

The SHORT WAVE Magazine

VOL. XXIII

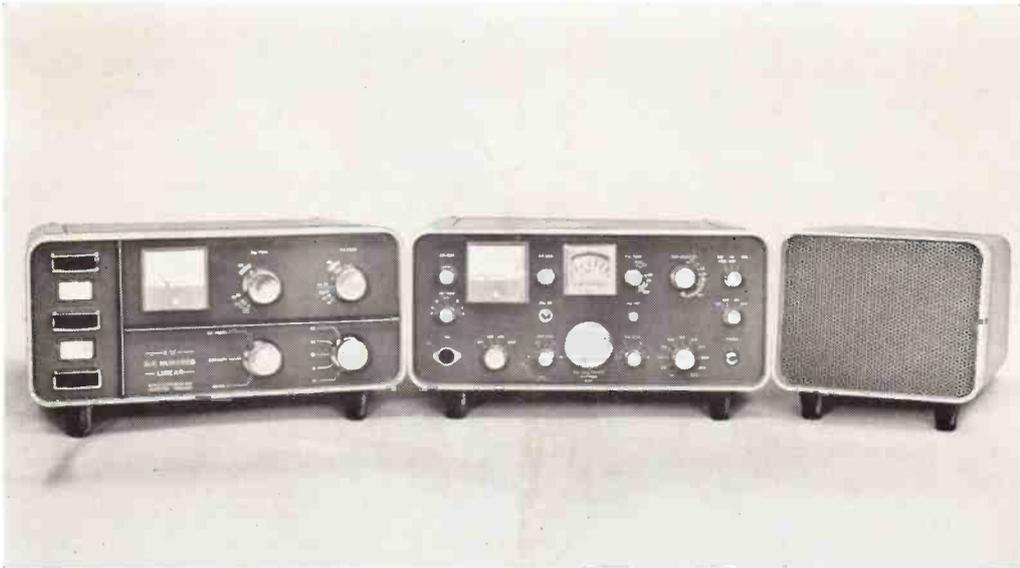
AUGUST, 1965

NUMBER 6

K. W. ELECTRONICS for all your Amateur Radio Requirements

The NEW "G" Line by K.W.

A new style cabinet with lift-up inspection lid, handsomely finished in two-tone grey stoved-enamel, fitted now to the KW2000, KW2000A and KW600.



The "G" Line—KW2000A Transceiver and KW600 Linear Amplifier.

CDR ROTORS and CONTROL UNITS

TR1A recommended for 2M ...	£14. 0.0
AR22 thousands in use ...	£21. 0.0
TR44 latest model ...	£37.10.0
HAM-M will handle a 'Big Bertha' ...	£61. 0.0
Carriage included.	

KW MODELS, 1965

KW2000. SSB Transceiver 90 watts	£173
PSU extra.	
KW2000A. SSB Transceiver (180 watts)	£195
PSU extra.	
KW600. Linear Amp. Complete with PSU	£105
KW "Viceroy." SSB Transmitter. Complete with PSU.	£156
KW "Vanguard." AM/CW Transmitter 10-160m.	£73/10/-
Carriage extra on the above.	

KW stock includes: Adaptors, Aerials, Airdux Coils, Beams, Converters, Filters SSB, Mechanical and Crystal Filters, Microphones, Mobile Whips, Nuvistor Plugs, Pi-Coils, Plugs, Receivers, Relays, R.F. Chokes, Rotors, Signal Generators, Sockets, SWR indicators, Towers, Transmitters, VFO's, Walkie-Talkies, Collins 'S' Line Equipment, etc., etc. U.S.A. Equipment. Trade-in Receivers and Transmitters.

We accept trade-in equipment. Easy terms available.

HAMMARLUND RECEIVERS, HQ170A, HQ145X, HQ180A, HQ170A-VHF now in stock.

KW

ELECTRONICS LTD Vanguard Works

1 HEATH STREET, DARTFORD, KENT Cables: KAYDUBLEW, Dartford Phone: DARTFORD 25574

Until 1st June, this Company was known as Green & Davis Ltd.

GREEN**A COMPLETE AMATEUR SERVICE MANUFACTURING
THE WIDEST RANGE OF EQUIPMENT IN EUROPE****GREEN LA-600**NEW LINEAR AMPLIFIER FROM GREEN E.C.E. LTD.
(DEVELOPED FROM THE NOW POPULAR PGLA-1)

- Passive grid input circuit.
- Modular construction.
- Size : only 11 $\frac{3}{4}$ " x 5 $\frac{3}{4}$ " x 16" deep.
- High efficiency RCA.7094 (this tube will run flat out at 60 Mc/s.).
- Price **£85.** Delivery: from stock.

**GREEN 2M1000**

A 150 watt 2m., phone-CW Transmitter of compact design—advanced circuitry and completely self-contained with power supplies and 120w. modulator.

- Mullard QQV06-40A final (driven by QQV03-10).
- Over 90 watts R.F. output (built-in R.F. output wattmeter). $\frac{1}{4}$ wave lines in silver plated P.A. cct.
- P.T.T. on microphone.
- QSY facility (also uses 6, 8, 12, 18 or 24 Mc/s. xtals).
- High Power (90 watt) 70 cm. extension facility (couples to 70CM1000 directly) single switch from 2m. to 70 cm.
- 100% plate and screen modulation.
- Size only : 11 $\frac{3}{4}$ " x 5 $\frac{3}{4}$ " x 16" deep.
- Price : **96 gns.** Delivery : from stock.

GREEN VHF & UHF TRANSMITTERS

- ★ CTX-2 : 20 watt 2m., CW, TX, **14 gns.** ex stock.
- ★ CTX-4 : 20 watt 4m., CW, TX, **14 gns.** ex stock.
- ★ CTR-70 : 8 watt 70 cm., Trip. Amp. for use in conjunction with CTX-2 or 2M20, **£20** ex stock.

GREEN VHF & UHF CONVERTERS

- ★ Mk. III 2 metre Converter I.F. 1-8-3-8, 4-6, 10-12, 14-16, 24-26, 28-30 Mc/s. Price : **£8. 19. 6** ex stock.
- ★ Mk. IV 2 metre Converter I.F. 1-8-3-8, 4-6, 14-16, 24-26, 28-30 Mc/s. Price : **14 gns.** ex stock.
- ★ 3N70 70 cm. Converter I.F. 12-16, 24-28, 27-31 Mc/s. Price : **16 gns.** ex stock.

GREEN ACCESSORIES

12v. D.C. to 300v. at 200 mA. D.C.-D.C. Converter, **£7. 19. 6.** Hand Transceivers—latest 28.5 Mc/s., **£26** per pair. Mobile Aerials—Panorama : 2 and 4 metre Whips, **£3** ; Halson 3FIF : **£6. 10. 0.**, optional coils, **£3. 10. 0** ; New-tronics : "Hustler," 80-10 metres (P.O.A.). 140ft. reels 14 s.w.g. HD copper wire, **£1 + 2/6** P.P. 70 ohm super aeraxial coax, **1/8** yd., 300 ohm ribbon, **6d.** yd. + 1/- P.P. any length. 800v., $\frac{1}{2}$ amp recs., **4/6** each. 800v., 6 amp recs., **10/-** each. Minimitter aerials : X20, Birdcage, multi-band ferrite loaded dipole. 1 kW. R.F. Choke, **£1** and **£3.** Polythene guy cord, 360-lb., **12/-** ; 440-lb., **15/-** ; 650-lb., **18/-** ; 1,200-lb., **39/-** ; per 100 feet.

