RESISTORS. New and Unused Erie and Dubliler. We have secured another fine parcel of these and offer as follows: 2 watts 15/- per 100, 1 watt 9/- insulated 15/- per 100, 1 watt standard type 15/- per 100, 2 watts 20/- per 100, 5 watts 25/- per 100. All well assorted values between 100 ohm and 68 Mh. Or sample 100 each as follows: 20 watts, 25 watts, 20 watt insulated, 20 watt standard, 10 watt, 5 Watts, with a range of at least 30 different values at 14/- post free.

OCCISCOPE. By well known British Manufacturer. In black crackle steel cases, size 13 x 8 x 6ins. For AC mains 230/200/50 c/6. Tube size 3ins. (green). Hard valve type base continuously variable from 5 to 250,000 c.d.s. Pushpull type "x" deflection circuit with T.B. wave form brought out to separate controls for modulator work or synchronizion. Provision for fly back suppression. Pushpull "y" deflection circuit, level from 15 to 300,000 c.p.s. All usual controls and provision for using a D.C. volt-meter to measure the amplitude of an A.C. waveform. Separate sync. and def. amplifiers and control interconnection. Complete with all test leads and instruction manual. They are brand new and boxed in original cartons and represent an un-repeasable bargain at £19/10/0. Carr. paid.

AUTOMATIC 3 SPEED RECORD CHANGERS. Plessey, 12in. and 10in. mixed at 78 r.p.m. 12in., and 10in. mixed at 33 1/3 r.p.m. 7in. at 33 1/3 r.p.m. 7in. at 45 r.p.m. Crystal pick up with two switched sapphire styli. Rotary switch for automatic selection of any record from any batch. 200 to 250 50 cy. A.C. mains. Velocities have originally 2000 records on each style without attention or change. Immediate delivery from stock Carr. Paid. £23/16/0. Min. size of minimum order £10

ELECTRONIC KEYER. 230v 50c/6. A.C. Mains. Our own production. Grey crackle steel case 9 x 7 x 6ins. Employed in all 5 values. Controls for dot, dash, and spacing, with speed control continuously variable from below 10 wds. per minute to 60 wds. per minute, with perfect formation of characters. This is precision first class operating made easy. Carr. paid £12/10/0.

CRYSTALS. 1000 kc Ysley, Billey or Somerset, standard 2in. pin spacing, 20/-, 7K. 1000 kc substandards, 20/-. Western. Elec. 500 kc Fr. 434 0.012 inch 12/-. Etc. With alternating 70M/f 12/-. 1200 kc oscillograph, and acid etched to final freq. Are available in either Fe or copper holders, 5in. British, 7in. in U.S. at 15/- each, with own choice of freq. 2c to 10 Mc inclusive. We will despatch to within 1 kc of your choice free of charge at 15/- each accurately calibrated with freq. clearly marked. Slight extra charges for decimal point freq. We also undertake the calibration, or re-gridding of your own crystals at extremely reasonable and nominal charges.

This month's special offer. 1000 kc Ysley, Billey or Somerset standard 2in. pin spacing, 20/-, 7K. 1000 kc substandards, 20/-. Western. Elec. 500 kc Fr. 434 0.012 inch 12/-. Etc. With alternating 70M/f 12/-. 1200 kc oscillograph, and acid etched to final freq. Are available in either Fe or copper holders, 5in. British, 7in. in U.S. at 15/- each, with own choice of freq. 2c to 10 Mc inclusive. We will despatch to within 1 kc of your choice free of charge at 15/- each, accurately calibrated with freq. clearly marked. Slight extra charges for decimal point freq. We also undertake the calibration, or re-gridding of your own crystals at extremely reasonable and nominal charges.

This month's special offer. 1200 kc Ysley, Billey or Somerset, standard 2in. pin spacing, 20/-, 7K. 1200 kc substandards, 20/-. Western. Elec. 500 kc Fr. 434 0.012 inch 12/-. Etc. With alternating 70M/f 12/-. 1200 kc oscillograph, and acid etched to final freq. Are available in either Fe or copper holders, 5in. British, 7in. in U.S. at 15/- each, with own choice of freq. 2c to 10 Mc inclusive. We will despatch to within 1 kc of your choice free of charge at 15/- each, accurately calibrated with freq. clearly marked. Slight extra charges for decimal point freq. We also undertake the calibration, or re-gridding of your own crystals at extremely reasonable and nominal charges.

This month's special offer. 1200 kc Ysley, Billey or Somerset, standard 2in. pin spacing, 20/-, 7K. 1200 kc substandards, 20/-. Western. Elec. 500 kc Fr. 434 0.012 inch 12/-. Etc. With alternating 70M/f 12/-. 1200 kc oscillograph, and acid etched to final freq. Are available in either Fe or copper holders, 5in. British, 7in. in U.S. at 15/- each, with own choice of freq. 2c to 10 Mc inclusive. We will despatch to within 1 kc of your choice free of charge at 15/- each, accurately calibrated with freq. clearly marked. Slight extra charges for decimal point freq. We also undertake the calibration, or re-gridding of your own crystals at extremely reasonable and nominal charges.

TRANSFORMERS. Thermodor 500 ohm to 805 grids 20/-, ditto R.C.A. 15/-, Weden P/P. 6L6s to 500 ohm line 22/-, Thermodor speech input trans. m/c 50/-, U.S.A. miniature P.P. desk or trans. Mu metal with P.P. output trans., to match 5/- pair. Place etc. Weden 350/0/350 80 mls 6v, 30/-. Ditto 120 mls 40/-, ditto 500/0/500 150 mls 5v 3 amp. 6.3v 3 amp. 75/-, Parmeko 680/0/680 200 mls 9v, 20/-, Radio Receptor Co., U.S.A. Switched primary 100/200/500. Output 1250/1250 at 450 mls, 25/-. U.S.A. 3v 10 amp. 12v 3 vol. 4 amp 10/-, ditto 500 Va 35/-, 3 Kva £5, Hallacraft Output P.P. Primary, separate Mic & Low impedance outputs, SS-CO 19 30/0/1000 c/6, 7/-, Mec-Vik Plate 1900/0/1900 at 1 amp. weight 5 c/w. 6in. stand off £10 Carr. Paid. Chokes, 100 volt 400 mls 13/-, R.C.A. 100/0/1000 5ins £15, U.S.A. Potted 80 volts 300 mls 20/-, Ex Admiralty 20 mls 3/6.


ATKINS 45SK. I.F. TRANSFORMERS, 4/6 each. Ditto Weartite, 6/- each to clear. Weartite all P type coils, full range to clear at 2/- each.

CONVOS. Silver Mica Approx. 10 assorted values including 1000v wks at 4/6 per doz. Flat mica, 002, 002 350v, 005, 0047, 006 1000v at 3/6 per doz. Mica 2500v wkr Sangano etc. 12/- doz. assorted. Mica 5 K v wkr Sangano etc. 004, 0006 and 001 2/- each. Mica 001 and 002 Muhrehead 4 K at 30 Mc 4/- each. All high voltage mica are bakelit lined. Paper and oil, 4m 2000v 5 K wkr 4/-, 4m 1m 2000v wkr 8/-, 10m 1000v wkr 5/-, 6m 1000v wkr 4/-, 4m 500v wkr 2/-, G.E.C. 2s 350w wkr Tubsr 12/- per normal order of box of 100. Blas. One doz. assorted 6/-, 1000v 1200w 12/-, etc., 12/- doz. assorted. Mica, metal can smoothing, bias, bath tub, high voltage types 15/- Post free. We will be pleased to have your enquiries for any type condensers to 20 Kv wks etc. We carry exceptionally good stocks including U.S.A. all types.

POWER SUPPLY UNIT. TYPE 247. Input 230v 50c/6, output 550v at 300 mls, plus 6.3v at 3 amp. In grey steel cases 11ins. x 10ins. x 9ins. With pilot light. 9SU rectifier required. £3/19/6. Carr. paid.

Short Wave Magazine, January 1952
YOUR EQUIPMENT CAN HAVE THE PROFESSIONAL LOOK

BY USING WODEN POTTED COMPONENTS

Woden Potted Transformers and Chokes ensure a clean layout with uniform smart appearance. They are used by many leading radio and television manufacturers, and this is sufficient testimony to the high standard of efficiency which characterizes these components. Available for "Wireless World" Williamson Amplifier. "Electronic Engineering" Home-built Televisor and other popular circuits.

THE EQUIPMENT SHOWN IS THE TOP BAND CABINET TRANSMITTER AS DESCRIBED IN THE "SHORT WAVE MAGAZINE."

Send for illustrated literature and price lists of our complete range

THE RADIO & ELECTRICAL MART

OF 253-B PORTOBELLO ROAD, LONDON, W.11

Phone: Park 6026 Please add postage when writing.

Valves. 1S5, 1R5, 12/6; 1T4, 1S4, 10/6; 354, 3AV4, 10/6; 6AG5, 10/6; 11726, 12/6; 6SH7, 6/6; EF50, 6XV; 9002, 6/6; 9001, 9002, 7/6; 955, 954, 6/6; 6G115, 6/6; 6B4G, 16/6; 6V6GT, 11/6; TT11, 8/6; 6GT7, 10/6; 6SN7G.T., 12/6, 5Y3GT, 10/6, 163, 10/6, 6MU4, 10/6; VR150, 10/6; 524, 10/6; VP4B, 11/6; 42, 10/6.

Selenium Rectifiers. 120mA, 8/6; 6.W, 6-12 or 24v, 2A, 13/6, 12v 1/2 amp., 5/6. Post paid.

New and Boxed P.M. Speakers. W.B., 2½ 14/6 P.P. Rola Bins, P.M. 21/6.

New IN34 Germanium Crystal Diodes with wire ends, 5/6, P.P.

Mains Transformers. Input, 200/240v, output 6.3v, 1.5A, 10/6; 250-0-250v, or 250-0-250v. 80mA, 4v, and 6.3v, 4A and 4v, and 5v, 2A, 26/6. Trans.: 200/240v. output 3, 4, 5, 6, 8, 9, 10, 12, 15, 18, 20, 24, 30 volts at 2 amps, 21/3. One Year’s Guarantee. Post paid.

RF24 Units. Converted to 28 mcs band variable tuned with 100-1 geared SM dial. Complete with leads for immediate use. £3. Post paid.

Deaf Aid Miniature Valves. DL72 and CK512AX. New, 9/- P.P.

Army Carbon Microphone. With switch, 4/6, P.P. Trans. to match, 4/6, P.P.

M/C Microphone with Switch, 6/6, P.P. Transformer to match, 5/- P.P.

New odd Freq. Crystals between 6 to 8 mcs 3/6 each P.P. Spot freq., 5/6; Amateur band 12/6, Trans. 230/6.3v, 1½ amp., 6/6 P.P.

1/6 H.P. Motors, A.C./D.C. 100/120v, or 200/240 D.C. 5/16ins, dia. spindle, 3½ins x 3½ins, 32/- or with 2}ins, Grindstone, 36/6, P.P.

Army Morse Keys, 2/- P.P.

200/240 volt A.C. Alarm Bells, 3/6 P.P.

10H-120MA. Shrouded Chokes, 7/6 P.P. 6 volt Vibrator Units. Complete in black steel case, 78 x 5½ x 3½ins. Output 200 volts, 40 mA., 22/6 P.P.

2 — Complete A.C. 240v. Army Film Unit. Sound on Film 35mm. Projectors — (less lenses, which are obtainable). Amplifiers and Speakers. £50 each. Write for details.

Special Offer. Scope Units. Containing VCR130/E9CR35, 3½in, CRT with mu-metal screen, 2-EP50’s, 2-EB234’s. Pots and the usual resistors and condensers, in steel case, 6in. x 6in. x 15in. Can be modified as a standard scope in a few hours and only requires external power pack (which would cost £3. Price 70/- post paid.

D.P.D.T. Relays. Operate at 200/300 volts D.C., 6mA., 13/- P.P.
Introduction to Radio
Direct Current Circuits
Alternating Current Circuits
Vacuum Tube Principles
Vacuum Tube Amplifiers
Radio Receiver Fundamentals
Power Supplies
Measurement
Generation
Radio-Frequency
Amplitude Modulation
FM and Single-Sided Transmission
Transmitter Design, Keying, and Control
High-Frequency Power
Directive Antenna Arrays
Speech and Amplitude Modulation
V-H-F and K-W Power Supplies
Antennas and Antenna Materials
Receiving Equipment
Exciters and Low-Power Transmitters
High-Frequency Power
ORDER NOW!

GET YOUR COPY!
Giant Thirteenth Edition
RADIO HANDBOOK
734 PAGES!
£2.8s.
Plus postage 1/6

SURPLUS RADIO CONVERSION MANUAL IN TWO VOLUMES
This set of reference data has become standard for the most commonly used items of surplus electronic equipment. All conversions have been proven by testing on several units; each yields a useful item of equipment. For list of items covered write us.
21s. 5d. per vol. (Post Free)

ANTENNA MANUAL
The most practical, comprehensive book on antennas. 300 pages of down-to-earth help on antenna, feed line, radiation and propagation for all frequencies up to 1000 Mc. including FM and TV. Plain language; no need to brush up on math. A necessity for everyone interested in transmission or reception.
27s. 11d. (Post Free)

Published by Editors and Engineers Ltd., Santa Barbara, California, U.S.A. and distributed in the British Isles and Europe by GAGE & POLLARD
55 VICTORIA STREET · LONDON · S.W.1 Abbey 5034

Short Wave Magazine, January 1952
Salford Electrical Instruments Ltd
Peel Works - Silk Street - Salford 3 - Lancs - England
A subsidiary of The General Electric Co. Ltd. of England

Clydesdale
Bargains in Ex-Services Radio and Electronic Equipment

Command Speech Modulator BC-456
With valves, 1625, 12JS, VR150/30, modulation trans., RF, Choke, Mic. trans., relays etc., etc. Enclosed chassis 10 x 7 x 4 ins. less dynamotor. Clydesdale's price only 25/- paid

Command Transmitter Chassis
Partly stripped by the M.O.S. less valves, coil winding, crystal and dynamotor, but otherwise fairly intact. A fine basis for ideas in V.F.O. or Tx. Original valve types 2/1625, 1626, 1629. Conversion suggestions and circuits supplied. In aluminium case. Dim: 7 x 5 x 8 ins. Wgt: 8lbs. Clydesdale's price only 15/- post paid

Command Receiver CCT/CBY4412
U.S.N. version of the BC-453 for that Sharp channel "Q-Fiver." Range 550-190 Kc. with 6 valves, 3/13SK7, 12A8, 12SR7, three gang tuning cond., etc., etc. Dim: 11 x 5 x 8 ins., finish black, less dynamotor. Clydesdale's price only 70/- post paid. Circuits of BC-453 available at 1/3

Dinghy Telescopic Mast
A light weight (6 lbs.) Mast for many uses. Car Aerial, Camera Tripod, fishing rod, etc. Made of Aluminium, 7 sections, Clipped 14 ins. Extended 7 ft. 6 ins. Diam. base 7/8 ins. top 7/16 ins. Clydesdale's price only 6/- post paid

The R3601 Receiver Unit
A 14 valve dual chassis radar receiver for 233 mcs. with 13 mcs IF. RF Section High cycle Power Section, antenna switch, relay, etc., etc. and valves 5/D611, 4/E572, 2/EFS45, EF50, EC52, 6V6, VU39A, housed in metal case. Dim: 18 x 9 x 8 ins., finish light blue. Clydesdale's price only 4/12/6 carr. price paid

New List No. 8
Giving details and illustrations of ex-service items and cancelling all previous lists and supplements. Now ready 1/6. Price credited on first purchase of 10/- or over.

BC - 625 - A Transmitter Chassis
Less valves, and partly stripped by the M.O.S. R.F. Section in good order. Dim: 15 x 7 x 6 ins. Separate Modulation Transformer and Choke supplied. Clydesdale's price only 29/- carriage paid

Order direct from:
Clydesdale Supply Co. Ltd.
2 Bridge Street, Glasgow C.5. Phone: SOUTH 2706/9
Branches in Scotland, England & N. Ireland
HIGH RESISTANCE HEADPHONES.—Ericsson's first grade. 4,000 ohms per pair. Brand New in attractively coloured presentation boxes. ONLY 10/6 (1/1 post, etc.).

THE NEW 1355 CONVERSION DATA FOR ALL FIVE T.V. CHANNELS 3/—

**RECEIVER P40** Tunes 85—95 mc/s; crystal controlled oscillator, with subsequent frequency multiplication ensures stability. With 4 EF54's (RF, mixer, and multipliers) 1 ECS2 (I.O.), 2 EF39's (2.9mc/s IF's) EB34 (det) and 6J5 and 6V6 (audio), these may be easily converted for "2" or the new BBC UHF transmissions from Wrotham. BRAND NEW with circuit 69/6. (circuit only, 1/3)

**MODULATION Transformer** to match class B 221's to a class C 221 final, these may be used as 2:1 mains auto-transformers handling some 75 watts. ONLY 6/6. (1/- post). Input transformers, to drive class B 221's 4/6. (1/- post).

**POWER UNIT S41B** 300v at 200mA DC, 12v 3A AC and 5v DC provided from 200/250v 50cps input. These, in attractive grey crackle finish cases, use separate HT and LT transformers, with individual switching and indicator lights, the HT being also relay controlled if desired. In SEALED MAKER'S CARTONS. 65/- (5/- carr.).

**MAINS TRANSFORMERS** to deliver approx. 200v at 30mA, and 18v at 200mA from 200/250v 50cps. ONLY 4/6 (1/- post).

**TRANSMITTER 21** Covering 4.2—7.5 mc/s, sending speech, CW or MOW, and complete with valves, key, control box and circuit, the PA coils (not formers) and relays have been stripped by the M.O.S, but may be easily replaced by following our data. Complete with front panel for mounting receiver and vibrator pack. 25/—

**VIBRATOR PACK 21** Delivers approx 140v at 40mA from 6v input. ONLY 16/6 (1/6 post).

**RECEIVER 1225** ; with five EF50's, two EF39's, one EB34; these have four preset tuned frequencies, and XTL controlled oscillator; precision tuning condensers ensure stability. Ideal for use on two metres. ONLY 39/6. (1/6 post).

**POWER PACK 532**. Complete with one S24, one SU2150A (2v indirectly heated filament) 5KV rectifier, three condensers, two high cycle transformers, choke relay, etc. O U R P R I C E complete with our 50 cops EHT and HT conversion data. To supply approx. 1,800v EHT or approx. 450v at 50 mA, 17/6. (2/3 carr.).

**NON-SPIILLABLE ACCUMULATORS** Multi-plaee, in celluloid cases (approx 4x3x1 ins.). 2v, 7AH. OUR PRICE 5/11. (6d. post).

**TUNING METERS.** 2in. Square flange mounting—2mA, F.S.D., scaled 10/0. New and boxed, 7/6 (6d. post).

**MIDGET AMPLIFIERS**: with 2 x 12 SH7's and 1 x 12S72, measures only 5 x 3 x 3 ins. 13/6 (carr. 1/6).

---

**PULLIN SERIES 100**

**MULTI-RANGE TEST SET**

Sensitivity 10,000 ohms per volt, with A.C./D.C. Voltage Multiplier for 2,500 v. and 5,000 v. Volts A.C. and D.C. range : 10, 25, 100, 250, 500, 1,000. Milliamps D.C., only : 2.5, 10, 50, 100, 500. Ohms : 0/10,000 and 0/1 megohm. A.C. Current Transformer range : 0.025, 0.01, 0.5, 1.0, 5.0, 25.0 amps. Early deliveries.

MEASURING INSTRUMENTS (PULLIN) LTD.

Electrik Works, Winchester Street, W.3
Tel. : ACorn 4851/3.

---

**P.C.A. RADIO**

R.C.A. TRANSMITTERS. Type ET-4336. Complete with matched speech amplifier, crystal multiplier and VFO Units; brand new. (Export only).

AMERICAN ULTRA High Frequency Transmitters UFI, UF2, 60-75 mc.

TRANSMITTER No. 12. With coupling units, remote control, microphone, etc.

NAVY MODEL TBY-8 TRANSMITTING RECEIVING EQUIPMENT. Output 0.75 watts on M.C.W. telegraphy and 0.5 watts on telephony. Frequency range 25-80 mc.

AR.77's, AR.88's, NC.200, NC.45 (540 kc-30 mc AC/DC supply). MOS, 'HRO's and others.

All above items in excellent working condition with new valves, working demonstration on request.

TX VALVES. 803, 805, 807, 814, 861, 866A.

RX VALVES. IT4, 154, 155 and many others.

Large stock of transmitting condensers, crystals and other components. Alignment and repair of communication receivers and all other amateur equipment undertaken.

P.C.A. RADIO


Receiver Div.: 170 Goldhawk Road, Shepherds Bush, W.12. Tel. SHE 4946.

---

Short Wave Magazine, January 1952
SHORT SIZE 2F INCORPORATED H.R. PHONES, SELF-CONTAINED. FRAME AERIAL IN P.M. BAKELITE X 200/250V 50C/S. 0-110/210/240V AND 100/16/6. CASED, THEY D.C. IT. STRENGTH FULL.


MUS 9188

RADIO CLEARANCE LTD.
27, TOTTENHAM COURT ROAD, W.1

SPECIAL LINE TELEVISION COMPONENTS

Comprising Line Transformer with E.H.T. winding (gives 7KV using E.Y.51), Scanning Coils (low imp line and frame), and Focus Coil (res 10,000a, current approx. 20 ma). Special offer at 42/- the set, post 1/6, while they last.

MEDIUM-WAVE PERSONAL RECEIVERS


MOVING COIL METERS

2 in. Square bakelite case, 0/5mA, 6/6; 0-50mA, 7/6; 0-300V, D.C. with series res., 8/6; 2½ in. bakelite cased, 0-200mA, 9/6; all flush mounting. 3½ in. Projection Type, 0-3500V, series res., incorporated 16/6.

ROTARY POWER UNITS

Type 104. 12V D.C. input, outputs 250V 65MA, 6.5V, 2.5A, D.C. P.M. rotary on chassis with cover, size 8½" x 4½" x 6½", 7/6, post paid. Type 87, input 24v. output as Type 104, 6/6 post paid.

MAINS TRANSFORMERS

Primary 0-110/210/240V 50C/S. Sec. 300-300V, 80MA, 6.3V 2.5A, 4v 2A, 15/6, post paid. Primary 200/250V 50C/S. Sec. 6.3V 3A, automound, 8½, post paid. Primary 200/250V 50C/S. Sec. 280-0-280V, 60MA, 6.3V 2A, 4V 1.1A, 14/6 post paid.

P.M. LOUDSPEAKERS

6 in. P.M. New and Boxed, 12/6 post paid. 10 in. P.M. with Trans. 4500V, 33/6 P.P.

SMOOTHING CHOKES

5H, 200MA, 100 z 5/6. 20H, 80MA, 350 z 6/6. 8H, 250MA, 50 z Post paid 10/-

MANSBRIDGE CONDENSERS

4mF. 1000V, wkg., 3/6 each, 6/- pair, post paid.
SAMSONS
SURPLUS STORES

AERIAL MASTS R.A.F. Type 50 Complete kit consists of 9 Tubular Steel sections length 4ft. diameter 2in. Set of pickets, Tap plate, guys stay wires, and all fittings. Supplied Brand New in canvas carrying bags. Ideal for TV Aerial Masts. £3/10/- Carr. 7/6.

FIELD TELEPHONES Type D.S. in perfect condition complete with hand Ser. Single Headphone, and 2 1½v cells. £3/5/- Carr. 4/-.

FIELD TELEPHONE CABLE Type D3 on 1 mile Drums Brand New 55/- Carr. 5/-.

DESYNN TRIMMERS 12v Type No 167 10/6 post 9d.

HEAVY DUTY TRANSFORMERS Prim 180v 230v 30 cy. Sec. 14-20v 20 Amps £2/6 Carr. 2/6. Prim 200-240v 50v Sec. 6-3v 15amps £1/6 Carr. 1/6 Prim. 100-250v 50cy. Sec. 28-39-30-31-21 Amps £4/15/- Carr. 5/-.

PAINTON ATTENUATORS 5000 ohms in 75 ohm Steps 10/6 post 1/-.

169/171 EDGWARE ROAD
LONDON, W.2. Tel.: PADDINGTON 7851
125 Tottenham Court Road, W.1. Tel.: EUS 5982
Hundreds of Bargains for Callers

Edgware Road Branch Open All Day Saturday.
All orders & enquiries to our Edgware Rd. Branch please.

“SENSITIVE TRF RECEIVER”
(Amos & Johnstone W.W. November issue)

SMITHS
of EDGWARE ROAD
THE COMPONENT SPECIALISTS

Can supply ALL the parts as used by the designers, for this amazing receiver.

TOTAL COST about £7
Send for Complete Priced List of Parts.

H. L. SMITH & CO., LTD.
ELECTRONIC COMPONENT SPECIALISTS
287/9 Edgware Rd., London, W.2
Tel. Paddington 5891. Hours 9 a.m. to 6 p.m. (Thurs. 10 o’clock)
Near Edgware Road station, Metropolitan and Bakerloo

To HAMS & DEALERS
WE WANT TO BUY
AMERICAN SURPLUS EQUIPMENT OF EVERY KIND
FOR RADIO HAM SHACK—
NEW YORK’S LEADING DEALERS

RECEIVERS - TRANSMITTERS
TEST SETS - SIGNAL GENS.
EVERYTHING ELECTRONIC

We are interested in any quantity, from one upwards.

*Phone us immediately, transfer charge

SOLE AGENTS IN G.T. BRITAIN

ALTHAM RADIO CO., BRAZENNOSE ST.
MANCHESTER 2
Tel: DEANSGATE 5387

YOU CAN RELY ON US FOR BRAND NEW,
CLEAN COMPETITIVE COMPONENTS.
VALVE MANUALS.
BRIMAR, ORSAM, MULLARD, 5/- each.

VALVES
In addition to our large stock we again have a few of the following:

-6CS22, 7/-; -6ES4 7/-, 6h4 metal
4/6; 6FL2 10/-; ECC82, 8/-; EL22 (Mullard), 7/-;
2155, 4/6; 6D6, 6/6; 6ES7 Metal, 4/6; 6100 B, 5/-; 6AK6, 8/6;
6F6, 7/-; 77, 7/6; 7U8, 10/-; 337, 10/-; EF50, 7/-;
954, 5/-; CV1141, 4v Thyratron, 5/-.

MINIATURE SHORT WAVE TUNING CONDENsERS. 25 Pf. Single Section, Ceramic, Size 14 x 13 x 14ins. Spindle fin. 2 1/2. 25 Pf. do. 13 x 13 x 14ins. Spindle fin. 2 1/2. 30 Pf. do. 13 x 13 x 14ins. Spindle fin. 2 1/2. 65 Pf. do. 13 x 13 x 14ins. Spindle fin. 2 1/2. 25 Pf. Split Stator, Ceramic, Size 14 x 13 x 14ins. Spindle fin. 1 1/2. 5 x 5 of. ganged 2 1/2.

FILAMENT TRANSFORMERS
Finished in green crackle and of very small dimensions
2/10/240v to 6.3v at 1.5a. 8/6; 210/240v to 6.3v 3a 12/6.

SELENIUM RECTIFIERS
RM1, 4/6; RM2, 5/-; RM3, 6/-; EHT50, 22/6. EHT45,
20/6. 12v, 5ma meter rectifiers, 1/- each. WX6,
WX3, new midget type 3 1/2. 36EH7 100, 27/10.
1ma meter rectifier Westinghouse, 11/4.
LT51 12v. 12amps. Westinghouse 17/6.

SPEAKER TRANSFORMERS
Elsone B Ratio, 7/6; medium mains pentode, 4/-;
super midget for personals to match 354, DL95, 9/-

TWIN-GANGS
.0005mfd New, Complete with slow-motion drive and
drum, rubber mounting, standard size, 10/6.

TAXLEY
6 pole, 3 way 4/6. 4 pole, 3 way 3/6.

Don’t forget some posture, chaps.

RADIO SERVICING CO. DEPT. M/O 444 Wandsworth Road, Clapham, S.W.8
MACaulay 4155
CATHODE-Rayoscope 10 available 2/6d. stamp

Short Wave Magazine, January 1952
BROOKES of GREENWICH

Type “S”
Frequency range 100 kc/s to 15 mc/s. Black bakelite case 1½ ins.
high, 1½ ins. wide, 2½ ins. thick, with two ½ ins. diameter pins spaced ½ ins. centres.

World-famous for Crystals of Supreme Accuracy

BROOKES CRYSTALS LIMITED
10 Stockwell Street, Greenwich, London S.E.10

BROOKES CRYSTALS

BARGAINS in Test Gear, etc.
SPECIAL OFFER OF TEST GEAR. All guaranteed and Lab. tested. R.C.2/21 Frequency Meters 120 kc/s to 20 Mc/s accuracy 0.005%. Battery operated, complete with all charts and crystals, new £40. Meters internally as new but cases store soiled £30 to £35 each. Signal Generators, Wave meters etc. Sell for list.
MEGGER. EVERSHED AND VIGNOLES 5000 volts 2000 mgs, in poa. wood case.
RECORDING METERS. Everett Edgumbe 230 volts A.C. 3-0-3 milli-volts with extra marker. Pen operated from small solenoid, wall mounting, iron case, as new.
CONDENSERS 250 volt paper 2 mfd. 10/6 doz. 1-1 mfd. 7/6 doz., 8 mfd. 4000 volts, 4 mfd 1000 volts, 2 mfd. 2500 volts. Write for list.

