               | G8QR  | R. Brake, 108 St. William's Way, Thorpe, Norwich, Norfolk.                         |
| GM5PV  | T. Sagar, 1 Balure Crescent, Fallin, Stirling, Scotland.                           | G8UD  | E. W. Price, Broad Street, Newent, Glos.   |
| G6AT   | F. Aughtie, 20 Links View Road, Hampton Hill, Middlesex.                           |       |  |
| G8OO   | W. Moore, Windy Ridge, Bridport Road, Dorchester, Dorset.                          |       |  |

## CHANGE OF ADDRESS

## CORRECTIONS

- |       |   |
|-------|---|
| G2ACN | B. J. Bale, Coldstream, Barnfield Road, Tatsfield, Westerham, Kent. |
| G2AOB | W. Jardine, 45 Merchland Road, New Eltham, London, S.E.9.           |

- |        |   |
|--------|---|
| GM2DPW | J. H. McEwing, 89 Armadale Street, Glasgow, E.1., Scotland. |
| G3GN   | R. W. Cavill, The Spinney, London Road, Knebworth, Herts.   |

## CLIX ORGANISATION

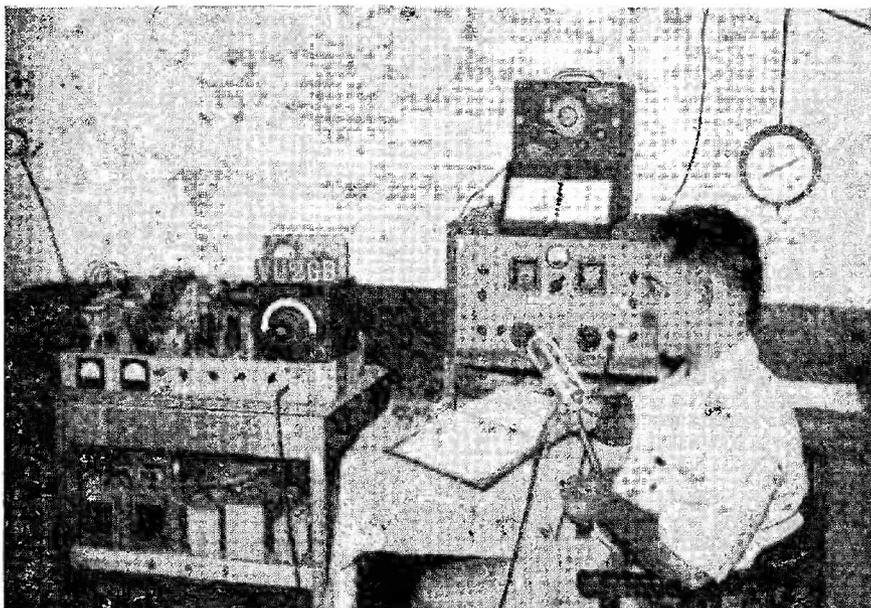
## TAYLOR VALVE TESTER

With immediate effect, the well-known "Clix" range of radio products manufactured by British Mechanical Productions, Ltd., will be marketed by General Accessories Co., Ltd., 21 Bruton Street, London, W.1. The G.A.C. is the wholly-owned subsidiary of British Mechanical Productions, Ltd.

To accompany the comprehensive instruction manual issued with the Taylor Valve Tester, a Valve Supplement is being made available tabulating some 160 different types of valves with their respective switch settings; the intention is that this Supplement should be used with the Tester Instruction manual. All this material is very comprehensive and careful consideration has been given to both technical and non-technical reader; the instruction manual is beautifully printed and may be bought separately at 3s. 6d. Also available is a wide range of adaptors of various kinds—shunt, valve-base and transformer—for use with the extensive series of Taylor Instruments. Taylor Electrical Instruments, Ltd., 419/42r Montrose Avenue, Slough, Bucks.

## THE ZONE MAP

Have you seen the full-colour version of our DX Zone Map, on linen-backed paper, and with the prefix lists amended to date? The price is 6s. 0d. post free. It gives all the information the DX man needs, and looks well in any station.



## The other man's station VU2GB

For a change, here is the story on one of our overseas stations, VU2GB—Inspector G. Ballentine, i/c Docks and Harbour, Yellowgate Police Station, Bombay—who is an “exiled Scot” and so is always glad to have G; and in particular GM, contacts.

With the exception of the receivers—HRO, Super Pro and BC-348—all the gear is home-built. The transmitter is VFO-controlled, with a pair of 807's in the final run at 100 watts input. The speech amplifier-modulator line is 6SF5-6J5-6J5-P/P 6B4G's-P/P 830B's in Class-B, with a moving-coil microphone.

Operation is mainly on the 14 and 28 mc bands with 'phone, and world-wide con-

tacts have been achieved. The aerial system is: For 10 metres, a 3-element close-spaced beam; for 20 metres, a long-wire type aerial, 99 ft. in the Kraus mode, with 600-ohm feeders. The driven element of the 28 mc beam is a folded dipole fed through 72-ohm coaxial line.

VU2GB's activity period is mainly at week-ends, though he is on at other times as duties permit. In the true amateur spirit, he offers hospitality to any operators who may be passing through Bombay—contact can always be made with him at the address given above—and if conditions serve, they can “talk back home” from VU2GB.

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### R.C.M.F. BULLETIN NO. 6

The latest issue carries an interesting article on the tropical proofing of radio equipment; in addition to the use of metal for panels and cabinets, an internal 5-watt strip heater is recommended so that the interior of the set can be kept dried out. On the damage that can be caused by insects, the writer describes how ants in tropical countries can work their way into a screw-cap bottle and eat the contents—this makes it useless to employ such vulnerable components as

wax-impregnated resistors and condensers. It reminds us of the true story of the pre-war VU who could never put up his QSL cards because the white ants ate them off the walls!

Also in this issue, the President of the British Standards Institution makes a special appeal to the radio industry to support the B.S.I. move to re-examine British standards from the point of view of their application to the sale of British products overseas.

# THE MONTH WITH THE CLUBS

## FROM REPORTS

This month the total number of reports to hand is somewhat smaller than usual, owing to the universal habit of taking holidays in August! Nevertheless, a total of 29 clubs have sent in particulars of their activities, showing that rival pleasures cannot damp the enthusiasm of really well-organised gatherings.

We are glad to be able to reply to many queries on the subject by announcing, herewith, the third *Magazine Club Contest*.

### "CQ MCC"

The period of the Contest this year has been fixed for the first full week at the beginning of December, and the band, as usual, will be 1.7 mc. Starting at 0001 GMT on December 4, and finishing at 2359 GMT on December 12, all Club stations will be allowed a total of 30 hours' operating during the period. Clubs without a call-sign of their own will be allowed to nominate a member's station as their official entry. The rules will be as last year—these were heartily approved by 90 per cent. of the Clubs taking part.

Entry forms will shortly be sent out to secretaries of clubs who have reported their activities to us during the last six months. Any from whom we have *not heard during that period* are presumed to be either defunct or disinterested.

Clubs with transmitting licences of their own will be well advised to make sure that their 1.7 mc operation is all that it should be, and to prepare for this popular party which begins on December 4. Let us see if we cannot muster a record entry this year. And for the record, winners in 1946 were Coventry, Cheltenham and Grafton, and in 1947 first three were West Cornwall, Warrington and Coventry.

### Reports for October

The next deadline for reports is first post, September 15. Address them to "Club Secretary", *Short Wave Magazine*, 49 Victoria Street, London, S.W.1.

