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*The*  
**SHORTWAVE**

*Magazine*



STROUD

RADIO

CLUB.

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

**VOL. IV No. 12 FEBRUARY 1947**

# WEBB'S RADIO

The centre for  
high-grade  
Electronic supplies

## GRAMOPHONE EQUIPMENT

The moving-coil pick-up has come to stay—the general clarity of reproduction is unchallenged. We have two representative makes in stock :—

**LEXINGTON "DE LUXE" MODEL**  
automatic insertion and rejection of sapphire needles. Needle pressure approximately ½ oz. Price (including Purchase Tax) .. £6 5s.

**LEXINGTON "JUNIOR" MODEL**  
Similar construction to the "De Luxe", but without mounting base and automatic device. Uses commercial steel needles, easily replaced. Price £3 18s. 9d. Lexington Sapphires .. 15s. 3d. Input Transformer in Mu-metal Box .. £1 10s. 2d.

**WILKINS & WRIGHT TYPE "N"**  
Uses easily changed commercial hard-steel needles, playing approximately 20 records. Needle pressure adjustable from ½ oz. to 1 oz. Complete with coupling transformer and equaliser in screened case, arm rest, instructions and fixing screws. Price (including Purchase Tax) .. £7 0s. 7d.

**Wilkins & Wright "Scratch" Filter**  
—not merely a "top" tone control, but a low-pass filter cutting above 8.5 kc/s. Price (including Purchase Tax) .. £2 11s. 4d.

**Wilkins & Wright Steel Needles**  
In handy container with 20 needles. Price .. 5s. 6d.

## LOUDSPEAKERS

**GOODMAN'S 12" P.M.**  
A heavy duty reproducer capable of excellent quality, speech-coil 15 ohms. Price .. £6 15s.

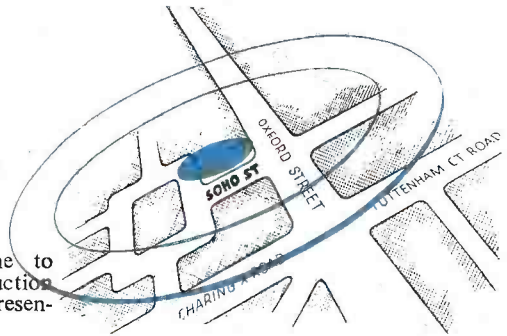
**WHARFEDALE W.10/C.S.**  
A new 10 in. P.M. reproducer of interesting design and excellent fidelity. Bass resonance below 60 c/s and top effective to 18,000 c/s. Price .. £7

**CELESTION RANGE OF P.M.**  
speakers, usually available—2½ in.—27s.; 3½ in.—29s. 6d.; 8 in.—30s.

## AERIAL EQUIPMENT

**LONDEX AERIAL RELAYS**  
(6v. AC operated) type AECO4. Double-pole change-over contacts for up to 4 amps. Base size 3 in. × 3 in. Price .. £2 17s. 6d.

Type AECO15.  
Double-pole change-over contact for up to 15 amps. Base size 6 in. × 4 in. Price £5 10s.



## CO-AXIAL CABLE

0.54 in. diameter polythene insulation Braided copper with P.V.C. outer covering. Impedance 80 ohms. Price, per yard .. 1s. 6d.

**DURALUMIN TUBE** Outside diameter ⅜ in., 8 ft. 6 in. length for 5 and 10-meter work .. 4s. 6d. 10 ft. 6 in. length for Television, etc. ... 5s. 6d.

(Note : Callers only for this tube ! Cannot be despatched.)

## WEBB'S RADIO FEEDER

ready built in lengths of 50 and 35 feet. Spacing 3½ in. with 18-gauge wire. Polythene spreaders securely moulded into wire every 20 in., light and rigid construction. Supplied on drums ready for winding off, and immediate use.  
Per 50 ft. drum .. £1 17s. 6d.  
Per 35 ft. drum .. £1 6s. 3d.  
(Packing and despatch 2s. 6d. extra.)

## TUNING CONDENSERS

### EDDYSTONE MICROCONDENSERS

1094.	20 P.F.	3,500v.	.. ..	6s. 0d.
1129.	40 P.F.	2,300v.	.. ..	6s. 6d.
1093.	60 P.F.	2,300v.	.. ..	7s. 0d.
1130.	100 P.F.	1,000v.	.. ..	7s. 11d.
1131.	160 P.F.	1,000v.	.. ..	8s. 3d.

### STANDARD GANGED CONDENSERS

(All have ceramic insulation)

2 gang	500 P.F.	2½ in. × 1½ in. × 2½ in. deep	13s. 6d.
3 "	500 P.F.	3½ in. × 1½ in. × 4 in. "	14s. 0d.
4 "	500 P.F.	2½ in. × 1½ in. × 4½ in. "	14s. 0d.
4 "	500 P.F.	3 in. × 2½ in. × 5½ in. "	10s. 0d.
3 "	200 P.F.	2½ in. × 1½ in. × 3½ in. "	17s. 6d.

### MINIATURE 2-GANG CONDENSERS

especially applicable for H.F. and V.H.F. work. (S.L.C.)  
Panel Mounting, 1½ in. × 1½ in. × 1½ in. deep, plus spindle.  
44 plus 44 P.F. 10s. 3d. 18 plus 18 P.F. 7s. 6d.  
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Base Mounting, 1½ in. × 1½ in. × 2 in. deep plus spindle and mounts.  
25 plus 25 P.F. 8s. 0d. 75 plus 75 P.F. 11s. 6d.

# WEBB'S RADIO

14 SOHO ST., OXFORD ST., LONDON, W.1

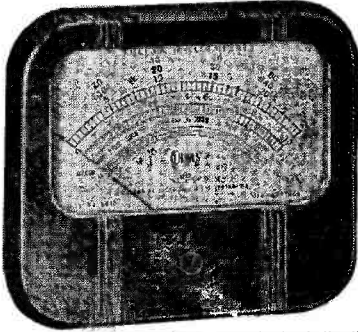
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*Write for pamphlet descriptive of the  
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MEASURING INSTRUMENTS (PULLIN) LTD., Phoenix Works, Gt. West Rd., Brentford, Middx. Ealing 0011

# INDISPENSABLE IN THE HAM SHACK

This attractive  $3\frac{1}{2}$ " scale instrument has separate coloured scales for resistance, and 10v. A.C. ranges. All components can be obtained to build this model multi-range test meter. Price (1 ma. movement) - £4.9.0



## FOUNDATION INSTRUMENTS & MULTI-RANGE TEST SETS

Address all correspondence to Dept. T.

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**METERS.** D.C. Moving Coil micro ammeter, 2" dia., flush panel, 0-500 micro amps, zero adjuster, 500 ohm resistance, 40/- . D.C. Moving Coil milliammeter, 2½" dia., flush panel, 0-1 ma, 55/- . Double reading first grade D.C. Moving Coil Voltmeter, by Elliott, 0-10 and 0-40 volts, 2½", flush panel, 55/- . Ammeters, 0-2.5 amps, 55/- . Hot Wire Ammeters; surplus, panel type, 0-0.5 amps, 21/- . 0-2 amps, 27/6 ; few only.

**D.C. MOTORS.** Shunt wound K.B.B. Motor, 110 volts 1/100 H.P., protected type, 2,000 r.p.m., with 20/1 ratio reduction gear, mounted on C.I. base, 45/- .

**D.C. Fan Motors;** large bulkhead type, 110 and 220 volts, 35/- each. D.C. 110 and 220 volt Table Fans, with 12" blade and guard, 45/- ; oscillator type, 55/- .

**HAND MAGNETO GENERATORS.** Output approximately 70 volts 25 ma A.C., heavy perm steel magnet, wound armature, driven by gearing in handle, for A.C. experiments, 10/- . 3-Magnet type, 12/6 . 5-Magnet type, 15/- ., postage 1/- extra.

**MOTOR BLOWERS.** 12 volt D.C. for valve cooling and lab. work, 70/- .

**VIBRATORS.** Mallory 12 volt battery Vibrator, 15/- . Special transformer, 27/6 . Vibrator Contacts, thin H.F. Reed, bakelite mounted, fine thread adjustment, milled locking nut, 4/- .

**LAMPS.** 230 volt Neon lamps letter plate, E.S. base, 2/6 . 25 volt 8 C.P. tubular lamps, S.B.C. base, 7/6 doz.

**SUPERSEDEERS.** H.T. Battery Superseder D.C./D.C. for Radio Receivers, 6 volt input, 110 v. 15 m.a. output; 12 volt input, 230 v. 30 m.a. output; last for ever and cost little more than a few months run on one H.T. battery; 5½" x 3½" x 3½", ball bearings, model finish, £3/15/- .

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**PLUGS AND SOCKETS.** Red and Black insulated, single socket with plug, 1/3 pair. 2-way Radio plug and socket for table mounting, 1/- . 2-pin plug and socket for cord connections, 2/- .

**MULTIPLE CONNECTION STRIPS** of soldering tags, telephone type, moulded mounting, 60-way, 3/6 . R.A.F. 10-way telephone terminal strips, bakelite, 2/9 .

**HEADPHONES.** Single low resistance headphones, as new, surplus G.P.O. stock type S.G.B., light weight, bakelite case and cap with headband and cord, 8/6 . High resistance double headphones, type S.G.B., with headband and cord, light weight, ex surplus; new condition 23/- .

**CONDENSERS.** Variable 3-gang short wave condensers, new, 12/6 ; 16 m.mfd. Ultra S/W variable air Condensers, ball bearings, Trolit insulation, new, 5/- ; -0003 or -0005 solid dielectric variable Condensers, 3/6 .

**COIL ASSEMBLIES.** S/W Midget with trimmer on paxolin base, 3/6 ; with can, 4/6 . Medium and long range Midget Coil, 6/- ; matched pair, 10/- .

**PARCELS.** 7 lb. of useful oddments for your junk box, all clean and dismantled from Government and other surplus apparatus, 7/6, post free.

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

**ELECTRADIX RADIOS**  
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Telephone MACaulay 2159

# EDDYSTONE AND THE AMATEUR

## IMPORTANT ANNOUNCEMENT

We have known for some time the urgent requirement for a first-class Communications Receiver essentially for Amateur use. In collaboration with expert Amateurs, men who are fully alive to the exacting and special requirements of the Amateur movement, we have designed just such a receiver. This new receiver is the Eddystone "640." It is BRITISH THROUGHOUT. Its star features are:—

- ELECTRICAL BAND SPREAD
- OUTSTANDINGLY GOOD SIGNAL-TO-NOISE RATIO
- EXCEPTIONALLY HIGH IMAGE RATIO
- ADAPTOR TO ALLOW FOR LOW VOLTAGE OPERATION

In addition, the set possesses everything expected in a first-class Amateur Bands Communications Receiver, i.e., Crystal Filter, 1,600 Kc/s I.F. High Gain R.F. Stage. Adjustable B.F.O. Stand-by-Receive switch and provision for "S" meter. Construction follows the traditional Eddystone high standard which is already well known and universally accepted. Although this receiver will not be available for some months, we feel that you should know of its existence. We are not making any rash promises regarding supplies, but you may be sure that the "Eddystone" staff are doing their utmost to bring about its release, and we aim to have this set distributed to all Registered Eddystone Retailers by August 1947.



**STRATTON & Co. Ltd.**  
 EDDYSTONE WORKS  
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**OAK EXCLUSIVE**

**DOUBLE CONTACT**

**SELF-ALIGNMENT**

**ENSURE RELIABILITY**



# OAK SWITCHES

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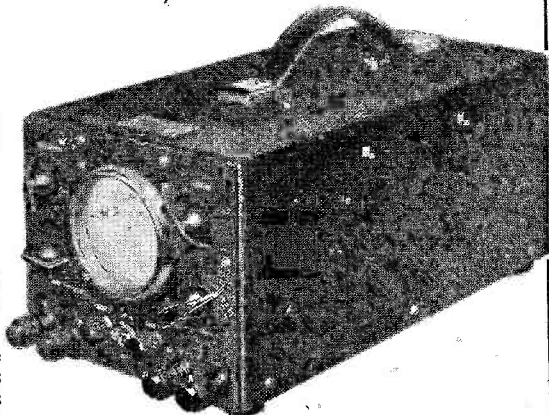
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An inexpensive Oscilloscope  
ideally suited  
for Amateur Transmitter use

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Price complete . . . £16-16-0



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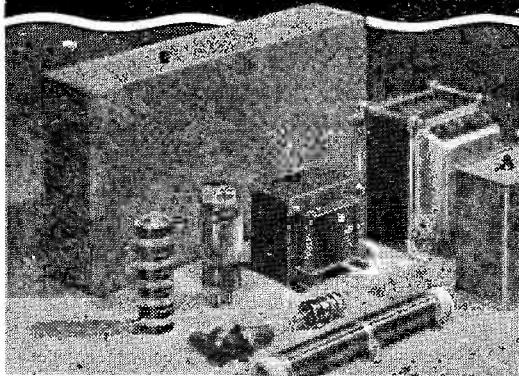
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Grams: Labgear, Cambridge

## Radiocraft POWER Equipment



We hold in stock a range of high-grade apparatus for power supply. Complete power packs can be supplied or individual components.

The following components are illustrated:

Chassis.—14" x 8" x 3" . . . . .	9/6
Transformer.—Providing a secondary voltage of 750 volts at 250 ma, £3/7/6	
Oil-immersed Smoothing Condenser, 4 mfd 2,000 volt working. Each 9/6	
Smoothing Choke, Swinging, 6/19 henry 250 mA . . . . .	£2
Heavy Duty Resistor, vitreous enamelled, and adjustable types, 75 watt, 50,000 ohms tapped at 10,000, 20,000 and 30,000 ohms, 21/3; 75 watt with variable adjustment, 25,000 ohms . . . . .	11/8
Mercury Vapour Rectifier. RG1/240A (two will give up to 1,500 volts at 500 mA, 19/- each. Types 2V/400A, etc., also available.	
Belling Lee High Tension Plug and Socket . . . . .	6/6
Indicator Lamp Holders . . . . .	2/6

For callers we are open from 9 a.m. until 6 p.m., both on weekdays and Saturdays. Our Mail Order Department will give rapid and efficient service to postal enquiries and orders.

## Radiocraft Ltd

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

TAYLOR 1217

# The Peak of Perfection!



in Radio Reception has been attained by the latest S. G. BROWN, Type K

## MOVING COIL HEADPHONES

Where High Fidelity Reproduction is required, such as for DX work, Monitoring and Laboratory purposes, etc., these precision-built Moving Coil Headphones will be highly appreciated.

*Technical Details:*

D.C. RESISTANCE—94 ohms per pair  
 IMPEDANCE—104 ohms @ 1,000 c.p.s.  
 SENSITIVITY—8Dbs. above 1 microwatt per bar @ 1,000 c.p.s.

PRICE £5 . 5 . 0 PER PAIR

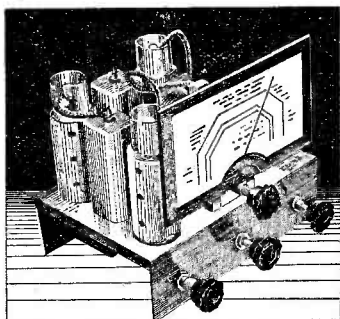
DESCRIPTIVE BROCHURE "S.W.K." will be sent free on request. For details of other S. G. Brown Headphones (prices from 25/- to 60/-) ask for Brochure "S.W."

### S.G. Brown, Ltd.

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ALIGNED INSTRUMENTS SERVICES \* 30 COIL PACK SERIES

ALIGNED INSTRUMENTS SERVICES



### MODEL 40 COIL PACK

The latest development in coil packs including an H.F. stage. Uses 9 iron cored coils in All-wave Superhet circuit. Wavebands covered—15-50, 200-550, 750-2,000, metres. For use with 465 kc/s I.F. Aligned and gain tested before despatch. Designed by the creators of the now famous 30 coil pack. Price 3 gns.

### A.I.S. TUNING HEART MODEL 30. (As Illustrated)

This latest All-wave Superhet unit incorporates the 30 Coil Pack and can be coupled to any amplifier. Employs 6K8G-6K7G- and 6Q7G valves, and covers all stages from Aerial to 1st A.F. amplifier. Wavebands: 16-50, 200-550-750-2,000 metres. Requires 250v at 20 m.a., and 6.3v at 0.9 amps.

Price (including P.T.) £8 10 0

Send 1d. Stamp for List 'M.F.'

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THE FINEST CORED SOLDER IN THE WORLD

# New Large Size

The most economical way in which to buy Ersin Multicore—the solder wire containing 3 cores of non-corrosive Ersin Flux—is in the new large size one carton. Available in 4 specifications. Wire pulls out without becoming tangled.

SIZE ONE CARTON. Service Engineer & Maintenance Size.

Catalogue Ref. No.	Alloy Tin/Lead	S.W.G.	Approx. length per carton	List price per carton (subject)
C 16014	60/40	14	55 feet	s. d. 6 0
C 16018	60/40	18	145 feet	6 9
C 14013	40/60	13	35 feet	4 10
C 14016	40/60	16	80 feet	5 3



Small (Size Two) Cartons. Each carton contains enough Solder for approximately 200 average joints. Price 6d.

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Offer the following

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**PULLIN Multi-Range Test Meter**, Series 100, A.C. and D.C. voltage ranges; D.C. milliamps and resistance. 10,000 ohms per volt movement. Complete with test leads. £8 10 0

**AEROVOX Condensers**, 2 MFD, 1000 v. wkg. 3/- each.  
Condensers ½ MFD, 2000 v. wkg. 3/6 each

**WODEN Filament Transformers**, D.T.F.12., 2.5 v. 10A.—D.T.F.17, 7.5v. 5A.—30/8. 34/10,  
**Woden Modulation Transformers**, type U.M.1., 30 watts audio. 38/5.

**EDDYSTONE Full Vision Dials**, 598. 18/6.  
**Eddystone S.M. Dial**, 3½" Black, 594. 17/6.  
**Eddystone Metal Cabinet**, 644 25/- Chassis 643 9/6.  
**Eddystone Metal Cabinet** 609, 65/- Chassis 641 12/6-Handles 608 5/6 pr.

Several Communications Receivers in stock; send for list "C.S.M."

**OUR COMPLETE CATALOGUE "S.M."** sent free on request to—A.C.S. Radio

**44 WIDMORE RD BROMLEY, KENT**  
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## Q.C.C. TYPE P5 QUARTZ CRYSTAL UNIT

This unit uses the well-known Q.C.C. Power type crystal, which is undoubtedly the most rugged and active crystal cut available for amateur use. The crystal is mounted in our type U dust proof holder, with standard ½ 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 in the 1.8 to 2.0 Mc. band for fundamental use, and in the 3.5 Mc. band and 7 Mc. band for frequency multiplying to the 28 and 58 Mc. bands.

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 ... £1.2.6

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 033



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**MIDGET COMMUNICATION RECEIVERS**  
—MCR I. Brand new in sealed tins as used by the Resistance movement. The very best quality components used throughout—ceramic slow-motion tuning condenser, ceramic valveholders, miniature valves 1T4's and 1R5. 5-valve superhet with sensitivity and reaction controls. Frequency coverage 150 to 1,600 kcs and 2.5 to 15 mcs. Complete equipment ready for immediate use with no modification necessary. Receiver  $8\frac{1}{2}'' \times 3\frac{1}{2}'' \times 2\frac{1}{2}''$ , power pack for 97 to 250 volts AC or DC size  $8\frac{1}{2}'' \times 3\frac{1}{2}'' \times 2\frac{1}{2}''$ . Pair of Midget Headphones, aerial and earth and complete instructions. Can also be used on dry batteries. Note our price £10/10/- Complete.

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**BLOCK CONDENSERS**—T.C.C. 4 mfd 800v DC wkg, 5/-; Aerovox 2 mfd 1,000v D.C. wkg, 4/6; 8 mfd 1,000v D.C. wkg, 15/-; T.C.C. 4 mfd 2,000v D.C. wkg, 15/-; T.C.C. 4 mfd 2,500v D.C. wkg, 20/-.

A large number of "Ham" lines are contained in our latest catalogue—Send 6d. in stamps for your copy.

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Do you want to get up to 18 w.p.m., or to higher speeds in both Sending and Receiving Morse? If YES—then

### CANDLER CAN HELP YOU

There are Candler **MORSE CODE** Courses for **Beginners** and also for **Operators** who wish to improve their accuracy, speeds and technique.

A student taking the **JUNIOR** Course says:—

"I am pleased to report excellent progress, and many Hams have said with what ease they can copy my sending."

Ref. No. 3048.

A student taking the **ADVANCED** Course says:—

"I am very satisfied with the result of studying the first five lessons, and the course is all that you claim for it. In actual fact, my code speed has increased from 15 w.p.m. at the time of starting the course, to about 25 w.p.m. at the present time, after five lessons, spread over seven weeks."

Ref. No. 4026.

*NOTE* : The original letters and many other similar ones have been inspected by the Advertisement Manager of the Short Wave Magazine.

Full details of all Courses are set out in the Candler "**BOOK OF FACTS**," Post free on request.

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Candler System Co., Denver, Colorado, U.S.A.

# UNIVERSAL TAYLORMETER

Model  
**90a**



First grade accuracy,  
40 ranges, 1000 ohms per volt.

- 1 Four-inch meter scale.
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- 3 Buzzer for Continuity Tests.
- 4 Automatic overload protection.
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Tel: Slough 21381 (4 lines) Grams: "Taylins", Slough

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We specialise in assembly of amateur radio products, manufacturers' prototypes, etc. We have facilities for sheet metal work, electric, oxy and spot welding, rolling, bending, brazing and spraying black crackle.