GREEN 70CM1000

High powered 70 cm. Tripler-Amplifier for use in conjunction with Transmitters like 2M1000.

- Mullard QQV03-20A tripler.
- Mullard QQV06-40A amplifier (forced air cooled).
- 90 watts input.
- 50 watts R.F. output (built-in R.F. output wattmeter).
- All chassis, screens, brackets and $\frac{1}{2}$ wave lines are silver plated.
- 23 cm. extension facility (23CM1000 available in the future).
- Size : only 11 $\frac{3}{4}$ " x 5 $\frac{3}{4}$ " x 8" deep.
- Price : **£65.** Delivery : from stock.

GREEN 2M20

A 20-50 watt 2 metre mains/mobile Transmitter with all the features of a 2M1000.

- QQV03-20A final.
- Size : only 11 $\frac{3}{4}$ " x 5 $\frac{3}{4}$ " x 8" deep.
- Transistor modulator.
- 70CM extension facility (use CTR-70).
- Built-in R.F. wattmeter, P.T.T. QSY facility, etc., etc.
- Price : **48 gns.**

Write for data sheet on any of the above equipment.

H.P. and part exchange arranged

Please allow 6/- for P.P. and Ins. on items marked ★

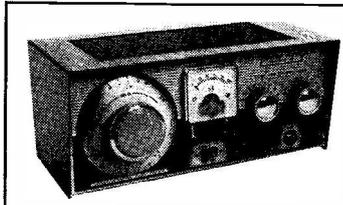
GREEN ELECTRONIC & COMMUNICATION EQUIPMENT LTD

104 HORNSEY ROAD LONDON N.7 TELEPHONE: NORTH 6871

GREEN E.C.E. LTD. DISTRIBUTORS : Chas. H. Young Ltd., J. & A. Tweedy Ltd., Peter Seymour Ltd., Taurus Electrical, James-Stephens Ltd.

HERE ARE TWO MORE . . .

(There'll be more next month)

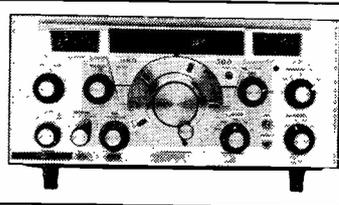


CODAR A.T.5 TRANSMITTER
 80-160 metres, £16. 10. 0
 Mains p.s.u., £8
 12v. D.C. p.s.u., £11. 5. 0
 Remote control switching unit, £2. 7. 6

. . . and if you would like further details of these two items and the rest of our stock just write, 'phone or call in for a demonstration.

New and second-hand equipment on display Monday to Saturday 9 a.m. to 6 p.m.

NATIONAL HRO-500
 Professional solid state receiver, 5 kc/s. to 30 Mc/s. £705



BRIAN J. AYRES & CO.

21 VICTORIA ROAD, SURBITON, SURREY

100 yards from Surbiton station

Tel.: Elmbridge 2833 and Lower Hook 2000

Opposite Victor Value

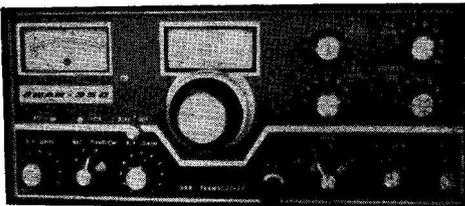
● PETER SEYMOUR LTD.

COMMUNICATIONS EQUIPMENT SPECIALISTS

presents:—THE SWAN-350 TRANSCEIVER

5 BANDS — 400 WATTS AND ONLY £205

- 3.5-4.0 Mc/s., 7.0-7.5 Mc/s., 13.85-14.35 Mc/s., 21.0-21.5 Mc/s., 28-29.7 Mc/s.
- Transistorized VFO, temperature and voltage stabilized.
- Precision dual-ratio tuning.
- Crystal lattice filter.
- ALC . . . AGC . . . S-Meter.
- 5 1/2 in. high, 13 in. wide, 1 1/2 in. deep.
- 400 watts SSB input. 320 watts CW input 125 watts AM input.
- Sideband suppression: 40dB. Carrier suppression: 50dB. Third order distortion: 30dB.
- Lower sideband on 80M and 40M. Upper sideband on 20M, 15M, and 10M. (Opposite sideband kit available.)



- Viceroy Mk. IIIA with power unit, as new £115
- Viceroy Mk. II with power unit, as new £95
- Viceroy Mk. I with power unit, as new £2 10
- 4X150As. Sorry no bases £220
- BY100 equivalents 6d. p.p. any quantity 4/6 each
- Collins 75A4. The last word in amateur band receivers. Fitted with 3.1 kc. mechanical filter and special reduction knob. 1 kc dial accuracy, notch filter separate noise limiters for AM/SSB. CW. Passband tuning, etc. £85
- Heathkit DX100U fitted with SB10U SSB adaptor £85
- G.E.C. BRT400D table model 150 kc/s.-32 Mc/s. 100-250 AC input £75
- For the CW man the latest Hallicrafters Type HA5 Mixer VFO. Highly stable outputs from 80-2 Mtrs. Brand new £40
- National NC270 in brand new condition. Amateur bands only. Selectable sidebands, slot filter, calibrator, etc. £25
- Minimitter MR44/2 in new condition with matching speaker £25
- Hallicrafters S108 in new condition. 540 kc/s.-32 Mc/s., plus separate calibrated bandspread 80-10 Mtrs. £40
- AR88LF/E 75-550 kc/s. and 1.5-30 Mc/s. fully rewired with pvc and fitted with "S" meter. Variable selectivity, improved SSB performance £40
- National NCX5 used 2 months only, complete with power unit £285
- For the mobile man. Single earpiece headsets fitted with boom low impedance noise cancelling microphone. Brand new £4 2 6
- Dipole traps covering 80-10 Mtrs. epoxy resin encapsulated. Per pair £2 7 6

- ACCESSORIES :**
- AC power supply, matching cabinet with speaker. Model 2306 £45
 - 12 volt DC power supply. Model 412 £60
 - Plug-in VOX. Model VX-1 £16
- And in addition has the usual wide range of items, including :
- COLLINS receiver type R390, the highest standard of receiver possible. 500 kc/s.-32 Mc/s. in 32 bands, frequency meter accuracy within 200 cps. Reputed to cost £4,000, offered at £395
 - Eddystone 640 1.8-30 Mc/s., 240 AC input. Xtal filter, etc. £25
 - Heathkit Mohican 600 kc/s.-30 Mc/s. all transistor £25
 - Eddystone 940 as brand new 480 kc/s.-30 Mc/s. Cost new £125 £95
 - MC Jones direct reading dummy load wattmeters, 120W, 50-600 Mc/s. 52 ohms £15

SEE THE NEW SWAN 350 — NOW! H.P. available on equipment over £35.0.0 inclusive

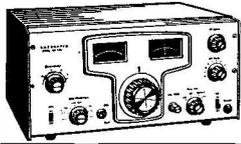
410 BEVERLEY ROAD, HULL, YORKSHIRE. TEL: HULL 41938 (43353 after 7.30 p.m.)