**Oswestry and District Radio Society.**—Recent activities have included NFD and a 5-metre Field Day in which G4LU, 2AUZ, 3ASC and 2APW organised and ran a station in Denbighshire with the call GW4LU. They were 1,300 feet up and, at times, almost airborne. At a recent meeting the lecturer was G5JU, who addressed a crowded house on 144 mc technique. The club has decided to co-operate in the newly formed Association of Midland Radio Committees, which appears to be an enterprising and thriving organisation.

**Solihull Amateur Radio Society.**—At a recent meeting the design and construction of a 14 mc converter unit, built by a junior member for use with his 1224A receiver, was discussed. Meetings are held on alternate Wednesdays, and visitors and new members will be heartily welcomed.

**Sutton and Cheam Radio Society.**—At the last meeting G4DH lectured on the elements of AC theory and G2AYC, the President, offered prizes in a constructional contest open to all members. G3CDK recently

demonstrated a "Q-5er" with a BC 453B and a communications receiver—most members now possess one! The club "Phone Net is active on 1746 kc.

**East Surrey Radio Club.**—The July meeting was well attended and six of the leading communications receivers were demonstrated. A visit was also paid recently to the BBC Receiving Station at Tatsfield. Meetings are held at the Toc H Rooms, Redhill, on the fourth Thursday of the month.

**Lothians Radio Society.**—The first General Meeting of the coming season will be held on September 30 in the Chamber of Commerce Rooms, 25 Charlotte Square, Edinburgh, at 7.30. The Secretary, GM3CVJ, is resigning on account of lack of time, and a new Secretary will be elected at this meeting. We have received their *Radio Amateur News* once more; this racy publication is a credit to the club and is full of really interesting material. If you have an 807 that you can't tame, join the Lothians Radio Society and ask for No. 3 of their publication!

**Grimsby Amateur Radio Society.**—The AGM was held in July, and a Management Committee was formed to look after affairs for three weeks of the month, a committee meeting being held on the last Thursday of each month. Membership is increasing, and G8KH has arranged to give a series of lectures on Radio Theory. Morse instruction is also "on tap" each week. Newcomers and visitors are welcome at 115 Garden Street, every Thursday at 7.30.

**Hounslow and District Radio Society.**—The Hon. Sec. is running a course on Fundamentals at the meetings on alternate Wednesdays, 7.30 p.m. at Grove Road Schools, Cromwell Road, Hounslow. The autumn session begins on September 8.

**Queen Mary College Amateur Radio Society.**—This club is Open to members of the Union Society, Queen Mary College (University of London). G4RG, the club transmitter, was licensed last year, but was not put on the air until more recently. Recent lectures have been by Mr. M. D. Samain, B.Sc., on Communication Receivers, and by Mr. C. R. Stoner, B.Sc., M.I.E.E., the University Reader in Electrical Engineering, on Aerials. The latter also gave a demonstration of methods of communication, including pulse modulation and FM.

**Derby and District Amateur Radio Society.**—Activities are increasing steadily, and the club meets on alternate Wednesdays at 7.15 p.m. Lectures and demonstrations on Television are now in progress. Plans for the club's own station are also under way, and it is hoped to cater for all interests during the forthcoming season. On August 4, G5RW gave them a lecture and demonstration on Crystal Grinding, and on September 1 ex-G2NC is to continue his talk on TV, the subject being "Cathode Ray Tubes and

Time Bases." An excellent photograph of the August meeting will appear in an early issue.

**Malvern and District Radio Society.**—They meet on the first Wednesday of the month at the Foresters' Arms, Malvern. At the August meeting, Mr. F. T. Wilson, G2XX, gave a talk on modifying the BC610E for amateur use, giving also the theoretical details of the circuit. The September meeting, on the 1st, will take the form of a Junk Sale.

**Midland Amateur Radio Society.**—At a recent meeting Mr. A. Rhodes gave a lecture on the MARS communications receiver, designed and built by G5BJ and himself. The AGM will be on September 21 at 6.45 p.m., and the date fixed for the MARS Dinner is October 5—both at the Imperial Hotel, Birmingham.

**Hi-Q Club, Giffnock.**—Great interest has been aroused by some effective results on 2,400 mc, with good 'phone contacts over 4½ miles! The club also went portable in

July, on 58 mc, and worked six European countries with their call GM4JO/P. At the other extreme of the spectrum, they hope to enter for the 1.7 mc MCC in November.

**Bradford Amateur Radio Society.**—The AGM is fixed for September 21 at 7.30 p.m., and will officially open the 1948/9 season. A full syllabus has been prepared and a successful season is expected. New members will be heartily welcomed.

**Worcester and District Amateur Radio Club.**—The lecture on Valves, with film strip illustrations, loaned by Mullards, will take place on September 2. For the October meeting it is proposed to demonstrate two widely different types of receivers and to discuss their performances. Suggestions for enlivening the winter season will be welcomed by the Secretary. Congratulations to two members who have been notified of passing the C. & G. Examination.

**Liverpool and District Short Wave Club.**—The programme for the forthcoming season

This list gives the names and addresses of the Secretaries of Clubs whose reports appear in this issue. They will be pleased to give every possible assistance to prospective members.

**BRADFORD.** W. S. Sykes, G2DJS, 287 Poplar Grove, Great Horton, Bradford.  
**COVENTRY (G2ASE).** J. W. Swinnerton, G2YS, 118 Moor Street, Coventry.  
**DERBY.** F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby.  
**EAST SURREY.** L. Knight, G5LK, Radiohome, Madeira Walk, Reigate.  
**GRIMSBY (G3CNX).** R. F. Borrill, G3TZ, 115 Garden Street, Grimsby.  
**HARROW.** J. R. Pikett, 93 Whitmore Road, Harrow, Middx.  
**HI-Q (GIFENOCK).** J. D. Gillies, GM2FZT, 3 Berridale Avenue, Glasgow, S.4.  
**HOUNSLOW.** A. H. Pottle, B.Sc., 11 Abinger Gardens, Isleworth, Middx.  
**LEEK.** W. L. Woodcraft, 35 The Crescent, Leek, Staffs.  
**LIVERPOOL (G3AHD).** W. G. Andrews, G3DVW, 17 Lingfield Road, Liverpool 14.  
**LOTHIANS.** J. W. Sime, GM3CVJ, c/o Miller, Etrick Grove, Edinburgh, 10.  
**MALVERN.** E. Cross, Dalvington, Priory Road, Malvern, Worcs.  
**MIDLAND.** W. J. Vincent, G401, 342 Warwick Road, Solihull, Birmingham.  
**OSWESTRY.** A. D. Narraway, G2APW, Lamorna, Pant, Oswestry, Salop.  
**PETERSFIELD.** C. Watts, Hylton House, St. Mary's Road, Liss, Hants.  
**QUEEN MARY COLLEGE (LONDON, E.1).** J. W. Peppitt, Q.M.C., Mile End Road, London, E.1.  
**READING.** L. Watts, G6WO, 817 Oxford Road, Reading.  
**SOLIHULL.** H. C. Holloway, 20 Danford Lane, Solihull, Birmingham.  
**SOUTHPORT.** F. H. P. Cawson, G2ART, 113 Waterloo Road, Southport.  
**STOURBRIDGE.** W. A. Higgins, 35 John Street, Brierley Hill, Staffs.  
**SURREY (CROYDON).** L. C. Blanchard, 122 St. Andrews Road, Coulsdon, Surrey.  
**SUTTON AND CHEAM.** B. J. Blount, 5 Priory Crescent, Cheam, Surrey.  
**WALSALL.** L. G. Barlow, 15 Kinnerley Street, Walsall, Staffs.  
**WANSTEAD (G3BRX).** R. J. C. Broadbent, G3AAJ, 24 St. Margarets Road, Wanstead Park, London, E.12.  
**WEST MIDDLESEX.** C. Alabaster, 34 Lothian Avenue, Hayes, Middx.  
**WIRRAL.** B. O'Brien, G2AMV, 26 Coombe Road, Irby, Heswall, Cheshire.  
**WOLVERHAMPTON.** H. Porter, G2YM, 221 Park Lane, Wolverhampton.  
**WORCESTER.** J. Morris Casey, G8JC, c/o Brookhill Farm, Ladywood, Droitwich, Worcs.  
**WORTHING.** G. W. Morton, G3DRC, 42 Southfarm Road, Worthing, Sussex.