Furthermore, we can get a job into production pretty quickly.

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We can provide chimneyclamps, brackets, pulley assemblies, rotating mechanisms, steel rope, and any special ironmongery for that new installation, even complete beams.

CONSULT US FIRST, we may be able to save you **TIME, MONEY AND HEADACHES**

**ACE WORKS, MOOR LANE, STAINES**  
Staines 2230

*New Stocks*

*Just Arrived*

Right Up-to-Date

### RADIO VALVES OF THE WORLD

An International Reference Handbook from Obsolete to Modern types

International

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P. H. Brans

12s. 6d.

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One of the smallest communications receivers yet produced. The type MCR1 by Marconi.

Frequency coverage 100 Kcs-15 Mcs by means of 4 plug in coils. Dimensions of receiver,  $2\frac{1}{2}'' \times 3\frac{1}{2}'' \times 9''$ . Supplied complete with 5 valves, plug in coils, pr. headphones, aerial, earth and battery. **ONLY £8/19/6**

An AC/DC power pack is also available, making this an all purpose AC/DC or battery operated receiver. Power pack £3.

Spare batteries, 20/- each.

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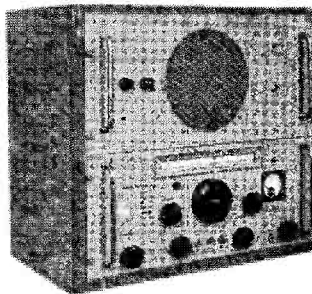
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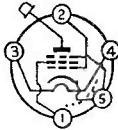
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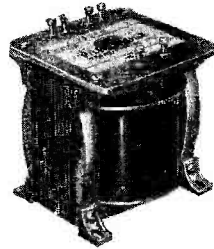
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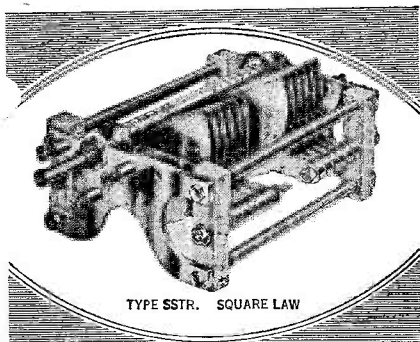
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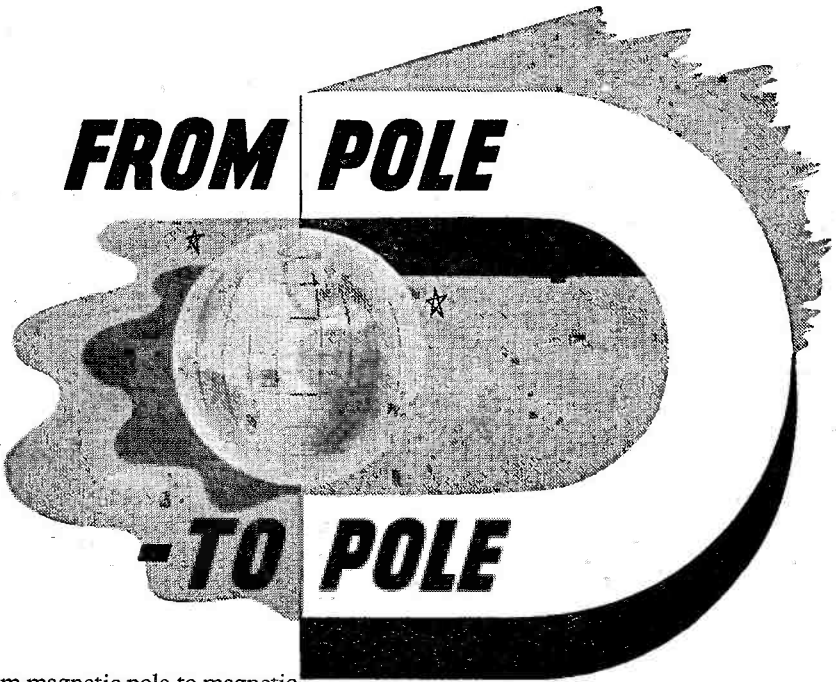
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# SHORT WAVE MAGAZINE

FOR THE RADIO AMATEUR AND AMATEUR RADIO

Vol. IV.

FEBRUARY 1947

No. 12

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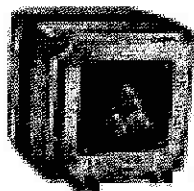
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## EDITORIAL

## Frequencies

Elsewhere in this issue we summarise the present proposals in regard to the allocation of amateur frequencies at the forthcoming World Telecommunications Conference. They make sombre reading and will come as something of a shock to amateurs in this country.

It is easy to be critical of those who have been representing the amateur viewpoint to our authorities—always a difficult task. But it would seem that the British official representatives at the Moscow conference in October last were not particularly impressed by our needs and aspirations—certainly not to the extent most amateurs will have expected.

Excluding amateur allocations altogether, it is inconceivable that American requirements for ether space are less than those of the European Powers. How then can America afford to offer amateur allocations on a far more generous scale than our own authorities have so far agreed? The answer would appear to be that the case for British amateurs has not been so effectively presented.

However, all is not lost. The present proposals—and they are still only proposals—may yet lead to more favourable decisions. But the fact remains that on the present showing it will be the Americans, and the Americans alone, who will have to fight the battle for Amateur Radio at the World Conference. Indeed, this is no more than actually happened on the pre-war Madrid and Cairo occasions, when similar problems arose.

It is still the American authorities—prompted by the powerful and influential American Radio Relay League, acting through the Federal Communications Commission—who have the most enlightened views on the future of Amateur Radio.

*Arthur Fordy G6FO.*

## Five Metres

*New 245-mile GDX Record to G2IQ/G5BY—  
Improved Conditions over period Jan. 19-21—  
Steady Activity—Continental Interest Increasing*

By A. J. DEVON

**J**UST as the draft of this column was completed, in came the flash—in what many thought would be the dead season for GDX—on the new inter-G record for 58 mc. G5BY is in it again, of course, this time in partnership with an operator whom we welcome to the band and to these pages—G2IQ of Sheffield. He came on for the first time on December 29, worked G6MN (Worksop) and was heard the same evening by G2XC (Portsmouth).

On January 21, 2145-2215, G2IQ/G5BY established contact over the 245-mile path; congratulations to them both.

There had been a patch of good conditions since the evening of the 19th, when several fresh GDX QSO's were made and G2IQ was being well heard by the southerly stations. At the moment, there are no details of the gear at his end, except that he started up with a fixed 3-element beam in the roof space. In an earlier note to introduce himself as active, G2IQ mentioned that he comes on at 1730 most evenings but hears nobody till 2100, when they all come up together! Well, a few of the regulars do look in between 1800 and 2000—and this gives us the cue to suggest, as often before, that it pays to put out a CQ on what appears to be a dead band. There always seems to be someone listening.

### January Results

G4AJ (Basingstoke) did well on January 19—see log in Calls Heard. He was getting northerners like G2IQ (143 miles), G5MQ and G6YQ (164), and G8UZ (125) at up to S7. G6CW (Nottingham, 113 miles) was S9. Five

hours' work by G4AJ that evening produced nine GDX contacts and two more heard, in G3IS (Rugby, 73 miles) and G5BD (150 miles). He has also had five QSO's during the month with G5BY (139). This is good work and is without doubt largely attributable to the 4-element beam shown here.

G2IQ remarks that he has had a very interesting baptism on five metres. On the evening of January 20, his was the pleasant experience of having the south of England stations queuing up for him—as he says, it was just like being in some remote DX location. GDX worked by G2IQ (including the G5BY contact for the new inter-G record) now totals G2MR, G2MV, G2YL, G3IS, G4AJ, G5JU, G5LJ, G5MA, G6LK, G6VX and G6YU. Off the sides of his beam he has had contacts with G5GX and G6OS of Hull, and G6YQ. And with G6YO of Bradford off the back!

G6YU found activity at rather a low ebb since the Contest, but nevertheless knocked up 64 contacts with 21 stations during the month ended January 18—his log is also in Calls Heard. These QSO's include several with G5BD, in spite of the five BBC harmonics the latter has to dodge in G6YU's receiver! He also makes some interesting observations. Both G4AJ and G5MA have been heard well in broad daylight, and G6YU confirms the effect (which he has noticed on many occasions when working G2MR, G2XC, G5MA, G6LK and G6VX) described by G5BY in his article last month on meteor reflection. The peaks have been sufficient to overload the receiver

and the effect is obviously not due to aircraft reflection (as has been suggested and is possible under suitable conditions) because these bursts of signal are of extremely short duration.

New ground is being broken up in Oswestry. G4LU has got going well with schedule contacts across country to the Birmingham (55) and Nottingham (81) stations. G3AHX (Oswestry) reports that there is great interest in 58 mc in that neighbourhood but that so far DX has been very rare. He asks that the regulars shoot their beams that way sometimes. We look forward to hearing more from this quarter.

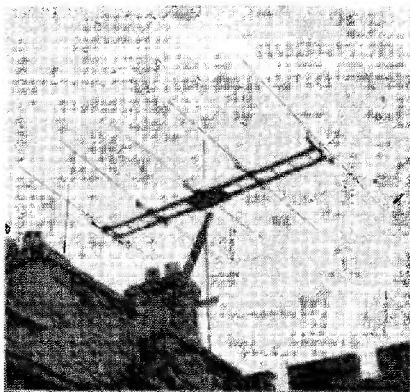
The question of shooting beams is also raised by G3BW, the outpost station 'way up in Whitehaven, Cumberland. Night after night he works GM3OL\* (Dumfries) and his local G2HNB, but nothing else is ever heard—except the 80 mc Preston police station at a good 70 miles! G3BW thinks it must be because no one ever thinks of looking his way. There is a relatively high level of activity in the Lancashire area, and a QSO would seem feasible. G3BW is on 58872 kc CW every evening between 1900 and 2200, and pleads for a report from anyone, anywhere—except GM3OL and G2HNB, of course! If no one else will give him a contact, he says that just a solitary report from outside his local area would ease his mind.

Again on this beam problem, G5US (Frimley, Surrey) suggests that all beam operators add the line-of-shoot when calling CQ; this would be of immense help to stations listening on the band.

G2BOK (Cheam, Surrey) has got a single 807 firing on five and is ready for action. He would particularly appreciate reports, from any distance.

G6CW has been putting out a signal heard in nearly all centres of 58 mc activity south of the Border. He and the other two Nottingham stations have been investigating the behaviour of some of these close-spaced beam designs, with rather startling results

(\*Since this was written, we understand that GM3OL worked G6YQ on the evening of January 25—the distance Dumfries-Woolton, Liverpool is 139 miles.—Ed.)



The 58 mc 4-element rotary at G4AJ, Basingstoke. It consists of one reflector and two directors, the driven element being delta-matched to 80-ohm Belling-Lee cable. The aerial is 15-ft. above roof level.

which we hope to publish shortly. G6CW's recent contacts round-the-clock include G5GX and G6OS, both of Hull (it is good to know they have got out of the city at last), G5BD in Mablethorpe, G2IQ in Sheffield, G6YQ in Liverpool, G4LU in Oswestry and several of the southerners, including G2XC and G5MA. So John has got that beam buttoned all right.

Expected on are G2XS (King's Lynn) one of the old timers, and G2UK (Boston, Lincs).

#### APOLOGY!

It is regretted that due to heavy pressure on space this month it has not been found possible to include A. J. Devon's full summary of the recent 58 mc Contest. His analysis tables will therefore appear in the March issue. A total of 63 logs was finally received—but we hope that this does not necessarily mean that 63 correspondents are going to be disappointed this time.

#### Scotland—and Schedules

On behalf of Birmingham's G2AK, G5JU, G6XJ and himself, G5LJ asks us to say that they want schedules with Scottish stations. Well, we can give them these introductions—GM's 2LQ, 2DI, 2KP, 3AKK, 3BBW, 3PB, 3YS,

5ST, 5VG, 6MS, 6SR, 8AH, 8CH, 8MJ, all just reported as active in the Glasgow-Edinburgh area and planning a network down to the Border. The co-ordinator of this activity is GM2FZT, 3 Berridale Avenue, Glasgow, S.4, who though not himself on 58 mc, will gladly act as liaison.

GM3OL is still the only Scot who has heard a G, and so the Edinburgh-Glasgow clan is very anxious to get in on this GDX they keep reading about in the *Magazine*.

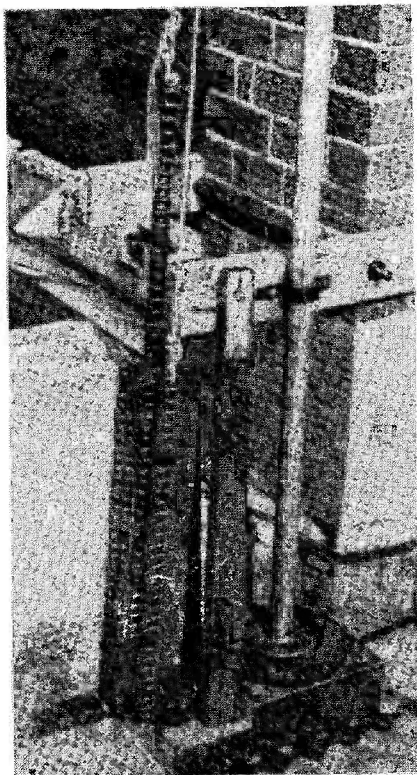
### Continental Activity

Just as we closed for press, we had word that the French want us to help organise a 58 mc network for regular operation between Paris and London, with the end of their route at Boulogne. Your earnest conductor has composed a letter, which is believed to be in French, asking for further information on this interesting project and pledging the G's to play. In the meantime, we would be glad of one or two volunteers prepared to run tests to establish the cross-Channel link; please give frequency and convenient operating periods.

G5WW reports that PAØWL is looking for G's and that PAØHQ (Rotterdam) is on 58.7 mc CW between 2150 and 2250 every Monday and Friday, with a beam aimed at us. This should be a fairly easy contact for some of the South London stations. Another Netherlander on the band is PAØRA (Oosterbierum, Friesland with CW on 59 mc between 2000 and 2300 most nights.

ON4IF (Antwerp) is very well equipped, with an 815 PA feeding a 4-element rotary; his receiver is a 14-valve German job designed for the 27-70 mc band. It seems that ON4IF is usually on 56048 kc but has crystals to get up to 59 mc. By the time you see this, he should be fairly well informed as to current G activity; here again, a contact ought not to be too difficult, particularly if a schedule is arranged—QRAR.

OK1AW reports that his friend OK2MV is making automatic calls on 56 mc at five minutes past each hour



Close-up of the rotating mechanism for G4AJ's beam. A crown-wheel and pinion drive turns the supporting pipe-mast, which is carried on bearings and steadied near the top by the buttress visible in the other photograph.

from 1400 to 1800 daily, with 50 watts. OK1AW noticed that conditions were good on November 24 (when G5BY and G6DH heard W1HDQ on 50 mc) but did not receive any G's.

### Pre-War Trans-Atlantics

We are informed that G6SL, Birmingham (the Eddystone station) had an American report on their 56 mc signals in the autumn of 1935. Most unfortunately, no other details are available as the evidence was lost when their factory was blitzed. This claim was never put forward in the pre-war era because its importance was not appreciated at the time.

G5BY put in a fully authenticated

claim to the first East-to-West reception with a report from W2HXD, New York, who heard G5BY's CW on 56 mc at 1508 on December 27, 1936. This has hitherto been accepted on both sides of the Atlantic as the first 5-metre signal across the water in either direction.

The point about the recent work with W1HDQ is that it is the first reception West-to-East. G5BY enjoys, among his many distinctions in the field of Amateur Radio, that of having bridged the Atlantic both ways in the 5-metre region.

### Reports—March

The closing date is February 17 for the March issue, though late news of particular interest can be accepted by telephone or telegram up to the 22nd. We should particularly like to have more reports and Calls Heard lists from the northerly stations, as we are anxious to make another survey of the activity on the band.

Address 5-metre correspondence to A. J. Devon, c/o *Short Wave Magazine*, 49 Victoria Street, London, S.W.1. (ABBey 2384).

And so, till next month . . .

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## New Amateur Organisation

As we rather expected, the notice on p. 662 of the January issue of the *Short Wave Magazine*—with regard to the possible formation of a new Amateur Radio association in this country open only to transmitters—has aroused more than a little interest.

Many correspondents in both camps draw quite unwarranted conclusions (sometimes expressed with considerable vigour!) because they are not aware of facts which, though they may be obscure, are yet cogent. This shows the importance of allowing ample time for ideas to germinate and discussion to flourish on what is undoubtedly a controversial issue of great importance.

By this token, then, let the debate continue. We would like to hear from all those with opinions on the subject.

But please do not tangle up your arguments, as some have done, with unfounded allegations against the probity and good faith of the *Short Wave Magazine*. Not that we object to criticism, but in this matter we really are quite impartial—see January Editorial. The *Magazine* is not pledged to any national society or organisation, and if the new association is formed, it will have to stand on its own feet.

As an independent periodical, and the only one of its kind in this country, it is our duty and our privilege to ensure that what we conceive to be issues affecting the well-being and development of Amateur Radio are given a fair hearing. And we have as big an interest in the future of Amateur Radio as anyone !

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### RADIOCRAFT EQUIPMENT

We have recently had in use some sample items from the Radiocraft range—a 17-in. by 10-in. by 2-in. steel chassis, finished grey crackle, and various mains transformers and smoothing chokes.

The chassis is extremely well made and nicely finished, and is in a heavy enough gauge of metal to support the weightiest components.

The transformers are very soundly constructed, with ample insulation, are rated well within their safe limits and run quite cool on full load. The smoothing chokes, of the unshrouded type, are equally satisfactory and the characteristics as measured agree well with the ratings stated.

Laminations are tight and all these units are free of vibration hum. The connections are brought out to solder tags and are clearly marked. All these items are moderately priced and can be recommended with confidence. Write Messrs. Radiocraft, Ltd., 11 Church Road, Upper Norwood, London, S.E.19.

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### PULLIN MULTI-RANGE TEST SET

We are informed that the current price of the Pullin M.I.P. Series 100 Multi-Range Test Set is £8 10s. and not as previously advertised. Messrs. Measuring Instruments (Pullin), Ltd., Phoenix Works, Great West Road, Brentford, Middlesex. (EALing 0011).

# Transmitter Remote Control

## Practical System Meeting Most Requirements

By H. M. BAWTREE, Grad.I.E.E. (G2BOK)

**A** VERY large number of amateurs are obliged, for domestic reasons, to utilise garden sheds and similar outbuildings for the purpose of housing their transmitters.

In the summer this scheme leaves little to be desired; but as winter approaches, the occupant of the outbuilding realises that to be able to operate from an indoor fireside would be infinitely more comfortable, and far less conducive to influenza and similar ailments. Such was the case at G2BOK, where the "shack" is located at the foot of a long garden. It was therefore decided to operate from a comfortable room indoors.

### The Remote-Control Problem

The facilities required were :—

- Switching of filament circuits,
- Switching of HT circuits,
- Telephony operation,
- Monitoring of outgoing signals,
- Reception of incoming signals.

It was also considered desirable to include safety precautions to ensure :—

- That a visual indication was given at the remote or operating position when the filaments were "on",
- That HT could not be applied to the rectifiers or other valves unless the filaments were "on."

### Equipment Layout

The control of the switching circuits presented no great difficulties. Relays, a few of which were available, were used in entirely conventional circuits. At G2BOK the filament and HT transformers are all separate, except in the case of the modulator power-unit, in which one transformer supplies both requirements. In this instance the primary was wired in parallel with the filament transformer primaries, and a relay included in the centre-tap of the HT winding, which closed only when the remaining HT transformers were energised.

The arrangement of these circuits is clearly shown in Fig. 1, from which it will be seen that relay B controls all filament circuits, while relay A applies HT.

The neon lamp N, wired in parallel

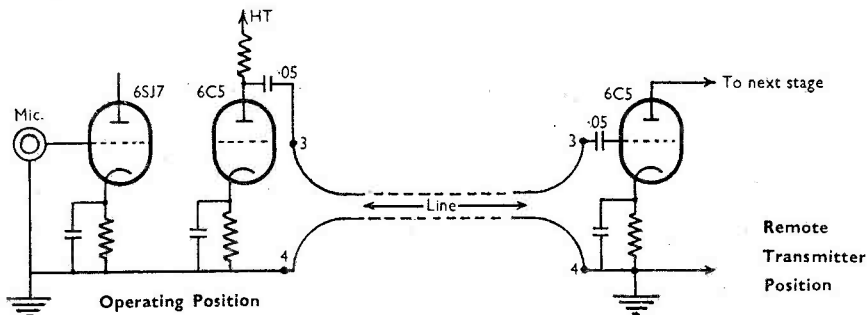


Fig. 2. The speech-line coupling system, which has been tested to work satisfactorily with up to 300-ft. of cable with no serious loss of quality at speech frequencies. The numbers 3, 4, refer to the line connections in Figs. 1 and 3.

with the filament transformer primaries, was mounted on the aerial mast so as to be clearly visible from the remote position, indicating that the LT circuits were "live." A further relay, C, energised through a Westinghouse J-type rectifier with suitable dropping resistance, was also wired in parallel with the filament transformer primaries as a safety device. It will be seen from Fig. 1 that it is impossible to apply HT to any part of the transmitter until this relay is closed, i.e. until the filaments are "on."