ELECTROSTATIC VOLTMETERS Everett Edgumbe 2½ins. flush 1500 volts 65/- Voltmeters 2in. flush D.C. m.c. 0-20 volts 8½ post 9d. Ammeters to match 0-50 amps. 10/- plus 9d. post.
RESISTANCES. Variable double tube sliders 152 ohms 2 amps. all as new 30/- post 2/- single tube 300 ohms 1 amp 15/- post 1/-.

TRANSFORMERS double wound 230/110 volts 50 cycles £6/10/-, carr. 5/- Auto Transformers 220/110 volts Met-Vic. 500 watt £4/10/- carr. 5/-.
RECTIFIERS ½ wave selenium 500 volts 40 m.a. 7½. 20 volts ½ amp 15/-.
WESTINGHOUSE Metal Rectifier Units. Transformer and Rectifier in Vent. Metal Case, 230 volts 50 c/s, input 50 volts 5 amps. output £9. 50 volts ½ amp. £10/6 doz. carr. extra.
SUNDRIES. Dewar Key Switches 3/6. 125 watt Chokes 21/-. Pyo co-axial sockets, right angle entry 1/-. Plugs 528 or 628 9d. each. Telephone Plugs 2/6 Jacks 1/6.

ELECTRAX RADIOS
214 QUEENSTOWN ROAD, LONDON, S.W.8
Telephone : MACaulay 2159

R.C.A. TRANSMITTER ET4336.

UNUSED AND RECONDITIONED

THIS MAGNIFICENT TRANSMITTER IS COMPLETE IN ONE TOTALLY ENCLODED RACK AND INCLUDES AERIAL TUNING PANEL.


20 page manual and circuit diagram with each equipment. Every Instrument is Air Tested and Guaranteed perfect.

WILCOX GAY Crystal Multiplier for use with above transmitter. SPEECH AMPLIFIER British made with 500 ohm output, suitable for use with EF4336B.

R.C.A. ET4336 SPARES. Very large stocks of essential maintenance spares available.

McELROY-ADAMS Manufacturing Group Ltd.
(Sole concessionaries U.K. for Hallicrafter Communication Equipment)
The efficiency of your equipment depends on the solder that you use

Just a single faulty connection may interfere seriously with reception or transmission. Make sure that every joint is sound by using Ersin Multicore—the 3-core solder that ensures complete freedom from "dry" or H.R. joints.

Illustrated above is the Size 1 carton for Service Engineers and maintenance use. Price 5/- Each. Both sizes are obtainable at most radio and electrical shops.

MULTICORE SOLDER LTD., MELLIER HOUSE, ALBEMARLE ST., LONDON, W.1 • REGent 1411

Short Wave Magazine, January 1952
## Short Wave Magazine

**FOR THE RADIO AMATEUR & AMATEUR RADIO**

Vol. IX  JANUARY 1952  No. 102

### Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Editorial</td>
<td>651</td>
</tr>
<tr>
<td>Fundamental Drive Oscillator for Ten</td>
<td>652</td>
</tr>
<tr>
<td>by L. G. Blundell (G5LB)</td>
<td></td>
</tr>
<tr>
<td>Low Power Operating</td>
<td>653</td>
</tr>
<tr>
<td>by J. H. A. Neuth (G3EIN) and C. E. Sutton (G3ANQ)</td>
<td></td>
</tr>
<tr>
<td>Voice Operated Carrier</td>
<td>654</td>
</tr>
<tr>
<td>by N. C. Holman (ZS5GO)</td>
<td></td>
</tr>
<tr>
<td>Reception of SSB Telephony, Part II</td>
<td>655</td>
</tr>
<tr>
<td>by H. C. Woodhead (G2NN)</td>
<td></td>
</tr>
<tr>
<td>General Purpose RF Test Meter</td>
<td>656</td>
</tr>
<tr>
<td>by F. E. Winsfield (G2AO)</td>
<td></td>
</tr>
<tr>
<td>Amateur Radio Exhibition</td>
<td>657</td>
</tr>
<tr>
<td>DX Commentary</td>
<td>658</td>
</tr>
<tr>
<td>by L. H. Thomas, M.B.E. (G6QB)</td>
<td></td>
</tr>
<tr>
<td>Sideband Splatter</td>
<td>659</td>
</tr>
<tr>
<td>Abstracts of Interest</td>
<td>660</td>
</tr>
<tr>
<td>Random Jottings</td>
<td>661</td>
</tr>
<tr>
<td>by The Old Timer</td>
<td></td>
</tr>
<tr>
<td>VHF Bands by E. J. Williams, B.Sc. (G2NC)</td>
<td>662</td>
</tr>
<tr>
<td>Here and There</td>
<td>663</td>
</tr>
<tr>
<td>New OTH's</td>
<td>664</td>
</tr>
<tr>
<td>The Other Man's Station—G3ZI</td>
<td>665</td>
</tr>
<tr>
<td>The Sixth MCC—Club Contest Report</td>
<td>666</td>
</tr>
</tbody>
</table>

---

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

**Advertisement Manager:** P. H. FALKNER

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

Published the Friday following the first Wednesday each month at 85 Victoria Street, London, S.W.1.

Telephone: Abbey 2384

Annual Subscription: Inland 24s. Abroad 24s. post paid.

Copyright Reserved throughout the World

**AUTHORS’ MS**

Articles submitted for editorial consideration must be typed double-spaced with wide margins on one side only of quarto sheets, with diagrams shown separately. Photographs should be clearly identified on the back. Payment is made for all material used, and a figure quoted in the letter of acceptance. It is a condition of acceptance that copyright of all material used passes to the Short Wave Magazine Ltd., on publication.

THE SHORT WAVE LISTENER ASSOCIATED WITH THIS MAGAZINE IS SPECIALLY FOR THE RECEIVING ENTHUSIAST
Over 250 pages of technical data and circuit information are contained in the new Osram Valve Manual. Radio engineers and enthusiasts everywhere are finding it of constant assistance for reference.

**MAKE SURE OF YOUR COPY — SEE YOUR RADIO DEALER NOW!**

It contains, among other things, technical data on:
- Osram receiving valves;
- G.E.C. cathode ray tubes;
- photocells;
- germanium crystals and all other G.E.C. electronic devices as well as comparative and replacement tables;
- typical valve circuits, etc. etc.

5' (plus ninepence for postage and packing if you send for it)

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2.
Forward

Once again we are happy to be able to wish all our Readers, at home and over the seas, and our friends and supporters in the Trade, the best of good wishes for the New Year now upon us.

It will remain the purpose and the function of Short Wave Magazine to mirror activity and results on the operating bands, to present an even wider range of practical material on methods and techniques, and to comment freely (and we hope fairly) on all those matters of interest in the world of Amateur Radio.

The field of amateur endeavour is now far wider than it has ever been, and the number of those interested in Amateur Radio is, as we know, constantly increasing. Many of those licensed in recent years are qualified engineers, some with a high skill or a considerable reputation quite unconnected with radio as a profession. This is all to the good, and believing as we do that Amateur Radio is an important scientific hobby which can give great intellectual satisfaction, we are glad to welcome those newcomers who are professionally qualified in other fields. At the same time, there is plenty of room for and much to interest the junior beginner who just wants to build some simple gear and get on the air. And he is no less welcome.

Our good wishes to everyone who may read these words, and may this coming year be full of interest and achievement for us all.
Fundamental Drive Oscillator For Ten

DESIGN AND CONSTRUCTION

By L. G. BLUNDELL (G5LB)

ANY amateurs will, no doubt, be interested in a drive system which has been in use at the writer's station for the best part of two years, and which is completely free of the difficulties associated with television interference caused by harmonics arising from a low-frequency source of drive.

Between September 1947 and June 1948 operations on 28-30 mc (the only band used at G5LB) were subject to considerable curtailment, voluntary and otherwise, because of 42-45 mc harmonics generated and radiated from the Tritet CO/FD/PA transmitter. Many months were subsequently spent in "trapping" and filtering various circuits in the transmitter, and eventually a reasonable reduction was effected in the local field strength of the offending harmonic component. This state of affairs only held good, however, so long as no great change in operating frequency was made, and in the event of an appreciable change being necessary in the operating frequency, then it became essential, in order to keep the harmonic component down to the previous level, to re-tune the various traps in circuit.

Such a procedure was not particularly attractive, as a certain amount of flexibility was desirable from time to time, according to the state of activity on the band. Further, in the event of VFO facilities being incorporated in the transmitter in place of a range of crystals, the comparative inflexibility imposed by the high-Q trap circuits would be even more aggravating, and, in the writer's private opinion, the general situation was rather indicative of that where one can lose on both swing and roundabout!

Practical Philosophy — "Straight Through" Operation

Consideration of causes and effects impelled the train of thought toward the obvious-enough answer: that if natural order harmonics were to be "barred" below, say, 50 mc, then the fundamental frequency cannot be below 25 mc. On the other hand, harmonics in the 50-60 mc spectrum might very well be, under certain circumstances, an embarrassment. So, the circumstances required for 28-30 mc are that the fundamental frequency be also the operating frequency (or vice versa if you prefer it that way) and, possibly, no second harmonic worth speaking of. As the latter contingency can be taken care of by means of a well-balanced push-pull final amplifier, the prime question is the appropriate type of oscillator for use on the frequencies concerned.

Oscillator for 28-30 mc

For some reason, or reasons, the use of stable self-excited oscillators in the higher HF ranges seems to be restricted (in a very general sense) to receiving equipment, although it is evident that the high orders of frequency stability demanded in such employment (and comparatively easily provided) could be more often utilised in a transmitting frequency source, where, by and large, reliance is placed on quartz plate control (operated in fundamental or harmonic mode), and a number of plates provided to give the required frequency range.

So far as the writer was concerned, quartz control was immediately "out" because of cost and inconvenience, and a good alternative had to be found. The problem was referred to standard and accepted professional text-book treatment of the subject, and after due thought had been given to the physical and mechanical requirements of this, that, and the other circuit, a final choice was made in favour of the standard electron-coupled Colpitts circuit, with but one modification. The modification consisted simply of replacing the normal...
coaxial cable to act as a linear (or near linear) circuit.

**Design and Construction of the 28-30 mc ECO**

Having made the choice of circuit with the single component modification noted above, a prototype was made up for test and experimental treatment, and Fig. 1 shows the circuit and components as used by the writer. It will be appreciated that the HT voltage regulating components can well be on the power supply chassis, but since these components are actually a very important part of the ECO as a whole, they have been, for the purpose of reference, included in the diagram.

It will not be out of place at this point to state that, in the construction and operation of a stable oscillator for the frequencies in question, due regard must be given to all those circumstances and conditions which can and will affect the overall stability characteristics of the circuit, i.e., internal and external screening of the valve, complete screening of the respective “input” and “output” sections of the circuit, and, equally important, mechanical rigidity in chassis work and the mounting of components. These latter requirements are all the more important where the ultimately amplified and radiated signal frequency is the same as the oscillator frequency.

---

**Table of Values**

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>30-40 µF, midget tuning</td>
</tr>
<tr>
<td>C2, C3</td>
<td>20-30 µF, midget trimmer</td>
</tr>
<tr>
<td>C4</td>
<td>10-50 µF, silver mica</td>
</tr>
<tr>
<td>C5, C6</td>
<td>2.2 µF, silver mica</td>
</tr>
<tr>
<td>C7</td>
<td>800 µF, silver mica</td>
</tr>
<tr>
<td>R1</td>
<td>100,000 ohms, ½-watt</td>
</tr>
<tr>
<td>L1</td>
<td>Close-wound on small former to self-resonate at 28 mc</td>
</tr>
<tr>
<td>RFC</td>
<td>Standard RF choke</td>
</tr>
<tr>
<td>VR2, VR3</td>
<td>S.130 stabilisers</td>
</tr>
<tr>
<td>Valve</td>
<td>807</td>
</tr>
</tbody>
</table>

The same high order of inter-circuit and external screening must also be achieved in respect of all the isolating or buffer stages which complete the drive unit. (To this end, the writer cheerfully admits to having spent all of three months in arriving at a physical and mechanical design which met the various requirements, before daring to put an ECO controlled signal on the air!)

Fig. 2 shows how a great deal can be achieved by way of screening-up the circuits when using 807-type valves. The components can be nicely placed round the respective ends of the valve, and, when all are mounted and wired up, the end sections can be completely boxed in.

To those amateurs wishing to use valves other than 807's, e.g. single-ended types, it will be apparent that more normal types of chassis can be employed. Under these circumstances, however, it must be realised that the matter of external screening, and screening between input and output sections of each stage, must be made as complete as possible.

As Fig. 1 shows, there is nothing "fancy" about the circuit or the various components comprising it, and, providing it is constructed with reasonable care, it will give a signal which is comparable with many lower frequency counterparts.

**Checking Oscillator Performance**

For the purpose of initial running tests, leave off the chassis end-covers, and, assuming a valve has been inserted, connect up to an appropriate power supply, the HT side of which is known to have fairly good regulation, and to be well smoothed. Switch on power and, after valve has thoroughly warmed up, note reading on HT feed meter. Check that the reading is reasonable for the valve in use considering the anode and screen volts applied, and the fact that the circuit is, as yet, in a non-oscillating condition (or should be so).

If all is so far in order, procure a 7-ft. length of 80 ohm coaxial cable, fix a
temporary shorting contact between inner and outer conductors at one end, and attach a proper coaxial-type plug at the other.

Next, set C1, C2 and C3 at half capacity and then plug the coaxial cable into the socket provided on the ECO chassis. Having done this, note reading on HT feed meter. If the reading has dropped substantially, and the new reading is steady, it may be taken that the circuit is now oscillating fairly readily at a frequency which has yet to be determined.

Leave the oscillator running; in the meantime, bring into use a well-calibrated receiver, and set up to cover the range of, say, 20 mc to 30 mc. Allow the receiver to warm up thoroughly, then switch in BFO. Now search for the signal from the ECO, the strength of which, when located, should leave no room for doubting the source of the signal.

Having located the ECO signal, tune for a beat-note of about 1 ke and let things run at that for the next fifteen or twenty minutes (the receiver should be operated with RF gain control backed off as far as possible). During this period just sit back and listen pretty carefully, and critically, to the beat-note produced by the receiver. The beat-note, if the ECO is in fair shape, and the receiver ditto, should be in the region of T8 to T9. If, however, it is worse than T8, then the power supply HT smoothing should be checked for ripple. If the HT supply is known, or found, to be as near-as-no-matter pure DC, then it would be as well to check the ECO valve for poor heater/cathode insulation. If these two items prove faultless, then whole set-up—ECO, power supply and receiver—should be checked for "out-of-place" AC.

Assuming that the beat-note qualifies at least for T8, the next step is to get the ECO frequency up into the 28-30 mc band. This is very easily accomplished by pruning-down the coaxial line 6 inches at a time (replacing the shorting device after each cut, of course) and locating the new frequency each time on the receiver. On arrival at a frequency of 26/27 mc, the next few cuts off the coaxial line should be made in steps of about ½ inch at a time, until 28 mc is reached; then stop cutting and make a better job of the short circuit between inner and outer conductors by lightly soldering together. Let the ECO

---

**Fig. 2. Chassis design for the ECO-Driver, on the lines discussed in the text.** The "A" and "D" sections can be in 16-18 g. aluminium or dural; "B" is a small tin can or tube to clear valve envelope; "C" is ⅛ in. or ⅜ in. angle, in the same material as "A" and "D." The sketch at lower right shows how the chassis can be assembled head-to-tail. A rigid sub-panel must be provided to mount C1; when bending up section "D," dimension "X" should allow for a close fit over the outside faces of the bracing members "C."
run for another five minutes, and note whether the frequency remains fairly stable. If it is found that the frequency “jumps” slightly, but erratically, it will be necessary to check all soldered connections in the ECO circuit, including the end connections to all resistors and condensers, and valve pin/socket contacts, and so on. As it is very easy to be misled in this particular matter, a check-up should also be made on the receiver and the power unit supplying the ECO.

If and when the signal is stable (apart, maybe, from slight drift), power may be taken off the ECO, and end covers fitted over the open ends of the chassis. In doing this, remember to provide lead holes for the power leads and for the connecting lead from C7 at the anode end of the chassis. Remember also to provide some ventilation apertures in the anode “box,” or, alternatively, use a good-quality metal gauze for the cover, which material will give both adequate screening and ventilation.

**Final Adjustment and Checks**

Now, with the ECO chassis fully screened up, and all retaining bolts, etc., tightly screwed down, it is possible to proceed with the final setting up of the circuit and check for long-term stability. First, re-set C2 and C3 to one-third of maximum capacity. Second, connect a 10,000 ohm one-watt resistor to the end of the lead from C7 and to chassis (this provides a temporary load circuit). Third, ensure that C1 is still set at half-capacity, and then re-apply power to the circuit. In consequence of the adjustments to C2 and C3, the operating frequency will now be higher than before, and the new frequency should be logged on the receiver. Next, set C1 to maximum capacity and again locate, on the receiver, this last (and lower) frequency, which will, most likely, be in the region of 27 mc. Leave C1 at maximum capacity, and again prune-down the length of coaxial line in cuts of one-quarter of an inch at a time until, with a good short circuit between inner and outer at the cut, the frequency comes up to 28 mc dead on zero beat.

At this point remove the temporary short-circuit and, stripping off a little of the insulation, solder inner and outer conductors together. It is most important that a thoroughly good job be made of this, both electrically and mechanically. The best method is to leave about one-quarter of an inch of the inner conductor protruding, perfectly straight.

---

![Fig. 3. Circuitry for a simple broad-band inter-stage coupling for the 28-30 mc Exciter. See text for details and table for values.](image)

**Table of Values**

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1, C2, C3</td>
<td>.006 µF mica</td>
</tr>
<tr>
<td>C3, C4</td>
<td>500-1000 µµF, silver mica</td>
</tr>
<tr>
<td>R1</td>
<td>8,000 ohms 5-w.</td>
</tr>
<tr>
<td>R2</td>
<td>1,000-2,000 ohms 2-w.</td>
</tr>
<tr>
<td>RFC</td>
<td>Standard RF choke</td>
</tr>
<tr>
<td>L1</td>
<td>Close-wound to self-resonate at about 28.5 mc</td>
</tr>
<tr>
<td>L2</td>
<td>Close-wound to self-resonate at 29.5 mc</td>
</tr>
<tr>
<td>Valves</td>
<td>807</td>
</tr>
</tbody>
</table>

(Note: L1/L2 comprise broad-band coupler)

---

**Setting-Up Tests**

All is now ready for the main “proving” test, but before starting this, rotate C1 from maximum to minimum capacity and note from the receiver what tuning range is available. With good quality coaxial line and similar quality construction in C1, C2 and C3, the tuning range should be at least 1.5 mc. The upper frequency limit depends...
on the self-capacity of the coaxial line as reckoned against the various other fixed circuit capacities. After this check, take all power off the ECO and allow it ample time to get "stone cold," but, in the meantime, leave the receiver running and bring into service a sub-standard frequency source such as a 100 kc oscillator, with, if possible, a multi-vibrator giving 10 or 5 kc check points.

Set up receiver (BFO off) on the 29 mc harmonic from the sub-standard. This signal should be made heavy enough to give S5 to S6 on the receiver-carrier meter (or something of the same order if judged aurally). Now switch on power to ECO and, immediately the HT order meter indicates power to ECO and, immediately the HT carrier meter (or something sufficient) is heard, tune the ECO feed meter indicates an oscillating, quickly tune the ECO valve and, immediately the HT order of the oscillator, with, and bring into service the above-mentioned average frequency. After checking the amount of drift, but at the end of the five-minute periods tune the receiver from the sub-standard signal to the middle of the ECO signal, and thus measure the drift to some degree of accuracy. After checking the amount of drift in each period, the ECO should, of course, be re-tuned to zero beat with the sub-standard signal.

At G5LB the average drift checks as follows: In the first five minutes (from cold start) 10 kc; at the end of second five minutes, 3 kc; at end of third five minutes, 1 ½ kc; at end of fourth five minutes, less than 1 kc. From then on the frequency holds to within a few hundred cycles of the sub-standard frequency. In cases where the amount of drift is appreciably in excess of the above-mentioned average figures, judicious raising or lowering of screen voltage to the ECO valve will effect some control over the amount and direction of drift. If the indications are that a lower voltage than that obtaining at the junction of the S.130 regulators is required, then a resistance (of generous rating) of appropriate value should be inserted in the feed line to the valve. If a higher voltage is required, then the upper S.130 should have some parallel resistance placed across it.

**Buffer Stages and Circuits**

It is not thought necessary to treat this part of the equipment in detail, since technique and operation are much the same as for lower frequency work.

However, it will not be out of place to make several recommendations which are appropriate to the "straight-through" method of operation on the frequencies immediately concerned. Such recommendations apply to the electrical operating conditions and physical design of the various stages involved.

In the first place, no less than three buffer stages should be used between the ECO and the final power amplifier. These stages should be operated Class A, B, and C in that order. All these stages should be run with DC inputs well within valve ratings for each condition of operation. With the ECO giving complete VF facilities, it is, of course, necessary that the RF coupling circuits in the successive buffer stages be of the aperiodic or semi-aperiodic variety. Properly designed "broad-band" couplings will, of course, be most satisfactory, but rather expensive. Alternatively, a very useful amount of "broad-band" characteristic can be achieved by the use of RF chokes and "self-resonant" coils in capacity coupled circuits. Fig. 3 gives an idea of the very simple, but effective, arrangements used by the writer.

With regard to the physical and mechanical design of the various buffer stages, it is strongly recommended that the screening provided between input and output circuits of each stage be made as complete and as thorough as possible. Likewise, the external screening of the same stages should be every bit as good as that provided for the oscillator.

It is further recommended that the completed drive unit, comprising ECO and the three buffer stages, be split, from the power supply point of view, into two sections, i.e. ECO and Class A buffer (run continuously) with common power source; Classes B and C buffers with common power source. Under these circumstances, the "drive on/off" switching should be operated in the Class B stage, and keying for CW in the Class C stage. Appropriate metering facilities should, of course, be incorporated in all feed circuits.

As stated in the opening paragraph of this article, equipment such as described has been in use over a period of nearly three years, with an average run of three hours per day, and, in spite of pretty severe manhandling at various times, has maintained the high order of operational stability previously mentioned.
Low Power Operating

QRP v. QRM

By J. H. A. NEWTH (G3EJN) and C. E. SUTTON (G3ANQ)

In the previous article, “Beating the QRM” (Short Wave Magazine, December, 1951) the technical considerations involved in reducing interference by rational use of power were discussed. The authors, in arriving at their conclusions, employed a three-watt signal with such unexpected success that they deviated somewhat from their original intention in order to prove how effective such a low input could be. This article describes the operating methods they had to use, as an example of what will soon be common practice with increasing QRO interference, and as a basis of what will be necessary if any serious attempt is ever made to reduce it in this country on 80-metre CW by the use of minimum power for domestic communication.

There is a general assumption, invariably stressed in any article on QRP (in this Magazine or any other) that Low Power contacts are extraordinary, and difficult if not impossible through the heavy interference of powerful stations, and that favourable times must be chosen if such work is to be successful. But when G3EJN, at Bristol, attempted to get his 3-watt signal through to G3ANQ on top of a 100-ft. building in West Central London in the worst QRM ever known on “Eighty,” both operators were soon forced into an entirely new attitude towards QRP working.

On the London aerial the strength of the QRO stations is simply enormous; many of those mentioned in the previous article, when properly tuned-in without any excessive amplification, are clearly readable on the speaker far out on the roof over 100 ft. from the cabin door. It was soon realised that this interference would not only have to be faced but worked through, and so, hopeful but not very sanguine, the two operators set out to find a way through the screaming barrage of QRM.

The Competition

Hemmed in and almost obliterated by the tremendous carriers of stations running inputs up to 50 times their own, hammered by key clicks, flogged unmercifully by raucous ripple and bullying phone, tormented by chirping CW and the “yip” and “twizzle” of galloping VFO’s, night after night, through February, March and April of last year, for two hours on end the two QRP stations worked doggedly on, testing and reporting, and finally rereading when the night’s work was done.

That frequency shift, occasional repetition, and call and counter-call, were necessary to maintain contact and give proper signal reports will be obvious; but no QSO was ever abandoned, nor was contact ever lost, save for a few minutes on some occasions, when EJN attempted to fight his way through on a new and often “weaker” aerial. Encouraged by continual practice, emboldened by many a hairbreadth escape, the authors came to realise that they could not only survive but actually fight the QRO, and this spurred them on to increasing audacity, out of which came a new technique, which previously they would never have considered workable.

This technique is founded, in the first place, on a perfect understanding between the two operators, a mutual determination not to be put off by any kind of interference, close appreciation of receiver selectivity, precise variation of frequency, and rock-steady transmitter note. In the second place, they developed an operating method which calls for special description, since, evolved from sheer necessity, it proved to be their only chance of survival.

The Method of Meeting the QRM

At first, when heavy interference was encountered, ‘EJN stood by while ANQ searched frantically for a quiet (?) spot, till one awful night, faced with a band one mass of stations, they decided, in ‘EJN’s pathetic words, to “stay here and...
go under together"! They won through that desperate moment, from which they never looked back, and so the new technique was born: a technique of short overs, "beat note change," "dodging the blot-out" and "kiling through."

Break working was employed by 'EJN, while 'ANQ used a C/O switch. It cannot be too clearly emphasised that overs must be short, otherwise contact will soon be lost. Break working helps, but cannot be relied upon exclusively, as the weak breaking signal is often inudible against the tremendous background. Call-signs also must be kept to the minimum; there is a general tendency to overdue them, and this must be avoided. The Post Office requires each station to identify itself and its contact, by sending both call-signs in the prescribed manner at least once every ten minutes, and, provided this is done, they have no objection to break working. On the other hand, to work break continually without call-signs is as foolish as it is illegal, as two QRP stations in heavy interference must keep rapid and constant identification or lose contact.

VFO is essential; no crystal-only station would last five minutes in the conditions under which the authors often worked, even if several channels were available. This is due to the vital importance of a small frequency change, discovered accidentally under the desperate conditions just described. With this must be considered "blot-out," or "QBO," to give it the signal invented by the authors to measure and give warning of this particular menace.

Depending on receiver selectivity and RF gain employed, the swamp or blot-out effect of a powerful station extends several kc either side of its frequency. The actual strength of the wanted signal has constantly to be considered, as well as the amount by which it is reduced. As no signal exists to warn the distant operator of this, the authors appropriated QBO, which has an aircraft significance which does not matter. QRM, also employed, works upwards in S-points, from 0 to 9, as is well known. But OBO works downwards, from 8 to 0, giving the nett S-value of the previously reported signal, thus: S6, OBO4, QRM3, or briefly: S6, B4, M3—a state of affairs often encountered.

With the wanted signal hemmed in between two powerful stations, its S6 reduced two whole S-points, as in the above example, and a QRM of S3 besides, the receiving operator may need some help to pull the traffic through. Surprisingly, all he often wants is a QSY of a few hundred cycles, enough to give a clear beat-note difference from the QRM3 just mentioned, and for this the authors signalled "up" or "down" as needed. If the greater shift was required, the necessary figure of kc was added, and by this simple means contact was maintained under apparently impossible conditions.

In Practice

Incredible as it may seem, the greatest shift has been only 8 kc off the schedule channel—frequently, less than half this—a movement which, at the outset, the two operators would have thought unbelievably small. Receiver selectivity and radiated signal strength have much to do with this at both ends; the essential thing in this working is to provide sufficient margin against QBO, which always appears suddenly. To move too far is, invariably, to plunge into fresh or worse interference.

Phone is another menace; also strong ripple—and here, perhaps, the two operators scored their greatest triumph. In London, the telephony jam is, of course, appalling, but G3ANQ's BRT400 has both crystal and audio filters, which strip the sidebands most effectively. Thanks to this "kiling" effect, ripple and telephony have been made bearable, and once, for twenty glorious minutes, G3EJN in Bristol was read clearly straight through the heart of a roaring phone!

Chirp requires particular mention. 'EJN would have been quite impossible to read on most occasions without his steady note with its trace of heavy undertone. Drift, of course, is fatal, as often there is literally no margin either side. But chirping QRM is deadly, as its clapper-like effect, moving to and fro across the wanted signal and, especially, the filter channel, makes note discrimination almost impossible.

Several other points need emphasis. Instant come-back is vital; if no answer was heard, either station would query or start calling in a few seconds, listening meanwhile for break, or instructions to move out of sudden interference; contact cannot be maintained without such rapidity and resource.

Important also is accurate, steady sending and, especially, clear word-
spacings; the average speed was 14 to 16 w.p.m., with occasional excursions up to 20. There was no waiting for QRM to finish: the two stations would never have worked at all had they adopted this popular practice. Neither was there any running away from QBO—merely a movement enough to minimise it if excessive. The correct adjustment for this, the ordering of the distant operator, and interpretation on his part, are matters of some mutual skill and practice. It is difficult at first to believe the penetration of a 3-watt signal among powerful stations and instruct accordingly; also to give, when ordered, the exact touch to the VFO for the critical beat-note change on "up" and "down." The tendency is to go too far—about 1 kc—which may make reception hopeless at the other end. It goes without saying that VFO and receiver must be accurately calibrated.