Photograph by Film & Stage Photography, Westcliff  
 Picture taken at a recent Southend Radio Society gathering, and featuring some well-known operators. Back row (left to right) : G2SO, G8DH, G6MH, G3BUE, G3BUJ (Hon. Secretary), G5ZH, G3AHE, G5ZM, A.N.O. Front row (seated left to right) : G6CH (Vice-Chairman), G5XI (Chairman), G5VQ, G6CT, G3CQL, G3BSI (Asst. Hon. Secretary), G3AXN, G3OA.

was discussed at the last meeting, and it has been decided to allot one period each month to the solution of members' problems, when all hands will come forward with some advice, if not the solution! A short talk was also given during August by G3DVW on his "Electronic Bug", built during his sea-going service. Meetings every Tuesday, 8 p.m., at St. Barnabas Church Hall, Penny Lane.

**Reading Amateur Radio Society.**—At a recent meeting G3BJE gave a comprehensive talk on TVI, which went into details of screening, harmonic filters and stubs. On July 25 seven groups, comprising 32 persons, took part in a 5-metre D-F Contest, all equipment being suitable for carriage by walkers or cyclists. Two groups located the hidden transmitter. G8TH was the winner.

**Wirral Amateur Radio Society.**—G6VS recently gave an instructive lecture on the adaptation of the BC348 to amateur requirements. On August 4, Mr. D. H. McClelland began a series of lecturettes on the history and applications of Radar. The Friday-night top band "Net" continues. Next meetings, September 8 and 22, at the YMCA, Whetstone Lane, Birkenhead.

**West Middlesex Amateur Radio Club.**—Meetings are well attended and an autumn programme has been arranged,

consisting of talks, question nights, visits and an informal exhibition night. A club transmitter should be on the air before the end of the season, and a visit to Brookmans Park (BBC) has also been arranged. Meetings are on the second and fourth Wednesdays, Labour Hall, Uxbridge Road, Southall.

**Petersfield and District Radio Society.**—This recently formed club is hoping to increase its membership, and has given leaflets to all the local radio traders for distribution to everyone who might be interested. It is hoped to organise a visit to a BBC station in the near future. Prospective members will be heartily welcomed—secretary's QTH in panel.

**Radio Society of Harrow.**—After a short "rest period," meetings were resumed on August 17 at the Northwick Tea Rooms, Kenton Road. Future meetings will be on Tuesdays, 7.30-10.30 p.m., and a comprehensive programme has been arranged for the coming season.

**Southport Radio Society.**—Meetings are held on the first and third Wednesdays, and for the benefit of would-be transmitting members, Morse classes are being held. It is hoped to arrange a good programme of lectures for the winter months. First Wednesday in September will be celebrated with a Junk Sale.

**Coventry Amateur Radio Society.**—A recent discussion on Power Supplies was "dropped in on" by LA6B, and it is hoped that an ON visitor will arrive shortly. G2LU won a tin of bacon for working ten members of the Franford Radio Club of U.S.A.—a gesture of friendship from the associated club. With the large number of passes in the recent exams., CARS expect their number of full "tickets" to exceed the 60 mark shortly.

**Walsall and District Amateur Radio Society.**—Membership is increasing, and so is attendance at the regular meetings. On August 21 the club visited Droitwich, and Walsall Technical College has agreed to provide a series of evening classes in Elementary Radio, to begin in the autumn. This club is taking an active part in the newly formed Association of Midland Radio Committees.

**Surrey Radio Contact Club (Croydon).**—The August meeting, instead of being the worst-attended of the year, was very well supported by members who heard G2ANR and G2FKZ talk on Converting the R.1147B for 144 mc, and Some Fantasies on VHF. Next meeting is on September 14 at the Blacksmiths Arms, and will be a junk sale.

**Worthing Radio Group.**—Organised activities will begin again on September 2 at Olivers Cafe, Southfarm Road, with the foundation of the

**Worthing & District Amateur Radio Club.** This first meeting will be devoted to business. Club premises are available in an ideal location, 400 feet high, away from busy roads and a good distance from the nearest TV set! A local amateur has generously presented the club with a complete 25-watt Phone outfit.

**Wanstead and Woodford Radio Society.**—Since the society has had its better accommodation available, attendances have improved; a number of work benches are now being built for the use of members. At the forthcoming Woodford Green

Fete the club is going portable with three transmitters, and there is also a club outing organised for September.

**Wolverhampton Amateur Radio Society.**—The recent AGM was well attended, and with the experience of two years of post-war conditions there is every evidence of a successful season ahead. An interesting series of lectures is already arranged.

**Leek & District Amateur Radio Society.**—This is a newly formed club with a membership of some 27, but already these members have their own

workshop and meeting room. Regular meetings are held on Mondays, Morse Classes on Wednesdays and a "working party" on Fridays. Lectures, junk sales and visits have already been organised for the coming winter. Hon. Sec.'s name and address in panel.

**Stourbridge & District Amateur Radio Society.**—At the August meeting members heard the second part of Mr. Rigg's talk on the CRO, and saw a demonstration on the lecturer's 'scope. Next meeting is on September 7, when G3CLG will talk on Building a Super-het Receiver.

#### ANOTHER NOTE FOR CONTRIBUTORS

Recently, we have had to put in a great deal of work, which should not really have been necessary, in preparing certain articles for publication. We would therefore draw the particular attention of authors, not in possession of our guide to the subject, to the following points when submitting material for Editorial consideration:

- (1) Type double- or treble-spaced on one side only of quarto or foolscap sheets, and leave wide margins.
- (2) Check and re-check the text for accuracy.
- (3) Draw circuits on separate sheets and in close conformity with *Magazine* convention (see any issue).
- (4) Check and re-check drawings for electrical accuracy.
- (5) Set out tables of values on separate sheets, double-space the lines, and employ the signs and conventions always used in any *Magazine* article. Note in particular that we do not deal in mc/s, pF, milliamps., mmfd's and similar abbreviations; also, that we never write H.T. or P.A., but always HT and PA, and so on.
- (6) Please get all this right before you send in your work—not only does it help us, but it helps you, because the less of our precious time we have to use in preparing the article for the printer, the more it makes.

