

The SHORT WAVE Magazine

VOL. XV

AUGUST, 1957

NUMBER 6



communication

world wide

FOR THE RADIO AMATEUR AND AMATEUR RADIO

H. WHITAKER G3SJ

Court Road, Newton Ferrers, SOUTH DEVON
(A.R.B. APPROVED)

Telephone 320
Newton Ferrers

Precision crystals of all types in a wide variety of bases covering the complete range 50 kc/s to 18 mc/s in fundamental frequencies. All are made to extremely fine tolerances and frequency adjustment can be given up to .005%. Plated electrodes of gold, silver, or aluminium with wired in spot welded contacts are available. Quotations can be given for any type of cut, or mode of oscillation, including a complete range for filters with zero temperature co-efficient over a sensibly wide temperature range.

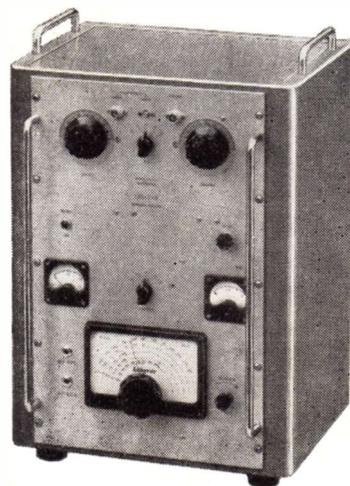
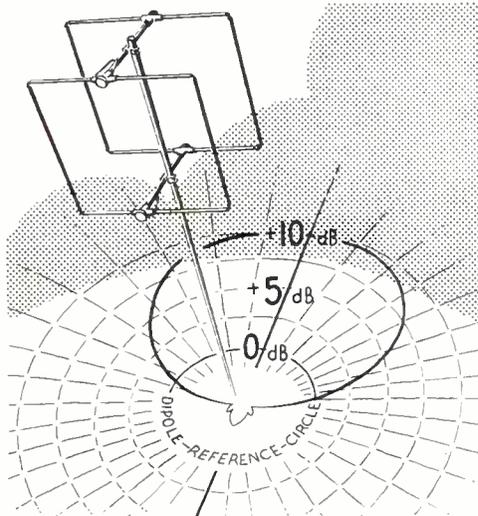
Special Offer :

400 crystals in the range 7100 to 7150 kc/s inclusive. Brand new and unused post-war production. Specification: BT cuts, zero temperature co-efficient, gold plated electrodes, wired into FT 241 type holders with standard $\frac{1}{2}$ " pin spacing. Accurately calibrated. Better than average activity, EPR is better than 14 K. Ohms at 30 pf. input capacity. Price 18/- each, post free. All fully guaranteed and unrepeatable at today's prices. The offer applies only to the range mentioned above, all frequencies between 7100 and 7150 kc/s available.

VHF ENTHUSIASTS

No more change of doublers ! A complete new range of crystals for DIRECT output up to 74 mc/s when using only a simple RF pentode oscillator such as Z77, EF80, etc. full details of this range on request.

AT THE NATIONAL RADIO SHOW (EARLS COURT Aug. 27th — Sept. 7th)



BEAM AERIALS - AMATEUR TRANSMITTERS - COMPONENTS - TEST GEAR - KITS
DON'T MISS STAND No. 217

Send S.A.E. NOW for advance details of our new 28 Mc/s. BI-SQUARE BEAM and other items.

Labgear (Cambridge) Ltd.

'Phone 88021
and 2494-5

WILLOW PLACE - CAMBRIDGE - ENGLAND



See AVO Instruments at
RADIO SHOW Stand No. **62**

An
Entirely
NEW
Standard

THIS new "Avo" Instrument is a self-contained mains driven model incorporating 24 calibrated ranges.

One sweep of the main calibrated dial covers four decades and assures a very rapid search for balance. This, combined with an automatic scale expansion device, enables the two lower accuracy decades of the main scale to be read at full scale accuracy.

Leakage currents can be measured down to 0.01 μ A at 450V, thus representing an ability to read up to 45,000 M Ω . Balance indication is clearly shown by a panel meter operating in conjunction with a valve voltmeter circuit.

For production checking, the Bridge has been fitted with a $\pm 10\%$ comparison scale for use with external standards.

Resistance measurements employ D.C. When measuring inductance and capacity, the Bridge network is fed from an internal 1,000 c/s oscillator. Internal capacity strays have been eliminated electronically.

The instruction manual provided shows how components can be tested in situ.

List Price **£75**

Dimensions: $15\frac{1}{2} \times 10\frac{1}{2} \times 10$ ins. approx (with lid closed)

Weight: 16 lbs. approx.

Power Supply: 100-110V. and 200-250V. A.C. 40-65 c/s.

in
BRIDGE
 Presentation



**Universal
 MEASURING
 BRIDGE Type 1**

RESISTANCE: 6 calibrated ranges covering 0.1 Ω to 1,000 M Ω . (Accuracy $\pm 1\%$ at midscale).

CAPACITY: 6 calibrated ranges covering 1 μ F to 1,000 μ F. (Accuracy $\pm 1\%$ at midscale).

INDUCTANCE: 6 calibrated ranges covering 1 mH to 1,000 H. (Accuracy $\pm 2\%$ at midscale).

AVO LTD.

Formerly THE AUTOMATIC COIL WINDER & ELECTRICAL EQUIPMENT CO. LTD.

AVOCET HOUSE · 92-96 VAUXHALL BRIDGE ROAD · LONDON · S.W.1 VICTORIA 3404 (9 lines)

TECHNICAL PUBLICATIONS

AVAILABLE FROM STOCK

	Post Free		Post Free
ANTENNA HANDBOOK (Published by A.R.R.L. (8th Edition).....	19s. 0d.	PRACTICAL DISC RECORDING.....	6s. 6d.
A COURSE IN RADIO FUNDAMENTALS (New Edition).....	10s. 6d.	RADIO AMATEUR DX GUIDE★.....	12s. 6d.
BASIC AUDIO COURSE.....	22s. 6d.	RADIO AND ELECTRONICS HANDBOOK (H. W. Sams).....	40s. 0d.
BASIC RADIO COURSE.....	19s. 0d.	RADIO AND TV HINTS.....	8s. 6d.
BEAM ANTENNA HANDBOOK.....	22s. 0d.	SERVICING RECORD CHANGERS.....	24s. 0d.
COLOUR TV FOR THE SERVICE TECHNICIAN (H. W. Sams).....	20s. 0d.	SCATTER PROPAGATION THEORY AND PRACTICE (H. W. Sams).....	25s. 0d.
COMMAND SETS. Published by "CQ" Information on conversion of all Command Transmitters and Receivers.....	12s. 6d.	SINGLE SIDEBAND FOR THE RADIO AMATEUR.....	14s. 6d.
ELECTRONICS MADE EASY.....	6d. 6d.	SINGLE SIDEBAND TECHNIQUES.....	14s. 6d.
HAMS INTERPRETER Published by OH2SQ	7s. 0d.	SURPLUS CONVERSION MANUAL Vol. 1	21s. 0d.
HIGH FIDELITY by G. A. BRIGGS (Published by Wharfedale Wireless).....	12s. 6d.	Vol. 2	21s. 0d.
HIGH FIDELITY (Gernsback).....	12s. 6d.	SWEEP MARKER GENERATORS FOR TELEVISION RADIO.....	20s. 6d.
HIGH FIDELITY TECHNIQUES (Gernsback).....	8s. 6d.	TECHNICAL DICTIONARY (H. W. Sams).....	16s. 6d.
HINTS AND KINKS, Vol. 5.....	11s. 0d.	THE OSCILLOSCOPE.....	18s. 6d.
HOW TO BECOME A RADIO AMATEUR★	5s. 0d.	THE RECORDING AND REPRODUCTION OF SOUND (H. W. Sams).....	64s. 0d.
HOW TO LISTEN TO THE WORLD (Latest Edition). For the SWL.....	7s. 6d.	TRANSISTORS—	
LEARNING THE RADIO TELEGRAPH CODE.....	4s. 6d.	THEORY AND PRACTICE (Gernsback)	16s. 6d.
MAINTAINING HI-FI EQUIPMENT.....	24s. 0d.	TRANSISTOR TECHNIQUES (Gernsback)]	12s. 6d.
MOBILE HANDBOOK (Published by CQ) (Second Edition).....	24s. 0d.	UHF ANTENNAS, CONVERTERS AND TUNERS.....	12s. 0d.
MOBILE MANUAL (Published by ARRL).....	23s. 0d.	VHF HANDBOOK.....	24s. 0d.
MODEL CONTROL BY RADIO.....	8s. 6d.	WORLD RADIO TELEVISION VALVE HANDBOOK.....	14s. 9d.
NOVICE HANDBOOK.....	23s. 6d.	WORLD RADIO HANDBOOK. 1957 Edition.....	13s. 0d.
OPERATING AN AMATEUR RADIO STATION (Published by ARRL)★.....	2s. 8d.		

(★ Not strictly applicable under U.K. conditions)

THE RADIO AMATEUR'S HANDBOOK

(Published by A.R.R.L.) 1957 Edition. Price 34s. Post Free.

RADIO AMATEUR CALL BOOK

Summer Edition. Abridged Edition excludes only American amateur stations. Otherwise complete with latest call sign-address listings for all countries, and including much DX data. In its 35th year of publication. Abridged Edition, Price 17s. 9d. Post Free. (Complete Edition, price 37s. 6d. post free.)

THE RADIO HANDBOOK 14th Edition

American, Published by "Editors and Engineers," 768 pages, 60s. Post Free.

	One Year	One Year
MAGAZINES BY SUBSCRIPTION	AUDIO.....	40s. 0d.
	CQ, RADIO AMATEUR'S JOURNAL.....	44s. 0d.
	ELECTRONICS (Trade only).....	160s. 0d.
	POPULAR MECHANICS.....	32s. 0d.
	POPULAR SCIENCE.....	48s. 0d.
	QST, ARRL.....	36s. 0d.
	HIGH FIDELITY.....	56s. 0d.
	RADIO AND TELEVISION NEWS.....	36s. 0d.
	RADIO ELECTRONICS.....	36s. 0d.
	SERVICE.....	24s. 0d.
	TELEVISION.....	48s. 0d.

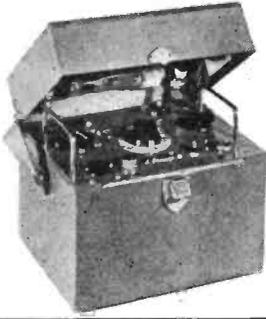
Subscription Service for all American Radio and Technical Periodicals.

SHORT WAVE MAGAZINE

(PUBLICATIONS DEPARTMENT)

55 VICTORIA STREET · LONDON · S.W.1 · ABBEY 5341

SPECIAL 'HAM' OFFER



TEST SET 102

Consists of impregnated mains transformer 200-250v. 50 cycles, 12v, 2 amps, 6v, 3 amp, output 250v. at 80 ma. S.T.C. metal rectifier 10 ma. 1-DET19, 1-6J5. Bulgin plugs, sockets and pilot lights. Mains leads. Circuit is a multi vibrator locked mains type, with a cathode follower. Can be utilized for:

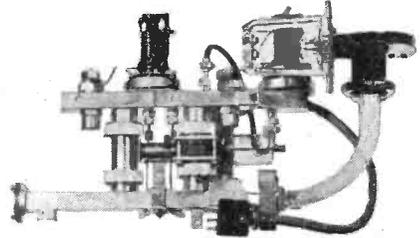
- Audio Amplifier.
- Audio Oscillator.
- V.F.O.
- External Synchronizer.
- Stabilized Power Unit.
- Modulator, Etc.

Brand new including circuit only 40/-, p.p. 3/-.

3 CM MAGNETRON/KLYSTRONS ASSEMBLY

Includes :

- 1 725A MAGNETRON
- 2 723A/B KLYSTRONS
- 2 CV253 CRYSTAL DIODES
- 1 IB24 TR TUBE
- 1 CV115 ATR TUBE



ASSOCIATED WAVEGUIDE ASSEMBLY PRICE, £7 10s. each, P.P. 7/6. PULSE TRANSFORMER AND MAGNET FOR ABOVE, £3.

MINIATURE I.F. STRIP TYPE '373'



9.72 Mc/s.
3-E.F. 91,
2-EF 92,
1-EB 91,
Size: 10 3/4" x 2 1/2" x 3" completely valved with

screening cans. Ideal for modification to F.M. Tuner as described on page 107 of the April "Practical Wireless." Price 45/-, Less valves, 8/6.

HIGH RESISTANCE HEADPHONES. Complete. High Resistance Headgear Mark IV with cord and plug. Brand new and boxed. 11/- each, post 1/6.

HOOVER ROTARY TRANSFORMERS. 11.5v. input 490v. output at 65 m/a and 6v. input, 300v. output at 75 m/a. Guaranteed and tested, only 27/6, post and packing 2/6.

LOW IMPEDANCE PADDED HEADPHONES TYPE D.L.R. 3. Complete with cord and plug. Brand new, 9/-, P.P. 1/6

U.S.A. INDICATOR BC 929A

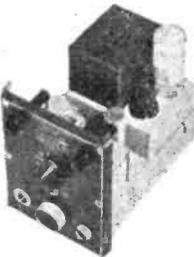
Complete with 3BPI shield and holder. Aerial switching unit. 7 valves —

- 2-6H6GT
- 1-6X5GT
- 1-2X2
- 1-6G6
- 2-6N7

Brand new original cartons, 55/-, carriage 7/6.

PARMEKO C CORE TRANSFORMER Intervalve Transformer. Ratio 4/1 600 ohms CT, 1 1/2" x 1 1/2" x 2". Original cartons. 6/- post paid.

RCAF AMPLIFIER UNIT



12v. input. Vibrator. OZ4. Microphone Transformer into a 6K6GT output valve with negative feed back. Size: 8" x 5 1/2" x 8 1/2". Brand new, 35/- each, p.p. 3/-.

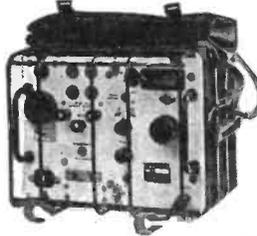
COMMAND TRANSMITTERS

2.1-3 Mc/s valved less crystal	17/-
3-4 Mc/s valved with crystal	25/-
4-5.3 Mc/s valved less crystal	17/-
5.3-7 Mc/s valved less crystal	17/-

P. & P. 3/- each.

R 109A RECEIVER

8 valves 5—AR 12s, 3—AR 8s covering 2-12 Mc/s on two frequency bands. Contains 6v. Vibrator Pack and built-in 3jins. Goodman speaker, operates from 6v. battery, consumption 2 amps. Housed in metal case 13 x 12 x 1 1/2 ins. Designed for Mobile or Ground station. Operates with any normal aerial. Complete, guaranteed and tested, including circuit. Very good condition. Only 85/- carr. paid.



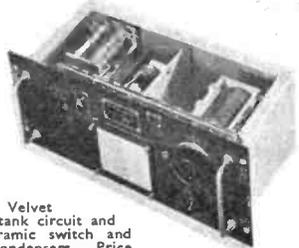
Save £££'s on your Beam Antenna !

Aerial whip antenna sections. 4ft. lengths can be utilized for beam antenna construction. Brand new. Six for 12/6. Plus carriage 2/-. Twelve for 24/-. Plus carriage 3/-.

TUNING UNITS

- TU -6-B 3000-4500 KC
- TU -7-B 4500-6200 KC
- TU -8-B 6200-7.700 KC
- TU -10-B 10,000-12500 KC

These well known units have Micro Meter dials in our own warehouse over 180 degrees rotation giving plenty of mechanical bandspread. Velvet vernier drive, high Q tank circuit and heavy duty 6-way ceramic switch and variable transmitting condensers. Price 14/- each P.P. 4/-.

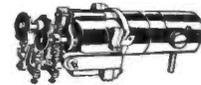


GRAND OPENING

Visit our newly opened BARGAIN STORE in our own warehouse SEE FOR YOURSELF !!

- ★ Three thousand square feet of warehouse space loaded with a tremendous variety of resistors, condensers, chokes, transformers, valves, headsets, microphones, test sets, receivers, transmitters.
- ★ EVERYTHING IN ELECTRONICS
- ★ ROCK BOTTOM PRICES !!

AMERICAN GEARED MOTOR



24v. D.C. with built-in precision gearbox, No. 1 drive 24 R.P.M. No. 2 drive 6R.P.M. On 12v. No. 1 drive 16 R.P.M. No. 2 drive 4 R.P.M. Overall size of motor and gearbox 7 1/2" x 3 1/2" x 3 1/2", weight 1 lb. 14 ozs. Brand New. Only 29/6. P. & P. 2/-.

A. F. AMPLIFIER. An Audio Frequency Amplifier in a sub-chassis 5" x 3" x 3 1/2" R/C coupled, using 2—12SH7 and 1—12S17 valves; and can be used for Telephone Intercom., Pre-Amplifiers, etc. PRICE, 12/-, P.P. 2/-.

R.F. UNITS.

- R.F. 24 20-30 Mc/s, 8/6 each.
- R.F. 25 40-50 Mc/s, 8/6 each.
- R.F. 26 50-65 Mc/s, 25/- each.

All valved. Brand New in original cartons. Postage 3/- each.

BENDIX 12v. RECEIVER

Covering 3.4-7 Mc/s, 325-695 Kc/s. 150-325 Kc/s.

- Valves used
- 5 - 6 K 7
- 2 - 6 N 7
- 2 - 6 J 7
- 1 - 6 L 6
- 1 - 6 F 6

Complete with switching motor and 12v. Dynamotor Only 65/-, carr. 8/6.

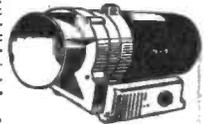


DIPOLE AERIAL No. 4A. 32 foot hard drawn 7/22 copper wire with centre insulator, fitted with feeder sockets. Both ends have 3 link insulators and slotted wire adaptors. Brand new. Price 9/-, post and packing 2/-.

U.S.A. INTERPHONE AMPLIFIER This unit uses 2 6v6's. Includes Microphone Transformer, output Transformer, Sidetone Transformer, 60 ma choke. Fuse holders and double pole 10 amp switch. DYNAMOTOR 12v. INPUT 250v. OUTPUT AT 50 MA. Size 9" x 9" x 5". Brand new, less valves, only 55/-, carriage 5/-.

AMERICAN ROTARY CONVERTOR

★ with cooling fan. Input 12V. d.c. output 300V at 90 mA. Completely supplied. Brand new. 19/- each. Plus P. & P. 3/-.



Hours of business :
8.30 a.m. to 6 p.m.

Monday to Saturday.

OPPOSITE

BRITISH MUSEUM

Relda Radio

Ltd.

(Dept. "S") 32A, Coptic Street, London, W.C.1. Phone : MUSEum 9607

Carriage charges apply to England and Wales only.

Terms : cash with order. All orders despatched same day.

EXPORT ENQUIRIES INVITED.



BROOKES
mean
DEPENDABLE
frequency
control



● Illustrated above is a Type SJ Crystal Unit from a range covering 3-20 mc/s and on the right is a Type SM Crystal Unit from a range covering 3-20 mc/s.

ALL Brookes Crystals are made to exacting standards and close tolerances. They are available with a variety of bases and in a wide range of frequencies. There is a Brookes Crystal to suit your purpose—let us have your enquiry now.



Brookes Crystals Ltd

Suppliers to Ministry of Supply, Home Office, BBC, etc
181/183 TRAFALGAR RD., LONDON, S.E.10.
Tel. GREenwich 1828. Grams: Xtals Green, London

GELOSO

SIGNAL SHIFTERS

NOW AVAILABLE AT REDUCED PRICES

4/101 to drive single 807 £5 12 6*
4/102 to drive pair 807's £5 17 6*

*Less valves — Less dials

Dials for above £1 15s. 0d. each

Also available ex stock:

- GELOSO TRANSMITTER G210-TR
- GELOSO RECEIVER G207-DR
- GELOSO MINIATURE TAPE RECORDER
- GELOSO CRYSTAL MICROPHONES

Expected shortly:

- PI Output Coils
- Receiver Front Ends

K.W. PRODUCTS Available — Ex Stock

G8KW MULTIBAND AERIAL WITH TRAPS FOR 10-160 METRES	...	...	£6 15 0
PAIR OF AERIAL TRAPS ONLY	...	...	£2 10 0
LOW PASS FILTERS	...	...	£3 17 6
HIGH PASS FILTERS	...	...	18 6

K. W. ELECTRONICS LIMITED

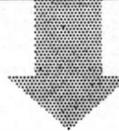
136 Birchwood Road, Wilmington, Dartford, Kent.

Tel: Swanley Junction 2137

G5KW

G8KW

All
the
experts
use—



- ★ Reliable
- ★ Speedy
- ★ Long-lasting

A model for every purpose

65 watt round pencil bit



Leaflets on request from:

W. T. HENLEY'S TELEGRAPH
WORKS CO. LTD.

51-53 Hatton Garden, London, E.C.1
Tel: CHAncery 6822

FOR 25 YEARS THE BEST

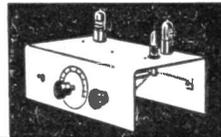
CALLING S.W. ENTHUSIASTS

COURSES FOR RADIO AMATEURS EXAMS AND P.M.G. 1st & 2nd CLASS CERTIFICATES (THEORY) Many other courses in Radio & Television Engineering.

Take our special home study courses which have been written by experts both in these subjects and in modern methods of postal instruction. **E.M.I. INSTITUTES** are part of a world-wide electronics organisation, and many former students testify that our tuition was invaluable in ensuring their success in examinations.

SPECIAL PRACTICAL KITS

are available as part of our Radio Courses. A typical course for beginners covers the design, construction and operation of a short wave 2 valve receiver. This equipment is supplied upon enrolment, and remains your property.



POST THIS COUPON TODAY

To E.M.I. INSTITUTES, Dept. 14R, London W.4.
Please send FREE Brochure without obligation to:

AUG

NAME _____

ADDRESS _____

BLOCK
CAPS
PLEASE

Subject(s) of interest _____ with/without equipment

E.M.I. INSTITUTES

The only Postal College which is part of a world-wide Industrial Organisation.

(Associated with "H.M.V." Marconiphone, etc. etc.)
ICF

Have you heard? Yes—it's out!

PANDA'S NEWEST HIGH-POWER TABLE TOPPER

EXPLORER 1

WILL SOON BE AVAILABLE FOR YOUR DELIGHT

Briefly:

- Modern valves
- Enhanced appearance
- More power
- Fully TVI proofed
- Slide-rule scale
- Built to the highest standards

and less than £100 !!

Full details in next issue—orders for August/September delivery will be accepted.

This rig will be the sensation of 1957 !

Panda Radio Co. Ltd.

16-18 Heywood Road, Castleton, Rochdale
Tel.: Castleton 57396
Cables: Panda, Rochdale.



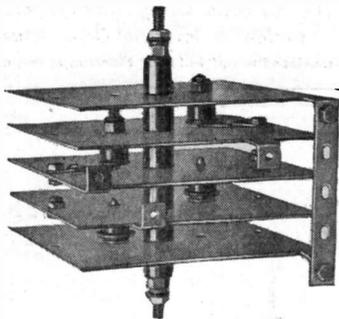
G.E.C.

'GEX 541' germanium power rectifier available in finned and unfinned stacks

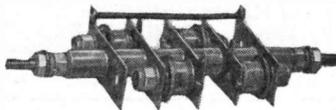
The basic element in all stacks is the GEX 541 diode, standard ranges being available in both finned and unfinned stacks. Whether a finned or unfinned stack is used for a specific application will depend upon monetary and space considerations.

Using series and parallel diode connections, power requirements of up to 30 kVA are economically handled by finned units. With derating, operation is still possible up to a maximum ambient temperature of 55°C. Each stack illustrated uses four diodes.

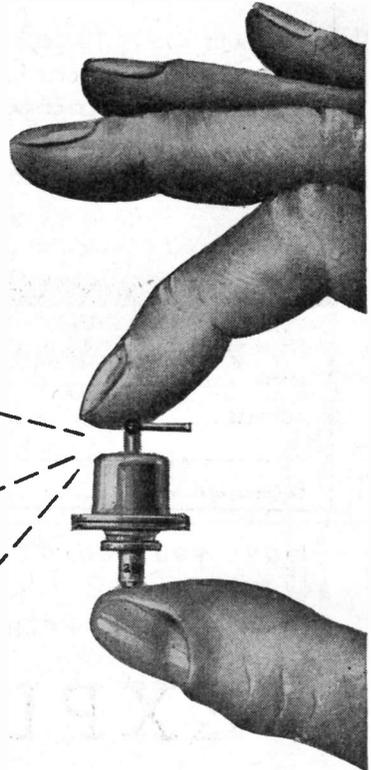
Rectifier units constructed with this diode show remarkable improvements over those previously available.



*Single Phase Bridge (Finned) GEX 541 BIPI F.
Available output at 35°C is 12A. at 48V.*



*Single Phase Bridge (Unfinned) GEX 541 BIPI.
Available output at 35°C is 5A. at 48V.*



EXTREMELY GOOD REGULATION

SMALL POWER LOSS

**VERY FAVOURABLE WEIGHT
AND SIZE CHARACTERISTICS**

CONSTANCY OF PERFORMANCE

**OPERATION UNDER ADVERSE
CLIMATIC CONDITIONS**

For further information send for publication OV3910

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

INDEX TO
ADVERTISERS

	PAGE
Altham Radio	335
Anglin	331
Avo, Ltd.	281
Brookes Crystals, Ltd. ...	284
Candler System	333
Deane-Gray	332
Electronic Precision Equip.	335
E.M.I. Institutes	285
G.E.C.	286
Harris, P.	334
Henley's	284
Henry's	cover iv
Home Radio	333
K.W. Electronics	284
Labgear	cover ii
Minimitter	331
New Zealand Posts & Telegraphs	332
Panda	285 & 332
Popular Mechanics	336
Proops	288
Relda Radio	283
Rollet, H.	335
Small Advertisements	332 - 336
Southern Radio	334
S.W.M. Publications Dept.	282
Tiger Radio	cover iii
Universal Electronics ...	331
Whitaker	cover ii
Young	cover iii

SHORT WAVE MAGAZINE

VOL. XV

AUGUST 1957

No. 168

CONTENTS

	Page
Editorial	289
Clip that Audio, by D. M. Gill (4S7MG)	290
Automatic Change-Over System, From Notes by G3HSR ...	294
Amateur TV Demonstrated	296
Controlled Carrier Constant Modulation	298
Triumph of the Spirit, by W. L. Rimmington (G2DVD) ...	300
A Page of Book Reviews	302
DX Commentary, by L. H. Thomas, M.B.E. (G6QB)	304
SSB Topics, by R. L. Glaisher (G6LX)	312
VHF Bands, by A. J. Devon	316
Techniques for Two Metres, Part I (Receivers), by B. Sykes (G2HCG)	321
New QTH's	325
The Other Man's Station — G3LSC	326
The Month with The Clubs — From Reports	327
G6HH/A at the Hastings Hobbies Exhibition	329

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

Advertisement Manager: P. H. FALKNER

Published the Friday following the first Wednesday each month at 55 Victoria Street, London, S.W.1.
Telephone: Abbey 5341/2

Annual Subscription: Home and Overseas 30s. post paid.

Copyright Reserved throughout the World.

AUTHORS' MSS

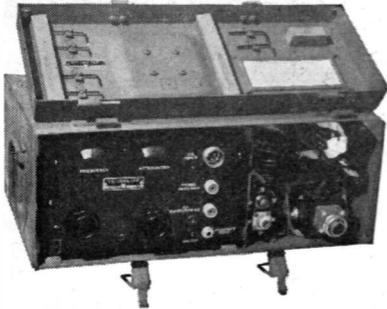
Articles submitted for Editorial consideration must be typed double-spaced with wide margins on one side only of quarto or foolscap sheets, with diagrams shown separately. Photographs should be clearly identified on the back. Payment is made for all material used, and it is a condition of acceptance that full copyright passes to the Short Wave Magazine, Ltd., on application.

The Walk-around Shop for fine equipment

THE MOST SIGNIFICANT RELEASE THIS YEAR—

The TSI84 A/AP

A REAL 70cm. TEST GEAR for **£5.10.0**



Brand new in carrying case
for **£5.10.0**

plus packing and carriage

Portable precision for mobile hams, amateur T.V. telearchies (with acknowledgement to free grid) and those monitoring the latest U.H.F. Allocations.

RESONANT CAVITY WAVEMETER

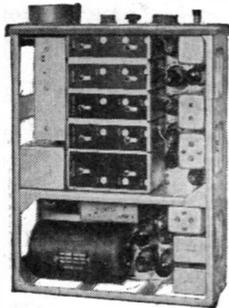
Calibrated 400-430 Mc/s. Tuning stops adjustable to any 30 Mc/s band within 400-470 Mc/s coverage.

Calibrated scale rack and pinion drive piston input attenuator—and alternative fixed coupling loop input provide facilities for use as Signal Generator.

Plug-on "Telescopic Probe Antenna." 6J6 detector and monitor amplifier, 2 600 ohm phone jacks for modulated signals. Panel output terminals for metering 6J6 output current.

Power required 6 volts at 300 mA and 30 volts at ½ mA.

Circuit diagram and instructions for adjusting tuning stops supplied. Details of suggested free oscillator to plug in front panel. Socket for signal generator operation (or built-in oscillator for those who prefer) and comprehensive circuit description available shortly; automatically sent to every purchaser as soon as ready.



BENDIX COMMUNICATION RECEIVER M.N.26C

A superb 12 valve receiver covering 150-1500 kc/s in 3 bands, 150-325. 325-695, 695-1500 kc/s. I.F. frequency 112.6 kc/s.

Valve line-up: 6K7 1st and 2nd R.F. 6L7 Mixer. 615 Oscillator. 6K7 I.F. Amplifier, 6B8 1st and 2nd Det. and A.V.C. 6J5 B.F.O. 6F6 Audio Output. Also Radio Compass output stage: 6N7 Compass Modulator. 6N7 Audio Oscillator. 6K7 Loop Amplifier. 6K7 Compass Output.

Power Supply 28 volt D.C. 1.6 amps to internal Motor Generator.

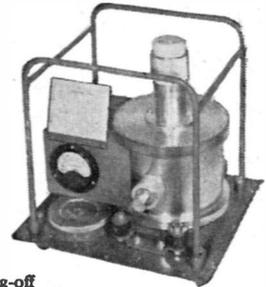
which can be easily changed for 12 volt Generator as unit was designed for both supplies (Details available). THE PERFECT CAR RADIO. Size 15½" x 6". For A.C. mains operation supply required: 6.3v. and 230v. 100 mA. Circuit diagram and connection chart free with each unit. Price **£3.10.0**, plus 10/- carriage.

12V. Dynamotors available (U.S.A.) at 30/- each.

'S' BAND PRECISION WAVEMETER

2900 to 3150 Mc/s. TEST SET 288 A.M. Ref. 10SB/6161.

Comprising exceptionally rugged silver-plated Wavemeter Type 1665, resiliently mounted and directly tuned by 7½" dia. calibrated micrometer with 64" thimble scale. Temperature correction for micrometer attached. Resonance indicated on 100 microamp meter. Equally suitable for laboratory using milliwatt powers or, with loose coupling, for high powers. UR21 connecting cable and coupling probe supplied. Brand new in robust moisture-proof case with jacking-off screws and tool. Price **£15**, plus 1/1 packing and carriage.



DESYNN TYPE Antenna or Beam position indication system

This comprises a transmitter unit and Indicator which will operate on 12 or 24 volts D.C. and will indicate with instantaneous and smooth pointer movement. The Transmitter is a specially designed potentiometer and will operate the Receiver on a simple three-wire system, and the receiver in this instance is calibrated in Gallons but dial could be easily altered to indicate a 360° sweep. Transmitter and Receiver with full instructions. Price **12/6**, plus 2/- p.p.

OSCILLOSCOPE UNIT

With internal 12V Vibrator Power Pack.

Suitable for Modulator Indicator or conversion to Oscilloscope unit. Containing V.C.R. 139 A. 2-VR.56 1-VR.54, 2-EF.50. Size 1'6" x 9½" x 8". Price **£3.0.0**, plus 10/- carriage.

ARR 2 RECEIVERS

Covering 235 to 358 Mc/s. Contains 3 6AK5's, 7 9001's, 1 12A6. Good condition. Price **25/-**, plus 3/- post and packing. Circuit supplied. Size 10½" x 4½" x 5½". Black crackle finish.

RADIO ALTIMETER

5mA panel mounting meter, 3" dia., 8" circular scale. Large magnet. Scale easily removable, leaving finished faceplate for re-calibration. Basis for sensitive portable multimeter. Brand New, Boxed. **7/6** post free.



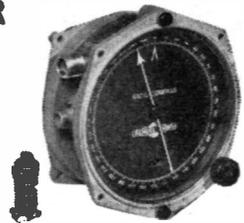
COMPRESSOR AND VACUUM PUMP

(Edwards Type 4) A beautifully constructed pump, coupled with a 24 v. D.C. Motor mounted on rigid steel base, with cover. Complete with hose coupling Vacuum 10 cm. mercury. Pressure 10lb. per sq. in. 2.6 cu. ft. per min. Unit in case size 16" x 7" x 8" New and boxed **£4.0.0**, plus 10/- p.p.

AZIMUTH INDICATOR

Bendix Radio Compass

For use with D.F. loop on manual operation. Flexible cable entries on both sides of unit. Dial face calibrated in degrees and adjustable for corrections. Small dial lamps are fitted for night use and unit is supplied with plug for input. Size 6" dia. x 2½" deep. Grey crackle finish. Brand new and boxed. Price **15/-**, plus 2/6 p.p.



Note: Carriage prices quoted apply only to England and Wales.

Head Office: Telephone : LANgham 0141

Mail order enquiries: Telephone: EUSton 8812

PROOPS

BROS. LTD.,

DEPT. 'S' · 52 TOTTENHAM COURT ROAD · LONDON, W.1.

Shop hours 9 a.m. to 6 p.m.—Thurs.: 9 a.m. to 1 p.m.

OPEN ALL DAY SATURDAY.

FOR THE RADIO AMATEUR AND AMATEUR RADIO

The SHORT-WAVE *Magazine*

E D I T O R I A L

Safety *In a recent comment in this space, we touched upon the necessity for taking proper precautions in the design of a mobile installation, so that it would be safe to operate under all road conditions.*

Safety does not, of course, begin and end with the mobile rig. In a different sense, due regard must also be paid to safety in and about the station itself. There is a long catalogue of precautions which can be taken, and which will in any event suggest themselves to the serious and responsible radio amateur. To attempt to list them all here will be of no help to anyone who fails to keep constantly in mind that the ordinary HT power pack is dangerous, and can be lethal.

It is not clever, or bold, or daring to dice with death like a Teddy-boy on a motor-cycle when handling power leads — it is foolish, irresponsible and inconsiderate, and frequently has the same consequences as those that eventually catch up on the reckless motor-cyclist.

The most important precautions to be taken for safety in the amateur station have often been stated: Keep N, L, E, sorted out all through the mains wiring; fit a double-pole master switch for cutting the power to the whole station, and make sure other members of the household know where it is and what it is for; earth down all chassis; instal high-voltage power units out of immediate reach, preferably in protective cages; bleed all HT filters; fuse HT supplies and packs at all possible points; protect all HV points on open-chassis apparatus — the easiest way to do this is to put it out of reach; never use both hands if adjustments have to be made to live gear — one hand should always be in a pocket; if a large rack-built assembly is in use, it should stand on, and be surrounded by, rubber mats; fit a large aerial earthing switch, and use it when there is heavy static about; make sure that even in the event of a major break-down, no HV DC can reach the aerial.