**Modulation Control**

The speech circuit had next to be considered. A number of experiments were done, as a result of which it was decided to employ a small two-valve amplifier at the remote position to feed the line. At the far end it was intended that the line should be matched into the grid of the low-level input valve in the main speech amplifier, suitable impedance-matching transformers being used at both ends.

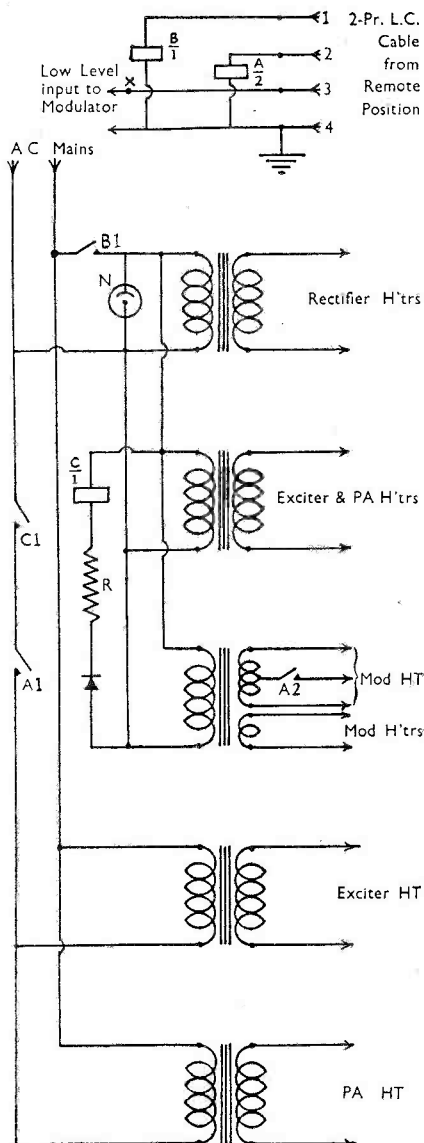
Unfortunately this scheme did not turn out to be as simple in operation as was anticipated. No matching arrangement seemed satisfactory since every system tried either attenuated the treble or the bass frequencies. In desperation both transformers were removed from the circuit and buried deep in Mother Earth!

Instead, the circuit shown in Fig. 2 was tried. Technically unsound though it may appear, this idea worked to perfection. CR-tube measurements showed a surprisingly even response to all practical speech frequencies over 100 yards of line.

**Operating Position**

Attention was now turned to the layout of the operating position. A single-valve receiver with plug-in coils was constructed to serve as a monitor. Both this and the speech-amplifier were arranged to draw their HT and LT from the same power-pack as the receiver. Additional power supply problems, with their associated expense, did not therefore arise.

To complete the installation, a small



Note: A .05  $\mu$ F Condenser should be inserted at "X" if one is not already included in the Amplifier

Fig. 1. The circuitry at the transmitter position in G2BOK's remote-control system. Relay B switches power to the LT transformers and relay A to the HT primaries. Relay C imposes a time-delay, via contact C1, which prevents mains power being applied to the HT primaries till the LT is right up. The neon tube N is mounted so as to be visible from the operating position.

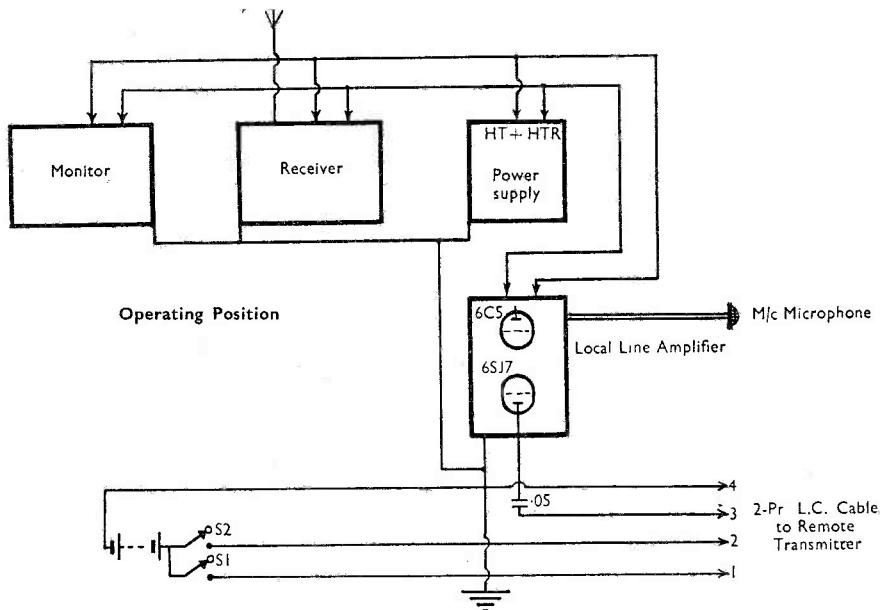
but efficient all-wave aerial for the receiver was mounted on the roof of the house. No aerial was needed for the monitor, since the local field was very strong. Fig. 3 shows the complete layout at the operating position.

### Inter-Connection

A 100-yard length of 2-pair lead-covered telephone cable was used to connect the transmitter with the remote position, three wires serving as separate circuits while the fourth was used as a

common return for them all. In order to avoid introducing hum into the speech line, dry batteries were used to supply current for the remote switching circuits.

It is fully realised that no particularly novel features are to be found in this remote control system, but the article has been written at the instigation of a number of amateurs who have evinced great interest in the scheme, and who have asked over the air for full details.



Note. One side of each Heater Circuit is earthed.

Fig. 3. General arrangement at the control end in G2BOK's system. Switches S1, S2, connect the energising battery to relays A and B in Fig. 1.

### MULLARD AMATEUR VALVES

They are doing a very nice brochure giving details and base connections of all types of interest to the amateur. The range of valves covers all usual and some unusual requirements, and we cannot do better than suggest to readers that they write Messrs. Mullard Wireless Service Co., Ltd., Publications Dept., Century House, Shaftesbury Avenue, London, W.C.2, asking for the booklet "Mullard Valves for Amateur Communication."

### SWL REPORTS

Transmitters who would like listener reports are invited to send us details covering the band(s) and type of transmission on which they are required, the distances over which they are wanted, the QTH for QSL's and, if possible, the operating periods.

These details will be listed under "Pse QSL" in our *Short Wave Listener*, on the understanding that reports so received will be acknowledged by QSL card.



# Modulator for 50 Watts

Using a Phase Inverter and Common-Grid Speech Amplifier

By L. V. MAYHEAD (G3AQC)

In designing this modulator efficiency was a major consideration, but cost was also important. It was decided to use a pair of 6L6's in Class-ABI, sufficient to modulate 50-60 watts.

A carbon microphone is used in a special input circuit which avoids many of the disadvantages of this type of microphone. The power supply required is relatively low voltage and this, together with the fact that there is only one transformer in the whole modulator, also makes for economy.

The first stage, a 6J7, has its grid earthed which is thus common to both input and output circuits. The microphone is a GPO-type carbon, connected in series with the cathode bias resistor; the cathode current of the 6J7 is sufficient to energise the microphone.

The rest of the circuit is more conventional. A 6N7 is used as phase-inverter, one triode section feeding one 6L6; part of this is then fed back through a potential divider to the other triode section, which drives the second 6L6.

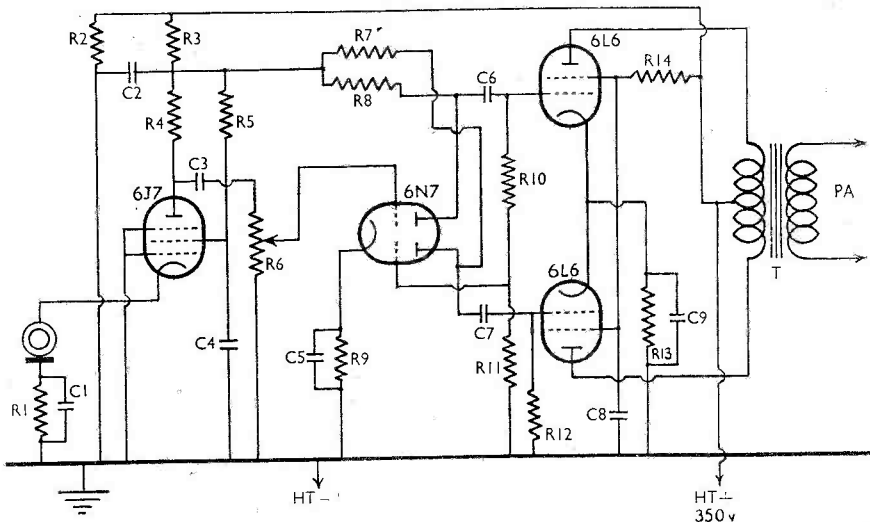
The resistances forming this potential divider network should be of a reasonable order of accuracy.

With 350 volts HT the modulator gives excellent results. None of the troubles usually connected with a carbon microphone—such as frying, blasting, and irregular speech level—seem to be experienced. Quality and output are good, and in QSO operators thought that a crystal microphone was employed.

### Table of Values

Modulator for 50 Watts

C1	= 12 $\mu$ F
C2, C8	= 8 $\mu$ F
C3, C4,	
C6, C7	= 0.1 $\mu$ F
C5, C9	= 25 $\mu$ F
R1	= 1,000 ohms
R2	= 30,000 ohms, 10-watt
R3	= 50,000 ohms, 2-watt
R4	= 200,000 ohms
R5	= 1 megohm
R6	= 250,000 ohms, gain control potentiometer
R7, R8, R10	= 100,000 ohms
R9	= 3,000 ohms
R11	= 5,000 ohms
R12	= 105,000 ohms
R13	= 200 ohms
R14	= 10,000 ohms



G3AQC's modulator, using a grounded-grid 6J7 in the first stage. A carbon microphone may be directly connected as shown, no transformer or external energising source being required. This modulator will swing a 50-watt carrier.

# Crystal-Heterodyne Frequency Meter

## *Design and Calibration of a Sub-Standard Instrument covering all Amateur Bands*

By M. COX, A.R.C.S., B.Sc.

**I**N the present crowded state of the 7 and 14 mc bands the use of a VFO becomes desirable. It is essential, however, to have available a piezo-electric crystal wavemeter, which must be used whenever the operating frequency is changed and which must be accurate to GPO limits.

The instrument described here is accurate to within 0.05 per cent. and gives continuous coverage from 7 to 8 mc and the harmonic frequencies of that range. It may also be utilised for the determination of transmitter frequencies from 1.75-2.00 and 3.5-4.00 mc.

The construction and calibration of the wavemeter is simple, although certain precautions need to be observed.

### The Circuit

The oscillator section of a 6K8G is used in a Colpitts circuit as a 1,000 kc crystal oscillator. This oscillator is readily adjusted and is particularly stable. A separate 6J7 pentode is used as an electron coupled oscillator, working in the range 7-8 mc, its output being fed into the signal grid of the 6K8. Phones are plugged into the anode circuit of the latter to detect the beats produced by the two oscillators.

Thus, the 7th harmonic of the crystal oscillator beats with the fundamental of the heterodyne oscillator at 7 mc. Similarly, a beat is produced with the 15th harmonic of the crystal oscillator and the 2nd harmonic of the heterodyne oscillator when this is set at 7.5 mc. Beats are thus produced when a harmonic of the heterodyne oscillator becomes a whole number of megacycles.

It is not practicable to use harmonics higher than the 12th since the beat notes become very weak, unless additional amplification is used.

### Construction

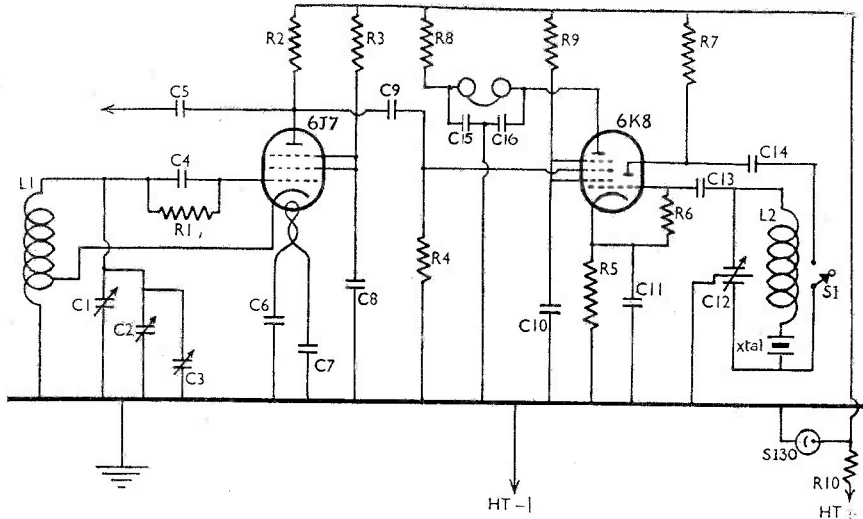
The instrument must be rigidly constructed; all condensers and resistors being mounted on group boards or fixed to the chassis. They should not be suspended in the wiring. The resistors employed should be adequately rated; in the original model all resistors carrying current are of the 1-watt type, with the exception of R10 which is rated at 2 watts. Wiring should be as short and direct as possible, 16 or 18 SWG wire being used. The coils and condensers must be of the highest quality, with ceramic or other high-grade insulation of low temperature coefficient. The tuned circuits are screened from each other and separated from the valves, to avoid interaction and undue temperature rise. A first-class vernier dial which can be read to 0.1 deg. or its equivalent is essential. Only by observing these precautions can an accurate and stable job be produced.

The whole instrument is comfortably accommodated in a steel cabinet measuring 12-in. × 7-in. × 7-in. The main tuning condenser C1 and the zero-set condenser C3 are controlled from the front panel, whilst C2 the tank condenser and C12 the split-stator crystal oscillator condenser are mounted inside the wavemeter, since they need be touched only during the initial adjustments.

A separate power pack is used delivering 250 volts HT and 6.3 volts 0.5 amp. The receiver power pack may be employed for this purpose since the HT voltage is stabilised in the oscillator.

### Operation and Calibration

Some experiment will be required to find the proper value of the resistor R10 used for voltage dropping, since



Circuit of the crystal checked heterodyne frequency meter, giving coverage over all bands. Beats between the 1,000 kc crystal oscillator section of the 6K8 and the 6J7 heterodyne oscillator are fed back and amplified in the hexode section of the 6K8, and are audible in the 'phones in its plate circuit. With careful construction, accuracy as high as 0.05 per cent. can be obtained.

specimens of gas stabilising tubes vary ; also the initial voltage applied to the instrument depends on the particular power pack used. The correct value is such that the tube strikes and carries some 5-7 mA.

The oscillator should then be allowed to run for some 30 minutes or more, so as to reach a steady temperature. The crystal is now shorted out and the crystal oscillator tuning condenser C12 adjusted to 1,000 kc, when the shorting strip can be removed. This adjustment ensures that the highest stability is achieved.

The zero-set condenser C3 is set to half-capacity and left in this position during the whole of the following operations. The tank condenser C2 of the heterodyne oscillator is rotated with the main tuning condenser at maximum capacity, until a beat note is heard in a receiver tuned to 7 mc. A beat will also be heard in the oscillator 'phones when the tuning is set to 7 mc. The receiver is then used to identify the beats within the wavemeter at 7.25, 7.5, 7.75 and 8 mc, produced when the main tuning condenser C1 is rotated. After these strong beats have been located, the

**Tables of Values**

**Crystal-Heterodyne Frequency Meter**

- C1 = 40  $\mu\mu\text{F}$
- C2 = 160  $\mu\mu\text{F}$
- C3, C5 = 10  $\mu\mu\text{F}$
- C4 = 50  $\mu\mu\text{F}$
- C6, C7 = 0.01  $\mu\text{F}$
- C8 = .025  $\mu\text{F}$
- C9 = 30  $\mu\mu\text{F}$
- C10, C11 = 0.1  $\mu\text{F}$
- C12 = .0005  $\mu\text{F}$  split stator or twin-gang
- C13 = 100  $\mu\mu\text{F}$
- C15 = 1  $\mu\text{F}$
- C16 = .0005  $\mu\text{F}$
- R1, R3, R6 = 150,000 ohms
- R2 = 30,000 ohms
- R4 = 500,000 ohms
- R5 = 500 ohms
- R7, R9 = 50,000 ohms
- R8 = 5,000 ohms
- R10 = 5,000 ohms 2-watt, but see text.
- L1 = 12 turns at 12 t.p.i. on 1 1/4-in. diameter former, tapped 3 turns from earth end.
- L2 = 390  $\mu\text{H}$ , standard long-wave oscillator coil.
- Valves = 6J7G, 6K8G, Cossor S130 stabiliser.
- Crystal = 1,000 kc.

receiver may be dispensed with. If a superheterodyne receiver is being used, care must be taken to avoid spurious beats from its own local oscillator.

A graph should now be drawn on a fairly small scale, say one division per degree and one division per 10 kc, as this will be of great help in identifying the other beats heard in the oscillator 'phones. The oscillator tuning control is rotated and the readings at which beats occur recorded to the nearest 0.1 deg. It is advantageous to note the strength of the beats, since, in general, a weak note is obtained when the beat corresponds to a high harmonic. The frequencies at which beats occur can now be identified, remembering that a beat is obtained when a harmonic of the heterodyne oscillator is a whole number of megacycles.

In this way points are obtained at 7.00, 7.10, 7.15, 7.20, 7.25, 7.30, 7.33 mc and so on, corresponding respectively to the fundamental and the 10th, 8th, 5th, 4th, 10th, 3rd *et seq* harmonics of the heterodyne oscillator.

A series of graphs can now be drawn, taking one division per 0.1 deg. and one division per kilocycle, giving the final calibration of the wavemeter. A chart may also be constructed giving dial readings at 10 kc intervals. This is very useful for quick reference, when the approximate frequency is required.

The accuracy of the meter can be checked against WWV on 20 mc by setting the heterodyne oscillator at 7.333 mc, when its 3rd harmonic should

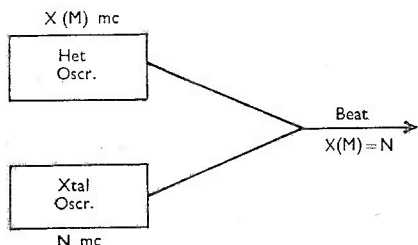
fall on 20 mc. At this setting a strong note should be heard in the wavemeter 'phones, since the crystal and heterodyne oscillators beat at this frequency.

### Method of Use

The wavemeter should be allowed to warm up for 30 minutes before being used and the zero checked. Thus a beat note should be heard in the 'phones at a crystal check point, where the reading should have been previously noted. If the beat is slightly off, it may be restored by rotation of the zero-set condenser C3. This adjustment should seldom be needed.

When it is desired to check the frequency of a transmitter, it should be loosely coupled into the output terminal of the wavemeter. The wavemeter tuning is then rotated until zero beat is obtained in the 'phones. Direct calibration can thus be obtained for a transmitter working in the 1.75, 3.5, 7, 14, 28 and 58 mc amateur bands. It may be convenient to switch off the crystal oscillator S1 when searching for the beat with the transmitter, but this should be switched on again for a check against the crystal when the beat has been obtained.

If a receiver is being calibrated, its aerial terminal is connected to the output socket of the oscillator. Beat notes will be heard in the receiver 'phones as the tuning is varied, and a series of points may be obtained.



Block diagram illustrating selection of the beat in the crystal-heterodyne frequency meter.

### QSL BUREAUX ADDRESSES

On page 621 of the December issue, we published an up-to-date address list of the QSL Bureaux of the world, so far as they are now functioning. The list is not yet quite complete because many countries are still in process of getting their QSL arrangements organised.

As more QSL Bureaux are established, we shall add to the list already published. In the meantime, keep that one for reference; it was printed to back on Calls Heard, which have only a temporary interest, to permit of cutting out.

# Crystal Grinding

## Some Useful Practical Information

By H. S. KING (G3ASE)

It is not intended to attempt to give a professional treatise on the finer arts of crystal grinding, but to provide a practical description of how the amateur may perform the business of altering crystal frequencies, easily and without special apparatus. There are many cases where grinding can transform a useless crystal into something really valuable working on the exact frequency required. This is particularly applicable to those Service crystals available which are far removed from the amateur bands.

Barring accidents, three things can be achieved by grinding, and these will be dealt with in order :

- (i) A crystal may be ground from some remote frequency to operate within an amateur band.
- (ii) A crystal already in an amateur band may be moved slightly higher in frequency to clear some form of permanent QRM.
- (iii) A poor, intermittent or completely dead crystal may be ground into life and its output improved.

### Grinding into a Band

To grind a crystal through several megacycles is the hardest job to tackle and requires care and faith, but not as much patience as some people imagine. The need for faith will become apparent later on !

Before commencing to grind a lot away from a crystal it pays to consider exactly what frequency is required. For instance, if it is desired to utilise a 3.8 mc crystal for 14 mc operation it is not necessary to grind to the 7 mc band when a 4.7 mc crystal in a tritet oscillator will do the job as well by extracting the third harmonic.

The apparatus required for grinding consists of a piece of glass of convenient size (preferably plate), a quantity of fine, dry carborundum powder and, if possible, some tripoli powder. Both these abrasives are rather difficult to obtain, and tripoli is possibly unobtainable. However, a substitute has been found in fine carborundum valve-grinding paste.