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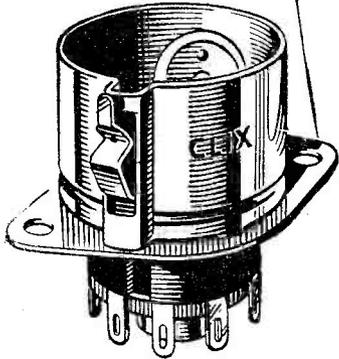
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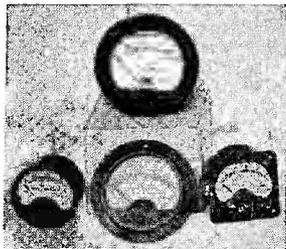
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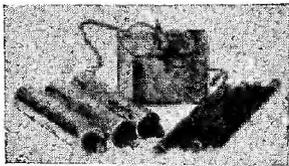
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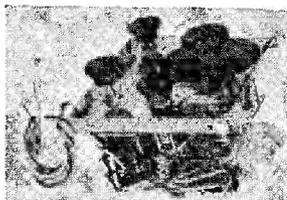
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2½ a.	2in.	Thermo	..	5/-	1 ma.	3in.	M.C.	..	15/11
20 a.	2in.	M.C.	..	7/6	500 ua.	3in.	M.C.	..	19/6
40 a.	2in.	M.C.	..	7/6	20 v.	2in.	M.C.	..	5/8
25 a.	3½in.	M.C.	..	7/6	15 v.	3in.	M.I.	..	7/8
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**R.1155 POWER SUPPLY UNIT INCORPORATING OUTPUT STAGE.** A robust unit contained in a black enamelled case 10" x 8" x 6", which matches the Receiver. There are two models, input for 100-250v. 50 cycle mains, or 12v. D.C.

Each model contains the output stage (GFB) with output transformer. The Power Pack supplies 250v. at 80 ma., which is ample for the R.1155 Receiver and output stage. For those requiring a power supply unit without the output stage, we can offer two additional units.

For 100-250v. 50 cycle input.  
For 12v. D.C. input, output 250v. 80 ma. All four types have complete smoothing and the 12v. types are fitted with suppressors, making them an ideal Power Unit for a Car Radio or Mobile Amplifier.

Type 100/A	100/250v. with out-put stage	..	..	£3/15/-
Type 100.	100/250v.	..	..	£2/10/-
Type 12/A.	12v. with output stage	£3/10/-		
Type 12.	12v.	..	..	£2/-/-

## PORTABLE LOUDSPEAKER CABINETS.

Strong wood cabinets to take 10" Speaker 16" x 13" x 5½" with handle. There is ample room to build a Portable Amplifier into the Cabinet, and a Chassis can be supplied to fit at 4/6. Finished in Brown Cellulose. Cabinet only .. .. . 21/6  
With 10" Loudspeaker .. .. . 45/-

## THE FAMOUS R.1155 RECEIVER.

These are all Brand New and Unused. Frequency range 7.5 mc/s.-7 kc. in 5 wavebands. Complete with 10 valves (including Magic Eye). Completely enclosed in black crackled metal case, 10" x 9" x 9".

Brand New	..	..	£12/12/-
Used models	..	..	£8/8/-

## PREMIER COIL PACK 4-BAND.

Consist of a fully wired and calibrated coil pack of the latest type. 5-Position switch includes a gram. position.

Wavebands covered, 13.6-52 metres. (22-8.5 mc/s), 51-200 metres (5.9-1.5 mc/s), 200-550 metres and 900-2,100 metres. Air dielectric trimmers on all short wave coils. Unit consists of 3 screened sections, Aerial, R.F. and oscillator.

Dimensions of pack, 6" x 4½" x 2½". Also included pair I.F. transformers with permeability tuned litz windings of high "Q", 3-gang condenser, drive spindle, drive wheel. Price with circuit diagram 85/-, or complete with coloured glass dial, backplate, pointer, dial light brackets and drilled 7-valve chassis, with blue prints. £5/10/-.

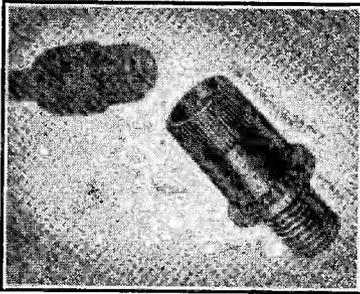
## TANK AERIALS.

Seven 2 ft. lengths of steel tube which fit into each other, making a very efficient aerial, 3/6 each. Rubber bases to fit, 2/6 each.

**MOVING COIL EARPIECES,** complete as 1½ in. moving-coil Loudspeaker fitted with noise-excluding rubber caps. Make excellent Mike's, Phones or Speakers, 2/- each, 18/- doz.

# Hams should know!

*An unsuppressed motor car can seriously interfere with Ultra short-wave and Television reception*



The "Belling-Lee" suppressor L630 screws into specified makes of distributor caps after removal of the H.T. lead terminal, which is then screwed into the top of the suppressor.

Many large concerns have suppressed "fleets" of vehicles which show that the campaign, for the voluntary suppression of car interference, is proving a success.

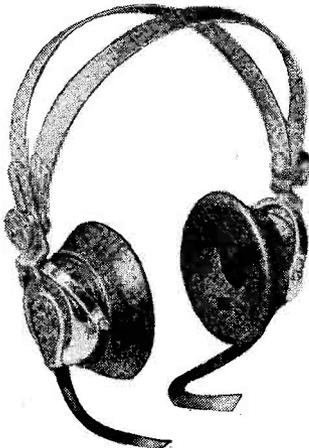
One Teviewer, who, disgusted with seeing his picture spoiled by car interference, bought fifty suppressors and gave them gratis to his neighbours, tradesmen, etc., and owners of vehicles frequently passing his house. He now considers his total expenditure well worth while, but is fortunate in not living on a main road.

Everybody cannot do this, but everybody can suppress their own cars, and encourage their friends to do so, at a reasonable cost.

Distributor suppressors cost 1/6 each, are easily fitted and do not affect engine performance.



## HEADPHONES WHICH UPHOLD BRITISH PRESTIGE



TYPE "K"

for details of other S.G. Brown Headphones (prices from 30/- to 63/-) write for illustrated Brochure "S.W."

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

### OUTSTANDING CHARACTERISTICS

D.C. RESISTANCE, 47 Ohms.  
 IMPEDANCE, 52 Ohms at 1,000 c.p.s.  
 SENSITIVITY,  $1.2 \times 10^{-13}$  watts at  
 1 kc. = .0002 Dyne/cm<sup>2</sup>.

Price **£5 : 5 : 0** Per Pair

Your local dealer can supply

Descriptive Literature on request

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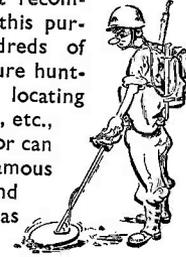
# S.G. Brown, Ltd.

SHAKESPEARE STREET, WATFORD, HERTS.

Phone: WATFORD 7241

# MINE DETECTORS

The picture shows the "G.I." digging with his Mine Detector. We do not recommend that you buy one for this purpose, but there are hundreds of applications such as — Treasure hunting, locating buried pipes, locating metal in trees before sawing, etc., etc., which only a mine detector can perform. We can offer the famous American SCR.625 complete and brand new, ready to operate as soon as batteries are connected.



DON'T LET YOUR SEARCH COIL TOUCH THE GROUND

The price of the complete outfit is **£10/10/-** including carriage. Order Item No. 249. The 70-page instruction book can be supplied separately. The price is **7/6** post free. Order Item No. 249B.