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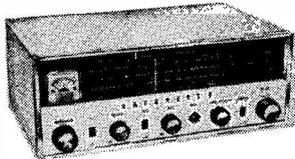
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NEW MODEL!
LAFAYETTE HA-350 AMATEUR RECEIVER
10-80 metres dual conversion with mechanical filter for high selectivity. Incorporates 12 valves, crystal controlled osc., product detector, 100 kc/s. crystal calib., crystal B.F.O., A.N.L., "S" meter, etc. Supplied brand new and guaranteed. 75 gns. S.A.E. for full details.



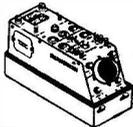
NEW MODEL!
LAFAYETTE HA-230 AMATEUR COMMUNICATIONS RECEIVER
Supersedes model HE-30, 8 valves plus rectifier. Continuous coverage on 4 bands. 550 kc/s.-30 mc/s. Incorporates 1 RF and 2 IF stages, Q Multiplier, B.F.O., ANL, "S" meter, Electrical bandspread, aerial trimmer, etc. Supplied brand new and guaranteed. 33 gns. S.A.E. for full details.



STAR SR-40 COMMUNICATION RECEIVER
4 Bands 550 kc/s.-30 mc/s. "S" Meter - BFO - ANL - Bandspread Tuning - Built-in speaker. 200-250v. AC. Brand New, 18½ Gns., carr. 10/-.



LAFAYETTE "PRECON" AMATEUR PRESELECTOR CONVERTER
● Crystal Controlled ● For 80-40-20-15-10 Metre Bands ● As a Converter - Converts Receiver to Dual Conversion Operation ● Improves Selectivity ● Widens Bandspread. Three crystals are included for 20, 15 and 10 metre bands. Operates on 230v. 50/60 cycles AC. 2 stages of RF assures a high signal to noise ratio. S.A.E. for full details, 19 Gns. P.P. 7/6.



OS/BB/U OSCILLOSCOPES
High quality Portable American Oscilloscope. 3" c.r.t. T/B: 3 cfs-50kc/s. X Amp: 0-500 kc/s. Y Amp.: 0-2 mc/s. Power requirements 105-125v. AC. Supplied in "as new" condition, fully tested, £25, carr. 10/-. Suitable 230/115v. Transformer, 15/6.

TYPE 13 DOUBLE BEAM OSCILLOSCOPES
Perfect order, £27/10/-, Carr. 20/-.

Special Offer!
AR88 RECEIVERS FOR CALLERS ONLY

LF MODEL. 75 kc/s.-550 kc/s. and 1.5-30 mc/s., £25.

D MODEL. 550 kc/s.-32 mc/s. £30. Excellent condition. Limited quantity.

NATIONAL H.R.O. RECEIVERS

50 kc/s.-30 mc/s. with complete set of 9 coils. Perfect condition, £23, carriage 20/-. Mains power pack, 59/6.

COLLINS R-278/GR RADIO RECEIVERS

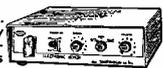
High quality military UHF crystal controlled receiver providing reception of AM and CW signals on any one of 1,750 channels in the frequency range of 225-399.9 Mc/s. Power requirements 115-230v. A.C. Size 13" x 19" x 20". Output 3 watts into 600 ohms. Original cost hundreds of £££s. Available in as new condition, fully tested complete with all crystals. £60. Carr. 50/-.

G.E.C. BRT. 402 RECEIVERS

A high grade 14 valve communication receiver covering 150-385 kc/s. and 510 kc/s. to 30 mc/s. in six bands. Special features include 2 RF stages, "S" meter, variable selectivity, BFO, ANL, AGC, 500 kc. crystal calibrator, slide rule vernier dial with logging scale. Operation for 50-10v. and 195-250v. A.C. Outputs for phones, speaker or line. Offered in excellent condition, fully tested and guaranteed, £60, carr. 30/-.

MODEL DA-1 TRANSISTORISED FULLY AUTOMATIC ELECTRONIC KEYS

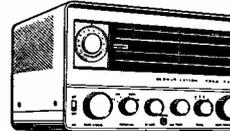
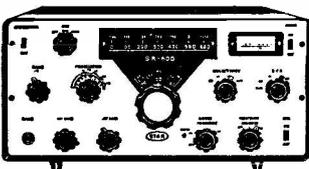
230 v. AC. or Battery operated. Incorporates built-in monitor oscillator, speaker and keying lever. Fully adjustable speeds giving either auto, semi-auto or hold. 7 transistors, 4 diodes, £16/10/-, P.P. 6/-.



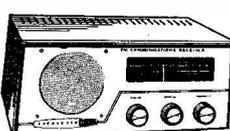
AVO-METERS
Supplied re-conditioned, guaranteed perfect.
Model D £8/19/6
Model 7 £12/10/- Post and Ins. 6/6

STAR SR.600 AMATEUR COMMUNICATION RECEIVER

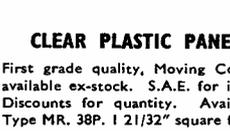
New crystal controlled triple conversion de luxe 80-10 metre band receiver. Extremely high sensitivity, selectivity and stability. Special features include 3 I.F. stages, crystal controlled oscillator, 4 section I/F filter, "S" meter, B.F.O., A.N.L., 100 kc/s. crystal calibrator, etc. Supplied brand new and guaranteed, 95 Gns. S.A.E. for full details.



LAFAYETTE HA 63 COMMUNICATION RECEIVER
7 valves - Rectifier, 4 Bands 550 kc/s.-31 mc/s. "S" Meter-BFO-ANL-Bandspread Tuning 200/250v. AC. Brand New, 24 Gns., carr. paid.



NEW MODEL!
LAFAYETTE HA-55 AIRCRAFT RECEIVER
108-136 mc/s. High selectivity and sensitivity. Incorporates 2 RF stages including 6CV4 Nuvistor, 8 tubes for 11 tube performance, solid state power supply, adjustable squelch control, slide rule dial, built-in 4" speaker and front panel phone jack. 220/240v. AC. Supplied brand new and guaranteed. 19 gns., carriage 10/-.



CLEAR PLASTIC PANEL METERS
First grade quality, Moving Coil panel meters, available ex-stock. S.A.E. for illustrated leaflet. Discounts for quantity. Available as follows. Type MR. 38P. 1 2 1/32" square fronts.

50µA	32/6	1-0-1mA	22/6	150mA	22/6	3v DC	22/6	500v DC	22/6
100µA	29/6	1mA	22/6	200mA	22/6	10v DC	22/6	750v DC	22/6
200µA	27/6	2mA	22/6	300mA	22/6	2v DC	22/6	15v AC	22/6
500µA	25/-	5mA	22/6	500mA	22/6	50v DC	22/6	50v AC	22/6
50-0-50µA	29/6	10mA	22/6	750mA	22/6	100v DC	22/6	150v AC	22/6
100-0-100µA	27/6	50mA	22/6	1A DC	22/6	150v DC	22/6	300v AC	22/6
500-0-500µA	22/6	100mA	22/6	5A DC	22/6	300v DC	22/6	500v AC	22/6

Larger sizes available - send for lists

ILLUMINATED "S" METER. 1 2 1/32" sq. front. Cal. in S units, 6v. lamp, 29/6. P.P. 1/-; 2 5/16" square, 39/6. P.P. 1/-.