Control Signals

To facilitate understanding, each ordered the other on the old sea principle that the operator receiving is, for the moment, in control; "k" or "nw k" being often added to his orders to signify "go ahead at once without acknowledgment" as in marine practice, which saves vital seconds. This simple method, with the abbreviated signalling of QBO, QRM and frequency change already described, is clearer, safer and faster than any use of QSV, QSY, QSU or QSW. They were tried and abandoned as too clumsy and time-wasting for the rapid "push-to-talk" style working so necessary for continuous contact—and survival.

Finally, those who attempt this type of CW work should realise that nothing makes up for the ability to read Morse through interference and a determination to take on all comers regardless, and fight them to a standstill; for the comparatively quiet channel invites endless interference from QRO operators who do not listen and phone stations who do not care.

The authors, who succeeded far beyond their expectations, feel that there is more and better work to be done in workshop and on the air in the furtherance of this worthy and exhilarating sport, and hope that their modest experience may be an encouragement to Low Power operators in securing fresh triumphs for QRP, to the ultimate benefit of Amateur Radio.

Shielded Link Construction

INCREASING COUPLING

By R. YOUNG (G3BTP)

THE shielded link constructed of coaxial cable is gaining great favour in amateur circles, since it provides a simple way of obtaining inductive link coupling with a minimum of capacitive coupling. In use, however, there are occasions when insufficient coupling can be obtained with the single-turn link available when coaxial cable is used in the construction.

To obtain increased coupling, a two-turn link can be made just as easily by the use of 70-ohm screened twin cable instead of coaxial cable, which gives the necessary freedom from capacity effects, yet permits of greater linkage. Its construction can best be seen from the accompanying diagram, which is self-explanatory.

It is hoped that this extension of an original idea may prove helpful in those cases where the maximum of coupling is required.

Construction of the two-turn shield link.

Short Wave Magazine, Volume IX
Voice Operated Carrier

DISCUSSING A PRACTICAL CIRCUIT

By N. C. HOLMAN (ZZ5GO)

WE have become so used to the present system of transmitting a steady carrier, and then adding audio to it up to 50% of the carrier power, that we are apt to regard it as the only possible system.

However, radiating a constant carrier is a great waste of power, and it might be preferable to vary the carrier at a sub-audio frequency so that its power at any instant is just sufficient to allow 100% modulation with the audio power at that instant. Such a system has been attempted since the earliest days of radio-telephony, with a view to obtaining another advantage of the system—namely, that no send-receive switch would be necessary, since as soon as the operator stops talking, the carrier will also cut off. The latter advantage has not been so easy to realise in practice.

Note that Voice Operated Carrier is not the same as the suppressed carrier used in SSSC (which transmits one side-band without carrier), nor is it the same as Super-modulation. Nor is the V.O.C.S.U. (Voice Operated Carrier Switching Unit) of some Marconi transmitters the same, since here the audio power actually operates a relay to switch the transmitter on and off in the usual way.

It would be convenient to refer to the normal system of modulation as commonly used today as Constant Carrier. The name Voice Operated Carrier would apply to all cases where the carrier is varied at a sub-audio frequency in addition to being modulated at the audio frequency. One form of V.O.C. is the Constant Modulation system (to which this article refers), and independently of this, there will be the usual division into Plate or Screen Modulation, and also there will be Plate Control or Screen Control, according to where the carrier control is applied. Then again, there can be High Level or Low Level modulation and control, depending on whether the modulation and control are applied to the final amplifier or to an earlier stage.

It is easy to represent the Constant Modulation system pictorially. The radio frequency oscillations are supposed to be so rapid that they are not seen individually, but as a shading—as in fact they are seen on an oscilloscope screen. The audio is supposed to be a single word, or sound, and the waves have been reduced in number for clearness. The oscilloscope should be set to a low frequency sweep triggered by the commencement of the audio. The great waste of carrier power is clearly shown. (Fig. 1.)

One such method of obtaining Constant Modulation is to use a special

![Waveform shapes to illustrate the discussion in the text.](image)

This article discusses a VOC system applied to the screen of the final RF amplifier. It is shown that while satisfactory operation can be obtained, the system holds no great advantage over the more usual AM control methods. On the other hand, there is ample scope for experiment in the development of fully effective VOC circuits.—Editor.

Short Wave Magazine, January 1952
Practical Considerations

The first weakness is the result of applying the control voltage to the screen grid, and it is that the carrier does not cut right off when not speaking. The screen volts do go down to zero, but the carrier remains at about 20% of its normal value, a manifestation which will be well known to all who have tried keying a CW transmitter in the screen of the final amplifier. A negative voltage can be applied to the screen, but it cuts down the maximum of the carrier as well as the minimum—the fact is, that with normal valves (this article refers mainly to the 807 and 813) the screen has not got a sufficiently high mutual conductance to give the control required (and the same limitation applies to screen modulation also, although this is incidental to the present case). But some small negative voltage can be used, and this is shown in the circuit (Fig. 2) as being taken from the final grid leak, avoiding the necessity of a bias battery and not introducing any undesirable complications. About 20 volts is a good value—with two 807's in parallel and a grid drive of 6mA, 30 volts will be available across a 5,000 ohm resistance in series with the usual grid leak.

The second point is that not enough control voltage is available. Heavy overmodulation occurs on louder passages, and the carrier cannot be driven up high enough to obtain the advantage of being able to run the PA at higher power than normal ratings. A screen milliammeter is necessary as well as a plate meter, and ideally the plate current should swing up momentarily on speech to 40% more than the final would normally be run on Constant Carrier.

A third disadvantage applies to all cases where the control voltage is taken from the modulation transformer, and is that the condenser C2 heavily loads the secondary (through the rectifier) and cuts the highs, making the speech very deep and muffled. Inserting a small audio choke in the output from the rectifier (both leads in the case of the voltage-doubler circuit) obviates this at the expense of a further fall in the already inadequate DC control voltage.

The condenser C2 in Fig. 2 is of importance because it defines the time-constant of the control voltage, and holds the carrier on between words. The maker's figures for the screen grid of the 807 are 6 mA, at 275 volts (with 600 volts on the plate) which represents a resistance of 46,000 ohms (or 23,000 for two valves in parallel).

Neglecting R1, which should be high enough not to load the circuit too much, say 100,000 ohms, this requires a value of 0.4 µF for a time constant of a fiftieth of a second (one valve) or 0.8 µF for two valves in parallel. The
rectifier does not have to be taken into consideration in this calculation as the charge cannot leak away through it.

**Satisfactory Solution**

A circuit which overcomes these difficulties is given in Fig. 3. A separate channel is used for the carrier control, and it is much more successful than the previous circuits in getting peak power out of the finals, though it still does not solve the problem of obtaining complete carrier cut-off. A gain control is fitted to the audio channel, and the control channel is always run wide open.

After considerable tests with this transmitter its good and bad points can be enumerated. It certainly works according to the book. Using a 60-watt 220-volt lamp as an artificial aerial switched in to replace the 300-ohm line, the lamp does not glow when not talking, but it lights to full brilliance on whistling into the mike. The screen current (with two 807's in the final) swings from zero to 20 mA and the plate current from 20 to 120 mA (with no bias on the control rectifier). There is plenty of output from the control rectifier, so that some negative bias can be applied for cutting down the idling carrier. The question of distortion does not arise since the control circuit does not now load the modulation transformer.

Reports on this transmitter always mention a very high background noise when not speaking. Actually the noise was normal, but it seemed much greater since it was applied to a much smaller carrier, and its effect was still further exaggerated when the receiving station was using AVC. Undue background noise (as when using a carbon microphone) must be avoided, since it would hold the carrier on, and a muting device might be added.

When testing this transmitter with a steady audio note, the 'scope pattern and the meter readings are indistinguishable from the normal system. The
Long before the advent of power tetrodes a controlled carrier system was used in which a Class-B modulator system was connected in series with the plate lead to the triode final, and no doubt the advantages and disadvantages of the scheme were then fully disclosed, and the whole matter was forgotten for many years till its recent revival.

All in all, unless some new feature is introduced (such as a special valve with high mutual conductance of screen and suppressor grid to plate) this system is unlikely to replace our present high level modulated Constant Carrier sets. The present system which links up with receiver design using AVC is after all pretty well established and it would be a revolution to alter it.

---

**Reception of Amateur SSB Telephony**

**Further Notes on Receiver Adjustment**

Part II

By H. C. WOODHEAD (G2NX)

HAVING become proficient in the SSB tuning procedure, one may examine the results a little more closely.

If the transmission is a good one, having adequate suppression of the unwanted sideband, there will be a narrow band A, over the whole of which intelligible, even good quality, speech will be received, as shown in Fig. 2; but, in exploring this band more closely, it will be found that there is only one point, B, Fig. 3, where speech which is a true reproduction of the speaker's voice, is received. On either side of this point the voice appears to be higher or lower in pitch than is normal. This is only, to a small degree, insufficient to render it unintelligible; indeed, without knowing the speaker's natural voice, any point in this band would pass as satisfactory. In other words, there is a small amount of latitude of adjustment in this area.

If the transmission is not a perfect single sideband—that is to say, if some appreciable amount of the unwanted sideband is present, this will show up in the part marked A of Fig. 2. It will no longer be true that there is some latitude either side of the point B, Fig. 3. The raising or lowering of the voice pitch will be noticed on either side of B, but it is accompanied by what is
best described as a "frog in the throat" effect. The point B is very difficult, if not impossible, to find. This is especially noticeable if the unwanted sideband is only slightly suppressed, and in this case the raising and lowering of the pitch is not nearly so clear. Each side of B the voice seems to go both guttural and tinny at the same time, so that it is impossible to distinguish one side from the other. When adjusted very close to the point B, a kind of beat note may be heard in the speech, which is only present when speech is passing. The beat is due to the error in setting the BFO and is caused by the beating together of the two sidebands, which are different from each other by twice the error of the BFO. This is much easier to observe if tone is being transmitted instead of speech.

Testing with Tone

It is probably reasonable to say that every SSB station should have a source of pure tone permanently on hand for testing, for it is almost an essential for assessing the quality of the transmission. It may therefore be of interest to consider how the transmission will be received in this case.

If the transmission has already been adjusted by the BFO to give good speech and the transmission is as it should be, only one frequency will be discernible in the receiver, which will be the same as the original tone transmitted, but will be caused by the beat due to the difference in frequency between the BFO and the transmitted frequency (transferred to the IF of the receiver.)

This tone frequency can be reduced to zero by shifting the BFO until it agrees with the transmitted frequency. Any carrier present would now appear as a faint tone of the same frequency as before. The loudness of the two tones in these conditions may be used as a measure of the two signals—sideband and carrier. It may be that no carrier is heard at all, though it is sometimes an advantage to the receiving end if some carrier, at very low level, is put out by the transmitter.

This method of measurement will be made clear by reference to Fig. 4, which shows one sideband and reduced carrier. If the BFO is set to zero beat with the carrier B, then A will be heard as a 1000-cycle tone; if the BFO is set to zero beat with the side frequency A, then B will appear as a 1000-cycle tone of lower level.

The case where there is some unwanted sideband as well as carrier is shown in Fig. 5. First, if the BFO is set exactly to zero beat with the residual carrier B, a 1000-cycle tone will be provided from each side-frequency A and C. If, however, the BFO is displaced towards C by as much as one cycle, then C will appear as 999 cycles and A as 1001 cycles. There will also be a slow beat of 2 cycles per second, which will be proportional to the amplitude of the unwanted side frequency C. It is this latter which causes the "frog in the throat" effect on speech.

It is interesting to consider the same test on a perfect transmission, with no unwanted sideband. The resulting tone in the receiver would be 1001 cycles instead of 1000, and it is doubtful whether many of us would be able to detect the difference! It is the beat with the unwanted sideband which causes all the trouble and necessitates its suppression.

Returning to the case shown in Fig. 5 and setting the BFO to zero beat with the wanted side-frequency A, then B will appear as the 1000-cycle tone and C its second harmonic. An hour spent in tuning around on the lines indicated above will go far to elucidate the mysteries of SSB.

Receiver Improvements

There are, of course, one or two directions in which the average com-
munications receiver fails to make the most of the advantages of SSB working. Notably, the first oscillator—which is usually the most critical one—may be lacking in frequency stability and, in consequence, it may be necessary to re-tune the BFO continually to compensate for drift. Not that this is an insuperable difficulty; it can usually be overcome by stabilising the HT supply to the first oscillator with a VR 150 (which ought to be done in any case).

Then there is the question of bandwidth. SSB uses less than half the bandwidth of the ordinary AM system, and, to take full advantage of it, the receiver bandwidth should be cut down to suit. This can usually be done by employing a fairly narrow band in the case of a receiver provided with a switched bandwidth. If SSB, occupying less than 3 kc, is received in the full-bandwidth conditions, which may be ± 6 kc (that is, a total width of 12 kc), noise and QRM will be received over the whole 12 kc and will be four times as great as if the receiver band was cut down to 3 kc. It should be borne in mind, in this connection, that the narrower bands, such as 3 kc, on the average communications receiver are likely to be similar to A of Fig. 6, whereas ideally they should be like B.

Again, on some types of receiver one finds that there is a tendency for the BFO to "pull in" on low frequencies. The principle is that if a stable oscillator is supplied with a small amount of power at a frequency very close to its own, it is liable to "lock on" to this frequency instead of its own. The effect depends on the power of the external signal and the proximity of the two frequencies. The higher the power and the closer the two frequencies, the more likely is it to occur. The effect is familiar to anyone who has constructed converters for use on VHF bands. The condition is illustrated in Fig. 7, where A shows the case where there is no pulling and an audio frequency is obtainable right down to zero beat. When pulling is experienced, the beat frequency falls to zero some way before the zero point is reached, and the BFO is held in synchronism with the signal right through to the same point on the other side of what would have been the zero point. This is shown in B, Fig 7. It can be checked on any receiver by tuning to a steady carrier, switching on the BFO and tuning it through zero to ascertain the lowest frequency which can be obtained without the oscillator being pulled into synchronism. The result can be compared with that obtained when using a heterodyne wavemeter to produce a beat in a local receiver from an incoming carrier. In this latter case beats can be produced down to one every few seconds without pulling in.

The pulling of the BFO depends largely on the form of coupling between it and the final IF stage. It may be avoided by using a separate heterodyne at the signal frequency, as indicated above, instead of the IF, provided some instrument like the BC-221 is available. Many SSB stations use the leak signal from the VFO of their AM transmitting gear.

Future Development

There is plenty of scope, therefore, for the development of special circuits at the receiving end to suit SSB, though most reception is being carried out at the moment on ordinary receivers. One suggestion has already been given in Short Wave Magazine by G3AAT (July 1950), and no doubt the information in this article may have encouraged others, who are mainly interested in the receiving side, to try their hand. In view of the close limits of tuning accuracy required on SSB, there is a definite need for a receiver with a form of AFC to hold it to the correct frequency, and this will probably require the transmission of a low-level pilot carrier such as is used in the commercial SSB transmissions.

THANK YOU!

It is at this time of year that we take a corner of space to thank all those many readers who have been kind enough to remember us with Christmas cards and letters of encouragement and good wishes. Each and every one is greatly appreciated.
General Purpose RF Test Meter
USEFUL DE-BUGGING DEVICE

By F. E. WINGFIELD (G2AO)

In these days of TVI and BCI, of odd harmonics, triplers and quadruplers, it is most necessary to know where you are and where things are going. Many wave-meters have been used at G2AO, all including crystal rectification and meter indication. The one described here was built as a result of not being able to get into a small corner of the transmitter with a 4-in. cube box when chasing a TV bug let loose in a cable form. It is named the D-B. or—De-Bugger.

Circuit?—There is very little to it, and all parts can be obtained from the junk box, except possibly the 1N34; it has proved to have sharp tuning, although it does not contain the recommended loosely-coupled meter circuit. The latter did not lend itself to the probe type of coil desired.

For those who wish to copy it exactly, full details are given in the figures and tables. Variations in dial readings will naturally occur, but some are given as a guide.

The box was half of a long biscuit tin and measures 7in. long x 3in. wide x 2in. deep; fitted into one end is a piece of ½-in. thick perspex for mounting the two sockets for the plug-in coils.

Application Notes

Before dealing with the uses to which this instrument can be put, a few notes about absorption wave-meters may not

<table>
<thead>
<tr>
<th>Coil</th>
<th>Dim : A.</th>
<th>T</th>
<th>SWG</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Surplus 104 µH</td>
<td>Inductance</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>½in.</td>
<td>115</td>
<td>40</td>
</tr>
<tr>
<td>C</td>
<td>½in.</td>
<td>40</td>
<td>36</td>
</tr>
<tr>
<td>D</td>
<td>½in.</td>
<td>15</td>
<td>32</td>
</tr>
<tr>
<td>E</td>
<td>½in.</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>F</td>
<td>Loop ½in. diam. silver plated copper 3½in. including top of plugs.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

View of the completed RF Tester, which has many practical applications.

be out of place. They are not highly accurate for two reasons: (i) The indication of resonance is fairly broad when
Circuit arrangement of the G2AO De-Bugger — simple enough.

**Table of Values**

**Fig. 1. Circuit of the G2AO DeBugger**

- **C1** = 47 µF Ceramic
- **C2** = 100 µF midget variable
- **C3** = 0.002 µF mica
- **C4** = 0.01 µF mica
- **R1** = 100 ohms 1-watt
- **M** = 0-200 microampere meter
- **Sw1** = SPST toggle switch
- **X** = 1N34 or BTH equivalent
- **L** = See coil tables
- **J** = Single circuit jack.

Compared with the zero beat obtained when using a heterodyne frequency meter; (ii) Owing to the fact that close coupling is generally necessary between the meter and the circuit being checked, a certain amount of detuning occurs in both circuits and therefore the calibration depends to some extent upon the coupling.

On the other side of the house we have the following: (i) By using a sensitive meter, the degree of coupling is less and therefore does not cause so much variation in calibration; by using a remote coupling cord, this is reduced even more. (ii) No power supplies are required. (iii) With the heterodyne meter it is possible to get into trouble with the number of harmonics present.

**Coil Frequency Table**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr.</td>
<td>Dial</td>
<td>Mr.</td>
<td>Dial</td>
<td>Mr.</td>
<td>Dial</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>2.03</td>
<td>30</td>
<td>3-8</td>
<td>15</td>
<td>9-74</td>
<td>9</td>
</tr>
<tr>
<td>2-0</td>
<td>32</td>
<td>3-52</td>
<td>20</td>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td>1-8</td>
<td>46</td>
<td>2-54</td>
<td>53-5</td>
<td>7</td>
<td>29</td>
</tr>
<tr>
<td>1-74</td>
<td>54</td>
<td>2-4</td>
<td>59</td>
<td>6</td>
<td>41</td>
</tr>
<tr>
<td>2-3</td>
<td>69</td>
<td>5-7</td>
<td>48</td>
<td>14</td>
<td>41</td>
</tr>
<tr>
<td>2-1</td>
<td>84</td>
<td>4-8</td>
<td>69</td>
<td>12</td>
<td>58</td>
</tr>
<tr>
<td>2</td>
<td>93</td>
<td>4-45</td>
<td>84</td>
<td>11-4</td>
<td>67</td>
</tr>
<tr>
<td>4-3</td>
<td>91</td>
<td>10-7</td>
<td>76</td>
<td>24</td>
<td>80</td>
</tr>
<tr>
<td>9-7</td>
<td>93-5</td>
<td>22</td>
<td>97-5</td>
<td>64</td>
<td>53</td>
</tr>
<tr>
<td>56</td>
<td>70</td>
<td>48</td>
<td>98</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Fig. 2. Details of the box for the RF Tester.*

Short Wave Magazine, Volume IX 667
whereas with a simple tuned circuit this is avoided, as it will only respond to one frequency.

Apart from chasing RF along cables, this meter can be used for checking output frequencies, neutralizing, as a phone monitor and as a field strength meter.

To adapt the instrument as a field strength meter a 48-in. (extended) long telescopic whip aerial is attached to the side of the case by means of feed-through insulators which have clips fitted to hold the aerial. When used for this purpose, the rod should be fully extended or made a half-wave on 144 mc and held horizontally. Immediate field patterns can be traced out easily. This aerial has also been found useful for checking for RF in house wiring by putting it parallel to the cables. For all other purposes, the aerial should be removed when the meter is in use, otherwise the pick-up will not be concentrated in the required area.

For checking the output frequencies of a doubler or any device producing RF, great care must be taken that the meter is coupled only to the circuit to be measured and that no RF is being picked up from other stages. To achieve this, in difficult positions, a coupling line has been made. This consists of a coil, to which is connected a length of coaxial cable with a detachable search loop, which slides over the plug-in coils.

Neutralising Tester

When checking neutralising, make sure that there is no stray coupling to earlier stages. When this is difficult, due to a compact PA, the long lead can be used without the search loop. The lead should be connected directly to the aerial link on the PA. Tune the neutralizing condenser for minimum reading as in any other method.

The instrument can also be used to get

Interior of the useful RF Tester described by G2AO.

Fig. 3. Dimensions of the coil former used by G2AO. Winding specifications are given in the table.

Short Wave Magazine, January 1952
a rough idea where the oscillator of a receiver or converter is by coupling to the oscillator coil; in some cases a meter reading can be obtained, but when this is not possible, by using headphones on the receiver one can hear the oscillator being pulled when the wave-meter is tuned through its frequency.

To use the instrument as a phone monitor, a pair of headphones are plugged into the jack on the front panel of the unit; depending on how close it is to the transmitter, the aerial may or may not be necessary. The phones are coupled to the detector by C4 to avoid placing a low resistance across the meter; if high impedance phones are employed this is not necessary.

The switch Sw1 places R1 in parallel with the meter when a very large signal is liable to be encountered in initial measurements, or at any other time when reduced sensitivity is required. In the unit described it reduced the reading to approximately one-sixth.

Remember—always make the coupling between the meter and the circuit to be checked as loose as possible and you will have a very useful and quite selective piece of equipment.

---

Amateur Radio Exhibition

The fifth in the series, the Amateur Radio Exhibition this year took place in London during the period November 28 to December 1. There were many interesting exhibits—in particular, the showing of amateur-built equipment was a successful innovation, even if it did mean that a number of trade stands had not been taken up. In fact, some firms well known in the Amateur Radio field were notably absent, and there was a marked falling off in trade support compared with previous years.

Some very fine examples of amateur craftsmanship in the radio and electronics field were shown, and the generally high standard of these exhibits probably surprised a great many of the visitors—the band-switched transmitter by G4DC, the 70-centimetre apparatus by G4LU, and the 2-metre equipment by G3AST are worthy of special mention as outstanding examples of amateur design and construction.

Round the Stands

The Royal Navy and the Royal Air Force had effective and interesting recruiting displays, and the trade stands included AVQ with their world-famous range of instruments; Cosmocord displaying many items of interest to amateurs and sound-recording enthusiasts; E.M.I. Sales showing a selection of high-grade equipment; Easibind with their well-known product, specially made for a number of leading periodicals; English Electric displaying some interesting TV and specialised products; the G.E.C. with a wide range of Osram valves, CR tubes and germanium crystal diodes—and the BRT-400, a fine example of modern communications receiver engineering; the Panda Radio Co., coming to the fore with a new all-band CW/Phone transmitter in the modern table-top design; Salford Electrical Instruments, showing many examples of crystal units, and selenium and copper oxide rectifiers; Philpotts with their well-designed chassis, cabinet and rack-panel assemblies; and Woden's showing their transformers and chokes, now widely used in communications, television and electronic equipment generally.

Other stands were taken by the Television Society, Iliffe & Sons, Ltd., Short Wave Magazine, Ltd., and the Radio Society of Great Britain, sponsors of the Exhibition itself.

The attendance was fair on the opening day (Wednesday), but below expectations on Thursday and Friday. Saturday, as always, saw a good crowd between 3 and 8 p.m. The attendance overall was certainly down on last year; for this Exhibition, 1948 was probably the peak year, in terms both of attendance and general trade support.

PHOTOGRAPHS

Readers are reminded that we are always glad to see good photographs—which can be any size, print or negative, but must be clear and sharp—of Amateur Radio interest, for possible publication in these pages. Payment is made for all such photographs used, immediately upon appearance in print.
MAY we start by wishing all our readers, great and small, QRO and QRP, DX and local, a Happy New Year! May 1952 prove a successful year for you, both in Amateur Radio and in whatever other occupation for which you may have to spare time. And, in particular, may it prove a better year than 1951 from the point of view of conditions. Even Shakespeare had a thought for present-day Amateur Radio when he wrote "Now is the winter of our discontent."

It certainly has been pretty grim at times. In November we had some quite good patches, but then it settled down to a spell of the most uninteresting conditions. Even the breakfast-time ZL and the tea-time W6 became a chancy business, and of the more exotic DX there was none—except for the sooth- ing sound of the pirates and phoneys quietly going about their nefarious business.

Don't Trust Them

It's a pity to have to begin 1952 on a discordant note, but one or two of these fakers have removed themselves from the category of mere clots and have now become infernal nuisances. There was a "VO1RF" let loose on 80-metre CW; he took several people in, although VO4RF was still on the air from Kenya, and telling people on 10-metre phone that the VQ1 expedition had been delayed for a few days.

Last month G5RY reported working "ZK1AB" on Eighty, but we rather fear that ZK1AB went off the air a year or two ago; now this month we have some reports of QSO's (same band) with "VR2CJ." Even recent QSO's, late at night, with CE2AC are suspect. All these contacts seem to have happened around 3520 kc; the chap we suspect has a T9x note and sends very slowly with a good fist. He extracts the right Christian name from the Call Book, and

Calls Heard, Worked & QSL'd

he spends his spare time thinking of nice new call-signs to use. He is probably very QRP and "somewhere in Europe", he fades in and out most convincingly. We won't comment on his behaviour; what we think of him should be fairly obvious. The best way to thwart a pest like this is to stop his fun by not working him. (At the same time, if we happened to know his address . . . . )

And so to the month's DX, which is not very thrilling. Nevertheless, we will take it band by band, as usual.

Ten-Metre DX

Pretty grim, compared with November, although the phone men have notched-up a point or two. G60QX (Hornchurch) found ZC4XP for a new one (CW) and worked other Africans, such as ZS and FF8. G5JU (Birmingham) winkled out TA3EFA and SW0WS, to push up his Marathon score to 46.

G2AJ (Biggin Hill) raised the genuine VO1RF and was his second G contact, G2DPZ being the first. He confirms that 1RF is using phone only, and says they have half Zanzibar working for them, putting up Vee-beams and so forth. VO4RF has to hold a regular pay parade for the native labourers!

G2BW (Walton) only heard three stations, all of whom he worked—ZC4XP, ZS2A and 4X4BX (CW). G3FXB (Hove) found an opening one Saturday and raised FF8, KP4, QV2, ZC4, ZS and W. GM2DBX (Methel- hill) worked CE, CX, JY and ZS on phone, with AP5TM, OA1F and ZS3G giving him new ones.

G3ATU (Roker) worked AR8BB and a couple of KP4's, but he says "I wish more users of this band would throw away their blinking mikes!" GW3FSP (Neath) did well with ZS3E, CR7CJ,
Operating position at G3ZI, Chobham, Surrey. Receivers are a Radiovision "Commander" and an RME-69 with DB-20 in front. A two-metre converter works into the "Commander." A further description of G3ZI appears in "Other Man's Station" this Month.

FF8AG as well as CE, CO, KP4, VK, VQ2, VU, W, ZC4 and ZS—a nice bunch. G2NS (Bournemouth) collected PY, LU and sundry W's—all on CW.

That just about concludes the ten-metre list; the only "openings" for the CW man appear to happen at week-ends when a Contest of some kind is running. And then, curiously enough, the band always seems wide open on the Saturday and dead tired of it by the Sunday. Practically all the good ten-metre DX of this year has been worked on Saturday afternoons, as far as the CW experts are concerned. Football fans, please note.

The DX on Twenty

Here we certainly have more to choose from, although conditions have been pretty foul. FB8ZZ (New Amsterdam, Zone 39) has been giving a few people a new country and, in the case of G6QX, a new Zone as well. The best of the month at G5JU were CR4AJ, JA2KW, VK1BS, VP5BL and ZD6DU.

G8KU (Scarborough) raked in PX1AA on phone; he, by the way, was genuine. He was operated by DL4IA, who proceeded afterwards to Monaco, where he became 3A2AP. All this mileage was covered on a motor-bike—complete with station! G2BW also worked him, and so did G5BZ (Croydon), who also collected ZD6DU—both on CW.

G3GUM (Formby) thinks we must surely be in the bottom of the trough now, although he managed to raise CO7AH, CR5AA, KH6PM, ZE4JG and sundry Mobiles of the /MM and /AM variety. G5MR (Hythe) added one to his score with EA9BA on CW.

G3FXB has not had much time to spare, but worked EA8, HZ, KP4, VO, VP9 and more of "the usual stuff," with nothing outstanding. G2HKU (Sheerness) raised CO2OE, EQ3Q (claiming to be in Teheran, but we wonder!), FO8AE and MD2JB, who is W1LIV and leaving in a month. Gotaways were some FF's, FB8ZZ, HV2PX (!) and VK9XX. HV2PX was asking someone to wait for his QSL, but he didn't say how long . . .