A station laid out in accordance with these broad principles should be absolutely safe not only to the operator, but also to his family and his friends.

*Austin Foley
G6FO.*

Clip that Audio!

FULL MODULATION
WITHOUT SPLATTER

D. M. GILL (4S7MG)

Nothing annoys your neighbours on the band more than too much modulation, producing splatter and sharshy noises well off your frequency. However, with a properly designed, and adjusted, speech clipper, you can still make full use of your carrier without any noises-off. This article explains exactly how to do it.—Editor.

IF you have ever connected a cathode ray tube to the second detector of a receiver and watched the modulation percentage of the B.B.C. transmitters you will immediately notice its low *average* level and how seldom the modulation approaches anything like 70 to 80%. Speech is a very uneconomical form of intelligence to transmit as the peak values are very high compared with the average values. Thus, to prevent going over the 100% modulation mark low averages must be employed. With the relatively small powers available to amateur transmitters this does not make the best use of the carrier.

Cause and Effect

In actual fact, the tendency is for most amateur phone stations to over-modulate. With some who are over-modulating heavily it is evident as distortion and splatter. Others may be going slightly over the 100% mark without any marked deterioration in quality, as the ear is very kind in this respect. Unless the distortion lasts more than a certain period—some fraction of a second—the ear does not “hear” the distortion, nevertheless, it can be observed on a cathode ray tube, and also on the receiver as slight splatter either side of the carrier. Some operators take the attitude “Oh, well, it’s very slight, so why worry?” In these days, however, that is not good enough, as it does add to the noises on our bands to an extent that is really not necessary. Modern receivers do help to sort out a lot of the mess, but it is the writer’s contention that the design of AM phone transmitters is many years behind the design of receivers. It is not that the techniques are not known, but that they are not being applied in all cases.

Consider TVI, for instance. This is caused mainly by the radiation of unwanted harmonics

and these *can* be cleared up. Part of TVI is also due to spurious frequencies being generated during the process of modulation, and are usually caused by over-modulation and nothing else.

Economical Frequency Range

To radiate speech effectively it is only necessary to transmit the frequencies between 300 and 3000 cycles-sec. and at the same time to *chop off* all the peaks of excessive amplitude. This also will *considerably increase the talk-power* of the transmitter—but how many actually do it? The pre-amplifier to be described will do most of what is required and provided it is followed by a well-designed modulator it will still give you “B.B.C. quality.” This may sound improbable to those without experience in the use of clippers; it is, however, absolutely true *provided* the clipping is not carried too far. As an example, the writer would mention that a lot of the short-wave broadcasting stations outside England do use clippers permanently in circuit—but it is impossible to know this simply by listening to their signal. The whole secret is *not to carry the process of clipping too far*. This is where the fault so often lies when reports of poor quality are received. Unless you have a cathode ray tube to observe the audio waveform from the pre-amplifier it is not really possible to know exactly where clipping starts. The man at the other end is not always a reliable guide as to how the rig is operating; he will simply tell you: “It sounds quite O.K. to me.” (People do not invariably give critical reports!)

Practical Considerations

The circuit given here is not original. It is easy to build, and the clipper does not require any adjustment except for the setting of control P1.

The circuit is shown in Fig. 1. It is designed (in the writer’s case) for a low-impedance moving coil microphone; if you are using a crystal microphone the input transformer T1 is omitted and a resistor of about one megohm or more (depending upon the microphone characteristic) is connected from grid to earth in order to complete the DC path. Remember, however, that the higher the DC grid resistance, the greater the hum is likely to be from the first valve. The first valve (V1) here is a 6AU6, which is not really an audio type at all, but was used as it was available. A 6BR7 would be the proper choice. A circuit for the 6BR7 pentode with correct values of re-

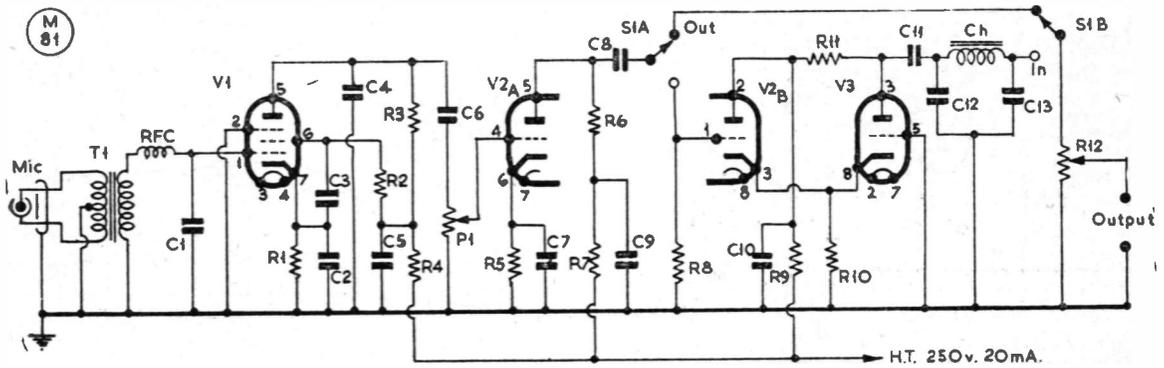


Fig. 1. Circuit of the speech pre-amplifier and clipper unit, V2B-V3, described by 4S7MG. S1 switches the Clipper in or out of circuit, as required. To achieve the curve shown in Fig. 4 it is essential to use a choke of generous proportions for Ch and to adhere to the values of C12, C13. The input end can be arranged for a crystal microphone, as shown in Fig. 2.

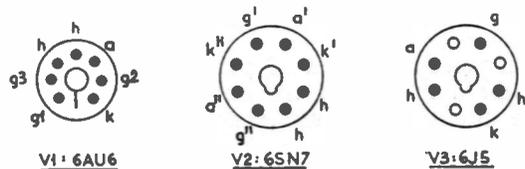


Table of Values

Fig. 1. Circuit of the Speech Amplifier/Clipper

C1 = 50 μ F	R8 = 1 megohm
C2, C7 = 100 μ F, 25v.	R10 = 1,500 ohms, 1-w.
C3 = .03 μ F	R11 = 56,000 ohms, 1-w.
C4 = 100 μ F (see text)	P1, R12 = 0.5 megohm potentiometers
C5, C9, C10 = 8 μ F, 450v.	RFC = Small 1.5 mH RF choke
C6, C11 = .001 μ F, 600v.	Ch = 5 Henry (see text)
C8 = 150 μ F	T1 = 1:50 microphone xformer (for low-impedance mic., see text)
C12, C13 = 330 μ F	S1A, S1B = DPDT toggle
R1 = 1,000 ohms	V1 = 6AU6 (see text)
R2 = 560,000 ohms	V2A, V2B = 6SN7
R3 = 220,000 ohms	V3 = 6J5
R4, R9 = 47,000 ohms, 1-w.	
R5 = 3,600 ohms	
R6 = 100,000 ohms	
R7 = 22,000 ohms	

(Note: All resistors $\frac{1}{2}$ -watt unless otherwise stated).

sistors is shown in Fig. 1A.

When designing a pre-amplifier it is difficult to know how much gain or amplification to build into it as there is such a variety of microphones available with varying outputs, any of which might be used. More amplification than usual is required when clipping is employed, as the speech level has to be built up to sufficient amplitude to clip, or just to start to clip, on normal levels of speech. Usually, a pentode stage followed by a triode is sufficient for most low-output microphones. Carbon track potentiometers require a minimum value of signal voltage per ohm or kilo-ohm if they are to be kept from going noisy. If they follow a pentode stage in a microphone amplifier the level is usually sufficiently high.

Referring to Fig. 1, it will be seen that there is a low pass filter in the grid circuit of V1. The RF choke and C1 should be right up on

the pin in order to prevent RF reaching the grid of V1. Similarly, C4 is connected directly from the anode pin to earth in order to provide a short circuit for RF. Nevertheless, the 6AU6 should be screened and all leads kept short, if not, it is a good idea to use screened wire. A modulator that howls because RF is getting into the front end is a nuisance. It can be avoided by taking simple precautions.

The measured gain of the V1 stage from the primary of the microphone transformer to the volume control P1 turned out to be 2500 times. As the microphone transformer had a step up of 1: 50 the stage gain of the 6AU6 is thus in the region of 50. (The expected gain was 100, but one seldom gets the amplification given in the books!) A loss of 6 dB is not much and as it happens there is quite sufficient gain in the amplifier so no attempt was made to find out what happened to the lost 6 dB. The stage gain of V2A was not measured; it should be in the region of 10.

Clipping Action

With this type of cathode coupled clipper, V2B and V3, clipping will start when the voltage to the grid of V2B exceeds about 1 volt peak, or 0.7 volt r.m.s. Assuming the gain from the grid of the 6AU6 to the grid of the clipper is about 500, then the input voltage at the grid of the 6AU6, for clipping to commence, should be 0.0014 volts, or 1.4 mV. The measured value was 1 mV, which is near enough for all practical purposes. When

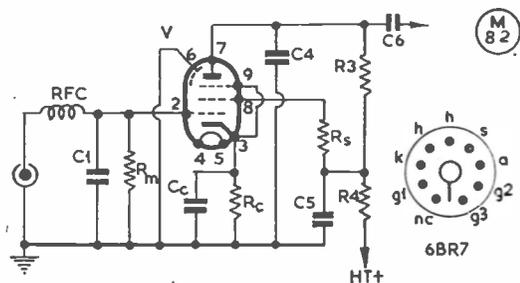


Fig. 1A. As a 6BR7 would be better than a 6AU6 for the first stage of the amplifier, the circuit arrangement is shown here, for a crystal microphone. All values are as for Fig. 1, except as follows: Cc, 100 μ F, 25v.; Rc, 2200 ohms; Rm, 1-3 megohms to suit microphone; Rs, 1.5 megohms. With a 6BR7, the voltage gain in the first stage should be about 125 times.

the input voltage is increased above this value, 1 mV, the amplitude of the output does not increase at all. The waveshape, of course, changes from sine to square-ish and if the output level is read on a voltmeter there will be a slight, apparent increase in output due to the changing waveshape. Fig. 2 shows this relationship between input and output voltages. The clipping introduces some distortion, but at low levels it is not severe as the low-pass filter, consisting of the 5 Henry choke Ch. and two 330 μ F silver mica condensers, C12, C13, removes most of the harmonics. Fig. 3 gives some idea of what the output waveshape looks like for 20 dB of clipping. (The frequency of the input wave was 1000 cps.) The low-pass filter is absolutely essential in order to remove the unwanted harmonics generated by the clipping action. It will be seen from the overall

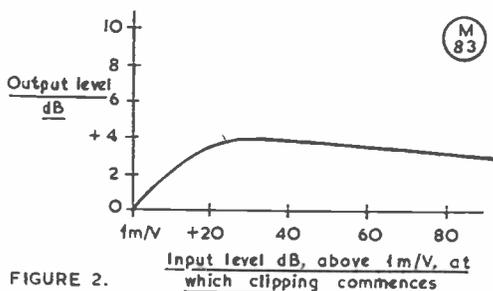


FIGURE 2. Input level dB, above 1m/V, at which clipping commences

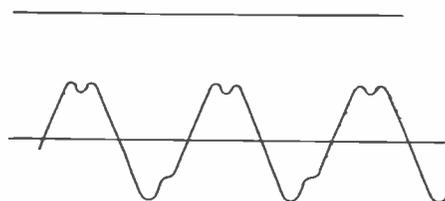


FIGURE 3. Output wave shape for 20dB clipping

response of the amplifier and clipper, shown in Fig. 4, that it starts to cut off at 300 cycles and has virtually no response at all above 4000 cycles per second. A word of warning: If you want the identical response use a good choke. "Any old choke," even if it is marked 5 Henry, may not do, as for this purpose it should have a generous-sized core or a large air gap, or both.

No layout details are given as normal speech amplifier construction technique can be used, and in any event most people have their own ideas. This model was built up on a

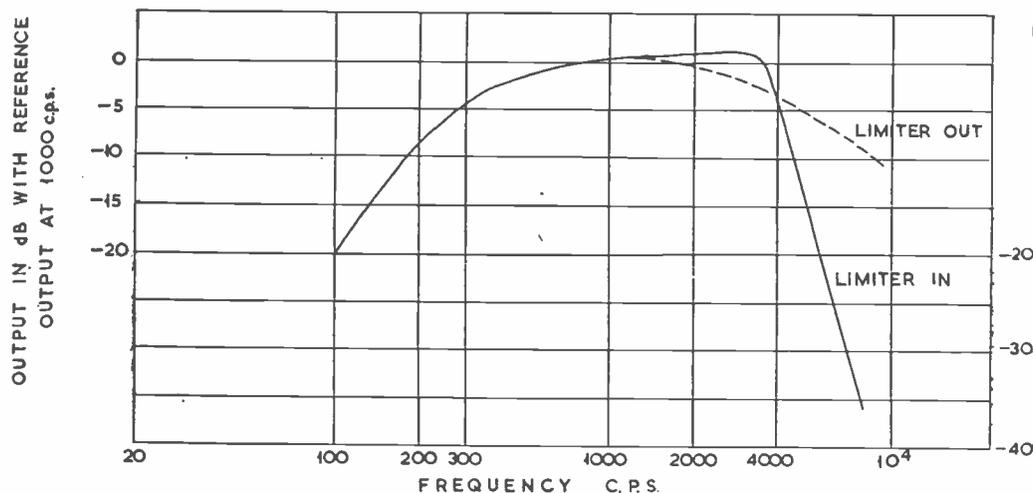


Fig. 4. Overall response curves of the speech amplifier-clipper. With the clipper in, the speech band transmitted is about 300 to 4000 c.p.s. only, which is sufficient for good, crisp quality. Overdoing the clipping, though it may increase apparent modulation, will rapidly degrade the quality.

panel 19 inches wide by $3\frac{1}{2}$ inches deep, complete with a small power unit, which resulted in components being somewhat crowded. Despite this, the noise level, including hum, was 44 dB below the maximum audio output.

The peak output of the unit as described here is about 5 volts r.m.s., which is sufficient to drive most amplifiers at the intermediate stage.

Setting Up

To set up the clipper for correct operation a cathode ray oscillograph is really essential, and if you do possess such an instrument (as you should for serious work!) the job is delightfully simple. All you have to do is to connect the CRT to the output and increase on P1 while talking into the microphone. As P1 is turned

up, the deflection on the CRT will also increase, but eventually a setting of P1 will be found beyond which there will be *no increase in the deflection* of the trace on the CRT. This is the point where clipping or limiting commences. On the model, this setting was marked "LC," (Limiting Commences) and the control then turned very slightly beyond this point. If you go too far your speech will sound unnatural. The clipper circuit is now delivering an audio wave of constant amplitude and all that is further required is to set the gain on the modulator, by R12, so that the modulation does not exceed 90% ; to do this properly you will again need an oscilloscope. Well, some good designs have appeared in *Short Wave Magazine!*

RADIO RESEARCH IN 1956

Radio wave propagation over a very wide frequency band has been one of the principal subjects of research during 1956. The research contributes information required for the efficient use of the radio frequency spectrum for communication and other purposes. The Radio Research Organisation is participating in measurements on the ionosphere and radio noise during the present International Geophysical Year. Equipment for this work has been constructed for use at Slough, at the Department's stations at Inverness and overseas, and at the Royal Society's special base at Halley Bay in Antarctica.

Radio Communication and Broadcasting

Regular ionospheric measurements are made at the Department's observatories, and these, together with similar measurements made by other countries, are translated into forecasts of world-wide ionospheric conditions for use in high-frequency communication and broadcasting.

Practical studies of long-distance communications have been made in the high-frequency band using signals received from distant pulsed transmitters. Back scatter sounding, in which no distant transmitter is required for examining transmission conditions, has been examined in relation to possible application to civil aviation communications; encouraging results were obtained in tests over the North Atlantic air route. Radio noise, due to atmospheric, and its effects on radio services continues to be studied.

In the VHF bands, long-distance transmission by way of forward scattering in the ionosphere has received attention, particularly in relation to the angular spread and direction of arrival of the energy distribution constituting the scattered signal. At still higher frequencies the forward scatter radiation from the un-ionised lower atmosphere—the troposphere—

is being studied in order to understand this propagation process so that the best practical use can be made of it. Work is in progress on this subject in collaboration with the Post Office, on a frequency of 1.37 Gc (1370 mc).

Radio-Navigation

Basic research is being undertaken into the possibilities of very low-frequency radio waves in the region of 10 to 20 kc for long-distance navigational aids. The variable phase changes introduced by the ionosphere constitute a limitation on the accuracy attainable, and it is this matter which is being investigated experimentally in co-operation with the Admiralty.

Semi-conductors and Transistors

Semi-conducting materials and devices made from them are studied to obtain a better physical insight into the factors determining their properties. Because of the trend towards the application of transistors to higher frequencies, special attention has been paid to high-frequency transistors. This has been facilitated by the development at the Radio Research Station of equipment for measuring the current gain of transistors up to rather more than 100 mc.

The foregoing is a brief outline of the very important work in hand at the Radio Research Board, contained in the Report of the Director (Dr. R. L. Smith-Rose). This report is actually a well-produced booklet of some 50 pages, containing a great deal of useful, interesting and unexpected information. It costs only 3s. 2d. post free, and is obtainable from any branch of the Stationery Office (in Belfast, Birmingham, Bristol, Cardiff, Edinburgh and Manchester), or to order through any bookseller, or direct from H.M.S.O., York House, Kingsway, London, W.C.2.

Automatic Change-Over System

INGENIOUS BK/MUTING CIRCUIT

From Notes By G3HSR

THE circuit shown here was evolved after having had the experience of the slick break-in working possible with an SSB transmitter and receiver, in the SSB mode. The requirement became that of being able to operate the equipment, in the same sort of way, for normal CW working; that is, with full break-in and complete receiver muting. It was found that only a few circuit changes need be involved. The arrangement has since been used on other transmitters, and has given consistently satisfactory results.

For smooth BK operation, the oscillator must be cut without being keyed, as this is the failing of many break-in systems, *i.e.* while, of course, the oscillator follows the keying, other sections of the transmitter must be completely cut-off. The ideal to aim for is complete cut-off between words. Similarly, the PA stage must be controlled in the same way as the oscillator, radiating only when the key is down. Hence, keying in the sense in which it is normally understood should be carried out in some intermediate stage in the transmitter.

Fig. 1 is a block diagram to show the sequence of operations. With the relay contacts open, both the oscillator (VFO) and PA stage grids are a full 100v. negative to earth, and are

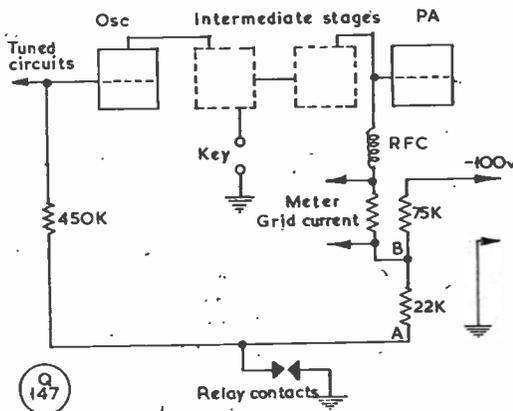


Fig. 1. Block schematic of the arrangement suggested in the article. With the relay contacts open, both oscillator (VFO) and PA grids are completely blocked.

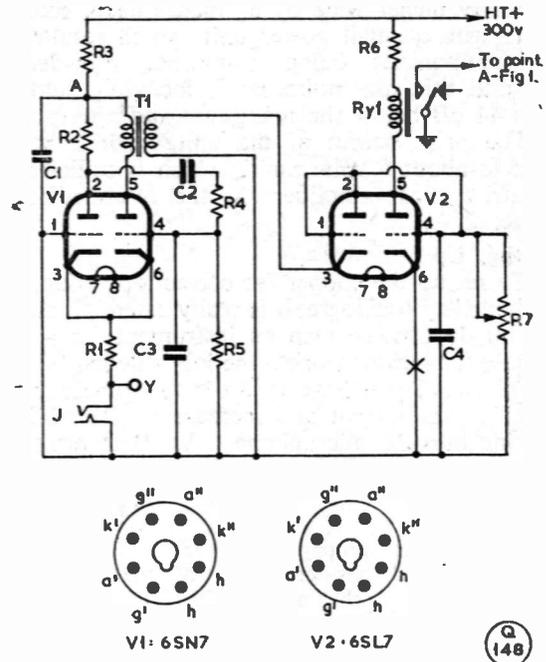


Fig. 2. The keyed audio oscillator V1 produces a control voltage for the relay-operating valve V2. A relay in the cathode of the triode section of V2 controls receiver change-over. The circuit can be adjusted, by R7, to give listening-through between words.

Table of Values

Fig. 2. Circuit of the Change-Over Unit

C1 = 8 μF, 250v.	R7 = 1.5 megohm (or near) pot/meter
C2, C3 = .001 μF	T1 = Any small step-up xformer
C4 = 0.1 μF (see text)	V1 = 6SN7
R1 = 1,000 ohms	V2 = 6SL7
R2 = 50,000 ohms	Ryl = Small SPDT type 8 mA working (or as suitable)
R3 = 25,000 ohms	
R4, R5 = 100,000 ohms	
R6 = See text (about 1,500 ohms)	

completely cut off. When the relay is closed, point A is earthed, so the oscillator is fired; point B goes about 20v. negative, so the PA stage is normally biased and can take drive, though at all times it has this degree of protective bias under no-drive conditions. Keying is carried out in the cathode of an intermediate stage, as indicated.

Practical Circuit

The control sequence having been arranged, the next point is that the keying and operation of the relay contacts must be tied into a common system, as shown in Fig. 2. In this, V1 operates as a 1,000-cycle (audio) oscillator, and across T1 appears the audio voltage when the cathode of V1 is closed. This voltage is rectified by the first half of V2, diode connected, and

passed to the grid of the second half, as a negative voltage which will be controlled by the setting of R7. The grid of the triode section of V2 will retain its negative charge for a space of time, governed by C4 and R7.

If we then arranged R6 so that the current through the triode portion of V2 energises the relay Ryl in its anode, it follows that when we close the cathode of V1, the rectified audio will be sufficient to reduce the current through the relay valve, thus de-energising the relay. It will stay that way until we release the key and the charge on C4 can leak away. Having achieved this relay action, the rest is easy.

The cathode of the intermediate stage to be actually keyed is returned to point Y in the cathode of V1, Fig. 2, with the key in J1. The intermediate stage can then be keyed together with the oscillator, with full blocking of the PA when the key is up—see Fig. 1 again.

On keying at normal speeds, the rectified audio on the relay valve never gets time to leak away through C4, so the relay stays de-energised; however, the setting of R7 (and perhaps the value of C4) can be adjusted so that the relay is energised *between words*, so switching out the VFO and the PA.

Receiver Control

For full automatic BK, the system must, of course, be extended into the receiver. The point marked X in the cathode of V2, Fig. 2, can be opened and another relay inserted to control the receiver muting. Alternatively, this could be done by using for Ryl a relay with a second pair of contacts.

At G3HSR, a separate aerial is used for reception, and Fig. 3 shows the control arrangement for the receiver. On "transmit" the

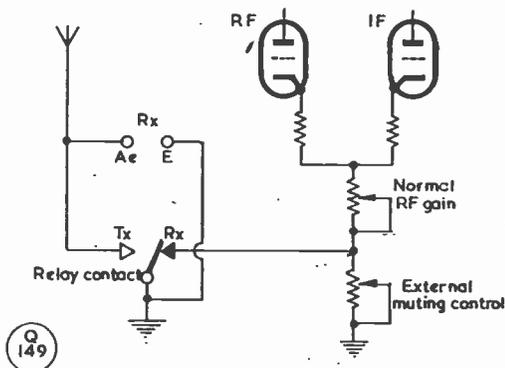


Fig. 3. Circuit for the receiver muting and change-over control. The only internal modification required is to bring out the bottom end of the receiver RF gain control.

aerial terminals are shorted out and a muting level resistor is brought in, series-ed with the normal RF gain control. This external control can be set for the required degree of muting.

The system as described here works well, gives full automatic break-in without splash, ensures a good clean keying characteristic and, once set up, is completely trouble-free. It is only when the whole station control is on the key itself that one experiences the real pleasure of smooth CW operation. For VFO netting, the cathode of the oscillator can be closed by a push-switch, and a further refinement could be to use the audio tone from V1 in Fig. 2 as a keying monitor—though normally one hears the signal as radiated in the muted receiver.

R.A.E. IN OCTOBER

Once again, the G.P.O. will be holding the autumn examination and Morse test for the radio amateur licence. The written test will be on October 5, 2.0-5.0 p.m., at the G.P.O., Armour House, London, E.C.1; at the Radio Surveyor's Office, 2 Bute Place, Cardiff; and at the Radio Surveyor's Office, Customs House, Dock Place, Leith, Edinburgh. Applications to sit, with a remittance for 25s., must reach the W/T Section, Radio Dept., Union House, G.P.O., London, E.C.1, by September 7 latest.

NUCLEAR POWER ENGINEERING

Those interested in this subject should write to the South-East London Technical College for the syllabus and details of a course of 18 lectures, which begins on November 12. Applications should be made to: Head of Department, Electrical Engineering and Applied Physics, L.C.C. South-East London Technical College, Lewisham Way, London, S.E.4, as soon as possible after September 7. The College also offers courses—part-time, full time, day and evening—on a wide range of electrical, communication and radio engineering subjects, at very modest fees.

CARDS IN THE BOX

Stations listed here are those for which we have no forwarding address, to clear cards held for them at our QSL Bureau. Please send a large, stamped addressed envelope, with name and call-sign, to: BCM/QSL, London, W.C.1, and the cards will be despatched with the next G clearance. If you would like your call-sign/address to appear in our "New QTH" feature, and in *Radio Amateur Call Book*—the only directory to the radio amateurs of the world—that should be mentioned when sending for your cards.

G3BPI, 3BYK, 3FRE, 3HHJ, 3JWT,
3KCL, 3KPW, 3KXW, 3EBX, 3LIT,
3LJC, 3LKE, 3LKN, 3LLT, 3LQC,
3LRB, G13FKJ.

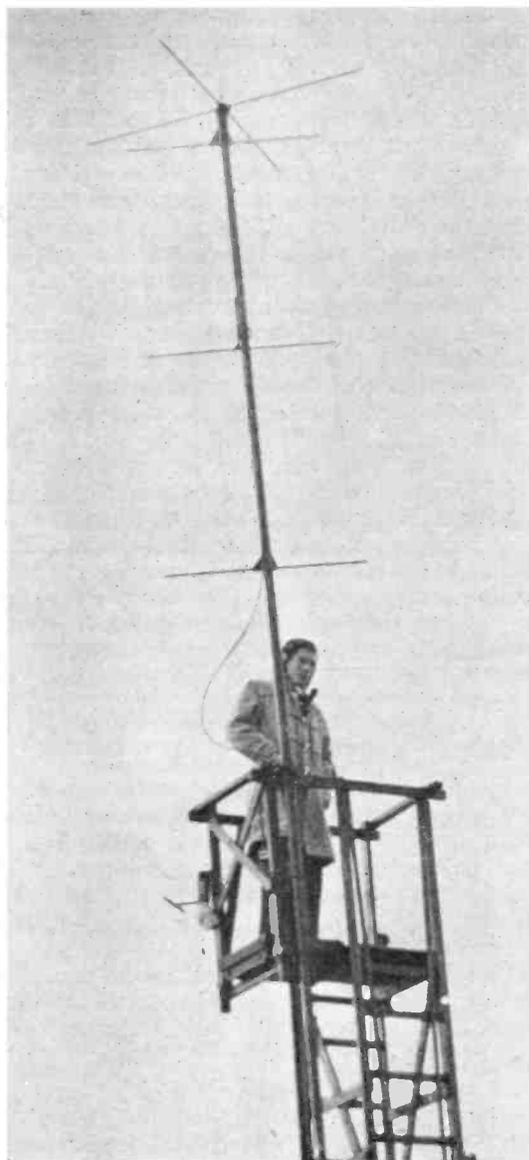
AMATEUR TV DEMONSTRATED

DAGENHAM, JULY 13-14

WHILE it is true that amateur television transmission has not yet got a very numerous following, it is also true to say that those interested and active in this field more than make up for lack of numbers by their efficiency and enthusiasm.

There are at the present time some 30 U.K. amateurs licensed for TV transmission, in the 430 mc band. Those with fully operational ATV stations are considerably fewer than this, though nearly all have some essential item of equipment for TV transmission—the camera being, of course, the main complication and expense. The organisation responsible for co-ordinating their efforts and interests is the British Amateur Television Club, which has also laid down the necessary technical standards for the transmission system. For the last eight years or so, the activities of the B.A.T.C. have been largely inspired by M. Barlow, G3CVO, who is also responsible for the Club's own quarterly publication *CQ-TV*. This is always useful and interesting, covering the technical aspects of ATV, as well as giving news on the progress of B.A.T.C. members.

The photographs illustrating this article were taken when the B.A.T.C. demonstrated ATV very successfully at the Dagenham Town Show on July 13-14. This display is thought to have been the largest and most ambitious of its kind yet given in this country, and probably in the world. The S/W Essex Group of the Club co-ordinated all support and dealt directly with the organisers of the Show itself. The group also supplied the inter-com-



munication, sync. signal distribution, the video mixing equipment (built by G3AKJ) and the audio mixing panel (by member W. Hall). On the second day of the Show a 5527 camera constructed by G3AKJ was also in operation.

Two cameras and control units were provided by the Chelmsford Group, B.A.T.C.—a vidicon built by member J. Tanner, and an image orthicon by G3KOK/T. A "Test Card C" monoscope camera and a novel video effects amplifier were operated by G3CVO/T. An image iconoscope camera and control unit were brought by G2WJ/T, who also supplied another monoscope camera and the RF distribution for the demonstration. G3KKD/T, with his own camera and control unit, televised the Show arena and fed video signals to the

TV marquee, in collaboration with G2WJ/T.

"Roving Eye"

The remarkable vehicle shown in this photograph accompanied the Cambridge Group of the B.A.T.C.—a complete roving-eye OB unit, known as "Matilda II." An old London taxi has been fully equipped with petrol generating set, control gear, 70 cm aerial and transmitting equipment, with a station camera (the work of G8PY), mounted on the roof. Another photograph shows Matilda's look-out, an electrician's extension stand, equipped with inter-com. and receiving aeri-als, rotated by hand to keep Matilda "in view" in the radio sense. Excellent pictures were received and displayed in the TV marquee when Matilda was two miles or more away.

For the two days of the Show, the B.A.T.C. gave a continuous ATV demonstration, without any serious hitches, and with first-class results. The cameras, entirely home-constructed by G2WJ/T, G3KKD/T, G3KOK/T and G8PY/T, performed admirably, as did the rest of the necessarily rather complicated gear and circuitry required to keep the demonstration before the public. The display was on twelve TV receivers generously lent for the occasion by Philco Radio, to whom the Club



is much indebted. And readers will agree that the British Amateur Television Club itself also deserves thanks and congratulations for having staged a demonstration much to the credit of Amateur Radio.

COURSES FOR THE R.A.E.

In the September issue of SHORT WAVE MAGAZINE we hope to publish a list of those schools, local authorities and club organisations under which courses of instruction will be given this coming season for the Radio Amateurs' Examination to be held in May next year. In the meantime, we ask that those bodies who may not yet have reported their arrangements to let us have the details by August 19 latest for the September issue. Readers interested in the 1958 City & Guilds R.A.E. may like to refer to p.357 of the September 1956 issue of SHORT WAVE MAGAZINE for some immediate information—most of it is still applicable to the next Examination.

VHF CAR RADIO

In the opinion of the BBC, as expressed by Sir Ian Jacob recently, the radio industry of this country has been slow in developing portable and car radio VHF receivers; the Germans are five years ahead of us in this respect. In this connection, it is interesting to note that the firm of Radio Telephone Aerial Systems, Ltd., formed in association with J-Beam Aerials, Ltd., (of which G2HCG is managing director) now offer for the commercial market a new type of mobile whip aerial.

It is an end-fed arrangement, designed for wing or scuttle mounting, and is cased in fibre-glass. It is flexible in any direction and will give results as good as, if not better than, the roof-mounted ground plane type. The new J-Beam design overcomes the difficulty brought about by the increasing use of plastic head-linings on modern cars.

LOW-TIDE FROLIC

On August 25, Norwich & District Radio Club hope to have G3JGI/A operating on Top Band and 15 metres from Scroby Sands, a half-tide bank of sand about three miles off the Yarmouth-Caister coast line. The tide is the critical factor in this operation, as when and how long they can be there depends entirely on how it serves. On this occasion, it fits in well, as August 25 is a Sunday, and the activity period can be 1200-1700 clock time. Special QSL cards will be sent to all stations worked. This Scroby Sands outing is becoming an annual adventure for the Norwich group, and must involve a good deal of staff work to get the party, with all its gear and provender, to the right place at the right time. And for the information of those who may be inclined to ask, a contact with G3JGI/A on Scroby Sands would count only for Norfolk—the island is not (yet) recognised (by the ARRL) as a new country!

Controlled Carrier Constant Modulation

NOTES ON ANOTHER "EFFICIENCY" SYSTEM

MODULATION systems such as screen, suppressor, clamp and cathode control are, in effect, attempts to get "something for nothing," in the sense that the aim is to modulate fully with the simplest possible audio equipment, *i.e.* to swing the carrier using considerably less audio than would be required for full modulation under normal high level (plate-and-screen) conditions.

In fact, of the types mentioned, it would be fair to say that only screen control using an 813 can be considered fully effective; in round terms, the reason for this is that it is only a valve in the 813 category that can be run satisfactorily at the full 150 watts DC input with the low static screen voltage (about 200v.) which enables full modulation to be achieved by swinging on the screen. This is something of a generalisation, because it could be said that with low static screen voltage the 813 does not develop the full RF output of which it is capable with 150 watts DC input. This is true under CW conditions, but not under modulation.

The snag is that screen control in the ordinary way demands lowered static screen voltage for clean modulation. No valve smaller than an 813 can be run at anything like the full DC input at the screen voltage necessary for full and distortionless modulation. Hence the great disparity in performance (not at all accounted for by the difference in DC input, or carrier power) between, say, a screen-modulated 807 and an 813 modulated on the screen. The difference is, of course, due to the fact that the 813 can easily be driven to 150 watts with less than half the rated voltage on the screen. The audio power required to achieve full, clean modulation under these conditions is less than 10 watts. Indeed, for amateur-band transmitters using 813's run at a genuine 150 watts input, there is no need to have a high-level modulator at all; full control can be obtained by swinging the screen with about six watts of audio.