SEMI-AUTOMATIC "BUG"

Super speed key, 7 speed adjustments. 10 WPM to as high as desired. Weight scale for reproducible settings. Precision cooled, anti-rust nickel plated brass and stainless steel operating parts. Size 6 1/2" x 3" x 2 1/2". Brand new, £4/10/-, P.P. 3/6.

TRANSISTORISED FIELD STRENGTH METER

3 bands, 2.5 to 57 mc/s., permits easy tune up for max. transmitter output. Earphone jack to monitor audio. 200µA meter cal. 0-10. Supplied complete with battery, telescopic aerial, £5/19/6 each. P.P. 2/6.

SILICON RECTIFIERS

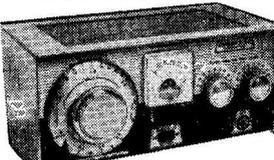
200 P.I.V. 200 mA	2/6
200v. P.I.V. 3 amp	7/6
200v. P.I.V. 6 amp	5/6
1,000v. P.I.V. 650 mA	7/6
800v. P.I.V. 500 mA	5/6
400v. P.I.V. 500 mA	3/6
95v. P.I.V. 3 amp	5/6
70v. P.I.V. 1 amp	3/6
150v. P.I.V. 165 mA	1/-

Discount for quantities. Post extra.

NATIONAL H.R.O. DIALS

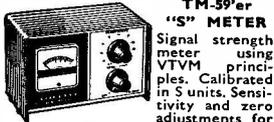
Brand new, 27/6. P.P. 1/6.

MAIN LONDON AGENTS for CODAR EQUIPMENT



P.R.30 Preselector	£4 19 6
P.R.30X Self powered	£7 4 0
R.O.10 "Q" Multiplier	£6 15 0
R.O.10X Self powered	£8 2 0
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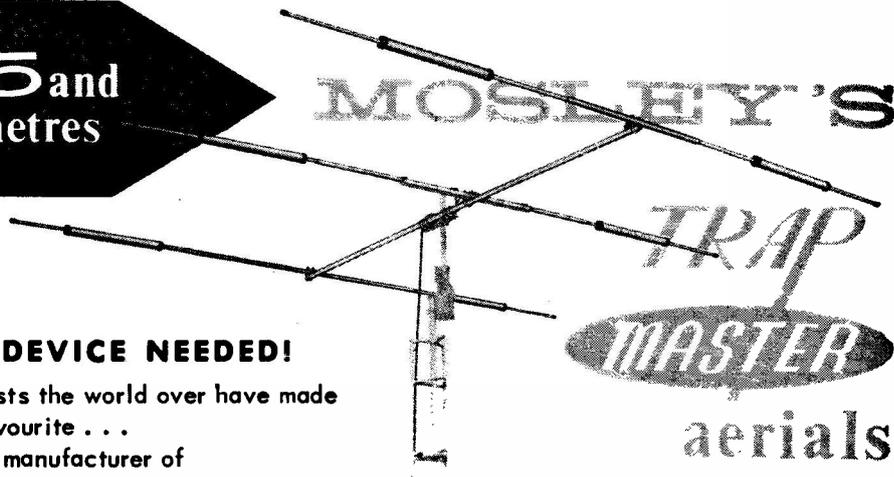
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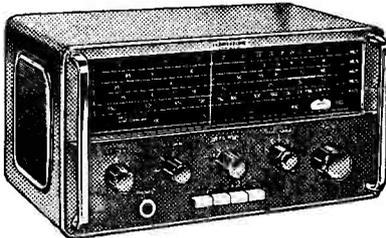
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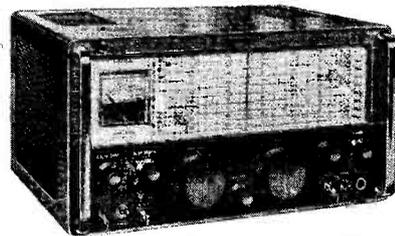
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(GB3SWM)

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AUGUST, 1965

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The SHORT-WAVE Magazine

EDITORIAL

Occupancy *The distribution of amateur activity over our communication bands is a matter of greater importance than it may seem—for one thing, we keep our bands by making full use of them, and for another, even distribution and the proper use of all bands will help to reduce congestion.*

It would be agreed on all sides that 80 and 20 metres are heavily over-populated compared with 15 and 10 metres. As things are, however, there is no reason why the 21 mc band should not be carrying a great deal more of our DX traffic. Ten is an attractive proposition from the point of view both of local net working when it is closed and for real DX when it is open—which will be quite often as the propagation cycle becomes more favourable.

We are not considering 160 metres or the UHF/VHF's in this brief survey because their potentialities are rather different from those of the HF communication bands, and these upper and lower regions in our spectrum have always been exploited in the manner to which they are best suited.

In considering the DX bands, 7 mc should not be neglected, even though in many ways it is nowadays one of the most difficult of all owing to the presence of illegitimate high-power broadcasters and other interlopers. In spite of this hazard, good use is being made of 40 metres by those who know how to use it, and abundant DX is workable during the small hours when the broadcast stations are shut down.

It can be seen, therefore, that the immediate need is for more sustained activity on both 21 and 28 mc; this will in turn encourage overseas amateurs to make fuller use of them and the result will be a better spread-out of stations over all bands, with the important advantages that would bring.

Actually, the foregoing was said in this space just ten years ago—is it any less true now than it was then?

*Austin Forsyth,
G6FO.*



How the miniature mobile Tx, as designed and constructed by G3SRY, looks when completed — note the half-crown for size comparison. The PA consists of a pair of Mullard AUY10's, running the full 10 watts input on 160m. from a 24-volt supply line, loading to just over 400 mA. The design incorporates VFO control, and high-level modulation is by another pair of AUY10's — see circuitry.

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THE "MINI-MOBILE" —
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TRANSISTORS THROUGHOUT—
FROM 24-VOLT LINE

R. J. HULBERT (G3SRY)

ALL radio circuitry is a compromise and the one about to be described is no exception to this rule. The ideal 160m. /M station would run directly from the 12-volt vehicle battery *via* filters only. This is rather difficult, and two years ago, when the writer started on the idea, more or less impossible.

Originally, OC24 transistors were tried. These had the low knee-voltage required, and were quite happy with 12 volts. However, to run them so close to their *alpha* cut-off frequency was asking too much, and the stage gain was very low—in fact, one could easily lose this gain in the coupling circuit.

The only other transistor readily available was the Mullard AUY10. This was capable of giving excellent gain and more than enough power output, but due to its relatively high knee-voltage, required rather more than 12 volts for correct operation.

The writer felt that to sit around waiting for someone to make the ideal transistor was no solution to the problem. Might as well get some practical experience of transistor transmitters, modification would inevitably follow, and the idea would mature.

More suitable transistors are becoming available, and the price is falling; and in a few years, the AUY10 will be obsolete as far as the /M man is concerned.

Providing the PA circuitry is turned upside down, so that the collectors are earthed, the AUY10 high-level modulates quite well. All other systems tried by the writer have given inferior results (very much so, usually).

The Tx is now taking shape. for 24-volt input, and since we have turned the PA upside down, negative earthed. The Field Day man would not care a scrap about this, since two 12v. batteries in series would run the PA and driver for several *days* without a battery change. Another 12v. battery would be required for the VFO/Exciter and Modulator, and here again the drain is low—80 mA quiescent, 350 mA average modulation. About 450 mA is required from the 24v. battery supply.