GM2DBX rustled-up 3A2AP, KG4AT, JY1XY, PX1AA and a couple of OX's, all on phone. G3ATU has hardly been on the band, having been amassing more Marathon points on the others. G5VT
(Bishops Stortford) says F9JD (Corsica) on phone is an easy one for new country-chasers; he has been QRT until recently, but is now very active, and there is only one other station on the island—we think that must be F9QV. 'VT adds that VQ8AL is a useful phone signal round about 1730 (1430 kc).

GW3FSP has had quite a good month and quotes EA0AD (1700), EL2R (1800), FB8BB (1800), FI8YB (1430), PX1AA, ZD6DU (1750) and ZS2MI, the latter on phone at 1930. G6YR (Southport) singles out FB8BB, FF8AE, FQ8AE, HZ1AR, LZ5LL, PX1AA, some DX's and TA1AR, as well as three QSO's with JA2KW, each with a different operator at the other end. Sundry gotaways included EQ3FM, FK8AC, some other stations, F7YB, PJ5RE and ZS3Q. A noteworthy point about 'YR's DX is that he is rock-bound; without having a VFO, he has put up a score of 38Z and 147C, which must surely be a record of some sort? But a VFO is on the way, so we must expect a rapid rise.

G2NS, working only between 1400 and 1630 GMT, managed to collect HS1UN, FF8AG, PJ1UE, PX1AA, MP4KA, LZ1RF and ZZZEM, as well as a lot of more routine DX. His gotaways included HB9GX/MM ("The Swiss Navy"). K1ILA, 3V9AN and 954AX. By the way, we make no apology for quoting all these "gotaways," because so many regular followers have said that they find them most interesting. After all, whether you work the man or not, he's still DX and he's still there, on the band. Incidentally, G6QB's own offerings in this category include Z53Q (four times), FB8ZZ, DU1VVS (1320), VK1BS, ZZZEM, VR2CG and FR7ZA, who is back on CW but considerably mobbed by W6's.

**FOUR BAND MARATHON**

**(STARTING JANUARY 1, 1951)**

<table>
<thead>
<tr>
<th>Station</th>
<th>Total</th>
<th>Points</th>
<th>3.5 mc</th>
<th>7 mc</th>
<th>14 mc</th>
<th>28 mc</th>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3ATU</td>
<td>300</td>
<td>40</td>
<td>90</td>
<td>151</td>
<td>19</td>
<td>158</td>
<td></td>
</tr>
<tr>
<td>G6QB</td>
<td>282</td>
<td>34</td>
<td>68</td>
<td>137</td>
<td>42</td>
<td>156</td>
<td></td>
</tr>
<tr>
<td>G5JU</td>
<td>277</td>
<td>33</td>
<td>72</td>
<td>126</td>
<td>46</td>
<td>139</td>
<td></td>
</tr>
<tr>
<td>G3FXB</td>
<td>274</td>
<td>35</td>
<td>84</td>
<td>131</td>
<td>24</td>
<td>144</td>
<td></td>
</tr>
<tr>
<td>G2AJ</td>
<td>271</td>
<td>36</td>
<td>62</td>
<td>126</td>
<td>47</td>
<td>139</td>
<td></td>
</tr>
<tr>
<td>G5BZ</td>
<td>261</td>
<td>33</td>
<td>62</td>
<td>149</td>
<td>17</td>
<td>154</td>
<td></td>
</tr>
<tr>
<td>G6QX</td>
<td>247</td>
<td>43</td>
<td>78</td>
<td>104</td>
<td>22</td>
<td>126</td>
<td></td>
</tr>
<tr>
<td>G5FA</td>
<td>220</td>
<td>29</td>
<td>75</td>
<td>109</td>
<td>7</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>G3ABG</td>
<td>203</td>
<td>30</td>
<td>65</td>
<td>83</td>
<td>25</td>
<td>103</td>
<td></td>
</tr>
<tr>
<td>GM2DBX</td>
<td>190</td>
<td>1</td>
<td>30</td>
<td>94</td>
<td>65</td>
<td>112</td>
<td></td>
</tr>
<tr>
<td>G2BW</td>
<td>177</td>
<td>14</td>
<td>42</td>
<td>92</td>
<td>29</td>
<td>103</td>
<td></td>
</tr>
<tr>
<td>G8KU</td>
<td>156</td>
<td>16</td>
<td>29</td>
<td>100</td>
<td>11</td>
<td>105</td>
<td></td>
</tr>
<tr>
<td>W2WC</td>
<td>148</td>
<td>22</td>
<td>35</td>
<td>84</td>
<td>7</td>
<td>91</td>
<td></td>
</tr>
<tr>
<td>G6TC</td>
<td>137</td>
<td>14</td>
<td>37</td>
<td>71</td>
<td>15</td>
<td>77</td>
<td></td>
</tr>
<tr>
<td>G8IP</td>
<td>133</td>
<td>12</td>
<td>50</td>
<td>63</td>
<td>8</td>
<td>86</td>
<td></td>
</tr>
<tr>
<td>G3COI</td>
<td>107</td>
<td>19</td>
<td>18</td>
<td>68</td>
<td>2</td>
<td>75</td>
<td></td>
</tr>
</tbody>
</table>

(Not that new entries to this table must not include QSO's dating back more than two months from the time of entry. Regular reporters should send in their score month by month—three months' failure to do so will be taken to indicate loss of interest and the score will be deleted).

**Forty-Metre Work**

When Ten and Twenty go bad on you, you usually expect Forty to turn up trumps. Alas! this month it has been just about as bad as the others. Early in December and soon after mid-November it wasn't too bad, but for the rest of the time it was terrible. In mid-November 55DQ (Cambridge) hit the high spots, with CR9AF (1615), VS6BZ (1920), VP7NM and 7NW (2300), ZD2DCP (2225) and sundry W6's the long way round at 1500. G5RI (Hexham) has not reported, but we know that he has consistently worked the W6's in the afternoons, with G6QB tailing along behind, unable to compete with a rhombic!

G5JU worked MP4EJS, VP4CQ and VP7NW. G5FA also worked the latter, together with W's and F's. TP, VK5 and ZC4. G2AJ weighs-in with CT2BO, K9P, V95FH and 5KU, VS7NG and ZC4XP. G3FXB thinks the band should be better than it is (don't we all?) and has found it quite flat at times when 3.5 mc has been open. His DX includes CT3, EA9, FA, FQ8AE, KP4, ZK5CW, PY, TA, ZC4 and ZL. VE1ABJ was worked at 1915 GMT for a surprising one.

G3ATU was quite pleased to raise VU2RX at 1750, especially as he needed just this one point to bring his Marathon score to 300. The rest of his interest in the band has, he says, been "left-footed," and occasioned by UL7, UH8,
about purpose gent and possibly CE2AC are all the QRP-with DX Eighty ing others have just mentioned the band, but have not worked anything of outstanding interest.

Eighty-Metre DX

As you will have gathered from an earlier paragraph, any claims of super-DX on this band must be tempered with reserve. For the moment we are assuming that ZK1AB, VR2CJ, VQ1RF and possibly CE2AC are all the QRPgent -from-Mittel-Europa. We will supply him with some high voltage at any times he desires, but not for the purpose of connecting it to his PA.

G5DQ worked VQ1RF twice or three times, the first being a fornight before the real one started operating! G6QX collected EK1CW, OY2Z, VO4W, YO6CA and ZC4XP. G5JU found EK1CW for a new one. G2AJ had a three-way with VE1CN and VE1AVB on eighty-metre phone; he has now erected a ground-plane for the band, so should be turning in some nice DX in the next few months.

G5BZ is still keeping his fingers crossed over VR2CJ; he was worked at 0800 and "sounded like a ZL."

G3GUM tells us that G3ATO worked "ZK1AB" with 6 watts input, which, alone, makes us slightly suspicious. After all, you can work VK or ZL on the band with very low inputs, when conditions are right, but to raise a rarity like "ZK1AB" who, presumably, is being called by dozens of QRO stations at the same time, takes more than 6 watts. "VQ1RF" is in rather the same category, having come back to a CQ by a station using 7 watts! G3FXB raised FA, GD, PX1AA, VE's, W's and ZC4, mostly during the European contest. Gotaways were VS7NG and VP8AP—what a pity, too! G3HMC (Yeovil) made his first Trans-Atlantic QSO on any band by working VE1EA up here. It was at 2120 GMT, with an input of 19 watts. Others on the band, but not worked at the time, were W1 and 2, KP4CC, EK, SP and ZC4.

G3ATU collected CT3AB, KP4CC, OY2Z and . . . VQ1RF! He, too, heard VP8AP and VS7NG, both round about midnight. GW3FSP worked KP4, EK, ZC4 and 4X—all before midnight.

To sum up, this band remains the queer mixture that it always has been; a band on which one can strain one's ears to bursting point for an elusive piece of DX, while two G's at S9 plus indulge in a long and perfectly legitimate ragchew on the same frequency. If the DX boys could annex just 20 kc or so, what a difference it would make—but they would have to keep outside of it themselves, and with the present VFO-happy technique it wouldn't work.

The Top-Band Season

By the time you read this, two of the Trans-Atlantic parties will be over. It looks as though the season should be a very successful one, since G3PU (Weymouth) opened the door as long ago as Sunday, November 25. On that
morning he worked VE1EA from 0520 until 0546, and shortly after that a CQ DX from G3PU was answered by W1LYV. This is a fine show, and such an early opening seems to point to the fact that this season might be better than last. Abandon sleep (on Sunday mornings) all ye who enter here!

As a follow-up to the recent notes about 4X4CJ and his Top-Band aspirations, G2QX (Luton) tells us that GW3FSP was working 4X4CJ on December 8. This was after 'FSP had written in with his news of the other bands, so we are glad to be able to bring it up to date for him. Another country in the bag! (Late Flash: 'FSP didn't work him, but they both tried hard!)

G2AJ will be a new participant this year, and from what we know of the aerial situation there (75-footers and the like, on top of a very nice hill) we are inclined to bet heavily on him. G3ATU is also going to have a crack, but wishes his long wires were higher.

GW3FSP has been working on the job of swinging his aerial system round from ZL-wards to States-wards! Considering that it consists of two or three half-waves in phase, you will appreciate that this is not just a matter of turning a handle. And 'FSP has another big item in his favour; to quote:—“My XYL has Job beaten all ends up for patience.” It helps—even at 5 a.m. on a cold Sunday morning.

G5GQ (London, N.W.3) passes on the information that KV4AA will be on either 1902 or 1998 kc, looking for European contacts in January. No news yet of any South American activity, although we well remember HC1JW’s signal last year. EK1AO has given no sign as yet, but EK1CW will definitely be on, and 4X4CJ will also be taking part in the Tests. Probably he will be most interested in trying to raise the Ws and VE’s, which means he will use the European frequencies and times. EK1CW has already worked six G’s and a GM; he says signals are better at 0600 than late at night.

The Four-Band Marathon

Final scores will not, of course, be through until next month’s issue, December still having 20 days to run at the time this month’s scores were sent in. G3ATU continues to be strongly fancied; his lead is colossal compared with the bunching between the second and fifth scorers. Next month, too, we hope to show the starting scores for the 1952 Marathon. Don’t forget that, in effect, our two tables are changing place next year; the Four-Band Table will be on a Post-War basis (please send one of those in, too), and the 1952 Marathon will be for Zones and Countries, irrespective of band.

So those who are in the present Marathon can send in three scores next month:—final score, 1951 Four-Band Marathon; starting score, 1952 WAZ Marathon; and Post-War Four-Band score. After the February issue there will, of course, be only the two tables. We hope for a particularly good and keen entry for the 1952 Marathon, which has no Four-Band label to scare away those who don’t use them all.

Miscellany

G8JC (Worcester) mentions peculiar conditions on Eighty, in which the band was completely devoid of G’s; HB9’s were S9 plus, and a PAO and a couple of SM’s made up the rest of the population. GM2DBX is now claiming his DXCC on phone, a card from AP5TM having given him his 100th confirmed.

G3ATU says there is reason to suppose that the phoney MD9BO, who was never in or near Yemen, operated from Iceland, of all places. ’ATU makes the bright suggestion that if all the chaps who have worked 190 or over would send in lists of “countries wanted,” it would make interesting reading. Some of us might even discover some valuable information on how to get them.

All sorts of news snippets from GW3FSP: ZB2A is a club station, and the receipt of a QSL is a matter of luck, according to which operator was worked. ZS9K does QSL. ‘FSP has never sent a reply coupon to anyone for a card; he has 145 confirmed and 25 that are not. His black list includes all sorts of people that we know have QSL’d to others. He got his one and only ON4 card by blackmail; ZS7C told the Belgian that he would only receive his ZS7 card when GW3FSP certified that he had received his ON4! Finally, Dewi is the proud owner of A.A.A. Certificate No. 28, just arrived from the S.A.R.L.

G2HKU says SP5SF has been active on Top Band CW, but he doesn’t know of anyone who has yet worked him. G5FA had an interesting visit from ex-MP4BAD and VQ3SS and had a long chat about the doubtful pleasure of being a “rarity”—as seen from the other end. G2AJ also had a visit—from
Station of G3GIR, Gorleston-on-Sea, Norfolk. Frequency control is by Heterodyne Crystal Oscillator-VFO, using a 6F6 through two 6V6's as buffer-doubler; the PA is a pair of 6L6s driven to 150 watts by an 807, modulation being by cathode control of the PA with a pair of 807's. The receiver is an S-640 and main interest at G3GIR is 14 mc phone and CW operation.

VK2AGW—and they had a good phone QSO with another ex-G: VP6CDI. Then, later, he worked VK2US, and G3DCU showed up at the mike. He is there for three years and will have his own call soon.

Talking of exiled G's and ex-G's, G5LI is by now in Canada, where he is working for a year's trial period, and will stay there for good if he likes it enough. George asks to be remembered to all his old DX-chasing friends; he will be on the air as frequently as possible from VE2WA, and does not expect to have either gear or call-sign of his own for the first year.

G3GUM remarks on what a friendly lot of chaps you all are! Meaning you who regularly report your doings to this Commentary. He has worked several of the regulars, and finds that they all want to compare "gotaways." They greet him as an old friend, although they have only met in print. Which is at it should be. G6QB could voice the same sentiment, with the proviso that when some-one says "I've been wanting to get hold of you for years," he never knows quite what is coming!

'GUM would like us to publish a list of Contest-free week-ends. He says that after the first misunderstanding regarding the various brands of numbers which he encounters each Sunday morning, he switches off and gets along with building his grid dip oscillator, or something like that.

G3FXB is playing with a quarter-wave vertical on 7 mc—not a ground-plane—and finds results interesting compared with his usual Zepp. G6QX also had some aerial fun, when the feeder of his Windom broke. He used the co-ax to his beam as an 80-metre aerial (although half of it is screened inside a 2-in. Dural tube) and managed to work VE1GU on it. Most of the "aerial" was 7 ft. high!

**QRP Topics**

We still haven't solved the problem, "What is QRP?" We should like to fix an arbitrary limit and say "anything
less than 5 watts," but some think otherwise. We will begin with G3HXZ, the Club call at R.A.F. Compton Bassett. This has been operated by ex-MP4ABAB, and, with 15 watts, he has worked too long a list of DX to quote in full. He says "DX can be worked if it can be heard, if the station concerned doesn't keep sending CQ DX every few minutes." When he himself was super-DX, 'way out in Trucial Oman, he says he always answered the call that was short and sharp and sent with a good fist. It's not the longest caller, or even the loudest signal, that gets away with it.

G3GOX (Colyton), our leading YL exponent of QRP, says she uses anything between 1 and 4½ watts to a 66-ft. indoor aerial which is only a few inches above the water pipes. She would prefer the QRP to be optional rather than forced on her by local conditions, but it's just the same. Working on 7 mc at "the worst time of day," GOX has raised II (2 watts), HB9 (3 watts) and EA (3½ watts). Regular daily schedules seldom fail, although signals are never reported as very strong.

GC2CNC (Jersey) mentions a "QRP Research Group" and suggests that those interested should get in touch with J. Whitehead, 6 Abbots Tilt, Hersham, Surrey. In a recent contest, CNC worked VS6CG with one watt, and earlier in the year raised UM8, CE and VK with the same power. In the same contest he worked G2AJU (250 miles) with one-tenth of a watt both ways. But he wishes to say that he is not claiming anything unusual with all this, because heaps of others have done equally good work.

From Overseas

VS6CF writes from Hong Kong confirming that XU6F is OK, and that his cards even adorn certain walls in Hong Kong! He also tells us that VS6AC has now closed down; the station has not been active since last July, although a pirate has been using the call on 7 mc. VS6CF asks for light on a certain ARBBV, giving his QTH as Tripoli and asking for QSL via "Amateurs Francaises, Tunisia."

Ex-G3HGT tells us that he is shortly returning to Khartoum and hopes to put ST2AM back on the air. The station has been neglected for quite a time, but there are two 90-ft. steel masts available, and it does seem a pity not to use them. He hopes to be on the air with phone and CW on Ten and Twenty, and, later, to build a Tx for 40 and 80. Operating times, 1800-2359 GMT most nights. If people who have previously worked ST2AM but have received no card will now send another QSL, it shall be attended to.

S/Ldr. K. S. Rancombe, who we well remember of old as using ST6KR, SU6KR, Y16KR and other exotic calls, writes to say that he has never yet operated his own station in England, but hopes to start in the New Year. He has a 120-watt Tx with push-pull 807's, and an AR88 — what more can anyone ask for? Oh, yes — he was also VS7KR last year! He was using a 132-ft. Windom out there, and now hopes to put up something similar, feeding with 300-ohm line. He asks if anyone has tried a 272-ft. version of this aerial yet?

SU1MR (Cairo) writes to explain that he is temporarily off the air because of "the present troubles," but hopes to be able to resume again shortly; he asks us to say that in the meantime all is well with him and his English wife.

Trans-Atlantics, First Leg

Conditions were not at all good, but punctually at 0500 on December 16, W1BB was heard on his usual frequency sending "greetings" and coming at about RST-339. A little later he was joined by K2USA, who had a slightly better signal. By 0630 they were both peaking to S5.

GW3ZV was apparently heard by both of them, but it seems that no other Europeans managed to get across; GW3ZV gave W1BB RST-229 on reception. There was a goodly turn-out of G's, with a lot of bunching towards 1800 kc, and EK1CW was on and coming in at about RST-55/69; he was not mentioned by the W stations. Towards the end of the period, when it was evident that conditions were all against any possibility of a Transatlantic QSO, EK1CW worked a number of G's.

On the whole, this first session was disappointing as regards conditions, but we can look forward to better things as time progresses.

Sundry Gleanings

If you worked ZS2MI (Marion Island) when the first operator was out there, you have probably got your card by now. If, on the other hand, you didn't work them until 1950 or after, you are unlucky. We understand from ZS6BT

Short Wave Magazine, January 1952
before January 16, for the 1952 WAZ Marathon; final claims for the 1951 Four-Band Marathon; and a resumption of the Post-War Four-Band Table.

No more for now, so again we wish you all a Happy New Year. May you hear all you work; may pirates and phoney's never take you in; and may conditions grow better each month. So 73, BCNU and Good Fishing.

XTAL XCHANGE

Insertions in this space are free, but can be accepted in respect of exchanges of crystals only: give make, type, frequency and pin spacing, stating whether a calibration certificate accompanies the crystal. Frequencies of crystals offered must be within the amateur bands, or in harmonic relation with one band. Offers should be set out in the form shown below, and all negotiations conducted direct.

G2XV, 89 Perne Road, Cambridge.
Has American types PR 28791 kc and Monitor 28800 kc crystals, not war surplus. Wants any frequency 1715—1735 and 7150—7175 kc.

G3DFS, 20 Oakwood Road, Sutton Coldfield, Warks.
Has 7478, 7506, 7706, 7716, 8206, 8240 kc crystals, fin. mounting; and 8180, 8410, 8910 kc crystals in fin. holders. Wants 100, 500 or 1000 kc bar, and any frequency in 3.5 and 7 mc amateur bands.

G3EFO, 15 Vincent Road, Coulsdon, Surrey.
Has Brookes or QCC crystal in 1800—1900 kc area.

G3GDB, 118 Woodpecker Road, New Cross, London, S.E.14.
Has QCC crystals 1922.5 and 3527 kc, certificated. Wants 100 kc bar.

G3GZN, 208 Twyford Avenue, Portsmouth, Hants.
Has variety crystals 1780—8146 kc, fin. mounting, and 6300—7350 kc, fin. pin spacing. Wants any frequency 7000—7035 kc, and 3500 kc.

CONVERTER FOR WROTHAM

Readers who may be interested in the BBC's experimental VHF transmission from Wrotham, Kent (on 93.8 mc) will find a useful and fully detailed constructional article on a suitable converter—having an IF of 10 mc—in the January 1952 issue of our Short Wave Listener & Television Review. Copies are available at 1s. 7d. each, post free, from The Circulation Manager, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.
Sideband Splatter

CAUSE AND EFFECT
CORRECT MODULATOR
ADJUSTMENT

There must be very few of us who have not experienced that most annoying form of interference caused by side-band splatter from a station on a neighbouring channel when we are trying to receive a weak DX signal. This splatter is probably most troublesome and persistent when it emanates from one of our amateur neighbours living, perhaps, less than a mile away; indeed, it takes courage and tact to report the truth to the culprit. There is always the feeling that the recipient of a "splatter" report will resent it! It is quite true, however, that side-band spread is unnecessary, and on amateur bands it is indeed a sure sign of incorrect transmitter design or adjustment, or both. The present article examines the reasons for splatter from amplitude modulated transmitters and indicates the steps which should be taken to prevent it.

Three possible reasons for excessive frequency spread immediately spring to mind; they are—

(a) Unwanted frequency modulation.
(b) Radiation of spurious signals due to parasitic oscillation in one or more stages in the transmitter.
(c) Excessive sidebands due to incorrect modulation.

The failings under (a) and (b) are not really included in the scope of this article, and they should not occur in properly designed and engineered transmitters. Suffice it to say, that spurious frequency modulation should be easy to avoid, especially if one or more buffer stages are used between the VFO and the modulated stage and provided that the power supply for the VFO is not itself modulated by the speech equipment, as might happen if common power packs were used. Parasitics can be avoided by the use of correct layout and all the other methods of suppressing them. At present we are concerned mainly with (c) and how the excessive sideband spread can be prevented in amateur transmitters.

This article deals in some detail with the troubles traceable to faulty modulator characteristics, and how they can be avoided. It is shown that, for satisfactory speech quality, the audio equipment can cut off above about 4000 c.p.s., thus avoiding excessive spreading of the transmission. Indeed, if all phone transmitters were adjusted to this standard, there would be a notable improvement in operating conditions on our phone bands.—Editor.

Amplitude Modulation

In order to appreciate the problem, let us go back to fundamentals for a few paragraphs.

Fig. 1A indicates an unmodulated RF carrier; Figs. 1B and 1C represent the carrier modulated to differing degrees by a low frequency sine wave; whilst Fig. 1D shows an over-modulated carrier which is completely cut off for a certain portion of each LF cycle.

The process of amplitude modulation may be considered as the "mixing" of an RF waveform and an LF waveform, and it can be shown mathematically as well as by practical experiment that the mixing of two sine waves of different frequencies gives rise to four frequencies in the mixture. These are \((f_1 - f_2), (f_1 + f_2), f_1\) and \(f_2\), where \(f_1\) and \(f_2\) are respectively the RF and LF components.

To take a practical example, suppose a transmitter on 1800 kc is modulated by a pure sine wave at 1 kc. If the transmitter output is analysed, component frequencies of 1 kc, 1800 kc, 1799 kc and 1801 kc will be found. Thus, in addition to the carrier and modulation frequencies, we find two new frequencies or "sidebands" spaced equally on either side of the carrier, so that the total spectrum occupied by the modulated carrier now extends for 2 kc. Naturally, if the carrier is modulated at 10 kc, the total spectrum spread of the transmission occupies 1790 kc to 1810 kc, or 20 kc, a goodly slice of any amateur band.

So far we have only spoken of pure sine waves; let us now turn to speech waveforms. It can be shown once again both mathematically and experimentally that any recurrent waveform, however complex, is built up of a fundamental sine wave plus a whole series of harmonic sine waves. The relative amplitudes of fundamental and the

Short Wave Magazine, January 1952
various harmonic waveforms in speech and music, and their phase relationships, determine the "quality" or characteristic nature of these sounds. In the case of speech and music, it may be argued that the waveforms are not recurrent, but, indeed, they are so for short periods of time (in speech equal to the syllabic rate), so that the whole family of waves consisting of fundamental plus harmonics is constantly changing at syllabic rate.

Now imagine a speech or music waveform modulating an RF carrier; in the modulated output we shall find the carrier frequency and, on either side of it, side bands whose individual frequencies are equal to the sums and differences between carrier and all the component modulating frequencies.

**Frequencies Necessary for Good Speech Quality**

It has been found by very extensive and authoritative experiment that for the transmission of speech it is necessary to employ only frequencies up to 3000 c.p.s. in order to ensure perfectly good, clear, intelligible speech. No improvement in intelligibility is achieved if higher frequencies are included. A frequency response up to 4000 c.p.s. gives exceptionally good quality speech reproduction and up to 7000 c.p.s. is sufficient for good quality music. Up to 15000 c.p.s. is required for the very highest possible quality rendering of musical instruments, but this is not, of course, achieved in any normal medium-wave broadcasting system; in any case, for speech reproduction little alteration in quality could be detected if the upper limit were raised above 4000 c.p.s. Add to this the fact that all modern communications receivers operate with pass bands not exceeding about 5 kc (i.e. ±2500 c.p.s.) and it will be realised that it is unnecessary (and wasteful) to allow the upper limit of frequency of speech modulation to exceed 3000 c/s or, perhaps, 4000 c/s. Any higher modulation frequencies are not detected by a normal communications receiver tuned to carrier frequency, since the sidebands corresponding to these frequencies are outside the receiver's pass band, anyway. But they can, and do, give rise to interference on receivers tuned to nearby channels.

Now, by the use of normal tone control circuits in the speech amplifier (i.e. small by-pass condensers in the speech circuits) it is easy to ensure that the amplifier response falls off at frequencies above 3000 or 4000 c/s. This, combined with the falling frequency characteristics of microphones normally used in amateur stations, will ensure that most of the unwanted high frequencies are removed before the modulator stage. If one is really anxious to make the best possible job of filtering out high frequencies, some form of low-pass filter could be included in the audio chain so that a relatively sharp limit is set to the highest frequency which the speech amplifier is capable of handling.

Fig. 1. The modulation effects discussed in the text.
HF Sidebands Caused by Distortion

It may not be generally understood that any waveform distortion which occurs in an amplifier introduces harmonics to the undistorted wave. This clearly follows from the statement made in a previous paragraph to the effect that all recurrent waveforms contain fundamental plus harmonics. Suppose we have a speech amplifier with an efficient low-pass filter fitted to an early stage so that everything over 4000 c/s is removed completely. Now suppose that third harmonic distortion occurs in some later stage (say, the modulator itself); it is quite obvious that there will be components at 3 x 4000, or, 12000 c/s in the modulated RF, and thus the total band-spread of the transmission will be 24 kc instead of 8 kc. We must therefore strive at all times to keep distortion to the lowest possible level—we must never try to modulate a large RF carrier with an undersized modulator. Always ensure that the modulator is man enough for the job and that is has something “in hand” when operating at normal modulation and carrier levels. The writer has all too clear recollections of a neighbour living less than a mile away who boasted that he could “fill” his 60-watt carrier by means of a modulator using only a pair of 6V6’s; not only did he “fill” his carrier, but he also filled the whole of whatever band he was on with the most objectionable splatter and splash.

Now, let us consider the question of distortion in greater detail. Fig. 2 shows three cycles of a periodic waveform, and it could be proved mathematically to consist of a fundamental sine wave with many orders of harmonics. The line XX is called the axis of the waveform and it is in such a position that the area of one half-cycle above the axis is exactly equal to that of the next half-cycle below, as indicated by the shading. It will be observed at once that the peak amplitudes above and below the axis are far from equal; this is not distortion, however, and the waveform could well be a portion of a speech waveform. If this waveform is modified in any way during its passage through amplifier, modulator or modulated stage, new harmonics will be introduced, and if the modified waveform is distorted in such a way that sharp angles occur (as in Fig. 3) these harmonics may well have very high frequencies and thus give rise to unduly wide sidebands. The distortion of Fig. 3 could be due to severe limiting in the amplifier. Such limiting or, as it is often called, “Peak Clipping,” is often introduced deliberately into a speech amplifier in order to allow the general level of modulation to be increased without over-modulation (loss of peaks is generally of no consequence to speech intelligibility), but it must always be followed by a filter circuit which cuts off all the higher harmonics which have been generated by the clipping process.

It will be noted from Fig. 3 that, in order to maintain equal areas in adjacent half-cycles of the distorted wave, the axis has had to move from XX to X’X’. This axis shift is the reason for the DC current changes which occur in a Class-A amplifier which is distorting and in a modulated Class-C amplifier which is not able to follow the modulator output without distortion.