**DATA BOOKS.** Copied from official publications, giving circuit diagrams, component values and useful notes: TR1196, BC.342, BC.348, BC.312, BC.221, R.208, R.103A, R.107, M.C.R.1, R.1155, W/S.22, RT.18, W/S.19, R.1116a, all at 2/3 each, also Walkie-Talkie 58, 3/6. "Demobbed" valves, 2/6. "£15 Television Receiver," 7/6. List free on application with stamp. 200 bargains described.

If you wish you may pay by instalments, but you must send a deposit of at least 25% with your order.

- The Kit comprises :
- The exploring rod assembly consisting of the Search Coil, Control Box, Handle, Visual Indicating Meter, Test Button, ON-OFF switch, etc.
  - Amplifier containing the battery compartment and the amplifier chassis.
  - 2 Resonators which are Receivers R-14 mounted in metal cases.
  - The instruction manual. 70 pages of useful information—including circuit diagrams, operational and maintenance notes, etc.
  - Haversack for carrying equipment when in use.
  - Complete set of spare valves.
  - Suit case type wooden container, for transporting the whole outfit.

**£15 TELEVISION RECEIVER.** We invite you to call on Saturdays before 5 p.m., during Television transmitting time, to see this excellent little receiver working. If you can't call send without delay for the constructional data. Price 7/6. The longer you leave it before ordering the longer you will be without the excellent entertaining that television offers.

## W. D. SALES

3 ELECTRON HOUSE, WINDMILL HILL,  
RUISLIP MANOR MIDDLESEX

**EDDYSTONE.**—We can now supply the famous "640" receiver at **£27/10/-**. Semi-automatic Morse keys, **£3/17/6**. "S" meter for "640", **£5/5/-**. Modulation Level Indication Meter, can also be used as sensitive field strength meter and 'phone monitor, **£8/15/-**. All other Eddystone Components in stock. **LAGGEAR—Transmitting Condensers:**—0.10 in. Air gap, 100 pF, **35/-**; 50+50 pF, **37/6**; 0.05 in. Air Gap, 100 pF, **16/6**; 50+50 pF, **21/-**; 75+75 pF, **23/-**. Neutralising Condensers, 4,000 pF wkg, 0.5-4 pF, **7/6**; 1-10 pF, **9/-**; Tx RF choke, 4mH, 350 mA, **7/6**; 1 mH, 350 mA, **6/-**.

**RAYMART—New TX Condensers.** 50 pF air-gap, 0.15 in, **45/-**; 50+50 pF, air-gap, 0.15 in., **55/-**; 100 pF, air-gap, 0.08 in., **45/-**; 100 pF, air-gap, 0.15 in., **55/-**; 100+100 pF, air-gap, 0.15 in., **65/-**. All other Raymart lines in stock.

### EX-GOVERNMENT SPECIALS

**BC221 Frequency Standard.** Crystal controlled temperature compensated heterodyne frequency meter Checks up to 5th harmonic on most RX and up to 125th on better ones. Fundamental ranges, 125-250 and 2,000-4,000 kc/s with frequency calibration charts from 125 kc/s up to 20 mc/s with stability of better than .005 per cent. Makes an excellent VFO (see QST March 1947) or ideal signal generator. **£12/10/-** plus 10/- carriage and packing.

**BC906 Frequency Meter Checks TX,** oscillating RX or Signal generator. Indication by dip on 0-500 micro-ammeter. Calibration charts, 23.5 mc/s to 14.5 mc/s, **75/-**, plus 10/- carriage and packing. 60-page illustrated "ham" catalogue, 9d. post free. Bargain list of surplus and Ex-Government lines, 3d. See us at Stand 6, Amateur Radio Exhibition, Royal Hotel, Woburn Place, W.C.1, November 17-20, 1948.

## SOUTHERN RADIO & ELECTRICAL SUPPLIES

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Telephone Salisbury 2108.



## 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 2 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. Dedman, G2NH, N. H. R. Munday, G5MA, W. J. Thompson, G2MR), 63/71 Kingston Road, **NEW MALDEN, SURREY.** Telephone: **MALden 0334**

**USED COMMERCIAL EQUIPMENT**

**TRANSMITTERS.** MO DET 12, PA 2-DET 12 in p/p, 350 watt input. In metal cabinet 3'x1'6" x1', with 7 first grade meters. Medium wave, but very suitable for conversion. Valves alone listed at £21. Our price complete, £5.

**50 WATT MODULATORS.** See last month's "S.W. Magazine," or send for details. Complete with 11 valves and 3 meters in cabinet, £12.

**POWER SUPPLY WB14.** 200-240v. input, output 1,490v at 400mA and 7.5v A.C., four rectifiers in bridge transformers and chokes by Woden, in cabinet, £10.

**POWER SUPPLY WB50.** as above, but giving 600v at 250mA only. £8.

**PORTABLE POWER UNITS,** in crackle cases, 20"x8"x11", with chrome fittings and carrying strap, 12v input, output 250v at 125mA. Rheostat control, fully smoothed, with plugs and leads, 25/-.

**MARCONI-REISS** marble t/c microphones, 17/6.

**DESK MIKE STANDS,** black crackle and chrome, from 10/-.

**DISTRENE DIPOLE CENTRES,** Perspex window, 7/6.

**G.E.C. "OVERSEAS TEN,"** 5-Waveband chassis, complete with valves, p/p 6V6 output, £12/10/-.

**MARCONI TRANSFORMERS,** usual primaries; for bias supply, secondary 180-230v 3A, 7/6; half-wave, 380v, secondary 3A, 15/-.

**CHOKES AND TRANSFORMERS.** ALL RATINGS IN STOCK.

**GARRARD PICKUPS,** 7/6. **PORCELAIN SPREADERS,** 600 Ohm, 3/6 doz.

**G.S.V. CO.,** 142 WESTMOUNT ROAD, S.E.9  
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A special correspondence course for those wishing to take the P.M.G. certificate has been planned by E.M.I. Institutes. It brings you tuition under the personal supervision of E.M.I.★ scientists, several of whom hold the transmitting licence. College and other correspondence courses, covering basic radio and basic television are also available.

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E48

**G6YA**

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

**G2BAR**

**100-150 mc/s TRANSMITTERS**  
**AM-18/APT.** P.P. 35TG. P.A. stage includes 400 cps power supply and smoothing using pair of high voltage rectifiers. Brand new in original cases. £5/10/-, plus 7/6 carriage.

**AM-14/APT.** P.P. 4E27/8001 (improved HK257), P.A. Stage. As above with 836 rectifiers, etc. Not new but in first-class condition. £4/10/-, plus 7/6 carriage.

**T28/APTI.** Valves: 1 931A electron multiplier, 3 6AC7's, 1 6V6, 2 6CA's, 1 832, 1 829B in final, variable inductance tuning, 400 cps. power supply with 2 5R4G rectifiers, 2 blower motors, etc. £4/10/-, plus 7/6 carriage.

**T1661/P.** Valves: 1 931A Electron multiplier, 2 6AC7's, 1 6AG7, 1 832, 1 829B in final. Plug in coils and split stator tuning in 832 and 829. Meter selection switch for grid and plate of osc. and P.A. All stages section built. £4/10/-, plus 7/6 carriage.

**T39/APG9.** 420-450 mc/s transmitter. Valves: 1 931A Electron multiplier, 2 6AC7's, 1 6AG7, 2 807's, 2 8012's. Guillotine tuning. Wave guide antenna matching. IN22 crystal output monitor. £4/15/-, plus 7/6 carriage.