Another Screen Control System

So much for the better-known low audio power systems. Here we get away from 813's

and discuss yet another efficiency circuit, known as Controlled Carrier Constant Modulation, also involving audio drive on the screen of the PA — 807, 832, 829, or whatever. It can be described as a much superior form of screen modulation, the advantages of which may be tabulated as follows:

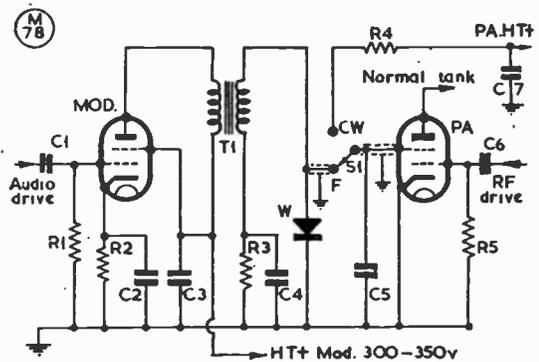
- (1) Inexpensive modulating equipment — a 6V6 will modulate a 150-watt carrier, or a pair of 6L6's a kilowatt.
- (2) A constant high level of modulated signal is radiated at all times, because the actual carrier amplitude is controlled by the modulating voltages.
- (3) Higher inputs can be run with smaller valves, as the peak input is only reached when modulating. An 832 can be pushed to 80 watts, and types similar to the 829 easily to 150 watts.
- (4) The system is extremely simple, needing only a small audio amplifier, and is easily adjusted.
- (5) Heterodyne interference is reduced, as the full carrier appears only when modulating; this helps to increase readability.
- (6) It is virtually impossible to over-modulate; if the system is properly set up, all that happens is that the carrier level increases with audio drive.

The *disadvantage* (naturally, there is always one or more of these!) is that the higher DC input demands bigger HT supplies, giving voltages of 750-1000v. with good regulation, even with valves in the 807/829 category. An 813 would have to be run at from 1500 to 2000 volts on the plate in this circuit. However, as a single 807 should drive to 100 watts or so peak with about 1000v. on the plate, there is no need to bother with 813's — unless you want to go really big!

Action of the Circuit

The output from the audio is rectified, and this rectified voltage applied to the screen of the PA. No other DC voltage is used on the screen, unless complete cut-off between words is wanted, in which case a little negative bias must be applied in addition to the rectified DC from the audio drive. This in practice is not a good thing, as when working DX the effect is to make the signal bob up and down too much, disappearing into the noise at low speech levels; this causes violent AVC and S-meter variations at the receiver.

It is better, therefore, to radiate a reasonable carrier level at all times, with voice peaks increasing power to maximum. In practice, this will appear as about a 20 dB increase in S-meter reading at the other end. Unfortunately, some valves almost cut off with no screen voltage, so different types will give different



Circuit of the Controlled Carrier Constant Modulation system discussed in the text. The action of the circuit is that rectified audio appears as DC on the screen of the PA, thus driving the PA in accordance with the modulation; the effect is that the carrier amplitude varies with the speech, full power only being radiated on peaks. This means that the PA can be run at well over normal ratings with safety. In a typical case, a 6V6 will modulate an 897 to 100 watts or more peak input. In a PA valve which cuts off completely with no screen voltage, no carrier would be radiated until the microphone is spoken into; whatever the level of speech or noise input, the carrier itself is always fully modulated irrespective of its amplitude. It is impossible to over-modulate.

degrees of control. (It would be worth experimenting with small static voltages on the screen to retain some level of carrier when not modulating.)

As examples, an 832 gives a 30-40 dB increase in S-meter reading when fully driven, with almost no carrier, whereas a QQV06-40 produces a fair carrier, with a correspondingly smaller dB gain as shown on the S-meter; but the signal is easier to tune and to identify because of the presence of the carrier.

In reception, it is sometimes better to tune a controlled-carrier constant-modulation signal as when taking CW, i.e. with AVC off and less RF gain.

A Practical Circuit

This is shown in the diagram, which should make things quite clear. The 6L6 is in Class-A, which will be suitable for most PA's capable of a peak power of 100-120 watts input. The metal rectifier should be rated at about 30 mA, but a bigger one will drop less volts across it, making more available for the screen. The type RM4 suggested has an excellent characteristic in this respect, and has been proved to be entirely satisfactory as regards both voltage output and quality.

For setting up the PA, it will be necessary to incorporate the Phone/CW switch S1, because all preliminary adjustment is carried out under full CW conditions—that is, the PA and its loading are set for full RF output into the aerial, which can be slightly over rather than under coupled. To go over to phone, simply throw

Table of Values

Modulator-PA Circuit for Constant Modulation

C1 = 0.1 μF, or as normally used	R1 = 250,000 ohms, or as normally used
C2 = 25 μF	R2 = 300 ohms
C3 = 16 μF	R3 = 100,000 ohms
C4 = 0.2 μF	R4 = 50,000-70,000 ohms (see text)
C5 = .001 μF, 600v. wkng.	R5 = As normally used
C6 = As normally used	T1 = 1:1 to 1:2 (see text)
C7 = .01 μF, rated at twice HT voltage	S1 = SPDT, safe for HT
	W = RM4 or similar

S1 — and there you are.

One other point — T1 can be as given, but even better results could probably be obtained by using a multi-match transformer, such as Woden UM1, with the tapplings arranged to produce the highest possible audio voltage across the output or secondary side, connected into the rectifier. It should also be noted that because higher-than-usual HT voltage for the valve in use will be employed, the screen dropper R4 must be of greater value than is normally used; otherwise the valve will be over-run under CW or tune conditions.

(EDITORIAL NOTE: For that part of this article discussing the Controlled Carrier Constant Modulation system we are indebted to VQ4GF and the notes by him on the circuit in the May 1957 issue of the Radio Society of East Africa's *Circular Letter*.)

FACTORY LINE AT THE RADIO SHOW

As in previous years at the National Radio Exhibition, Multicore Solders Ltd. will be putting on, by way of a demonstration of the use of their cored solder products, a miniature factory production-line. This time it will be Decca record player amplifiers which will be shown under construction. These will be standard production units and will eventually be sold into the trade in the ordinary way; ten Decca operatives will be employed on the demonstration, for the duration of the exhibition—which opens at Earl's Court on August 28.

Ersin Multicore solders have been used for nearly 20 years by most of the leading manufacturers of radio, television and electronic apparatus—in addition to which the firm does a very large export business, and is a significant dollar earner.

MORSE TEST ARRANGEMENTS

Early in September, Morse tests for the Radio Amateur Licence will be held at the head post offices in Birmingham, Cambridge, Derby, Edinburgh, Leeds and Manchester. Application forms, which should be applied for immediately, can be obtained from the W/T Section, Radio Dept., Union House, G.P.O., London, E.C.1. These application forms, with 10s. in stamps, have to be returned before August 20, so that the place, date and time for the Test can be fixed with the candidate.

TRIUMPH OF THE SPIRIT

THE GENESIS OF G3MAC

W. L. Rimmington (G2DVD)

This is a story of difficulties faced and overcome which will touch the heart, and stir the conscience, of everyone who reads it. The way in which C3MAC has been brought on the air is probably without parallel in the annals of Amateur Radio. And we can say here, what he does not say himself, is that much of the credit for a remarkable achievement is due to G2DVD.

—Editor.

RECENTLY, accounts have appeared in the national Press about "Man from the jungle who takes polio as a matter of course" and "The man polio cannot beat."

They went on to tell how a young officer of the Royal Sussex Regiment had, during his period of service in Malaya, contracted poliomyelitis, as a result of which he had been invalidated home, completely paralysed from the neck down. In spite of the terrible handicap of having to spend his entire existence on his back, completely dependent on an electrically powered artificial lung for respiration, and requiring attention for 24 hours a day, Paul Bates has been able, as a result of his spirit and tenacity, to make for himself a life—which, although not what he would have expected to return to after his period of service, was at least varied and full of interest.

These newspaper articles told how 23-year-old Paul was using an electric typewriter, operating the keys by means of a wooden hammer held in his teeth, and how he was able to play chess and bridge. He has, of course, other interests, such as television, radio, and a very fine collection of gramophone records. But, by special request, from the first article was omitted Paul's keen interest in Amateur Radio—for at that time he had not progressed far enough.

Now that the story can be told in full, the writer (who has been intimately connected with the whole project from the beginning) feels that there is so much which should be told, not only to show how the courage of one man can take him far along a road which to most people would be impassable, but to give encouragement to those who are in any way handicapped, and imagine that the difficulties of obtaining a ticket are too great to be overcome. It is also in no small measure due to the sympathetic co-operation of the authorities that the story can be told at all, and it is felt that the widest publicity possible should be given to their part in the emergence of G3MAC.

This, then, is a brief account of how a newcomer to the ranks of Amateur Radio—who has possibly been worked already, under various call signs, by many readers of SHORT WAVE MAGAZINE—came to be operative under his own call.

Making a Start

In the newspaper story already mentioned, a phrase used was "The awful moment of realisation." This

more than somewhat describes the feeling of the writer late in the autumn of 1956, when it was realised what a task lay ahead. A letter was received from a friend of Paul Bates, addressed to G2DVD, asking whether there was a local club which might be interested in helping in some way. As the circumstances of the case were already well known to the writer, the task at first seemed an almost impossible one.

Imagine the situation: The only movement possible to Paul was that of his head from side to side, and slight control of the first joints of the first and second fingers of the left hand. On this basis, the whole campaign was planned, and shortly after the New Year, a start was made.

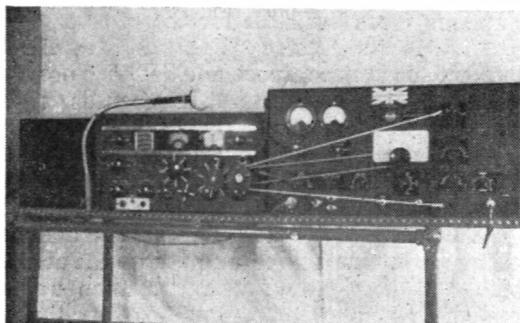
In the somewhat sparsely populated (from an amateur point of view) district of north-west Sussex, there are about ten stations within striking distance of Slinfold, where both G2DVD and G3MAC are situated, and it is much to their credit that all offered to take what part they could in order to get the necessary work done.

One member of the group undertook the coaching in theory, and another the Morse Code, because it was found that whatever the condition of the applicant for a licence, the two essential examinations had to be taken, and passed, before a licence could be granted. However, the G.P.O. responded magnificently and made a most important concession—namely, that a full-power station could be installed at Paul's home, to be operated by him, although unlicensed, under the immediate supervision of G2DVD, and using the alternative call of G2DVD/A.

This, of course, was just the incentive needed. Before more than a few days had passed, an Eddystone S.640 was installed, and an order given for a Minimitter transmitter. These two pieces of equipment were decided on after quite some thought, as being the most easily operable, yet capable of giving the best results. The original idea was to motorise as much of the equipment as possible, but this was not acceptable to our young friend, who insisted that the job must be done by his own efforts, without mechanical aid, where it could possibly be avoided. He planned the station entirely by himself, and it was only left for others to put his ideas into operation.

Equipment Control Problems

As can be seen from the photograph, which shows the latest acquisition, an AR88, Paul's ideas were



essentially practical. They were first tried out on the S.640; all controls were grouped within reach of a stick held in his mouth, the knobs being drilled and bolts inserted to form a sort of capstan, which could be engaged by the stick. Where controls were too far away to be reached, extra knobs were fitted inside the area covered by the stick, and connected to the controls by means of spring driving cords.

A relay unit and power pack had in the meantime been made, and the station was ready for operation, the sole problem remaining being that of switching. This, as usual, was solved by Paul himself. A plaster cast of his arm was made, on the end of which were mounted two switches, one a micro-switch to operate the netting control on the transmitter, and the other a very light push-on, push-off switch which actuated the main switch and the relay systems. The manufacturers of the transmitter had brought out to the front panel a pair of coax sockets, which were in parallel with the "transmit" and "VFO" switches normally used.

In the meantime, other members of the Sussex group had installed a long-wire aerial, and dipoles for 80, 20 and 10 metres; a metal trolley had been made which carried all the station, the only external connections necessary being to the mains, and to the aerial in use. This trolley was constructed so that it could be easily wheeled about the room by the nurses, and placed across the bed whenever wanted.

It is gratifying to be able to record that all the gear worked perfectly as planned from the beginning and also that, with one minor exception, there was no interference whatever to the TV receiver working in the same room.

Many contacts were enjoyed as G2DVD/A. From time to time, other members of the group called, and often operated /A, so that a certain amount of confusion was caused by the receiving and sending of cards all for the same person, but under different callsigns. It is hoped that any operators who may have been puzzled by this will now understand the somewhat unusual circumstances under which Paul was operating!

Exam. Preparation

During all this time, coaching was going on, and it was decided that the Radio Amateur's Examination held on May 10 should be attempted. The City and Guilds of London Institute was approached; the authorities there were just as helpful as the G.P.O., being unstinting in their efforts to make the job as smooth as possible. They suggested that they felt that it would be better if someone to whom Paul were accustomed were to take the examination, and they therefore asked the writer to act as Examiner. On the evening of May 10, Paul was duly examined, of course orally. The whole session was recorded for future reference and checking by the City and Guilds; and with no difficulty whatsoever, a pass figure of over 80% was obtained.

The first hurdle having thus been overcome, it was decided to apply for the Morse Test to be taken. A second plaster cast had been made, with a very lightly balanced key fitted to the end, and everything was

ready. Here again, full credit should be given to the G.P.O. for arranging for one of its staff members to come and conduct the Test. A pass resulted, and it only remained now to put in the formal application for the licence. A callsign had already been allotted, cards had been ordered, and the new station was ready to go, with Paul himself in charge under his own call. From start to finish, the whole project had taken six months only.

The final additions to the station—a fully motorised HF beam, and equipment for listening on two metres—are now being dealt with, and will no doubt be in operation by the time this article appears in print.

Although the task has at times been difficult, it has been the most satisfying job that has ever been undertaken by the writer in twenty-odd years' connection with Amateur Radio, and it is very much hoped that for G3MAC many years of enjoyment will be the result of it all.

Acknowledgements

Special thanks are due to Mr. G. Nisbet, who provided the necessary knowhow and equipment to make the gear workable; to Mr. Goldsmith of the Radio and Accommodations Dept. of the G.P.O. for his invaluable help in making the special arrangements; to Mr. Carlow of the City and Guilds of London Institute for his sympathy and understanding in handling the details concerning the Examination itself; to Mr. Harris Ward of the G.P.O. (and, indeed, to his wife also) for giving up an afternoon of their holiday on the South Coast to take the Morse Test on a day when the temperature was over 80°; and to G3ABJ, G3HCU, G3JEP, G3KWU, G3LKB, G5PR and other local amateurs for coaching, transport, assistance and encouragement—and finally to G3MAC himself for making the "awful moment of realisation" into the splendid moment of realisation that the job could be done, and after all done so easily . . .

"ONE HUNDRED WATTS OF AUDIO"

With reference to this article in our July issue, Standard Telephones & Cables, Ltd. draw attention to the fact that the grid input impedance of a pair of 807's in Class-B push-pull is 7,100 ohms, and not as stated; thus, the input transformer T1 should have an impedance ratio of 1:1.6, for which a turns ratio of 1:1.25 is near enough, this being taken as for primary to total secondary. Secondly, the maximum-signal anode current of the two valves in this mode is about 240 mA (depending on anode-to-anode load), and not as stated. In fact, it would not be possible to drive the 807's to 400 mA peak in this circuit.

PANDA OFFER TO CLUBS

We are asked by the Panda Radio Co., Ltd. to say that they are prepared to give working demonstrations of Panda equipment to local radio Clubs and Societies in that part of the country south of the line Severn-Wash. Club secretaries wishing to take advantage of this interesting offer should write, giving at least *two week's notice*, to: Panda Radio Co., Ltd., Autavia House, Redcliffe Gardens, London, S.W.10 (FLAxman 0907).

A Page of

BOOK REVIEWS

We discuss below some of the new books and manuals we are now stocking, available for immediate delivery. The prices quoted are *post free*, and orders should be sent to: Publications Dept., SHORT WAVE MAGAZINE, LTD., 55 Victoria Street, London, S.W.1. Readers overseas can remit by international money order, by cheque drawn on a U.K. account, or in any convertible currency.

COMMAND SETS. This is a brand-new, 136-page manual dealing with that item of American "surplus" equipment described variously as the SCR-274N, ARC-5 or (as it is best known in this country) the Command Set. These are the U.S. Navy, Army and Air Force designations for what is virtually the same unit, though there are numerous sub-marks of receiver, transmitter and power supply, covering a wide frequency range and several applications. There are, in fact, altogether six receivers and six transmitters, all similar in appearance, but designed for different frequency bands and having differing IF channels.

The book discusses various modification possibilities, giving data and circuitry for the use of Command Sets as amateur-band transmitters and receivers, also on modulation, TVI-proofing, mobile operation and some special conversions. There is plenty of illustration with many diagrams and circuits. The cost of *Command Sets* is 12s. 6d.

RADIO ELECTRONICS HANDBOOK (Radio Data Book). This is a compilation of nearly 900 pages, giving basic information, reference data, formulæ and test procedures covering AM Receivers and Transmitters, FM techniques, basic Television theory and practice, Sound reproduction and Recording, Aerials and Transmission Lines, Test Gear and Alignment sequences. Divided into 18 sections, the *Radio Electronics Handbook* correlates and condenses the information which otherwise could only be obtained by consulting something like 300 different text books and manuals. It has been produced by an American industrial engineering organisation whose function it is to prepare technical manuals on radio and electronics for the Armed Forces of the U.S.A. It was found that this gigantic task could only be undertaken by first producing a compendium of all the basic data, over the whole field of radionics. The *Radio Electronics Handbook* is the result, and is now in the third printing of its second edition.

Some 200 pages, in seven sections, are devoted to what is described as "a briefing on fundamentals," amply illustrated and well explained. There are then nine sections divided as outlined above, followed by two more sections covering Data and Formulæ (86 pages), and Valve and CRT Charts (138 pages).

The book is adequately indexed, the space devoted to contents and index totalling some 17 pages. *Radio Electronics Handbook* is the sort of manual which will be found invaluable by the professional radio engineer, the Service technician, the laboratory worker, students and radio amateurs—of whatever grade or proficiency. As the preface so rightly says, the book is intended for use on the board, on the bench, on the desk and in the field. *Radio Electronics Handbook*, by Boyce & Roche, price 40s.

COYNE TECHNICAL DICTIONARY. Prepared as an aid to teaching by the Coyne Electrical School, Chicago, this is a 150-page handbook giving the accepted meanings of some 4,000 terms, abbreviations, symbols and expressions used in the radio, electrical, electronics and television fields. In addition, there is a quick reference data section of 36 pages, which gives formulæ, tables and basic electrical information (the latter being mainly applicable to American practice and technique). The great value of this book over here lies in its very useful dictionary content. The price is 16s. 6d.

RADIO AMATEUR CALL BOOK, Summer Edition, 1957. For the first time, the latest issue of the *Call Book*—containing the call-sign, name and address of every known amateur in the world—makes just the 600 pages. The current offering is more than twice the size of the last pre-war issue (Summer, 1939) available in the U.K. The *Call Book* is a remarkable publication in many ways. Launched some 35 years ago, with local agents in all countries where there are radio amateurs, the aim of the publishers has always been to make each issue as complete, as accurate and as up-to-date as possible. Of course, the ultimate can never quite be achieved, because new amateurs are being licensed, or changing their addresses, even while each quarterly edition is at press.

So far as the G Section is concerned, having been for many years agents for the *Call Book* in the U.K. and Europe, we are responsible for keeping the British Isles listings up-to-date. All U.K. amateurs—whether subscribers to or even readers of SHORT WAVE MAGAZINE—are invited to notify us immediately of a new licence or a change of address.

This latest *Call Book* contains 28 pages of U.K.

call-sign/addresses. Taking the world as a whole, the total amateur listings are now estimated at not less than 215,000, of which the United States alone accounts for some 149,000 licensed amateurs. The remaining 66,000 are listed in 178 pages, alphabetically by prefix and call-sign, and nearly all countries outside the U.S.A. are represented. These astonishing figures take no account of the total amateur population (which is known to be high) in the Iron Curtain countries; some of them, like the Soviet Union, Czechoslovakia and Roumania, do not allow their amateur station addresses to be published; a notable exception is YU, Yugo-Slavia.

The *Call Book* also gives a lot of other essential DX information besides these call-sign listings—such as the QSL bureaux addresses for each country, its zone number in the 40 zones into which the Amateur Radio world is arbitrarily divided for DX purposes, a two-page world map showing prefix locations, the ARRL agreed list of countries, lists by prefix and country alphabetically, a world time-conversion chart, and how the 48 American States and the District of Columbia fall into the ten W1-W0 call areas.

Still the only directory to the radio amateur stations of the world, the *Radio Amateur Call Book* is always available in two editions of each issue—the Full and the Abridged. The latter omits the 400 pages of American call-sign/addresses, but is otherwise complete with all the usual *Call Book* data and QTH's for the rest of the world outside the United States. The Full (or Complete) Edition of the Summer 1957 issue costs 37s. 6d., and the Abridged Edition 17s. 9d.

THE RADIO AMATEUR'S HANDBOOK, 34th Edition, 1957. The earliest example of the *ARRL Handbook* (as it is usually known) that we possess is a much-cherished copy of the third edition, second printing, of some 200 pages, and dated 1928; this sold 10,000 copies at a dollar a-piece (even in 1928). Nearly 30 years on, and now we have the 34th edition of the *Handbook*, in much the same format, but more than three times the size. And it is to the credit of the ARRL that the cover price has only gone up in just about the same ratio—it is now \$3.50 in the U.S.A. This is mainly because the *ARRL Handbook* has always been a best seller. Over the

years, literally millions of copies have been sold throughout the world, not only in the Amateur Radio field, but because it is accepted as a standard radio text, meeting the needs of the professional radio engineer in the same way that it does those of the amateur. To produce anything at all comparable in this country—to sell into a guaranteed market of, say, fifteen thousand copies—would mean a cover price of not less than £5. A British book on the lines of the *ARRL Handbook* could certainly be produced, but to sell at a competitive price it would have to be heavily subsidised for years, and even at best it could only divide the market.

The *Radio Amateur's Handbook* is now as much an institution as Amateur Radio itself. It has earned universal acceptance because it is essentially practical, giving the quick answer to almost any problem in the communications field—whether it be the design of a receiver, the construction of a transmitter, or the layout of an aerial system. Taking the frequency range from HF to VHF, the *Handbook* covers theory, design, construction and operation, all from the strictly Amateur Radio point of view. You can build the gear either in a well-equipped workshop (such as many amateurs have) or on the end of the kitchen table (which is what most use). There are better and more comprehensive books on particular branches of the art, but there is no other bringing it all under one cover in language that that mysterious individual, "the average amateur," can clearly comprehend. There is an illustration, or a circuit diagram or two, on practically every page—the block cost alone must be astronomical by ordinary textbook standards. Whether it be VHF, mobile, SSB, modulating capability, super-selectivity receivers, transmitters for high or low power, the construction of elaborate beam aerial systems or the feeding of a simple sky-wire, work-bench methods, an explanation of how the valve works, the approach to TVI-proofing, or the characteristics of a valve type you have never heard of before—it's all in the *ARRL Handbook*, and all strictly in relation to the amateur bands and the amateur's needs.

We are, and always have been, enthusiastic about the *Radio Amateur's Handbook*, not because it is American, but because all along it has given the right sort of information at what is relatively a very low price. To be exact, 34s.

(All the Books mentioned in this Review are obtainable from stock at the prices given from: The Publications Department, SHORT WAVE MAGAZINE, LTD., 55 Victoria Street, London, S.W.1. The current issues of the CALL BOOK and the 1957 RADIO AMATEUR'S HANDBOOK will only be available while present stocks last.)

ELECTRONIC COMPUTER EXHIBITION

To the increasing number of specialist exhibitions in the radionics field is now added that to be devoted exclusively to Computers, their technology and application. This exhibition will be at Olympia (London), during November 28-December 4, and in conjunction with it the National Physical Laboratory is arranging an international technical symposium, or get-together of the boffinery in this particular line of business.

CAREFUL DRAFTING HELPS

In sending in a small advertisement, please write clearly, punctuate carefully, avoid ambiguity, and use the accepted abbreviations. As a small advertisement has to go through the machines, or before the eyes, of a number of people to whom (for all the meaning it conveys) it might just as well be written in Greek or Hindustani, accurate transcription into print depends upon the copy being written out clearly.

DX COMMENTARY

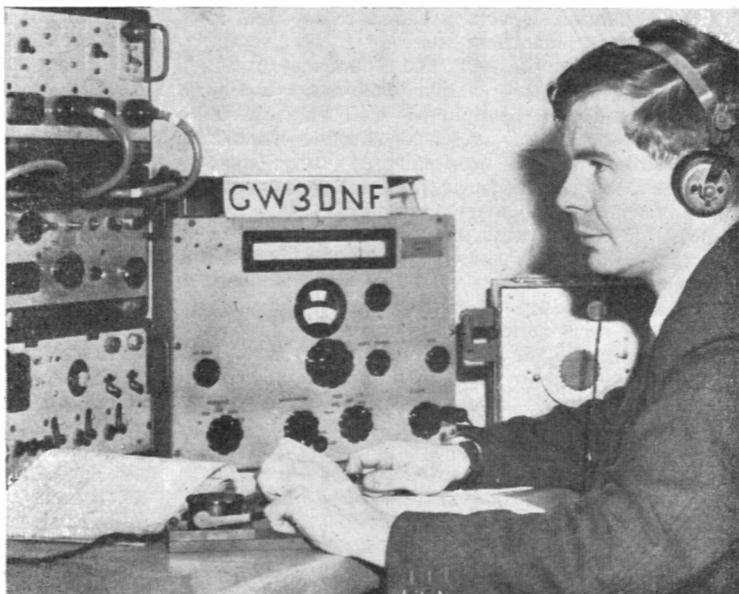
L. H. THOMAS, M.B.E. (G6QB)

DURING the period under review—mid-June to mid-July—conditions have varied from bad to excellent, through all the intermediate stages. We have had a cross-sectional view of all that the DX bands can do, with spells that could only be described as mediocre, dull and downright dead.

At the time of writing the previous Commentary the sunspot activity had thoroughly upset all bands, and conditions continued to be really poor for ten days or a fortnight. By mid-July, however, they had come right up to a level that was at least interesting, if not phenomenal. We imagine that they will still be fluctuating for another month or two, before settling down to what we hope will be the DX-hunter's paradise in the autumn.

Ten has been open on the North-South path, with occasional openings on East-West lines (notably on July 14-15). *Fifteen* has no longer been the best DX band, as it has been shut down by conditions for so much of the time. *Twenty* has been unreliable but nearly always worth a look round.

The month's DX visitor was PX1FC, an expedition about which many tales have been circulating (among them the one that they were using half a kilowatt from batteries!). The operators were apparently F9FC, ON4AU and HB9MQ, and the station was on all bands from a QTH 7500 ft. above sea level. Their signal on *Twenty* and *Fifteen* was phenomenal, as were the pile-ups caused by their appearance. Other interesting



GW3DNF

CALLS HEARD, WORKED and QSL'd

pieces of DX are promised, and are reviewed in the appropriate places in the story which follows.

Round the DX Bands

G3DO (Sutton Coldfield) added to his scores with KV4BU, ET3XY and VQ6ST, all on *Fifteen* phone; also new, for the Marathon, was HK7LX on *Twenty* phone. Otherwise he was not very active.

G5FA (London, N.11) boosted his Marathon figures with VS1HC on *Fifteen*; EA6AW, UO5, LU, TA, ZB2R, UI8 and OA4GT on *Twenty*; and UAØBC, UR2AN and HE1AW on *Forty*. He promises good conditions during the last two weeks of August, when he will be away on holiday!

New ones for G2BLA (Morden) were OK3NM and ZD6RM on *Ten* CW; PX1FC, EL1P, 3V8AD, UQ and HA on *Fifteen* CW; OH3AA/Ø and KL7CDF on *Twenty* CW. Among the others

worked were VK6WT on *Twenty* for a new Zone, UA9KAG on *Twenty* (QTH Magnitogorsk) and sundry bread-and-butter contacts.

G3LKZ (Cleadow) finds *Twenty* the only band likely to yield anything new, and on CW he dug out UN1KAA, CN8, UO5, IT, SVØWZ, YV4AU and OH3TCØ. Phone fetched in TF2WBZ for one more new one.

G3ABG (Cannock) stuck to CW and raised EL2S, ZA2ACB, UA9 and Ø, CR6 and 7, and PX1FC on *Twenty*, with OH3TC/Ø, FE8AH, MP4BBL, EA8BF and W8ADS/MM on *Fifteen*. CR6AI told him that CR5SP would be operating as CR5P from the Principe Islands in mid-July—*Twenty* phone. G3ABG is probably unique in being able to use a TVI complaint as a proof of his whereabouts during a recent police check in the Cannock district! He and G2YV were both able to show that they

were at home by entries in their logs, but the TVI must have added some weight.

G5BZ (Croydon), after quite a spell of "non-enthusiasm," got going again and made a few additions. On Fifteen he collected ZP9AW, VS6, ZE2, OQ5, FP8AA, FB8BX (Nossi Be), JA. VP8BS, PX1FC and others; Twenty yielded VO6AB, FP8AA and ZD4CM. G5BZ was surprised at the terrific opening to the U.S.A. on Fifteen during the week-end of July 13-14; he thought it quite remarkable for the time of year, and found even Ten wide open to East Coast W's; otherwise conditions were pretty unexciting.

G3BDQ (St. Leonards) kept on Twenty and emerged with VK's, VS1's, VU, 3W8AA, OH0, EA9EB, VP8BS, JA's, CE3UA, UH8, UJ8, UA9 and 0, and VK9JF, a new one on Cocos-Keeling who wants QSO's with Cornwall, especially Penzance. G3BDQ also heard XW8AB and 8AG but wasn't able to call them at the time.

G2DHV/A operated while on holiday at Broadstairs, and raised HB1MX/FL, 5A2TY, VE and VK on Twenty. Later, he was hoping to work both /A and /M from the Isle of Wight. From home he raised FF8, PJ, PX1FC, VQ 2 and 4, VP5 and VE8 on Fifteen, and UD6 and UM8 on Twenty.

GM3EOJ (Aberdeen) operated only on Twenty and only during the evenings, finding things pretty poor except for occasional openings. Russians were very prominent and he raised UN1, UL7, UO5, UD6 and UG6, among others; two new countries both arrived on July 8 when he worked 3W8AA and ZD1NWW. VK5DK was booked in on July 1 at 1915 GMT in peculiar conditions. Up there in the North, GM3EOJ tells us, the East/West path hardly ever seems to open.

G3LNO (Coventry) is a new correspondent, and we duly welcome him. Normally a Top-Bander, he made an excursion to Twenty with 7 watts, rock-bound on 14015 kc. With this QRP rig he raised four W districts, lots of Russians and an HK, plus all Europe on short skip—indeed

enough to whet his appetite for more!

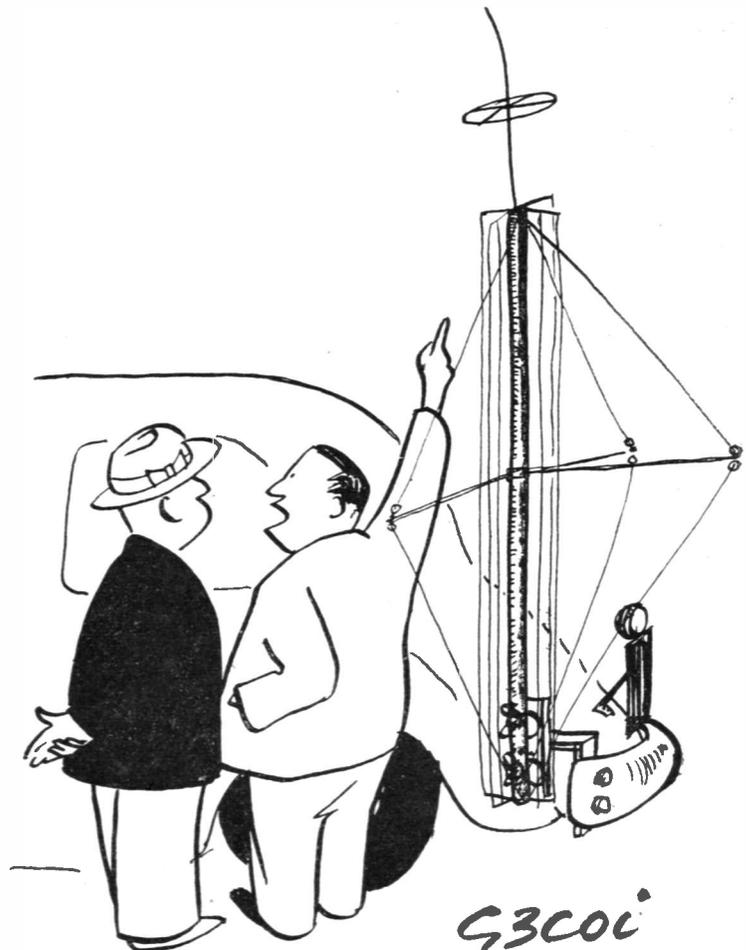
G3JJG (Mitcham) used to write to us when he was a Top-Bander a few years back. Now he has an 813 rig and joins the Five-Band Table. He is also licensed as 5A2CR, whence he operated for six weeks earlier in the year.

DX on Forty

As ever, reports on Forty metres are scarce, but G3JAG (Rochdale) upholds the honour of that band in a big way, as his log shows. Recent catches have been HI8BE (0100), KZ5RF (0010), KG1JA (0400) and lots of PY's. He has had a sked with W6MOJ which produced over 100 QSO's, but that has failed during the summer

months. W's are now scarce, but he heard K5AJK at S7 (0404) just recently. A month or so back he worked CM8EM, OQ5GU and ZC4BN, and he has 40-metre cards from 3W8AA, CE3AG, YV5FT and XE1KD, together with a goodly waiting list. The rig that does this for him runs 150 watts to parallel PT-15's; receiver is an R.103A; and the aerial is a folded ground-plane with six radials. G3JAG recommends bamboo for ground-plane supports—not only light and strong, but only 8s. 6d. for a 20-ft. length.

G3LNR (Nottingham) worked several new Europeans on Forty, including OH3AA/0, YO3RN and a UA3. DX heard, but not worked, included KZ5RF, ZP9AY,



"... I think that capacity hat makes the whole thing look slightly ridiculous..."

OX3LW, PJ2AV, HH2Y, VP3VN, lots of W and PY and the inevitable Russians. The queerest one heard was GØKVY/F—and your guess is as good as ours.

CW Fiesta

The Fifth Annual "Topsfest" will be held at the Swan Hotel, Lichfield, on Sunday, August 25. A full programme has been arranged, and it is hoped that over 100 will attend this year. Admission costs but 2s., and the inclusive price for the meeting and high tea is 8s. 6d. Tickets may be obtained from G3ABG, 24 Walhouse Street, Cannock, and should be applied for *before* August 20.

The Tops CW Club, sponsors of this event, also invite everyone to listen to their "Tops Newscast," radiated on Forty CW every Sunday at 1700 GMT by a rota of Tops operators. Readers wishing to improve their Morse, and DX'ers looking out for hot tips may all benefit from this.

DX Bands Again

GM3BCL (Aberdeen) amends his Marathon score to 28Z and

68C, which may not seem a remarkable figure—unless one knows that it represents *Ten phone only*! He has been having rather a thin time during the last few months, of course, but short-skip has produced some new ones. GM3BCL is now off on holiday, but is taking a very QRP 40-metre rig with him. On his return, he hopes again to be "in daily conflict with the ionosphere"—his own phrase.

G3DNR (Broadstairs) has been another single-bander, Twenty being the one. New contacts were furnished by KV4AA, KL7BA, UN1, UD6 and YV5BX. G3DNR thinks the bright side of poor conditions is that one can always get on with gardening and the other domestic chores without brooding on what one might be missing.