Place a small portion of carborundum on one corner of the glass plate and moisten the glass surface with water before commencing to rub the crystal in a circular

motion, allowing it to contact the powder occasionally, which will be forced between the glass and crystal and carried round with the movement. A large area of the glass should be covered to ensure that the glass wears away evenly and if much coarse grinding is done, the glass should be changed when suspected of considerable wear. As the going gets harder fresh drops of water must be applied. If possible, one side only of the crystal should be ground and one finger placed in the centre of the crystal during grinding so that a slightly concave surface results. After this treatment has lasted about three minutes the powder will have become much finer and until this stage is reached it is unusual for the crystal to oscillate. The powder when worn is valuable and should be kept for finer grinding, as a substitute for the tripoli powder. A separate piece of glass should be reserved for coarse grinding or alternatively, a large sheet may be employed, using sectors of different grades.

If tripoli is available, this should be used after every coarse application to ensure good oscillation ; failing tripoli of course the fine, worn carborundum must be used.

Unless a few megacycles are to be removed, heavy pressure is inadvisable, and in any case, gentle pressure only should be applied towards the end of each period prior to testing. To give an idea of the time required, a 3.8 mc crystal was ground to 4.7 mc in half-an-hour, including ten frequency checks. It is here that the faith factor comes into the picture. A crystal may be ground for a short time, checked, found all right, ground again, checked and found to be completely dead and still dead after two or three further attempts. The would-be crystal grinder naturally gets a bit downhearted and feels inclined to throw the whole thing up. This feeling must be overcome, because with a little perseverance, the crystal *will* "perk" again, perhaps better than before. In these cases "little and often" is the motto, trying coarse and fine powders with only gentle pressure for short periods, and with pressure confined to the crystal centre.

### Testing for Frequency

Obviously, an easily dismantled crystal holder is a decided asset when testing, and

it is often unnecessary to screw down the cover ; it can be held down with the hand, provided the cover is insulated or at earth potential.

Washing between grindings is not essential—a piece of damp cloth followed by the application of a dry one usually does the trick. It is advisable to have a check crystal handy, as if the oscillator fails a crystal may easily be ground beyond the required frequency, whilst the operator is under the impression that the crystal is at fault. Should a signal generator and valve-voltmeter be available, a very easy method of testing is to insert the crystal in series with the signal output and voltmeter terminals, when oscillation and frequency can be checked simultaneously. Strangely enough, after a careful steady grind the crystal is often stubborn, whereas a further nonchalant rub will result in a nice output.

Sometimes, after a long session the crystal faces may become uneven or out of parallel, in which case a micrometer is a valuable verification. However, without this instrument, all is not lost, for continued grinding, finger in the centre only and with light pressure, will usually restore oscillation. It does also seem possible to make the surfaces too smooth and thus to discourage the crystal ; in such a case the obvious thing is to apply some coarser powder. When the required frequency is reached and the output is up to expectations, a cleaning of crystal and holder in carbon tetrachloride should be given.

#### Moving within a Band

When it is required to change frequency by a small amount to avoid a bad spot of QRM, great care must be taken not to shoot out of the band or into worse QRM, especially on 7 mc. Absolute certainty that the QRM is bad and permanent is essential, as however carefully one goes it is so easy to land up in worse circumstances, as the writer has learned to his cost !

If the tripoli powder is available, it is generally safe to make just a few circular movements ; but even so, when it is a case of a move of a few cycles only, worn tripoli should be used. Where carborundum is employed it is best to use some of known capabilities, or else to wear some powder down specially with a piece of glass or a crystal known to be beyond hope of redemption. Remember that fine valve-grinding paste, as sold, is very coarse from the crystal's point of view. Experience will soon teach how to estimate the grade of powder, from the noise and feel as grinding is carried out.

It is difficult to estimate how much rubbing will be required to move a given distance, but in any case very light pressure only should be used on local changes.

#### Rejuvenating Crystals

A poor or non-oscillating crystal can sometimes be salvaged very easily. Any old crystal which is intermittent, does not oscillate, or only works very feebly should be given a few turns on fine powder and if unsuccessful, tried upon a coarser grain with the pressure applied in the middle to produce the concave surface.

Perhaps these notes will induce some readers to help fill up the wide open spaces on 1.7 and 28 mc ! At the moment, it appears that in the London area the 85 kc area below 1,800 kc is shared only by G3ASE and, of course, the inevitable BBC—although not this time as an intentional offender but an accidental harmonic. There is, however, plenty of space to be filled which, if only local contacts or tests are required, relieves the DX bands.

Finally, a word of caution : It is not sufficient to assume you are in the band just because amateur signals can be heard on either side of your frequency. Always have some other means of checking frequency, possibly from another known crystal. When a particular crystal is ground and finished, get it measured as a check for others.

#### THE AMATEUR BANDS

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

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

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

# Getting Out on One-Sixty

Matching Systems for the Marconi—Measuring Aerial Power

By E. J. JOHNSON, G2HR

Most amateurs begrudge no time or energy in putting up an aerial for the higher-frequency bands, and the majority are familiar with the operation and adjustment. But there is a widespread (and fallacious) belief that any old length of wire used in conjunction with some sort of coupling system that gives one a reasonable aerial current will suffice for the 1.7 mc band.

## Hertz v Marconi

The ideal aerial would be the Hertz; that is, a wire erected well in the clear, a definite number of half-waves long, and fed by one of the accepted methods. Few of us are fortunate enough to have the space for even one half-wave on the top band. One alternative is to erect a  $\frac{1}{4}$ -wave aerial, resonance being achieved by assuming the missing  $\frac{1}{4}$ -wave to be mirrored in the earth or counterpoise system. This is the Marconi aerial.

## Coupling Systems

Assuming in each case that the radiator is brought right down to the transmitter, the correct coupling system is indicated by the order of the base impedance. In the case of the Hertz it will probably be between 1000-2000 ohms; the base impedance of the Marconi, however, will be very much lower—30-40 ohms is quite a usual figure. The Hertz aerial, therefore, will call for a parallel-tuned circuit which has a high impedance at resonance: on the other hand, the Marconi needs a low impedance tuned circuit, or series tuning. In the latter case the aerial must be loaded a little beyond the  $\frac{1}{4}$ -wave position, resonance being restored with the series condenser.

The fundamental differences between the two types are shown in Fig. 1.

## Short Aerials

Most of us probably have to be satisfied with an aerial which is considerably shorter than the full  $\frac{1}{4}$ -wave. This is where the snags arise. The base impedance is certainly going to be an uncertain quantity. We obviously need a flexible transformer arrangement that will match our aerial impedance to the tuned circuit.

Fortunately we do not have to *know* the base impedance. We simply juggle about with our transformer ratio until maximum aerial current is obtained. One method is,

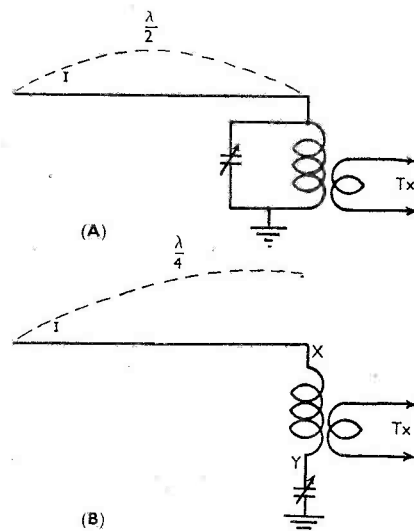


Fig. 1. Illustrating current distribution on a  $\frac{1}{4}$ -wave Hertz (A) and a  $\frac{1}{4}$ -wave Marconi (B). An ammeter at points X or Y should give a comparatively high current reading.

of course, to have a tapped parallel-tuned coil, choosing the tap which gives the highest radiation. Starting at the "hot" end, the ratio is 1:1. A centre-tap gives a 2:1 step down, or an impedance step-down of 4:1 (Fig. 2).

A much more flexible system is achieved by using an electrical tapping method, which gives much finer control than the more conventional type; this is shown in Fig. 3. For top-band use both condensers should be  $.0005 \mu\text{F}$ . When they are at the same capacity setting, an effective centre-tap is obtained. Increasing  $C_1$ —which will necessitate decreasing  $C_2$  to restore resonance—will result in moving the tap towards the "hot" end. By reversing the operation the tap can be shifted towards the "cold" end.

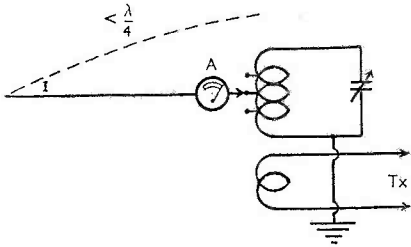


Fig. 2. Matching a 1-wave aerial by means of an auto-transformer (tapped coil). The tap and tuning should be adjusted till maximum current reading is obtained on ammeter A.

In the extreme position, with C2 at minimum, it will be seen that the tuned circuit is, in effect, series-tuned. The aerial, may, of course, be tapped direct on the the "hot" end to give parallel tuning, although the maximum tuning capacity will obviously be  $\cdot 00025 \mu\text{F}$ .

#### Misleading Readings.

When carrying out experiments as outlined above keep the aerial ammeter at the same point in the system. Whether in the aerial or counterpoise (or earth, if used) makes no difference. True it is that the readings will vary according to position, but it is important to have a fixed reference point when carrying out adjustments.

And don't worry if G2XYZ is getting a lot more aerial current than you are with the same 10 watts. His aerial may have a low radiation resistance, and a little mental arithmetic with "I<sup>2</sup>R" will show that his radiated power is no more than yours, and may even be less!

#### Measuring Aerial Power

The next thing one wants to know is the amount of power actually delivered to the aerial. It is generally conceded that the construction of a transmitter does not present undue difficulties to any experienced amateur. In other words, generating the RF is easy, but getting rid of it *via* the aerial is another story. It is no use having kilowatts of RF inside if you can't put it "up the spout."

As pointed out above, aerial current readings are useful for comparative purposes, but mean little unless one knows the impedance at the point of measurement. We are told that the base impedance of a Marconi aerial is about 40 ohms, for example. But one has a nasty suspicion that it will be far from the truth if one is unable to erect anything like a quarter-wave wire.

#### Measurement of Impedance

Once the impedance at the point of current measurement is known, you can then state unequivocally the power in the aerial from I<sup>2</sup>R. The simple method here described is not for various reasons absolutely accurate, but is certainly good enough for most amateur purposes. The measurement of 1.7 mc aerial impedance is taken as the example, as one does not normally have to contend with feeders on that band, and with the aeriels most likely to be encountered there will be a sizeable current at the station end.

#### Substitution Method

The transmitter is tuned in the usual manner and the aerial current noted. A *non-inductive* resistor with a value of the same order of the aerial impedance (see Fig. 4) is then switched in and the new aerial ammeter reading noted. Slight adjustment of the coupling link may be necessary to maintain the same input to the final stage. It is recommended that a thermo-couple meter be used in preference to the hot-wire type, which often has rather a high resistance.

#### Working Example

The writer's 1.7 mc transmitter is a plain KT66 crystal oscillator running to 25 mA at 400 volts. The input was carefully adjusted to this point and an aerial current of 0.36 amps. obtained. Upon switching in a carbon type resistor of 19 ohms, the current dropped to 0.28 amps. Thus, in the first instance, we have:

$$\frac{E}{Z} = \cdot 36$$

With the resistor in circuit this becomes:

$$\frac{E}{Z + R} = \cdot 28$$

Dividing one equation by the other we eliminate E and obtain our final equation:

$$\frac{\cdot 36}{\cdot 28} = \frac{19 + Z}{Z}$$

Transposing gives the value of Z, the aerial impedance, as approximately 66

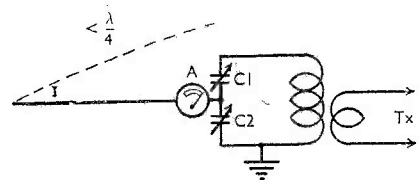


Fig. 3. Matching the aerial tap by means of the relative settings of two condensers. As in Fig. 2, the correct match is indicated by a maximum reading on ammeter A.



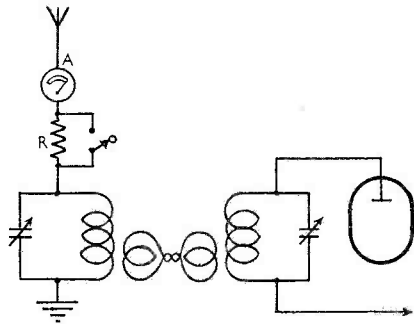


Fig. 4. Method used by G2HR to measure power delivered to the aerial. *R* is the non-inductive substitution resistor, and *A* should be a thermo-couple RF ammeter with a clearly-divided scale reading to 0.5 amps for 1.7 mc working.

ohms at the point of measurement. From  $I^2Z$ , using the values already found by experiment, the power in the aerial is 8.6 watts.

#### Interpretation of Result

This result must be interpreted with caution, bearing in mind that the aerial impedance is made up of ohmic loss and insulation losses, *plus* radiation resistance, the latter being the important factor from the standpoint of the power actually put out. Obviously, part of the 8.6 watts must go in losses. These are very largely under the operator's control, and with careful design should not represent more than a small fraction of the power in the aerial.

It is important, however, to distinguish between this and actual power radiated,

the measurement of which is an entirely different problem of some complexity. Whatever the aerial losses may be, the method described does at least show the *transfer efficiency* from last stage to aerial.

In the writer's case this would appear to be very high for a crystal oscillator. It is, nevertheless, the reward of many months' experiments with aerials, earths and counterpoises and, perhaps more important still, coupling systems.

#### Aerial Losses

The one aerial loss well under control of the operator is obviously ohmic loss, and there is no excuse if this is excessive. If a straight earth is employed time expended on it will be well repaid. Many of us, for domestic reasons, have to use a wire running down the fence which we describe confidently as a "counterpoise." More often than not this behaves simply as an extension of the aerial proper, which is thus being fed at a point at or near the centre.

A counterpoise, to act as such, should effectively shield the aerial from its ground projection. This can rarely be achieved in practice. But where space is no object, a fan of wires can be erected radiating in all directions and completely screening the aerial from earth. Ohmic loss, most of which normally occurs in the straight earth, is then reduced to a very low figure. Finally, if you feel you *have* reduced losses to a minimum, short the aerial ammeter once you have tuned your transmitter. A hot-wire instrument at full scale will often absorb something like 1 watt. In a low-power station this can be ill-afforded.

#### TIME MARCHES ON

In December, 1921, P. F. Godley, American 2ZE, sat in a tent up at Ardrossan in Scotland. He was there to listen for coded schedule transmissions from American amateurs on 200 metres. To cut a long story (told with verve in January *QST*) quite short, Godley logged 26—six of them using spark (one a pirate, 1AAW, never located, and actually the first to be heard!) and the remainder on CW. This was the birth of short wave radio and at the time was hailed as one of the advances of science—as indeed it was. A number of clever people had propounded sound theoretical arguments proving that waves as short as 200 metres would *never* give long-distance communication. Only 25 years ago—time marches on!

#### SO NOW YOU KNOW

We are frequently asked "Who really is G9BF?", or (more often) "Who writes that tosh?" or "Who does those clever cartoons?"

The drawings are by quite a young lady with (we think) a brilliant future as a cartooniste. The G9BF stories, such a they be, are laboriously ground out by a bald-headed old codger who, after about twenty years' solemn contemplation of the art and practice of Amateur Radio, now thinks he is beginning to see that it has a funny side.

And that's all we are going to tell anybody! In any case, the old codger is taking a rest for a bit.

# DX COMMENTARY

## ON CALLS HEARD, WORKED & QSL'd

Another month full of interest and good work. All bands open (or should we say full?), new stations appearing at the same steady rate, new DX turning up in all sorts of unlikely places, and complete and utter CW/Phone chaos. The mixture as before, in fact.

Correspondence on the latter subject has been quite heavy, and has a rather peculiar characteristic. This is that the CW fraternity persist in asking for "just a little band, preferably at the LF end" where they can be certain of being clear of 'phone; whereas the 'phone fraternity in general don't see why they should give up a solitary kilocycle anywhere. They, in fact, would like the whole band cleared of CW for evermore—in spite of the fact that the QRM would be much worse if all the CW turned into 'phone. But at this stage we are not trying to analyse the position—we just mention the phenomenon as a matter of interest.

One pertinent remark comes to hand from a well-known amateur who uses CW and 'phone in about equal proportions. He writes: "Keep my name out of this—I don't want thousands of rude letters—but have you noticed that CW operating is very good nowadays and that practically all the bad stuff comes out on 'phone? These new three-letter G-3's know how to operate, of course, and they constitute a large part of the CW brigade, but the old stagers are good, too, whereas the 'phone-hounds, even those who have been on long enough to know better, still break all the laws of operating. For instance, they sign off about four times with the same station, they give call-signs in the wrong order, they work multiple QSO's and rattle off all the calls so that no one knows who is speaking at the time, they dribble about 'Q R Mother' and '6 Victoria 6' until one wonders whether a mental home for worn-out amateurs would not be a better proposition than trying to run a station." Fightin' words! We don't go quite all the way, but we do agree that nothing has made Amateur Radio sound more ridiculous than this "Q R Madagascar" and "George Number Nine Zanzibar Pennsylvania" business. The high-spot was reached the other day

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

when we heard a chap go over and say "Oh Kilowatt, old man"! For the love of Pete, what *is* this—a nursery, a kindergarten or a grown-up hobby? We make no promises not to return to this subject . . . .

### 28 mc DX

High-spot of 28 mc does this month is G2CDI's 'phone WAC in 20 minutes. It took place, it is true, on December 18, but was too late to catch the last issue. Between 1242 and 1302 on that day, G2CDI (Stokenchurch, Bucks) worked HK3AB, SUIHF, VK3JD, W1CPI, VS9AR and G5DF, in that order. He has received all the cards, and they are reproduced herewith. G2CDI is claiming this as a world record; his transmitter runs 25 watts to an 807 doubler/final and a 3-element rotary. As he says himself, "We may as well claim the record for Great Britain . . . it will make some of the California Kilowatt and BC610 boys sit up and take notice." Very fine work, 'CDI, and also the score of 91 countries on 28 mc since mid-June.

Yet another claim from G2CDI concerns a duplex 'phone contact with VK2AHB on 28 mc. This may not be the first of its kind—but we rather think it is. The duplex was Q5 S8 both ways for 20 minutes, with (we hasten to add) the usual breaks for identification. G2CDI is one of the outstanding exponents of 28 mc, and spends many hours on the band.

G5LC (East Molesey) has started a new game. How many G's have worked another amateur with the same call-sign? He raised VK5LC in December. G2VV (Hampton) is going nicely from his new QTH, but still prefers gardening to Amateur Radio as a week-end hobby! He was trying to trace ZL2OQ, an old friend of his; found from ZL2SM that 'OQ was in Washington; got a message to him via W3KJJ, and found that ZL2OQ may be visiting England this year en route for New Zealand. This is the sort of thing that really does justice to the game—



Cards received by G2CDI (Stokenchurch, Bucks) for his record WAC on 28 mc. December 18, 1242-1302

finding someone by Amateur Radio and then getting to him by the same means.

G6BW (Churchill, Som.) now has QSL's for 101 countries on 'phone—very fine work. We were sorry to hear that he has been laid up, but is going on well again. A photograph of his station adorns these pages.

GM3ANV (Giffnock) is working hard on 28 mc but wants to know where all the W5's and W7's have gone. Well, they break through often enough down in Sussex, but Scotland is far enough away for conditions to be quite different. Personally, we find that when the W5's really burst out, there are very few other stations on the band—they have a species of "condx" all their own. We recently worked five of them in a row.

G6QB (Bexhill) has just had his 150th QSO with W6 on 28 mc. One of them recently suggested that he used fly-paper for his aerial. Quite untrue—it's No. 12 copper. Everyone seems to find a favourite spot for putting his signals; it does not always check up with the theoretical polar diagrams of the aerial system, either. Our own is certainly California; but we know people who find PY's or ZS's spring on out of a dead band every time they call CQ.

#### 14 mc DX

While 28 mc seems to have settled down as the reliable band for what we may call repetitive DX, 14 mc is still the happy hunting ground for new countries and rare museum pieces. G3BEV (Guildford) has worked HZ4EA in Mecca (QTH in box at end)—14 mc 'phone with 25 watts. G2HOS is active as VQ6HOS in Hargeisa, British Somaliland; the whole station runs off two six-volt accumulators driving a rotary and two vibrapacks! He wants more G QSO's.

G3AAK (Broad Hinton, Wilts) was licensed last July and has raised 81 countries since then. He must be unique in that his very first call put out after obtaining his licence brought back VE1PX! His aerial is a vertical 32-ft. rod, 70 ft. high at the top, and well out in the country, 600 ft. up. G3AAK says his main source of QRM is precipitation static during rain-storms. He also comments on the QSL situation; he has worked 50 Australians and only received two cards. In other respects his log of stations heard and worked reads rather like a call-book—and we have to thank him for several of this month's DX QTH's.

G2DZ (Daventry) is with the BBC but also wields an 813 on 14 mc. He, too, has winkled out some nice rare ones, and has

sent a most useful list of QTH's for us. Calls like PK4KS (Banka), ST2AM (Khartoum), VE8MF (Baffin), W7GOY/KL7 (Alaska), and so on occur through his letters just like punctuation marks. But he doesn't like the BBC QRM!