What about the /M man? Well, that is where G3SRY/M comes in. The 24v. supply is obtained from a vibrator unit (only until a suitable transistor pack can be designed and built). The total transmitter power drain is approximately 1.5 amps. quiescent, and 1.75 amps. with average modulation. The writer's 11-transistor home brew Rx averages about 75 mA consumption. Compare this with a valve transceiver—Tx at 4.2 amp., Rx 3.5 amp. There are no valve heaters burning whilst on "receive," either, and no warm-up time. The overall power efficiency makes any valve rig look very greedy.

Stage-by-Stage Description

The transmitter can be divided into three parts: VFO/Exciter, Driver/PA, and Modulator. In the "Mini-Mobile" these sections are contained in one cabinet, 7in. wide, 3in. high, and 5½in. deep. The power supply and filter unit are separately housed,

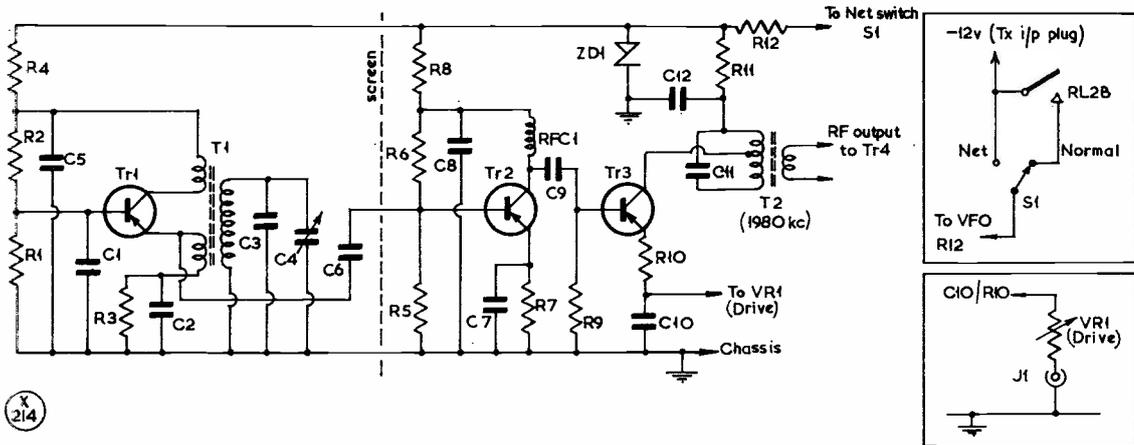


Fig. 1. Circuit of the VFO/Exciter section of the 160-metre Transistor Transmitter described by G3SRY, using AF117's in this part of the circuit. Drive is taken from the winding on T2 into TR4 in Fig. 2. As shown in the circuit inset, this is controllable on VR1, J1 being a metering jack. Note that the VFO side is isolated by screening.

Table of Values

TABLE OF COIL DATA

Figs. 1, 2. VFO/Exciter and Driver/PA sections of G3SRY Tx.

- C1, C2, C9 = .01 μ F, 30v.
- C3 = 300 μ F, 1%, s/m
- C4 = 100 μ F
- C5, C7, C8, C10, C12 = .04 μ F, 30v.
- C6 = 10 μ F, s/m
- C11, C14, C16 C17 = 470 μ F, 1%, s/m
- C13 = 0.25 μ F, 150v.
- C15 = 1 μ F, 50v.
- C18 = Jackson 2 x 365 μ F, "O"-gang
- C19, C20 = .01 μ F, 150v.
- R1, R5 = 4,700 ohms
- R2, R6 = 15,000 ohms
- R3 = 680,000 ohms
- R4, R8 = 220 ohms
- R7 = 690 ohms
- R9 = 2,200 ohms
- R10, R14 = 22 ohms
- R11 = 47 ohms
- R12 = 120 ohms
- R13, R15, R16 = One ohm
- VR1 = 1,000-ohm min. potentiometer, drive control
- RFC = 2.5 mH RF choke, Repanco min.
- TR1, TR2, TR3 = Mullard AF117
- TR4 = Mullard AF117
- TR5, TR6 = Mullard AUY10

- T1 — Denco type 3T Red.
 - T2 — On $\frac{1}{8}$ in. former, with slug. Pri: 45 turns 30g. enamelled, tapped 15t from cold end. Sec: 3 turns as primary, wound on cold end, with one turn p.v.c. tape insulation.
 - T3 — On $\frac{1}{8}$ in. former with slug, in $\frac{1}{8}$ in. square can, 1 $\frac{1}{2}$ in. high. Primary as T2. Sec: 3+3 turns 30g. enam., bifilar wound over cold end, with one turn p.v.c. tape insulation.
 - T4 — One-inch paxolin former stood off from chassis on 6 BA studding. Pri: 40 turns 20g. enam., centre-tapped, and tapped 4 $\frac{1}{2}$ turns each side of centre. Sec: 20g. enam., 3-4 turns for loaded whip /M aerial, or 4-5 turns for ATU feed.
- Notes: TR5, TR6 are mounted under T4, upside down through chassis, without insulation. ZD1 is 9.5v. close-tolerance zener diode. VFO control is Jackson ball-drive Type F, Cat. 4511/F. RL1, RL2 are 200-ohm miniature relays, with RL2 mounted in Tx, and RL1 with PSU. Meter is Jap type MR2P 0.1 mA, shunted to read 0.1 amp. Tx chassis is 7in. x 5 $\frac{1}{2}$ in. x 1in. deep, with front and back panels 7in. x 3in., in aluminium with wrap-round cover, as photograph.

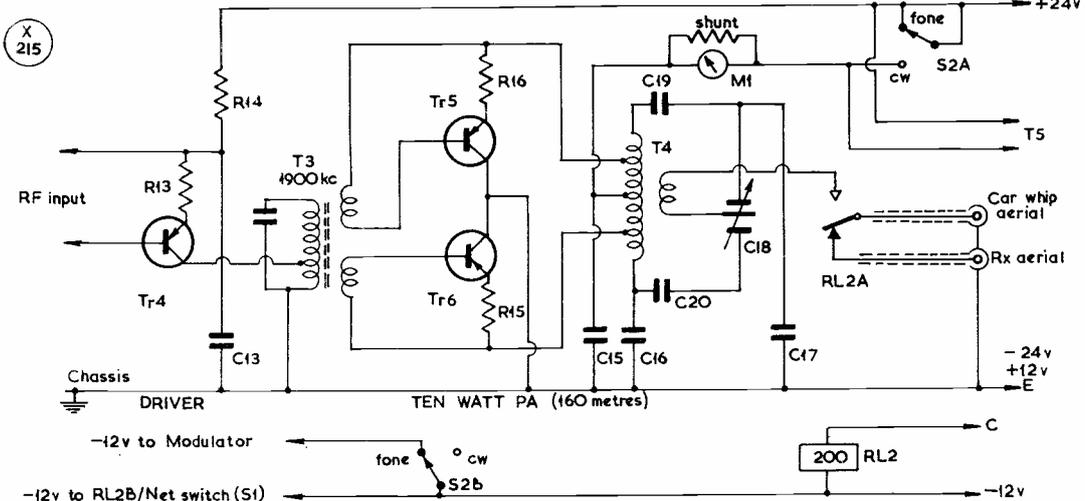


Fig. 2. The driver/PA circuit and inter-control switching for the 160-metre fully transistorised transmitter described by G3SRY. This part of the Tx, which is operated at +24v., must be read with Fig. 1. The AUY10's in the PA can be pushed to 22 watts input (on 80 metres) at 24v. on the line, but this is undesirable, as explained in the text. The condensers C19, C20 are precautionary against the danger of a short to ground across C18A, C18B, which would destroy the PA transistors TR5, TR6. The transistorised modulator for this transmitter is given in Fig. 3. The 200-ohm relay RL2 is in the control line C, with RL1

and can be in any suitable spare space.