G3AFT (Grafton's Club Tx) operates only on Fridays (2000-2200) and with 25 watts to a 68-ft. centre-fed affair, but they have raised KV4AA, 3V8AD, PY's, VK's, CN8, many Russian prefixes and, of course, plenty of W's—all on CW. Old Grafton members are asked to note that

G3AFT is now in the DX business!

G3LET (Westcliff) thought June was the poorest month this year, but he collected 9 new countries and 4 new Zones, so he is not despondent. One of his contacts was LA2JE/P (Hope Is.), and was looked on as No Good because of G3JXE's note last month. However, LA5HE told G3LET that he knew him personally and that he is quite OK. And he adds that LA2HF/P is on from the same QTH. They both run 15 watts and promise to QSL when they return to Norway in the autumn of 1958.

Other news from G3LET is that I1ADW was trying out a QRP rig intended for M1 operation in August, and that the SV's say that there is now no one left in Crete.

G3GZJ (London; S.E.23) collected ZP9AY on Fifteen; also KZ5RF and a UR on Forty—all new ones. Many new ones on Twenty included TF, HC1CM, CR4AH, CP1CJ, OH3AA/Ø, HI8BE, PZ1AP and HC7WK—among others.

G3IGW (Halifax) reports on Fifteen only, where he worked OA7I on CW, and heard 3W8AA (CW) and FS7RT, TG9WB, HH2DB, HI7LS, BV1US and VP5CM (phone).

G3HQX (Mitcham) improved his score with EL1R, KZ5, ZD2MFM, UF6AC, UN1AE and others on Twenty, and with VS6 and short-skippers on Fifteen. He has found Ten pretty dead (and haven't we all?).

Early-Bird Stuff

G3JCQ (Barrow-in-Furness) still operates Twenty phone "around sunrise" and has found things excellent just recently. Contacts include three XE's, TI2FFD, KZ5EA, ZP5CF and PJ2CE. Early evening work brought in I5FL, HZ1NA and a VQ4. G3JCQ uses a long wire, 275 feet, N.-S., and had excellent results last winter with the north end only eight feet high, including five QSO's with ZK1BS and reports of S9 *plus* 10 dB. He wonders where VU, VS, DU and KA have disappeared to these days and reminisces about his receiving results from that direction in 1938-9 with an 0-V-2

**FIVE BAND DX TABLE
(POST-WAR)**

Station	Points						Countries	Station	Points						Countries
		3.5 mc	7 mc	14 mc	21 mc	28 mc				3.5 mc	7 mc	14 mc	21 mc	28 mc	
DL7AA	808	109	166	224	165	144	236	G3JWZ	268	49	61	70	55	33	106
G3FXB	706	72	129	204	177	124	226	G3IGW	260	42	63	80	55	20	108
G5BZ	704	64	118	240	168	114	246	G3JLB	257	41	41	65	60	50	108
W8KIA	704	68	148	265	113	110	265	G3IUW	245	31	38	67	60	49	114
G3DO	594	24	46	225	147	152	243	G6TC	245	17	62	116	23	27	125
W6AM	502	30	58	271	86	57	271	G3JZK	221	15	46	47	77	36	115
G2YS	446	65	85	145	97	54	163	G2DHV	201	20	26	120	21	14	124
G3WL	436	38	75	138	112	73	171	G3HQX	198	9	37	62	44	46	94
G3ABG	423	45	83	161	71	63	178	G3DNR	176	10	21	75	35	35	89
GM2DBX (Phone)	411	34	31	158	97	91	172	G2BLA	167	18	39	50	49	11	80
G3BHW	392	15	32	145	109	91	180	G3JJG	154	34	40	58	20	2	75
JA1CR	348	19	49	174	70	36	176	GW3DNF	143	21	30	50	33	7	59
W6AM (Phone)	343	13	32	238	39	21	238	G3HEV	79	10	21	20	24	2	51
G6VC	333	33	44	136	65	55	145	G3IDG	78	11	14	14	13	26	39
G3INR	330	46	57	124	60	33	135	G3JSN	75	16	17	22	13	7	33
G3GZJ	281	18	54	86	81	42	124								

(Failure to report for three months entails removal from this Table. New claims can be made at any time).

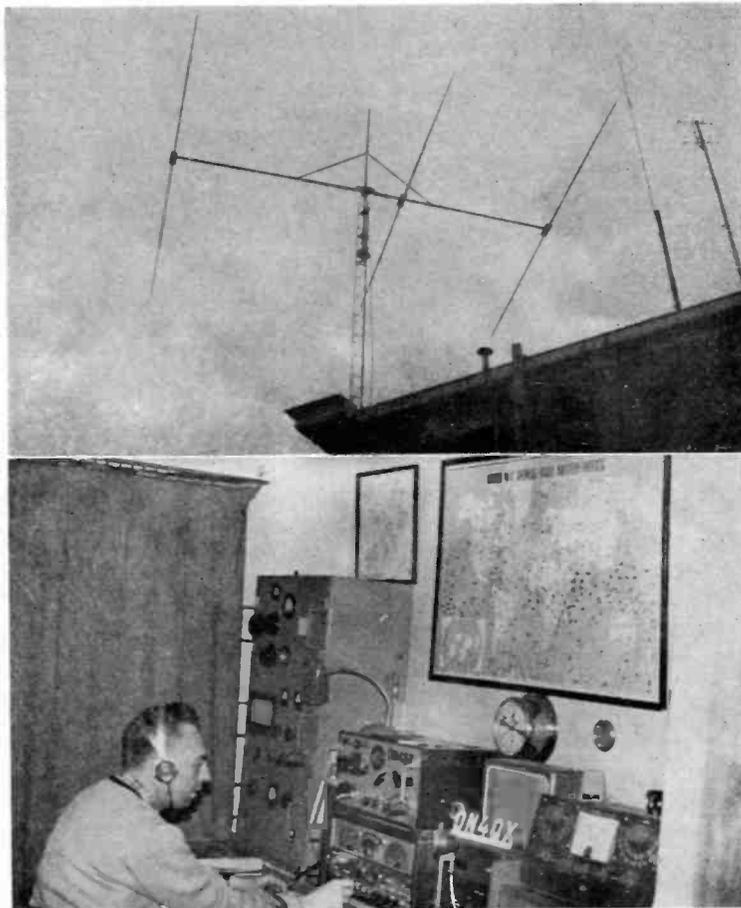
receiver.

G3FPK (London, E.10) has also been an Early Bird in his attempts to collect WAS; he finds the 0600-0700 period useful when chasing W6, 7 and Ø, since many of the East Coast stations have gone to bed by then. After a lengthy rebuild, G3FPK has been on regularly and has worked 97C in 33Z. He asks which Zone UAØKFG (Sakhalin Island) is in, rather hoping that it might be Zone 25; our information is that he is Zone 19. (See later paragraph on distribution of Far East Russians.)

On Twenty CW G3FPK has landed EL1R (0530), KX6NB (1640), HC7WK (0001), KZ5IF (0600) and 3W8AA (1730). He has found conditions pretty good to VK and ZL in the mornings... but his best DX of the year was on *Eighty*, when he worked PJ2ME.

G3FXB (Southwick) comments on the spectacular improvement on the bands in mid-July. On Twenty he raised FB8CD (Comoro Is.) and says also that VQ9HAY is active with a B.2 but not much hope of raising G's. ZK2AD was heard but not worked; and as for FW8AA... G3FXB was told that the best way of raising *him* is to send him a cable. He will then come up and work you and go QRT again! On Fifteen, G3FXB lists BV1US, CP1CF, ET3XY, HB1MX/HE, HC1RY, OA4H, PJ2MC, VP2GC, VP5AR, VR2AZ, VS9AI, ZK1BS and HI7LMQ (all phone, and as nice a bunch as we have seen this summer). CW fetched in KG4AN, KR6AK, UD6 and 3V8. Apparently MP4BBL and a couple of G's worked VR6TC on Fifteen phone (July 15) while G3FXB was looking for DX on Twenty; he also missed the ZA2ACB expedition, but understands that OK1MB is making one later.

G3BHW (Margate) is back on the air after having his beam damaged by a gale. He actually had some luck on Ten phone, raising ZD8SC, ZD9G, VP5CP and many others from a southerly direction—plus short-skip Europeans, of course. On Fifteen he found things much better and worked LX1DC,



The set-up at ON4QX (Antwerp), who runs a G4ZU beam for 10-15 metres and a ground-plane (on the mast to the right centre) on 20 metres. The receiver is an SX-100 and the transmitter has an 814 in the PA, taking 150 watts input. ON4QX is active on all bands, CW and phone (but mainly CW on 14 mc), has made over 7,000 contacts, and holds many operating awards, including our WNACA.

HB1MX/FL, HI7LMQ, TG7CB, 9BG and 9AD, CP1AK, EL1P and many others, all on phone. The Central and South Americans were all worked between 2200 and midnight GMT. Twenty CW brought in GC3AAE, PX1FC and TA1FA for all-time new ones.

G3KMA (London, N.W.11) was very active on Twenty CW, and was rewarded with KL7, KZ5's, VE6 and 7, W7, PZ1AP, YV5BX, ZP5AY, OA4GT, OH3AA/Ø, VK, ZL and Russians. He runs 60 watts to a long wire.

G6TC (Wolverhampton) has gone up to 150 watts for the first time in his twenty years on the air; he is looking forward to returning to his old love (Forty!) in the autumn and winter. Mean-

while he has raised UAØ, VE6, KL7, HK and CR7 on Twenty; and JA, KZ5, VS1 and 6, and 4S7 on Fifteen.

Top Band Topics

There have been so few changes in the Top Band Ladder this month that we are not reproducing it, but holding over until next issue. This also means there is not much 160-metre news from correspondents. G3KNH/M (Cannock) was pleased to work G3LIQ in Hull, from a QTH near Bewdley, Worcs. He would like to see more details of such "DX" from Top-Band Mobiles and to know how they are getting on; he would also like fixed stations to pause occasionally in their rag-

chews on Eighty and One-Sixty in case the mobileers are calling them. His own equipment is a ZC1 (7 watts) with a 14-ft. centre-loaded whip.

G3JHH (Hounslow) managed to sort out G5PP/P when he was in Wigtown, through a terrific noise level. GW3DNF (Chirk, Denbighshire) has got going on the band and his county score is 31 worked, 3 confirmed! He worked GC5BI/A (GW5BI on holiday), GD's, GI's and GM's and is getting quite to like the band!

G3ESY (Hereford) tells us that he will be operating on August 16 and 17 from the Black Mountains, at a place where the county boundaries of Hereford, Monmouth and Brecon meet . . . so he will give any one of those three counties, as requested! Look for him at the high end of the Top Band.

W A Z MARATHON, 1957

All Bands

Station	Zones	Countries
G3FKM	39	157
G3HLY	39	157
G3BHW	39	153
G3DO	39	152
G3FXB	39	147
G5BZ	39	145
G3BDQ	39	133
GM3EOJ	37	104
G3HCU	36	98
G3JKF	36	94
G2DC	35	102
G3GZJ	33	93
G5FA	33	85
G3FPK	33	82
G3LET	33	81
G3GGS	31	83
G6PJ	31	75
G2BLA	30	70
G3HQX	29	83
G3JWZ	28	76
GM3BCL	28	68
G3DNR	26	70
G3KMA	25	71
ZL3CP	22	34
GM2DBX	21	52

G3DXJ (Reading) will be on the air from Caithness and Sutherland on August 9/11, and from Peebles on August 13/14. This will be in collaboration with GM3COV, who will be able to work his own county for the first time! Frequency 1850-60 kc, 2200 BST onwards.

G2NJ (Peterborough) worked G5PP during his GM and GI trips, and received reports from Sweden (SM6) on two different nights.

Russian Zoning

This information has been published before, but G3ESY kindly supplies it in very compact form and we feel that it will be useful to Zone-chasers:

Zone 16: UA9S... 9KS... 9W... and 9KW...

Zone 17: UA9A and KA, 9C and KC, 9D and KD, 9F and KF, 9J and KJ, 9M and KM, 9Q and KQ.

Zone 18: UA9H and KH, 9O and KO, 9U and KU, 9Y and KY, UA0A and KA, 0KB, 0O and KO, 0P, 0S and KS, 0U and 0V.

Zone 19: UA0F and KF, 0KG, 0L, 0KK and 0KQ.

Zone 23: UA0KT.

SWL Column

J. W. Cave (Parkstone) has been a ten-metre enthusiast for years, and says that except during complete fade-outs he has found signals well above the normal for June and July — such as FF8, ZD3, ZS9, VS6 and so on. On July 14 he received all W districts except 6 and 7 between 1200 and 1400 GMT.

M. J. Prestidge (Birmingham) logged FB8CD (Comoro) on Twenty at 1720 and says he works both phone and CW—prefers phone. On Fifteen he heard "YA5B," said to be in Kabul but somewhat doubtful!

M. V. Bond (Ruddington) found things good from the Caribbean and South America, nice ones being HC1HT, HH2Z, PJ2AX, PJ2MC, HP1LV, HI3HH/9 and many LU, CE, OA and PY stations. ET3XY and ET2PA were S9 plus on July 15; VS1HC and ZD1EO were encountered on July 16. All the above were on Fifteen phone, and UJ8AG was logged on CW.

H. L. Spindler (Barkingside), also on Fifteen phone, mentions PJ2MC working SSB (2300),

HC1HT, VP5CM, HH2DB and VP6ZX (all late evening). Twenty was also good for DX at the same time of day, and July 8 was a particularly good night for Fifteen.

A. R. Dexter (Bedford) concentrated on Fifteen phone and collected BV1US, EL2D (1830), KR6BN (1900), VS1 and 2, ZD2FNX (1640) and HB1MX/FL (1315).

P. Day (Sheffield) was delighted with results on July 13, when, on Fifteen phone, he logged CR5SP, BV1US, VQ6ST, KA2KS and PX1FC (CW) between 1500 and 1900. At 1930 he heard VE3AHU/SU in the Gaza Strip, where he was running 400 watts to a rhombic! He also passes on the information that VR6TC is active on Fifteen phone, 0615 GMT most days (via MP4BBL, who worked him).

Miscellany

From a QSL from W6KG. (Alameda) we quote the following details because they are interesting and unusual. No fewer than 21 previous calls have been held by him, including such as FA8JD, KL7KG, JA2KG, J2USA, DL4's, W2, W4 and W7; 82 countries have been actually visited (including all 48 States and all 8 VE districts). The family (OM, XYL and YL) have, between them, worked 66,000 stations in 252 countries . . . about "half the active amateurs of the world." Finally, W6KG holds 26 awards, and belongs to 17 radio clubs. And the QSL also leaves space for details of the QSO! Our admiring 73 to Lloyd and his other two operators, Iris and Joy.

G3ESY tells us (concerning a recent paragraph) that ZC6UNJ was operating from Jerusalem as recently as April 1957. QSL via United Nations, Government House, Jerusalem; operator, Paul Altorf. (Recent information was that ZC6UNJ had packed up in 1950, but this other must be a new operator with the same call.)

Sheepskins

WASM II (Class B) is available to amateurs outside LA, OH, OZ and SM who submit proof of having worked all 25 counties of

Sweden since January 1, 1953—any band, CW or phone. QSL's and five IRC's to SM6ID.

WASM is simpler, the qualification being two contacts with each of the seven Swedish call areas, SM1-7 inclusive. QSL's and ten IRC's to SSA, Stockholm 4.

The W-CR7-A requires QSL's from fifteen licensed CR7 stations (25 if you live in Africa), since January 12, 1949. Cards and five IRC's to LREM, Box 812, Lourenzo Marques, Mozambique, Portuguese East Africa.

The "Beira Delegation Certificate" is for two contacts with amateurs in Beira during August 1957, the town's 50th anniversary. QSL's and two IRC's to CR7BN, Box 875, Beira. The Mayor of Beira will sign each certificate. (Thanks to G3AIM/ZS4MG for the CR7 details.)

Someone asked us the other day who originated the expression "Sheepskins" for Certificates and Awards. Apart from feeling fairly certain that the country of origin is the U.S.A., we are stumped. But we have a clue as to the inner significance of the term—we always believe in inventing a bit of inner significance where none was intended.

Sheepskins are made available to the wolves, who have for countless years been lamenting the absence of sheep's clothing in which to hide themselves.

The PRA

This is, perhaps (not!), the best point at which to mention that we shall shortly be offering a new SHORT WAVE MAGAZINE parchment, which we hope will be of interest to all serious seekers of the elusive. It is the "Polar Regions Award"—almost self-explanatory, but there are rules and conditions, which will duly be unfolded in our next. In the meantime, get out your atlas and study the lie of the land north of the Arctic Circle and south of the parallel of latitude that takes in the Falkland Islands.

Long Wires

How long is a long wire? We regret to note that this perfectly proper technical expression, once reserved for the description of



Neat layout at GW3ITD, Llanbyther, Carmarthen, who was first licensed in 1952. The transmitter assembly at left consists of an EF91 Clapp VFO into EF91's as buffers, exciting four 5763's as wide-band amplifiers, into a pair of 807's in parallel; the modulator arrangement is EF91-6J5-6N7 into push-pull 5B/254M's, and is contained with the RF section of the transmitter. Receivers are R.107, BC-312 and an R.1224A for portable work. His aerial is 132 ft., pi-coupled.

aerials carrying quite a number of half-waves along their tops, now seems to mean nothing whatever. During a few excursions to the world of Forty phone we heard no fewer than five stations asserting that their radiating equipment is a "long wire, 67 feet long"; so apparently a dipole is now described as a long wire!

The happy owner of 136 feet of conductor can doubtless describe it as a long-wire to his friends on 28, 21 or even 14 mc, but it would be stretching a point to term it such on 7 mc and absolute nonsense on 3.5. Come to think about it, we are certain we have heard talk of "long wires" of 100 feet or so—on *Top Band*!

Let's try and get some sense into the nomenclature and reserve this term for aerials that really are long wires in relation to the band in use—say, at least four half-waves in length. For the

shorter ones we should talk about dipoles, full waves and "three half-waves."

News from Overseas

ZD1EO (Freetown) writes to say that he is active with 40 watts, mostly on Ten and Twenty, and mainly phone. On occasional visits to Fifteen he uses CW only. In the first three weeks on the air he raised about sixty stations in 16 countries, and promises QSL's all round, as soon as the cards arrive. QSL to him c/o SLEME, Army Post Office, Freetown. ZD1FG is ex-ZL2FG, and very active on all bands, usually on phone. ZD1PW, a Club station at the Prince of Wales' School, will also be active very shortly. ZD1EO reports that G's are best on Ten in the mornings, and on Twenty in the late evening; these are different times from the W's, who are almost the

reverse, so the main QRM comes from ZS's, who arrive practically all the time.

G3ICH (home QTH Leighton Buzzard) writes from Habbaniya in YI-land, where he is unfortunately in hospital at present. He tells us that, despite the end of the "state of emergency" in Iraq, YI2AM shows no signs of being allowed on the air again. There are about seven or eight exiled amateurs out there, but all YI activity since the Middle East troubles has been unlicensed. G3ICH (who is also ex-DL2SU) hopes to be back on the air somewhere, somehow, as soon as possible. Meanwhile we reciprocate his kind wishes to the "Commentary" and hope he will soon be well and active again.

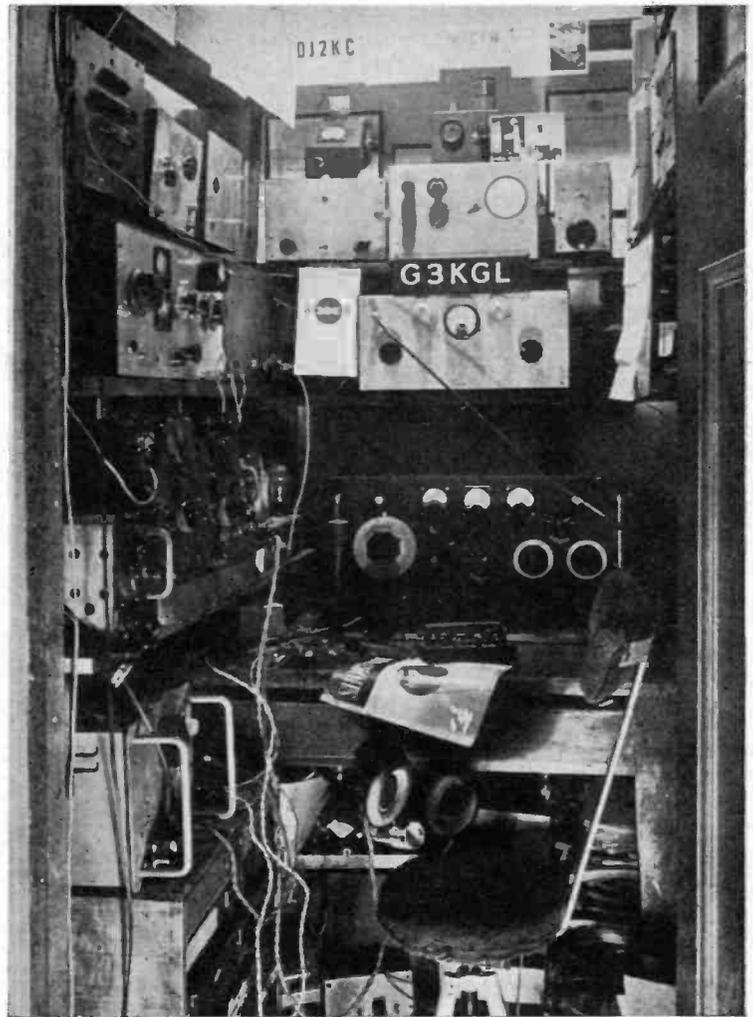
ON4QX (Antwerp) tells us that his planned expedition to San Marino or Luxembourg will not take place this year . . . too QRL. He was puzzled last year by working more than 20 G's from Luxembourg, but very few asked for his QSL. Does this mean, he asks, that all G's have worked LX?

DX Strays

First of all, here is a red-hot one, or the promise thereof: VQ8AG (Mauritius) tells us that R. A. Davis, ex-G3EAO, ST2RD and ZC4RD, has just received VQ8AS as his fourth call-sign. The point is that he will not operate from Mauritius, but from Rodrigues Island, which is situated 350 miles east of Mauritius, of which it is a dependency. The QTH is 18° S., 62° 5' E. No amateur station has ever operated from Rodrigues before, and it seems likely that it will achieve country status.

VQ8AS, who works for Cable and Wireless, Ltd., will be there for about three years—so don't all speak at once . . . The snag is that his only supply will be 100 volts DC, and all gear must be obtained from Mauritius or the U.K.

The genuine ZK2AB was on from Niue last January, and worked only about fifteen stations, mostly W6's. All those who have worked "ZK2AB" since then have been taken in by a phoney.



The station of G3KGL, Bournemouth, is entirely contained in a cupboard 2½ ft. wide by 5 ft. deep and 6½ ft. high, known as the "Coal Hole." Nevertheless, there is room for a good deal of equipment, covering all bands 1.8 to 28 mc; the receiver is a BC-342 with a converter for 21/28 mc, and the transmitter runs 40 watts, with a 120-ft. end fed aerial. The XYL's only complaint is that she cannot quite shut G3KGL right into the cupboard!

. . . Likewise ZM7AC, strongly suspected of being the same character owing to his operating characteristics and apparent direction.

ZA2ACB, operated by DM2ACB, is said to be OK, and probably the first genuine Albanian in history! HB9MQ, who was in on the PX1FC deal, promises to operate from Leichtenstein some time this summer (signing HB9MQ/FL).

CEØAC and ØAD are shortly departing from Easter Island for

good, leaving no amateur population thereon . . . VR3G has probably left Christmas Island by now and will be G3KDE once more. . . . W7FNK/KP6 is putting Palmyra on the air once again, and very welcome, too; Twenty CW seems to be the medium . . . Look for VS4BA on 14086 kc with 100 watts and a dipole, but a better aerial expected soon.

VK2NF is ex-GM3HXT, and has met ex-GM3GUS out there, who hopes to be VK5DS. . . .

Bogus DX

The DX bands would make a wonderful study for a psychiatrist (if one could find a psychiatrist who really understood what Amateur Radio was all about). Just as many people who are cool and placid in their homes, kind to children and dogs, and altogether models of gentle living become ravening wolves when placed at the wheel of a motor-car, so there are many who are completely transformed when the door of the shack shuts behind them.

We all know about bad manners on the air, and the tactics adopted by the clever boys to raise the rare DX at the expense of anyone else who may be around. But the manifestation that bothers us now is different—it is the desire to be recognised as rare DX. To explain . . . it only needs a rarish station like PX1FC to appear on the air for one or two obviously bogus "PX1FC's" to materialise on the same band.

We have noticed this over and over again. By the time one has identified a rare one and noted his tactics, he becomes part of the scenery for as long as he stays on the band. Not so the badly-operated chirper, without a clue about procedure, who adopts the same call-sign and shovels out a

barely-recognisable "CQ DX".

The only reason for this must be the desire to hear lots of stations replying to a CQ call . . . and this ties up with the fact that the types indulging in this practice *do* normally call CQ for hours and hours without getting replies. They must feel very frustrated when they adopt a rare but bogus call and *still* don't pull anything in; we heard the phoney PX1FC putting out CQ after CQ without a single reply. Maybe the reason was that the real one was peeling them off only a few kilocycles away!

Other obvious phonies recently operating include AC4A, ZK2AB, ZD9AF and 9AG, ZM7AC, and strange fruit like ZZ2XY; other pirates use common- or -garden call-signs which attract no attention (such as G's and W's) and manage to stay around for quite a long time . . . but the axe descends eventually.

The QSL Business

Frequently, correspondents mention in the course of their letters that they can't get a QSL out of this or that station, and how is it done? Others say that they are so fed up with the poor response ratio that they no longer originate any cards, but answer all those

coming in.

This is a natural phenomenon caused by the greatly increased activity on all bands and the impossibility of QSL'ing all stations. G6PJ says he has worked 74 countries this year, but only 10 are verified; but he adds that he no longer sends cards until the others arrive. If everyone he works adopts this principle, of course, there will be no traffic in either direction! He formerly spent "a small fortune" in direct QSL's to rare ones, without much in the way of results.

Surely the sensible thing to do, in these busy periods, is to originate QSL's to those stations *whose card you really need*; to answer all others coming in; and to make use of the Bureau to save the "small fortune" that you would otherwise dissipate on direct mail.

And so we round off another month's activity. Deadline for the next issue is **first post on Friday, August 16** (and for the following one *September 13*). Address everything to "DX Commentary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1, and don't be late—or your news will be delayed by one month. 73, BCNU, and Good Hunting till we meet again.

NATIONAL RADIO EXHIBITION

This year's Radio Show at Earl's Court, August 28 to September 7, will mark the 21st anniversary of the start of the world's first regular high-definition TV service. More than 100 manufacturers will be exhibiting, and among the Service and Government authorities with large stands will be the Royal Air Force and the Post Office. The Show, under the patronage of Her Majesty, will be opened by that remarkable man Lord Brabazon, who is himself a pioneer in the radio field, as in many other developments of this 20th century.

ECHO FROM STONEY CROSS

In our account of the Mobile Rally at Stoney Cross in the July issue, it was remarked that after the gathering broke up at 6.0 p.m., many of the mobiles headed for Bournemouth. It seems that at this point G3IUG (Poole) came on the air, and thereafter did a masterly job of traffic control and direction, since most of the visitors were strangers to the neighbourhood. He talked them into car parks, told them where they could get tea and — a most complicated manoeuvre, this — directed several cars from Bournemouth Pier to Shell Bay and the Studland-Swanage road; this entails crossing the entrance to Poole Harbour by the old steam-driven chain ferry.

It was on this crossing that G3IUG was working his contacts as Mobile/MM — well, perhaps not quite /MM, because this ferry is permanently connected by chains to the jetty at each end of its travel; no "free navigation" is involved! G3IUG kept in contact with some of the mobiles through Corfe Castle all the way to Swanage, warning them of every bend and bump in the road; he also directed cars away from Bournemouth on to the A31 for Winchester and London. It is reported that this contribution by G3IUG made a most interesting and enjoyable finish to the Rally; at one time he had no less than seven mobiles on his hook, all dependent on him for directions, which they got without mistake or confusion.

NEW R.I.C. SECRETARY

It is announced that Mr. G. B. Campbell has been appointed the new Secretary of the Radio Industry Council, in succession to Mr. R. P. Browne, on retirement. This is an important appointment, because the R.I.C. is the co-ordinating authority for four trade associations within the industry — those representing domestic receiver manufacturers, the valve and CRT firms, the component manufacturing section, and the makers of communications equipment, radio and radar navigation aids and industrial electronic apparatus.

SSB Topics •

TECHNICALIA, ACTIVITY & OPERATING RESULTS

Conducted by R. L. GLAISHER, G6LX

EARLY in 1950, the writer was asked to prepare a series of articles dealing with station design and planning. It was intended that they would review post-war trends and operating practice. The first drafts were completed and agreed by the publisher, "subject to a few minor corrections." Those corrections were never made and the articles wound up in the waste paper basket, for at that time G6LX discovered single-sideband. Within a few hours of making the first two-way SSB contact using a barefoot exciter, it was pretty obvious that all the time spent in correlating information about CW and AM stations had been wasted, for here was a communications method that not only out-performed much high powered AM stations, but required so very much less equipment to achieve the object. Furthermore, the operating techniques used by the sideband fraternity were a revelation to a poor innocent who thought that single control send-receive switching was the ultimate in operating convenience.

The articles should, of course, have been re-written to include the newly obtained SSB know-how, but by then the author had lost all interest in the project—he was far too busy building more SSB gear!

The G2MA Linear Amplifier

It seems that we really started something by publishing the description of the G2MA "drive controlled" Class-B tetrode amplifier (June "SSB Topics"). The letters have been rolling in, and both G2MA and your scribe have been hard pushed to sort out the many and varied queries.

First, to ease the minds of a number of readers who did not understand the purpose of the RF choke connected across the output socket of the pi-tank anode circuit—see p.203, June. Typical queries in this category include "Is it really necessary?" "It must short the output," "What does it do?" "Surely a drawing error," "Does it reduce harmonics?" and so forth.

Well, it is always good safety practice to introduce this choke, even if only to ensure that there is no chance of high voltage being applied to the aerial feeder, either by accidental contact or through component breakdown. The anode blocking condenser (C7 in the G2MA circuit) can be

a real hazard in the pi-tank circuit, for no matter how good it may be or how much it is under-run, it is subjected to high electrical stresses. The inclusion of RFC5 provides a DC path, which in the event of a breakdown of C7, will short the HT to earth and blow the HT fuse. (Assuming a fuse is included, as it should be, in the feed circuit or in the power supply.) It is true that in many cases the pi-output is connected to an aerial tuner via a link which would provide the necessary DC path, but it is still common sense to include the choke. A few shillings plus two soldered joints might save a lot of trouble.

The second major query concerns the diodes D1 and D2 and a number of readers have asked for this component to be specified by make and type number. G2MA advises that *any* of the normal TV and general-purpose types are suitable, and the only point to watch is the peak voltage rating. This factor dictated the use of two diodes in series in the original circuit. If preferred, a valve diode can be used in place of the crystals, but it may be necessary to put in heater chokes for correct operation. If diode trouble is suspected the rectified RF bias voltage can be checked by means of a valve voltmeter.

Many readers have complained that the amplifier is difficult to drive to the point where sufficient clamp valve bias is developed to provide the correct screen



A big man in the SSB world is W9AC, of Chicago, Ill., who is president of Hallicrafters, the famous American firm of amateur-band equipment manufacturers, who have been in the business for more than 20 years. Naturally, he does not have much trouble (or choice!) about his gear, and at present is running one of the new Hallicrafters SX-101 receivers, with his firm's HT32-HT33 sideband exciter-linear PA, rated at just the one kilowatt.

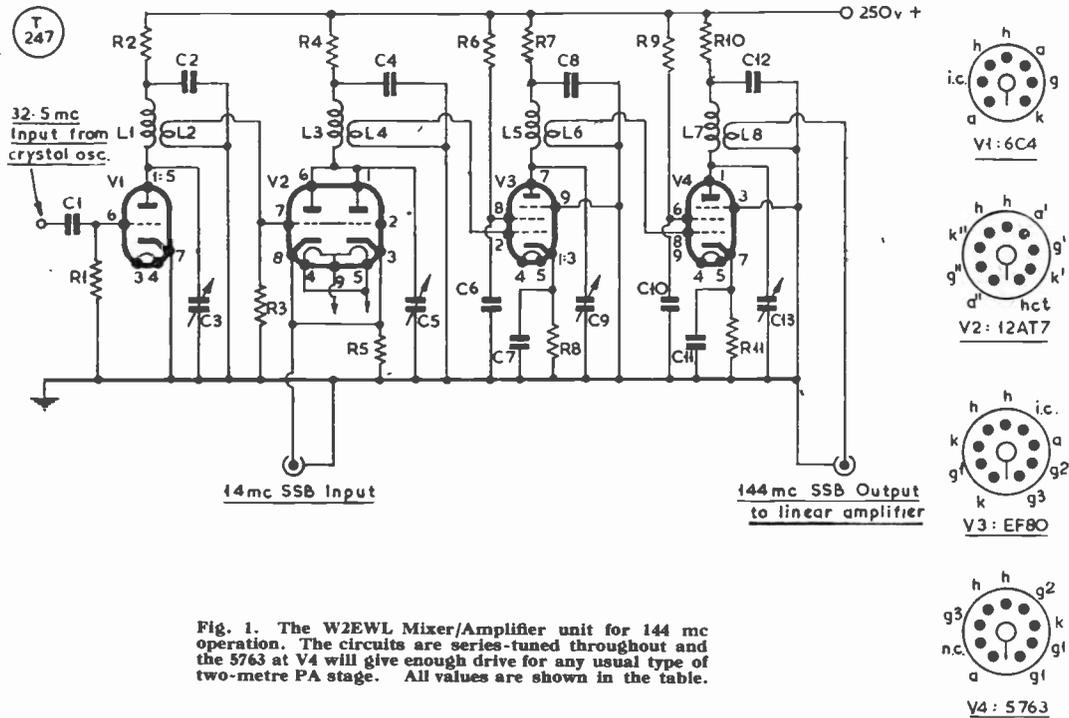


Fig. 1. The W2EWL Mixer/Amplifier unit for 144 mc operation. The circuits are series-tuned throughout and the 5763 at V4 will give enough drive for any usual type of two-metre PA stage. All values are shown in the table.

voltage for the amplifier valve. G2MA finds that 25-30 volts bias is satisfactory, and this will provide a screen voltage of 350v. under drive conditions. The no-signal standing screen voltage is 40 and the peak grid current is 8-10 mA indicated. G3MY is also using an 813 final connected as for the G2MA circuit and he finds 1½-2 watts of drive sufficient for full output. He points out that as the amplifier is operated in Class-B zero-bias, careful impedance matching is required between the drive source and the amplifier grid. Careful checks at G6LX indicate that the required drive is more than that required for Class-A or AB1 operation, but quite a lot less than for Class-AB2.

144 mc Single-Sideband

As evidenced by previous notes in "SSB Topics," two-metre SSB has a small but enthusiastic following in the U.S.A. With the usual summer improvement in VHF conditions providing opportunities for inter-European working, several of our Continental readers have asked for information as to current SSB VHF activity in the U.K. Although several stations were interested and some test transmissions were made towards the end of 1956, it is believed that G3ILI is now about the only British station regularly active on SSB in the two-metre band.