Over-modulation

One of the worst forms of distortion which can give rise to excessive sideband spread is due to over-modulation. A given amount of distortion produced by over-modulation is apparently worse in causing sideband splatter than similar distortion at an earlier stage in the speech amplifier. The reason for this is that all audio frequency harmonics produced by over-modulation are immediately applied to the carrier, which thus receives strong high frequency sidebands. Similar harmonic distortion earlier in the amplifier had to pass through the remainder of the speech stages and the modulator; and, in general, the highest harmonic frequencies will be considerably attenuated in the process, thus giving less signal spread. Fig. 4A shows a carrier over-modulated with a low frequency wave, and this, as is well known, will produce extremely bad sideband splatter, which is usually attributed to the carrier discontinuities which occur once every cycle of LF. The discontinuity is not the primary cause of splatter, however; the high order sidebands are produced merely because the audio wave has been distorted in such a way that it contains very high order harmonics which naturally cannot be filtered out (since they are produced in the actual process of modulation).

Exactly the same sideband spread is produced by the modulation waveforms shown in Figs. 4B and 4C. These are identical in shape with those of Fig. 4A,
Fig. 2. Speech waveform when modulating conditions are symmetrical.

except that no over-modulation is taking place and in 4C the waveform has been inverted. It will be noted that the same sharp angles exist on the LF wave, and it is these which give rise to high order harmonics and splatter. It is interesting to note that the condition of 4C would be more objectionable than either 4A or 4B because the sharp changes of slope of the modulation envelope occur at much higher power levels and the harmonic content of the wave has a higher intensity.

Some Practical Considerations

Having briefly discussed some of the reasons for excessive sideband spread in amateur transmitters, it is proposed to give a few pointers and comments on ways and means of reducing the nuisance. To carry out measurements and observations, an oscilloscope and an LF oscillator are of immense value, but, even without these, it is possible to take many steps which will ensure clean, crisp transmissions.

In checking transmitter performance, a dummy load, or so-called artificial aerial, must be used at all times (e.g. electric light bulbs tapped across the final tank circuit), and it is also very useful to be able to load the modulator itself with a dummy load whilst checking LF performance. A bank of wire-wound or even carbon resistors of sufficient wattage rating are suitable, and they have the advantage that convenient tapping points along the dummy load can be "scoped" so that output waveforms can be seen without excessive CRT deflection.

If a source of LF waveform is not readily available from some form of LF oscillator, it is possible to use the output of a receiver which is tuned to a steady carrier (say a heterodyne wavemeter) with the BFO switched on; quite a reasonable sine wave output will be obtained.

The following is a resumé of a complete test procedure which could be adopted to check the performance of an amplitude modulated transmitter:

1. Disconnect the modulator from the modulated RF stage and load it with a resistive load of suitable value.
2. Apply input sine wave at any convenient frequency (say, 1000 c/s) to the microphone input socket. Adjust the input amplitude to a very low value by means of a potentiometer arrangement, so that the first stage operates at a voltage level comparable with that obtained when the microphone is in use.

Fig. 3. The condition of Fig. 2 when modulation is not symmetrical due to distortion in the speech chain.
(3). Observe the waveform at each valve anode grid by means of an oscilloscope and note that no distortion is taking place. Check the performance of the gain control.

(4). If a phase splitter is used to provide push-pull drive, check that the amplitudes of the push-pull voltages are equal at the two outputs of the phase splitting stage; if they are not, adjust the values of the phase splitter components until they are.

(5). Observe the waveform at the secondary of the modulation transformer and check for distortion. The output voltage swing on the secondary of the transformer will probably be too large to observe directly; in this case adjust the values of the dummy load resistors so that a suitable tapping point can be used for waveform observation. Fig. 5 shows one such arrangement. Supposing that the correct secondary load is 6000 ohms (for example, corresponding to a modulated Class-C amplifier load of 100 mA at 600 volts, i.e. 60 watts input to the modulated amplifier which requires a modulator rated at 30 watts output for complete sine wave modulation), the resistor values shown give 6:1 step-down in voltage at the inspection point. The 5000-ohm resistor must be capable of dissipating at least 30 watts. The actual figures quoted are, of course, given simply as an example.

(6). Disconnect the modulator dummy load and reconnect the Class-C amplifier together with its RF dummy load. Adjust the input to this stage to give correct modulator loading conditions. By means of a pick-up loop placed near the RF tank circuit and connected to the oscilloscope, observe the RF envelope and check its waveform. This should be free from distortion and spurious "wiggles"; breaking of the baseline indicates over-modulation, and flattening of the peaks of the envelope indicates lack of RF grid drive on the Class-C stage (provided that there is no modulator distortion).

(7). Swing the audio input frequency from a low value (say, 100 c/s) up to about 10 kc, keeping its amplitude more or less constant. Note that there are no resonances at any frequency. Arrange suitable tone control circuits so that the output begins to fall off at frequencies above 3 kc.

(8). Replace the sine wave input to the modulator by the microphone and speak whilst observing the RF waveform. The waveform of most people’s speech is asymmetric, and it is a good idea to arrange the polarity of the secondary of the modulation transformer to ensure that the highest peaks of the speech waveform are "upwards"; in this way the characteristic peaks of one's articulation will not cause breaks in the RF envelope when the general modulation level is still relatively low.

Speech Clipping and Filtering

As in all things, one must learn to walk before attempting to run, and in the case of radio-telephony one must become completely familiar with the management of straightforward modulators before attempting to use special devices such as speech clipping circuits, limiters, filters, compression circuits and the like. Any form of speech clipping or limiting introduces distortion (which may, however, even improve intelligibility in special circumstances), and in so
The British Short Wave League

We frequently receive inquiries as to the status and scope of the British Short Wave League, and whether it offers facilities or services of interest to amateur transmitters. The brief answers are (a) The League was first established as long ago as 1935 and it has been in continuous existence ever since, (b) It has a world-wide membership, which shows a progressive increase over the last three years, (c) It publishes its own 12-page BSWL Review, which is bound in with our Short Wave Listener & Television Review, the combined 44-page magazine going free to members (only) each month, (d) There is an active Transmitter Section of the League, the doings of which are covered in the Review, (e) Membership of the League carries with it entitlement to a number of free services, including our QSL Bureau, (f) The League awards Achievement Certificates covering operation on all amateur bands, and (g) The subscription rate is 18s. per annum. An explanatory pamphlet on the BSWL is available on request to: The Manager, British Short Wave League, 55 Victoria Street, London, S.W.1.

Cards in the Box

If your call appears below, it is because our QSL Bureau holds card(s) for you and we have not got your address. Please send a large S.A.E., with name, address and call-sign, to: BCM/QSL, London, W.C.1. Cards will be forwarded on the next G clearance, which will be not more than a fortnight from receipt of your envelope. And if you want your call to appear in “New QTH’s,” and subsequently in the Radio Amateur Call Book, please mention that at the same time.

G2LH, 2LZ, 2NB, 2OZ, 3FBT, 3FLO, 3FYU, 3GBI, 3GDJ, 3HHE, 3HHR, 3HTX, 3HWR, 3IXN, 3IVY, 6FL, 8CY, G3BHUT.
ABSTRACTS OF INTEREST
CURRENT TECHNICAL DIGEST

Each month we present brief references to useful practical articles appearing in the overseas radio press. These publications can be obtained on a sterling subscription basis on application to: Gage & Pollard, Publishers' Agents, 55 Victoria Street, London, S.W.1. We are informed that single copies of the periodicals mentioned can NOT be supplied.

RADIO AND TELEVISION NEWS, October 1951

In an article entitled "Putting the Clamp Tube to Work," W2GCB describes an ingenious variation on the usual "clamp" circuits by using one valve which will give amplitude-modulated phone or clickless CW, merely by throwing one switch. In the CW position, use is made of the inherent time-delay in the receiver to eliminate key-clicks; phone the clamping valve functions as a Class A modulator with the screen circuit of the PA for its load.

RADIO ELECTRONICS, November 1951

Some very interesting facts about the "Discone" as a broad-band aerial system are given by Fred Shuman. Two students of the College of Engineering, New York University, have produced a compact aerial with the incredible band-width of 100 kc to 4000 mc, by using only three switch positions. The lowest band is covered by a whip and tunable loading; the rest of the spectrum—12 to 4000 mc—is covered by two discones. Described as "a radiator intermediate between a conventional dipole and an electro-magnetic horn," the discone is well worth study by VHF enthusiasts. It is compact, easily constructed, and omni-directional; it also possesses this fantastic band-width. Its derivation from other forms of aerial is described in a lucid and interesting manner.

QST, October 1951

A description of an interesting pre-amplifier built by W9RZP shows it to be a "series-tuned cathode-coupled grounded-grid push-pull" affair. The circuit diagram looks considerably simpler than the name, and it is claimed that this circuit gives excellent gain as well as signal/noise ratio, having the advantage of extreme ease of adjustment. It should be eminently suitable for use on 144 mc, although the model shown was designed primarily for 28 mc. On the latter band it gives a gain of 20 db, with an increase in noise of only 15 db. On 80 mc signal/noise gain of about 5 db was also recorded.

CO, October 1951

The well-known BC-453 has now been "miniaturised" by the National Bureau of Standards, and although the new receiver will not be available for use as a Q5'er, it is described in an article entitled "The Miniature BC-453." The old BC-453 was made to a pre-war design with pre-war components; its successor, incredibly small in physical size, uses the most modern practice in every way. The RF circuits are slug-tuned with ferrite cores, driven by variable-pitch screws to give linear calibration; there is no dynamotor, the 28-volt DC supply being applied to heaters, screens and anodes. This necessitates the use of four valves in parallel-push-pull to give 100 milliwatts of output, and the unit uses, in all, twelve valves of the sub-miniature type. Some idea of the reduction in size over the conventional BC-453 may be gained from the fact that the IF transformers measure 1½in. by ½in. by ½in.

RADIO-ELECTRONICS October 1951

An interesting variation on the well-known "electronic bug" is described by Martin Crane. This key uses the standard bug's mechanical method of producing dots, but the dashes are derived from an unsymmetrical multi-vibrator circuit. Thus an ordinary bug key may be used as the "foundation," the dash contact merely being disconnected and fed through the new circuit. Its only disadvantage would appear to be that the dot speed must be adjusted mechanically to match the dash speed selected by the controls, but against this is the advantage of considerable simplicity and cheapness compared with fully electronic keys.

QST, November 1951

The need for constantly-increasing selectivity in amateur-band receivers is well illustrated in an article by W6SRY and W6YIR, entitled "One dB per Cycle." In the receiver described, a 14 mc signal is mixed with a high-stability oscillator output at 8 mc, passed through a selective 6 mc amplifier, heterodyned to 470 kc, and passed through another sharp amplifier. The signal then goes through a 20 kc amplifier and the audio stages. Except for the tunable 8 mc oscillator, all oscillators are crystal-controlled. A further interesting feature is that only the 8 mc tuning control is located at the operating position, the rest of the receiver being installed elsewhere. The 20 kc amplifier uses twelve high-Q circuits, the coils being wound on powdered-iron toroid formers. The overall selectivity curve has a flat top with a width of 220 cycles; at 60 db down the width is 330 cycles, and at 90 db down, 395 cycles.

QST, November 1951

VHF enthusiasts may learn a lot from an article by W1DBM on a 144 mc aerial system. Although designed for civil defence rather than for amateur work, this aerial should be ideal for either. It gives an extremely low angle of radiation by using stacked co-axial dipoles, a system that has not yet been tried out very extensively. A four-section stacked array of the type described may be mounted very easily at the top of a light mast, and the results claimed for it are spectacular. The advantages given by the detailed arrangement are concerned chiefly with preventing a metal mast from radiating, although it is used to form part of the array.

Always mention the Short Wave Magazine when writing to Advertisers—It Helps You, Helps Them and Helps Us

Short Wave Magazine, January 1952
Random Jottings

By THE OLD TIMER

A GOOD many problems that perplex the searcher after long distances can be solved by the acquisition of a really good atlas. Two recent publications are really excellent in their presentation of detail. Even the small Pacific Islands are given little maps to themselves, round the margins of the large Pacific Ocean map; and each such island is well and truly “spotted” by having latitude and longitude lines drawn through it and clearly marked on the small map. If you want to know the great circle bearing of Heard Island, Macquarie, Kerguelen, New Amsterdam and literally hundreds of such places, it is an easy matter to locate them in a modern atlas and then transfer them on to a Great Circle map such as our own DX Zone Map.

IN THE PANHANDLE

How many readers know that Alaska is not just a chunk of land up in the top left-hand corner of North America, but has a “panhandle” extending down the Canadian coast almost as far south as Vancouver? This is not just geographical memory-jogging, but an attempt to explain why certain KL7 stations seem to be heard only in the evenings, while others show up, mostly in the Spring, and always in the early mornings. The town of Juneau is well down in the panhandle, and its bearing is more or less that of the average VE7; the KL7’s up in Fairbanks, Anchorage and other towns in the Far Frozen North obey quite a different set of rules.

AERIAL COUPLERS

A surprising number of amateurs go to the trouble of devising an excellent unit for coupling their transmitter to the aerial system, but very few seem to use this same device for matching into the receiver. Considering the variety of impedances that can be encountered at the lead-in point of the average transmitting aerial, it is a little optimistic to expect the receiver to cope with anything and everything that is offered to it in this way. If your coupler succeeds in making your aerial “look like 72 ohms” for the benefit of the transmitter, why not let it benefit the receiver as well? Incidentally, although the average receiver is designed for an input impedance of 300 ohms or so, it has been proved conclusively that a better sig./noise ratio will result from a deliberate mismatch in which it is offered 72 ohms instead. Gain may drop a little, but sig./noise is what counts.

CHANGE-OVER RELAYS

A good many stations with relay switching of power supplies still rely on clumsy manual methods for aerial change-over. Perhaps their owners do not realise how easy it is to make an aerial change-over relay from an ordinary GPO type. The existing contacts are all removed; a thin strip of insulation is fixed to the armature in such a way as to extend it for an inch or so; and the “moving” contact (the one with points on both sides of the blade) is then fixed to the end of the insulating strip. With luck, you should now have a moving arm about 2½ long, with an up-and-down (or sideways) motion of half-an-inch or so. The other contacts from the dismantled relay can now be mounted on small insulators so as to line up with the moving arm, and a nice low-capacity aerial change-over switch will be the result.

THE BEST OPERATORS?

Once upon a time we used to be able to say, with justification, that the G’s were, on the average, the best CW operators in the world—and that they had the best notes. It is doubtful if we can still make this claim—very doubtful. Who would you award the palm to at the present day? We rather feel that the ZL’s, or possibly the VK’s, come well into the running. A few years ago the OZ’s and SM’s would have stood a chance, but now we hear far too many bad notes from that direction.

PLUGS AND SOCKETS

The standard GPO jack-plug, while excellent for keying circuits, is a snare and a delusion where modulator outputs are concerned; speech or other audio peaks rapidly reduce the insulation to a charred mess and the resulting short-circuit often causes much head-scratching. Even a 5-amp. mains plug will sometimes break down under this treatment. Plugs and sockets for RF, of course, require even more careful choice, but several excellent types for 72-ohm co-ax are available.
By E. J. WILLIAMS, B.Sc. (G2XC)

A S was anticipated by most competitors, G3BLP won the Short Wave Magazine Two-Metre Contest by a handsome margin. In the past three years, G3BLP has therefore progressed from third position through second to first. All readers will join us in offering him hearty congratulations. The consistency of the signal from G3BLP is regularly commented upon in letters from readers in the Midlands and the North. The Contest has, therefore, served to emphasize the potency of the transmissions from Selsdon. At the same time, it must not be forgotten that a Contest score requires two-way contacts, and credit should also be given to the receiving equipment. Your conductor has not personally visited the location at which these remarkable results are obtained, but it is believed it is well situated for working towards the North. Most people who have been to G3BLP, in fact, say "Wish I had his QTH." However, it is obvious from the equipment used, that G3BLP does not rely on a good location alone. The transmitter runs push-pull 826’s with 100 to 150 watts input, the driver consisting of a CC EF55 tripling to 24 mc, followed by two EL91’s and an 832 buffer stage. The receiver is a cascade with a crystal-controlled oscillator. For aerials, three arrangements are available: a 16-element stack, an 8-element stack fixed NE/SW, and a 4-element Yagi.

Among the better contacts from G3BLP were G5BY, G5YV and

GW5MQ—all over 180 miles, and the last two being worked twice. Other good QSO’s were with G2OJ, G3AOU, G3AUS, G3BOC, and G3AGS. During the Gale and downpour of the Sunday evening, G2OJ, G5YV, GW2ADZ and GW5MQ were all worked.

A perusal of the logs submitted for the Contest suggested that G5YV (Leeds) had made many excellent contacts; in fact, more than one northern competitor backed him as the winner. Unfortunately, no entry had been received from G5YV. Just in case it had gone astray, your conductor wrote to G5YV and, in reply, came a copy of his Contest log and a note to say that pressure of business had made it impossible to write out the details previously. As the latest date for the acceptance of entries had by then been well passed, it was not possible to include G5YV’s score in the official Contest Results, even though his score reached 180 and would have placed him second.

Second position is officially taken by G3DAH (Herne Bay). We are glad of this, partly because we believe it is an unexpected result. At least, it came as a surprise to G3DAH himself! A rather interesting fact is that the best DX contact of the Contest was that between G3DAH, the official runner-up, and G5YV, the unofficial runner-up! The distance is just over 200 miles. G3DAH used a crystal-controlled converter with two 6AK5 RF stages. The transmitter has an 829B in the final with 60 watts input. The aerial was a 4-element wide-spaced Yagi fed by a T-match from 80-ohm twin screened feeder.

G2XV (Cambridge), operating from a location only 35 feet a.s.l., occupies third position—and may we add what a pleasure it is to see one of the real Old Timers so well up in the scoring. His final stage was also an 829B, and the aerial a 3-over-3-over-3 about 39 feet

GW5MQ— all over 180 miles, and the last two being worked twice. Other good QSO’s were with G2OJ, G3AOU, G3AUS, G3BOC, and G3AGS. During the Gale and downpour of the Sunday evening, G2OJ, G5YV, GW2ADZ and GW5MQ were all worked.

A perusal of the logs submitted for the Contest suggested that G5YV (Leeds) had made many excellent contacts; in fact, more than one northern competitor backed him as the winner. Unfortunately, no entry had been received from G5YV. Just in case it had gone astray, your conductor wrote to G5YV and, in reply, came a copy of his Contest log and a note to say that pressure of business had made it impossible to write out the details previously. As the latest date for the acceptance of entries had by then been well passed, it was not possible to include G5YV’s score in the official Contest Results, even though his score reached 180 and would have placed him second.

Second position is officially taken by G3DAH (Herne Bay). We are glad of this, partly because we believe it is an unexpected result. At least, it came as a surprise to G3DAH himself! A rather interesting fact is that the best DX contact of the Contest was that between G3DAH, the official runner-up, and G5YV, the unofficial runner-up! The distance is just over 200 miles. G3DAH used a crystal-controlled converter with two 6AK5 RF stages. The transmitter has an 829B in the final with 60 watts input. The aerial was a 4-element wide-spaced Yagi fed by a T-match from 80-ohm twin screened feeder.

G2XV (Cambridge), operating from a location only 35 feet a.s.l., occupies third position—and may we add what a pleasure it is to see one of the real Old Timers so well up in the scoring. His final stage was also an 829B, and the aerial a 3-over-3-over-3 about 39 feet
The Short Wave Magazine
TWO-METRE CONTEST
November 3-4, 1951

<table>
<thead>
<tr>
<th>POSITION</th>
<th>CALL</th>
<th>LOCATION</th>
<th>POINTS</th>
<th>INPUT (Watts)</th>
<th>AERIAL SYSTEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>G3BLP</td>
<td>Selsdon, Surrey</td>
<td>274</td>
<td>100/150</td>
<td>Various</td>
</tr>
<tr>
<td>2</td>
<td>G3DAH</td>
<td>Herne Bay, Kent</td>
<td>169</td>
<td>60</td>
<td>4 Yagi</td>
</tr>
<tr>
<td>3</td>
<td>G2XW</td>
<td>Cambridge</td>
<td>159</td>
<td>90</td>
<td>3/3/3</td>
</tr>
<tr>
<td>4</td>
<td>G3WW</td>
<td>Wimborne, Cambs.</td>
<td>155</td>
<td>140</td>
<td>5/5</td>
</tr>
<tr>
<td>5</td>
<td>G3DS</td>
<td>Surbiton, Surrey</td>
<td>154</td>
<td>65</td>
<td>12 Stack</td>
</tr>
<tr>
<td>6</td>
<td>G4HT</td>
<td>Ealing, Middlesex</td>
<td>152</td>
<td>100/25</td>
<td>Various</td>
</tr>
<tr>
<td>7</td>
<td>G5MA</td>
<td>Ashstead, Surrey</td>
<td>151</td>
<td>100/60</td>
<td>4/4</td>
</tr>
<tr>
<td>8</td>
<td>G3AB</td>
<td>Coventry, Warw.</td>
<td>148</td>
<td>120</td>
<td>16 Stack</td>
</tr>
<tr>
<td>9</td>
<td>G3GUD</td>
<td>Derby</td>
<td>128</td>
<td>50</td>
<td>8 Stack</td>
</tr>
<tr>
<td>10</td>
<td>G3CGQ</td>
<td>Luton, Beds.</td>
<td>128</td>
<td></td>
<td>8 Stack</td>
</tr>
<tr>
<td>11</td>
<td>G3VM</td>
<td>Norwich, Norfolk</td>
<td>119</td>
<td>90</td>
<td>4/4</td>
</tr>
<tr>
<td>12</td>
<td>G3GE</td>
<td>Kingsbury, Middx.</td>
<td>115</td>
<td>50</td>
<td>4/4</td>
</tr>
<tr>
<td>13</td>
<td>G2XC</td>
<td>Portsmouth, Hants.</td>
<td>114</td>
<td>25</td>
<td>4/4</td>
</tr>
<tr>
<td>14</td>
<td>G2NH</td>
<td>New Malden, Surrey</td>
<td>113</td>
<td>60</td>
<td>4/4</td>
</tr>
<tr>
<td>15</td>
<td>G3GDR</td>
<td>Abbots Langley, Herts.</td>
<td>112</td>
<td>20</td>
<td>12 Stack</td>
</tr>
<tr>
<td>16</td>
<td>G5RP</td>
<td>Abingdon, Berks.</td>
<td>109</td>
<td>9</td>
<td>5/5</td>
</tr>
<tr>
<td>17</td>
<td>6YVR</td>
<td>S. E. London</td>
<td>107</td>
<td>25</td>
<td>4 Yagi</td>
</tr>
<tr>
<td>18</td>
<td>G5DF</td>
<td>Reading, Berks.</td>
<td>106</td>
<td>85</td>
<td>16 Stack</td>
</tr>
<tr>
<td>19</td>
<td>G2HDZ</td>
<td>Pinners, Middlesex</td>
<td>100</td>
<td>22</td>
<td>Stack</td>
</tr>
<tr>
<td>20</td>
<td>G4CB</td>
<td>Wimbledon, Surrey</td>
<td>97</td>
<td>50</td>
<td>3/3/3</td>
</tr>
<tr>
<td>21</td>
<td>G3FB</td>
<td>Ryde, Isle of Wight</td>
<td>88</td>
<td>15</td>
<td>4 Yagi</td>
</tr>
<tr>
<td>22</td>
<td>GWSMQ</td>
<td>Rhoosevelt, Plints.</td>
<td>87</td>
<td>100</td>
<td>3/3/3</td>
</tr>
<tr>
<td>23</td>
<td>G3FD</td>
<td>Southgate, Herts.</td>
<td>86</td>
<td>40</td>
<td>8 Stack</td>
</tr>
<tr>
<td>24</td>
<td>G5BY</td>
<td>Bolt Tail, Devon</td>
<td>85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>G20I</td>
<td>Eccles, Lancs.</td>
<td>81</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>G3BO</td>
<td>Denham, Bucks.</td>
<td>66</td>
<td>30</td>
<td>4/4</td>
</tr>
<tr>
<td>27</td>
<td>G2AH</td>
<td>Perivale, Middx.</td>
<td>64</td>
<td>70/20</td>
<td>12 Stack</td>
</tr>
<tr>
<td>28</td>
<td>G4MR</td>
<td>Slough, Bucks.</td>
<td>62</td>
<td>20</td>
<td>4 Yagi</td>
</tr>
<tr>
<td>29</td>
<td>G5NP</td>
<td>Parnham, Surrey</td>
<td>61</td>
<td>24</td>
<td>12 Stack</td>
</tr>
<tr>
<td>30</td>
<td>G4TA</td>
<td>Balham, London</td>
<td>61</td>
<td>12</td>
<td>8 Stack</td>
</tr>
<tr>
<td>31</td>
<td>G3EYV</td>
<td>S. W. London</td>
<td>59</td>
<td>25</td>
<td>4 Stack</td>
</tr>
<tr>
<td>32</td>
<td>G5HAZ</td>
<td>Birmingham, Warw.</td>
<td>57</td>
<td>25</td>
<td>4 Yagi</td>
</tr>
<tr>
<td>33</td>
<td>G3FY</td>
<td>Clapham Park, London</td>
<td>56</td>
<td>25</td>
<td>4/4</td>
</tr>
<tr>
<td>34</td>
<td>G3ASG</td>
<td>West Ewell, Surrey</td>
<td>55</td>
<td>11</td>
<td>4 Yagi</td>
</tr>
<tr>
<td>35</td>
<td>G3HBW</td>
<td>Wembley, Middlesex</td>
<td>54</td>
<td>24</td>
<td>3/3</td>
</tr>
<tr>
<td>36</td>
<td>G3GHO</td>
<td>Romford, Northants</td>
<td>50</td>
<td></td>
<td>Turnstile</td>
</tr>
<tr>
<td>37</td>
<td>G2BN</td>
<td>Kingston, Surrey</td>
<td>48</td>
<td>60</td>
<td>4/4/4</td>
</tr>
<tr>
<td>38</td>
<td>G5LQ</td>
<td>Chiswick, Middlesex</td>
<td>44</td>
<td>18</td>
<td>6 Stack</td>
</tr>
<tr>
<td>39</td>
<td>G3BOC</td>
<td>Willaston, Cheshire</td>
<td>43</td>
<td>20</td>
<td>City Slicker</td>
</tr>
<tr>
<td>40</td>
<td>G3DVQ</td>
<td>Purley, Surrey</td>
<td>42</td>
<td>15</td>
<td>2 x 2/2</td>
</tr>
<tr>
<td>41</td>
<td>G5HN</td>
<td>Reading, Berks.</td>
<td>42</td>
<td>20</td>
<td>16 Stack</td>
</tr>
<tr>
<td>42</td>
<td>G3BVG</td>
<td>Ealing, Middlesex</td>
<td>41</td>
<td>13</td>
<td>4 Yagi</td>
</tr>
<tr>
<td>43</td>
<td>G3ENI</td>
<td>Kew Gardens, Surrey</td>
<td>41</td>
<td>15</td>
<td>Tri-square</td>
</tr>
<tr>
<td>44</td>
<td>G5UM</td>
<td>Kewworth, Herts.</td>
<td>40</td>
<td>24</td>
<td>3 Yagi</td>
</tr>
<tr>
<td>45</td>
<td>G5US</td>
<td>Camberley, Surrey</td>
<td>37</td>
<td>45</td>
<td>8 Yagi</td>
</tr>
<tr>
<td>46</td>
<td>G5QY</td>
<td>Birmingham, Warw.</td>
<td>36</td>
<td>40</td>
<td>4 Yagi</td>
</tr>
<tr>
<td>47</td>
<td>G2MI</td>
<td>Chesham, Bucks.</td>
<td>35</td>
<td></td>
<td>6 Stack</td>
</tr>
<tr>
<td>48</td>
<td>G3AGS</td>
<td>Manchester, Lancs.</td>
<td>26</td>
<td>20</td>
<td>4 Stack</td>
</tr>
<tr>
<td>49</td>
<td>G3CAZ</td>
<td>Gillingham, Kent</td>
<td>25</td>
<td>60</td>
<td>16 Stack</td>
</tr>
<tr>
<td>50</td>
<td>G3HOV</td>
<td>Parkstone, Dorset</td>
<td>22</td>
<td>15</td>
<td>5 Yagi</td>
</tr>
<tr>
<td>51</td>
<td>G2BRR</td>
<td>East London</td>
<td>21</td>
<td></td>
<td>3 Yagi</td>
</tr>
</tbody>
</table>

NOTE: Figures in the "Aerial System" column give number of elements, e.g. 3/3 denotes 3-over-3

high at its top. A cascode converter, comprising a triode-connected 6AK5, 6J6 (GG) and a 6J6 mixer-doubler, the local oscillator injection being CC, was used to pull the signals in. G2XV's best contact was with GW5MQ and, in all, 62 stations were worked.

Comment
In last month's pre-view of the Contest results, we mentioned that almost every competitor approved the scoring system. The supplementary tables which we print this month show what the positions would have been had only DX been permitted to count for points. Deleting all contacts over shorter distances than 40 miles mainly penalises stations in and around London. In fact, one station in this area loses all
his points under such a scheme! On the other hand, G3BLP still achieves more than 200 points, and this means he won the Contest without the aid of local contacts. However, G3BLP is an exceptional case, and the stations favoured by omitting the “under 40’s” are those located rather more than 40 miles from London. Your conductor, for instance, rises some five places compared with the “official” table.