G6PJ (Sheffield) makes several interesting remarks and asks a few questions, too. He has heard J4AAB, who always seems to be working ZL's, and can't raise him; he has worked CR4XR (Cape Verde Is.)—a new one; HZ4EA has also come his way. On the other hand he would like details of TA6ST ("QTH Turkey, QSL OK"); of ZA2D (Albania); and of SU9SV, who would not give a QTH.

G5LH (Horbury) sends pictures of his old station (G5KZ) as it was in 1924. After a pause for sentimental tear-shedding he has to admit that he can still work things on 14 mc! He mentions good lunch-time contacts with VK, and W7 and VE7 from 1700 onwards. Two new ones (complete with QTH's) are VQ2HC and VQ4KTH.

### 7 mc DX

Rather ironical, but just as more and more stations were queuing up for this, the band deflated somewhat; towards the latter end of December it was very good indeed, but mid-January saw something of a reversal. However, the regular 7 mc stalwarts have done very well for themselves. G5GK (Burnley), for instance, is WAC and WBE already. He has worked all districts USA, plus VK, ZL, VE7, KL7, VU, CM, YI and ST2AM (Khartoum). G5GK says best time for Asiatic stuff is 1900-2300, and for W6, W7, VE7 and KL7, 0700-1000. He has heard VR4AA (Fiji), and that, as he says, is DX!

GW3ALE (Dinas Powis) worked the band during his Christmas leave with 25 watts, and raised W8, VE1, VE3 and ZL. G3AAE (Dunfermline), also in the RAF, tried out a QRP rig during his leave, and had every contact ruined by 'phone QRM. He is a band-planning fan from now on.

G5FA (New Southgate) sends a list of DX as long as your arm, and works every morning and evening exclusively on 7 mc. He only missed his W contact one morning in the whole month. G5DQ (Salisbury) claims first post-war QSO with ZS on 7 mc, having worked ZS1Y at 0900 in mid-December.

G5LI (Hampstead) reports a QSO with ZD3AF (Lagos) at 2200, and also mentions that ZL4GA is on the band every evening from 1900. In short, anything

can be worked on 7 mc now (when it is open) but local 'phone continues to be a most serious menace. We still hears 'phone stations 50 miles apart bemoaning the absence of DX; as they talk there is a ZS beating with one of them and a ZL calling CQ on the other. If only everyone had a receiver. . . . There used to be a saying, "May you work all you hear!" But the present-day one seems to be "It is more blessed to give than to receive."

Final note on 7 mc: an interesting new country is Estonia. UR2KAA is in Tallinn. Several of the stalwarts were worked him.

### 3.5 mc

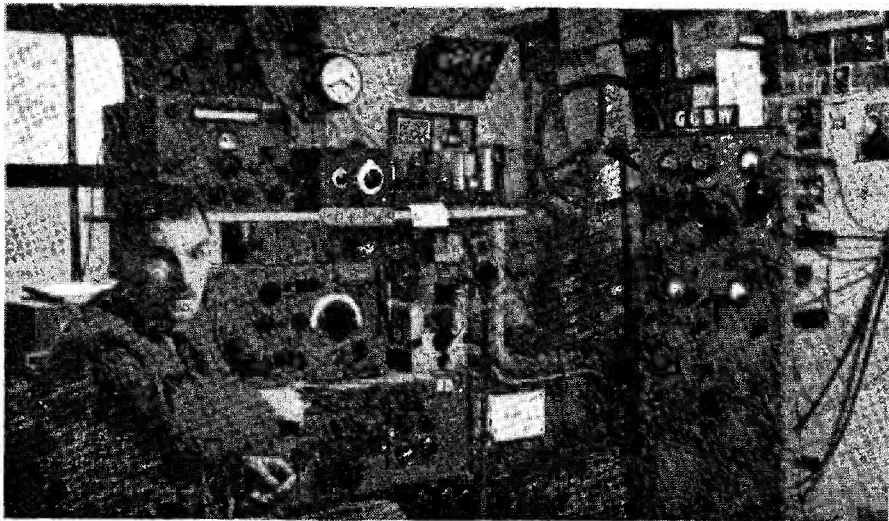
Real DX on this band is scarcer; conditions have been erratic even for semi-local work. VE1EP is on at 2330 every night, and SU1PF has been heard several times. G2FZO (Moreton-in-the-Marsh) suggests that a 3.5 mc Contest might arouse some real interest\*—he has worked W and VE on the band. G2AVW (Choppington, Northumberland) has also raised VE1RF, using only 15 watts, at 2315. G2SO (Leigh-on-Sea) would like details on YU1AK, ZA1AB and PA2X, all worked in addition to W's and VE's. Judging by some of these low-power results, some real DX ought to emerge on 3.5 if a few ZL's and VK's would start keeping a regular watch there. After all, it was done in 1924/5.

### Miscellany

Anyone ever worked New Caledonia? FK8VB is on 'phone, definitely on 28 mc and possibly on other bands too. He speaks with an Australian accent. G3AAU (Enfield) writes of the joys of CW and suggests that some of the QRO 'phone-merchants would get a much greater kick out of life doing a bit of QRP CW for a change. He also remarks that a little less power and a higher standard of operating would do much to clean up 7 mc.

G3CO (Plumstead) queries the status of Icelandic stations, and quotes a letter from a TF SWL in Reykjavik, who says "No Icelander has or ever had a transmitting licence. Those who were active before the war took a great personal risk and two of them had to pay dearly for it." But an Association has now been formed and there is a gleam of hope. G3CO also wants to know how to QSL to SP and OE stations, and points out that QSL's to

\* (A series of Contests is under consideration for this and other bands during the next twelve months.—Ed.)



General view of G6BW, Churchill, Somerset, a well-known DX operator who has topped the "100-worked" mark with 150 watts on 14 and 28 mc. The handwheel rotates the 10-metre beam, and the main receiver is a "special" with DB-20 pre-selector.

addresses given by YR amateurs in Roumania should not bear any call-sign or mention of radio on the envelope. . . . GW5YB (Bangor) sends some nice QTH's for the list. . . . G3AZL (Croydon) tells us how to get HB cards the following day. He worked HB9FK on 7 mc and met him at Croydon Airport next morning. QSL's were exchanged, and after a chat the HB took off with another load of passengers for Zurich. . . . G2FKS (Catford) has seen *Soviet Home Front*, published by the Society of Cultural Relations with the USSR, and it contains a description of Amateur Radio in Russia, with details of a world-wide DX Contest. G2NM (Bosham, Sussex) is working regular DX on 7 mc in the mornings, and has kept a long schedule with XON4AA on his yacht. The latter reports that Belgium is trying to run another International Cruise next summer, in which Amateur Radio will play a large part if René of ON4AA has anything to do with it!

G2FXH (Oswestry) makes a comment that NY4's in Cuba are counted by the ARRL as a country separate from CM/CO. NY4CM's QTH is in the list. G2FXH would like enlightenment on QBC4, who answered his CQ on 14 mc. . . . G3AFF (Portsmouth), commenting on ZB2A's attempts to hear G's on 1.7 mc, recalls that in 1943 he had some regular contacts between Hull and Gibraltar on about

1600 kc, period 2345-0015. He backs up GM3AJX's recent remarks about the sloppiness of amateur operating compared with the commercial variety, and adds that although strict discipline is the last thing needed, we ought to be able to eliminate this business of 25 CQ's and one sign. Also, as he says, when you are S9 both ways it is pointless to call and sign umpteen times. On 'phone, "a conversation which goes on for half-an-hour punctuated by 'er', 'now let me see' and the like, while the chap absolutely forces the other to listen while he invents bilge in order to prolong the agony, ought to be banned. And the lady who uses a mike while reclining in bed before 'dropping off' rather upsets my conception of a snappy contact." And do we agree with him!

The Hungarians are fully organised again, with their national society, MRRE ("Society of the Hungarian Shortwave Radioamateurs") re-formed. The QSL Bureau is working, and the manager is A. Sass, Dohány-u./c., Budapest, 5. D2KW (Hamburg) reports that they are trying to get a club going there, but it is rather difficult with so many of the local D2's away on duty and leave. They like to feel that the D2's are not a forgotten army, and are going to feed us with regular news and pictures.

G3AXU/XADZ points out that he is

*Transmitting readers are invited to send items for DX Commentary to L.H. Thomas, G6QB, "The Short Wave Magazine," 49 Victoria Street, London, S.W.1, to reach him as early as possible in the month. SWL reports are only included in DX Commentary if they are of direct interest to transmitters.*

given in the latest Call Book as the QSL Bureau for Italian stations. This is incorrect—he only operates for the XA stations, whether in Italy, Greece or Austria.

G3JU (ex-LI3JU) has left for Bahrein Island and during the next two years expects to be on 14 and 28, and possibly 7 mc as well, with about 50 watts CW; he will be CC at the LP end of each band, with a two-section W8JK aerial for 28 mc, beamed on this country. Though provisionally assigning himself VS8JU, he asks our advice on the prefix. It should be VU7—good luck, and we look forward to many contacts. . . . GC3GS (Jersey) mentions how signals on 7 mc build up to a high peak strength just as the band opens or closes, and then completely disappear, often in the middle of a transmission. This phenomenon is particularly noticeable as the W's go out in the early mornings.

#### Pirates

Piracy is coming nearer home! G6QB has received three cards for QSO's that he didn't make. If the party concerned would like to write with his full QTH, he shall have them. . . . G2AUB (Brighton) is receiving SWL reports on his 3.5 mc 'phone, but he is only licensed for CW. . . . G6MU (Tooting) has a pirate using his call, who operated with it right through the Magazine 1.7 Club Contest! Said station apparently uses about 200 watts on 1.7 mc.

#### The Month's Problem

A nearby station (call intentionally withheld) is not licensed for 'phone, and possesses neither microphone nor modulator. Yet he discovered accidentally that he could work another local station on 'phone. How was it done? Let us hasten to add that there was no trickery, such as using headphones in lieu of a mike, or anything of that kind. No prizes offered, but solution next month.

And that seems to be the lot this time. Acknowledgments and thanks to all who have written. Next month's dead-line for letters is February 12. Good hunting to you and remember the old motto—Keep it Clean!

#### DX QTH'S

AR1PC	Box 463, Damascus.
CN8BK	M. Lacaze, Rue Lebrun 57, Casablanca.
EK1AA	British G.P.O. 57, Tangier.
EL3A	Box 95, Monrovia, Liberia.
EP1C	R. Houseworth, W9SAJ/2, 5751 Winahickan Avenue, Philadelphia, Pa.
F7AE	M/Sgt. W. T. Dent, 1252 AAFBU, APO 194, P'master, U.S. Army.
HZ4EA	Box 812, Mecca, Arabia.
J3AAD	APO 301, c/o P'master, San Francisco.
LZ1XX	QSL via HB9CE (Station in Sofia)
NY4CM	U.S. Naval Base, Box 55, Guantanamo, Cuba.
OX3GE	APO 55, P'master, N.Y.C.
PK4KS	Pangkalpinang, Banka, Dutch East Indies.
PY7BC	Box 284, Fortaleza, Brazil.
PZ1G	Box 184, Paramaribo, Dutch Guiana.
ST2AM	Amateur Radio Club, R.A.F. Khartoum, Sudan.
T1NS	Signals Officer, R.A.F. Castelbenito, M.E.F.I.
VE8ME	157 St. James Street, Ottawa (Station in N.W.T.)
VO2AF	U.S. Naval Base, Argentina, Newfoundland.
VO2M	Cape Bonavista, Newfoundland.
VQ3HJP	H. F. J. Powell, Wireless Station, Dar-es-Salaam, Tanganyika.
VQ4KTH	Maj. J. L. Tanner, M.B.E., Box 4013, Nairobi, Kenya.
VQ5JTW	Govt. Radio Station, Entebbe, Uganda.
VQ6HOS	QSL to G2HOS, 46 Salisbury Road, Moseley, Birmingham.
VU2BN	Sgt. Smith, 4th Indian Div. Sigs., Poona, India Command.
W2CZ/KL7	C. A. A., Galena, Alaska.
W6VKV/I6	U.S. Army Radio Station, Asmara, Eritrea.
YI6T	R.A.F. Shaibah, British Forces in Iraq.
YV7AA	Luis Estaba Acuna, Cumena, Venezuela.
ZB1AC	Army Signals, Malta.
ZD4AB	T. F. Hall, Box 100, Koforidua, Gold Coast.



The card received by G8KP, Wakefield, Yorks, who was the only operator on either side of the Atlantic to raise the Super-Fortress "Pacusan Dreamboat" on a straight CQ. Every other amateur contact made was as the result of calling her. This card goes only to two G stations in confirmation of a two-way contact.

DX FORECAST FOR FEBRUARY 1947 (All times GMT)			
	7 mc	14 mc	28 mc
<b>NORTH AMERICA :</b>			
East and Central .. .. .	2230-0900	1200-0900	1130-1800
West Coast .. .. .	0700-1000	1600-2000	1600-1900
<b>CENTRAL AND SOUTH AMERICA :</b>	2300-0600	2100-0600	0900-2100
<b>AFRICA :</b>			
North of Cancer .. .. .	All day	All day	1000-1500
South of Cancer .. .. .	1800-2300	1500-2300	1000-2100
<b>ASIA :</b>			
West of 75°E. .. .. .	1700-2100	All day	0800-1100
East of 75°E. .. .. .	1900-2300	1300-1800	0900-1300
<b>OCEANIA :</b>			
VK, ZL .. .. .	{ 1900-2300	0800-1500	1030-1300
PK, KA, KG6, etc. .. .. .	{ 0800-1000	1300-1800	1000-1300
	?		

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

# CALLS HEARD

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

## 1.7 mc

Alois Weirauch, OK1AW, Mestec Kralove, Czechoslovakia.

**CW:** G2KO/A, 2CPT, 2FIX, 2NJ, 2YY, 3AGU, 3AUH, 3LF, 4GT, 6BQ, 6CT, 6KR, 8UL, D2CH. (Dec. 12-Jan. 5.)

C. D. Hammett, G3AWR, abroad s.s. "Alt" at Antwerp, Belgium.

G2AFM (55), 2AOA (44), 2BMP (44), 2AQH (56), 2FIX (33), 2FMM (55), 2FTM (57), 2HAO (44), 2HDT (55), 2HHV (55), 2IZ (55), 2NJ (44), 2SA (57), 2TZ (56), 3AHE (58), 3AHH (44), 3AHR (33), 3AJO (44), 3ALC (44), 3ANM (44), 3ARD (44), 3AUH (56), 3MD (55), 3TS (55), 3WP (55), 5FN (55), 5NB (44), 5SU (55), 5UB (56), 6BQ (57), 6DL (44), 6NU (56), 8JP (55), 8JR (44), GM2DRD (55), 6RI (56), G13JP (55). (Dec. 8-11: RS values in brackets.)

## 3.5 mc

Alois Weirauch, OK1AW, Mestec Kralove, Czechoslovakia.

G2BPW, 2HFO, 2LC, 2OR, 3AAB, 3AGU, 3AYO/A, 4HJ, 5FG, 6KP, 6ZO, GISUW, GM3RL, GW3ALV, SU1PF.

## 28 mc

R. Legge, 20 Beethoven Street, Binghamton, New York, U.S.A.

**'Phone:** D2CD, 2KW, G2CXQ, 2DWB, 2DYV, 2FFO, 2FUF, 2HFI, 3A0O, 3FT, 3GW, 3IO, 3ST, 3WW, 4BG, 4CI, 4GD, 4JZ, 4NT, 4PC, 4QG, 5AD, 6KM, 6OM, 6WK, 8JM, 8SK, GM4PW, 5ST, 8MJ, GWSVX, 6JW. (Receiver, SX-28A.)

## FIVE METRES

GSUS, Dunboyne, Frimley Surrey.

**Heard:** G2YL, 2MV, 2XC, 3VB/A, 4AJ, 5MA, 5TP, 6KB, 6OH, 6VA, 6VX, 8MG, 8SN, 8TS. (Rx: RF, Mixer, 2IF (Aerial:  $\frac{1}{2}$ -wave rotatable dipole).)

G4AJ, Beaurepaire Park, Basingstoke, Hants.

**Worked:** G2IQ (143), 3APY (125), 5BY (139), 5JU (78), 5MQ (164), 6CW (113), 6YQ (164), 6YU (78), 8UZ (125).

**Heard:** G3IS (73), 5BD (150), 5UI/A. (All between 1800-2330 January 19.) (Aerial: 4-element rotary.)

G6YU, 14 Bourne Road, Copsewood, Coventry.

**Worked:** G2AK, 2MR, 2XC, 3ABA, 3IS, 3PW, 4AJ, 4DN, 4IG, 4OS, 5BD, 5JU, 5LJ, 5MA, 6CW, 6GF, 6VA, 6VX, 6YQ, 8UZ, 8WL. **Heard:** G2YL. (All during December 15-January 18.)

G6CW, St. Ann's, Bramcote Lane, Wollaston, Notts.

**Worked:** G2IQ, 2YL, 2XC, 3PW, 4AJ, 4LU, 5BD, 5GX, 6GF, 6OS, 6YQ, 8MG. **Heard:** G8VN. (All during December 19-January 23.)

## QSL BUREAU RULES

- (1) Use of the Bureau is open only to readers who obtain either the *Short Wave Listener* or the *Short Wave Magazine* from us on direct subscription.
- (2) The Bureau can only handle cards for amateur stations and is prepared to accept them for amateurs throughout the world.
- (3) Cards should be forwarded to us in fully stamped envelopes addressed QSL Bureau, *The Short Wave Magazine*, 49 Victoria Street, London, S.W.1. The words "QSL Bureau" must appear in the address.
- (4) When sending the first batch of cards, enclose three stamped self-addressed envelopes of a suitable size for return QSL's.
- (5) All such return envelopes must be marked "QSL Bureau" in the top left-hand corner.
- (6) No communications of any kind, other than the cards, return envelopes and certain printed forms that will be supplied to users, should be contained in packets addressed to the QSL Bureau.
- (7) Cards inwards to the Bureau can be forwarded as frequently as may be desired. Cards outwards to Bureau users will be cleared fortnightly.

## MORE D2 STATISTICS

We hear from Capt. R. G. Shears, D2KW-G8KW, who is organising secretary for Amateur Radio in the British Zone of Germany, that 15 new D2 calls have been issued, making a total of 83. All call-signs in the D2 series are owned by British Service personnel, operating from Germany.

## VU2KL QSL's

G2HNC (ex-VU2KL), 8 Norbury Avenue, Bebington, Wirral, Cheshire, returned home suddenly from India and has many QSL's outstanding. Anyone who worked VU2KL, wants a card and has not yet received one, is asked to get in touch with G2HNC.



# First Class Operators' Club

## Progress Report—Second Membership List

The F.O.C. is now firmly on its feet, and steady progress is being made. If you are thinking of joining, look for a member on the air. They all sign "FOC" after the call, and Club periods (see Rules 5 and 6 p. 623, December) is the time to find them.

### Suggestions

That members keep the secretary supplied with news of their activities. Anything of particular interest will appear either in this space, or in the appropriate section of the *Magazine*.

That the Club considers circulating a letter budget. The secretary is prepared to organise this; let him know if you feel disposed to write a regular monthly letter.

The new Club note-heading is now available, in quarto size. Members who want some can apply to the secretary for an initial issue of 25 sheets; the only charge is 4d. for postage and stamps will do.

### Election Notice

In accordance with Rule 3, the following are declared active F.O.C. members on the current list:

A. D. Taylor, West Kirby (G8PG); W. Stirling, Ardrossan (GM6RV); and M. Geddes, Leigh-on-Sea (G2SO).

All correspondence regarding the F.O.C. should be directed to the honorary secretary-treasurer, Capt. A. M. H. Fergus, G2ZC, 89 West Street, Farnham, Surrey.

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## AMERICAN INTERNATIONAL CONTEST

This is the thirteenth in the series organised each year by the ARRL. Participants outside the U.S.A. and Canada allot themselves a 3-figure serial number and endeavour to work as many W's and VE's as they can, exchanging serial numbers and signal reports (RST for CW and QS for 'phone contacts). Each completed QSO counts three points. The same station may only be worked once on a particular band, but the contact can be repeated with both stations on a different band. All bands can be used. Cross-band working does not count at all.

The Contest is divided into two sections: CW only during the periods 0001 GMT February 15 to 2359 February 16, and 0001 GMT March 15 to 2359 March 16. That is, midnight on the Friday to midnight on the Sunday. The 'Phone periods are the same times February 22-23 and March 22-23. Stations may enter for both sections, but must work the method appropriate to each, i.e., CW/'Phone contacts do not count. The self-allotted serial number remains the same for CW and 'Phone sections (in the case of an operator entering both sections). This

serial is always sent *last* when exchanging reports.

In the case of a G station, the final score would be the total number of points (at 3 per completed contact) multiplied by the sum of the W/VE licensing areas worked on each band.

For example, over the two CW periods G2XYZ works eleven stations: Two W1's, and one W3 and W4, also a VE1 and VE2 on 14 mc; on 28 mc he works a W1, W5, W6, W7 and that VE2 again. His score is 33 points, with a multiplier of  $5 + 5 = 10$ , giving a final total of 330 points.

The periods do not count separately for scoring purposes, which means that a running log should be kept covering both periods in either section. The CW and 'Phone sections are, however, treated in effect as different contests.

If you are an ARRL member, you will know all about this Contest from January *QST*. If you are not, you have here the essential information for entering the Contest (for the fun of it) and we shall be glad to publish scores made accordingly in "DX Commentary" in the *Magazine*.