W2EWL, who was responsible for the Command Set conversion called "Cheap and Easy Sideband" has recently built a mixer-amplifier unit which allows him to use his 14 mc SSB exciter as the sideband generator for two metres. His circuit (Fig. 1) was

Table of Values

Fig. 1. The W2EWL Mixer-Amplifier for 144 mc SSB

C1	= 100 μμF	R1, R3	= 100,000 ohms
C2, C4, C6, C7, C8, C10, C11, C12	= 500 μμF	R2, R4, R5, R7, R10	= 1,000 ohms
L1, C3	= To tune 130 mc	R6	= 22,000 ohms
L3, C5, L5, C9, L7, C13	= To tune 144 mc	R8	= 75 ohms
L2, L4, L6, L8	= 2t. links on cold ends	R9	= 10,000 ohms
		R11	= 470 ohms
		V1	= 6C4
		V2	= Strapped 12AT7
		V3	= EF80
		V4	= 5763

(Note: All resistors ½-watt.)

first described in *QST* for May, 1957, in an article reviewing SSB ideas for the VHF man. During a discussion with W2EWL at the SSB Dinner in New York he recommended the use of a high-Q tuned filter between the driver unit and amplifier to avoid possible trouble from spurious mixer products.

Query Department

A man from Manchester asks if there is any published information on the transformerless balanced modulator which was mentioned in "SSB Topics" some months ago.

The circuit was first included in an advertisement of the Airborne Instrument Laboratories which appeared in the SSB issue of the *I.R.E. Proceedings* for December, 1956. A short description of the circuit was also included in *QST* for February, 1957. Developed by W2CSY, it is very similar to the triode product detector described recently in "SSB

Topics." The circuit is shown in Fig. 2.

Several readers have asked for circuit details of DSSC transmitter adaptors suitable for mobile application. Although we have not got any original circuit information on hand, another Command Set conversion, this time described in *CQ* for May, 1957, shows a very simple method of generating a DSB signal. Figs. 3 and 4 give the circuit modifications that are required to the 1625 PA stage to convert it for balanced modulator operation.

Next a reader in Cambridge asks for an explanation of the term P.E.P. that is coming into common use by sidebanders in the States.

P.E.P. is the now accepted abbreviation for the "peak envelope power" rating of SSB transmitter output. The usual definition of P.E.P. is the RMS power during the maximum RF cycle developed in the transmitter. When making two-tone tests, this occurs during the coincidence of the peaks of the two test tones.

News and Views

Activity reports for this period refer more to holidays and hot weather, rather than activity. Some people, however, keep at it all the time, otherwise there would be little to report in this section.

G3KTU (Esher) is back at his /A location in Mill Hill and is very active on 80 metres most weekends. He is very interested in ultra-miniature equipment and is planning a new sideband exciter using transistors. His initial ideas about suitable circuits were centred around the Jennings exciter with a half-lattice crystal section in place of the mechanical filter. If anyone has any better ideas he would like to hear about them.

G3AUB (Stockport) was heard operating I1LOV on 14 mc during a holiday visit in June. Also from Italy, I1BAO is back in Milan and has a new three-band beam mounted on top of his penthouse QTH.

It seems only yesterday that ZD4BF returned to Ghana after his last spell of leave in the U.K. He is, however, homeward bound again and expects to arrive in London early in August. Most of his leave will be spent in the Channel Isles and although sideband operation is not planned during this visit he expects to be able to sort out the aerial situation with an eye to the future.

Another exile in far-distant places is AP2BP, who recently returned to Pakistan after six months' leave in the U.K. He is active on 20 and 15 metres and hopes that his old G sideband friends have not forgotten where to head their beams.

G3GKG and G3CWB are both testing the G2MA circuit. SV0WZ has returned to Greece and has collected a new exciter during his visit to the States. He also is building a G2MA linear amplifier.

DJ1VD and DJ2XC are using DSSC on 3.8 mc with good results. Another double-sider is W2PUI, who recently converted from SSB! In the other direction is W2DGO, who started on DSSB and is now SSB. He says the change was well worth while. SM4BPM is also new on DSSB.

G3AOO sends along the news that he has been very busy recently and has not been able to spend much time on the air. With his brother (G2FOS)

he has developed a small crystal filter exciter which he expects to manufacture for sale in the amateur market. G3GKG has not been very active, but sends in amended scores for the Table.

A recent visitor to London was W2LNT, who was en route for Paris and DL4 land. W2JVO is also due and W2KG expects to be over in Europe later this month.

DX Notes

Expeditions are in the news again, for in addition to the OHØ visit reported in the last "Topics," several others are expected. A weekend trip to the Channel Isles during September is planned by several active G sidebanders. Operation on 14, 21 and 28 mc SSB is their objective, so as to give DX stations the chance of a new country.

SM5KV, who has been active from Spitzbergen during the winter months, has recently taken an interest in SSB. He is due to return to the Arctic later this year, and hopes to be able to work sideband in addition to his more usual A1 activity. A visit to Luxembourg has been arranged by ON4CC for August 15 to 18. Sideband operation will be on 20 and 80 metres.

It seems we all missed a good one recently. During a series of flight tests of a new airborne SSB equipment, K2AAA made a stop at Ascension Island (ZD8). Although prior notification had been given to the authorities, the required licence for fixed operation was not granted. Bad luck, OM! On the way to

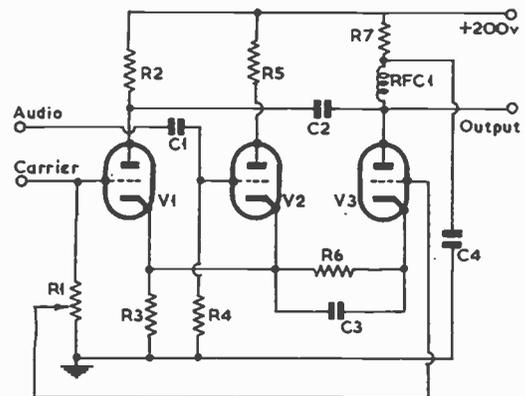


Fig. 2. A very interesting transformer-less balanced modulator circuit, suggested by W2CSY. C2 must be a very small capacity.

Table of Values

Fig. 2. Transformerless Balanced Modulator.

C1 = 0.01 μ F	R2, R5,
C2 = Less than 1 μ F	R7 = 470 ohms
(adjacent wire	R3 = 1,000 ohms
coupling)	R4 = 1 megohm
C3, C4 = By-pass at carrier	R6 = 2,700 ohms
frequency	V1, V2,
RFC1 = 2.5 mH RF choke	V3 = Any triodes simi-
R1 = 10,000-ohm	lar 6C4, 6J5,
potentiometer	12AU7, 6SN7

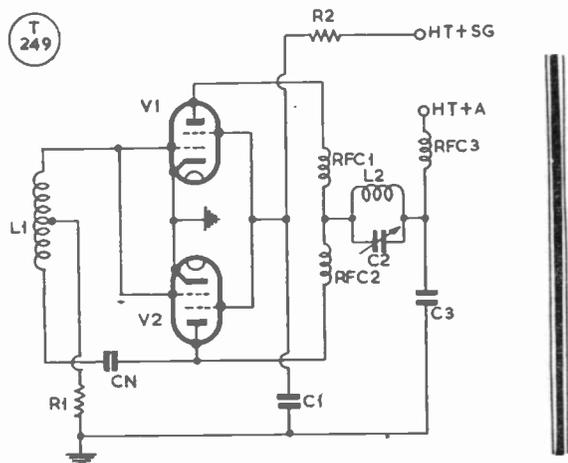


Fig 3: Command Set (PA only) BEFORE MODIFICATION

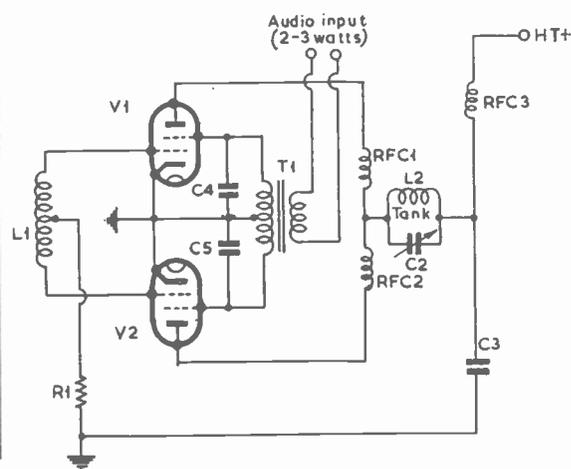


Fig 4: Command Set (PA only) AFTER MODIFICATION

Figs. 3 and 4. Modification of the PA stage in the Command transmitter for Balanced Modulator operation. This circuit could, of course, be applied to other types of BM where the requirement is for audio drive on the screens of a pair of tetrodes — say, 6BW6 for QRP and 807 for greater power inputs.

Ascension a sideband transmitter was left on the Windward Islands for VP2LU to operate. Although only active for a few days, many people collected this new one.

DU7SV has finally got going on 20 metres and has been putting a very fine SSB signal into Europe during the early evenings. Another newcomer reported active is CR9AH.

G3MY, sending in his score for the ladder, passes the word that W6ITH is back in St. Martin and will be on again from PJ2MC and FS7RT. HR2WC has returned to Honduras after his visit to W6 and has a new miniature final using water-cooled valves! He reports activity from KZ5AW, KZ5WZ and VP5MU, all of whom are looking for European contacts on SSB.

VQ4EO complains that conditions have been poor for G contacts, but sideband has been getting through. He expects to return to England on leave later this year, but VQ4EU and VQ4BP will remain active. VQ4EO has heard YI2RP and ET3RF working into the States on 20-metre SSB. (Our information is that the status of all YI stations is doubtful.)

These last two stations are also reported by OH2OJ, but again no QSO. OH2OJ mentions that his XYL is licensed as OH2QJ and will be on SSB herself during the OHØ expedition.

Other newcomers this month include ON4DM, who is on 15 and 20 metres, TI2HP and TI2AA on 14 mc, and OQ5GU, who appeared just as the disturbed conditions due to the solar flares made things difficult early in July.

Information for these notes was provided by:

It is much regretted that the SSB "Countries-Worked Ladder" has again had to be omitted due to pressure on space. Our apologies to the 30 operators climbing the Ladder.

Table of Values

Figs. 3 and 4. Command Set Modification for BM Operation.

C1, C2,	As fitted	C4, C5 = 500 μF, 600v.
C3, Cn	As fitted	working
L1, L2	Existing items	
R1, R2	As fitted	
RFC1,	As fitted	
RFC2,	As fitted	
RFC3 =	Existing items	
		T1 = Driver xformer, Class-B type, (6V6/6L6 to P/P grids)

G3GKG, G3MY, HR2WC, OH2OJ, ON4CC, SM5AQW, VQ4EO, W2KR, W4NQN, ZD4BF and SWL's Amie and Leslie. Many thanks to them all, and we look forward to a lot more for the next (October) issue.

Dead-line Date

This will be August 30, with your news, views, claims, comments and suggestions addressed "SSB Topics," c/o The Editor, *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. 73 de G6LX.

MAGAZINE DISTRIBUTION

We publish on the Friday after the first Wednesday every month, and on the morning of that Friday all direct subscribers in the U.K. should receive their copies by post. In some centres, bookstall readers may also be able to obtain their copies the same day—but in any event, U.K. distribution to newsagents should be completed by the Saturday in most parts of the country. As all bulk deliveries are made the day before publication, readers would help us by asking their newsagents to take up any instances of late delivery.

Are Your Power Circuits Safe ?

SINCE the Big Night on June 19 last—when conditions were probably better than they have ever been before on the VHF bands—two metres has relapsed into its more usual summer condition: Rather languid, with propagation occasionally good for GDX and the nearer EU's, and not much activity unless there happens to be an opening or a contest on.

One evening was, however, of particular interest, though apparently very few people noticed it. Commencing at about 2200 clock time, there was a good Aurora opening on Sunday, June 30, with GM easily workable from the south of England. It was a great pity that there were hardly any stations on the two-metre band at the time, for it is certain that a great many new QSO's could have been made. Bob of G5MA was there all right, and had two good contacts north of the Border, with GM3EGW (Dunfermline) and GM3KYI (Dundee); notes were strong T5, and all the usual Aurora manifestations were in evidence.

During this period of solar eruptions and disturbances, it is always worth keeping a look-out for Aurora conditions, which will not usually develop until fairly late in the evening. The symptoms are clear enough—notes go fuzzy and "thick," phone becomes more or less unreadable, and all signals are strongest (from whatever direction they may originate) when beams are headed somewhere between north and north-west. The IGY warnings now being given by the BBC at about 11.05 p.m., after the late-night news summary on the Home Service, are very useful in this respect.

The contest during the week-end July 6/7 was, as usual, an interesting event, but (again as usual!) failed to coincide with even fair conditions for GDX. There were a good number of portables out, and some mobiles, but scoring was not at a particularly high rate and there was no solid path between the northern counties and the south of England. On the Sunday, fading was bad on signals at around the 100-mile mark—this sort of distance now being con-

VHF BANDS

A. J. DEVON

Torpid Conditions until July 30—
KH6UK/W6NLZ Establish
World's New Two-Metre Record—
Interesting Portable Excursions—
U.K. Notes and News—
Activity Report, The Tables
and VHFCC Elections—

sidered as within the effective area of most portable stations.

New World Records

It is reported that after about nine months of regular schedule keeping on two metres, W6NLZ (nr. Los Angeles) and KH6UK on the Island of Oahu in the Pacific succeeded in making CW contact, and holding it for over an hour, from 1230 GMT on July 8, the distance being about 2,600 miles. Signals were fairly steady over noise, and the theory is that the propagation mode was tropospheric; at any rate, it is an ocean path. The latitude of Los Angeles is about the same as Gibraltar, and Oahu is in the Hawaiians, west by south of California.

This outstanding QSO was achieved not only after long and patient effort, but by the use of elaborate equipment at both ends. Each station runs a kilowatt, with a large aerial installation. Their new record will be very hard to beat, the main difficulty being a geographical one. The distance is about the same as from London to Baghdad, or the Cape Verde Is.; to extend it from this country, we would need a station somewhere

on the west coast of Africa south of Bathurst, or in Kenya. Well, there are active two-metre stations in VQ4. . . .

Last month in this space, the outstanding 70-cm QSO between G3HAZ and DL3YBA was recorded, and mentioned as being a possible new (world) record; this is indeed the case, the distance being just about 20 miles further for G3HAZ than it is for G5YV—Harold had also worked DL3YBA, about an hour before G3HAZ got him. Our congratulations to all concerned!

Talking of distances, it will be noticed in the Activity Report that SM6ANR (Gothenburg) shows a list of U.K. stations worked and heard on two metres during the June opening; for those interested in the QRB's involved in these fine contacts, the distance Manchester-Gothenburg is near enough 630 miles.

Journeys Portable

The G3JQN/G3KEQ expedition duly came off as planned, and has given much satisfaction to many people. On safari through uninhabited Wales, GW3KEQ/P came up from the rare counties of Breck., Carm., Pems., Cards. and Merioneth, and many beams were headed in their direction during this pilgrimage. These boys put up a very good show, and many correspondents this month mention G3JQN/G3KEQ with gratitude.

Some other interesting /P trips are in prospect for the immediate future. During August 17-30, GM6WL will (he hopes) be giving Wigtownshire from the Mull of Galloway, on both two metres and 70 centimetres; he is even thinking of taking some 4-metre gear if room can be found for it. Then, from September 1st to 14th, GM3BOC/A will be at Brora in Sutherland, on every evening at 1900-2230 clock time. And if you heard or worked G3DKF/P during the week to August 9, he was in Cornwall, as mentioned last month.

Over the next ten days or so (until August 21), Harold will be signing G5YV/P from Rutland, Hunts., Oxon. and Hereford, using frequencies 144.24 to 144.86 mc.

The General Report

Naturally, most of the correspondence this month has been concerned with the June opening; much of the story is told in the Activity Report, and there have been many claims for the Tables. These, we hope, are right up-to-date as presented here. Incidentally, Annual Counties comes to the end of its allotted span on August 31—how time flies! As usual, we would like your last claims for this Table with the September report, so that the final placings and the analysis can be shown in the October issue. (It seems only a few weeks ago that we were making the same note for last year's Annual Counties.)

Looking at this month's Activity Report, notice the worked-list put in by G5YV—in a week's operating, 73 EU's in six Continental countries. And Harold has done it all before! There are no "firsts" in this lot, though no doubt many of the stations shown were worked for the first time. Incidentally, the new-boy LA mentioned last month was LA9OD; his very first QSO with anybody on two metres was G5YV! He was only running 5 watts of CW, too. LA9OD told Harold he was also hearing about nine other G's, but only succeeded in raising G6XM after he had worked G5YV. For All-Time Counties, Harold can now show 76C, with a grand total of no less than 787 different stations worked on two metres. And for the information of those who have asked, one reason why G5YV is so far out in the All-Time table is because, being well placed for them and radiating a particularly potent signal, he has worked a number of GI and GM counties not yet claimed by other GDX operators who are also well up the Table, but who cannot get into GM so easily.

SM6ANR asks us to assure U.K. VHF operators that the Gothenburg stations are *always* there and looking for DX whenever there is the smell of an opening. Rolf says it would appear that not enough G's look north-east on these occasions, so opportunities are lost. He also remarks: "It is extremely heart-breaking to hear

TWO-METRE ACTIVITY REPORT

(Lists of stations heard and worked are requested for this section, set out in the form shown below, with call signs in strict alphabetical and numerical order).

G3KQF, Derby.

WORKED: DJ1XX, DL1LB, 3FO/P, 3VJ, 3YBA, G2CDB, 2CRL, 2CVD, 2FJR, 2FMO, 2FNW, 2HCJ/P, 2HII/P, 2HQ/P, 2XV/P, 3DLU, 3EGE, 3EHK, 3EHO/P, 3EJO, 3EKX, 3ENY/P, 3FUJ, 3GFD, 3GGR/P, 3GHO, 3GSO, 3GUD, 3HAZ, 3IUK, 3IVF, 3JGY/P, 3JWQ, 3JXN, 3JZG/P, 3KAG, 3KEF, 3KUH, 3LAY, 3LHA, 3LHW, 3LKA, 4MK, 5BD, 6XM, 6XM/A, 8SB/P, GW2ANT/P, ON4OZ, OZ2KH, PA0BLP, 0HA, 0NO, 0WI. (June 12 to July 15).

G3WW, Wimbington, Cambs.

WORKED: G2ANT/P (Norfolk), 2ATK, 2CIW, 2CZS, 2FNW/P, 2HCG, 2HCJ/P (Hereford), 2HOP, 2HQ/P, 2JF, 2XV 2XV/P (Derbys.), 3ALC, 3BGW, 3CGQ, 3DLU, 3FAN, 3FCQ, 3FEX, 3FJR, 3FUR, 3GGJ, 3GSO, 3IAM, 3IIT, 3IRA, 3KEQ, 3KHA, 3KQC, 3LCK/P (Beds.), 3LEK, 3LHA, 3PV, 3XC, 5BD, 5BQ, 5DW, 5JO, 5YV, 6XM/A, GW2ANT/P (Denbs.), 3GWA/P (Denbs.), ON4ZK.

HEARD: G2MV, 3BA, 3GHI, 3GHO, 3HBW, 3ICK, 3IJB, 3JZW, 4DC, 4MK, 5MA, 6LL, 6NB, 6RH, 6YU, 8SK, 8VZ, G13GXP/P. (June 27 to July 9).

SM6ANR, Gothenburg.

WORKED: G2HOP, 3ARX, 3GHO, 5BD, 5YV, 6LL, 6XM, GM3FGJ, 6XW.

HEARD: G3DLU, 8MW. (June 18-20).

G5YV, Morley, Leeds.

WORKED: DJ1EY, 1KV, 1XX, 2DS, 2NW, 2OR, 3CA, 3HV, DL1KM, 1RX, 1YY, 1ZQ, 3AY/P, 3IY, 3YBA, 6FX, 6SV, 9ARA, 9OA, 9QV, 0CX, 0HH, LA9OD, ON4BZ, 4DE, 4DW, 4HN, 4LN, 4ZH, 4ZK, OZ2IZ, 2KH, 3A, 3M, 3NH, 3XX, 6PB, 7BB, 9AC, 9BS, 9EA, PA0FN, 0BL, 0BN, 0BU, 0BZH, 0CGA, 0DEF, 0DSW, 0DT, 0FA, 0FB, 0FC, 0FP, 0GER, 0HA, 0HRX, 0JMS, 0KT, 0LAM, 0LDG, 0MAI, 0MF, 0NO, 0PFW, 0RG, 0ROK, 0WAR, 0WI, PE1PL, SM6ANR, 6BTT. (73 EU's in 6C, June 14-21 only).

SWL Smith, Nr., Diss, N'flk.

HEARD: DJ1XX, DL3IY, 3VJ, G2ANT/P, 2FJR, 2HOP, 2XV, 3DLU, 3DMU, 3FUR, 3GGJ, 3IIT, 3JWQ, 3WV, 5BD, 5YV, 6L, 6NB, PA0BL, 0BZH, 0FB, 0FC, 0LDG. (Phone and CW, June 17—July 18).

G2AHY, Crowthorne, Berks.

WORKED: G2BMZ, 2YB, 3ION/P (Watlington), 3JFR, 3XC, 5DW, 5WV, 6OX/P (Epsom), 8SK.

HEARD: G2ANT, 2CPX, 2FM, 2VX, 3ALC, 3EGV, 3FCQ, 3FMO, 3GHI, 3GHO, 3IRA, 3ITB, 3IUL, 3JR, 3KEQ, 3KHA, 3LOA, 3LOR, 4PS, 5MA, 5NF, 5YV, 6FM, 8VZ. (June 24 to July 22).

G2HDR, Stoke Bishop, Bristol.

WORKED: G2FQP, 3FIH, 3FKO, 3HHY, 3ION/P (Glos), 3IRS, 3JGY/P (Hereford), 3KHA, 5DW, 8SB/P (Som.), 8SB/P (Glos.), GW8UH, 8UH/P (Mon.).

SWL Stokes, Ruislip, Middx.

HEARD: F9EA/P, G2AHL/M, 2AHP, 2ANT, 2DDD, 2DTP/P, 2FM, 2GG, 2HDY, 2HDZ, 2JF, 2MV, 2QY/P, 2RD, 2UJ, 2WJ, 2YB, 3ABA, 3BFP/A, 3BLP, 3CO, 3CZY, 3DF, 3EYV, 3FAN, 3FCQ, 3FQS, 3GHI, 3GHO, 3GNR/P, 3GSE, 3GTH, 3HBW, 3HWJ, 3IAM, 3ISA, 3IUE, 3IUL, 3JQO, 3JQN, 3JR, 3JTF, 3JTQ/M, 3KBS/P, 3KEQ, 3KQC, 3KQR, 3LIM, 3LOA, 3LOK, 3LTF, 3PV, 3XC, 4DC, 4KD, 4PS/P, 5DS, 5DW, 5MA, 5NF, 5RD, 5WV, 6AG, 6JP, 6NB, 6OX/P, 6RH, 6YP, 8AL, 8RW, 8SC/P, 8SK, 8UG/A. (June 13—July 8).

SWL Woodhouse, Storrington, West Sussex.

HEARD: DL3FOP, 3IY, 3VI, 3YBA, 0HH, F9EA/P (Nr. Dieppe), 9LD, G2AHL/M (Nr. Guildford), 2ANT, 2ATK, 2AUD, 2BDP, 2BMZ, 2BVW, 2CPX, 2DDD, 2DSP, 2DVD, 2FM, 2FMJ, 2FNW, 2HCG, 2HOP, 2JF, 2MV, 2NM, 2UJ, 2XV, 2XV/P (Derbyshire), 2YB, 2YZ (Glos.), 3BA, 3BII, 3BLP, 3CGQ, 3CID, 3CZY, 3DLU, 3DOR, 3EGV, 3EJO, 3FAN, 3FCQ, 3FD, 3FEX, 3FIH, 3FMO, 3FQS, 3FUR, 3GDR, 3GHI, 3GHO, 3GNR/P (Nr. Guildford), 3GSE, 3GTH, 3HBW, 3HYH, 3IAM, 3IIT, 3IIV, 3IRA, 3IUE, 3IUL, 3JEP, 3JFR, 3JMA/P (Essex), 3JR, 3JTQ/M (Middlesex), 3JWQ, 3JZG, 3KBS/P, (Dunstable), 3KEF, 3KEQ/P (Dorset), 3KHA, 3KQC, 3LHA, 3LIM, 3LOK, 3LTF, 3PV, 3WV, 3XC, 3XC/M, 4DC, 5BD, 5DS, 5DW, 5KG, 5MA, 5ML, 5NF, 5TP, 5TZ, 5UM, 5US, 5WV, 5YV, 6AG, 6JK, 6JP, 6LL, 6OX, 6OX/P (Hindhead), 8SC, 8VZ, GC3EBK, GW2ANT/P (Denbigh), GW8UH/P (Monmouth), ON4DW, ON4LN, PA0BU, 0FC, 0HA. (June 18—July 20).

SWL Tomlin, Malvern, Worcs

HEARD: DL1LB, G2ATK, 2AUD, 2BMZ, 2CIW, 2CVD/P, 2FJR, 2FNW, 2HGR, 2NV, 2NY, 2XV, 3AVE, 3BA, 3BLP, 3CGQ, 3CNY, 3DLU, 3DO/P,

3EHO/P, 3EJO, 3FAN, 3FIH, 3FTN, 3GBJ, 3GHI, 3GHO, 3GKZ, 3GZM, 3HBW, 3HII/P, 3HTY, 3HXS, 3HYH, 3IR, 3IIT, 3IJB, 3IOO, 3IRA, 3IRA/P, 3IUD, 3IWI, 3JGY, 3JMA/M, 3JWQ, 3JZG, 3JZN, 3KBS/P, 3KEQ, 3KFD, 3KHA, 3LHA, 3LOK, 4DC, 5DW, 5KG, 5KW, 5MA, 5ML, 5YV, 6AG, 6OX/P, 8KW/M, 8VZ, GW2ANT/P, 3GWA, 8UH, PA0CGA, 0FB, 0HA, 0KH, 0WI. (June 1-30, weekends only).

G2CZS, Chelmsford, Essex.

WORKED: DL0HH, F9LD, G2ANT/P, 2FJR, 2JF, 2XV, 2YB, 3ANB, 3FIJ, 3FUR, 3GGJ, 3IIT, 3IJB, 3INU, 3JMA/M, 3JWQ, 3WV, 8SK, ON4ZK, PA0DEK, 0FB, 0FP, 0GST, 0JMS, 0MA, 0NO, 0PFW, 0WAR. (June 18 to July 6).

SWL Winters, Melton Mowbray, Leics.

PHONE: G2BVW, 2FNW, 2FNW/P, 2FMO, 2HCG, 2XV/P, 3BU, 3EKX, 3FUR, 3FUW, 3GHO, 3GSO, 3GUD, 3IVF, 3JWQ, 3JXN, 3LHW, 4MK, 5ML, 5YV, 8CZ, GW3GWA/P. C.W.: G2FNW, 3GSO, 4MK, 8CZ. (July 3-14).

G2FJR, Sutton Bridge, Lincs.

WORKED: DJ2NW, 2RL, 3CA, DL1YV, 3IY, 3ZL, 3VI, 9QX, 0HH, G2ANT/P (Denbi.), 2ANT/P (Norfolk), 2BVW, 2CZS, 2FNW, 2HCJ/P (Hereford), 2JF, 2NY, 2XV/P (Derby), 2YB, 3ALC, 3ATM, 3BGW, 3DMU, 3DLU, 3FUR, 3FZL, 3GCG, 3GFD, 3GGJ, 3GHI, 3GHO, 3GSO, 3HYH, 3IIT, 3IRA, 3JMA/P (Herts), 3JWQ, 3KBS/P (Bucks), 3KEQ/P (Dorset), 3KQF, 3KUH, 3KHA, 3LGE, 3LHA, 3LOK, 3WV, 4DC, 4MK, 5BD, 5DS, 5DW, 5JO, 5MA, 5WV, 5YV, 6SN, 6XM/A, 6YU, 8VZ, G13GXP, GM3DDE, 3EGW, 3ENJ, 3HLH, 3RYI, 4HR, GW3BOC/M, 3GWA/P (Denbi), ON4ZK, OZ2IZ, 2KH, 3A, 3M, 3NH, 3XX, 5J, 9BS, 9EA, PA0BL, 0BN, 0BU, 0BZH, 0CJP, 0DEF, 0DOK, 0FB, 0FC, 0JMS, 0LAM, 0LDG, 0NO, 0PFW, 0ZV, SM7BZX.

G3DLU, Sheffield.

WORKED: DJ1XX, DL0HH, 1LB, 1YY, 3IY, 6SV, F3AL, G2ANT/P (Nr. Buxton), G2ANT/P (Cromer), 2BMZ, 3ENY/M (Salop), 2FJR, 2FNW, 2JF, 3DA/M (Nr. Chesterfield), 3DMLL, 3EGE, 3EJO, 3GSO, 3KEF, 3KFX, 3KUH, 3LAY, 3LCV, 3WS, 3WV, 4DC, 5ML/M (Coventry), 5YV, 6CW, 6OX/P (Surrey), 6XM,

ON4HN, 4ZK, OZ3M, 3XX, 2WJ, 2XV, 2XV/P, 3AZU, 5BD, 5BM, 5CP, 5DW, 5LL, 9EA, PA0BN, 0PFW. 3BU, 3CCH, 3DKF, 3FAN, 5MA, 5ML, 6AG, 6LI, 6NB, 3FIH, 3GGJ, 3GHO, 3GUX, 8MW, 8SP/P (Mendip), 8VZ, 3GZM, 3HA, 3HAZ, 3HBW, ON2ZKH, 4AB, OZ2KA, 20F, PA0BHZ, 0BL, 0BN, 0EA, 0FB, 0HA, 0HRX, 0KT, 0MAL, 0WA. (June 18 to July 22).

HEARD: DLICK, 1UW, 3RX, 3VJ, 3YBA, F8MX (Dieppe), G2ATK, 2BDP, 2BVW, 2CIW, 2CRL, 2DD, 2FO, 2HOP, 2HQ, 2HQ/P, 3KQF, 3LHA, 3LKA, 4JJ/A,

all those weak, mumbling voices . . . please use your key ; you can send as slowly as you want—as a DX station you will always meet patience. And if you have no hope of learning the code (!) please write your call in Morse on paper and learn to whistle it into the mike . . . I hope these words will not make too many enemies for me"! Well, of course not. Rolf is dead right, and we can only hope, with him, that some of those "weak, mumbling voices" will break into slow CW sometimes.

G3GHO (Roade) still gets his

full share of the DX and sends us, for inspection, the QSL card from the W4 who thought it clever (with the connivance of a particularly juvenile G3, whose identity is known) to fake up a phoney heard-report on the two-metre signals from G3GHO and G6NB. We can only hope that the G3 concerned will see fit to make a proper and manly apology for his infantile behaviour. At any rate, he will not be reported in this column until he does. For the W4, of course, there is no hope.

G3BLP (Selsdon, Sy.) one of those who can be relied upon to swing his key, now goes to 64C in the All-Time, with GM3EGW for Fife and GM3HLH for Angus; another Dundee station worked was GM3KYI, all this being on June 19. G3LHA (Coventry) moves in both Tables, and G2HDR is a new Bristol station reporting for the first time; he is not very happy about his QTH, and there are many unproductive CQ's going out. G2HDR only runs 12w. to a 4-ele flat top, and thinks a slot-fed job will do him better—so do we.

Down in Cheltenham (and till you've been to that delightful spa, you don't realise how far "down" it is) G3IER was pleased at least to hear the DX, even though he couldn't work much of it, during the big opening. Being high in the band, he found that the EU's were not tuning above GW8UH's frequency—and, of course, they were themselves looking for GI and GM rather than G, already worked by most of them. It was a disappointment for G3IER, and we sympathise with him—it is a case of being band-planned out of the active area, and it is unfortunately true that this is the sort of thing that happens when we get a really good EDX opening. It seems to be impossible to get it over to the EU's that they should search the whole band, not just the 144-145 mc part of it.

G3IOE (Newcastle) reports himself back in circulation again, with

TWO METRES

COUNTRIES WORKED

Starting Figure, 8

- 16 ON4BZ (DL, EI, F, G, GC, GI, GM, GW, HB, LA, LX, ON, OZ, PA, SM, 954)
- 15 G3GHO, G4MW, G5YV, G6NB (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, ON, OZ, PA, SM)
- 14 G2FJR, G2HDZ, G3IOO, G5BD, G8OU
- 13 G2XV, G3BLP, G3CCH, G3DMU, G3GPT, G5DS, G5MA, G6XM, G6XX
- 12 G2HIF, G3FAN, G3JWQ, G3WW, G6LI, G6RH
- 11 EI2W, G2AJ, G3ABA, G3DVK, G3HAZ, G4RO, G4SA, G5UD
- 10 G2FQP, G2HOP, G3BK, G3BNC, G3EHY, G3GHI, G3GSE, G3WS, G5MR, G8IC, GM3EGW, GW5MQ, PA0FB
- 9 G2AHP, G2CZS, G2DVD, G3DKF, G3FIJ, G3IUD, G3LHA, G5ML, GC3EBK
- 8 G2CIW, G2DDD, G2XC, G3AEP, G3AGS, G3DLU, G3GBO, G3HCU, G3HWJ, G3VM, G5BM, G5BY, G8SB, GC2FZC

TWO METRES

COUNTRIES WORKED SINCE

SEPTEMBER 1, 1956

Starting Figure, 14

From Home QTH only

Worked	Station
57	G5MA
53	G3GHO
47	G3GPT
46	G3DKF
45	G3LHA
41	G3KEQ
35	G5ML
34	G2CIW, G3DLU, G3JWQ
33	G3IOO, G3IQN
32	G2DVD
30	G3CKQ, GC3EBK
27	G3IER
26	G3KHA
25	G3KUH
23	G3FUR, G3KEF, G3KPT
22	G5MR
19	G3FIH
18	G2AHY

This Annual Countries Worked Table opened on September 1st, 1956, and will run till August 31st, 1957. All operators who work 14 or more Countries on Two Metres in the year are eligible for entry in the Table. The final placings for the year will appear in the October issue. Table re-opens again w.e.f. September 1st.

a QQV06-40, which he finds a much better PA valve than the 829B; at any rate, it gives more RF output and runs much cooler. G3IOE is another badly-located station, right down in a hole, and he needs everything he can lay on to work anything in the way of DX; he hopes to do better when he gets the 20-element job up again. G3DLU (Sheffield) puts in a good calls h/w list and moves largely in the Tables; he remarks that he has tried the remote radiator suggested in this space some time ago, but with no very convincing result so far, on either transmission or reception.