If we cut out all contacts under 100 miles, some quite violent changes occur in the table, mainly to the benefit of those who are situated just over the 100-mile mark from London. It is particularly noticeable how G3VM (Norwich) and G5BY (Bolt Tail) improve their positions. At the other end of the Table, 19 stations lose all their points, and these are those whose areas are included from all stations. It would be rash to draw hasty conclusions from all this. The prevailing conditions also play their part, and a big part at that. Very poor conditions undoubtedly favour stations in areas of high activity. It was possible to score 70 or 80 points in the London area from stations in the under-40-mile group. On the other hand, exceptionally good conditions must favour the more remote stations, for if the band is open to London, then they have far more high-scoring contacts available to them than have the London stations. Under poor conditions, therefore, it would seem desirable to reduce the scoring on local contacts in order to obtain a more equitable state for everyone, while in a good spell of conditions the scoring rate for DX contacts would need reducing. Somewhere in between these two extremes of “very good” and “very poor” must lie the conditions when the scoring system is as fair as can be when judged on a distance basis. From all this it may be concluded that we are content that the present system is as fair as we can make it, and we have every intention of leaving it unchanged for the 1952 Contest.

Many of the scores have had to be changed from those claimed by entrants. Some have risen, some fallen. Changes have been made only after very careful checking. Where no National Grid reference is given by a competitor, it is often difficult to make an accurate measurement. The mere name of a town such as Birmingham or Portsmouth is far from sufficient, as a location, to enable an accurate check to be made. Your conductor’s location is, for example, four miles north of the centre of Portsmouth, and, as a result, several entrants who placed him in the middle of the town claimed a point too many. (There are, of course, always the optimists who pin-point G2XC somewhere in the middle of Spithead in the hope of yet another point!) All this brings us to the fact that it is highly desirable for all entrants to quote their NGR’s. In this connection, it may be worth mentioning that if the Ordnance Survey “10-mile” Map is used it is possible to measure distances correct to the nearest mile if the NGR’s are known. No calculations whatever are needed. For contest purposes, this degree of accuracy is quite adequate.

One or two competitors claimed full points on “second contacts” instead of the reduced scoring. This was duly amended! Others, omitting their NGR, located themselves in the south of their home-town when working stations to the north, and in the north when working to the south. For those who have not yet tried this one, we would simply remark that it does help increase the score! In all fairness, however, your conductor must say that there were as many, if not more, who under-estimated their distances and points, and that in general the Contest was entered in the true spirit of Amateur Radio.

Useful check logs were received from G2DHV, G2DSW, G2KF, G2YL, G3AOO, G3FZL, G4JJ, G8IC. Some of these would have made respectable entries, and we thank them for their interest and for adding to the general level of activity during the Contest.

Activity and Inactivity

Every year at about this time the complaints regarding inactivity on the two-metre band start to pour in. The first reaction of your conductor to this is always to point out that if everyone who grumbled about lack of signals on the band were himself active, the cause of the deficiency would be immediately removed. A glance through the log at G2XC for the past few December and Januarys shows that G2XC has, without exception, had to be relatively inactive during those eight weeks. The cause is not difficult to find—your conductor has just not had the time to spare. It is certain others are in a similar position.

Personally, we rather pity the man who writes saying, “I am active every evening from 1900 to 2300.” His apparent lack of other interests to
occupy his spare time seems to us deplorable, and we cannot associate ourselves with him when he goes on to a general condemnation of all others who are not also active every evening from tea-time to bed-time. Similarly, the man who contends that the VHF operator should never look at a TV programme but always be "on the band" is surely turning a hobby into a taskmaster!

Please, do not get us wrong on all this. Nobody would be more delighted than your conductor to know that there was such activity on two metres that, whenever he switched on, there would be a wide selection of stations to work; but while the number of stations interested in VHF work stands at its present average level of just over 200, it is quite unreasonable to expect such a state of affairs to exist. It has been said in these columns before, and on more than one occasion, that the only solution to the empty band is more stations equipped for VHF and not more activity from those already there. The trouble is also partly due to VHF contacts becoming too commonplace. A few weeks ago we looked back through an old log book of pre-war days; one was impressed by the rarity of contacts then on the 5-metre band, and recalled the thrill it gave when, after many nights of hearing nothing, a contact was obtained or perhaps just a signal heard. Nowadays it requires a 600-mile contact to produce a thrill, so when the rains come or the north wind blows, the VHF man finds it much preferable to sit by the fire with a book or the TV than thump a key out in the cold garden shack or climb up into the bitter attic where the VHF gear resides. However, all is not really so gloomy. Spring will come again and, with it, hopes of pushing that DX record up to 700, 800, 900 or who knows, perhaps 1000 miles—and perhaps someone will even go portable in Westmoreland! Then the two-metre man will awake from his winter hibernation, hope that there were not too many good nights during the spell he missed, and once again get down to the job of calling "CQ 2."

Other News

It was pleasing to be able to meet so many readers, including quite a large number from the North, at the Amateur

---

TWO-METRE CONTEST

Scores after eliminating

Local Contacts

<table>
<thead>
<tr>
<th>POS.</th>
<th>CALL</th>
<th>PTS.</th>
<th>POS.</th>
<th>CALL</th>
<th>PTS.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>G3BLP</td>
<td>207</td>
<td>26</td>
<td>G3FD</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>G3DAH</td>
<td>167</td>
<td>27</td>
<td>G6CB</td>
<td>28</td>
</tr>
<tr>
<td>3</td>
<td>G2XV</td>
<td>144</td>
<td>28</td>
<td>G3BOC</td>
<td>27</td>
</tr>
<tr>
<td>4</td>
<td>G3WW</td>
<td>143</td>
<td>29</td>
<td>G4MR</td>
<td>27</td>
</tr>
<tr>
<td>5</td>
<td>G3ABA</td>
<td>123</td>
<td>30</td>
<td>G3NF</td>
<td>27</td>
</tr>
<tr>
<td>6</td>
<td>G3VM</td>
<td>114</td>
<td>31</td>
<td>G8QY</td>
<td>25</td>
</tr>
<tr>
<td>7</td>
<td>G3GUD</td>
<td>113</td>
<td>32</td>
<td>G2AHP</td>
<td>23</td>
</tr>
<tr>
<td>8</td>
<td>G2XG</td>
<td>105</td>
<td>33</td>
<td>G3HBB</td>
<td>21</td>
</tr>
<tr>
<td>9</td>
<td>G4HT</td>
<td>97</td>
<td>34</td>
<td>G3AGS</td>
<td>20</td>
</tr>
<tr>
<td>10</td>
<td>G8RP</td>
<td>94</td>
<td>35</td>
<td>G3CAZ</td>
<td>18</td>
</tr>
<tr>
<td>11</td>
<td>G5MA</td>
<td>88</td>
<td>36</td>
<td>G5PY</td>
<td>16</td>
</tr>
<tr>
<td>12</td>
<td>G5DS</td>
<td>87</td>
<td>37</td>
<td>G3GBO</td>
<td>13</td>
</tr>
<tr>
<td>13</td>
<td>G3GQ</td>
<td>85</td>
<td>38</td>
<td>G3HVO</td>
<td>12</td>
</tr>
<tr>
<td>14</td>
<td>GW5MQ</td>
<td>85</td>
<td>39</td>
<td>G3EYV</td>
<td>11</td>
</tr>
<tr>
<td>15</td>
<td>G5BY</td>
<td>83</td>
<td>40</td>
<td>G5HN</td>
<td>11</td>
</tr>
<tr>
<td>16</td>
<td>G3GAN</td>
<td>77</td>
<td>41</td>
<td>G5LQ</td>
<td>11</td>
</tr>
<tr>
<td>17</td>
<td>G20I</td>
<td>74</td>
<td>42</td>
<td>G5UM</td>
<td>9</td>
</tr>
<tr>
<td>18</td>
<td>G5DF</td>
<td>69</td>
<td>43</td>
<td>G5US</td>
<td>9</td>
</tr>
<tr>
<td>19</td>
<td>G8VR</td>
<td>62</td>
<td>44</td>
<td>G3DVQ</td>
<td>8</td>
</tr>
<tr>
<td>20</td>
<td>G2NH</td>
<td>60</td>
<td>45</td>
<td>G6TA</td>
<td>7</td>
</tr>
<tr>
<td>21</td>
<td>3GHAZ</td>
<td>49</td>
<td>46</td>
<td>G2BN</td>
<td>6</td>
</tr>
<tr>
<td>22</td>
<td>G3GSE</td>
<td>47</td>
<td>47</td>
<td>G3ASG</td>
<td>4</td>
</tr>
<tr>
<td>23</td>
<td>G3GDR</td>
<td>47</td>
<td>48</td>
<td>G2BRR</td>
<td>2</td>
</tr>
<tr>
<td>24</td>
<td>G3GHO</td>
<td>43</td>
<td>49</td>
<td>G3BVG</td>
<td>2</td>
</tr>
<tr>
<td>25</td>
<td>G2HDZ</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: For this Table only contacts over distances of 40 miles or more have been counted.
Radio Exhibition on December 1st. Opportunity was taken to discuss with the Northern visitors the possibility of arranging a VHF dinner in their part of the country.

Among the few letters received for this month's news paragraphs is one from G2HIF (Wantage). He mentions that, as a result of 7 hours' operating during one week, he had a total of two contacts, one of which was a schedule! He goes on to say: "And before you attempt to explain it by poor conditions, poor night or poor equipment, I hasten to explain that I found conditions fair; that I regard my site as being above average to the north, west and east, and that a noise factor determination of my receiver has not disgraced it." (In case this should to the north, west and regard my explain it on one of which as a G2HIF of the less of the its greatest use signals monthly appearance should that appears "failed!) G2HIF failed!) of the country.

Among the less frequently heard conditions poor night he has spent just conditions, poor night the more active stations is certain that, he has spent just five hours' operating during July, 1949. He has added some reflectors to his City Slicker, but the poor conditions have not given him an opportunity to test it out properly. He sends a QSL for each initial QSO, but returns are only about 50%.

G5YV (Leeds) is hoping to put up a lattice steel tower as soon as he gets permission, and that will keep him busy for a month or two. This will probably mean little or no activity on Two until the spring, when, with the beam up at 75 feet, he may even be able to hear the stations in south Hampshire.

G5LI (Hampstead) has departed for Canada. His signal will certainly be missed from the band, but we look forward to hearing from him when he reaches VE and know that he will soon be looking up the VHF stations over in

<table>
<thead>
<tr>
<th>POS</th>
<th>CALL</th>
<th>PTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>G3BLP</td>
<td>144</td>
</tr>
<tr>
<td>2</td>
<td>G3VN</td>
<td>96</td>
</tr>
<tr>
<td>3</td>
<td>G5BY</td>
<td>75</td>
</tr>
<tr>
<td>4</td>
<td>G3GUD</td>
<td>71</td>
</tr>
<tr>
<td>5</td>
<td>G3DAH</td>
<td>65</td>
</tr>
<tr>
<td>6</td>
<td>GWSMQ</td>
<td>61</td>
</tr>
<tr>
<td>7</td>
<td>G2OI</td>
<td>59</td>
</tr>
<tr>
<td>8</td>
<td>G5DS</td>
<td>47</td>
</tr>
<tr>
<td>9</td>
<td>G5MA</td>
<td>46</td>
</tr>
<tr>
<td>10</td>
<td>G6HT</td>
<td>44</td>
</tr>
<tr>
<td>11</td>
<td>G2XY</td>
<td>43</td>
</tr>
<tr>
<td>12</td>
<td>G3WW</td>
<td>41</td>
</tr>
<tr>
<td>13</td>
<td>G2XC</td>
<td>31</td>
</tr>
<tr>
<td>14</td>
<td>G3BOC</td>
<td>27</td>
</tr>
<tr>
<td>15</td>
<td>G2NH</td>
<td>25</td>
</tr>
<tr>
<td>16</td>
<td>G3AZH</td>
<td>24</td>
</tr>
<tr>
<td>17</td>
<td>G3ABA</td>
<td>23</td>
</tr>
<tr>
<td>18</td>
<td>G8VR</td>
<td>23</td>
</tr>
<tr>
<td>19</td>
<td>G3GQ</td>
<td>21</td>
</tr>
<tr>
<td>20</td>
<td>G5DF</td>
<td>20</td>
</tr>
<tr>
<td>21</td>
<td>G4MR</td>
<td>16</td>
</tr>
<tr>
<td>22</td>
<td>G5RP</td>
<td>14</td>
</tr>
<tr>
<td>23</td>
<td>G3FAN</td>
<td>12</td>
</tr>
<tr>
<td>24</td>
<td>G8OV</td>
<td>12</td>
</tr>
<tr>
<td>25</td>
<td>G3AGS</td>
<td>9</td>
</tr>
<tr>
<td>26</td>
<td>G3HDZ</td>
<td>8</td>
</tr>
<tr>
<td>27</td>
<td>G3GHO</td>
<td>7</td>
</tr>
<tr>
<td>28</td>
<td>G6CB</td>
<td>7</td>
</tr>
<tr>
<td>29</td>
<td>G2AHZ</td>
<td>5</td>
</tr>
<tr>
<td>30</td>
<td>G5CAZ</td>
<td>5</td>
</tr>
<tr>
<td>31</td>
<td>G3GBO</td>
<td>5</td>
</tr>
<tr>
<td>32</td>
<td>G3GSE</td>
<td>5</td>
</tr>
</tbody>
</table>

TWO-METRE CONTEST
Over-100-Mile Scores

G2HIF says he is prepared to guarantee to be active for a minimum of 20 hours each month; and further on the subject of guarantees, he is maintaining his practice of sending a QSL for every initial contact. Finally, he wonders whether some sort of encouragement could be given to those who use the LF bands for local contacts to migrate to Two Metres. This would relieve the LF bands for real DX work, as well as increasing activity on VHF. On this point, at least, your conductor is in full accord with G2HIF. But what encouragement can we give?

G6CI (Kenilworth) has found a few openings during November for signals from the south-east, but, as a whole, conditions have been poor with him. He checks the band each evening and puts out a CQ or two, just in case.

G3AGS (Manchester) has been exclusively on Two Metres since July, 1949. He has added some reflectors to his City Slicker, but the poor conditions have not given him an opportunity to test it out properly. He sends a QSL for each initial QSO, but returns are only about 50%.

G5YV (Leeds) is hoping to put up a lattice steel tower as soon as he gets permission, and that will keep him busy for a month or two. This will probably mean little or no activity on Two until the spring, when, with the beam up at 75 feet, he may even be able to hear the stations in south Hampshire.

G5LI (Hampstead) has departed for Canada. His signal will certainly be missed from the band, but we look forward to hearing from him when he reaches VE and know that he will soon be looking up the VHF stations over in

Short Wave Magazine, January 1952
Montreal. G8LN (Plumstead) reports G2BN, G2BRR, G5TP, G6TA and G8HY as regularly active, and says conditions have been fair at times. G3HEA is a new station on. On the subject of making the 522 TVI-proof, G8LN comments: “It is definitely wrong to put RF chokes or condensers in the screen leads of the 832 circuits, as these set up parasities; hence their omission in the original.” Bench-work at G8LN includes a new exciter for two metres.

G6TA (Balham, S.W.12), in applying for FBC membership, remarks that though only on Two since the beginning of October, he has worked 90 different stations already; actually, he is an OT in this VHF game, having started-up on 8 metres, our then VHF band, in 1928.

G8VR (London, S.E.2) has found conditions dull and the going slow, but raised G2BD on November 14 for a new county; he wonders what is the location of a VHF station signing GOP, bearing north from London and sending auto, well heard November 14-16. The G8VR 70-centimetre signal has been received by G2WJ out in Great Canfield, Essex, on a cross-band QSO. G8VR has had the misfortune to lose his aerial gear and will be off until repairs can be completed.

G5W5MQ (Nr. Mold) remarks that the slump has certainly set in on Two,” but that he found the band wide open on odd occasions up to December 14. The 13th was one of these evenings, with GM’s, 3BDA and 3OL S9 on phone, and G2FO, G3WW, G3AMM and G8GL also excellent signals. The 70-cm log at G5W5MQ now shows G3APY (Kirkby-in-Ashfield) worked no less than 14 times.

That short article by G2IQ in our issue for September, 1951, naturally aroused a great deal of interest, and among those who are quite definite that they prefer the Cascode arrangement is G3EYV (London, S.W.4), who says he would “enter the lists with a broadside heavily in favour of the Cascode.” Recent activity at G3EYV has been the usual round of locals, and once again he feels the urge to get going on Seventy-cems—the QTH and considerations of aerial space are the present snags.

Unlike most of our correspondents this month, G3EHY of Banwell, says conditions have been good with him most nights, in proof of which he mentions a regular schedule-working with GW2ADZ (Oswestry) and G8OU of Ashtead, Surrey, in quite another direction; and 75% of these contacts have been on phone. As he rightly remarks, too many VHF operators just assume the winter is the “close season” on Two, without actually coming on and trying the band. About Seventy-cems, G3EHY is even more encouraging. In his area, stations now active are GW3HCH (Newport, Mon.), G3GFV and G3HSJ (Bristol) and also G3GJN of that city; with the exception of the latter, all these are regularly audible in Banwell on phone, GW3HCH being S9 at times. With a new GG RF stage—a 446B lighthouse in a tuned cavity—added to his 70-centimetre receiver, G3EHY achieved a very fine QSO on that band with GW2ADZ on the evening of December 12, reports being RST-599 solid both ways for three-quarters of an hour. This is in every way a noteworthy contact, and it will undoubtedly help to encourage many others to get going seriously on Seventy-cems. Well done. GW2ADZ/G3EHY!

The Clubs

It is hoped to arrange a Five-Band Club Dinner in London in April. Further details will be announced as soon as they are known. Once again the organiser will be the Club’s London representative, G3BLP. Looking further ahead, a dinner in the Midlands is envisaged for the summer, while we should be glad to support a similar event further North if someone in the Lancashire or Yorkshire area would care to undertake its organisation in conjunction with us.

New members of the Five-Band Club include G2HF and G3AGS. Amongst those who have recently qualified for the

---

**Some National Grid References**

<table>
<thead>
<tr>
<th>Grid</th>
<th>Callsign</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>G2AH</td>
<td>51/169830</td>
<td></td>
</tr>
<tr>
<td>G2NH</td>
<td>51/206494</td>
<td></td>
</tr>
<tr>
<td>G2XV</td>
<td>52/473568</td>
<td></td>
</tr>
<tr>
<td>G3ABA</td>
<td>42/133822</td>
<td></td>
</tr>
<tr>
<td>G3BLP</td>
<td>51/349626</td>
<td></td>
</tr>
<tr>
<td>G3BOC</td>
<td>33/336792</td>
<td></td>
</tr>
<tr>
<td>G3BVG</td>
<td>51/181677</td>
<td></td>
</tr>
<tr>
<td>G3DVQ</td>
<td>51/309899</td>
<td></td>
</tr>
<tr>
<td>G3EYV</td>
<td>51/302751</td>
<td></td>
</tr>
<tr>
<td>G3FD</td>
<td>51/27796</td>
<td></td>
</tr>
<tr>
<td>G3GOB</td>
<td>51/108662</td>
<td></td>
</tr>
<tr>
<td>G3GDR</td>
<td>52/10002</td>
<td></td>
</tr>
<tr>
<td>G3GUD</td>
<td>33/8854</td>
<td></td>
</tr>
<tr>
<td>G3VM</td>
<td>63/182101</td>
<td></td>
</tr>
<tr>
<td>G4MR</td>
<td>41/988792</td>
<td></td>
</tr>
<tr>
<td>G5DS</td>
<td>51/185665</td>
<td></td>
</tr>
<tr>
<td>G5LO</td>
<td>51/195784</td>
<td></td>
</tr>
<tr>
<td>G5MQ</td>
<td>33/289695</td>
<td></td>
</tr>
<tr>
<td>G5PY</td>
<td>51/2973</td>
<td></td>
</tr>
</tbody>
</table>
VHF Century Club are G8IC and G8VR. Congratulations to both of them. The Club now has 93 members, so the first century should be reached in the next few months. May we take this opportunity of reminding members of their membership promise to continue replying 100% to QSL's received. (And that reminds us of one or two we must send off!)

Late Flash: And having said all that about "Conditions and Activity" further back in this piece, what do we hear but that the band opened wide on the evening of December 12, as the weather changed from cold to milder! Stations in DL, F, ON and PA were heard working one another, and some good inter-G and Continental QSO's were made by those stations on the air at the time.

In Conclusion

Next month it is hoped to review the achievements and happenings of 1951. Please keep up the monthly reports during the "low-activity" period of the winter months, as only by that means can your conductor keep his claim for space for this feature. Many thanks to all those who have written regularly during 1951, and every good wish to all readers for the New Year. Letters for next month should be addressed to E. J. Williams, G2XC, Short Wave Magazine, 35 Victoria Street, London, S.W.1.

January 16 latest.

NEW POST OFFICE "SELF-HELP" PAMPHLET

Licensed operators will be interested to know that in future holders of sound and television broadcast receiving licences who complain to the Post Office of interference to their reception will be given a pamphlet which tells them how they can make simple tests to ascertain whether the trouble is due to a faulty receiver or an inefficient aerial and earth system. Interference due to such causes should not be referred to the Post Office Interference Investigation Service, but should be dealt with by the owner of the receiver, or his radio dealer.

If, however, the tests indicate that the interference is due to causes outside the control of the owner of the set, there is a form at the end of the pamphlet for enlisting the services of Post Office engineers to track down the source of the trouble.

The Post Office says that this new method of dealing with complaints of interference has been adopted because, in a large proportion of cases investigated by the GPO, bad reception was due to faulty receivers and/or inefficient aerial and earth systems. It is hoped that use of the new pamphlet will effect an appreciable reduction in the heavy calls made on the Interference Investigation Service.

"PSE QSL"

From time to time we remind operators who may need SWL reports on tests, or transmissions on particular bands, that a regular feature "PSE QSL" in our Short Wave Listener & Television Review is available for the purpose for all who may care to use it. Send call-sign, address for QSL's, and details of transmissions on which reports are wanted—operating periods, frequency, phone/CW, nature of tests, and so on—and the notice will appear in the next available issue of Short Wave Listener.

OCTOBER EXAMINATION RESULT

Candidates sitting for the October 1951 Radio Amateurs' Examination, held in London under G.P.O. auspices, totalled 55, of whom 40 were passed, giving a pass-rate of 73%. The paper was on the same lines as that set by the City & Guilds for the R.A.E. held in May last; at the moment of writing, the results of this are still awaited; the number of candidates taking the May examination was, of course, far greater, and it was held at a large number of centres, at home and overseas.

OUR QSL BUREAU

- Delivers cards to amateur addresses throughout the world
- Accepts cards from any overseas source for delivery to any G operator (or BSWL member)
- Can be used both ways only by Direct Subscribers and BSWL members
- Is recognised as a responsible independent agency
- Address is: BCM/QSL, London, W.C.1.
December 12, 1901

On this date 50 years ago the first Trans-Atlantic wireless reception was confirmed, when the Morse letter “S” transmitted from Poldhu was received in Newfoundland. Marconi was not, of course, the “inventor” of wireless, but he was the genius who saw, in the known phenomena of his time, the possibility of developing a system of communication by wireless, and he set out with that object in view. Experimental work and the propounding of theories had gone quite a long way before that first signal was heard across the Atlantic. And even in those days there were the experts who said it was impossible—and that Marconi’s letter “S” could just as well have been a train of chance atmospheric noises.

SSB Test Signal

We are informed by G3DCN (West Harrow) that an SSB test transmission originating in Germany can be heard on 9450 kc, during the period 2000-2030 GMT most evenings. The text, repeated continuously in English, is “‘This is Frankfurt-Main, Germany. transmitting on a single-sideband system to permit receiver adjustment. The station is operated by the Overseas Telephone Service for radio communication purposes.” As G3DCN remarks, this transmission should be very helpful to those interested in SSB working and receiver setting up.

Premiums for Technical Writers

The Radio Industry Council has recently made a most enlightened decision of great interest and importance to those authors, and would-be contributors, who have their work published in the technical radio press. Premiums of 25 guineas, up to an “average of six a year, will be awarded “to the writers of published articles which, in the opinion of a panel of judges, deserve the official commendation of the Industry.” Only non-professional writers—defined as those not paid a salary for regular writing, or deriving less than 25% of total income from casual author’s fees or book royalties—are eligible for consideration.

Awards will be made only in respect of articles appearing in the public press, by which is meant periodicals normally available on the bookstalls, as distinct from the proceedings of learned societies and privately circulated membership-only publications, which will not be eligible. Needless to say, contributors to Short Wave Magazine come within the orbit of the scheme, and naturally we hope that in due course we shall be able to announce one of these important awards.

The panel of judges is appointed by the Radio Industry Council, with power to co-opt specialists and seek the advice of learned Editors.

The F.O.C. Dinner

This enjoyable event, the fourth of its kind, was held in London on December 1st, 46 members being present, with Gerald Marcus, G2NM (President) in the chair. The numbers were made up to 60 by the presence of “sweethearts and wives.” It was, however, for everyone there a matter of the deepest regret that Fergie himself, G2ZC, again could not attend because of serious ill-health. Both he and G5PS, the retiring honorary secretaries, were presented with gifts, subscribed for beforehand by the membership of the Club, and framed addresses commemorating their great services to the First Class Operators’ Club over a period of years. The speeches were by the President, by G5PS and by an overseas member, PA0XE.

Call Book Prices

We are informed that, to clear the stocks remaining from the Amateur Radio Exhibition, the price of The G Call Book has been reduced to 1s. 6d., and that of the Foreign Section (which is the Radio Amateur Call Book proper, less only the United States section) to 5s., post free. Either would be a most acceptable present for any amateur, home or overseas, and at these prices they will be in great demand.

Short Wave Magazine, Volume IX

693
NEW QTH’s

This space is available for the publication of the addresses of all holders of new U.K. callsigns, as issued, or changes of address of transmitters already licensed. All addresses published here are reprinted in the quarterly issue of the “RADIO AMATEUR CALL BOOK” in preparation. QTH’s are inserted as they are received up to the limit of the space allowance each month. Please write clearly and address on a separate slip to QTH Section.

G2ANT W. Law, c/o C. S. Foster & Sons, Ltd., Loughton, Essex.
G3BTM N. Shires, 118 Manor Square, Dagenham, Essex.
G3CLW W. J. McIntyre, 83 Hillcrest Road, Bromley, Kent.
G3EAX Sgt. A. Weatherley, c/o 58 Sunningdale Road, North Cheam, Sutton, Surrey.
G3EUB J. N. A. Hudson, 53 Rudolph Road, Bushey, Herts. (Tel: Bushey Road 2700).
G3EWU J. F. Whelan, 36 Laxton Road, Liverpool, 19.
G3FAU V. Cundall, 93 Chandos Road, Stratford, London, E.15.
G3HGJ D. M. Foster, Clapham Vicarage, Yorkshire, via Lancaster. (Tel: Clapham 240).
G3HKN F. L. Shakespeare, 14 Richmond St., Burton-on-Trent, Staffs.
G3HMI A. Sandman, 2 Westcliff Avenue, Southend, Essex.
G3HQB L. C. Mason, 29 Upper Brighton Road, Surbiton, Surrey. (Tel: ELM. 2106).
G3HQG G. Atkins, 38 Fire Station, Division Street, Sheffield, Yorkshire.
G3HQM C. E. Light (ex-VK2QM), 18 Bramley Close, Whiston, Middlesex.
G3HRD J. Davis, 19 Boscawell Terrace, Pendene, nr. Penzance, Cornwall.
G3HRH G. R. Taylor, 7 Hill Street, Hednesford, Staffs.
G3HTR H. Bolton, 691 Hagley Road West, Quinton, Birmingham, 32.
G3HTW E. W. Parcell, 40 Campers Avenue, Letchworth, Herts.
G3HUW M. P. Morrissey, 51 Grove Lane, Kingston-on-Thames, Surrey.
G3HVA D. G. Pinmore, 19 Fountains Road, Luton, Beds.
G3HVB F. Dickinson, 372 Old Bath Road, Leightonbury Hill, Cheltenham, Glos.
G3HVE A. E. Broadbent, 78 Malthouse Meadows, Liphook, Hants.
G3HVS A. J. Stevenson, 8 North Blantyre Street, Findochty, Banffshire.
G3HWH W. E. Wilkinson, 11 Albinaroe Street, Clitheroe, Lancs.
G3HWI E. Whalley, 81 Moorfield Avenue, Ramsgrave, Blackburn, Lancs. (Tel: Blackburn 6856).
G3HWJ J. F. Cowling, 46 Queens Road, Rayleigh, Essex.
G3HWO B. Taylor, 12 Douglas Road, Mill Hill, Deal, Kent.
G3IIO M. G. Whittaker, Stile-House, Shelf, Halifax, Yorkshire.
G3IKY K. C. Young, 58 Plaxton Road, Plumstead, London, S.E.18.
G3ISW S. Watkins, 6 Stanley Avenue, Eccles, Lancs.
G3ITS Central Training School Radio Club, Duncan Hall, Stone, Staffs.
G4TM T. A. Maguire (ex-G5NV/A6CMG), 51 Whitchurch Gardens, Edgware, Middlesex.
G6MB F. Hicks Arnold, 64 Garrick Close, Walton-on-Thames, Surrey.