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*Mention the Magazine when writing to Advertisers—It Helps You,  
Helps Them and Helps Us*

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# Future Frequency Allocations

## Preliminary Proposals for the World Conference

*(The World Telecommunications Conference, at which the Amateur Bands will be finally settled for years to come, takes place this May at Miami and will probably last about four months. A preliminary Big Power conference was held last October in Moscow, mainly to discuss the most difficult problem the World Conference will have to face—frequency allocations as between all the services of every nation. Below are the proposals affecting amateurs which have emerged from these first discussions. After the Miami meeting, the decisions will have to be ratified and promulgated, so that we can expect to continue operating under the present allocations at least till the end of this year.—Ed.)*

From time to time during the past few months we have reminded readers of the imminence of the World Telecommunications Conference, at which will be decided (among many other important matters) the frequency bands to be allotted for future amateur operation.

The opening shots were fired last October at the preliminary meetings in Moscow. The Assistant Secretary to the American Radio Relay League (the American national amateur organisation) was attached as an official adviser to the American Government delegation to Moscow. As such, he was the only Amateur Radio representative to attend the conference.

His report on the proceedings as affecting amateurs appears in the January issue of *QST*, and is summarised here. Note that at this stage these are proposals only. The final decisions on amateur frequencies to be reached at the later World Conference may be either more or less favourable.

But what this summary does indicate is that the American authorities are by far the most considerate of all Governments towards the requirements of amateurs. The Americans are, in fact, reported to be prepared to stand firm on the allocations they propose.

By comparison, the British suggestions in regard to amateurs do not augur well for the final outcome on the European side. In particular, the fact that the British official proposals envisage the continuance of broadcasting in our 7 mc band, the narrowing of 3.5 mc to an exclusive 100 kc (with the remaining 300 kc shared between reduced-power amateurs and a variety of other services) and the indecision as to allocations between 23 and 100 mc, are likely to prove serious obstacles unless these views are considerably modified.

## SUMMARY OF PROPOSALS

### 1.7 mc, 1715-2000 kc

America : No allocation for amateurs.

Britain : 1715-1950 kc for amateurs, shared as at present with marine stations ; 1950-2000 kc, shared with navigation aids, i.e., Loran.

France : No proposal for amateurs.

U.S.S.R. : 1715-2000 kc for amateurs, on present shared basis.

### 3.5 mc, 3500-4000 kc

America : Whole band exclusively for amateurs.

Britain : 3500-3600 kc exclusively for amateurs ; 3600-3900 kc shared between amateurs and a variety of other services, including aeronautical aids and "tropical broadcasting."

France : 3500-3600 kc exclusively for amateurs ; 3600-3900 kc shared between amateurs and "medium power" services.

U.S.S.R. : No allocation for amateurs.

### 7 mc, 7000-7300 kc

America : Whole band exclusively for amateurs.

Britain : 7000-7200 kc exclusively for amateurs ; 7200-7300 kc shared with high-power broadcast.

France : 7000-7200 kc for amateurs exclusively ; 7200-7300 for broadcasting only.

U.S.S.R. : 7000-7200 kc shared between amateurs and fixed services ; 7200-7300 to broadcasting exclusively.

### 14 mc, 14000-14400 kc

America : Whole band exclusively for amateurs.

Britain : 14000-14350 kc exclusively for amateurs ; 14350-14400 kc shared between amateurs and broadcasting.

France : Whole band exclusively for amateurs.

U.S.S.R. : Band to be shared between amateurs and fixed services.

### 21 mc, 21000-21500 kc

America : New band proposed for amateurs exclusively.

Britain : No proposal for amateurs, but to be further considered ; any compromise to be contingent upon adjustment of broadcasting frequencies.

France : 21100-21450 kc exclusively for amateurs.

U.S.S.R. : 21100-21450 kc exclusively for amateurs.

**28 mc, 28000-30000 kc**

America : 28000-29700 kc exclusively for amateurs.

Britain : All amateur allocations above 23 mc provisional only, but prepared to continue full width *pro tem*, pending further consideration.

France : Whole band exclusively for amateurs.

U.S.S.R. : Whole band exclusively for amateurs.

**Above 28 mc**

America : Exclusive amateur bands 40-44, 144-148, 1145-1245, 2500-2700, 5250-5650, 10000-10500 and 21000-22000 mc.

Britain : 66.4-67.4 mc provisionally, 166-170 mc shared and 420-450 mc shared. Above 1000 mc : 1215-1295, 1345-1425, 2300-2450, 3400-3600 (shared), 5650-5850 and 10000-10500 mc.

France : 58.5-60 mc for amateurs exclusively.

U.S.S.R. : Proposals similar to America.

## Propagation on Five

### Contesting the Russell Theory

By E. J. WILLIAMS, B.Sc. (G2XC) and D. W. HEIGHTMAN, A.M.B.I.R.E. (G6DH)

*(Arising from the article "Short Skip on Five Metres" in the January issue, our contributors challenge O. J. Russell's theory. They argue that his analysis is unsound and that 58 mc medium-distance propagation as experienced in these latitudes can be explained by weather effects.—Ed.)*

We feel that the article "Short Skip on Five Metres," by O. J. Russell, B.Sc., A.Inst.P., in the *Short Wave Magazine* for January, 1947, calls for comment.

#### The Analysis

The method employed by Mr. Russell for analysing the distances over which contacts are most frequent is open to much criticism. It would appear that the author lacks personal experience of five-metre work, for only a few weeks' listening on the band would surely show that his method of attempting to eliminate false figures by permitting only one contact per pair of stations per month will, in effect, produce just what he is trying to avoid.

A simple example will suffice to show this. During the recent Contest G6CW at 146 miles was heard in Portsmouth on four occasions only, and then at very weak strength, and with much fading, while G6VX at 60 miles, was audible nightly at great strength and with little or no fading. If both of these are to count as just one reception report, then propagation over the 146-mile path appears to be as easy to obtain as that over the 60-mile path. To suggest equal reliability over these two paths must appear absurd to any regular five-metre worker, and it was presumably with this in mind that the scoring rules for the Contest were drawn up. The opening paragraphs of "Five metres" for January, 1947, support this contention.

A close study of the graphs and the text of Mr. Russell's article reveals some queer anomalies. The text, in explaining the construction of the graphs, states that the ranges are divided into ten-mile portions. This should produce six points on the graph between 60 and 120 miles, yet an examination of the graph for August, 1946, shows at least 11 points in this range ! In a further attempt to clarify the graphs it was decided to analyse the data for August ourselves. With some surprise we arrived at the graph shown in the accompanying diagram. Although there are one or two points of resemblance to the graph drawn by Mr. Russell, there are some notable discrepancies. The 135-mile peak is nowhere near as pronounced, and, in fact, is dwarfed by one at 115 miles, while a peak at 175 miles is followed by eight reception reports over distances of 180 to 210 miles, none of which are recorded in the original graph. So that there can be no doubt on this point, we give details of these contacts, all of which are logged in the August issue of the *Short Wave Magazine* : G4OS and G5TX (186 miles), G6YQ and G6VX (185 miles), G6YQ and G5TX (198 miles), and reception of G6YQ at G2XC (190 miles) and of G2XC at G4OS (180 miles). This would suggest that the reliability of these graphs, upon which a theory has been built, is in doubt.

However, both the original graphs and our own do show peaks which illustrate quite well the point made above; that this

method of analysis does not provide a fair representation of propagation conditions over varying distances, for it is absurd to suggest, as the curve herewith does, that propagation is easier and more consistent over a 175-mile path than a 65-mile path.

### Peaks Geographical

To what, then, are these peaks due? We would agree with Mr. Russell that a stable phenomenon is responsible, but propagation over distances in excess of 60 miles on a five-metre wavelength is a most unstable phenomenon—as he would know if he had listened at all regularly—and it is elsewhere we must look for our answer.

The writers would suggest that this stable phenomenon is none other than the distances separating the main centres of five-metre activity in this country.

The south Lancashire stations are 170 to 180 miles from the south London group, while Birmingham is 110 miles from the same area and 120 to 130 from the Portsmouth and Isle of Wight stations. Other similar examples can be found, and since there are large areas of England where there is no regular activity on the band, certain distances will naturally predominate every month, and it will be a matter of surprise if the graphs do *not* show these peaks.

While appreciating the work done by the *Short Wave Magazine* in encouraging activity on five metres, and in reporting the outstanding achievements on the band over a long period, we must point out that only a small percentage of the *total* activity can be recorded in each month's issue, for space would not permit anything like a complete log; hence, the analysis of conditions is being based on incomplete information.

### The Low-level Layer

The next matter which we feel bound to criticise is the suggested ionised layer at five to ten miles. The lowest layer generally agreed to be regularly present in the atmosphere is the D-layer, at about 40 miles. This, however, disappears at night as, at the comparatively high molecular density at this altitude, recombination of the ions is rapid as soon as the ionising agent (in this case, the sun) is removed. Even during daylight this layer is of insufficient intensity to reflect radio signals, but only causes absorption. Hence, to obtain a layer at even lower heights which could maintain an intense ionisation at night (when most of the five-metre medium distance contacts have been made) would call for a strong ionising agent other than the sun.

Further consideration of such a layer shows that for propagation over a 60-mile path and a layer height of five miles (as suggested) the vertical angle of radiation required would be approximately 9 deg. and this would also be (to a close approximation) the angle between the incident ray and the layer surface. This is not grazing incidence and would call for an extremely sharp boundary and/or a high degree of ionisation if effective reflection was to be obtained.

It is pertinent to enquire what happens to the radiation at lower angles, which should approach a more nearly grazing incidence on the layer and give more effective transmission over gradually increasing distances up to 400 miles? It is, in fact, difficult to see how a layer at such a height could produce a 60-mile skip. A height of 500 feet would be required to do this. It is considered very unlikely that a highly-ionised layer could have escaped detection at such a height.

### Troposphere Theory

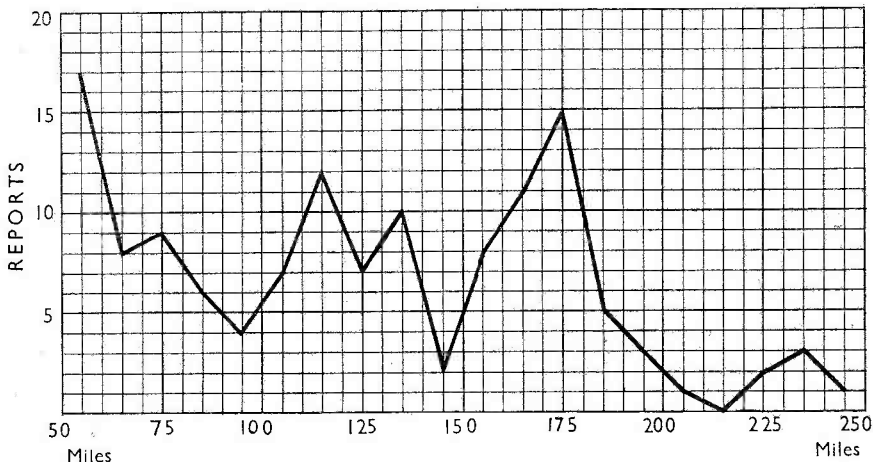
Having offered the above criticisms, it is thought desirable to draw attention to the fact that propagation of the type under review has been shown by the writers, and other workers, to be due to discontinuities in the troposphere brought about by varying weather conditions. Both experimental and theoretical proofs have been given and the facts can be summarised as follows:—

(a) It is a fundamental fact that an electro-magnetic wave passing through regions of varying dielectric constant is reflected and/or refracted by an amount dependent on the rate of change of dielectric constant and the angle of incidence of the wave.

(b) In the troposphere, variations of dielectric constant with height occur at varying rates dependent chiefly on temperature, pressure and humidity, which, in turn, depend on the prevailing weather.

(c) Best conditions for tropospheric propagation occur when there is a sharp boundary in the humidity and/or temperature of adjacent air masses at comparatively low heights of a few thousand feet (generally less than 3,000 feet), i.e., the humidity drops very suddenly or the temperature rises with increase of height (temperature inversion). This results in an abnormally rapid decrease in the dielectric constant, bringing about partial reflection of waves at sufficiently low angles of incidence. Total reflection may occur in extreme cases.

(d) The mechanism of propagation is



Curve drawn by the authors from the results given in "Five Metres" in the August, 1946, issue. Compare this with Fig. 1 on p. 671 of the January issue.

probably partial refraction of the wave in the very low atmosphere (i.e., below the discontinuity) where the change in dielectric constant is not so rapid, followed by still greater refraction as the wave enters the region of the discontinuity; this brings the wave to a sufficient grazing incidence for effective reflection as it progresses further through the region. This region may vary from a thickness of a hundred feet or so to one or two thousand feet and the conditions produced will depend on this thickness as well as the steepness of the dielectric constant gradient and the height of the region above ground. A low level discontinuity will produce more effective reflection but will reduce the range obtainable.

(e) From a knowledge of existing weather conditions it is possible accurately to forecast the probability of good or bad conditions.

(f) Since a requirement for best conditions is high ground humidity and because absolute humidity is dependent on temperature, warmer months or climates will normally provide better tropospheric conditions than cold ones.

### Ducting

Whilst writing, we would like to point out that we do not consider "ducting" to be the correct term for propagation of this type.\* "Tropospheric propagation" is definitely the preferable classification and the one we would like to see used exclusively.

Ducts, such as those described by some workers, do not appear to occur over this country sufficiently frequently to explain the conditions so often experienced on five metres. These ducts are usually described as starting at or very near the ground and having an upper boundary at a thousand or so feet. When temperature inversions occur within these limits, the accompanying humidity usually shows an increase with height and in consequence the dielectric constant instead of failing more rapidly falls more slowly and results in less refraction than normal.

Further, calculations made by the writers show that the rate of fall of dielectric constant is very seldom sufficient to cause a wave to bend round the earth's curvature by refraction alone, and that would appear to be an essential part of the mechanism of ducting.

Finally, we should like to suggest that any workers on five metres who are in any doubt about the causes of medium distance propagation, should obtain the Upper Air Section of the "Daily Weather Report of the Meteorological Office, London," from the Air Ministry and compare the weather data contained therein with their own observations on the five-metre band.

It is highly unlikely that they will find it necessary to evolve any new theories.

\* The expressive term "ducting" began to be used about 1943, when the medium-distance propagation of 1½-metre waves was explained as being due to temperature inversion. It is the accepted term in such literature on the subject as now exists.—Ed.)

# READERS' *half-guinea* IDEAS

*Slow-Motion Drive—S-Meter for the R.1155  
—W3EDP Coupling on 1.7 mc—Receiver  
Muting—Rectifier Delayed Switching*

(These are all good ones. We pay 10s. 6d. for any ideas published. Let us see yours.—Ed.)

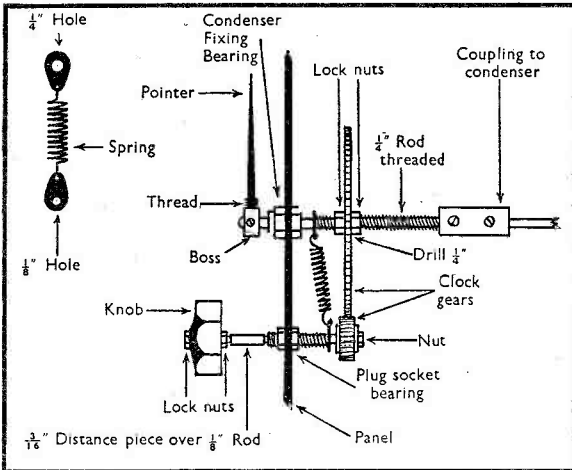


Fig. 1. Slow-motion drive devised by N. Woodbridge, using pinions from the gear-train of an old clock. The tension spring, to keep the gears closely in mesh, is an essential feature.

### Slow-Motion Drive

The sketch (Fig. 1) is almost self-explanatory. The drive unit is made up from old clock gears, which are spring-loaded to give positive control with-

out back-lash. The bearings are condenser bushes of the type taking a standard spindle and having a collar and locking nut.—From N. Woodbridge. Hope Cove, Fox Lane South, Chersey, Surrey.

### S-Meter for the R.1155

Fig. 2 shows the circuit. The resistor and earth connection are removed from the cathode pin of the first IF valve, and both are taken to the other earth connection on the holder of the same valve. The meter, which can be an 0.5 mA

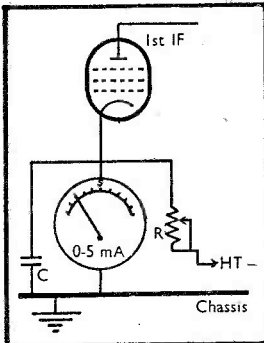


Fig. 2. Method adopted by G2TG to fit an S-meter to the R.A.F. R.1155. An 0.5 mA meter is inserted in series with the cathode of the first IF stage, by-passed with a .01  $\mu$ F condenser C. The meter is balanced by resistor R, which can be the meter amplitude potentiometer as fitted to the receiver.

movement, is then wired in as shown, the meter amplitude potentiometer on the R.1155 being used as a balance potentiometer. When balancing the meter, remove the aerial and detune the receiver.—From W. Stockburn, G2TG, 40 Netherburn Road, Sunderland, Co. Durham.

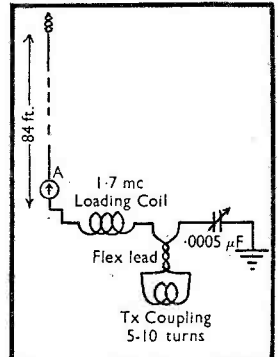


Fig. 3. G6QM's method of coupling the "W3EDP aerial" for 1.7 mc operation. Part of the loading inductance is taken back to the transmitter tank through a flex feed. The coil marked "Tx coupling" can be presented either to the cold side of a single-ended PA or the centre of a split plate output circuit. The series condenser is adjusted for maximum RF current in the aerial ammeter A.

### Coupling the W3EDP

The sketch at Fig. 3 shows the method evolved to couple the W3EDP on 1.7 mc. No swinging link or other similar arrangement is necessary. Just take a few turns off the loading coil and couple them back to the transmitter tank through a flex feed line. The aerial is tuned up in the usual way.—From A. Mathews, G6QM, 74 Hawthorn Road, Hornsey, London, N.8.

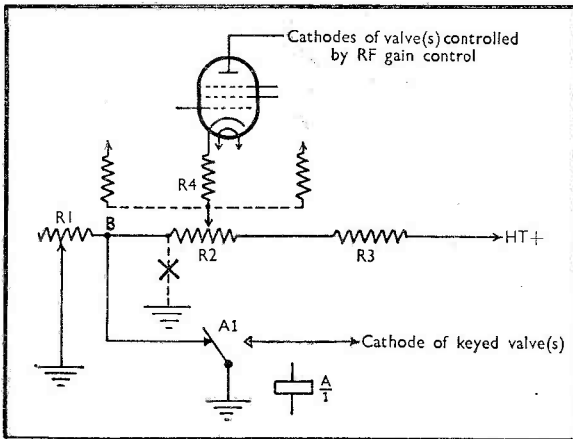


Fig. 4. G3AVI's muting circuit, applicable to any receiver employing a similar system of RF gain control. The note on the plate lead in this drawing should be read as applying to the resistors in parallel with R4.

**Receiver Muting**

This system of muting (see Fig. 4) is applicable to all receivers employing the circuit of R2, R3, R4, for RF gain control.

Normally, one end of R2 will be earthed. This must be disconnected from chassis and a potentiometer R1 fitted as shown. The value should be the same as that of R2. A change-over relay is employed, and when this is in the "normal" position, point B is earthed and the RF gain R2 operated in the usual way. When the relay is actuated, the receiver contacts are opened and extra bias is applied to the cathode(s). This extra bias voltage can be adjusted on R1 from nil to a value which will make the receiver absolutely dead. The advantages of the system are :

- (a) The receiver mutes before the transmitter comes on.
- (b) One can monitor when working single-channel, the signal being adjusted on R1 for comfortable strength with the key down. The writer works BKS in comfort with this arrangement.

(c) The system is practically clickless; if trouble is experienced, a little experiment with condensers across the contacts will cure it.—From C. S. Francis, G3AVI, Wessex, Thornton Hough, Wirral, Cheshire.

**Rectifier Delayed Switching**

When in regular use, mercury vapour rectifiers require a certain minimum time to heat up. If HT is applied

before this, the valves will be damaged. While it is possible to employ a manually-operated HT on-off switch and to rely on being careful, an automatic switching method is far preferable.

Fig. 5 shows the circuit of a simple arrangement. An under-run diode V controls a relay which switches HT primary. Any IH valve will do, with the electrodes strapped to give diode operation. The valve must not, however, be run from the rectifier LT supply, as the heater-cathode insulation cannot be expected to withstand high voltage. If the PA bias from the Tx end is used as the source of supply for the relay, HT cannot be applied to the PA if the bias is disconnected.

Using a 6J5 for V, with the grid tied to the cathode (not to the anode as shown), a delay of 45 seconds was obtained with 3.15 volts on the heater.—From J. B. Roscoe, G4QK, Springdale, Woburn Sands, Bleichley, Bucks.