The VFO, shown in Fig. 1, is extremely simple, the circuit being no more than the autodyne frequency converter found in most transistor BC receivers. The only modifications in principle are to earth the base and alter the bias. This enables us to use a readily available coil and components; and all such VFO's, if built properly, will behave alike. The circuit is stable, non-temperamental and very easy to get going. For these reasons it is used in preference to the equivalent Clapp or Colpitts circuit. No coil to wind, no fiddling, just zero in 1.9 mc with the slug on the station Rx and forget it. How can you miss?

To reduce pulling to the minimum, a small fraction of the available output is taken from the emitter of the AF117 VFO, via a 10 $\mu\mu\text{F}$ condenser to the base of the first buffer. This is another AF117 and works in Class-A. The RF output developed across RFC1 is R/C coupled to the 2nd buffer, yet another AF117. This stage draws rather more power than the two previous ones, and is nominally in Class-B, though due to base rectification, tends to wander towards Class-C when the drive control is near maximum. This is of no consequence, so can be ignored.

The output from TR3 is developed across a tuned circuit, T2; a small link winding provides more than enough drive power for the AUY10 driver, TR4. The impedance of this tuned circuit is quite low, and there is no trace of instability in TR3. The voltage to the VFO unit is stabilised by a Zener diode, 9.5 to 10 volt being correct.

As described, this VFO unit is simple and sure-fire. The writer has built several of them over the past couple of years and no snags have occurred.

For the "Mini-Mobile", it was essential to reduce the VFO section into an aluminium box having a front panel of 2½ in. x 1½ in., and front to back 4 in. An epicyclic drive is mounted on the front, directly on the shortened spindle of C4. A screen is erected across the box, half-way from front to back. The VFO is in the front half, with the two buffers at the back. All connections, including the twisted RF output pair, are taken out of the back. The box is fastened to the top of the chassis on its 4 in. x 1½ in. side.

It is not too easy to get all the bits into a box so small, and if attempted, the VFO section should be built first, before fitting the screen.

The Driver/PA Stage

The driver, TR4, is an AUY10—see Fig. 2—and operates in Class-B at a fraction of its full capability. Due to the positive HT line, the circuit is not quite normal p.n.p. practice, but electrically at least, is an ordinary earthed-emitter arrangement. TR4 must be insulated from chassis by the usual mica and bushed, unlike TR5 and TR6.

RF input from the VFO is via a short twisted pair. If a longer input lead is required, this should be screened, the braiding being connected to the junction of R13/R14. This lead may be several feet long if desired.

The collector of TR4 connects to a tap on the primary of T3. The link windings to the PA transistors, TR5, TR6, are bifilar wound, this being to ensure the same level of drive to each transistor. For correct phase, take the start of one winding to R15, the finish of the other to R16. If you get the phase wrong, you will have little or no indication of PA current.

The driver used on its own, with a suitable tank circuit, and T2 peaked, will run several watts input—which may be of interest to some readers.

In the "Mini-Mobile", T3 is tuned to approximately 1900 kc and T2 to about 1980 kc; staggered in this way, adequate drive is available over some 140 kc or so of the band. This is fine for /M, but for full band coverage, 100 $\mu\mu\text{F}$ variables can be connected across the tuned windings of T2 and T3, reducing the values of the fixed condensers accordingly. This will enable the Tx to be peaked up all through the band. A word of warning here: Under these conditions, you will have enough drive to wreck the PA, so be very careful with the drive control, or fit a series safety resistor.

The PA pair, TR5, TR6, also run in Class-B. The correct loaded PA current is 400 mA. Do not drive them any harder for, besides exceeding the legal limit for Top Band, the harmonic output increases considerably, and the safety margin is reduced. This rig will run about 22 watts, but you are also likely to lose the transistors. Before dealing with the tank circuit, one more point: Fit a low-pass filter for fixed-station work, as TVI can start at about 400 mA. Very slight, but the input only has to rise a little, and it gets quite annoying. A /M station probably will not have this trouble, but it is as well to check.

The PA tank circuit is conventional push-pull, with the emitter connections tapped down near the centre. The output link is wound directly over the centre of the coil. It tunes with high capacity, which keeps the RF voltage down, and swamps transistor capacitance. Of course, it is a compromise, and works with a very low loaded Q; it likes to be fairly heavily loaded by the aerial, but not over so. As a rejector of harmonics, it is rather poor, hence the call for a reasonable filter. Unfortunately, one cannot do much else, since the peak collector voltage on the AUY10 must be kept below 70, and this includes everything—RF, Mod. and all odd spikes—and it is surprising how they add up. To make the PA tuning component as small as possible, and yet not expensive, use has been made of a Jackson "O" Gang, 365 $\mu\mu\text{F}$ twin, with two 470 $\mu\mu\text{F}$ close tolerance silver micas in parallel. The set-up tunes towards maximum capacity.

The aerial feed link is 3 turns, for the writer's whip; four turns increases the current, but the modulation is then decrement. About 4 or 5 turns seems right for 70 ohm output impedance.

The Modulator Section

The modulator (Fig. 3) is a perfectly straightforward 7-watt Class-B amplifier, employing two OC28 or OC26, TR10, TR11. The driver is an OC78

or OC81 (TR9), and this is preceded by TR8 (OC78 or OC81) and TR7 (OC71). The microphone is a moving-coil of 200-ohm impedance, or thereabouts.

The modulator has been used by the South London Mobile Club for modulating valve rigs, for some time, and has proved itself. The modulation transformer is now 1/1:4 ratio, to match the 60-ohm impedance of the PA. The only other modification was to simplify the gain control, saving one electrolytic and allowing the use of a potentiometer out of the junk box.

The small-signal stages are built on a piece of paxolin, 4in. x $\frac{7}{8}$ in. and this is located to the left of the VFO unit. It fits the space between here and the left-hand cabinet side exactly. The driver transformer is at the back, convenient to TR10, TR11, which are mounted on the cabinet back. A short length of screened cable connects the input to the microphone socket almost directly below chassis.

The modulation transformer T5 was hand wound; the laminations and bobbin were originally a smoothing choke from an old TV set. It is important to keep the DC resistance as low as possible, otherwise volts and modulation power will be lost.