CHANGE OF ADDRESS

G3BHR A. W. Mundon, 9 Strawberry Lane, Carshalton, Surrey.
G3DCY S. Richards, 3 New Farm Cottages, Penybech, Pontypool, Mon.
G3ECH R. J. Price (ex-GW/ESCH/3UV/L), 51 Raleigh Hall, Eccleshall, Staffs.
G3EDE N. Clark, 39 Wimborne Drive, Pinner, Middlesex. (Tel: Field End 9136).
G3EEQ K. C. Gill, Homelea, Clowne Road, Barlborough, nr. Chesterfield, Derbyshire.
G3ESW B. Insull, 246 Duxsey, Stafford, Staffs.
G3F0I W. M. Gregory (ex-V5SWG), 85 Maidstone Road, Bounds Green, London, N.11.
G3GGJ A. H. G. Watson, 75 Vinery Road, Cambridge, Cambs.
G3GWI A. Stenhouse, 20 Overslade Lane, Rugby, Warwick.
G3HYY J. C. Watson, 19 Hampton Lane, Solihull, Warws. (Tel: Sol. 0187).
G3HHK M. J. F. Harrison, The Cliftonville Tavern, Ilderton Road, Bermondsey, London, S.E.I.
G5UI J. E. Perkins, 12 London Road, Stony Stratford, Wolverton, Bucks.
G6DY C. Keith Murray, 2 Walrond Road, Swangate, Dorset.

CORRECTION

G3ENT North Kent Radio Society, c/o L. E. J. Clinch, 8 Windsor Road, Bexleyheath, Kent. (Tel: Bexleyheath 1393).

Read Short Wave Magazine Regularly and Keep in Touch
The other man’s station G3ZI

The station of G3ZI—owned and operated by L. S. Woollatt at Cedar House, Filpot Lane, Chobham, Woking, Surrey—is of particular interest because he is phone-only on all bands, with 165 countries worked in 38 Zones.

With the exception of the two main receivers, a Radiovision “Commander” and an RME-69 with DB-20 pre-selector, all the gear (including the masts and aerials pictured on p.603 of our December issue) is home-built. Three transmitters are provided: For Forty and Eighty, a pair of 807’s are VFO-controlled through the usual buffer stages; on Twenty and Ten, the PA is an 813, and on Two Metres an 832A is run at 18 watts input. Modulation is by a pair of 807’s in push-pull, with a crystal microphone, and the whole station is relay controlled by a single switch after selection of the transmitter to be used. For reception on Two Metres, a 6J6 twin-triode converter feeds into the “Commander.”

If working phone is one interest at G3ZI, building aerials is another. The static all-band system is a 267-ft. long wire, connected (unusually) Windom fashion. For 14 mc, a 3-element beam is available, rotated by a prop-pitch motor with remote indication across a great circle map. On Ten another beam is fixed to fire West, and for Two Metres there is a 12-element stack.

The photograph shown here does not altogether do justice to G3ZI—a station incorporating the latest operating techniques, right in line with modern ideas, and capable of giving results under the most competitive conditions.

695
THE SIXTH MCC

THE MAGAZINE TOP-BAND CLUB CONTEST

Another ‘MCC’ is over, and a new page in the history of this Contest has been turned. With a completely new set of rules, giving the event quite a different character from its predecessors, MCC attracted an entry above the average. True, the 28 Clubs competing did not come up to the record numerical standard of last year’s 36, but there were some special and strange reasons for this!

A surprising number of Clubs wrote in to say that they would not compete, as they did not agree with the change of rules, and did not approve of a contest which was strictly an Inter-Club affair, as this was to be. They felt that it would be boring; that scoring would be slow; that, to stand a chance of winning, each Club would have to operate every night; and so on.

The remarkable fact is that those who did enter for the Contest—many of them being among the newer and smaller Clubs—stated, almost without exception, that the new Rules were an improvement. Competing Clubs, on the whole, enjoyed the Contest very much, and it was only those who stayed outside that did not!

The first three Clubs in this year’s event are shown in the Table herewith.

1st: Coventry Amateur Radio Society, G2LU (203)
2nd: West Cornwall Radio Club, G3IY (182)
3rd: Surrey Radio Contact Club, G8TB (174)

One can almost call it a runaway win for Coventry, in view of the close bunching of the scores between the 2nd and 14th positions. In any case, they are to be heartily congratulated on having staged this come-back, after holding a place among the first three for each of the six MCC events.

Table I gives the full list of positions and scores; Table II shows the first three for each of the years from 1946 to 1951. It will be noted that if we allow three marks for a first, two for a second and one for a third, the overall winners up-to-date are, again, Coventry—this represents a very fine consistent performance on their part.

It was a pity that Rhigos, GW3FFE, could not compete this year. “Personnel trouble” was at the root of the matter there, with two possible operators sick, one posted away from the district, and another unable to turn up regularly.

Neath and Port Talbot, GW3EOP, who were second in both the 1949 and 1950 events, did not compete seriously this year. The score of 20 points sent in by them is, we are told, to be regarded as a “token entry” in memory of the enjoyment they derived from the last two MCC’s; this year they disapproved of the rules.

At least, the new rules have relieved us of the necessity of explaining that so-and-so was regarded as a pirate, and that one Club claimed to have worked a PAO but hadn’t counted him, and so on. Various non-Club stations did appear, and some of them were worked and even counted, but our judges soon put this right. In actual fact, very small deductions were made from the scores, averaging only some three points, for strangers that slipped in and might have been thought to be Club stations.

One or two genuine, but non-competing, Clubs also appeared, mostly on the first two days, and contacts with these have been allowed to count.

General Experiences

The remarks received with the Entry Forms make it abundantly clear that the majority of participants thoroughly enjoyed the Contest. Scoring was not too slow; after all, the thirty hours’ limit meant an average operating time of not much more than three hours per
day, and during that three hours there should have been (in theory) 27 possible contacts—if all Clubs had chosen the right three hours!

This was where a certain amount of skill in planning was called for, and the high scorers were those who operated only in what were to be regarded as peak hours.

Coventry say “The contest was enjoyed by all members, of whom about 12 visited the station. The rig was a Clapp VFO, BA and PA, with 8½ watts to a 6L6 and a 150-ft. aerial. Conditions generally were poor, and operating standards not as good as in previous years . . . Roll on, next year!”

West Cornwall, the runners-up, considered that the scoring system had cut down “bad manners,” as displayed formerly by stations in search of a new multiplier, but had become too tame. They suggest that non-Club contacts should be allowed on another occasion, but without a multiplier. On the whole, we agree.

Kingston point out that this was their first attempt (and a highly successful one, too, giving them fourth place, bracketed with Gravesend.) They approved of the limitation to Club stations only, appreciating the simplification of the checking required. Gravesend, on the other hand, found the tempo much too slow and state that they will not compete next year under the present rules.

Edgware consider that the restriction to Club stations removes a good deal of the fun, and suggest that if this rule is kept for next year, the contest should be limited to two week-ends. They found conditions good, but static level high during the early part of the week.

Why Half a Band?

Several Club state that they made all their contacts between 1830 and 1900 kc, and ask why no one went outside those limits. We are seriously thinking of introducing one or two stations on fixed frequencies near 1715 and 2000 kc next year! It only requires two or three Clubs to move, and the rest would have to follow in order to raise them.

Trouble dogged Grafton this year, their transmitter blowing up on three successive days! They make the comment that the “Clubs Only” rule gave the whole show an intimate touch. Edinburgh, the only entry from North of the Border, gave nearly all Clubs some good GM contacts, and comment on the crowding. They don’t agree with the new rules, but intend to compete next year—a spirit of which we approve.

Comments in Brief

“Much enjoyment was obtained from sorting out the required signals, once the participating Clubs became known” (Salisbury) . . . “Could have wished for more Clubs, and spread throughout the band” (Sutton and Cheam) . . . .

“Overall standard of operating was good, with G3HPI and G3HQB outstanding” (Thanet) . . . . “Not one bad note but a few rather shaky operators” (Clifton) . . . .

“Our first contest as a Club station, and I have been asked to say how much we have enjoyed it” (Bristol) . . . .

“New rules made an interesting contest and altogether fairer than the old system” (Rugby) . . . . “Far better for Clubs only than for all and sundry, and we would like next year’s Contest on the same lines” (Scarborough) . . . .

“The new rules gave the less experienced operators more time to think . . . but many of the Club stations heard in previous Contests with very good operators were noticeably absent” (Lincoln) . . . . “Absence of stations after 2200 hrs. due to operators

---

**TABLE I**

**POSITIONS AND SCORES**

<table>
<thead>
<tr>
<th>CLUB</th>
<th>CALL</th>
<th>SCORES</th>
<th>POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Coventry</td>
<td>G2LU</td>
<td>203</td>
<td></td>
</tr>
<tr>
<td>2. West Cornwall</td>
<td>G6FY</td>
<td>182</td>
<td></td>
</tr>
<tr>
<td>3. Surrey (Croydon)</td>
<td>G8TB</td>
<td>174</td>
<td></td>
</tr>
<tr>
<td>4. Gravesend</td>
<td>G3GRS</td>
<td>171</td>
<td></td>
</tr>
<tr>
<td>5. Kingston</td>
<td>G3HQB</td>
<td>168</td>
<td></td>
</tr>
<tr>
<td>6. Edgware</td>
<td>G3ASRA</td>
<td>162</td>
<td></td>
</tr>
<tr>
<td>7. Grafton</td>
<td>G3AFT</td>
<td>159</td>
<td></td>
</tr>
<tr>
<td>8. Edinburgh</td>
<td>G3HAM/P</td>
<td>153</td>
<td></td>
</tr>
<tr>
<td>9. Salisbury</td>
<td>G3FKF</td>
<td>142</td>
<td></td>
</tr>
<tr>
<td>10. Sutton &amp; Cheam</td>
<td>G2BOF</td>
<td>137</td>
<td></td>
</tr>
<tr>
<td>11. Thanet</td>
<td>G3DOE</td>
<td>137</td>
<td></td>
</tr>
<tr>
<td>12. Clifton</td>
<td>G3GHN</td>
<td>136</td>
<td></td>
</tr>
<tr>
<td>13. Bristol</td>
<td>G3GIS</td>
<td>135</td>
<td></td>
</tr>
<tr>
<td>14. Albany</td>
<td>G3HPI</td>
<td>131</td>
<td></td>
</tr>
<tr>
<td>15. Rugby (BTH)</td>
<td>G3BXF</td>
<td>127</td>
<td></td>
</tr>
<tr>
<td>16. Torbay</td>
<td>G3GDW</td>
<td>123</td>
<td></td>
</tr>
<tr>
<td>17. Scarborough</td>
<td>G4BP</td>
<td>122</td>
<td></td>
</tr>
<tr>
<td>18. Lincoln</td>
<td>G3XM/A</td>
<td>113</td>
<td></td>
</tr>
<tr>
<td>19. Medway</td>
<td>G2FJA</td>
<td>108</td>
<td></td>
</tr>
<tr>
<td>20. Tees-side</td>
<td>G3HUG</td>
<td>104</td>
<td></td>
</tr>
<tr>
<td>22. Sheffield</td>
<td>G3FZM</td>
<td>87</td>
<td></td>
</tr>
<tr>
<td>23. Baldock</td>
<td>G3AXP/A</td>
<td>78</td>
<td></td>
</tr>
<tr>
<td>24. Warrington</td>
<td>G3KRA</td>
<td>76</td>
<td></td>
</tr>
<tr>
<td>25. Barnet</td>
<td>G3FFA</td>
<td>63</td>
<td></td>
</tr>
<tr>
<td>26. Birmingham</td>
<td>G2BON</td>
<td>52</td>
<td></td>
</tr>
<tr>
<td>27. Eccles</td>
<td>G3GXI</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>28. North &amp; Port Talbot</td>
<td>GW3EOP</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>
catching the last bus home” (Brentwood) ... “Difficulty in getting operators for the week-ends ... altogether. from our viewpoint, the Contest was too long” (Warrington) ...

“Still keeping the flag flying, we will be there next year—the smallest Club, representing the biggest Midland city” (Birmingham) ... “Most of our work was done by members who were only licensed this autumn” (Eccles) ... “Entry should be taken merely as a token of the pleasure and interest which your previous contests have given” (Neath and Port Talbot) ...

Sundry Matters

Various points came in for comment, not generally, but by individuals. One or two Clubs find it a hardship for two committee members to be excluded from the list of operators, in order to sign the entry form. Sheffield were in a jam because of the rule restricting operating periods to one hour or more, but it all boiled down to an error in keeping their log, which, doubtless, will not occur again! They make the sound suggestion, however, that a “final” period of less than an hour should be allowed, simply to bring the total operating time up to the maximum allowed and to tidy-up the log.

Finally, one or two Clubs operating from schools point out that they cannot operate on Sundays; in some contests this might not be serious, but the rules of this one made it imperative to work all the other Clubs every day of the nine-day period, or lose points.

The Summing-Up

It seems fair enough to remark that the new rules did not appeal to those Clubs who treat this Contest with a certain amount of grim earnestness, often using a member’s private station and a small team of very efficient operators for the main purpose of amassing a score which will certainly put them near the top of the list.

On the other hand, Clubs with their own station on the premises, and a number of operators with little or no Contest experience, found that the change made MCC much more enjoyable for them than it could have been under the previous rules. In short, it was kinder to the beginner.

There is, of course, much to be said on both sides, with the proviso that there are plenty of other Contests for which those in the first category can enter. The obvious conclusion would seem to be that a formula must be found for MCC which will have its appeal to both types, and it would appear that the ideal would be a Contest in which the accent was—as this year—on inter-Club working, but in which contacts with other stations would also count for points.

We visualise a future MCC in which Club contacts are allowed, as in this one, on every day of the week, and in which they score about five points each time. Contacts with other stations would be allowed once only, and would score only one point.

In any case, we are determined to keep it a Club Contest and not to let it become just another Top-Band Contest of the hit-and-run variety. There is plenty of time before next November, and we should welcome comments from competing Clubs on the suggestion in the previous paragraph. It seems to us that the large bonus obtainable from working a Club would put a premium on operating skill and good listening to such an extent that, even if the band were crowded with stations, it would still be necessary to find and work all the other Clubs on each night of the event.

STOP PRESS: Stoke-on-Trent (GAGBI) sent in a score of 118, but do not appear in the Tables because their entry arrived several days after the closing date.

The deadline for next month’s routine reports for “Month with the Clubs” is January 16, 1952, addressed “Club Secretary,” Short Wave Magazine, 55 Victoria Street, London, S.W.1.

Table II

<table>
<thead>
<tr>
<th>Year</th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
</tr>
</thead>
<tbody>
<tr>
<td>1948</td>
<td>Rhigos</td>
<td>Coventry</td>
<td>Wirral</td>
</tr>
<tr>
<td>1949</td>
<td>Rhigos</td>
<td>Neath</td>
<td>Coventry</td>
</tr>
<tr>
<td>1950</td>
<td>Rhigos</td>
<td>Neath</td>
<td>Coventry</td>
</tr>
<tr>
<td>1951</td>
<td>Coventry</td>
<td>West Cornwall</td>
<td>Surrey</td>
</tr>
</tbody>
</table>

Points Scored

| 1st, Three points; 2nd, Two points; 3rd, One point |
|--------|--------|--------|
| Coventry | 11 |
| Rhigos   | 10    |
| West Cornwall | 7 |
RESERVE YOUR PLACE NOW
JOIN THE
ROYAL NAVAL VOLUNTEER (Wireless) RESERVE
and let your hobby help both you and the country.

By joining this Naval Reserve you will ensure that in the event of an emergency you will serve as a Wireless Operator or Mechanic in the Royal Navy.

The R.N.V.(W.)R. also offers:

★ A transmitter and receiver for use in your own home and an allowance for its upkeep.
★ All travelling expenses paid from your home to R.N.V.(W.)R. Training Centres and Ships.
★ £9 per year Bounty and up to £3 per year Efficiency Grant. (Tax Free).
★ Full pay during training.

Write for details to:
The Staff Officer (Communications), Admiral Commanding Reserves, ADMIRALTLY, London

NAME
ADDRESS

Benson's Better Bargains


Mains Trans. New, std. inputs 50c. Outputs: 230v. (S.E.) 20ma, 6v. IIa 12/-; 350v. 80ma, Univ. 1/2; similar 250v. 18/-; Cellulose Cement 3/6-6/-; Box Condensers, block, 8mfnd, 440VAC w/kg 3/-, 4mfnd, 750ow 5/-; Sprague tub, 0.1 KV 6d.; Fuseholders, single 6d., twin 8d.; Panel, single 1/-; Fuse clips 3d., pr. Fuses 1½, cartridge 4½d. each. Terminals B1, B2, black, insulated 9d.; Condensers, 500 ma RF 3½, 5½; 40/120ma 2½, 6/- Mine Detector Amp with 3 x 1T4 ccc. 28½, chassis only 3/6. IFs, canned, new 100, £10, 200, £12.50, 300, £15, mcs 1/6. 10mcs for 22G W.B. Couplers, 2½. Conformers 2½, x 3½, 4 for 1/- Morse Keys, small, brass 2/6. Vibration packs, Mallory 12v synch. 150v. 30ma 12½; Vibrators 2v synch, 7pin UX, 6/-; Cable, 5 core rubber, 2yd lengths 1/-, Spindle couplers, brass; concertina or insulated 9d. each; Edysty type 1/2. Chokes, RF 4 pie Rx 9d., TX 1/-; LF 5H 150mva 1300, 6/5, 10/-; 250ma 12½. Mullard Ovals (black) 7/6, Ferranti 30w Mod. Trans. 2; I ratio 10/-, ET4336 Driver Trans., 1; 1, 8/6. XTALS: 100pcs., 5ins, or 3-pin 12/-; Dynamo trans. 9v, to 450v, 9/-; 24v, to 2500v, 5/6; 28v, to 385v, 7/6. COAX: 12x Plugs/6. 5½ ft. each, Triple skts, 1/-; 3-way skts/plugs 1/-. Vitreous resistors: 20k, 120w, 50w, 20k, 30w, 30µ, 65w., 75k, 10w, 20w, 15w, 3k, 25w, 2½k 12w, 30k 25w, 400µ 25w, 65k 10w, 6k Tap 2K 25w, 25w Tap 15w, 15k 25w, 3k 12w, 30µ 30w, each 1/-. AERIAL c/o RELAYS 12v. balanced. 4/6; Price Bros DP c/p, 28vdc 12/6. HANDDRIVEN GENERATORS: outputs 28/300v 9/-; RX5. R3/JARR-2X. 234/208 mcs. Valves: 36A1K5, 7/9001, 1/12A6. New condition. each £4. R78, less valves, xtal, tuning knob. 10/6. R28/ARCS. 100/150mcs. 11 valves, new £4.5/-, HANDSETS. Self-energised, with bracket. 25/-, pr. LINECORD. 3 way JA (60µ, p6) 1/-, 2½m. VALVE-HOLDERS, English, pak assd. doz. 5/-. INSULATORS: Beadsie 2pin, ceramic 9d. L, ribbed 3ins. glass, 1/-. Single standoff chassis, £4 for 6d. Glass lead-trust chassis type, 6 for 1/-, Thr'u chassis, double cone 4½, 1/-, Ariel, 4½ metal ends, 1/-, Ariel double "U", cer. 6d. Chassis thr'ud double 2½ cones, cer. 9d. Pillars, 2½, cer. 6d. Double-cones with skirt 6d.

LISTS AVAILABLE 1d. S.A.E.


W. A. BENSON, 308 Rathbone Rd., Liverpool, 13 STONEYCROFT 1604

Short Wave Magazine, Volume IX

699
LYONS RADIO LTD.

MICROPHONE CABLE etc. A screened copper conductor with outer insulating cover which gives it the appearance of coaxial cable. Ideal for mike lead, 12 yards, 8/6; 13-50 yards, 8d. yard; over 50 yards, 7d. yard, 100 yard coil, 50/-.

DYNAMOTOR TYPE DI01. By the famous U.S.A. Westinghouse Co. Sizes: A, 31/4 X, 10 x 23 ins. dia. Max. inside volts 27 DC, 285v. DC, output at 75 m.A. PRICE 10/-, post 1/-.

INDICATOR UNITS TYPE AS84. The U.S.A. version of our type 6. Contains many useful components including C.R. Tube SBPI, 3-6H6's, 4-A6CT7's, pots., switches, etc. PRICE 9/-, carriage 7/6.

INDICATOR UNITS TYPE 164. Contains the following very useful items: A complete AC power pack including Y39 (Rectifier) small L.E., choke, mains transformer for 230v, 50cps, input with a 400/0/400v, 50 m.A, 4v, 2.5A, and 2.6-3.1v (1), secondary windings, 1-V665, 1-Vi03 (Magic eye), 2-pots, DP, switch, etc. Assembled on a neat 2-decker chassis fitting into an 11 x 7 x 6 ins. box. In good condition. PRICE 37/6, post 2/-.

FREQUENTIILE CERAMIC COIL FORMERS. Length 6 ins., dia. 5/32, 400 Regs. for winding up to 12 swg., 14 holes provided for taps etc. Suitable for transmitter coils 3 m/s and above. For vertical or horizontal mounting. PRICE 2/9, each or 9/- (Post 9d. extra).

MILLI-METERS. First grade moving coil, 0/5 milli-amps. Bakelite case for panel mounting, over 9 volts d.c. Brand new PRICE 12/-.

3 GOLDHAWK ROAD (Dept. MS),
SHEPHERDS BUSH, LONDON, W.12
Telephone: Shepherds Bush 1729

Our 16th Year

Money Saving Offers

G.B.C. Ex-Gov't. TRANSMITTER-RECEIVER.

M. series, 10 valves. 1 Det. 19, I H63, 1 H63, 1 H61, 1 6AK5, 2 RCA954 (value of valves exceeds £10 at current prices). Five 3 ins. height. All valve guaranteed. Operating frequency 250-500 mcs. We regret that we have no precise technical data on this instrument. Apparently designed for mobile work with crystal control (no crystals included.) An outstanding bargain at £2/19/6, plus 5/- packing and carriage. Condition as new.


SECTIONAL AERIAL MASTS. Approx. 30'. Seasoned timber, 10 metal sleeved sections. Store soiled but absolutely sound. 30/- each. Case 5/-.

C/3 VOLTEGE CONTROL UNIT. Ref. No. SU1/269. Contains one switch. pilot light, 6 bank fuse panel, 5 plus 3 mf. Heavy-duty fully filtered mains suppressor. Handmade case. Size 12 x 8 x 15ins. 10/- each, carry 2/6.

PANASONIC P.A. SPEAKERS. 100m, high flux units (not surplus). Handmade marcon cellulose metal cabinet 30 x 9 x 13 ins. Impedance 3 ohms. Price 5/-, 2/-, 10/6.

ALTERNATORS. Engine driven, 24 v. output at 1300-2600 cycles, type No. SU1/271. Brand new in original packing. Price 20/6 each, carry 5/-.

SATISFACTION GUARANTEED AS ALWAYS.

Items over 16lbs. in weight cannot be sent C.O.D. C.O.D.-Orders must be accompanied by a 2/- stamp.

H. P. RADIO SERVICES LTD.

Britain's Leading Radio Mall Order House
55 COUNTY ROAD, LIVERPOOL 4.
Est. 1935
Tel. Aigburth 1445

SOUTHERN RADIO'S WIRELESS BARGAINS

WALKIE-TALKIE (TRANSMITTER-RECEIVER). Type 38 Mark II. Complete with 5 valves, Throat Microphone, Headphones, etc. Aerial, 7 m/c Amateur Band suitable for field use. Powerful Superhet Receiver. Modulated Transmitter. Guaranteed ready for the Air, less batteries £13/10/-.

R.315 TELEVISION UNITS. Complete with 21 valves. 6 Stage, 4F, 4L, 6F, myth, stereo circuit. Brand new in original wooden cases, £13/10/-.

G.E.C. 1120 ELECTRONIC MICROFISH


LUBERA HOLE CUTTERS. Adjustable from 1 in. to 3 in. for use on Wood, Metal, Plastic, etc., £5/9. LUBERA FLY CUTTERS, 14/-.

LIONEL "BUG" KEYS. Genuine U.S.A. Automatic Morse Key. Type 136. Few only. £3/7/6.

THRUST MICROPHONES. Magnetic type complete with long lead and plug. 4/-6.

HAND GENERATORS. 6 volts at 5 amps. With Crank, 21/-.

PLASTIC TRANSPARENT MAP CASES. 14 inches by 10 inches, 3 mm. C. T. S. maps, Charts, Display, Photographs, etc., 5/-.

STAR IDENTIFIERS. With Hydraulic Office Modifications A-N Type 1. Complete in case. 5/-.

MOVING COIL D.C. METERS. Brand new. 2in. 0-2 m.A., 50 mA, 0.5 mA., 200 mA, 2000 MA. £2/3/-.

WESTECTORS. Type WX6 and W12, 1/-, 2/-, etc., 11/- to 20/-.

MARCONI AERIAL FILTER UNITS. Type "916" in conformity with P.O. Specification Full instructions for fixing 4/6.

CONTACTOR TIME SWITCHES. 10-hour movement. 2 impulses per second. Thermostatic Control in soundproof Cases. £1/6.

VISUAL INDICATOR UNIT Type 3 (1QQ4). Contains two Moving Coil movements, two Neons, etc. Easily convertible to very efficient M. A. A. Control. Conversion fully detailed in W.W., Sept. 1951.

SOUTHERN RADIO SUPPLY LTD.
12, LITTLE NEWPORT STREET, LONDON W.2.

Short Wave Magazine, January 1952
SMALL ADVERTISEMENTS

9d. per word, minimum charge 12/-; no series discount; all charges payable with order. Insertions of radio interest only accepted. Add 25% for Bold Face (Heavy Type). No responsibility accepted for errors. Replies to Box Numbers should be addressed to The Short Magazine, 55 Victoria Street, S.W.1.

NAL S L’s and LOGS by MINERVA. The best there are. Samples from Minerva Press, 4 Queen Street, St Andrews, London, SW1.


WANTED BC-610 Hallcrafets, ET-4336 transmitters, SX-28’s, AR-88’s. Receivers and spare parts for above. Best prices. Write Box 364, c/o Spier Service, 92 Centurion Road, Brighton, Sussex.

QLS CARDS AND LOG BOOKS. APPROVED G.P.O. SAMPLES FREE. ATKINSON BROS, PRINTERS, ELLAND, YORKS.


FOR SALE. New and boxed. 813 (50/-) 3ST (19/6), 868A (18/3), 859G (9/-), V201 (1/-), T240 (17/6). Porters, 13 Chapel Street, Guildford, Surrey.

EXPORT Superhets: 6 valve two IF stages, 4 wave-bands. Only £18/18/-6. B. J. Graff 46 Tachbrook Street, S.W.1. (V.C. 9781.)

Tape & Wire Recording Components

Write for the latest price list of the following RECORO PLAYBACK & ERASE HEADS. THE NEW TAMSA HEAD RANGE ARE NOW AVAILABLE RECORD PLAYBACK AMPLIFIERS OSCILLATOR AND UNITS TAPE E.M.I. WIRE

G.E.C. On standard DUREX 1/4 hr. and 1 hr. Spools.

9d. per word, minimum charge 12/-.

--J

TAPE E.M.I. WIRE

G.E.C. On standard DUREX 1/4 hr. and 1 hr. Spools.

--J

TAPE E.M.I. WIRE

G.E.C. On standard DUREX 1/4 hr. and 1 hr. Spools.

Small Advertisements

For the latest price list of the following RECORO PLAYBACK & ERASE HEADS. THE NEW TAMSA HEAD RANGE ARE NOW AVAILABLE RECORD PLAYBACK AMPLIFIERS OSCILLATOR AND UNITS TAPE E.M.I. WIRE

G.E.C. On standard DUREX 1/4 hr. and 1 hr. Spools.

Small Advertisements

For the latest price list of the following RECORO PLAYBACK & ERASE HEADS. THE NEW TAMSA HEAD RANGE ARE NOW AVAILABLE RECORD PLAYBACK AMPLIFIERS OSCILLATOR AND UNITS TAPE E.M.I. WIRE

G.E.C. On standard DUREX 1/4 hr. and 1 hr. Spools.

Small Advertisements

For the latest price list of the following RECORO PLAYBACK & ERASE HEADS. THE NEW TAMSA HEAD RANGE ARE NOW AVAILABLE RECORD PLAYBACK AMPLIFIERS OSCILLATOR AND UNITS TAPE E.M.I. WIRE

G.E.C. On standard DUREX 1/4 hr. and 1 hr. Spools.

Small Advertisements

For the latest price list of the following RECORO PLAYBACK & ERASE HEADS. THE NEW TAMSA HEAD RANGE ARE NOW AVAILABLE RECORD PLAYBACK AMPLIFIERS OSCILLATOR AND UNITS TAPE E.M.I. WIRE

G.E.C. On standard DUREX 1/4 hr. and 1 hr. Spools.