**One only.** Factory-built amateur bands transmitter, 80/10 metres in 6 ft. rack. Stabilized and calibrated V.F.O. Switched doublers and P.A. grid. 813 in final capable 500 watts input C.V. No modulator but supply and spare panels available. Finished cream. Photo available. Buyer to collect if outside W. of England area. £70.

**RCA PLATE TRANSFORMER.** Input 190-250v 50cps. Sec.: 2,000-1,500-0-1,500-2000 v at 800 m/a. Weight 97 lbs. net. Size 9"x9"x7½". £6/10/- each.

**R.C.A. MODULATION TRANSFORMER.** Primary 10-400 ohms, suitable 805, TZ40, 813 in class B. Sec. 4,300 ohms, suit any P.A. up to 1kw. Weight 67½ lbs. net. Size 9"x9"x7". £4/15/- each.

**R.C.A. MODULATION UNITS.** Comprises Mod. Trans. as above, driver and filament transformers. Valveholders and balancing controls for P.P. 805 valves, on chassis, ready for use. (Input 190/250, 50 cps.) £7 each.

**LF. CHOKES**

Max. D.C. Inductance	Resistance	Weight	Price
500m/a. 15-20H.	80 ohms.	20 lbs.	25/-
250m/a. 10-15H.	100 ohms.	6½ lbs.	10/6
250m/a. 15-20H.	200 ohms.	6½ lbs.	10/6

**CONDENSERS, OIL IMPREGNATED**

Capacity	Working Voltage	Size	Price
4 mfd.	3,000	9" x 7" x 5"	25/-
4 mfd.	2,000	5" x 5" x 2½"	15/-
4 mfd.	1,500	5" x 5" x 2½"	12/6

**SPECIAL OFFER**

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

All items carriage paid in England unless otherwise stated.

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**EX-GOVERNMENT STOCK DISPOSAL!**



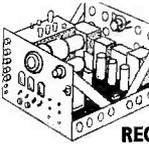
*The finest*  
**RADIO VALUES**  
*ever offered!*

**SATISFACTION GUARANTEED OR MONEY REFUNDED!**



**8/6**  
2 valve RECEIVER  
B.C.357  
**MARKER BEACON**

Can be adapted to Radio Controlled devices. Range 62-80 M/c. Circuit Diagram and parts List included. Complete in case with 12SQ7 and 12C8. ....8/6



**SPECIAL OFFER!**  
**£12/10/0**  
**RADIO**  
**RECEIVER-INDICATOR**

Cost \$850. 2 Cathode Ray Tubes, 39 valves. 86L61365N7, 3-5U4G, 2-6X5, etc. Transformers, Chokes-Electrolytics, Resistors, 24v Blower Condensers, Switches, etc. Worth £25 for valves alone. ....£12.10.0.



**RADIO COMPASS**  
**RECEIVER**  
B.C.433G  
**80/-**

3 bands 200-1,750 k/c. Complete with 17 valves. Ideal conversion to Home Broadcasts, also Hamshack, etc. 80/- each.



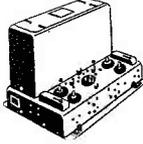
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**STAND TYPE MICROPHONES**

Carbon insert. Press button on/off. Aluminium case. ....2/6



**75/-**  
**RECEIVER AND POWER SUPPLY FOR APN-4**

Contains 16 valves, 1-6SN7, 1-6SL7-6H6, 4-6SK7, 1-VR105-30, 1-6SJ7, 2-2X2, 1-5U4G, 3-6B4G, 1-6SA7. Weight 32 lbs. ....75/-.



**20/-**  
**MODULATOR UNIT**  
B.C.456  
ONLY

3 valves, 12C5, 1626, 150, easy conversion to 8 watt Amplifier. Complete, ....20/-.



**2/6**  
**ANB.H-1 HEADPHONES**

Low impedance, complete with jack plug. Leather Bands. ....2/6



**30/-**  
**RECTIFIER-POWER-UNIT**

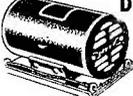
400 cycle, 115v. Contains 4-5R4GY tubes, 2-4 mfd. 1,000v DC conds., 2-1 mfd. 1,500v DC conds., 400-2,600 cycle trans., power resistors, etc. Wt. 38 lbs. Size 21" L x 5 1/8" W x 7 1/4" H 30/-

**NEW VALVES**

5U4G, 8/- 6X5, 6G6, 6/-  
6L6, 807 6N7, 25L6, 6/-  
6L5, 6K6

6AC7, 6AG7, 6K7, 6SK7, 5/-  
6SQ7, 6SJ7, 12A6, 12SG7, 12SH7, 12J5, 12SK7

6C5 4/-



**7/6**  
**DYNAMOTOR UNITS**

Input 28v 1A, output 250v 60 m/A. Easily convertible to 230v. A.C. Series Motor 1/40 M.H.P.

**NO CARRIAGE OR PACKING CHARGES!**

Terms - Cash with Order. Send Money Order or Postal Order to:

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New, 32 mfd. - 350 V.D.C.W. ....2/6

**HEADSET ADAPTORS**  
From High to Low impedance or alter to reverse 2/-

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### Receivers

R.11.55A. Limited number only, good condition. £9 each, carr. paid.  
 P.58 Naval receiver, 13 valves, super-het with power pack tuning range, 280-650 mcs. Complete in packing case, £7/10/- each.  
 B.C. 455. 6 Valves super-het, 6-9 mcs. £2/10/- each, carr. paid.  
 R.11. 32A. 7-Valve super-het tuning range, 100-125 mcs. Good condition, £4/10/- each, carr. paid.

### Meters

Ferranti. 0-500 micro-ammeters, Grade 1, moving coil, 2½" flush mounting. New and boxed. 16/6 each.  
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 0-300 Volts. A.C. 2½" flush, moving iron type. New and boxed. 8/6 each.

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Block Type. .1 plus .1 mfd. 3,000 volt, 2/6 each; 800 mfd. 12 volt, 2/- each; 8 mfd. G.E.C. 600 volt, in boxes of 2, 6/6 box; 4 mfd. 1,500 volt, 4/- each; 4 mfd. 450 volt, 2/6 each.

### Electrolytics

4 mfd. 450 volt, metal 25 mfd. 25 volt, cardboard; 75 mfd. 50 volt, bakelite. All 10/- half-dozen. £4/10/- half gross, £8 per gross. These will be mixed as ordered.  
 Tubular: .1 350 volt, 5/- doz., 20/- half gross, 35/- per gross.  
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### Miscellaneous

A.C. Eliminators 230 volt input, 120 volt output, at 30 m.a. New. Only £2 each.  
 Battery chargers, all metal rectifiers, input 230-240 A.C. Output, 15 volts at 5 amps. With ammeter and sliding control. only £4/4/- each. 3 m/m Sleeving, 11/- per reel, of 190 yds. 2 m/m Peribraid 9/6 per gross yards.

**TERMS:** We pay all carriage (Gt. Britain only), and Cash with Order, please.

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MUS 9188

THIS MONTH'S SPECIAL AT A SPECIAL PRICE

### B.C.221 FREQUENCY METERS

We offer a limited supply of these meters, acknowledged the best of their class. Coverage 125 Kc/s-20 Mc/s, with xtal checks. Accuracy .01% or 25 c/s. They are in practically new condition, with valves (1 6K8, 2 6SJ7), xtal, and calibration charts. While they last at £8/19/6. Carriage 7/6.