G3DKF also goes up in the Tables, and mentions (as do others) F8MX coming through nicely from his /P location on the evening of June '22—he was the only EDX on the band at that time, for by then the opening had been worked out. G5MA (Gt. Bookham, Sy.) reports that during the month to July 23 and including the June opening, he worked GD3UB six times, G2FO and G6XM/A in Co. Durham twice, and GI3GXP twice. Several /P's were also raised for the more difficult countries, and Bob was particularly pleased to get

TWO METRES
ALL-TIME COUNTIES WORKED
LIST
Starting Figure, 14
From Fixed QTH Only

Worked	Station
76	G5YV (787)
70	G6NB, G6XM
69	G3CCH
68	G3BW
66	EI2W (286), G3GHO, G3IUD (302), G5BD
64	G3BLP
63	G2FJR (542)
62	G5MA
60	G2OI (402), G3DMU
59	G3EHY, G4SA
58	G3FAN (637), G3IOO, G8OU
57	G8SB
56	G3WW (770), G5DS (654)
55	G2HDZ (495), G2HIF, G5BM, GW5MQ
53	G2AJ (519), G4CI
52	G2NH, G6RH, G6XX, GW2ADZ
51	G3HBW
50	G3ABA, G3GSE (518)
49	G3HAZ (358)
48	G3FIH, G5ML, G6TA (487)
47	G3DKF, G5WP
46	G4HT (476), G5BY, G6YU (205)
45	G2DVD (362), G2XC, G3BJQ, G3KEQ, G3LHA (261), G5JU
44	G2CIW (214)*, G3BK, G8DA
43	G2AHP (500), G2DDD, G3BA, G3COJ, G3HWJ, G3JWQ (325), G4RO, G5DF
42	G2HOP, G3BNC, G3DLU*, G6CI (220), GM3EGW (146)
41	G2CZS (282), G2FQP G3DO, G3WS (255)
40	G3CGQ, G3IER, G8KL
39	G2IQ, G3DVK (208), G3GBO (434), G3VM, G8IL (325)
38	G2FCL (234), G3APY, G3CKQ, G3HTY, G5MR (343), G8VN (190)
37	G2FNW, G2FZU (180), G3DLU, GC3EBK (260)
36	G2DC (155), G3CXD, G3DLU* G3IIT, G3KHA (195), G6CB (312), G8IP
35	G3FZL, G3FYY (235), G3HCU (224)
34	G3AEP, G3CKQ (162), G8IC
33	G3HHY (125)

GW3KEQ/P in Carms., Pems. and Merioneth, these being counties G5MA had often given to others but never worked himself. G2CZS (Chelmsford) was on at the right time and found plenty of EDX to work, and G2AHY (Crowthorne) moves in both Tables with G2BMZ worked for Devon on July 3; G2AHY is hoping to do better with a new 4/4.

G3HBW (Bushey Heath) reports a number of interesting encounters with the GM's, heard and worked.

Worked	Station
32	G3HIL, G8QY, G8VR, GC2FZC
31	G3HXO, G3KPT (108), G5RP
30	G3FRY, G3GOP (208), G3GSO (160), G3GVF (129), G3IRA, G3KEF (110), G5NF, GM3DIQ, GW8UH
29	G3AGS, G3AKU, G3FIJ (194)
28	G3ITF, G3KUH, G8DL, GM3BDA
27	G3CVO (231), G3DAH, G3ISA (160), G6GR, G13GQB, GW3GWA
26	G2AHY, G2BRR, G3CFR (125), G3SM (211), G3YH, G4LX, G4MR (189)
25	G3JMA, G3JXN (220), G5SK, G6PJ
24	G3FD, G3FXG, G3FXR, G3JHM
23	G3CWW (260), G3HSD, G4JJ/A G5PY
22	G2DRA, G3AGR (135), G3ASG (150), G3BPM, G3KQF, G5AM, G8NM
21	G2AOL (110), G3DVQ, G3IWI, G6XY
20	G3EYV, G3IOE
19	G3FEX (118), G3GCX, G5LQ (176)
18	G3DBP, G3JGY, GC2CNC
17	G3EGG
16	G3FRE, GM3DIQ*
15	G3IWA
14	G2DHV, G3CYY

Note: Figures in brackets after call are number of different stations worked on Two Metres. Starting figure for this classification, 100 stations worked. QSL cards are not required to verify for entry into this Table. On working 14C or more, a list showing stations and counties should be sent, and thereafter added to as more counties are worked.

* New QTH

and GD3UB for an all-time new one; also "a sort of sked developing" with G2FO during the opening; Arnold worked him ten times altogether, reports varying from 339 to 599.

Another to send in a very interesting calls h/w list is G2FJR, still Flying the Jolly Roger out at Sutton Bridge, Lincs. He worked no less than 32 new EU's (and 14 G's) during the opening; he heard himself played back by DLØHH on phone, and finished up at midnight on June 21 with a snappy CW contact with SM7BZX. Other points made by G2FJR: To prevent confusion when listening to weak phone (these weak phones are always coming in for criticism of one sort or another) it would help if the transmitting station would sign over with his own call *last* — which, incidentally, is in accordance with CW procedure; G2FJR would also like to remind SWL's that he cannot QSL without return postage; and finally he asks if anyone can give him constructional data for an electron microscope.

All-VHF-Band Station

G3JHM (Worthing) has at last managed to attract the attention of G6NB on 70 cm, putting him up to 7C worked in that table, and is now getting good results with a pyramidal horn of the type used by the well-known French VHF men F3SK and F8OL. In tests with G3GDR (at 60 miles) the improvement is about 1½ S-pts. both ways, with a beam-width comparable with that of a 5-ele Yagi. As G3JHM is active on 4 metres and 23 centimetres as well as on two metres and 70 centimetres, he hopes soon to complete contacts on all four UHF/VHF bands with his collaborators G2AIH and G3GDR, 38m. and 60m. distant respectively. (That would be quite an achievement, and we look forward to hearing from G3JHM that he has accomplished it, as we are sure he will.) During a recent visit to the Radio Research Board station at Slough, G3JHM was much interested in their tropospheric scatter link with Bristol, on 1370 mc; the path distance is about 100 miles and the gear used is not

beyond amateur scope. G3JHM remarks (as we can confirm) that the results they are getting over this path are impressive for the frequency.

G3KQF (Derby) did well during the opening—see calls h/w list—and in his first experience of working outside the U.K. on VHF, raised six stations in three countries. His new beam is a pair of slots backed by four reflectors, which was in position just in time to catch the opening; the next job is to increase transmitter efficiency. G3CCH (Scunthorpe) notes a move of four up in the All-Time; he now stands at the high figure of 69C worked. G3GSO (Derby) found that for the opening "everyone in the zone" was on his frequency, but managed to work five EU's in four countries nevertheless; apparently, in the North Midlands the two-metre band sounded like 20 metres during a contest!

Back again on two metres after too long an absence from our midst, G3WW (Wimblington, Cambs.) was glad to work a lot of old friends, after changing a somewhat makeshift aerial for a pair of slots. He mentions two stations worked for Denbighshire—GW2ANT/P and GW3GWA/P. The former is another who has been doing a good deal of useful portable work lately. G2DDD (Littlehampton) comes in again, to bring his claims up-to-date, and Arthur at G5BD (Mablethorpe) is in a good position on the 70-Centimetre Counties ladder.

G3JWQ (Ripley, Derbs.) made a very good showing for the opening, chalking up no less than 17 EU's, including SM6BTT; other nice ones he mentions are GD3UB and GW3BOC/P for Merioneth. The 100-mile G3JWQ/G8VZ schedule now stands at 220 contacts made, with a negligible proportion of total failures. G8VZ, at Princes Risborough, still uses 12w, only, but gets out exceptionally well to the north.

ZE on Six Metres

We are glad to give space and publicity to a request from ZE2JV (Salisbury, S. Rhodesia) who is on 50 mc (six metres) every evening during 1630-1635 GMT, beaming

north and calling on CW and phone. He asks for listener reports, and also the co-operation of G's in making cross-band contacts 6/10. ZE2JV says that he always listens on Ten after calling on 50 mc. He runs 100w, and a 4-ele flat-top, and has already worked F and FA stations.

An interesting comment by ZE2JV is that he regularly receives BBC TV on Band I, and has heard FM broadcasters on the VHF bands from France, Germany and Russia. As he says, things should be buzzing in a couple of months' time!

Solar Noise on Two

E14E, who tries so hard from Killarney but has very few stations in the log so far, sends in a very useful and interesting record of solar noise observations. On the three occasions, June 4, July 3 and July 6, the two-metre band showed noise effect of varying intensity: On June 4, 0935-0945, the level was about 6 dB above the normal receiver background; on July 3, it was noticeable from 0850 to 1040, peaking at 12 dB over at 1002; on July 6, the period was 0935-0944, peaking to about 8 dB over at times (which are GMT).

On July 20, there was a complete fade-out on the HF communication bands between 1340 and 1345 GMT: this brought no apparent solar noise effect on two metres, checked ten minutes after the HF bands returned to normal.

For anyone with a beam (preferably tiltable, or set at an angle) and a two-metre receiver, listening to and recording the incidence of solar noise can be very interesting. For instance, E14E has graphed his observations for July 3, and the variations shown are much on the lines of the G3CGQ results reported here in the January issue.

VHFCC Elections

After a long silence, broken

only by G3AGS last month, we now have no less than six VHF Century Club elections to register. They are: G. A. Piper, G3KQC, London, W.6, No. 212; J. Redrup, G8VZ, Princes Risborough, Bucks., No. 213; J. Berry, G3JZN, Whitefield, Lancs., No. 214; R. Bastin, G3LHA, Coventry, No. 215; T. W. Bryan, G3GSO, Derby, No. 216; and R. Jacobsson, SM6ANR, Gothenburg, No. 217. The (101) cards sent by SM6ANR show that he has worked, on two metres, F3LQ for the first and only F/SM contact; eleven DL's; 22 G's, including GM2FHH for the GM/SM "First"; eight LA's; three ON's; ten OZ's; eleven PA's; and 35 SM's. Outside Sweden itself, this makes a total of 66 EDX stations in 8 European countries: having regard to Rolf's geographical location, it is a record of which he may well be very proud.

And the election of G3LHA is probably unique in relation to the date of issue of his call.

In Conclusion

Your A.J.D. has been conducting some humble researches of his own and finds that he made the first regular contribution to SHORT WAVE MAGAZINE under the VHF heading just 19 years ago—in the August 1938 issue. The current offering is the 95th of the series, because our friend and distinguished colleague Ted Williams, ex-G2XC (who, incidentally, still reads "VHF Bands"), held the chair for some years in the early post-war period. A.J.D. hopes to survive to make the century; it would help him compile his next effort in good time if your report for September arrived by **Wednesday, August 21**, addressed: A. J. Devon, "VHF Bands," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. And as this issue went down, it looked as if another opening was developing. . . .

STOP PRESS—1957 R.A.E. RESULT

Just as this issue was going to press, we were informed by the City and Guilds of London Institute that for the Radio Amateurs' Examination held in May last, 562 candidates presented themselves: of these, 377 passed, leaving 185 failures. It is hoped to give fuller details, with the question paper as set, in our next issue.

Techniques for Two Metres

THE FRUITS OF EXPERIENCE WITH TRANSMITTERS AND RECEIVERS

PART I

B. SYKES (G2HCG)

The author of this article is one of the best-known of our VHF practitioners, who is consistently a most successful exponent of the art. Here he brings out a great number of those purely practical points of design—affecting both receiver and transmitter—which can only be discussed from knowledge gained by long experience. In the commercial field already one of our leading VHF aerial designers, by this article G2HCG will further enhance his reputation as a VHF technician.—Editor.

IT is well-known that the performance of a receiver depends on the input stages, but the choice of which type of RF stage to use presents quite a problem. Everyone has his own ideas, and perhaps layout is more important than choice of circuit.

Any receiver can be made or marred by the aerial input circuit, and the importance of this does not seem to be clearly understood. Measurements with a noise generator usually suggest that over-coupling to the input circuit provides optimum noise factor or signal-to-noise ratio. This is undoubtedly true when the receiver is fed from a noise generator—but when the input is *via* a feeder from an aerial it should be realized that under reception conditions the load on that feeder is the receiver input and unless this is allowed for correctly, standing waves will result with all the attendant evils of noise pick-up, detuning of the aerial, and losses. Experience has shown that if noise-generator measurements are conducted through a long length of feeder to simulate operating conditions, then the input coupling will usually adjust to that which gives a match to the feeder and will *not* be over-coupled. A simple test to ascertain if the input coupling is providing a correct match to the feeder is to alter the length of feeder by 6 inches or so, noting the effect on a steady signal; *any*

change, and there can be a lot, indicates incorrect input matching.

In fact, it is not easy to obtain a correct match at the input of a two-metre receiver, but a certain amount of perseverance will pay useful dividends. The greatest problem is the elimination of the reactive component and here it is preferable to tap the aerial feeder on to the input coil rather than use a coupling loop. A loop has inductance and therefore reactance and this must be balanced out by means of a series condenser, in effect making loop and condenser a series resonant circuit. The coupling under resonant loop conditions becomes *very critical* and mechanical problems make a perfect match difficult to obtain.

The choice of balanced or unbalanced feeder should be governed by the type of RF stage employed. The enthusiast for ribbon feeder *should* be using a push-pull RF stage, and coaxial feeders should go to single-ended stages. This rule can be circumvented by special circuits and the use of baluns, and a selection of possible RF input circuits for the receiver is illustrated in Figs. 1-6 herewith.

Figs. 1 and 2 are the obvious and easy ways of input coupling and the only point to bear in mind here is that when altering the position of the input taps there is no change in coupling between A and B in Fig. 7, even if B is further up the coil than A; this effect is due to inductive coupling between the wire to the tap and the turns of the coil and can only be overcome by suitably repositioning either the coil or the input connector.

Figs. 3 and 4 indicate the use of baluns, composed of half-waves of coaxial cable, to meet the needs of those whose feeders do not suit their receivers. Fig. 5 is another method of unbalance-to-balance conversion, but it should be remembered that the coupling coil must be made to resonate and it may be difficult to provide an accurate means of coupling adjustment under resonant conditions. Fig. 6 uses the pi-system of coupling and with a little care in adjustment probably provides *the best match of all*. The only snag is that due to the direct connection of aerial to input grid without the input coil being earthed, there is the possibility of break-through, although a VHF choke from aerial input to ground will minimise this.

The question of mechanical balance is most important with push-pull stages, and all the precautions taken with the transmitter apply equally to receivers. Figs. 1, 4 and 5 have a direct earth to the centre of the grid coil and it will be noticed that the cathode resistor in these circuits is *not* by-passed, to avoid the

difficulties associated with forcing two centre taps on to the circuit.

Correct neutralisation of triode RF stages is vitally important and before any attempts at input matching adjustments are made, the stage must be perfectly stable with no aerial connected. A common fault with push-pull triodes is the use of neutralising condensers of too great a physical size, necessitating long leads. Very simple, efficient and low minimum neutralising condensers can be made from miniature $\frac{1}{4}$ in. diameter coil formers with brass slugs, as shown in Fig 8, where each "plate" of the condenser consists of some half-dozen shorted turns of bare 22 SWG tinned copper wire, the capacity being adjusted by altering the position of the brass core. Fig. 9 illustrates a suitable layout utilising this type of neutralising condenser.

The Mixer Stage

Frequency changers are inherently noisy devices, and the choice of RF stage is governed to a certain extent by the fact that sufficient gain must be realised to overcome mixer noise. In this respect the push-pull neutralised triode probably offers the best and simplest solution. The cascode brigade may have differing views on this and to avoid a discussion on the relative merits of G2IQ and cascode it is probably safer to repeat as previously that "results depend more on layout than on circuitry."

The choice of mixer valve depends on the RF stage or stages preceding, and if one is prepared to go to extreme lengths, such as separate copper boxes and so forth, to obtain complete stability from two RF stages, then the diode or crystal mixer is supreme.

Normally, however, triode valves will be the choice, so that one fundamental fact must be kept in mind when push-pull mixers are used: There are three feeds around a mixer—signal input, oscillator input, and IF output. With a push-pull mixer, two of these must be push-pull and the third single-ended. It does not matter which is which so long as this fundamental is adhered to; normally, it is preferable to have both inputs in push-pull and the output single-ended, as there should then be complete cancellation of all inputs in the output circuit.

Oscillator Injection

It is vital to ensure adequate oscillator injection in true balanced push-pull mode to the grids. Injection by inductive coupling to the grid circuit cannot ever be satisfactory, as one is trying to couple into a circuit which is con-

siderably off tune. Capacity coupling to each grid is much better and in the case of a tuned push-pull oscillator this is easily achieved.

The use of tuned oscillators at VHF is perhaps a subject for some discussion, but basically for serious work crystal controlled injection must be preferable.

The problem of push-pull injection from a single-ended multiplier can be solved in a variety of ways and Fig. 10 illustrates two such circuits. The choice of circuit depends on layout, Fig. 10A being suitable where the last multiplier output does not come within easy reach of the mixer, whereas Fig. 10B lends itself to a more compact layout — but care should be taken to balance the series-tuned circuit; this can be done by the use of a pencil to ensure that the *centre* of the coil is the dead point. With push-pull mixers the cathode resistor should be by-passed with a condenser of low impedance at the IF used.

Mixer instability at VHF, especially with triodes, is easily cured by a 100-ohm anode stopper and/or 5 μ F condenser from anode to cathode. The IF coil in the anode circuit should be inductively tuned without any external capacity in order to provide sufficient bandwidth to avoid falling-off of signal strength at either end of the band. Any good two-metre converter should be flat over the band and any tendency towards lack of coverage is a sure sign of instability, which must be overcome before best results can be achieved.

Spurious Beats

A serious problem with VHF receivers is that of spurious signals or birdies. Due to the conflicting requirements of a high IF to eliminate second channel and mixer blocking troubles and a low IF for selectivity, every VHF receiver must be a double-superhet; in the case of a converter in front of a double superhet communications receiver the final set-up is a triple superhet. Birdies are caused by harmonics of the various oscillators falling within the passbands of the receiver, and some very queer combinations of frequencies can occur! Trouble from the first oscillator can be overcome by suitable choice of frequency. The 1st IF is normally a tunable receiver and a frequency between 24 and 30 mc will usually give the least trouble.

The crystal controlled multiplier chain is therefore required to produce a final frequency between 114 and 120 mc, and it is imperative that the crystal oscillator should be a harmonic type (such as the Squier) giving an output frequency not lower than the 1st IF. A single

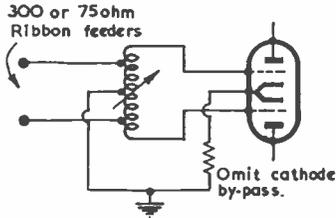


FIGURE 1

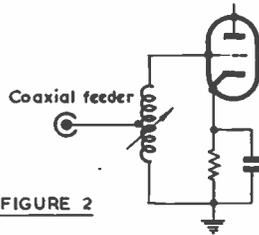


FIGURE 2

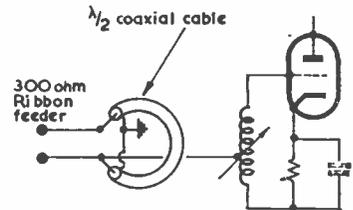


FIGURE 3

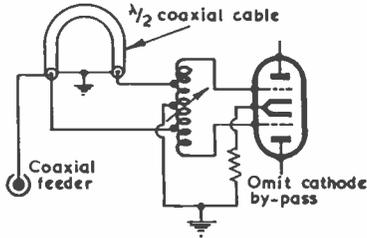


FIGURE 4

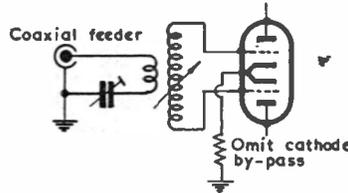


FIGURE 5

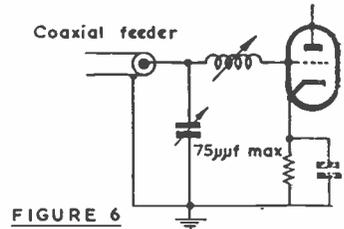
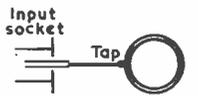


FIGURE 6

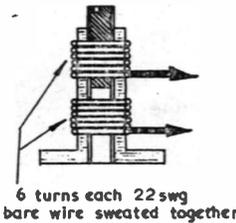


Plan view of coil

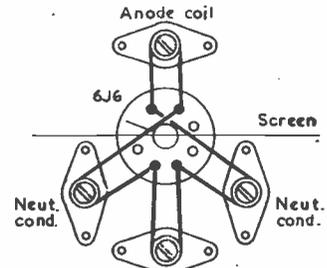


Plan view of coil

Coil tapping



6 turns each 22swg bare wire sweated together



Grid coil

R 226

FIGURE 7A

FIGURE 7B

FIGURE 8

Each one of these sketches is discussed in the article. At Fig. 8 is a particularly ingenious idea for the construction of a small semi-variable capacity, such as a neutralising condenser, for a VHF receiver. [Fig. 9 shows how the design can be applied in the layout of, say, a 6J6 RF stage.]

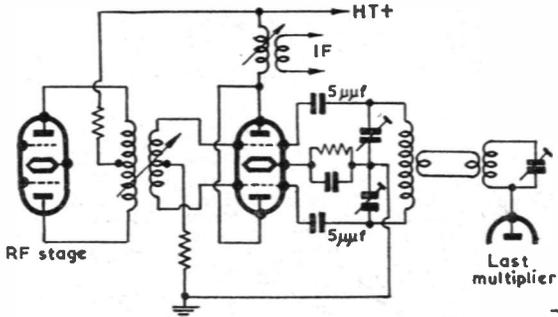


FIGURE 10A

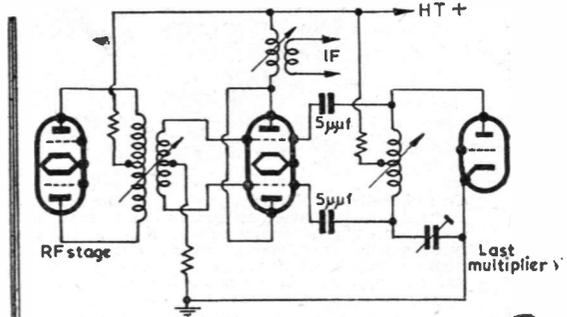


FIGURE 10B

T 250

Fig. 10A/10B. As explained by G2HCG, these are possible circuit arrangements for mixer-oscillator injection in the two-metre receiver. In Fig. 10A the link coupling can be made quite long if necessary, thus permitting the oscillator-multiplier chain to be well separated and screened, and improving general performance; construction is often made easier if the oscillator can be put together as a separate unit.

twin-triode valve is all that should be necessary for the multiplier chain, with the first half operating as Squier oscillator on the third harmonic of a 13 mc crystal (or fifth harmonic of 8 mc) and the second half tripling to 120 mc. Keeping the initial frequency of the first oscillator high removes any troubles from the harmonics in that stage, but a prolific source of beats is the second oscillator, and this should be run at the lowest possible HT voltage to reduce harmonic output. When designing a complete two-metre receiver it is as well to arrange the layout so that the second oscillator is well separated from the signal input, and provision for screening the second oscillator stage completely is a well worth-while precaution.

Break-through of stations on the frequency of the first IF can be very annoying and efficient screening and a *short* lead from the con-

verter to the main receiver is necessary—in fact, bonding the converter chassis to the main receiver can be very useful. Certain break-through troubles are caused by signals at IF being picked up direct on the two-metre aerial and passed right through the VHF section. This can be eliminated by attention to one or more of the following points: Use a type of aerial which has a short circuit to DC across the feeder, or, failing this, fit a quarter-wave closed stub, with the shorted end earthed, across the feeder. Ensure that inductive coupling, rather than capacitive, is used between the RF stage and the mixer, as shown in Fig. 10. This inductive coupling will have other advantages, too, giving increased gain and stability on two metres.

(Part II of this article, dealing with the Transmitter, will appear in the next issue.)



One of the latest National products is the NC-109, an 11-valve receiver which covers 540 kc to 40 mc in four switched ranges, with calibrated bandspread for the 10-11-15-20-40-80 metre amateur bands. There are five selectivity positions, with a crystal filter having one specially sharp phasing notch over 60 dB deep. There is a separate product detector for CW and SSB reception, and the receiver will also take normal AM phone on another switch position. An S-meter is provided, and the rear chassis-drop has an "accessory socket" for external power take-off when using converters or other auxiliary units. The NC-188 is somewhat similar in appearance, but is a simpler and less expensive receiver. The cost of the NC-109 (which is, of course, an American type) is the equivalent of about £70 in the States.

RECIPROCAL LICENSING ARRANGEMENT

By agreement between our G.P.O. and the East African High Commission, the holder of any VQ amateur permit will be granted a U.K. licence on pro-

duction of his East African ticket and his birth certificate. (Acknowledgement Radio Society of East Africa's "Circular Letter").

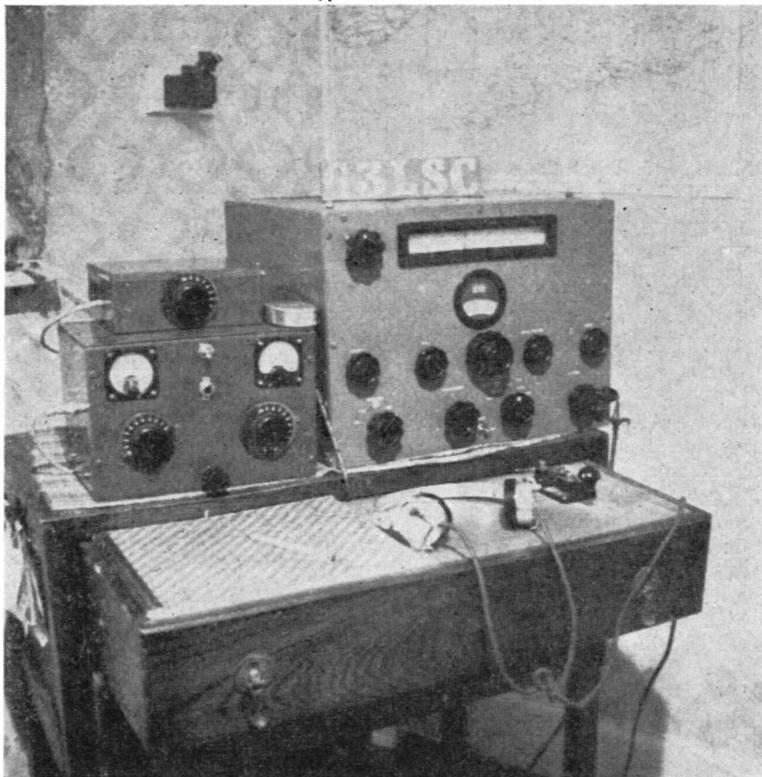
NEW QTH'S

This space is available for the publication of the addresses of all holders of new U.K. call signs, 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.

- DL2BH**, Sen./Tech: Dewar, M.R. (G3JUZ), c/o Sgts' Mess, R.A.F. Station, Oldenburg, B.A.O.R. 25.
- EI9S**, D. Murphy, 46 Marian Grove, Butterfield Avenue, Rathfarnham, Co. Dublin.
- G3IEB**, G. H. McDonald, 4 Bewick Road, Gateshead 8, Co. Durham.
- G3INW**, A. Davies, 39 Pullan Avenue, Eccleshill, Bradford 2, Yorkshire.
- G3KOF**, E. C. Banks, 121 Charles Street, Swinton, Manchester, Lancs.
- G3KSS**, F. J. Davies, 39 Pullan Avenue, Eccleshill, Bradford 2, Yorkshire.
- G3KZQ**, G. Goddard, 28 The Acre, Glossop, Derbyshire.
- G3LEI**, N. Mills, 196 Old Road East, Gravesend, Kent.
- G3LFFH**, S. Allan, 18 Strandburn Street, Sydenham, Belfast.
- G3LFS**, A. Foulsham, 84 Cranborne Avenue, Tolworth, Surbiton, Surrey.
- G3LHW**, D. Powles, 75 Cedar Street, Derby, Derbyshire.
- G3LNG**, G. Robbins, 35 Sunlight Street, Anfield, Liverpool 6, Lancs.
- GM3LOM**, J. McCann, 10 Southfield Crescent, Coatbridge, Lanarkshire.
- G3LPB**, J. Brown, The Waterworks, Penryn, Cornwall.
- G3LQV**, A. D. Evers, 198 Churchill Avenue, Chatham, Kent.
- G3LRN**, H. Clark, Rose-Ellen, King Richard Road, Hinckley, Leics.
- G3LRS**, Leicester Radio Society, c/o S. D. Hoff, 51 Gwencole Crescent, Braunstone, Leicester.
- G3LRU**, J. P. Miller, 4 Burstow Road, West Wimbledon, London, S.W.20.
- G3LSG**, C. A. J. Cotton, 10 Buci Crescent, Shoreham-by-Sea, Sussex.
- G3LSK**, A. J. Goodwin, Thornbury, Earl Howe Road, Holmer Green, nr. High Wycombe, Bucks.
- G3LSK/A**, A. J. Goodwin, c/o Radio Club, Science Dept., Holmer Green County Secondary School, Holmer Green, High Wycombe, Bucks.
- G3LSM**, L. A. Miller, 90 Moat Street, Donaghadee, Co. Down.
- G3LST**, P. F. L. Clarke (ex-DL2AK), Redroofs, Thordon Gate, Herongate, nr. Brentwood, Essex.
- G3LTA**, B. N. Brassett, 80 Forest Road, Loughborough, Leics. (Tel.: Loughborough 3779).
- GM3LTB**, A. Barnes, 7 South Park Terrace, Glasgow, W.2. (Tel.: West 4080).
- CHANGE OF ADDRESS**
- GW3AHN**, T. Higginson, 176 Countisbury Avenue, Llanrunney, Cardiff, Glam.
- G3AKI**, F. Knowles, School House, Ketton, Stamford, Lincs.
- G3CZS**, A. W. S. Whatley, A.M.Inst.B.E., 74 Barnfield Avenue, Allesley, Coventry, Warks. (Tel.: Allesley 379).
- G3EET**, T. Mitchell (ex-4S7TM), c/o Sgts' Mess, R.A.F. Station, Acklington, Northumberland.
- G3EFE**, A. R. Bryant (ex-J4AAP/Y13EFE/GW3EFE), 16 Benedict Drive, East Bedfont, Feltham, Middlesex.
- GD3EGF**, T. Kellett (ex-G3EGF), 44 York Road, Douglas, Isle of Man.
- G3ENT**, North Kent Radio Society, c/o 39 Woolwich Road, Bexleyheath, Kent.
- G3EUK**, R. W. Curtis, 19 Dumber Lane, Ashton-on-Mersey, Sale, Cheshire.
- G3FMO**, G. Elliott, 3 Sandgate Avenue, Tilehurst, Reading, Berks.
- G3FRV**, R. G. B. Vaughan, Cervante, Arundel Drive East, Saltdean, Brighton 7, Sussex.
- G3GFH**, W/Cdr. M. E. Pulvermacher, c/o Officers' Mess, R.A.F. Station, Andover, Hants.
- G3GGL**, A. W. G. Wormald, 100 Willow Avenue, Edgbaston, Birmingham, 17.
- G3HCU**, A. E. White, Timbers Ridge, Hoe Lane, Peaslake, Surrey.
- G3HDJ**, L. J. Smith, D.W.S. Hostel, Bletchley Park, Bletchley, Bucks.
- G3HMO**, J. M. Osborne, M.A., Quarry House, Stowe, Buckingham, Bucks.
- G3HTA**, J. D. Forward, 12 Clevedon Close, Pennsylvania, Exeter, Devon.
- G3HTC**, G. E. Storey, 10 Avon Road, Sunbury-on-Thames, Middlesex.
- GW3ILZ**, T. E. I. Bromham, 11 Caswell Avenue, Caswell, Swansea, Glam.
- G3INA**, R. G. Robinson, Cloudings, Beech Avenue, Sandiacre, Notts.
- G3IXZ**, R. T. Bowden, Penninis, Outwood Common Road, Billericay, Essex.
- G3IYX**, G. J. Leask, 32 Queen Anne Street, Bradwell, Wolverton, Bucks.
- GM3JCC**, J. C. Cunningham, Dalsarf Station Cottage, by Larkhall, Lanarkshire.
- G3JDO**, H. Martin, 30 Finchale Road, Monkton Lane, Hebburn, Co. Durham.
- G3JJK**, A. J. Nichols (ex-VS6CY), 112 Blackbrook Road, Heathfield Estate, Fareham, Hants.
- G3JUL**, G. C. Voller, 13 Marlborough Road, Ashford, Middlesex. (Tel.: Ashford 3559).
- GM3KDZ**, C. Ferns (ex-G3KDZ), Taybank, William Street, Tayport, Fife.
- G3KSO**, E. T. White, 19 Lewis Flats, London, W.14.
- G3KXT**, R. I. Richardson, 170 Orchard Way, Shirley, Croydon, Surrey.
- G3XC**, W. J. Colclough, Penttre, Christmas Lane, Farnham Common, Bucks.
- GM6TF**, W. Davidson, 7 Gaberston Avenue, Alloa, Clackmannanshire.
- G8CG**, R. E. R. England, Pax, Old Heathfield, Sussex.
- G8WN**, A. E. Reeve, 66 Newbury Road, Ipswich, Suffolk.

THE OTHER MAN'S STATION

G3LSC



THE station of G3LSC—owned and operated by D. T. Wyatt at 4 Norman Avenue, Branksome, Poole, Dorset—is of particular interest for several reasons: It is about the simplest possible, runs less than ten watts, is for Top Band only with receiver and transmitter working from the same power supply, and the Tx itself is the “Top Band Talking Box,” as described in the October 1956 issue of SHORT WAVE MAGAZINE.

In our photograph, the transmitter is on the left; the mechanical design and layout, constructionally, of the “Talking Box” as originally illustrated have been modified somewhat to suit G3LSC’s own requirements; in fact, this amounts to no more than using a larger box and arranging the two tuning controls and the plate meter on the front panel—in all other respects the circuit is exactly the same as that given for the “Talking Box,” with the addition of a small transformer for the valve heaters. As already mentioned, HT for the transmitter is obtained by switching over the supply from the

CR-100. Incidentally, the CR-100 is one of the “surplus” receivers with a very ample power unit—the stations supplied to members of the R.N.V. (W). R. are powered in the same way, with the transmitter actually built into the CR-100 cabinet, in which there is plenty of space for a QRP job.

At G3LSC, the aerial is a 145-footer, end fed, and tuned against ground by a simple aerial tuning unit (seen resting on the transmitter) link coupled to the “Talking Box” output by a length of coax; the link winding on the ATU itself incorporates a Faraday shield.

It is said that with the rig as illustrated here G3LSC is one of the most potent Top Band signals in his district; he himself remarks that “it is doing a grand job and excellent reports are coming in from well up the country.” Certainly, his is one of the simplest stations we have yet described in the many years that this feature has been running.

CARDS HELD FOR ZD4

We are asked by the manager of the ZD4 QSL Bureau (P.O. Box 565, Kumasi, Ghana, West Africa) to say that he is holding cards for a number of ex-ZD4 stations no longer operating in Ghana. As there are no less than 17 of them, he is anxious that they should claim their cards—this may also explain why *your* ZD4 card never materialised! The calls listed are ZD4 AC, AD, AH, AL, AM, AO, AP, AU, AW, AX, BA, BC, BD, BG,

BH, BI and BS. The present address of none of these operators is known at the ZD4 Bureau.

G3CTS/T, TELEVISION SOCIETY STATION

We are asked to announce that G3CTS/T, located at Norwood Technical College and operated on 427 mc (vision) and 423.5 mc (sound) for the Television Society, will be off the air until September 8, for the holiday period.

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for September Issue : AUGUST 19)

OUR records of Club activities go right back to 1946, and they have been kept in their present card-index form since early in 1948. It is not surprising, therefore, that some illuminating facts and figures are on record, and some of them are interesting enough to be quoted on the odd occasion.

This card index is divided into three categories — Active, "Resting," and Dead. The Active clubs are those that report more or less regularly, and their cards are not moved into the "Resting" Section until they have failed to report for six or seven months. At present the Active clubs number 82.

The "Resting" section (we cannot think of a better word, since "Moribund" might be doing them an injustice!) at present holds 98 cards. These include many clubs who reported for month after month and then (often after a change of secretary, incidentally) were never heard from again. It also includes quite a few who report perhaps twice a year and then lapse for a long period.