Small Advertisements

For the latest price list of the following RECORO PLAYBACK & ERASE HEADS. THE NEW TAMSA HEAD RANGE ARE NOW AVAILABLE RECORD PLAYBACK AMPLIFIERS OSCILLATOR AND UNITS TAPE E.M.I. WIRE

G.E.C. On standard DUREX 1/4 hr. and 1 hr. Spools.
G4GZ's BARGAINS.

VALVES: 6AG7M, 6SN7GT, 6L6G, 6L6M, 1622, KT66, 1622, 6V6M, SUA4, 12/6, 5Z4M, 6AG5, 2A3, 10/6, 6G6GT, 6GB6, 6J5M, 7/6, 954, 955, 956, 10N2, 2X2A, 5J6, 6A53/C6654, 6J6, 17/6, 866A, 22/6, 805, 25/-, 829, 829B, 65-.


J. T. ANGLIN,
160, Cleethorpe Road, Grimsby, Lincs.
Tel. 563515.

G2ACC OFFERS YOU—
- SPECIALISED EXPERIENCE
- RELIABLE GOODS • PROMPT SERVICE


Southern Radio & Electrical Supplies
45 FISHERTON STREET, SALISBURY, WILT.
Telephone: Salisbury 2108

ALPHA OFFERS VALVES

Majority in Makers' Cartons—Government surplus and some new.

<table>
<thead>
<tr>
<th>VALVE</th>
<th>QUANTITY</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0Z4</td>
<td>9/9</td>
<td>6/6</td>
</tr>
<tr>
<td>1T4(DP91)</td>
<td>9/9</td>
<td>6/6</td>
</tr>
<tr>
<td>1AS7</td>
<td>9/9</td>
<td>12/6</td>
</tr>
<tr>
<td>1S4(DL91)</td>
<td>9/9</td>
<td>6/6</td>
</tr>
<tr>
<td>1RS6(DK91)</td>
<td>9/9</td>
<td>6/6</td>
</tr>
<tr>
<td>1SS4(DAP91)</td>
<td>9/9</td>
<td>6/6</td>
</tr>
<tr>
<td>1CG5</td>
<td>9/9</td>
<td>6/6</td>
</tr>
<tr>
<td>3CG5</td>
<td>9/9</td>
<td>6/6</td>
</tr>
<tr>
<td>34M</td>
<td>9/9</td>
<td>6/6</td>
</tr>
<tr>
<td>34(2DL91)</td>
<td>10/6</td>
<td>9/9</td>
</tr>
<tr>
<td>41</td>
<td>9/9</td>
<td>6/6</td>
</tr>
<tr>
<td>42</td>
<td>9/9</td>
<td>6/6</td>
</tr>
<tr>
<td>5U4G</td>
<td>9/9</td>
<td>6/6</td>
</tr>
<tr>
<td>57G</td>
<td>9/9</td>
<td>6/6</td>
</tr>
<tr>
<td>57G</td>
<td>9/9</td>
<td>6/6</td>
</tr>
<tr>
<td>57G</td>
<td>9/9</td>
<td>6/6</td>
</tr>
<tr>
<td>58</td>
<td>6/6</td>
<td>6/6</td>
</tr>
<tr>
<td>58</td>
<td>6/6</td>
<td>6/6</td>
</tr>
<tr>
<td>58</td>
<td>6/6</td>
<td>6/6</td>
</tr>
<tr>
<td>58</td>
<td>6/6</td>
<td>6/6</td>
</tr>
<tr>
<td>58</td>
<td>6/6</td>
<td>6/6</td>
</tr>
<tr>
<td>58</td>
<td>6/6</td>
<td>6/6</td>
</tr>
<tr>
<td>58</td>
<td>6/6</td>
<td>6/6</td>
</tr>
<tr>
<td>58</td>
<td>6/6</td>
<td>6/6</td>
</tr>
<tr>
<td>58</td>
<td>6/6</td>
<td>6/6</td>
</tr>
<tr>
<td>58</td>
<td>6/6</td>
<td>6/6</td>
</tr>
<tr>
<td>58</td>
<td>6/6</td>
<td>6/6</td>
</tr>
</tbody>
</table>

SMALL ADVERTISEMENTS
TRADE—continued

THE XYL SAYS "FOR GOODNESS SAKE GET RID OF THAT HEEP AND BUY A PR-120-V" FROM PANDA RADIO CO., ROCHELDALE.

OSL


METALWORK.
All types cabinets, chassis, racks etc. to your own specifications. Philpott's Metal Works Ltd., [address], Champion Street, Loughborough, Leics.

BM3A Stabilising Valves urgently required—any quantity purchased. Apply Box No. 1028.

SITUATIONS VACANT

SERVICE Engineer, Television and Radio technically and practically experienced. Apply Cosk and Hamond, Beach Road, Littledemption, Sussex.

READERS' ADVERTISEMENTS

3d. per word, min. charge 5/-, payable with order. Box numbers 1/- extra. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, S.W.1.

WANTED: Marconi Magnetic Detector: D.E. and Multiple Tuners; 101, 106, 107 and 112 Receivers; Fleming valves; Coherers; and other early wireless gear, valves and literature. FRANKLIN WINGARD, Rock Island, Illinois, U.S.A.

LM.7 (BC221), internal mod and stob, power pack £23. ASB6, untouched, £7. RF 26, 30/-: AVO Model 7, £16. 829B £4, 802's 15/-: Above brand new and mint. 1131 driver, PA and p/p, (valved) £6/10/-, 6L6's 8A5, 955's, other valves Tx and Rx. Tx. meters. BC481L sep. p/p and speaker. 717A, one RF, ANL brand new before fully modified, £18. 9 Sawley Avenue, Bilton. (Tel.: 8046).

SALE.
Three 811 at 45/- each. Three 807 at 10/- each. Three VRS65 6/- each. Four VRS4 5/- each. Radiovision preselector, £10 plus carriage. 66 High Street, Loftus, Saltburn, Yorks.

R.1155A unused, unmodified, for sale 8/-10/-.
Also T.1131 modulator power unit less valves. Offers ? Box : 1021.

R103A Rx, magic eye, 12V DC, 190-250v AC, 1.7 mc—7.5 mc with CTC and BA phones, £7. Class C wavemeter BCI38, runs of Rx power pack with int. 8V6 xtal calib. 100 kc 1000 kc 8V6 PVO, 8V6 PA, EF37-6V6 modulator, 3in. meter, change-over switch phone/CW/AE, Sep. boxed VFO, band xtal mke. £4. Whole lot at £12. J. Wood, 192 Colchester Road, London, E.10.

WANTED late model U.S.A. communications receiver. Collins 75A-1. Hallcrafters SX71 or SX82 or similar model. Write full details, price required, Box : 1020.

MAGNIFICENT National HRO, receiver complete with National p/pack and bandspread coils covering 20/40/80/160, £27/10/-, 61 Thornton Road, Balham, London. (Tel.: TUL. 1930).

WANTED—Communication Receiver, 2-metre receiver and 2-metre machine—must be first class equipment and moderately priced. Boxed No.: 1024.

Short Wave Magazine, January 1952
SMALL ADVERTISEMENTS
READERS—continued

WANTED back numbers of Short Wave Magazine and Practical Wireless. Please state what have you? 1 Manchester Road, Pendlebury, Manchester.

TAYLOR Valve Tester 45A, as new with manual, £15. Or exchange for 125 cc motor cycle with cash adjustment. Froggatt, 18 Smithy Moor Avenue, Stockbridge, Sheffield.


R.1155 complete with separate cabinet containing power pack and M/C speaker, £10. 219 Sirdar Road, London N.22. (Bowes Park 5135).


SX28 for sale. Recently aligned "bang on" by professional in owner's presence. £45 or offer ? Can be seen working. Box No. 1029.


EXCHANGE—500 v. Megger, R208, both as new. Wanted—Signal Generator, Oscilloscope and 12v car radio. 303 North End, Northallerton, Yorks.

OFFERS—wanted for following brand new equipment—pair 813's with bases: pair 868's put transformer 1220–225v, output 1400–1000w. Type 813, 250 mA. Type 820 power unit; Type 1 generator: 4–4 1/2 2 KV Caps. All carriage extra. 6 Exeter Gardens, Ilford.

HT-11DE Hallcroftter Marine radiophone Rx tunable in two bands from 1.5–3 mc, 807 final, internal speaker and handset, 80th. Complete and working, needs 6/12v vibrator pack, £15. BC728 Galvin push-button Jeep JX, 71y. valves, 2–6 mc, internal speaker, 2v accumulator, 6/12v vibrate, used, no valves, manual, £220. BC852 Rx, 2–6 mc, two tunable bands with 8 valves (6V6 output), 12v. dynamotor, xtal calibrator chassis, and 1 mc entirely. Self-contained, circuit printed on base, no case, £410. 88 Set (Canadian) Tx/Rx, 6–9 mc, 8 valves, VLF power supply, phone/mic set, used, £5. 38 Set Tx/Rx, 6–9 mc, 5 valves, phone, mic, jack box, aerials, battery switch, unmodified, £220. Wilcox-Gay Xtal multiplier MI-18468, with 807 and manual, new £14. All carriage extra. Box No. 1025.

VALVES and equipment for 1 to 10,000 mc. Suit experimenter or amateur who "missed the boat" earlier. Offers, purchaser collects. S.A.E. lists, Cross, 490 Richmond Road, Sheffield 13.

CR100 in good condition. First £20 secures. Troy, 35 Hermiston Avenue, Glasgow, E.2.

Short Wave Magazine, Volume IX

PMG CERTIFICATE
Prepare now for next exam.
Take our special POSTAL COURSE.
Many former students testify that our tuition was invaluable in ensuring their success in previous examinations.
Full details in FREE BROCHURE from E.M.I. INSTITUTES, Dept. 14 Postal Division 43 Grove Park Road, Chiswick, London, W.4. Phone Chiswick 4147 £3.32

BRAND NEW.
829B, 100/-; 829, 90/-; 813, 80/-; 808, 40/-; TT15, 30/-; QVO47, 805, HK24, 3A5, 20/-; 1616, 15/-; only a few. Also 815, 35/-, 825, 6/-, 30/-; X7, 6/-.
X61M, CCH43, E91, 6A6A, 15/-; 6KB, 6A8, 12K8.
3S6L, KK32, 12/6; 666, 13L3, KT661, KT766, KT33C.
6A45, 6SN7, 6L6, PEN383, 6ES, PX25, 10/-; 807:
6P41, Y63, GT1C, VP41, 3Q4, T4, 120v, 3A4.
6L7, KT6W1, E6C3, N18, 7/, 6/, 6C4, 6K7, 6N7, 12A6.
H6, 13L2, 6/, 6/2; 9025. 6A7C, 65C, 6L3, 130/, 5/.
Following soiled but O.K.: PT15, 6/, T711, E3F6, 5/-; ML6, E3A0, 2/6.
SPECIAL OFFER of TWO IL4 and ONE 3Q4 or 3A4 for £1.
Please include 9d. postage on orders under £1.
Send S.A.E. for New Year Bargain List.

ELECTRAD RADIO
69 HIGH STREET, BELFAST, N.I.

EASIBINDERS for THE "SHORT WAVE MAGAZINE"
Bind your issues in the Easibinder. By a simple operation the journals are inserted with a steel wire, and at once become a neatly bound volume for the Bookcase.
The Easibinder is bound in green cloth, and gold-blocked with title and year on the spine. It will hold 12 issues. (One volume).

PRICE 1£/9 (Post Paid)
A Binder can be sent on approval if requested. When ordering please state the Vol. No. to be blacked.

EASIBIND LTD
64 NEWMAN STREET, LONDON, W.1

BRAND NEW EX-GOVERNMENT VALVES
The following valves are new and in their original cartons: 95A, 7193, VIU11, 3A4, 2C6, 2X2, 4/6, 680GT, 6/3; TV7, 6/6, 6/5, 6KGT, 6/7, 6/1; 6K7, 6K7, 7/9; 6K5GT, 8/7, 5U4G, 666G, 6/6, 6/6, 6/7; 6N7, 15/-; 6V6GT, 15/6; 6G2GT, 15/-.
The following types are in Services packing or unboxed: EB34, 2/6; E246, 2/6; E2A50, SP41, VT61A, 3A6, 2C6, 2X2, 4/3, EC53, 5/-; EC31, 5/6; 6B8, 1/-; E3F6, 6/3; 6L5, 6L7; 6N7, 6/6; 6K7, 6/9; KT623, 7/-; EL32, 8/-; KT811, P03, 10/-; VP133, 9/-; 6ABG, 6V6GT, 10/-; 6G2GT, 11/6; 6G8GT, HLI30D, TV233, 12/6; 1000 Volt working (2000v. Test) 6MPO CONDENSERS, 3/6 plus 6d. postage.
Ceramic 6in. spacers for Aerial feeders etc. 6d. each or 1/- a dozen.
5 WATT ERIE RESISTORS. The following values available: 500, 700V, 3K, 4K, 5K, 6K, 2K, 20K, 30K, 20K, 8d. each, or 1/- a dozen.
Please allow postage on all orders of less than £1.

REED & FORD
2a BURNLEY ROAD, AINSDALE, SOUTHPORT
RADIO G200 ANNOUNCES

VALVES: T11, HRV2A, 12H6, 6H8, 12SH7, 2X2, Pen220A, VY2, 5/8; VR78, VR92, 2/6; 6L7, 6NG7, 6NG7, 6G7, AC6Pen. Pen46, 6L5, 6D6, 1625, EL8, 125G7, 6K7G, 6K7GT, VR100, KTW61, KTW62, 125R7, EP36, VR56, 6/6; CV66, 6K6GT, 6C4, EL50, 1CS, 387/1291, 8/6; KT63, KT61, 6V6GT, 9/6; EH315, VR99A, X61M, X61, 12K8, X76M, '42. '8012. 10/6

Please add 6d. extra for post or 10d. Reg. Post.

TRADE & OVERSEAS ENQUIRIES INVITED.

ARTHUR HOILE
55 UNION STREET, MAIDSTONE, KENT

PHONE: 2812

BRASS, COPPER, DURAL, ALUMINUM, BRONZE

ROD, BAR, SHEET, TUBE, STRIP, WIRE

3,000 Standard Stock Sizes

NO QUANTITY TOO SMALL

List on Application

H. ROLLI T & CO. LTD.

London, Liverpool, SLOANE 3448
6 CHEASEM Place, S.W.1. Kirkby Estates
Simonswood 3271

Amateur enthusiasts should send for free catalogue and literature—stamp for postage

THE INCOMPARABLE

GLOBE-KING

SINGLE VALVE S.W. RECEIVER

- WORLD-WIDE RANGE 11-100 METRES
- CRYSTAL-CLEAR NOISE-FREE RECEPTION
- ELECTRICAL BAND-SPREAD TUNING
- EXTREMELY LOW RUNNING COSTS
- KITS OR READY-BUILT SETS FROM 25/- Direct from Makers. Home and Overseas Sales

JOHNSON'S (RADIO)

46 FRIAR STREET, WORCESTER

SOLDERING INSTRUMENTS

ADCOLA (Regd. Trade Mark)

Reg. Design No. 860302

British, U.S. and Foreign Patents

Supplied for all volt ranges from 6/7v-230/250v. Meets every requirement for radio assembly, maintenance, telecommunications, etc. High Temperature. Quick Heating. Low Consumer. Light Weight 3/16 Dia. Descriptive Bit Type

Sole Manufacturers: ADCOLA PRODUCTS LTD


(McCaulay 4272)

SHORT WAVE ANNOUNCES

Please add 6d. extra for post or 10d. Reg. Post.

TRADE & OVERSEAS ENQUIRIES INVITED.

ARTHUR HOILE
55 UNION STREET, MAIDSTONE, KENT

PHONE: 2812

Amateur enthusiasts should send for free catalogue and literature—stamp for postage

THE INCOMPARABLE

GLOBE-KING

SINGLE VALVE S.W. RECEIVER

- WORLD-WIDE RANGE 11-100 METRES
- CRYSTAL-CLEAR NOISE-FREE RECEPTION
- ELECTRICAL BAND-SPREAD TUNING
- EXTREMELY LOW RUNNING COSTS
- KITS OR READY-BUILT SETS FROM 25/- Direct from Makers. Home and Overseas Sales

JOHNSON'S (RADIO)

46 FRIAR STREET, WORCESTER

SOLDERING INSTRUMENTS

ADCOLA (Regd. Trade Mark)

Reg. Design No. 860302

British, U.S. and Foreign Patents

Supplied for all volt ranges from 6/7v-230/250v. Meets every requirement for radio assembly, maintenance, telecommunications, etc. High Temperature. Quick Heating. Low Consumer. Light Weight 3/16 Dia. Descriptive Bit Type

Sole Manufacturers: ADCOLA PRODUCTS LTD


(McCaulay 4272)

SHORT WAVE ANNOUNCES

Please add 6d. extra for post or 10d. Reg. Post.

TRADE & OVERSEAS ENQUIRIES INVITED.

ARTHUR HOILE
55 UNION STREET, MAIDSTONE, KENT

PHONE: 2812

Amateur enthusiasts should send for free catalogue and literature—stamp for postage

THE INCOMPARABLE

GLOBE-KING

SINGLE VALVE S.W. RECEIVER

- WORLD-WIDE RANGE 11-100 METRES
- CRYSTAL-CLEAR NOISE-FREE RECEPTION
- ELECTRICAL BAND-SPREAD TUNING
- EXTREMELY LOW RUNNING COSTS
- KITS OR READY-BUILT SETS FROM 25/- Direct from Makers. Home and Overseas Sales

JOHNSON'S (RADIO)

46 FRIAR STREET, WORCESTER

SOLDERING INSTRUMENTS

ADCOLA (Regd. Trade Mark)

Reg. Design No. 860302

British, U.S. and Foreign Patents

Supplied for all volt ranges from 6/7v-230/250v. Meets every requirement for radio assembly, maintenance, telecommunications, etc. High Temperature. Quick Heating. Low Consumer. Light Weight 3/16 Dia. Descriptive Bit Type

Sole Manufacturers: ADCOLA PRODUCTS LTD


(McCaulay 4272)

SMALL ADVERTISEMENTS

READERS—continued

B2 Transmitter/Receiver: Clapp Oscillator, unused; Wavebander W191 with spare valves, brand new. Power unit 247; 400v pack meters, keys, mikes, books, magazines. First reasonable offer. QRT. Joyce, Killarney.

CNY1 12 watts of Phone, CW or MCW. on 160, 80 and 40 metres 4 valve super, BFO, 190-250v AC, or 24 volts DC. A complete amateur station in perfect condition, modified to work without control unit £20 or near. Collins TCS12 complete with Rx and Tx genemotors, 12 volts DC. Xtal or MO, and PA, input 40 watts, Phone and CW, 1.5—12 mc. Offers: Wilcox-Gay VFO, modified, perfect keying, good output, £5. SCR822 Tx complete and working on 2 metres, £8. GW3BI, 171 City Road, Cardiff.

RK4D22'S (4) at 45/- each 811's (4) at 20/- each. All brand new. Manufacturers cartons. Box No. 1026.

WODEN Transformer 650 volts 250 milliamps, all inputs, new. £3. (Box 4/17/6). Haynes Focus Coil and Line output transformer 30/- lot. Woodlands, Cropston, Leicester.


WANTED urgently. One or more BC357 marker beacon transmitters, or sensitive relays from these receivers alone. (Tel.: Clumlin 208.) J. McGarry, G13ECQ, Ardmore, Clumlin, Co. Antrim, N.I.

FOR SALE. AR77E, good appearance, also AR77 Case. 27 Highbury Avenue, Salisbury, Wilts. (Sale 4805.)


BC342 modified by Metropolitan Radio, good condition internally and externally, nearest £25. 18 Hawkhurst Way, West Wickham, Kent. (Springbok 3988.)

SALE. Eddystone 610, £16. Type 145 VFO-CO 2-7.5 mc with Type 392 P2 (700v), £12. Complete B2 Tx/Rx. P/P, phones, key, etc. (no xtals), £15. All excellent condition. Or nearest offers. Wanted: Unmodified BC348 for dynamotor operation. Offers to BRS.10113, 10 Lilac Avenue, Swinton, Lancs.

FOR SALE. Complete Tx for Phone and CW, 150 watts 10, 15, 20 metres, final HK4'S, modulating pair 807'S, VFO or crystal relay control throughout, £55. Rx CR100 (B28) complete noise limiter, S-Meter, speaker £25. J. Lowden Road, Herne Hill, S.E.24.


AR88-D and BC221. Complete manuals, valves; working, must sell quick, £55 pr. Three 813's, 25/- each. 155's 6/-, 200/- each. Cinema speaker 18 in. embossed, £5/15/-. B2 Tx, 2 valves, 3 coils (no power), 50/-. Choke, 12 Henries 300 ma or 24 Henries 150 ma, 12/6. Three BC610 PA coils, damaged pairs, 15/- net. A Collins 20 watt modulation transformer, 61.6's to 807 (50 watt RP) 20/-. Write or call, Watson, California Apianires, Caravan 9, California, N. Wokingham, Berkshire.
## BOOKS FOR IMMEDIATE DELIVERY

<table>
<thead>
<tr>
<th>Post Free</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenna Manual</td>
<td>27/11</td>
</tr>
<tr>
<td>Post War Communication Receiver Manual</td>
<td>20/5</td>
</tr>
<tr>
<td>Antenna Handbook</td>
<td>11/7</td>
</tr>
<tr>
<td>Hints and Kinks</td>
<td>11/5</td>
</tr>
<tr>
<td>How to Listen to the World</td>
<td>1/11</td>
</tr>
<tr>
<td>&quot;Vade Mecum&quot; World Valve</td>
<td>25/1</td>
</tr>
<tr>
<td>Hams Interpreter</td>
<td>5/</td>
</tr>
<tr>
<td>World Radio Valve Handbook</td>
<td>11/10</td>
</tr>
<tr>
<td>World Radio Handbook</td>
<td>9/</td>
</tr>
</tbody>
</table>

## MAGAZINES BY SUBSCRIPTION

<table>
<thead>
<tr>
<th>ONE YEAR</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio Engineering</td>
<td>29/-</td>
</tr>
<tr>
<td>Radio and Tele. News</td>
<td>36/-</td>
</tr>
<tr>
<td>QST</td>
<td>36/-</td>
</tr>
<tr>
<td>CQ</td>
<td>29/-</td>
</tr>
<tr>
<td>Radio Electronics</td>
<td>33/-</td>
</tr>
<tr>
<td>Popular Mechanics</td>
<td>32/-</td>
</tr>
<tr>
<td>Radio Electronic Engineering</td>
<td>36/-</td>
</tr>
<tr>
<td>Service</td>
<td>24/-</td>
</tr>
<tr>
<td>F.M. and Television</td>
<td>32/-</td>
</tr>
<tr>
<td>Electronics</td>
<td>160/-</td>
</tr>
<tr>
<td>Popular Science</td>
<td>32/-</td>
</tr>
<tr>
<td>Proc. I.R.E.</td>
<td>152/-</td>
</tr>
<tr>
<td>RCA Review</td>
<td>20/-</td>
</tr>
<tr>
<td>Tele-Tech</td>
<td>40/-</td>
</tr>
<tr>
<td>Television</td>
<td>48/-</td>
</tr>
<tr>
<td>Television Engineering</td>
<td>32/-</td>
</tr>
</tbody>
</table>

Send stamp for copy of current price list

### The Radio Amateur Call Book

THE RADIO AMATEUR CALL BOOK is the only one of its kind. But the CALL BOOK does much more than list amateur stations throughout the world alphabetically by callsign (for this alone it is worth every penny)—it gives you the Continental area in which each country is included, and the Zone listing of that country. The CALL BOOK also shows the QSL Bureau address for every country, the callsign districts into which many countries of the world are divided for radio purposes, and provides time-conversion charts based on GMT; it also lists the Q-Code, the international language of radio, as used by amateurs all over the world.

The layout and arrangement of the CALL BOOK are such that all this vital information can be obtained in a matter of seconds, whether it is the name and address of an amateur in Siam or the QSL Bureau for Paraguay. The RADIO AMATEUR CALL BOOK is a large volume of 400 pages, published for times a year: Spring, Summer, Autumn and Winter. The callsign lists and addresses are under constant revision and each issue is right up-to-date with hundreds of new callsigns and changes of address.

**Fall 1951-52 Issue available from Stock**

**Prices**: Single copy 20/- (post free)—or for any two issues to choice 36/-—or for a year of four quarterly issues, delivered on publication 64/-.

### The G Call Book

A complete and up-to-date list of British amateur callsign/addresses, containing over 6,500 names compiled from the Radio Amateur Call Book. **SPECIAL REDUCED PRICE TO CLEAR EXISTING STOCK, 1/6 Post Free** (Previously advertised at 4/6)

### Radio Amateur Call Book Foreign Section

Listing amateur stations throughout the world less the United States; 140 pages **SPECIAL PRICE TO CLEAR EXISTING STOCK, 5/- Post Free** (Previously advertised at 8/6).

**GAGE & POLLARD, 55 Victoria St., London, S.W.1**

Suppliers of Technical Books and Publications to Schools, Universities, British and Colonial Government Departments.

Telephone: ABBEY 5034
HENRY’S

VCR97 C.R. TUBES. Brand new in original crates, guaranteed for television, 45/-, carr. and packing 7/6.
3 BPI C.R. TUBE complete with base and shield in holder with leads, 25/- Brand new.


GERMANIUM CRYSTAL DIODES, complete with full wiring circuit and diagram, 4/6.

METAL RECTIFIERS. S.T.C. 200, volts 75mA, 6/-; G.E.C. 6 volts 2 amp, 4/-; Westinghouse 12 volts 2 amp, 12/6; Pencil Type E.H.T., 600 v. 1 mA, 4/7; Pencil Type E.H.T., 1,000 v. 1 mA, 6/-; Pencil Type E.H.T., 2,400 v. 3 mA, 13/-; 12 v. 3 amp, 17/6.

ST.C.R.M.2. 125 v. 100 mA. 5/6.

FILAMENT TRANSFORMERS. All inputs 200/250 A.C. 6.3 J, 5 V, 7/6. Iridian 6.3 V, 2 J, 10/6. 6 V or 12, 3 A. 13/6. 6.3 V, 12 A, 3/6.

No. 38 "WALKIE-TALKIE" TRANS-RECEIVER. Complete with Throat Mike, "Phones", Junction Box and Aerial Rods in canvas bag. Freq. range 4 to 9 Mc/s. All units are as new and tested before dispatch. As supplied to Overseas Police Forces. £1/9/6. Carr, 2/6.

VIBRATOR POWER UNITS, 2 volt. As for Canadian 58 set. Completely smoothed, output 1.5 V.L.T. and 90 V, and 130 V.H.T. at 35 mA. Complete in grey metal box. Size 8 x 3 x 4 1/4. 30/- only.

FREQUENCY CONTROL CRYSTALS. By American G.E. Co. Octal base fixing. Following frequencies only: 3,500 kc/s., 6,200 kc/s., 8,000 kc/s., 7/6 each.

PRACTICE MORSE BUZZERS. Comprising Morse key, buzzer and terminals. Only requires Lt. Battery, 3/6 each.


RECORD CHANGERS Collaro RCS500 with crystal pick-up £11 2 3
Collaro RCS11 with plug-in pick-up either crystal or Hi-Fidelity £11 9 6
Collaro 3-speed changer £12 9 0
Plug-in heads for same magnetic £1 9 6
Plug-in heads for same crystal £2 2 4
Hi-Fidelity high impedance £2 6 0
Hi-Fidelity low impedance £1 19 6

MOVING COIL METERS (Brand New). O.50 ma. square panel mounting, 2in. scale 7 6
0.40 volts square panel mounting scale 7 6
0.20 amps. square panel mounting scale 7 6
0.300 volts square panel mounting scale 12 6
0.40/120 mA. double reading round £1 15 0
0.150 v. electrostatic 2in. scale round £1 5 0
0.100 v. A.C. rectified type, 2in. scale round £1 5 0
PLESSEY 3in. P.M. Speaker with miniature ohmset, £1 15 0
17/6. W.B. 2½ in., £3, ohms, less trans., 15/-

CONTINUITY TESTER. Manufactured by well-known manufacturer, dual-scale 0-500 ohms and 100-200,000 ohms. The meter is a moving coil type operated from 4½ volt battery incorporated in unit. Size 6 in., 3 in., 3½ in., weight 2 lbs. Listed at £7 10/-.

Our price, brand new, £4 4/- P.P.

MIDGET .005 mfd. TWO GANG TUNING CONDENSERS. Size only 2½ x 2½ x 1½. Capacity guaranteed, standard length, tin, spindle, complete with mounting bracket less trimmers, 4/-, or complete with "built in" trimmers 7 6 each, plus 6d, post.

TUNING CONDENSERS, .005-.010. ceramic insulation, with fixing fits at 5/-. .0005-.00025 ganged with four push-buttons, each fully adjustable at 6/6. .0005-.00025 midget 2 gangs with trimmers 7 6, less trimmers at 5 6.

Send stamp for current Component List Please include postage under £1

5, HARROW ROAD, W.2

We are situated at the junction of Edgeware Road and Harrow Road facing Edgeware Road Tube Station.
OPEN ALL DAY SATURDAY.