### TUNING UNITS. T.N16/APR4

These are beautiful 3-valve converters covering 38-95 Mc/s. Valves, R.F. 6AK5, mixer 9002, osc. 9002. I.F. Output, 30 Mc/s. They are mounted in cast all chassis, with 4-gang tuning cond. and split gear driven 100/1 slow-motion drive, with 3" scale calibrated in Mc/s. Power req. 6.3v L.T., 280v H.T. Provision is made for automatic band sweeping by means of a 28v motor, with speed control. Dial, light and fuse. The whole is fitted in black crackle case (6½" x 8" x 13"), mounted on base 11" x 8", with rubber bonded supports. We offer these, brand new, packed in original wooden cases, at £3/10/- Carriage 5/-. Circuit and layout diagrams included, inside.

### BENDIX RADIO COMPASSES, B.C.433G

15-Valve unit, incorporating D.F. section, and an 8-valve receiver, covering 171 mtes to 1,500 mtes in 3 bands. Receiver has 2 R.F. stages. Line up. ANT 6K7, RF1, 6K7, RF2 6L7, mixer 6K8, I.F. 6K7, det. and AVC 6B8, output 6F6, rect. S24. D.F. section, loop amp. 6K7, Osc. 6N7, mod. 6C57, loop AVC 6B8, output 2-2,051, 6F6 cath. foll. Rec. I.F. 142 kc/s. Power used 28v D.C., 115v 400 c/s. Supplied complete with 2 compass units, remote control box, flexible drive, plug, and official instruction book. These receivers are brand new. The price £6/19/6, carriage and packing 10/- extra. Available separately, flexible drive cables 8/6, control boxes 15/-.

### 6-VALVE REC. B.C.453

Line up. 12SK7 R.F. 12K8 mixer, 2 IF's, 12SK7, det. and BFO. 12SR7. Output 12A6. Coverage 190-550kc/s, with 85kc/s. I.F.s. Size 11" x 5" x 5½". These sets were operated 28v. Plug-in dynamotors (ideal for use as double superhets (the Q Fiver of Jan.QST)). Supplied complete with valves, less dynamotor, at the bargain price of 39/6. Postage 1/6 extra. We have available for these receivers the flexible drive cables, 7/6 plus 9d.

### Special R.F. Units Offer

Type 26, Brand New and Boxed	...	...	28/-	Type 24, in good condition	...	...	8/6
Type 27, in good condition	...	...	22/6	All supplied complete with valves and guaranteed.	...	...	
Type 25, in good condition	...	...	10/6	Postage 1/6 extra.	...	...	

**AMERICAN GROUND RADAR EQUIPMENT.** High voltage condensers, 10 kV. Transformers, E.H.T. and L.T. Chokes. Special heavy duty, 300 to 500 mA. Variacs, Selsyn units complete. High wattage resistors; 6" and 10" C.R.T.'s. Universal couplers and drive assemblies. Prices range from maximum of £3 downwards.

**6 VOLT VIBRATOR POWER UNITS.** 200v at 100 mA, 25/-.

**4" A.M. COMPASSES** in transit cases, fully luminous, 9/6.

**R.1155 RECEIVERS,** all wave (tested), £9/7/6, to work on 12, 24v DC or 230v A.C.

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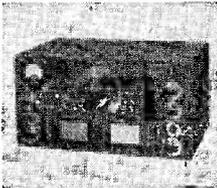
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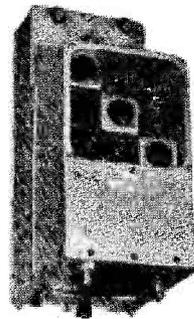
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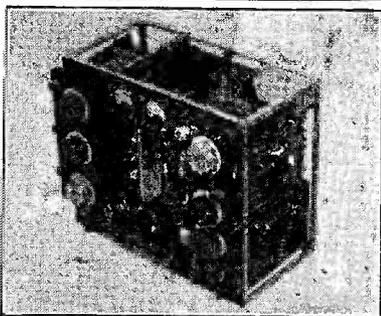
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**PARMEKO** Trans:—4000-2000-2000-4000, 400 mA. £6/10/-. 10 volt 7 amps, 35/-. VFO QST Mod. of TU5B, with valves, £5. Valves: Type 803, 57/- each; holders, 5/-. HRO Four-Gang Condenser Unit, with Dial, £5. Slide Rule, Electrical, 10 in., Faber, 30/-—G6NM, 10 The Circuit, Wilmslow, Manchester.

**SMALL ADVERTISEMENTS**

**READERS'—continued.**

**EDDYSTONE** 358 Communication Receiver—little used—Not Government surplus—genuine bargain. With all coils, power pack and loudspeaker. Offers around £23.—12 Bamber Avenue, Bispham, Blackpool.

**S27Rx**, 145-27 mc, any trial, near £40. Seen by appointment.—G2FFY, 'Phone Westerham, Kent, 275.

**R1155** modified and accurately calibrated, excellent job. Owner giving up. £15/10/-, or nearest offer.—Ascoli, Prospect House, Letham, Angus.

**HALICRAFTER** SX-28, excellent condition, 14 valves, 550 kc-42 mc, £35. Also RBZ miniature battery receiver, 5-13 mc, brand new, £4.—Box 362.

**HALICRAFTER** Sky Champion S20, For Sale, Recently aligned, instruction manual, spare valves, £22.—G3, C.B.V., 17 Alwyn Road, Old Bilton, Rugby.

**1155N** fully modified. S-Meter, AC Internal Power Pack, Speaker, etc. Perfect condition, £30 or nearest. Also BC342N Modified similar to QST. Good condition. £20 or nearest.—Box 363.

**WANTED.** Communications Receiver. Hallicrafters or National preferable, 32 mc-550 kc, or 32 mc-1.7 mc, £18-£20 cash. Write—Williams, 77 Somerleyton Road, London, S.W.9.

**SWOP** or sell complete B2. EF50's in ceramic basis, S4/. BC348, £15. No. 11 Tx/Rx, pack, coupler, new valves, Rx faulty, £6/10/-. S.A.E. List.—Box 364.

**SALE**, excellent condition, Det. 19, 807 ceramic, KT33c, VR150/30, 9003, 9004, at 9/6: 954, 955, 956 at 7/6: CV6, 6SK7, 6SJ7, 6N7, 6B8 at 7/-: 6SN7, 6AC7, 6H6, 12H6, 12SN7, 12SJ7, 6SL7, 12J5, 6J5, EF50, EF54 at 5/-: EA50, D1 at 3/6: EF50 bases at 1/-. Will exchange pair 813's for any two HRO coils—SWL, 36 Princes Park Avenue, London, N.W.11.

**EDDYSTONE** 504 and speaker. As new. Must sell. Offers over £30.—Box 365.

**FOR** Sale. Few unused EF50 (U.S.A.), 7/6. Pair Matched PX25. Offers?—117 Grosvenor Rd., Langley Vale, Epsom, Surrey.

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**QRT** BC348R, perfect. Mains converted, 'phones, best over £20. B2 Tx, power pack—offers? Also BC221, Meters, Xtals, Valves, etc.—S.A.E. List to: G3DCT, 38 Costead Manor Road, Brentwood, Essex.

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**TX** 1131 perfect, never been used, complete with valves. Offers, cash or other gear. Also HRO Senior with power pack.—Box 366.

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For this month's valves, see page 515.

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**WANTED.** SX28, AR88 or similar, any condition, incomplete or otherwise. New American Test equipment for disposal.—75 Edgehill Road, Winton, Bournemouth.