General Points

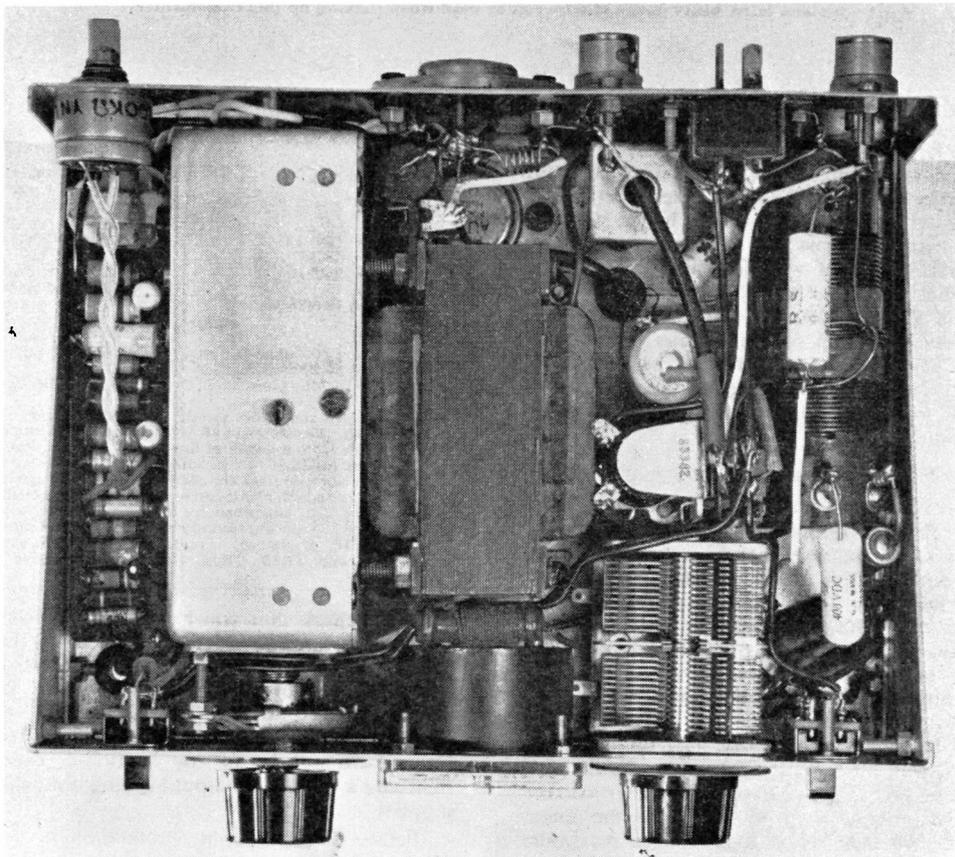
A relay (RL2) is contained within the "Mini-Mobile". This affects aerial change-over, and also makes the -12v. supply, while leaving a switched-on netting supply available. The other relay (RL1) is within the power supply and filter unit. It starts the vibrator for transmitting and removes the receiver supply. Using two relays reduces the number of wires to be brought to the transmitter and gives the PSU greater freedom for mounting.

One side of both relay coils is given a 12v. supply, and the other two are linked together and decoupled. By earthing this control line (C) change from "receive" to "transmit" is effected. A press-to-talk switch can be used, or an SPST toggle.

For G3SRY/M, the whip is fed directly from the output link using coax. An 0-5 amp. RF meter is included, being the final check that all is well.

Setting Up and Operation

The VFO/Exciter unit should be set up first. Connect a 220-ohm $\frac{1}{2}$ -watt resistor in place of the drive control, then a 12v. supply, with negative to the free end of R12, and positive to chassis. Set C4 to



Looking into the Mini-Mobile Transistor Tx described by G3SRY. The iron-cored item at centre is the modulation transformer T5, with the PA tuning condenser at right and the VFO/driver section to the left. The PA tank coil is at the right-band chassis edge and the relay (see circuit) can be seen just above the PA condenser. The plan size overall is no more than about 7in. by 6in. across knobs.

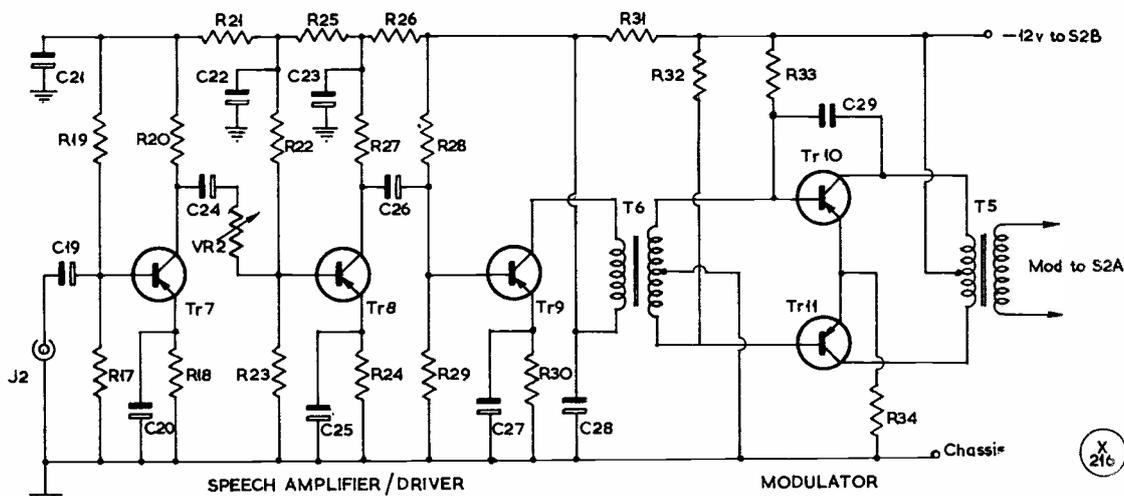


Fig. 3. Speech amplifier/modulator for the Transistor Top Band Mobile Tx, as used by G3SRV. The input circuit TR7 is for a moving-coil microphone of about 200 ohms impedance, with TR8 as a voltage amplifier and TR9 as driver into the Class-B modulator TR10, TR11. This will give an easy 7 watts of audio output, ample to modulate fully the AUY10's in the PA at 10 watts input. The modulation transformer T5 can be hand-wound using almost any available core — such as the smoothing choke from an old TV Rx — with the DC resistance kept down to avoid loss of modulating power. Since only relatively few turns are required for these windings (see table) a fairly heavy gauge of wire can be used when making up this transformer.

half mesh, and tune the station Rx to 1900 kc. Adjust the slug in T1 until the VFO is heard in the receiver. Placing the VFO close to the receiver will provide a good strong beat. Now check for full coverage from 1800 to 2000 kc. The VFO should run a little outside both ends of the band. Connect a 15-ohm resistor across the link winding of T2. Using a short length of wire for the receiver aerial, with the other end close to the 15-ohm resistor, tune both Rx and VFO to 1980 kc. Adjust the slug of T2 for maximum deflection of the S-meter. This completes the VFO adjustment. It can be used as a 50-milliwatt Tx on its own, and so used the writer obtained a 5/6/9 report from G3LYW, some 95 miles away.

Driver and PA Adjustment

The Driver and PA stages should next be tested. Ensure that the CW/Phone switch is in the CW position. (This switch *must* be fitted, even if you never use CW.) Set the VFO to 1900 kc and turn the drive control to minimum (maximum resistance). Apply 12 volts to the VFO and assuming that you have already made the usual checks for errors, connect a 12v. 6-watt lamp across a three-turn PA link; then apply 24 volts, being careful about polarity.

The PA meter should read zero. If all is well, set C18 to half-mesh and slowly turn up the drive. Unless T3 is well off tune, the PA meter should soon begin to read and if the PA tuning is near correct, the lamp will be glowing by the time the meter has risen to 300 mA. Next tune T3 for maximum PA current, backing off drive as you go, so that not more than 400 mA is indicated. Dip the PA and adjust drive for exactly 400 mA; the lamp should now be glowing brightly.