The "Dead" section is entirely composed of Clubs that reported to us just *once*, and failed ever to make a reappearance. This includes no fewer than 49 cards, and is regarded as a sad piece of evidence that one man's enthusiasm is insufficient to form a Club and also to keep it running.

These three figures make up the surprising total of 229 Clubs, past and present, who have at some time or other reported their proceedings in our columns.

Records also show that there are only five Clubs which have run since 1948 *without* a change of Secretary. These are Harrow, Kingston, Scarborough, Slade and Yeovil. There are many others, more recently formed, with only one Secretary's name on their cards, but the above five are the real old-stagers whose names and addresses we know by heart!

Bradford will hold an Informal Meeting on August 20, followed on September 10 by the opening meeting of the new season. Bury meet on August 13 for a "general discussion on matters of topical interest," which reads rather like a euphemism for a "ragchew"! On September 10 they will be having a talk on the Panda transmitter by G3DZU; on September 14 they are holding a Hamfest at the Derby Hotel, Bury — dinner, raffle and film show. Tickets are available now from the hon. sec.

The Cornish Radio and Television Club held a get-together at the Y.M.C.A., Falmouth, for their July meeting, at which Dr. Charles Elliot gave a lecture on Deafness and Electronic Aids. Visitors to the district are invited to make themselves known, but unfortunately

their next meeting after the foregoing was August 7 — a few days before publication date.

Cray Valley devoted their July meeting to a Junk Sale in aid of Club funds. Crystal Palace meet on August 10 to hear G2HP's talk on Using the Mains. They also gather on September 3; both meetings are at Windermere House, Westow Street, Crystal Palace, S.E.19.

Derby have a talk on Television Interference, by G2CVV, on August 14. August 21 is an Open Evening, and August 28 is booked for a Film Show. Flintshire will not be meeting in August, but on September 2 they have a talk booked on Uses of RF in Landline Communication. During July they had two very interesting and successful "outing-visits" — one to the G.P.O. Telephone Exchange at Prestatyn, and another to the new Power Station at Connah's Quay, with 30 members in the coach.

Harrow recently made a presentation to Mr. "Pop" Wilson, their oldest member, on his 75th birthday. On August 9 they have a Practical Evening; on the 16th a Quiz; on the 23rd another Practical Evening, and on the 30th the meeting is called "Electrical Puzzles." All meetings in the Science Lab., Roxeth Manor Secondary Modern School, Eastcote Lane, South Harrow.

Hartlepoons will be operating an Exhibition Station at the West Hartlepoons Annual Gardens Guild Show, using the Club's call G3IDV/A. One section of this station will be on the lookout for any "mobile" visitors. Leven, a newcomer to these columns, meets each Wednesday at the Durie Foundry, Leven Bank. They have acquired the call GM3LUM and their members are now building a transmitter. Membership includes quite a few TV engineers and radio apprentices, together with a goodly number of amateurs and SWL's.

The Science Museum Radio Society has arranged the first of its new season's meetings for September 10 at 6 p.m., when Major G. Watson, VP8BP, will give an illustrated talk on Radio in Antarctica. Membership is open to all Civil Servants, and full details may be obtained from the hon. sec. (*see panel*).

Slade are meeting on August 16 for a lecture on Coil Design by Mr. N. B. Simmonds. On the 30th they will be visiting the sound recording studios of Messrs. Hollick and Taylor. On August 25 they hold the Har-

All Clubs and local groups are invited to use this space for publicity and the reporting of their activities. Reports should be addressed to "Club Secretary," "Short Wave Magazine," 55 Victoria Street, London, S.W.1 and posted to arrive on or before the date given every month at the head of this article. Reports received late cannot usually be taken into this feature. Photographs suitable for reproduction are always welcome.

court Trophy D-F Test. The Club Station, G3JBN, is open for the use of members every day, and classes are held every Tuesday and Wednesday evening at Church House, High Street, Erdington, Birmingham 23.

Sutton and Cheam will be "going portable" from 8 p.m. onwards on August 20. On September 17 they have a talk on Measuring Instruments, by Mr. A. Pratt (Pullins). **Torbay** had an interesting lecture by G3FUT on Audio Fault-Finding at their July meeting; on August 10 the speaker will be Mr. D. Willoughby, DL2YU — 7.30 p.m. at the Y.M.C.A., Torquay.

Grafton recently held their Top-Band CW Contest for the G2AAN Cup, and the winner emerged as G3KQX, with G2HGT and G3KGM running second and third. Their annual Field Day on Hampstead Heath was a great success, as usual, with many local DX contacts made. Grafton is now closed for the summer recess, but will re-open on September 6. The popular and successful R.A.E.



Cannock Chase on safari, when the Club took part in the June field day event. Stations operated were G3KNB/A and G4CF/A, and left to right in this group are: G3KNH, SWL Sven, G3DZT, G4CF, G3FZW, SWL Garth, G3ABC, G3KNB, and two SWL members.

and Morse classes will be re-starting by September 23.

Purley met on July 19 to hear about Multi-Range Test Meters from G3DPW, and on the 20th they were operating from the Summer Fair in the Rotary Field, Purley (which sounds like a good site for beams but is not what it appears!) **Norwich** inform us that they meet on Fridays, 7.30 p.m. at the Golden Lion, St. Johns, Maddermarket. A recent talk, by G3ASQ, was on the subject of Electronic Computers. As mentioned elsewhere in this issue, they are going out to Scroby Sands again on August 25 — wind, weather and circumstances permitting.

Hastings once more ran a very successful working demonstration at the Hobbies Exhibition during Carnival Week, and made DX contacts on Twenty CW as well as many local phone QSO's on Forty. During the week they had a good contact with DLØRR, the station in the Hobbies Exhibition at Recklinghausen in the Ruhr, and much local interest was aroused. Weekly meetings continue, every Tuesday at 22 Middle Street, Hastings.

Newbury ran informal meetings in June and July, and these proved to be very popular. August is a blank month, but on September 27 the programme is resumed. There will be a Hamfest on October 13. Newbury can produce two Mobiles at present.

Nottingham (Amateur Radio Society) will meet on September 20 at the Basford Hall Miners' Welfare, Nuthall Road, Cinderhill, 7.30 p.m. There is no August meeting.

Pontefract are preparing a Clubroom on the upper floor of the Queens Hotel, one of the highest buildings in the town, with a 20-ft. flagpole on top. New members will be welcomed on the 1st, 3rd and 5th (if any) Thursdays each month at 8 p.m.

Shefford meet every Friday at Digswell House, 8 p.m. On August 16 G2DUS will talk on A Two-Metre Portable; on August 23, J. Brunt on Superhet Alignment; and on the 30th there is a Circuit-Drawing Quiz, which sounds intriguing. Recent events have included a

NAMES AND ADDRESSES OF CLUB SECRETARIES REPORTING IN THIS ISSUE:

BRADFORD: D. M. Pratt, G3KEP, 27 Woodlands Grove, Cottingley, Bingley.
BURY: L. Robinson, 56 Avondale Avenue, Bury.
CORNWALL: J. Brown, G3LPB, c/o W. A. Thomas, 38 Lower Market Street, Penryn, Cornwall.
CRAY VALLEY: S. W. Coursey, G3JJC, 49 Dulverton Road, London, S.E.9.
CRYSTAL PALACE: G. M. C. Stone, G3FZL, 10 Liphook Crescent, London, S.E.23.
DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby.
FLINTSHIRE: J. Thornton Lawrence, GW3JGA, Perranporth, East Avenue, Bryn Newydd, Prestatyn.
GRAFTON: A. W. H. Wonnell, G2CJN, 145 Uxendon Hill, Wembley Park, Middx.
HARROW: S. C. J. Phillips, 131 Belmont Road, Harrow Weald.
HARTLEPOOLS: J. Thompson, G3KQU, 27 Chester Road, West Hartlepool.
HASTINGS: W. E. Thompson, 8 Coventry Road, St. Leonards on Sea.
LEVEN: J. Taylor, GM2DBX, Main Street, Methilhill, Leven, Fife.
NEWBURY: J. A. Gale, Wild Hedges, Crookham Common, near Newbury.
NORWICH: H. Staff, G4KO, 59 Charles Avenue, Thorpe, Norwich.
NOTTINGHAM (Amateur Radio Club): F. V. Farnsworth, 32 Harrow Road, West Bridgford.
NOTTINGHAM (Amateur Radio Society): H. H. Pickering, G3DUL, 43 Plains Road, Mapperley, Nottingham.
PONTEFRACT: W. Farrar, G3ESP, Stanton, Hemsworth Road, Ackworth, Pontefract.
PURLEY: E. R. Honeywood, G3GKF, 105 Whytecliffe Road, Purley.
SCIENCE MUSEUM: G. C. Voller, G3JUL, Science Museum, South Kensington, London, S.W.7.
SHEFFORD: G. R. Cobb, G3IXG, 7 Hitchin Road, Shefford, Beds.
SLADE: C. N. Smart, 110 Woolmore Road, Birmingham 23.
STOCKPORT: G. R. Phillips, G3FYE, 7 Germans Buildings, Buxton Road, Stockport.
SUTTON AND CHEAM: F. J. Harris, G2BOF, 143 Collingwood Road, Sutton.
TORBAY: G. Western, G3LFL, 118 Salisbury Avenue, Barton, Torquay.
WANSTEAD AND WOODFORD: C. Stevenson, 25 Boundary Road, Barking, Essex.

Colour TV demonstration by G2DUS, and talks on "Ham Jargon" and the Club history.

Stockport do not meet again until August 28 (SSB, by G3A00); on September 11 the subject is TVI, by G3AUB. Recent lectures have covered Oscillators, Transistors, Power Packs and Workshop Practice.

Wanstead and Woodford ask members to note that an Extraordinary General Meeting will be held on August 13 at 8 p.m. Their Two-Metre gear is now on the air, and they also have a Top-Band rig, almost ready.

The other Nottingham group, the Amateur Radio Club, are at Woodthorpe House, Mansfield Road every Tuesday evening (but not August 11 and 20) and prospective members are always welcome.

G6HH/A AT THE HASTINGS HOBBIES EXHIBITION

W. E. Thompson

(Hon. Secretary, Hastings & District Amateur Radio Club)

The Hastings & District Amateur Radio Club again exhibited at the Hobbies and Crafts Exhibition during Hastings Carnival Week. This popular exhibition is held in two indoor bowls pavilions in Falaise Road, Hastings, during the first full week in July each year. This is the fifth year that the Club has been present and operating an amateur station. The call-sign G6HH/A ("Happy Hastings") was used, and it is already well known as a potent signal from the yearly exhibition.

In previous years Eighty had been the band, but considerable difficulty had been experienced with QRM from the Fair immediately adjoining the exhibition halls. So severe was this that operating the station during the afternoon was almost impossible, since only the strongest of S9 signals could penetrate the high noise level. When the Fair got into its full stride after 6.30 p.m. all reception was shut out, and the station had to be closed down. Last year we tried 40 metres and found the band to be much quieter, so this year we decided to use this band again and also try 20 metres. The plan was to use 40 during the mornings and afternoons, and to go on 20 for CW in the late evening and try some long-haul stuff. Results have shown that the choice was justified.

Aerials were erected on the Wednesday evening, July 3, and the station installed on Friday 5th, in readiness for the exhibition, which ran from July 6 to 13 inclusive with the exception of the Sunday. (We did, however, work a few stations on the Sunday to keep our hand in.)

The aerials were half-wave dipoles for 40 and 20 at a height of about 35ft., centre-fed with co-axial cable. They spanned one of the two bowling greens and were supported by three masts. The 40-metre aerial was about 80ft. from the station, and the 20-metre aerial some 50ft. away. Being on high ground above the White Rock Pavilion, they were some 150ft. a.s.l. The good site almost certainly accounts for the strong signals reported from all stations worked during the week.

The 120-watt transmitter consisted of a modified Bendix TA12C modulated by a pair of 807's in Class-B,

zero bias. A crystal deaf-aid microphone was used, mounted in a marble case. This equipment and the associated power supplies were built by the Club's chairman in readiness for the day, near at hand, when his own ticket arrives. The week's work gave the apparatus a good try-out and at least shows that it does (or did?) work. In the early part of the week the Club secretary's SX-28 receiver was used, but on the Wednesday this developed shorted turns in one half of the HT windings on the mains transformer. It had previously given warning that all was not well when explosive noises and some traces of pungent smoke were emitted, but this proved to be nothing more serious than an 0.01 μ F filter condenser across the mains input "going dis," so no serious notice was taken. However, shorted HT windings being a different kettle of fish, the chairman's CR-100 was brought into service, so we finished up with all his stuff on the table — and right well it worked, too.

During Friday morning, July 12, a fairly boisterous gale blew up, and in the middle of a QSO with G3DLP just at a point where he was about to turn the transmission over to us, the receiver suddenly went dead. A glance out of the window confirmed our worst fears — the aerials had gone! The centre mast had snapped in three places, precisely at 1145 a.m. A dash across the Cumberland turf and a quick pull on the 40-metre dipole halyard, a hasty make-off on a stay-rod, and we were on the air again at 1150 hrs. with G2FQD, and G3DLP hooked up again at 1157. However, due to the feeder trailing along the ground, the transmitter could not be loaded up properly, so a second attempt at repairs was made at 1215, when a stump of the broken mast was slipped over a stay-rod and the 40-metre dipole fastened to it. This raised one end about 7 feet the other end then being some 20ft. high, thereby getting the feeder off the deck. The transmitter then loaded more sensibly, and reports still said S9 or S9+ so we left it like that!

Later, at 1300 B.S.T., an interesting QSO resulted with DLØRR, another exhibition station at Recklinghausen, near Essen, in the Ruhr district of Western Germany. A schedule was made for a further QSO at 1545 which turned out to be of considerable interest to the visitors at both exhibitions. DLØRR reported a large crowd around him, listening to us, and we were able to say the same from our end. In addition, we were fortunate to have a visit from the Hastings "Carnival Queen" and her four "Maids of Honour," each of whom spoke capably and confidently to the DL exhibition station, and exchanged greetings with the folk there.

On Saturday July 13 the whole morning was spent chasing a gremlin in the transmitter, which for some unknown reason would not load up properly, but when left to its own devices for the lunch hour was found to be in good order when next switched on!

There were other outstanding incidents, too. The Teddy-boy, for example, who sat himself down beside the operator when we were on 20 metre CW, and demanded, "Get a Ruski — go on — get a Ruski!" When we obliged he declared he could not understand the reply, so we explained that the chap the other end was talking in Russian Morse. Teddy then wanted us to send out a message and receive it back ourselves;

he seemed doubtful of our prowess because we could not do it for him. By this time we were a bit browned off, so we got rid of him.

Some words of wisdom were uttered by two members of the other sex; one explained to her small son that we were sending SOS's to ships, while another proclaimed that what she heard sounded "just like Luxembourg."

During the afternoon of Thursday July 11 the pirate of all pirates came up with the call-sign G3PGM. When we queried the call and announced that three operators, including two old-timers, were waiting for him, he took fright and vanished. The previous day we gave QRZ to a station calling us, who returned to say they were Army radio mechs. in Germany testing, and would we give them a report. We became stony silent.

The general reaction of onlookers was rather unusual. Much to our surprise they did *not* take a great deal of interest in us when we were working phone. It would seem that the general public has become used to seeing someone talk into a microphone, and hearing a voice from a loudspeaker. On the other hand, when we were pounding brass for dear life, sizeable crowds gathered round and looked to be intensely interested. Even though 99 out of 100 had not the faintest notion of what we were actually doing, they seemed completely mesmerised. Interest became almost fanatical when some far-off country was contacted, the high-light being when G3BDQ hooked 3W8AA in Northern Viet-Nam. We felt certain many of the onlookers thought we understood Chinese.

To assist people who watched us, we chalked up on a black-board the call-sign and country of origin of stations worked. There was also a list which grew daily,

showing countries worked to date. This aroused considerable comment. There was also an oscilloscope on a table nearby, rigged to amuse people by showing waveforms when they spoke into a microphone; but being in a strong RF field it also managed to reproduce our key and phone transmissions and thus demonstrate that we really were sending out something. The microphone also picked up sound from the speaker and showed waveforms of that, too. This accidental demonstration, at a distance, caused endless wonderment.

When the rig was fired up for a try-out on the evening of Friday July 5, our first QSO was with W1AXA on 14 mc CW, the second being with UB5AI. Our final contact before we went QRT on Saturday July 13, strangely, was also with a W, this time W2IOP on 14 mc CW.

Perhaps the two outstanding QSO's were those with G3HLS/M in Bromley, Kent, who was putting in a cracking signal, and the reply to a chance CQ-VK at 1050 on Friday July 12 which brought us VK3CX. Unfortunately, we lost the VK when a W1 and an OZ neatly sat on us and proceeded to pound out G6HH/A. What we called them was nobody's business.

An analysis of the station log shows that during the week we had 240 QSO's and worked 194 stations. Of these, 12 were worked on 14 mc phone, 56 on 14 mc CW and 126 on 7 mc phone. Eleven QSO's on 7 mc phone were with stations on the Continent, the remainder being with G's. A total of 35 countries was safely in the bag by the time we went QRT, which is not bad going.

G6HH/A would like to say a hearty "thank-you" to all stations worked for the very pleasant QSO's, and to reciprocate their 73.

SIEMENS-EDISWAN MERGER AFFECTS TUNGSRAM VALVES

With the complete integration of Siemens Bros. and Edison, Swan the handling of Tungfram Valves reverts to the British Tungfram Radio Works Co., Ltd., West Road, Tottenham, London, N.17. The new firm of Siemens Edison Swan, Ltd. (as it is now known) will continue to be responsible for the manufacture and distribution of all Ediswan Mazda valve and CRT types. Certain of these have been increased in price since the beginning of July.

WARNING OF DANGER?

In the House of Commons on July 3, the Postmaster-General said, in reply to a question, that he "Intends to set up a new Committee, which will include representatives of industry and users, to advise (him) on the broad aspects of radio frequency allocation." Since frequency allocation is settled by international agreement (one of the few matters in which the Russians do co-operate fully, because they have to) presumably the new PMG Committee will deal only with those frequency areas under direct domestic control. These are mainly UHF/VHF — but in view of the pressure on all our bands, HF as well as VHF, the situation, and the composition of this Committee, wants careful watching. We are surrounded by ill-disposed persons, who would gladly have us off the air altogether.

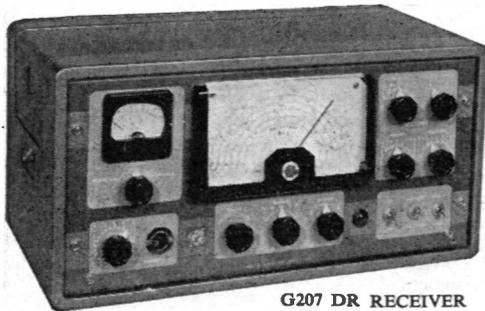
BLIND AMATEUR REGISTER

Further to the notices in the June and July issues of SHORT WAVE MAGAZINE, we now have the call signs, names and addresses of no less than 35 U.K. licensed amateurs who are sightless. Each is being asked to supply certain information for the Register of Blind Amateurs, and it is hoped to initiate regular net operation on the 80 and/or 40 metre bands, when details of equipment and operating times are available. In the meantime, anyone who is aware of a blind amateur who may not yet have made himself known is asked to put him in touch — see p. 190 June and p. 242 July for further information.

In connection with this project, we have in mind the possibility that readers generally may have items of equipment that they would like to donate to their sightless colleagues. In collaboration with G6KJ — who is in charge of the Register of Blind Amateurs, and is himself sightless — we would arrange for potential donors to be put in touch with those who may be in need of the apparatus they have for disposal. In the first instance, readers with spare gear for this purpose are asked to write in — to G6KJ, Blind Amateur Register, c/o The Editor — saying exactly what they have to give away. (It should, of course, be useful apparatus in reasonable working order.)

Please *do not*, however, send any such equipment in to us. Our function is simply to act as a clearing house for information, not for the actual gear. We will in due course put donors in contact with suitable recipients.

Quality Electronic Equipment All Guaranteed in Perfect Condition



G207 DR RECEIVER

GELOSO Equipment from stock

G207/DR RECEIVER Double conversion superhet; band spreads 80, 40, 20, 15, and 10m. A.M. and c.w. Crystal filter. 'S' meter. Excellent signal/noise figures. Complete with valves, £83.

G210/TR TRANSMITTER Completely enclosed with power supply unit 35w. input. 80, 40, 20, 15, and 10m. Mod. pair 6L6g's. Audio input for crystal/microphone, phone/c.w. Pi output circuit. Price 65gns. less valves,

SIGNAL SHIFTER Output 80, 40, 20, 15, and 10m. to drive single 807 (model 4/101) or two 807s (model 4/102). Calibrated dial 8 1/2" x 5". Uses valves 6J5GT, 6AU6, 6V6G. Less valves, £7 17s. 6d.

TR 175 TAPE RECORDER Speeds 1 1/2" and 3 1/2" per sec., give playing times of 1 hr. and 1/2 hr. with standard tape. 10" x 5 1/2" x 6", weight 7 1/2 lb. Complete with microphone, tape and tele/radio pick-up, 38gns. Carrying pack 36/-

E.M.I. SPECIALISED EQUIPMENT FOR THE AMATEUR All Brand New

1 Mc/s SPOT FREQUENCY MARKER Type AD/U405. For bands 2, 7, 14, 28, 29, 30, 144, 145, and 146 Mc/s. External power supply required £4 5s. 0d.

65-150 Mc/s V.H.F. GRID DIP OSCILLATOR Type AD/U406 External power supply required £4 5s. 0d.

1.6-30 Mc/s ABSORPTION WAVEMETER Type AD/U408 £4 5s. 0d.

V.H.F. ABSORPTION WAVEMETER and FIELD STRENGTH METER Type AD/U409 Frequency range 65-150 Mc/s £4 5s. 0d.

WANTED URGENTLY

BC221

FREQUENCY METERS or Cases

Also TS174, TS175 and all U.S.A. Microwave Test Equipment.

AVO VALVE TESTERS

Roller panel Type

£8.15.0 each

AVO 1957 Manual £11.5.0 extra

AVO RESISTANCE CAPACITY Bridges £7.10.0 each

Taylor Model 82A.

AC/DC Test meter Ranges : 0-500V; 0-10A AC/DC ; 0-1 Meg. resistance, £8.15.0

UNIVERSAL ELECTRONICS

22/27 LISLE STREET · LEICESTER SQUARE · LONDON · W.C.2

Call, write or phone : GERrard 8410

VALVES : EA50, 1/6. 125C7M, 2/6. IA3, 5P61, V570, 3/-, 6J6, 1629, EF36, EL32, TT11, VR116, 9006, 4/-, 6B8G, 6F8G, 6G6G, 4/6. 3D6, 6AC7M, 6AK5, 6C4, 6J5GT, EF39, 5/-, IA5, 6K7G, 5/6. 1LD5, 6J5M, 6/-, 5Y4G, 6F6M, 6SK7M, 6SN7GT, 6X4, 6/6. 3A4, 7/-, 6AM6, 6BE6, 6K7M, 6SA7M, 6SG7M, 6SJ7M, 6SL7GT, 6SQ7M, 6V6GT, 6L7M, 6X5GT, 12C8M, 12SK7M, 12SR7M, 42, EBC33, EF91, EB91, VR150/30, Z77, 7/6. 6AT6, 12AT6, EZ40, 8/-, 2A3, 3Q4, 5U4G, 6AQ5, 6AU6, 6BA6, 7Y4, 6K8G, 12BE6, 12SQ7M, 12AU7, 35Z4, 35Z5, 50L6GT, 80, EF37A, VR105/30, EZ80, 8/6. 7B7, 7C5, 7C6, 12AU6, 12Q7GT, 12K7GT, EF80, 9/-, 3A5, 6Q7GT, 12J7GT, 35L6GT, DAF96, DP96, DK96, DL96, DL33, ECC82, ECC83, KT33C, PL82, PY80, PY81, PY82, VU39, 9/6. 6AG7M, EABC80, EBF80, EBF89, ECH81, ECL80, EF85, EF89, EL41, EH80, UY85, 10/-, 5R4YG, 6K8M, 801A, EAF42, EBC41, ECC85, ECH42, EF41, EL84, GZ32, PCC84, UAF42, UBC41, UBF89, UABC80, UCC85, UF41, UL41, UCH42, 10/6. ECC84, PCF82, 11/-, 6BR7, 6L6M, ECF82, EYS1, PL83, 11/6. 6F13, 6U4GT, 12AH8, 866A, PCF80, PCL83, R19, U25, EY86, 12/6. ECF80, 13/6. 830B, 15/-, 446A, 17/6. 803, 20/-, 5B/254M, 21/-, 808, HK24G, 25/-, 805, 30/-, 811, 45/-, 813, 95/-.

WHIP AERIALS. 12' 6" long, 4 section, screw-in (part of BC610 whip), 12/6 each, plus 3/- carr. Beautiful job.

RF24 UNITS. New with 3 SP61, 12/6, post paid.

COMMAND RECEIVERS BC454B. 3-6 Mc/s. New with 6 valves, 45/- each. Ditto but 1.5-3 Mc/s. Not new but good condition, 55/- each, post paid.

MAINS TRANSFORMERS 1.-190/250v. input, 10v. 10a. 2 1/2v. 10a. twice, all CT. and HV insulation. American manufacture, 28/6 each. 2.-230/250v. input, 10v. 2a. O/p. 7/6. Midjet, 230/250v. input (same size as std. spkr. o/p), 220v. 20 m/a., 6.3v., 0.6a. Ditto, but 175v. 25 m/a. Both types 11/9 each, post paid.

RESISTANCE UNIT TYPE 231. Comprising 12 heavy duty carbon non-inductive 80 ohm. resistors (10" long) in perforated metal case. Ideal dummy load or RF measurements, 32/6 each. carr. paid.

Post 6d. under £1. S.A.E. enquiries please. We regret we cannot accept overseas orders.

JOHN ANGLIN

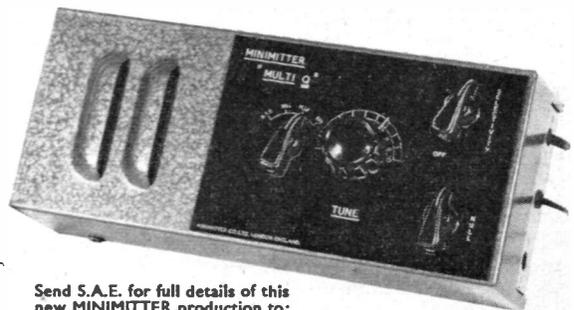
385 CLEETHORPE ROAD, GRIMSBY, LINC'S. Telephone 56315.

DO YOU WANT . . .

- 100% improved reception from your present receiver? Extra gain and selectivity, perfect C.W., B.F.O. and superb S.S.B. reception?
- Then write for full details of the new MINIMITTER MULTI-Q. Regardless of the type of your receiver, provided it has an I.F. of between 450-470 kc/s, this compact, self-contained unit will give you all this and more.

Continuing our policy of offering the amateur up-to-the-minute high performance equipment at the minimum cost, we proudly present the

minimitter multi-Q



Send S.A.E. for full details of this new MINIMITTER production to:

The Minimitter Co. Ltd.

37 Dollis Hill Avenue, London, N.W.2.

Tel.: PADDington 2160

—SUMMER TIME IS—

Beam time!

Get the latest MINIBEAM now :

- New die cast alloy fittings.
- New unbreakable insulators.
- Fed with 300 ohm tubular down the centre of the 2" pole.
- It is unobtrusive, light-weight and extremely efficient.
- 3 Bands—One Beam; switched only at the transmitter.

Patented throughout the World and made only by PANDA.

Get the new G4ZU now and get on the beam

Delivery ex-stock and still only £21. Crg. fwd.

AUTOMATCH £7.17.6 300 ohm feeder 1/6 yd.
(12 yds. required).

Panda Radio Co. Ltd.

18 - 18 Heywood Road, Castleton, Rochdale.
Tel.: Castleton 57396. Cables: Panda, Rochdale.

FOR SALE

NEVER BEFORE OFFERED

COMPLETE AMATEUR RADIO TELEPHONE-TELEGRAPH TRANSMITTING-RECEIVING STATION of highest quality made by Scientific Communications Ltd., London. The whole equipment is rack mounted in four 6ft. Bays, is finished in grey and chrome and operates from 230v. A.C. supply. It comprises:

Bay 1.—600 WATT TRANSMITTER for 20, 40, 80 and 160 metre bands turrent tuned with 5-way Crystal oscillator, Doubler, Trebler and R.F. Panel (P.A. is 2-HF-300 valves in push-pull). Power unit 3000v. Variac controlled.

Bay 2.—HOWARD MODEL 450A COMMUNICATIONS RECEIVER with 2-I-F freq.; range 500 kc. to 65 m/c continuous; Crystal; BFO; Band spread tuning; "S" meter etc. **MODULATOR PANEL 2=**TZ-40. **POWER SUPPLY PANEL 1250v.**; Loudspeaker 12" m/c.

Bay 3.—AMPLIFIER PANEL 8 valves with power supply. H.F. speaker **POWER SUPPLY PANEL 1250v.** **POWER SUPPLY PANEL 750v.**

Bay 4.—CONTROL PANEL with Pilot indicators for all circuits. Switching Panel; Patch Panel, and Power Input Panel with twin Variacs.

Numerous refinements such as Modulator %, Carrier and 3 D/B meters (4" square)—there are a total of 22 meters—automatic HT switching—are fitted. The valves are visible behind glass panels in chrome surrounds, everything is engraved and flush mounted and the whole forms a most impressive array, a pleasure to look at and use.

THE EQUIPMENT was specially constructed and is the only one of its kind. It is for disposal owing to removal and was purchased new by present owner. Original cost £1,200. The low price of £185 will be accepted which is practically the cost of the variacs, meters and valves only.

Also available is the Aerial Equipment comprising 70ft. tapered Lattice Steel Tower and feeder made by Painter Bros. of Hereford.

NONE OF THE ABOVE IS EX-GOVERNMENT SURPLUS
CAN BE SEEN AT BOURNEMOUTH, HANTS.

D. B. DEANE-GRAY,
G3JNG, 92 Cheyne Walk,
London, S.W.10.

NEW ZEALAND

Radio Mechanics

Applications for posts with the New Zealand Post and Telegraph Department are invited from fully experienced single men between 21 and 30. Excellent pay and conditions. Free passages are granted to successful applicants. For full information apply to New Zealand Migration Office, Adelphi Building, John Adam Street, London, W.C.2 quoting this advertisement.

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 Wave Magazine, 55 Victoria Street, S.W.1.

SITUATIONS VACANT

MINISTRY OF TRANSPORT AND CIVIL AVIATION: TRAINEE COMMUNICATIONS OFFICERS. Applications invited from men and women aged at least 18. Candidates must have an elementary knowledge of radio communication principles, be able to send and receive Morse signals at 20 words a minute; type or teleprint at 30 groups a minute; transmit and receive telephone messages. Weekly rates of pay whilst under training from £6 1s. 9d. at age 18 to £8 17s. 6d. (men) and £8 13s. 0d. (women), at age 25 or over, plus free meals and accommodation. On successful completion of training course, annual salary will be £347 at age 18; £568 at age 25 or over, rising to £706 for men; £349 at age 18, £536 at age 25 or over, rising to £637, for women (slightly lower rates at certain stations). Women's pay being improved under equal pay scheme. Appointments will be temporary (non-pensionable).—Application form and further particulars from Ministry of Transport and Civil Aviation (ESB1/COM), Berkeley Square, London, W.1.

RADIO TECHNICIANS IN CIVIL AVIATION. A number of appointments are available for interesting work providing and maintaining aeronautical telecommunications and electronic navigational aids at aerodromes and radio stations in various parts of the United Kingdom. Applications are invited from men aged 19 and over who have a fundamental knowledge of radio or radar with some practical experience. Training courses are provided to give familiarity with the types of equipment used. Salary £561 10s. at age 25, rising (subject to a practical test) to £671. The rates are somewhat lower in the provinces and for those below age 25. Prospects for permanent pensionable posts for those who qualify. Opportunities for promotion to Telecommunications Technical Officer are good for those who obtain the Ordinary National Certificate in Electrical Engineering or certain City and Guilds Certificates. The maximum salaries of Telecommunications Technical Officers are: Grade III, £830; Grade II, £980; Grade I, £1,190.—Apply to the Ministry of Transport and Civil Aviation (ESB 1/RT), Berkeley Square House, London, W.1, or to any Employment Exchange (quoting Order No. Westminster 2109).

SITUATIONS VACANT—continued

OVERSEAS: Men capable of maintaining portable medium-power low-frequency transmitter for Radio Survey Control. Service with Forces, or Amateur Transmitter's R/T knowledge preferable. Salary: £69 10s. monthly and all found when abroad. Initial contract, one year (possibility permanency).—Box No. 1894, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

DEVON HAM DEALER REQUIRES RADIO/TELEVISION ENGINEER; PREFERS LICENSED HAM; MUST BE FIRST-RATE MAN WITH INITIATIVE AND EXPERIENCE. PERMANENT POSITION. ACCOMMODATION AVAILABLE. EXCELLENT WORKING CONDITIONS.—R. B. HOLMAN, G2DYM, 86 FORE STREET, KINGSBRIDGE, S. DEVON.

FORCES' BROADCASTING SERVICE: TECHNICAL ASSISTANTS.—The Civil Service Commissioners invite applications for three pensionable posts under the War Department. The posts are in the Middle East, East Africa, Germany and London. Age at least 25 years on 1st August, 1957. Candidates must have passed Radio II of the City and Guilds examination, or examination of equivalent or higher standard, or produce other evidence of training and experience of special value and at least 2 years' experience in operation and maintenance of medium and short wave transmitters or of recording and general studio equipment. SALARY: Men, £469-£691. Somewhat lower in provinces. Women's somewhat lower, but being improved to reach equality with men's by 1961. Foreign service allowance, at present tax free, may also be payable to cover the extra costs of having to live outside the United Kingdom. Promotion prospects.—Particulars and application forms from Secretary, Civil Service Commission, 6 Burlington Gardens, London, W.1, quoting 4742/57. Completed application forms should be returned by 23rd August, 1957.

TRADE

QSL CARDS AND LOG BOOKS, G.P.O. APPROVED. CHEAPEST, BEST. PROMPT DELIVERY. SAMPLES.—ATKINSON BROS., PRINTERS, LOOE, CORNWALL.

TELEVISION INTERFERENCE. — Receiver Filters: High-pass E.5037, 30/-; Low-pass E.5031, 30/-; Composite Band I/III, 49/6. Transmitter Filter E.5034, 80 dB, 1 kW, £6. — Labgear (Cambridge), Ltd., Willow Place, Cambridge.

QSL's and Logs by Minerva. The best there are.—Samples from Minerva Press, 2 New Road, Brentwood, Essex.

WANTED: BC610 Hallicrafters, ET-4336 Transmitters. BC-312 Receivers, BC-221 Frequency Meters and spare parts for all above. Best cash prices.—P.C.A. Radio, Beavor Lane, Hammersmith, W.6.

G3CGD QSL's. Fixed and mobile samples on request. Printing enquiries welcome.—30, St. Luke's Road, Cheltenham.

READERS' ADVERTISEMENTS

3d. per word, min. charge 5/-, payable with order. Please write clearly, using full punctuation and recognised abbreviations. No responsibility accepted for transcription errors. Box Numbers 1/6 extra. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, S.W.1.