**BC348** £14. Another fitted Noise Limiter & S-Meter, £25. 1 mc, 10 mc Xtals, 10/-, 6J6, etc., 10/-. Wavemeter, 65-75 mc, with Xtals, £3.—G5KX, 1 Balmoral Drive, Southport, Lancs.

**SUPER-Pro Power Pack**, New, £10. Spare valve kit for BC659, £4. VR90's, 7/6. CRP-1005, 7/6. Brand new BC312N, complete with manual, spare valves and speaker, £20. Four Hallicrafters new HT6 ECO coils, £4. J36 Bug Key, 45/-. BC-609, Brand New, £4.—G3DAM, 2 Church Street, Evesham Worcs.

**HALLICRAFTERS.** Brand New HT14 Tx/Rx complete with mike, crystals, all valves and power-pack, connecting cables, remote control unit, manual. Offers over £45.—Box No. 368.

**WANTED.** Original coils and/or tuning condensers for R.103 and/or R.103A Rx's.—Boursin, Listowel, Co. Kerry, Eire.

**SALE.** Hallicrafters SX24, nice condition. Offers? Also British Physical Laboratories signal generator 100 kc to 30 mc, £10.—52 Bannerman Avenue, Heaton Park, Manchester.

**1155** Built-in power pack, 6F6 output, S-Meter, noise limiter, etc., bargain, £12/10/-. New Eimac 35T, £1. Gramplan m/c mike and chrome floor stand, 50/-. Baker triple-cone speaker, 35/-.—Box 369.

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**HALLICRAFTERS** Sky Champion, last model, perfect con. Excel. 10/20. Handbook, spare valves. Best offer over £20.—GD3BZE, 8 Arbory Street, Castletown, Isle of Man.

**FOR Sale—Ex-Army** wireless set 21, Tx-Rx, 4.2-7.5 mc, 19-31 mc, 6-volt battery operated, spare valves, vibrators, circuit diagram. Two 813's, two SU-750's. Offers?—G3DTO, c/o Heathfield House, Heath Lane, Halifax.

**HRO** Coils for Sale. 7-14 mc and 1.7-4 mc. Hinton General coverage, £2 each.—G6BS, 96 Hinton Way, Gt. Shelford, Cambridge.

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**2C26** VHF Triode, 15/-: 814, £2: 813, £3: 1619, 7/6: 830B, 17/6: J36 Bug Key, 45/-: BC906D frequency meter, £3. TG10 Keyer, less valves, £5. Xtals 28.4, 28.6, 28.7, 28.8, 28.9, 35.0, 35.4, 35.5, 35.6, 36.0 mc, 30/- each. All gear new, unused.—Parker, 9 Cheltenham Road, Broadway, Worcestershire.

**SALE.** New 1132A, never used, £5/10/-. As new, B2 Rx and Power Pack, £8/10/-. Working condition 1116/A, £4/10/-. All in transit cases, carriage free. Any offer considered.—Box 370.

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**COMMUNICATION Receivers** for Sale. New rack mounted HRO, RBJ4, 9 coils, with noise limiter, £55. AR77, perfect condition, £38. BC348, AC 230/50, £20. HRO Snr. (no power pack) Amateur Coils, Perfect, £30. Buyers collect.—C. J. Smith, 82 Framingham Road, Brooklands, Manchester

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SMALL ADVERTISEMENTS

READERS'—continued

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**SALE.** R.1155, KT63 output, separate P/Pack, £10. Avomitor, £4/10/-, TU5B as 1.7 mc Tx Osc/BA/PA, £3. Want BC348/2.—Box 374.

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**BC348** built-in AC power pack, Lab modified S-meter, £20 or nearest. Also new SCR-522 transmitter receiver for 144 mc, £10, with valves.—Box 373.

**FOR Sale.**—Hallicrafters S20, 500 kc to 43 mc, perfect condition, £25. Wanted, B2 Rx/Tx complete with coils.—G3CIL, 21 M/G., R.A.F. North Coates, Nr. Grimsby, Lincs.

**BC348M** internal mains, excellent condition, £18/10/-. Tx 1154B, complete, £4/15/-. RF27, 20/-, TU7, 9 & 10B, 10/6 each. Phone Jacks and Sockets, boxed, 1/6 pair.—Holmes, 24 Castle Lane, Bedford.

**813's, BRAND NEW, BOXED, £2. 6AC7, 4 FOR 10/-, BC-459A, VFO/PA (PARALLEL 1625's), 7-9.1 MC GANG TUNED, MODIFIED PER JULY CQ, BUILT-IN XTAL CALIBRATOR, WITH VALVES, LESS XTAL, £4. 28v. DC BLOWER MOTORS, PERFECT ON 24v. AC, REVERSIBLE. 1/2 IN. SHAFT, 10/-, 120-WATT MOD. TRANS., FORMERS, MATCH CLASS-B TRIODES TO 803, 813, ETC., SEPARATE SCREEN WINDING, £1. CLASS-B DRIVER TRANS. TO SUIT, 10/-, S.A.E. ANY DETAILS.—C. R. HAMPTON, G3BPP, 10 WEST TERRACE, NORTH ORMESBY, MIDDLESBROUGH.**

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**VALVES.** 813's, £2; 808's, TZ40's, 15/-; 807's, KT66's, U50's, 10/-; 866A's, £1. 6V6's, 6F6's, EF50's, 7/6; 6J7's, 6J5's, etc., 5/- each. All new in original cartons.—G3AZO, 56 Gifford Terrace Road, Plymouth.

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case, 70/-. Bug Key, £1. Crystal insert for D.104 Mike,  
25/- Selenium rectifier, 300v. 60 mA, 7/- 6v. 1 1/2a., 3/6.  
1 in. CR Tube, 12/6. 504, 7/- 807, 8/6. 6N7, 6/-.  
Wanted: 25, 50 and 100 watt modulation transformer.  
—G2VJ, 54 Lordship Lane, S.E.22

R107 20, 40, 80, 160 metres, BFO, AVC, good  
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SALE. B2 Rx/Tx/PP complete, receiver faulty on  
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FOR Sale. Hallicrafter SX23 (540 kc-34.0 mc), with  
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G200S' announcements now appear in the  
Trade Small Advertisement column and on  
Page 518.

BC221 frequency meter, £9. B2 receiver, less  
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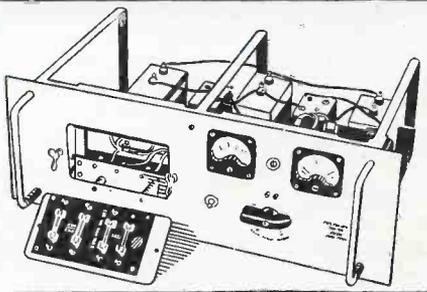
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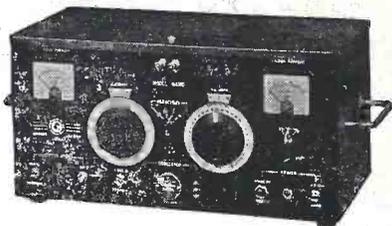
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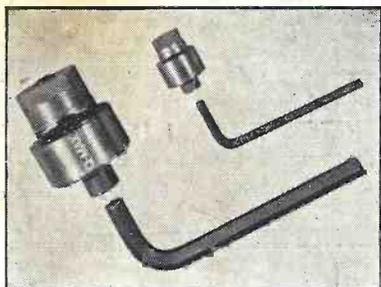
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