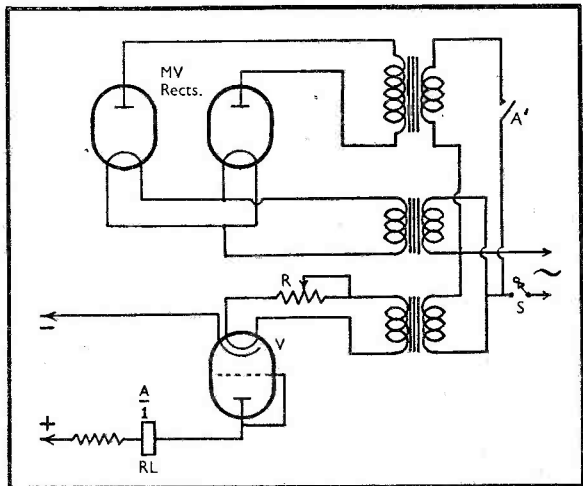


Fig. 5. G4QK's safety delay circuit for a power supply unit using mercury-vapour rectifiers. Switch S first brings up heaters only; when the diode V becomes conducting, relay RL closes contact A1 and HT is applied to the rectifiers. A delay of at least 30 secs. can be obtained by limiting the diode heater voltage with a suitable series resistor. V must not draw its LT from the rectifier winding, as its heater-cathode insulation would not withstand the HT voltage.

Read the Magazine regularly

# Amateur Procedure

## Note for Exempted G3's

By THE OLD TIMER

*(Many new transmitters are ex-Service personnel with no pre-war experience of Amateur Radio. Though much about how to operate the station can be learnt over the air, we asked "Old Timer" to produce something to help them before they start transmission. Here it is.—Ed.)*

NOW that the ranks of the amateur fraternity are being increased by enthusiasts fresh from the Services who have had no previous experience of Amateur Radio, the question of amateur procedure—or lack of procedure—is becoming important. This article is written, in fact, at the request of readers who have acquired three-letter call-signs prefixed G3—those who come into the category mentioned. In many cases, they have been infected with the well-known amateur "bug" through prolonged service with pre-war amateurs, and also, latterly, through seeing Amateur Radio at work in the Services. They have been used to Service operating, and are, by virtue of their trades, exempted from both the technical examination and the Morse test.

They are in the unique position of being free to build and operate an amateur station from scratch without having graduated through the preliminary stages of becoming an amateur—a state of affairs without parallel in our annals.

Now, there is not the least intention of preaching at these newcomers, who are just as welcome as the more experienced beginners. Left to themselves, they would probably behave better on the bands than a good many operators we hear on the air every day! But they have joined a new Club, so to speak, and they themselves want to know what is done and what is not.

### Amateur Procedure

There really *is* such a thing as "amateur procedure." It may be a bit loose

and vague, but it has established itself on a very wide international basis and over many years has not changed much. We could all criticise it and suggest what we think might be improvements, but there it is—it is traditional, for better or worse, and a handful of members cannot alter the rules of a club with a membership of many tens of thousands..

Compared with the slick "procedure" (official word!) of some branches of the Services, amateur "behaviour" probably seems sloppy. But we do not want military discipline in Amateur Radio, and if we had it—well, we can pass over that, perhaps. So let us consider CW procedure, which the 3-letter G3's and other newcomers will be interested in for quite a time.

It all starts with someone calling CQ—not you, perhaps, but if you are going to call another station you will have to find someone sending a CQ. If he is a good amateur he will be sending "CQ CQ CQ de G3HAM G3HAM G3HAM" and repeating the whole thing three, four or five times. This is how a CQ *should* be put out. You will hear certain operators (rarely British) sending CQ *ad lib* until you have not the patience to listen any longer, and you probably never get their call-sign at all. Remember, "CQ" itself tells nobody anything—it is the call-sign that contains the information. So "three times three" is a good rule. If it seems a little short, or if no one comes back, then you can do it again. Send firmly and not too fast, and you will have someone back all right, if the



transmitter is doing its stuff. (If it is not, remember, no sort of a call will improve your chances!)

### Working the Contact

Right! You have heard an exemplary three-times-three CQ call from G3HAM, and so you reply. Now here the three-times-three is not so good, because by the time you have sent his call three times and come to your own, he will probably be on his way round the band, and hearing your call-sign, which will mean nothing to him, G3HAM proceeds past you until he hears "G3HAM" coming from someone. My own rule is to call the other man ten times (sometimes extended to twelve for DX) and to sign very clearly three times. So your call will sound like this: "G3HAM (ten times) de G3XXX (three times) AR K." Yes, AR means "end of message" and K "please transmit"—just as they should. This call will take you just over a minute, if you send no faster than 12 or 15 wpm, and you will go over hopefully to G3HAM's frequency. And there he is, for the purposes of argument, coming along with "G3XXX (three times) de G3HAM (three times) . . . rr OK ge om tnx for call—ur rst 579 hr in London—pse hw?—G3XXX de G3HAM ar k."

Now, does that shake you? Perhaps not. If it does, it need not. The translation is "Received OK; good evening, old man; thanks for call; your signals are R (readability) 5, S (strength) 7, T (tone) 9 here in London. Please how am I doing? Go ahead." The RST Code, introduced some years before the war, is now definitely accepted all over the world, and is a most useful abbreviated form of report.

That reply, please note, told you what you wanted to know and wasted no time. And there is something to be learned from that, for it is an excellent scheme to go back to the other fellow with nothing but his report and your location (both of which he sadly wants to know) before going on with any chat. Likewise it gives him

a chance to come back with your report before you really get under way, and you will know how fast to send, and so on. So back you go to him with a similar text—say thank you, as you should, give him his report and your location and then start your chat. Someone's got to start it! So off you go now: "G3HAM (three times) de G3XXX (three times)—rr OK ge om—tnx for rept—gld QSO—ur sigs also rst 579 hr in Bristol—hr using 25 watts with VFO es half-wave antenna—etc., etc." to the usual ending.

### Abbreviations

Only two things need explaining there—"QSO" as used by amateurs simply mean "a contact." "Gld QSO" means "glad to work you." The other one—sent "es"—is the American Morse abbreviation for "and." It saves time and everyone knows it. The standard abbreviations—"rpt" for "report" and "condx" for "conditions," and "wx" for "weather," and so on, are all pretty obvious and do not need listing. One or two of the more mystifying, like "bcnu" for "be seeing you" might need a bit of thought, but they're no harder than crossword puzzles! "Cuagn" is obvious, and I think everyone knows "73" for "best regards." But please note that if you are the type that sends "Best 73's" you are sending, literally, "Best best regards's"—so please don't! It means nothing and it wastes dots and dashes.

At one time the Services were somewhat derisive of the amateur's interpretation of the standard Q Code. But they have used it for so long now that every amateur the world over, *irrespective of language or nationality*, knows what they mean in amateur parlance, and that meaning is not so far removed from their official meaning, which, in many cases, would not make sense for amateur use anyway.

### Rubber-Stamp QSO's

Now all QSO's (let's use the code!) can be of two kinds—the chatty, friendly one as between one old amateur and another, or the "rubber-

stamp" variety. There are many of the latter, especially when the DX is rolling in; indeed, it would be selfish to monopolise a rare DX station for a long chat when lots of others are queuing up for him. But even "rubber-stamp" QSO's need not become a mere formality. An average one, between two stations whom, for brevity, we will call "A" and "B" would go like this:

(i) A calls CQ; (ii) B replies; (iii) A replies to B (who is a lucky fellow!) with report and QRA; (iv) B replies to A with report and QRA and perhaps a few odd remarks about conditions, input, etc. (v) A replies likewise and says (*toujours la politesse!*) "Mustn't keep you now so 73 and DX and hope cuagn; will QSL." (This really means "You had better not keep me—I want some more DX"—but they both know that and nobody worries). (vi) B replies with "Thanks for QSO, cuagn, OK about QSL, 73 VA." And then probably B, not wasting time, goes straight on with "QRZ? QRZ? QRZ?" and his call-sign, in case someone else has been sitting and waiting for him. This saves another CQ and does no harm, anyway.

A rubber-stamp QSO conducted with all politeness may be over in less than ten minutes. Some old-timers rave about the habit, but, after all, more and more amateurs are coming on the air every day, and if it is DX contacts you want, then you should be thankful that there *are* so many rubber-stampers—they all save congestion on the bands.

### The Other Kind

Of course, I need give no rules for a QSO of the other variety—simply chat away for all you are worth. But I might add that when you really get to know another amateur by this means, and finding him on again, repeat the dose, you will have made a genuine friendship over the air. This is the real stuff of Amateur Radio, rather than the slickest possible exchange of reports and promises of QSL's. Two old-timers doing the "dear old pals" act over the air really do enjoy themselves; I myself have just had a few

contacts with DX stations that I remember well, but have not worked for ten, fifteen or twenty years, and we have fairly fallen on each other's necks—if you can imagine that in Morse!

### Reporting

Make your RST reports *mean* something—be candid. If the other fellow is T7, you are not doing him a good turn by pretending that he is T9—so tell him so. And do not forget that R5 does not necessarily imply strong signals—simply 100 per cent. readable. A station can be RST 539 or RST 359; in fact, I had to give a DX station RST 189 on one occasion on account of echo, flutter-fading and QRM.

As far as Morse operation goes, do not show off by sending fast until the other chap asks you to do so. Good "solid sending"—you will know what that means—gets through every time. Some of these chaps who let themselves loose on bug-keys before they can operate them properly sound very impressive and alarming when calling CQ, and then break up into small pieces when it comes to transmitting text! And the amateur who sends fast but repeats each word twice is just devoid of common sense. That is another point—do not send "doubles" unless you are asked for them (QSZ); remember that it doubles the QRM, as far as someone else is concerned.

Lend a helping hand when the other fellow is obviously not so hot on the key; he will learn, and his speed will improve, if enough people give him a chance. But if you work anyone whose sending is downright bad, tell him so—otherwise he probably will not learn.

In short, try to co-operate. Amateur radio should be more co-operational than competitive. You may be the type who wants to shine over everyone else; you can do that by making your station a model of how to operate, without treading everyone else down all over the place. Consideration and politeness on the air cost nothing and use up no watts; and they are going to be much needed in the days to come.



## The other man's station G3NQ

These are photographs of G3NQ, owned and operated by W. J. Barker, Woodside, Radfall Hill, Chestfield, Nr. Whitstable, Kent. Another view appeared in "DX Commentary" in the December issue. G3NQ is active on all bands 1.7 to 14 mc, and his equipment is most complete.

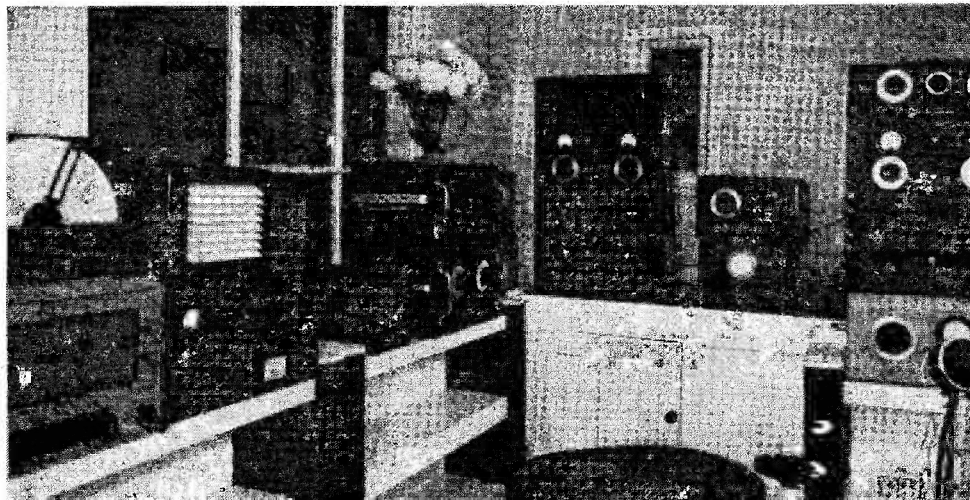
The top photograph, of the operating position, shows the Stromberg-Carlson receiver, feeding into a 15-watt amplifier for quality checking of any received transmission. To the left is the 'phone monitor, and in the foreground can be seen the m/c microphone, with a crystal microphone on the table. All transmitters are controlled from the operating position, the switch box for which is on top of the receiver.

In the lower photograph, the 1.7 mc 6L6-6L6-807 transmitter is on the left. To its right is a Meissner signal shifter linked

to a PA using a T40. This combination is available for immediate operation on any band. In the left foreground is an HRO Senior used for recording, the output of which is fed to a 50-watt amplifier.

Other equipment includes an elaborate modulator with inputs arranged to take either moving-coil or crystal microphones or pick-ups, the modulator being self-powered and with separate faders. G3NQ also runs play-back equipment in conjunction with the recording apparatus. A sub-frequency standard is provided for frequency measurement and control.

Aerials in use are a 138-footer, a 342-ft. Vee-beam, a 14 mc dipole and a 66-ft. Zepp. The layout and appearance of this impressive station is something to envy, and G3NQ is to be congratulated on a very fine installation.



## NEW QTH's

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

- G2ADD E. D. Botwright, 32 Haling Park Road, Croydon, Surrey.
- G2AFQ C. R. Goodall, 40 Morley Street, Bury, Lancs.
- G2AIX G. H. Robinson, 34 Sandringham Road, West Hartlepool, Co. Durham.
- G2ATM S. Read, 37 China Street, Bulwell, Nottingham.
- G2AUI E. T. Noakes, 36 Greenfield Road, Little Sutton, Wirral, Cheshire.
- G2AXU K. Mallett, 59 Tankerton Road, Whitstable, Kent. (Tel.: Whitstable 2091.)
- G2AYC S. E. Vanstone, 11 Holmwood Road, Cheam, Surrey. (Tel.: Ewell 4076.)
- G2BJX H. Harrison, 1 Britannia Avenue, Luton, Beds.
- G2CBN J. W. J. Tyrrell, 120 The Broadway, Southall, Middx.
- G2CKU J. W. Cookson, 41 Tudorville Road, Bebington, Cheshire.
- G2DSP R. Allen, Farndell, Upper Bognor Road, Bognor Regis, Sussex.
- G2FKZ C. E. Newton, 105 Underhill Road, East Dulwich, London, S.E.22.
- G2FNK J. H. Ellis, 64 Ashley Road, Walton-on-Thames Surrey.
- G2FTY G. E. Duffin, 15 Marlpit Road, Redditch, Worcs.
- GC2FZC W. E. Butt, Meo Voto, Green Lanes, St. Peter Port, Guernsey, C.I.
- G2SY W. Rogers, Drayton, Daventry, Northants.
- G2YI R. C. Horsnell, 80 Mayfield Drive, Caversham, Reading, Berks. (Tel.: Reading 72871.)
- G3AAM J. A. Mann, 105 Greenhill Road, Blackheath, Birmingham.
- GM3AEC A. J. James, The Dell, Stanley Drive, Brookfield, Renfrewshire.
- G3AFF R. Short, 30 Angerstein Road, Northend, Portsmouth, Hants.
- G3AJA M. Robinson, 34 Sandringham Road, West Hartlepool, Co. Durham.
- G3AJD T. Moore, B.Sc.(Eng.), 2 St. James Avenue, Whetstone, London, N.20.
- G3ALW L. G. Baker, 83 Columbia Road, Ensbury Park, Bournemouth, Hants.
- G3AMK B. Littleproud, 6 Priory Plain, Great Yarmouth, Norfolk.
- G13AOB J. J. Smyth, 3 Alexandra Gardens, Portsdown, Armagh, N. Ireland.
- G3AOP G. A. B. Coultiss, Barkerend Hotel, Barkerend Road, Bradford, Yorks.
- G3APN D. Rabbage, 8 Carlton Terrace, Dawlish, S. Devon.
- G3AQY J. A. Porter, High Street, North Thoresby, Lincs. (Tel.: N. Thoresby 268.)
- G3ARO W. J. Marten, 18 Bridgewood Road, Streatham Vale, London, S.W.16.
- G3ATU S. A. Herbert, Roker House, Roker, Sunderland, Co. Durham.
- G3AVY S. Williams, 196 Tinchill Road, Cookridge, Leeds, Yorks.
- G3AWD S. A. Wood, 105 Charlton Road, Blackheath, London, S.E.3.
- G3AWJ J. W. Toll, Offord Darcy Rectory, Huntingdon, Hants.
- G3AYZ J. F. Turner, 59 Grove Hill, South Woodford, London, E.18.
- G3AZM C. E. Stebbings, 17 Chollerford Avenue, Whitley Bay, Northumberland.
- G3BAP R. Cordingley, 61 Cleeveleys Avenue, Lancaster, Lancs.
- G3BBU F/O B. A. Toms, 38 Ashbourne Avenue, South Woodford, London, E.18.
- G3BCB K. F. Searle, 149 Cumnor Road, Boars Hill, Oxford.
- G3BCJ H. E. Crosland, 24/25 Foley Street, London, W.1.
- G3BCY F. W. Unstead, 52 Devonshire Drive, Greenwich, London, S.E.10.
- G3BDQ J. D. Heys, 2 Carlisle Parade, Hastings, Sussex.
- G3BEJ A. Cherrett, 22 St. Julien Gardens, Cochrane Park, Newcastle-on-Tyne 7, Northumberland.
- G3BEQ D. Rickard, 43 Canmore Gardens, Streatham Vale, London, S.W.16.
- GW3BFH R. H. James, 63 Parkfield Road, Bridgend, Glam., S. Wales. (Tel.: Bridgend 325.)
- GM3CAR W. T. McDowall, RAF Station Mauripur, Sind, India Command.
- G3SK R. G. Kitchenn, Duncan Hall, Stone, Staffs.
- G4GS H. Eastwood, 11 Harper Street, Oldham, Lancs.
- G4QW J. Allnutt, 38 Chatsworth Avenue, Merton Park, London, S.W.20. (Tel. LIBerty 3233.)
- G6HL S/L I. E. Hill, Woodville, Havant Road, Emsworth, Hants.
- G6ZB H. Benford, 12 Eton Grove, Kingsbury, London, N.W.9.
- G6LZ E. J. Bonner, 3 Kings Drive, Gravesend, Kent.
- G8UY W. Hartley, Wingarth, Forest Moor Drive, Knaresborough, Yorks.

# Here and There

## Crystal Exchange

Several readers have suggested that, in connection with the Band Planning proposals, we run a crystal exchange section. This we shall be glad to do, and a small space will be allotted each month as an experiment. Insertions will be free.

For economy in space, please send requests in this form :

Call-sign, address : Have so-and-so frequency(ies) ; Want such-and-such or near.

Note that this free space is given for a *crystal exchange* service only, and that "buy or sell" insertions cannot in any circumstances be accepted for the Crystal Exchange section. All negotiations should be conducted direct, *not* through us, and of course we can accept no responsibility as to the quality of the crystals offered.

## Italian QSL Bureau

The correct Bureau address for QSL's to stations using the I prefix is A.R.I., Viale Bianca Maria 24, Milan. Capt. P. G. Keller, XADZ/G3AXU, handles cards for all XA's, but for them only. His QTH is British Army, A/5, G.H.Q., C.M.F., Italy.

## The Short Wave Listener

The January and February (No. 4) issues of our companion *Short Wave Listener* carried main articles on Systematic Listening, Band Spread, an Amateur Band Frequency Meter, Band Padding, Circuit Ideas, a Simple Valve Voltmeter and Noise Suppression.

The news articles—"Have You Heard?" by the DX Scribe and "DX Broadcast", by R. H. Greenland—cover respectively amateur and short-wave broadcast band reception in considerable detail. Other features are a large Calls Heard section, "Pse QSL" (now patronised by overseas transmitters as well as G's) and a Broadcast Station List.

The *Short Wave Listener* : Conducted by the staff of the *Short Wave Magazine* ; 32 pp., published on the third Thursday of each month, for the interests of the SWL. Price 1s. 3d. single copy, or 16s. post free for one year (12 issues).

## England-South Africa Flight

With reference to the note appearing under this head on p. 695 of the January issue, just before closing for press we hear that the flight has been "postponed indefinitely" ! So that's that.

## QSL Bureau

Cards are held for the following G's : G2AKK, G2DHR, G3ALC, G3BCF, G3BCS, G3NR, GM3AJY, GM3BDA. If they will make known their present whereabouts to the QSL Bureau, *Short Wave Magazine*, 49 Victoria Street, London, S.W.1, the cards will be forwarded on the next clearance.

On the subject of the QSL Bureau—which is now running well—several readers have suggested an abbreviated address ; it had been intended from the first that if our Bureau appeared to be meeting a need, this would be arranged. So it is hoped shortly to make an announcement.

## "Planning the Amateur Bands"

We are glad to report that the article appearing in the January issue on this subject has produced a large correspondence, the great bulk of which favours without amendment the ideas put forward. We are, however, anxious that the matter should be thoroughly ventilated, so we invite those who may have opinions not already expressed, either yea or nay, to let us know what they think. As it is intended to summarise opinion in the March issue, we should like to hear from you by February 15.

## More Corrigenda

It never seems to be quite possible to dispense with this error crep' in business. An unfortunate one wormed its way through to the circuit diagram on p. 668 of the January issue. The jack J should be shown on the HT+ side of the resistor R5 ; this will enable plate-and-screen modulation to be obtained and will save the 807 if a blanking plug is inserted at J ! And G8VQ reminds us that his name is Greasley, not as given in "New QTH's" in the same issue. Sorry about these !



### “MOBILE MARINE”

#### NICE WORK

At 1315 on January 22, G2AXG of Sanderstead, Surrey, was called on 28 mc by SU1GL (Cairo) and asked to QSP a message to the Edinburgh police regarding the state of health of the wife of a quartermaster-sergeant in the Army. The police confirmed that she was in hospital with meningitis and the Army authorities arranged an air passage for the husband the next day. As a result of this action, G2AXG was telephoned by a welfare officer at the War Office, who asked him if he could do anything about another man who was wanted home urgently from Shaibah. On January 24, G2AXG raised Y12WM (Shaibah), who reported the facts to his orderly room—and this second man was flown home on January 25. Well done, G2AXG; two rescues in three days is good going.