S.740 UNMODIFIED, £25. Q.S.T., January-June, 15/-.—R. Grain, 15 Waverley Gardens, Grays, Essex.

RADIO AMATEURS..



You must be a good MORSE Operator to possess an Amateur Radio Transmitting Licence. A "slap-dash" 12 w.p.m. neither satisfies the authorities, yourself nor your operator friends. Morse operating is an exacting art unless your training is made simple and is based on sound fundamentals. For this reason the Candler System was invented to take the "grind" out of Code tuition and to turn a "tricky" subject into a pleasurable pursuit.

Send 2½d. stamp for full details.

CANDLER SYSTEM CO.

(Dept. 55SW) 52b ABINGDON ROAD, LONDON, W.8.
Candler System Company, Denver, Colorado, U.S.A.

HOME RADIO OF MITCHAM

OFFICIAL STOCKISTS FOR THE
PANDA CUB



TRANSMITTER

We will be pleased to forward full specification and details of this fine transmitter on request. We have a demonstration model available for inspection at our showroom and delivery is from stock.

Price £59 10s. 0d. or H.P. terms.

HOME RADIO (MITCHAM) LTD

187, LONDON ROAD, MITCHAM, SURREY.

MIT. 3282

"The QUALITY radio component specialists"

AERIALS.—SEVEN FOOT, SEVEN SECTION, ALUMINIUM TELESCOPIC WHIP AERIALS, $\frac{1}{8}$ " to $\frac{3}{8}$ " dia., 16 oz., 10/- (2/6). **R.C.A. 5 element YAGI ARRAYS.** 12" dipoles on mount, 35/- (3/6). 24" "H" **PARROT CAGE DIPOLES** with 45ft. co-ax lead in on mount, ideal for F.M., 30/- (3/6).

SIX FOOT HIGH ENCLOSED TRANSMITTER CABINETS. 19" wide, drilled and tapped sides, full length rear door, £6 (20/-).

MILLIAMMETERS. 2 $\frac{1}{2}$ " dia. 0/500, 15/- (2/-); 0/300, 15/- (2/-); 0/100, 15/- (2/-); 0/1, 20/- (2/-). Voltmeters, 2 $\frac{1}{2}$ " 0/15 A.C., 15/- (2/-). All moving coil.

TRANSFORMERS, all 230v. Primary. 1000-0-1000v. 400 m/a, 7 x 6 x 6, 65/- (10/-); 1000-0-1000v. 500 m/a and 4v. 8 x 8 x 7, 75/- (15/-). 300-0-300v. 350 m/a and 4v. 6 x 5 x 4, 30/- (6/-); 7.5v. 6a. twice 7.5v. 3 $\frac{1}{2}$ a., 6.3v. 4 $\frac{1}{2}$ a. twice and 4v. (six secs.), 32/6 (7/6).

KLAXON GEARED MOTORS. 230v. A.C. 50 cyc. 60 r.p.m. $\frac{1}{2}$ h.p., 30/- (5/-).

VALVES. TZ-40, 20/-; 811, 20/-; DET-12, 20/- all (1/-).

CHOKES. 20 Henries, 400 m/a. 6 x 6 x 5, 20/- (5/-); 6 **VOLT INPUT ROTARY POWER UNITS.** 260v. 55 m/a. D.C. Output smoothed with hash filters all on rack mount, 50/- (10/-).

POWER UNITS. All 230v. A.C. input tapped. Outputs 160v. 60 m/a. smoothed and 6.3v. 5a. A.C., 35/- (7/6). Outputs 420v. 140 m/a and 150v. 10 m/a, smoothed and 13v. 2.5a. A.C., 57/6 (10/-). Output 250v. 90 m/a, smoothed, 30/- (10/-). Outputs 350v. 40 m/a smoothed and 12v. 3a. D.C., 35/- (7/6). Outputs 800v. 420 m/a smoothed, £8 (20/-). Outputs 1000v. 500 m/a, £10/- (20/-). Output 3000v. 500 m/a, £25 (cost). Input 12v. D.C. Output 300v. 260 m/a, 35/- (7/6).

Amount in brackets is carriage, England and Wales.
Large quantity ham gear.
Full lists available. Satisfaction guaranteed.

P. HARRIS
ORGANFORD DORSET

Southern Radio's Wireless Bargains

TRANSRECEIVERS. Type "18" Mark III. Two Units (Receiver and Sender) Complete with Six Valves, Microammeter, etc. in Metal Carrying Case. Untested, without guarantee but COMPLETE £2 18s. 6d.

RECEIVERS R.109. Short Wave Receiver complete in Case with eight valves. Built-in Speaker and 6-volts Vibrator Pack. Untested without guarantee but COMPLETE..... £2 18s. 6d.

ATTACHMENTS for Type "38" Transreceivers. ALL BRAND NEW. HEADPHONES, 15/6; THROAT MICROPHONES, 4/6; JUNCTION BOXES, 2/6; AERIALS, No. 1, 2/6, No. 2, 5/-; WEBBING, 4/-; HAVERSACKS, 5/-; VALVES, A.R.P. 12, 4/6; A.T.P.4, 3/6. Set of FIVE VALVES 19/- the set.

ATTACHMENTS for "18" Transreceivers. ALL BRAND NEW. HEADPHONES, 15/6; HAND MICROPHONE, 12/6; AERIALS, 5/-; SET OF 6 VALVES, 30/-.

RESISTANCES. 100 Assorted useful values. New wire end 12/6

CONDENSERS. 100 Assorted. Mica, Tubular, etc.....15/-

BOMBSIGHT COMPUTERS. Ex-R.A.F. NEW. Hundreds of Components, Gears, etc. Ideal for Experimenters.....£3

LUBRA HOLE CUTTERS. Adjustable $\frac{3}{8}$ " to $\frac{3}{4}$ ". For Metal, Plastic, etc. 7/-

QUARTZ CRYSTALS. Types F.T.241 and F.T.243, 2-pin, $\frac{1}{8}$ " Spacing. Frequencies between 5675 Kcs. and 8650 Kcs. (F.T.243) 20 Mcs. and 38.8 Mcs. (F.T.241, 54th Harmonic), 4/- each. ALL BRAND NEW. TWELVE ASSORTED CRYSTALS, 45/-.. Holders for both types 1/- each. Customers ordering 12 crystals can be supplied with lists of Frequencies available for their choice.

MORSE TAPPERS. Standard type, 3/6; Extra Heavy on Base, 5/6; Midget, 2/9.

TRANSPARENT MAP CASES. Plastic, 14" x 10 $\frac{1}{2}$ ". Ideal for Maps, Display, etc.....5/6

DINGHY AERIALS. Ex-U.S.A. Reflector Type.....4/6

STAR IDENTIFIERS. Type I A-N Covers both Hemispheres 5/6

CONTACTOR TIME SWITCHES. 2 Impulses per sec. in case 11/6

POST OR CARRIAGE EXTRA. FULL LIST RADIO BOOKS, ETC., 3d.

SOUTHERN RADIO SUPPLY LTD.
11, LITTLE NEWPORT STREET, LONDON, W.C.2.
GERrard 6653

SMALL ADVERTISEMENTS, READERS—continued

HRO SENIOR; four coils, 1.7 to 30 mc; bandspread 10/20/40/80; power pack; £20 (o.n.o.).—R. Kenny, 14 Elswick Road, Newcastle-on-Tyne, 4.

WANTED: Communications Receiver in good working condition.—Please state price and details of type, frequency ranges, etc., Box No. 1889, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

CR 100: Excellent condition and performance; no modifications, speaker, £20 (carriage free). Pifco radiometer, as new £1; 6v. Vibrator pack, output 160v. 10 mA, fully smoothed, spare vibrator, £1.—B. Taylor, Irvine Crescent, Bathgate, West Lothian.

WANTED: Complete Coils, ranges 3, 4 and 6, Eddystone 358 or 358X receivers.—P. Pond, Ceinfan, Lampeter Road, Aberayron, Cards.

SMALL AMATEUR STATION for sale (getting married). Table-top Tx, 25 watts, wide-band couplers, 80-15 metres, TVI-proof. SX-24 needs slight attention. Accept £30.—G3KOJ, 38 Salcombe Gardens, Mill Hall, London, N.W.7.

MORSE RECORDS for sale; 10 Lessons, 8-12 w.p.m., 30s.—3 The Crescent, St. Bees, Cumb.

A BARGAIN: Two Infants for quick sale; Minimitter Tx, 150 watts, with Acos crystal microphone, 14 months old, 60 guineas. Eddystone S.750, 18 months old, 48 guineas. Cash preferred, or instalments considered. No exchanges. Reason for sale: QSY abroad soon.—GW3KWI, Dr. Stewart, Senior Obstetrics Officer, Mount Pleasant Hospital, Swansea, Glam.

SALE: Gelo 5-band VFO, brand-new, boxed, S with valves, £6 10s. 0d. Woden 75-watt modulator, £30. High-voltage power packs, mains transformers, chokes, valves, crystals, UM1, UM2, mod. transformers, etc.; all at low prices.—Ellis (G3SN), 47 Victoria Road, Saltash, Cornwall.

R.C.A. 12-watt speech amplifier for 230v., AC mains, with pedestal moving-coil microphone, £9 10s. 0d. BC-312, perfect, less dynamotor, needs mains power pack only, £10 10s. 0d. Garrard single-speed autostop turntable, £1 15s. VFO using Franklin oscillator outputs to CO stage on three bands; built-in power and in crackle cabinet, £10. Buyers pay carriage.—Box No. 1890, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: R.208 Receiver, £10; R.107 Receiver, £10; Eddystone 358X, £15; 1132A. P/Pack, O/P stage, £3 10s. Two TS46 Telechsions, complete, unworking, 30s. each; 100 Valves: 6V6, 6K7, 3s. each; 10 VCR-97, with screens, 10s. each, perfect.—K. Briscoe, 311 Eton Road, Ilford, Essex.

FOR SALE: B2 Xmitter/Receiver, Coils, Key, £8 10s. 0d.; Eddystone 358, P/Pack, Coils, 31 mc-90 kc, £10; TA12C, wired for 12v. Htrs., wkg 40, 80, manual, £4 10s. 0d. (or nearest).—G. Thomson, 88 High Street, Ayr.

SALE: R1155B with 160m. and O/P stage, xtal converter for 15 and 10 m., £12 (buyer collects). Series 8345 AC/DC Test Meter, £4; 813, £2 (or best offers). **WANTED:** HRO S-meter and b/s coils.—G3LDI, 128 Drayton Road, Norwich, Norfolk.

FOR SALE: Panda PR120V Transmitter, with Panda ATU150; cost, new, £165; in mint condition, with Manual, used only about twelve hours; £125 (or near offer). AR88 (CR91), six bands, S-meter, in metal cabinet, excellent condition, with Manual, £40 (or near offer).—Box No. 1892, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS, READERS—*continued*

FOR SALE: Amplifier, S/H tuner, 10in. speaker, cabinet, £10. Work Bench, £2. 6v. Charger Transformer and Rectifier, £1. Absorption Wave-meter, 10s. RF Locator, 10s. VCR97, 517, £1 each. Tool Cabinet containing several hundreds components, £3. Scope EHT transformer, 17/6. Tx cabinet by G4BI, 35s. S.a.e. details. Carriage extra.—Box No. 1891, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

80 OHM 50 WATT non-inductive resistors for Dummy Aerials, 5s. 6d., post free.—G3HAL, 28 Vicarage Road, Winslow, Bletchley, Bucks.

CR-100: Exceptionally fine condition, S-meter, noise limiter, manual; complete set spare coils, xtal and tuning capacitor; £27 10s. 0d. (or separate).—Wood, 6 Wensley Road, Gatley, Cheshire (Tel.: Gatley 3936).

URGENTLY REQUIRED: Hallicrafters SX28 Second IF transformer; your price paid. Also required: BC-453, perfect condition essential.—G3KJG, 6 Handforth Grove, Manchester, 13.

75A1, 10A, Matchbox, Micromatch mm.4, 230/110 volts in 1000v. 500 mA or 2000v. 250 mA P/Pack. New Cadenza ribbon.—Offers to 33 Lloyd Street, Llandudno, Caernarvonshire.

WANTED: TCS Transmitter Receiver without (or with) valves, for stripping; also GEC Miniscope, must be cheap; also Collins Mechanical Filter.—Box No. 1903, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

COMPLETE Power Supplies, 1200v., 250 mA; Partridge transformers, chokes, 650v. 2000 mA, Woden transformers, chokes. Modulator 6SJ7, 6J5; P/P 6J5; P/P 807; ATU, complete coils, meter, relays. Relay power supply on chassis. PA PT-15's, fully metered, 6ft. rack, 19in. standard. All above units on 19in. standard chassis. £30 the lot (or offers separately). Will exchange for first-class all-amateur band receiver. — D. W. Hudson, 37 Marlborough Road, Shipley, Yorkshire.

WANTED: Woden UM3, 650v.-0-650v. 300 mA, 750v.-0-750v. 300 mA, 50v. 1-amp. transformers. Heater Trans.: 6.3v. 6A twice, 6.3v. 6A-5v. 6A. Also commercial all-band transmitter.—70 Arnold Road, Binstead, Ryde, I.O.W.

EXCHANGE excellent fibre-glass Fishing Rod and threadline reel (both almost brand-new) for good Communications Receiver; London area.—Box No. 1893, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

BC-221 Aluminium Case, with valves, £2 10s. CNY-2 Tx/Rx, £8. CR-100 Transformers, £1. 35TG valves, 17/6. All brand-new.—17 Kent Road, Atherton, Manchester.

WANTED: Instructional Manual for ex-Service oscilloscope, U.S. make RWM81B, RAF 110-SB54.—Box No. 1896, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

GELOSO VFO, unused, no valves, £6 10s.; SX16, working, but requires servicing, £18; PA stage, 813's P/P, with heater trans., valves, meter, plug-in coils, attractive metal cabinet, £15. Similar 808's P/P, £10.—Box No. 1898, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

GELOSO 210-Tx and 20T Rx. quick sale for cash; two months old, and perfect. Tx, £50; Rx, £60. Also Philips car radio, as new, with aerial, £16 (6- or 12-volt operation). — Box No. 1897, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

TRANSMITTER NAVY MODEL TCK-7

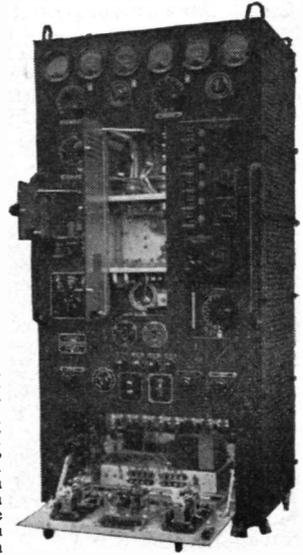
Yours for only £10

American transmitters still in original packing cases. Designed for the Navy, these are really beautifully made and most impressive, standing 5ft. high by 2ft. wide and finished in instrument crackle. All meters and controls are on the front panel. The transmitter tunes over the range of 2 megacycles to 18 megacycles and it is designed for high speed precision communication without preliminary calling. Frequency control and stability is particularly good, being better than .005% under the worst conditions. Power output is 400 watts on C.W. and 100 watts on phone. Tuning is very simple—a unit control mechanism gives a direct reading in frequency.

Complete with valves and instruction manual. Price £65 cash or £10 deposit and 12 payments of £5—carriage extra at cost.

NOTE: Power packs are not supplied with these but full details of power requirements are given in the instruction manual.

View by appointment only.



ELECTRONIC PRECISION EQUIPMENT LTD
(Dept. Q) Sutton Road, Eastbourne

ALTHAM RADIO CO. LTD.

Jersey House, Jersey Street, Manchester 4.
Tel.: Central 7834/5/6.

TO OVERSEAS BUYERS

We have the largest stock in Europe of U.S.A. Government surplus electronic material. What do you require?

This month's special offer:

TRANSISTORS Red-Spot, approximate equivalent
Mullard OC71 5s. 4d. each
New American Field Telephones Type EEB at a very low price.

WE WANT TO BUY

All U.S.A. Test Sets prefixed TS and
APN3, APN9, ARC3, ARN7, ART13, BC221,
BC788C, CPN2.

**BRASS, COPPER, BRONZE,
ALUMINIUM, LIGHT ALLOYS**
IN ROD, BAR, SHEET, TUBE, STRIP, WIRE

3000 STANDARD STOCK SIZES

H. ROLLET & CO., LTD.

6, CHESHAM PLACE, LONDON, S.W.1.

SLOne 3463

Works: 36 ROSEBERY AVENUE, LONDON, E.C.1.
Branches at LIVERPOOL, MANCHESTER, BIRMINGHAM, LEEDS

"No Quantity too Small"

SMALL ADVERTISEMENTS READERS—continued

WILCOX-GAY VFO, £2; Trans. 350-0-350v., 6.3, 5v. filaments, brand-new, 35s.; also 600v., 200 mA, 30s. Meters, transformers, etc.—G6TC, 136 Black Halve Lane, Wednesfield, Wolverhampton.

BC312 Modified; very good condition, crystal filter, N/L, RF and audio gain controls, output stage, mains P/Pk., £11.—G3FAU, 23 Shacklewell, Stevenage, Herts.

PANDA PR120V, new, £100. Consider part-exchange Collins 75A, National NC-300, etc.—Box. No. 1899, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Complete Mobile Installation, any bands, 6- or 12-volt.—Full details and price to Box No. 1900, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Eddystone 888 Receiver with S-meter and speaker; delivered 6 weeks ago and now unwanted; would accept mint condition AR88, SX-42, SX-43, SX62, or similar, in part or full exchange. Delivery by car arranged 100 miles of London.—Box No. 1901, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR QUICK SALE: S-meter and Mounting Plate, suitable AR88; BC-221T, complete with canvas bag and AC power unit; S27 receiver, 28-143 mc; P.58 receiver, 290-650 mc; Taylor Signal Generator, 65C, 100 kc-160 mc; Labgear 2-metre converter, power pack, 19-in. rack mounting, 1250v. at 300 mA and 350v. at 120 mA; all Woden transformers and chokes, metered, and arranged relay control. Late type HRO-MX, enclosed crystal model, fitted noise limiter, bandspread coils for 80, 40, 15 and 10 metres, power pack, speaker and manual. Also Pandaptor for same if required. Mint condition. Delivery arranged.—Hanks, 25 Russell Avenue, Sprowston, Norwich, Norfolk.

75 w. MOBILE OUTFIT OR FIXED STATION, modified ZC1, Mk. II Transmitter and Receiver, working 40, 80 and 160 m. bands. Offers?—G2MF, 51 Townhead Road, Dore, Sheffield.

LAVOIE Micro Wave Frequency Meter, Model L105SM, 375/725 mc, with manual, £15 (o.n.o.).—Box No. 1902, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: TS3B, 40s.; 17 Set, 30s.; Westinghouse Strickle charger, 200-250v. in, 6-12v. out, 30s.; Motor Gen., 11-12v. in, 480v. out, 10s. Valves: 1A7, 1H5, 1C5, PM12, S215, H210, PV215, 2s. each, 10s. lot. **WANTED**: Rotary Inductor, Lcng Whip, Transistors, Components.—Lloyd, Duckworth Farm, Shawforth, Rochdale.

CR100/4, 6 months old, not "surplus"; performance to maker's specification, figures available; full muting fitted for H/S BK. Genuine bargain; good reason for sale; £17 10s. Buyer collects.—233 Chelmsford Road, Shenfield, Essex. (Brentwood 699).

WANTED: Transformer 750-0-750v., 250 mA., 6.3v. 5v.; swinging choke 5/25H, 250 mA. Please state physical sizes.—G3JSG, 18 Harrow Avenue, Rochdale, Lancs.

MINI-MITTER CONVERTER, 1.5 mc IF, £15; ASB8, £4 10s.; spare lines with Lighthouse valve, £1 10s.; BC-342, £5; R.1294, modified 70 cm, £4; CV105 Unit, £1; 19 Set, 3.5, 7 mc, with Gene, ATU, Cables, £7.—Hales, 165 Longley Road, London, S.W.17. (Bal. 7753).

G5RV, Elizabethan 50-watt Tx, with power supplies; can be seen working; £15. R.1155N dial, drive, condensers, 7/-. Buyer covers transit.—G3BNW, 13 Heywood Road, Alderley Edge, Cheshire.

STEEL MAST: Six 8ft. 6in. sections, each with 8in. overlap, 3in. diam., with strainers and brackets, £5. R1667A Rx, 200 mc, new, all plugs, etc., with circuit and conversion notes per M.O.S., £2 10s. CR100 tuning pack with gang condenser, all IF coils, crystal gate, BFO, selectivity Sw., new, unused, with circuit, £3 10s. Desk-type 0-1 mA. 2½in. meters, 25s. New SP61 1/6. 78 r.p.m. variable speed gram. motor with turntable, £1. Vitavox m/c, microphone, 30s. 204v. DC rot. gen., 230v., 50c., 100 watts, £2. Premier large 30-watt Matchmaker multi-ratio trans., output and mod., £2 10s. Condensers: 4 µF, 2kV, working; 2 µF, 2.5 kV, working; 2 µF 4 kV, working; 5s. each. U.S.A. oil µF, 1500v., working, 1s. 6d. Carriage extra all above. Exchanges for Test Gear considered. **WANTED**: S27.—Palmer, 16 The Crest, Widley, Portsmouth.

MORSE CODE Records wanted.—Price and particulars to W. E. Whitmore, Stirton, Skipton, Yorkshire.

500 FT243 xtals., 3.5, 7 and 8 mc, at 7s. 6d. each. Send stamp for list of frequencies.—G5YV, 8 Ashfield Avenue, Morley, Leeds.

"WIRELESS WORLD" QUALITY AMPLIFIER, 6V6's, power pack, and Baxandall inexpensive tone control, on three chassis; no speaker; £10. BC-221 electronic stabilised power pack, miniature valves, £4.—Cranfield, 87 Cecil Park, Pinner, Middlesex.

FOR SALE: HT and Heater Trans., 75v. bias supply, 24v. relay supply, mod. trans. UM2, etc.; Tx and Rx valves, meters, crystals, relays, cheap; s.a.e. list.—G3GHB, 31 Franklin Road, Birmingham, 30.

FOR SALE: BRT-400 Rx in mint condition; manufacturer's manual; £75.—Cutler, Barn Cottage, Walberton, Arundel, Sussex. (Eastergate 367).

WANTED: Valves, Type 4E27 or 4E27A; also CQ Magazine, March 1957.—Condition and price to G3JPT, Post Office, Barnham Broom, Norwich.

Short Wave Magazine Advertising gives
World-Wide Coverage.

SEND NOW FOR YOUR COPY OF

ELECTRONICS MADE EASY

For Amateurs, Radio Engineers, Hi-Fi enthusiasts
and Electronics Engineers. 192 packed pages, over
500 drawings, diagrams and photographs.

POST
PAID
6/6

POPULAR MECHANICS, 109 Jermyan St., London, S.W.1

ORDER FORM

Send at once "ELECTRONICS MADE EASY," remittance enclosed.

Name _____
Address _____

TIGER RADIO

LIMITED

15 VERONA AVENUE, SOUTHBOURNE,
BOURNEMOUTH,
HANTS. ENGLAND.

Tel.: Southbourne 47177

Introduce two New "Tiger" Rigs
The "TR200" Full 200w on 5 Bands £150
The "TR300" Full 300w on 5 Bands £200
(Consoles 38" x 20" x 14")

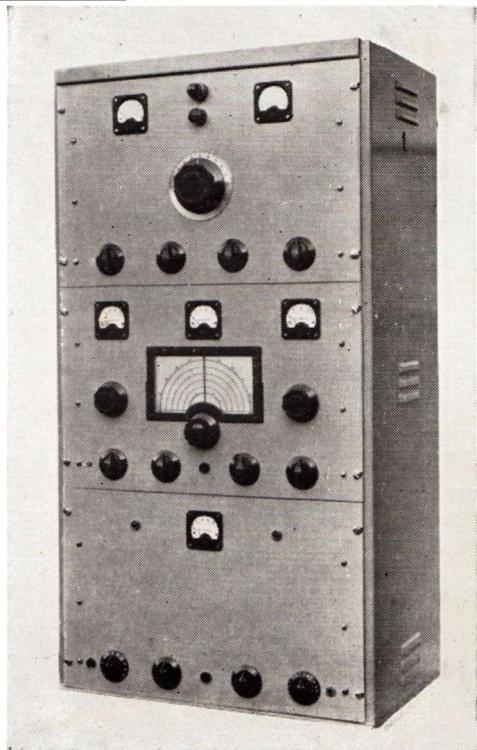
Highest Power at lowest price ever.—These fine sets, individually produced and marketed for the past 12 years by G8VB and known throughout the whole amateur world — are now being produced in Bournemouth in quantity.

Available from Stock. Enjoy a revelation in amateur transmitting.

Guaranteed Harmonic Proof

The only Rig in the whole of Europe with "W.A.S." and "W.A.C." Diplomas on 80m. Phone.

Send for descriptive leaflet "TR200."



G2AK THIS MONTH'S BARGAINS G2AK

SPECIAL OFFER —

D.104 CRYSTAL HAND MIKES

List £6 complete with 6ft. of cord and plug.

ONLY £3/10/0 each

VERY LIMITED QUANTITY AVAILABLE — DON'T BE TOO LATE

Items for the MOBILEER

• 12V. MINIATURE ROTARY TRANSFORMERS. Output 360/310V., 30mA c.c.s. or 70mA i.c.a.s. Only 4½" x 2½" overall. Only 21/- each or £2 for 2. P. & P. 2/-.

• BRITISH BREAST MIKES complete with pair of H.R. 4000 ohm Phones, in wooden carrying case, 8½" x 4½" x 7½". New "W.D." stock. Unrepeatable at 17/6. P. & P. 2/-.

• AMERICAN BREAST MIKES. Swivel head, push to talk and lock on switch. Excellent job. Only 12/6. P. & P. 1/6.

• TRANSMITTING TYPE TUNING CONDENSERS by E. F. Johnson, U.S.A. 500 pF, 1,500V. rating. Ideal for Pi Output circuits. 15/-, post 1/-.

• THE NEW GELOSO V.F.O. UNIT. Output on 80, 40, 20, 15 and 10 metres sufficient for fully driving pair of 807 or QV06/20 (6146) tubes. Complete with 8½" x 5" calibrated dial and escutcheon. Price less tubes, £7/17/6. Set of 3 tubes 24/-.

• HEADPHONES, H.R. type, 4000 ohms, very sensitive. Only 12/6 pair. P. & P. 1/6. C.L.R. (low res.) 8/6 P. & P. 1/6.

• AMERICAN 807 VALVES. New, boxed. 7/6 or 4 for 25/-, post free.

• COPPER WIRE. 14G, H/D, 140 ft., 17/-; 70 ft., 8/6, post and packing 2/-; Other lengths pro rata. Stranded 7/25, 140 ft., 10/-; 70 ft., 5/-; P. & P. 2/-.

• CONDENSERS. T.C.C. type 111. 8 mfd, 1,000 V. List, over £3. Only 10/6 each, post 1/9. 8mfd, 750 V., 5/6 each, post 1/6.

• RIBBED GLASS 3" AERIAL INSULATORS. 1/6 each or 6 for 7/6. 12 or more post free. Small shell porcelain 4½d. each, or 4/- doz.

• ABSORPTION WAVEMETERS. 3.00 to 35.00 Mc/s in 3 Switched Bands. 3.5, 7, 14, 21 and 28 Mc/s Ham Bands marked on scale. Complete with indicator bulb. A MUST for any Ham shack. Only 17/6 each, post free.

• RACK MOUNTING PANELS. 19" x 5½", 7", 8½", or 10½", black crackle finish, 5/9, 6/6, 7/6, 9/- respectively. P. & P. 2/-.

• TWIN FEEDER. 300 ohm twin ribbon feeder similar K25, 6d. per yard. K35B Telcon (round), 1/6 per yard. Post on above feeder and cable, 1/6 any length.

• COLLINS MODULATION TRANSFORMERS. P.P. 807s. 20 watts audio to parr. 807s. Beautiful job. Only 12/6 post free. Very limited quantity available.

A good range of Components and Communication Receivers always available

Full range of DENCO, REPANCO and EDDYSTONE coils and components available

CHAS. H. YOUNG Ltd

No C.O.D. on Orders under £1. PLEASE PRINT YOUR NAME AND ADDRESS
Dept. "S," 110 Dale End, Birmingham CENTRAL 1635

HENRY'S (Radio) LTD

5 Harrow Rd., Paddington, W.2

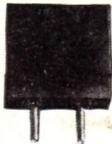
Opposite Edgware Road Station
Paddington 1008/9

Open Monday to Saturday 9-6. Thursday 1 p.m.
Send 3d. for 28-page Catalogue.



QUARTZ CRYSTALS

FT243
Fundamentals



80 Types 5706.667 Kc/s to 8340 kc/s. (In steps of 33,333 kc/s). 120 Types 5675 kc/s to 8650 kc/s. (In steps of 25 kc/s).
(Excluding Types 7000/7300 and 8000/8300).
5/- EACH

Complete Sets of 80 Crystals ...	£7 10 0
Complete Sets, 120 Crystals ...	£10 0 0

7000 kc/s. to 7300 kc/s. in steps of 25 kc/s. **7/6**
8000 kc/s. to 8300 kc/s. in steps of 25 kc/s. each

FT241A — 54th HARMONIC
80 Types 20 Mc/s to 27.9 Mc/s. (In steps of 100 kc/s).
(Excluding 27 Mc/s.).
5/- EACH Complete Set of 80 Crystals, £6
27 Mc/s., 10/-

100 Kc's. Gold Plated D.T. Cut ...	22/6
150 Kc's. Two Pin Round ...	12/6
160 Kc's. Two Pin 10X ...	12/6
200 Kc's. FT241A ...	10/-
500 Kc's. FT241A ...	10/-
500 Kc's. Brook's Special Holder ...	15/-
5000 Kc's. Piezo 2-Pin Holder ...	12/6

P.O. TYPE 4B CERAMIC
100 kc/s 819.6 Kc/s. **15/-** EACH
163.9 Kc/s. 1000 Kc/s.

CERAMIC 2-PIN BANANA PLUG FUNDAMENTALS
15,010 Kc/s.; 16,135 Kc/s.; 16,435 Kc/s.; 18,025 Kc/s.;
15,110 Kc/s.; 16,335 Kc/s.; 16,700 Kc/s.; 18,125 Kc/s.
10/- EACH

TCS COLLINS TYPE 3-PIN FT249
1665.5 Kc/s.; 1700 Kc/s.; 2073.5 Kc/s.; **10/-** EACH
1962.5 Kc/s.; 2072.5 Kc/s.; 2400 Kc/s.

DC 11A TWO-PIN
1740 Kc/s.; 1780 Kc/s.; 1764.5 Kc/s., **7/6** EACH

MARCONI & GEC GOLD PLATED 2-PIN
10,245 Kc/s.; 10,300 Kc/s.; 10,500 Kc/s., **7/6** EACH

QCC MARCONI & S.T.C. 10X TYPE
10,245 Kc/s. to 12,685 Kc/s., **7/6** EACH
(Send for List Showing Frequencies).
N.B.—ALL CRYSTALS TESTED FOR ACTIVITY AND GUARANTEED

TRANSMITTER/RECEIVER

Army Type 17 Mk. II

Complete with Valves, High Resistance Headphones, Handmike and Instruction Book

Frequency Range 44.0 to 61 Mc/s.
Range Approximately 3 to 8 miles.
Power requirements Standard 120v. H.T. and 2v. L.T.

Ideal for Civil Defence and communications.
BRAND NEW 59/6
Calibrated Wavemeter for same 10/- extra.

TRANSISTORS

JUNCTION TYPE P-N-P.
British Manufactured.

RED-SPOT 800 kc/s Audio Frequency ...	18/-
BLUE-SPOT 1.6 Mc/s and Frequency Changer ...	15/-
WHITE-SPOT 2.5 Mc/s R.F. and I.F. Amp ...	20/-

All Transistors are Tested and Guaranteed
N.B. The Red-Spot is similar to Mullard OC71

Over 300 different types of B.V.A. and American valves in stock. Send for Lists

"TRANSISTOR-8"

Push-Pull Portable Superhet
CAN BE BUILT FOR £11. 10. 0

This Portable 8 Transistor Superhet is tunable for both Medium and Long Waves and is comparable in performance to any equivalent Commercial Transistor Set.

Simplified construction enables this set to be built easily and quickly into an attractive lightweight cabinet supplied.

TEN STAR FEATURES

- ★ 8 Specially Selected Transistors
- ★ 250 Milliwatts Output Push-Pull
- ★ Medium and Long Waves
- ★ Internal Ferrite Rod Aerial
- ★ 7 x 4 Elliptical High Resistance Speaker
- ★ Drilled Plastic Chassis 8½ x 2½ in.
- ★ Point to Point wiring and practical layout
- ★ Economical. Powered by 7½ v. battery
- ★ Highly sensitive
- ★ Attractive lightweight contemporary case

We can supply all these items including Cabinet for **£11/10/0**
All parts sold separately

Send for circuit diagrams, assembly data, illustrations and instructions, and full shopping list 1/6.

Pair OC72's supplied 40/- extra. Call and hear demonstration model.

"EAVESDROPPER"

3-TRANSISTOR POCKET RADIO

No Aerial or Earth Required. Pre-selected 2-Station Receiver.

We can supply all the components for building the above set as per "Radio Constructor." With plastic case, **77/6**.

With Acos Mike, 90/-. Single Headphone, 4/6. With Miniature Hearing Aid, 92/6.

THE TELETRON "COMPANION"

THREE-TRANSISTOR POCKET-RECEIVER

MEDIUM AND LONG WAVES. NO AERIAL OR EARTH

Tuned R.F. Circuit. Ardente Transformers. 3—Transistors. Drilled Plastic Chassis and Cabinet size 4½ x 3 x 1 in., and all Components. Balanced Armature Output. Batteries, knobs and transistor holders. Total cost:

89/6

ALL PARTS SOLD SEPARATELY

TRANSISTOR PUSH-PULL AUDIO AMPLIFIER (200 Milliwatts Output)

Build this Push-Pull Amplifier which is ideal for Crystal or Magnetic Pick-up Amplification, Baby Alarm, Microphone Amplifier, etc.

Powered by 6-volt Dry Battery lasting for months.

Complete Kit of Parts including 4 Transistors and all Components with Circuit (less Speaker), £4/10/-.

TRANSISTOR SIGNAL TRACER

Complete Kit with 2 Transistors, Components, Plastic Case, and Phones with Circuit **42/6**.

TRANSISTOR SQUARE WAVE GENERATOR

Complete Kit with 2 Transistors, Components, Plastic Case, and Circuit. **25/-**.

DIODES

B.T.H. GERMANIUM ...	1/6
MULLARD OA74 ...	2/6
IN21 ...	3/6
IN22, IN23, IN21A ...	5/-

"HOMELIGHT"

2 Transistor Personal Portable

No Aerial or Earth Required Pre-selected 2 Stations Receiver

We can supply all components including 2 Transistors, Diode, Resistors, Condensers and Miniature Hearing Aid and Plastic Case size 4½ x 2½ x 1½ and 1½ v. Battery. **FOR 55/-**
All items sold separately.

MODEL-MAKERS MOTORS

Two types available 12 or 24 v. with ½ in. spindle ... **10/-** each

TRANSMITTER/RECEIVER SCR 522

Comprising the well-known BC625 and BC624A. The complete unit is in very good condition having very useful parts including Relays, Transformers, Condensers, etc. Less valves, **45/-**, carr. 5/-.