#### RECORD, OF COURSE !

W5LVZ of El Reno, Oklahoma, got his ticket in September last. He is ten years old and his father is W5LTB. This *must* be a record! W9RQT of Homewood, Illinois, was licensed in July, and is on 3.5 and 7 mc with 12 watts to a CO—he is 12 years old. It beats us! (*Acknowledgment QST*).

#### INDEX AND BINDER

The present issue completes Volume IV of the *Short Wave Magazine*. An Index to it is being prepared and will appear as a supplement to the March issue. It is hoped shortly to make an announcement regarding a binder for the twelve copies.

★ ★ ★

#### 1947 R.C.M.F. EXHIBITION

The annual private exhibition of British Radio and Communications Components and Accessories will be held at the new Royal Horticultural Hall, Greycoat and Elverton Streets, Westminster, S.W1., during the period March 10-13, 1947.

The display is organised by the Radio Component Manufacturers Federation, and, as in former years, is intended to acquaint radio manufacturers and engineers with the most recent advances in the design and development of British radio components, accessories and materials.

The Exhibition will be open to visitors, by invitation only, from 10 a.m. to 6 p.m. daily during the four days Monday to Thursday inclusive, and it is hoped to attract a record attendance of overseas visitors.

Further particulars will be announced in due course.

# THE MONTH WITH THE CLUBS

## FROM REPORTS

Nearly all our contributors among the Clubs (some 30 of them this month) report encouraging progress, increasing membership and an interesting programme of meetings, lectures and instruction. There is also a fair salting of new ideas which are doubtless appropriated by other Clubs and turned to advantage.

We have heard from the Radio Controlled Models Society (Hon. Sec. R. Lawton, 10 Dalton Avenue, Whitefield, Nr. Manchester) to the effect that this Club will be pleased to co-operate with others in any aspect of Model Control work. They will also be very glad to welcome anyone interested to their meetings, and potential visitors are asked to get in touch with the Secretary for full particulars. Meetings will be held monthly in Manchester.

### March Closing Date

The final date for accepting copy for the March issue is February 14, which means posting not later than February 12. Address Club Secretary, *The Short Wave Magazine*, 49 Victoria Street, London, S.W.1. And so to the reports. . . .

**North-East Amateur Transmitting Society.**—This Club seems to have started another very good idea, whereby members who have problems may submit them anonymously in writing for discussion at meetings. A full series of lectures is being arranged, and membership continues to grow. The results of the recent DX Contest will be made known shortly.

**North-West Kent Amateur Radio Society.**—A junk sale was held on January 31; on February 28 G2MI will lecture on Frequency Measurement, with a demonstration. In March a talk on VHF propagation will be given by G2WS.

**Oswestry & District Radio Society.**—In January the Club heard a lecture by G3AKG and G3AQA on the theory and practice of direction finding. Many newcomers turned up, and the state of the Club is flourishing. A visit to the RAF station at Shawbury is being arranged; otherwise meetings are held fortnightly in the Technical College.

**Kingston & District Amateur Radio Society.**—The January lecture, on Aerial Coupling Systems, was given by G2CUA. On February 6 there will be another lecture, and on February 20 a General Meeting. The rendezvous is the Three Fishes Hotel, Kingston, on the second and fourth Thursdays at 8 p.m.

**Leeds & District Amateur Radio Society.**—This Club has now been allotted the call G3BEW, and the station will be operating on Friday evenings, 1900-2130, on frequencies in the 3.5 and 7 mc bands. Membership has increased to 30, including six licensed amateurs, and much interest is now focused on 58 mc, for which several receivers have been built.

**Liverpool & District Short Wave Club.**—The Club has built a transmitter for 1.7 and 3.5 mc and will be on the air shortly. A new committee has been elected—note new secretary's QTH in the list. The programme for February includes a Quiz, a Film Show, a Brains Trust and a lecture on Crystals.

**Medway Amateur Transmitters' Society.**—The Annual General Meeting was held on January 6. The new committee was duly elected, with G5FN as President. The club call is

**Radio Society of Harrow.**—Membership continues to increase—the 50 mark has now been passed—and meetings are held on alternate Tuesdays (7.30 p.m.) at 206/208 Kenton Road. Newcomers will be cordially welcomed.



Winners of the Magazine 1.7 mc Club Contest the Coventry team was G6TD (left), G2YS (standing). They put out a fine signal and worked six Zones.



**G3LP**, outstanding performer in the 1.7 mc Club Contest. *He not only worked single-handed for Cheltenham, but made the highest individual score before multiplying by Zones worked.*

**G2FJA**, and the club station will have made its debut on 1.7 mc by the time these notes appear. Meetings are held every Monday at 207 Luton Road, Chatham, and all are welcome, from the beginner to the "highly technical" man.

**HI-Q Club, Giffnock.**—They have not been very active during the holiday period, but have now come back to life and are eagerly demanding more contests. Portable equipment is being tried out with a view to going mobile next summer.

**Grays & District Amateur Radio Club.**—Fortnightly meetings continue, and the Club now has the use of a 16-mm. projector on which it is hoped to show some technical films. **G2YH** recently talked on "Transformers, and this lecture is being continued at a future meeting.

**Bradford Short Wave Club.**—Meetings continue to be well attended, and a recent auction sale produced a very good turnover. The Club has had QSL cards printed by one of the textile organisations, and distributed free to members. On February 3 there was a junk sale, and on February 17 a talk on "The Multivibrator applied to Receiver Calibration." All meetings are at 1374A, Leeds Road, Bradford.

**Cheadle & District Amateur Radio Society.**—The Chairman of the Cheadle Rural Council recently performed the official opening of the new club premises, and a number of civic dignitaries were duly introduced to Amateur Radio in action. **G3UB** demonstrated the club's gear and gained four quick contacts in front of the audience. Cheadle are very proud of their club-room and are awaiting new members to take advantage of the facilities.

**Cheltenham & District Amateur Radio Society.**—Recent meetings have included two Brain Trusts (the brains are **G5BK**, **G5BM** and **G3LP**). A lecture on "First Aid for Electric Shock" was also given recently—an excellent idea which might well be copied. The Club has also arranged its own 1.7 mc Contest among its members—results not yet determined. Forthcoming lectures include "The Field Strength Meter" as a subject, and a full programme is arranged.

**Brighton & Hove Group.**—An interesting winter programme has been arranged, including a Brains Trust on February 10 and a practical lecture on "Alignment of Superhets with FM Oscillator and 'Scope'" on February 24. Subjects for March include "Aerials" and "Power Supplies."

**Coventry Amateur Radio Society.**—The first meeting of the New Year saw members airing their "radio resolutions." The February 3 meeting was an open night, but on February 17 **G6WH** will be lecturing on Frequency Modulation. The Annual Dinner has also been fixed for February 22, and amateurs finding themselves in this district round that date will be cordially welcomed.

**Doncaster & District Amateur Radio Society.**—The January lectures included one on Fundamentals and one on Television, and Morse classes were held each Wednesday evening. A new headquarters has been located (at 73 Hexthorpe Road), but the Committee are out at present looking for "seating." The Club now has over 50 members.

**Southampton Radio Club.**—The original secretary, Mr. A. Ward, has been reluctantly obliged to resign—a vote of thanks was passed to him for his fine efforts in starting the Club and putting it on its feet. Several new members were enrolled in January, and continued expansion is expected. Meeting night has been changed from Monday to Wednesday. New secretary **QTH** in list.



**Edgware & District Radio Society**—Meetings are now being held at the Orchard Cafe, 92 Mill Hill Broadway, instead of the previous venue. The Annual General Meeting and the Annual Dinner were held in January, and future meetings are scheduled to take place every Wednesday. A Slow Morse transmission is now made each Sunday by G3HT (1100 on 1.7 mc) and a group of members learning Morse hold weekly meetings. A 5-metre sub-committee has also been formed. The Club is now in its flourishing tenth year.

**Halifax Experimental Radio Society**—Meetings are held on alternate Monday evenings at 7.30 p.m., in the Toc-H Rooms, 32 Clare Road. Negotiations for a transmitting licence are in hand; Morse classes are proving popular; and much interesting work is being done by a group of members interested in remote control of models. It is hoped that the Model Aero Club will be co-operating on this side.

**Wanstead & Woodford Radio Society**—Members recently enjoyed an interesting film show on "Radars and Radio in Battle." The Club transmitter will be on the air in February, and all visitors are welcomed at Wanstead House, every Tuesday evening.

**West Bromwich & District Radio Society**—Meetings are held every Monday at 7.30 p.m., at the Gough Arms Hotel, Jowetts Lane, West Bromwich. G8NC gave an interesting talk on 5-metre straight and super-het receivers at a recent one, and there is a marked increase in 5-metre interest. There are now seven fully active transmitting members, and some lively discussions take place. A technical library is also very popular.

**Wolverhampton Amateur Radio Society**—An interesting talk on moving coil speakers was recently given by Mr. Butcher, of R & A Ltd. A very full future programme has been drawn up and new members will be welcomed.

**Yeovil Amateur Radio Club**—Steady progress is maintained, and the Annual Supper was held in January. Plans are in hand for a 58 mc Field Day, and Morse instruction is given regularly. Meetings are held at Ben Mill Cafe, Sherborne Road, on Thursdays at 7.30 p.m., and new members will be welcomed.

**Neath, Port Talbot & District Short Wave Club**—Meetings are held on alternate Tuesdays at the Dock Hotel, Briton Ferry. Among the 23 present members are ten transmitters; a club magazine ("The Link") is published; and new members will be heartily welcomed if they will "break in" to a meeting and get on touch with the Chairman, GW5VX, for Port Talbot, or the Secretary, GW4NZ, for Neath.

**Midland Amateur Radio Society**—New ground was broken at a recent meeting, which was held over the air on the 58 mc band. The subject was a demonstration of VHF

Following are the names and addresses of the secretaries of the clubs mentioned this month. They will be pleased to give every assistance to prospective members.

- BRADFORD**. (Amateur Radio Society): J. H. Macdonald, G4GJ, Mayfield, Wagon Lane, Bingley, Yorks.  
**BRADFORD**. (Short Wave Club): V. W. Sowen, G2BYC, Rushwood, Grange Park Drive, Cottingley, Bingley, Yorks.  
**BRIGHTON**. P. J. Donald, 2 Canfield Road, Brighton 7.  
**CHEADLE**. V. E. Hughes, G3AVG, Abbots-Have, Cheadle, Stoke-on-Trent.  
**COVENTRY**. J. W. Swinnerton, G2YS, 118 Moor Street, Coventry. (Tel.: Coventry 4578).  
**DONCASTER**. H. Flintham, 50 Burton Avenue, Balby, Doncaster.  
**EDGWARE**. R. H. Newland, G3VW, 1 Albany Court, Montrose Avenue, Edgware, Middx.  
**GIFFNOCK**. (Hi-Q Club): J. D. Gillies, GM2FZT, 3 Berridale Avenue, Glasgow, S.4. (Tel.: Merrylee 4060).  
**GRAFTON**. W. H. C. Jennings, G2AHH, 82 Craven Park Road, London, N.15.  
**GRAYS**. R. F. Read, 26 Hillside, Little Thurrock, Grays, Essex.  
**HALIFAX**. L. Blagbrough, 39 Fountain Street, Sowerby Bridge, Yorks.  
**HARROW**. J. F. A. Lavender, G2KA, 29 Crofts Road, Harrow, Middx.  
**KINGSTON**. J. J. Hughes, 12 Hillington Avenue, Ashford, Middx.  
**LEEDS**. F. Stork, 1 Brudewell View, Leeds, 6.  
**LIVERPOOL**. M. B. Morgan, G8JU, 17 Gerneth Close, Speke, Liverpool, 19.  
**MEDWAY**. S. J. Coombes, Stanvic, Longhill Road, Chatham, Kent.  
**MIDLAND**. W. J. Vincent, G4OI, 342 Warwick Road, Solihull, Birmingham. (Tel.: Solihull 0413).  
**NEATH**. S. Roberts, GW4NZ, 29 Chestnut Road, Cimla, Neath, Glam.  
**NORTH-EAST**. J. W. Hogarth, G3ACK, 4 Fenwick Avenue, Blyth, Northumberland.  
**NORTH-WEST KENT**. L. Gregory, G2AVI, 18 Upper Park Road, Bromley, Kent. (Tel.: Ravensbourne 2071).  
**OSWESTRY**. G. H. Banner, G3AHX, 6 Coppice Drive, Oswestry, Salop.  
**ROMFORD**. R. C. E. Beardow, G3FT, 3 Geneva Gardens, Whalebone Lane North, Chadwell Heath, Essex.  
**SOUTHAMPTON**. J. H. Sillence, 80 The Drove, Coxford, Southampton.  
**SOUTHPORT**. R. Moffitt, G5KX, 1 Balmoral Drive, Southport.  
**WANSTEAD**. M. M. D'Arcy, 27 Theydon Grove, Woodford Green, Essex.  
**WEST BROMWICH**. R. G. Cousins, G3BCS, 38 Collins Road, Wednesbury, Staffs.  
**WOLVERHAMPTON**. W. O. Sturmeay, G8KL, 3 Broome Road, Wolverhampton.  
**YEovil**. D. Hover, 57 Everton Road, Yeovil, Somerset.



Some of the crew on G3AFT, Grafton, placed third in the Contest. GW3ALE at the wheel, with G8DF (on right) keeping an eye on things.

gear by G2AK, and contact with G5LJ in Sutton Coldfield was maintained throughout the meeting, some of the members being at the latter station. Clubs who are running short of ideas are informed that this one is not copyright!

**Romford & District Radio Society.**—A comprehensive programme has been prepared until April 21, meetings being held every Monday at 8 p.m. February lectures include "Aerials, Part 4" (February 3) and "Fundamentals, Part 4" (February 10). On the 17th G6VY is describing "Balloon Escapades on the Top Band."

A 1.7 mc Contest has been fixed for February 11—results will be given at the last February meeting.

**Southport Amateur Transmitters' Association.**—This Club is now in full swing, and meetings are held on the first and third Thursdays at Thorp's Restaurant, Nevill Street. A Hamfest is being held on Thursday, February, 20 and early application for tickets is recommended. The Club publishes its own news-sheet, called *QSO*, of which we have seen No. 1 of Vol. 1 and heartily approve.

**Bradford Amateur Radio Society.**—Membership continues to increase and the Club is now flourishing and continuing its fortnightly meetings. Recent events included a talk on aerials by G2QM and a second lecture on the oscilloscope by G6BX. On February 10 there is a discussion, and on February 24 a talk by G2BOO on Multivibrators, with a demonstration.

**Grafton Radio Society.**—Members are making excellent progress in Morse, no doubt because instruction takes place three evenings a week. London "ex-AA's" who are not keen on the Morse test are recommended to put in a few months' study at Grafton. SWL's, also, who miss a great deal of possible enjoyment of their hobby by being "phone only" can join the road to success.

Grafton is duly elated at its third place in the recent Contest, and is busy preparing to grab a "first" next time!

*Pending the local re-organisation, Guildford amateurs have asked H. C. Spencer, 1 Shepherd's Hill, Stoughton, Guildford, to keep meetings going. A gathering is arranged for February 23 at 3 p.m. at the Cinema Cafe, Woodbridge Road, Guildford, to which all interested are invited. Please confirm by post-card to the first address, saying whether tea is wanted.*

### MORE ON THE NoYuGo

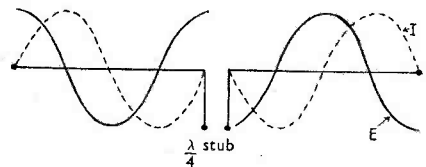
The caption to the sketch at Fig. 1 on p. 676 of the January issue is somewhat misleading. It suggests that GM6LS's aerial gives a lobe distribution as shown there, whereas in fact with the feeder system he describes the operation is not so simple.

On 14 mc, the two half-waves on the roof are in phase and the aerial works as a two-section Franklin co-linear. The lobes will tend to be more broadside than with a straight full-wave top in which the two half-waves are out of phase.

On 28 mc, the NoYuGo as described operates with the two full-waves on the roof out of phase, and the voltage-current

distribution under these conditions is sketched herewith.

None of this, however, prevents the NoYuGo from working as GM6LS says it should—and giving very good results.



The wave-form on a twin-top with two full waves out of phase. This is the voltage-current distribution on GM6LS's 66-ft. wire on 28 mc, when using his system of feeding.

## Note for Contributors

We are always glad to see technical or semi-technical articles—constructional, theoretical or practical—on any aspect of Amateur Radio. We give quick appearance to worthy material and our rates of payment (which vary in accordance with the scope and originality of the work) are the highest in the world offered by any purely Amateur Radio publication. Indeed, for years the *Short Wave Magazine* had led the way in this respect, as in many others!

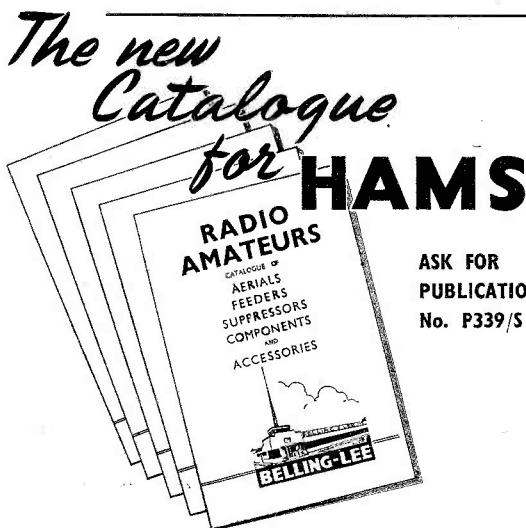
Articles must be typed double-spaced, with wide margins, on one side only of quarto or foolscap sheets. Circuits and other sketches should be shown separately, and prepared strictly in accordance with *Magazine* drawing convention—see any issue for circuit style. Drawings need not be copper-plate, but they must be clear and accurate for copying. Tables of values and other tabular data should also be given on separate sheets. Photographs can be any size, print or negative, but must be clear and sharp.

Payment for articles is made on publication, and the amount quoted in the letter of acceptance.

In accordance with the practice always obtaining in the publication of literary work of any kind, the copyright of all material appearing in the *Short Wave Magazine* passes to us. But we are always willing to meet, by arrangement, the wishes of authors who may want to re-publish elsewhere.

As a general rule, the Editor is not prepared to criticise rejected work, nor to offer suggestions for articles to prospective contributors who have not previously been in print. On the other hand, we are particularly interested in seeing work by new writers with up-to-date technical knowledge and experience.

Intending contributors are advised to study carefully *Magazine* technique in presentation, particularly in regard to permitted abbreviations, before offering material—it always saves time and trouble in the end!



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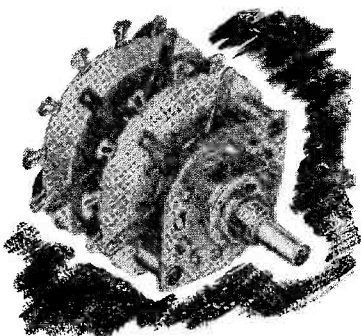
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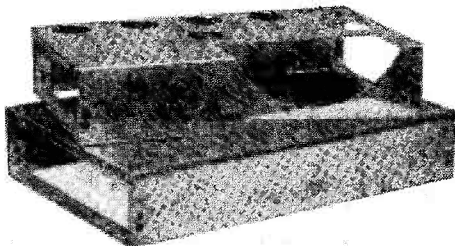
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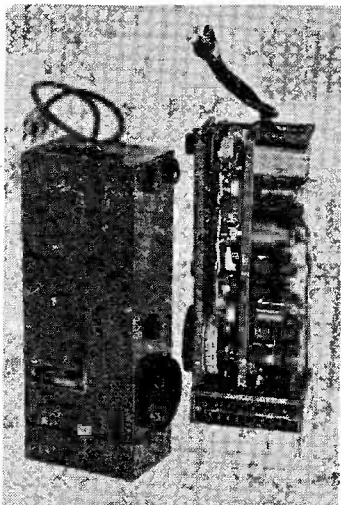
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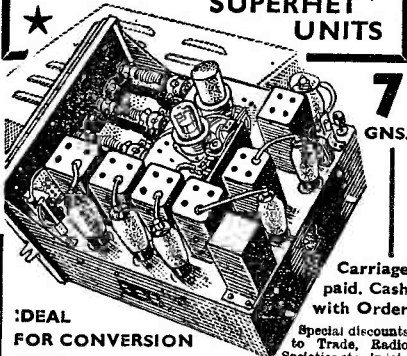
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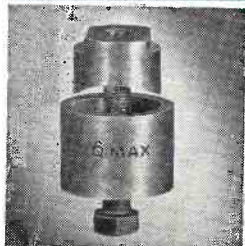
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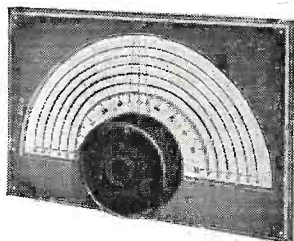


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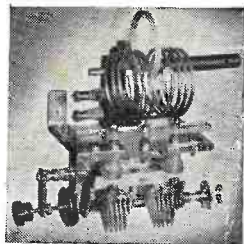
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