Table of Values

Fig. 3. Speech-Amplifier/Modulator for the G3SRV "Mini-Mobile" Tx

C19 = 10 μ F	R27 = 5,600 ohms
C20, C21, C22, C23, C25, C27, C28 = 100 μ F	R29 = 3,300 ohms
C24, C26 = 50 μ F	R30 = 470 ohms
C29 = 0.25 μ F	R31 = 180 ohms
R17, R23, R28 = 10,000 ohms	R32, R33 = 2,200 ohms nominal (see text)
R18, R21, R24, R25, R26 = 1,000 ohms	R34 = half-ohm, 1-watt
R19, R22 = 56,000 ohms	VR2 = 500,000-ohm potentiometer gain control
R20 = 4,700 ohms	TR7 = Mullard OC71
	TR8, TR9 = Mullard OC78
	TR10, TR11 = Mullard OC26

Notes: All capacitors should be rated in excess of 12v. working. Resistors are all $\frac{1}{2}$ -watt, except R34, which can be made from a length of fire spiral. R32, R33 should be adjusted for 25-30 mA standing current in each transistor. T5 can be made from the core of a surplus TV smoothing choke, of section about $\frac{1}{2}$ in. to 1 in. by $\frac{1}{4}$ in., wound 66-0-66 turns of 22g. enamelled on the primary side, with 264 turns of 22g. on the secondary. T6 can be a Radiospares type TT6, or similar. Transistors TR8, TR9 could be OC81, and TR10, TR11, OC28, as alternative types.

Next, check that you have enough drive over the desired band sector (1860 to 2000 kc in the writer's case); take it slowly and carefully, keeping the PA current down to 400 mA at all times. If needed, make slight adjustments to T2 and T3, and redip the PA every time you QSY. Get the feel of the rig and do not be in any hurry. If everything is right and a good RF output is being obtained, remove supplies.

Before talking about modulation, a few words of warning: *Never* tune up in the Phone position; stay on CW until happy that the PA is correctly loaded. When operating /M, do not shout into the mike when your high-Q whip is detuned by a low

bridge. The AUY10 is rated at -70 volts peak on the collector and they will not take much more before they short circuit. The 0.5 amp. RF meter is a useful check on the whip tune state, and well worth its investment.

Properly built and used with intelligence, this transistor Tx should not develop any faults at all.

Modulator Section

The values given for R32 and R33, in Fig. 3, are nominal; in practice they are adjusted for 25 to 30 mA quiescent current in each OC28, TR10, TR11.

To test the modulator, disconnect the secondary of T5 from the CW/Phone switch and put a 60-ohm 5-watt resistor across the two wires as a load. Connect a pair of low-impedance headphones across the primary. Turn the modulator gain half up, and plug in the microphone. Now run the -12 volt supply to the modulator, with a one amp. meter in series and switch on.

The meter will read only about 60 to 65 mA, but will rise on speaking into the microphone. Speech as heard in the phones should be free from distortion, except possibly with the gain flat out, but you will not need that much audio anyway. It should be possible to talk the modulator current up to 800 mA at full gain.

Final Test

With the CW/Phone switch to "CW" and every part of the Tx complete and tested, connect all supplies, back off the drive control, and switch on. Load up to 400 mA as before on the lamp load, then connect microphone and switch to Phone. Whistle gently at, but not into, the mike. The PA needle will kick slightly downwards, and the lamp will brighten slightly. (The audio gain VR2 will be about half-way up with a typical mike.) You cannot put 500 per cent modulation on this rig—so do not expect the lamp to dazzle you on peaks. A little experiment may be necessary with the PA link. This transmitter modulates to almost 100 per cent, and has plenty of punch. It does not behave quite the same as a valve rig, and getting used to it may take a little while.

In the "Mini-Mobile" the whole of the metal work has to do the job of general heat sink. Since no transistor runs more than just warm, this is fine. If the transmitter were left in the blazing sun in a locked car during a heat-wave, and then switched on, a very different state of affairs could exist. Thermal runaway might then occur—but since we have not had a heat-wave for some time, the writer has not been able to put this to the test! However, when a hair-dryer was played over the Tx, it continued to work, although the cabinet got quite hot, and no damage occurred.

The "net" switch behaves as one would expect, but the netting signal is rather strong; reducing drive reduces the level of the netting signal somewhat.

With a correctly matched whip, or ATU into aerial, maximum RF output is almost but not quite coincident with PA dip. Serious departure from this condition indicates aerial mismatch and should be

corrected at once.

In conclusion, it may be stated that the "Mini-Mobile" is doing a good job. Reports show that the signal is substantially the same strength as from the fully-valved mobile rig used in the past. The writer intends to continue development, and hopes to arrive at the 12-volt-line only state before long.

TRANSISTORS IN GPO TELEPHONE NETWORK

The Post Office is increasing its use of transistors for medium and long distance links in the inland telephone network. Previously these links required valve amplifiers at intervals of between 3 and 6 miles, with reliable power supplies and well constructed buildings sited near the cable routes. The use of transistor amplifiers has reduced size and power requirements to such an extent that amplifiers can now be housed in footway boxes at the roadside, energised by power fed to them over the cable and using safe values of current.

Several 300-circuit line systems using 0.174in. diameter coaxial cable are already operating and others with a capacity of 960-circuits will shortly be ready. A few 12-circuit carrier systems using two unloaded audio pairs, are also working. For distances between 15 and 40 miles pulse code modulation (PCM) systems have been developed. These use wires in cables of a type already existing in large quantities. Requiring only four wires to provide 23 circuits, such systems promise greater use of existing underground plant—without pulse code modulation the same four wires would provide only two circuits. The principle involved is that speech is coded at the sending end into a sequence of pulses. These are transmitted over the line to the receiving terminal, at which speech signals are regenerated. Repeaters employing transistors and housed in watertight containers sited in manholes along the route are energised from the terminals, using safe current values, *via* the same wires used to bear the coded speech channels. Since at the repeaters and receiving terminals it is necessary to recognise only the presence or absence of pulses, PCM systems can be made very resistant to the disturbing effects of crosstalk and noise.

"SEMICONDUCTOR DIODE CIRCUITS"

NEW MULLARD FILMSTRIP

A new 27-frame colour filmstrip entitled *Semiconductor Diode Circuits* is announced by the Mullard Educational Service. It forms part of a series covering advanced electronic circuitry and is intended for use in technical colleges, universities, industry and the Services. The strip describes the construction and theory of semiconductor diodes and their use in power supply units, radio and television, computers and miscellaneous applications.

Copies may be ordered from:— Unicorn Head Visual Aids Ltd., 42 Westminster Palace Gardens, Artillery Row, London, S.W.1, price 25s. per strip, including comprehensive teaching notes.

THE CODAR A.T.5

COMPACT AND EFFICIENT
LF-BAND CW/PHONE
TRANSMITTER—FOR FIXED OR
PORTABLE/MOBILE OPERATION

TEST REPORT

MANY Top-Band enthusiasts have in their possession a well-built, compact mobile rig for the band, which is left permanently in the car. The fixed rig, indoors, is usually less compact (to say the least) and is often downright clumsy and untidy, being the result of years of growth and modification.

On the other hand, many owners of such home outfits are deterred from going mobile by the very unsuitability of the gear, and their unwillingness to build a completely new transmitter for the car.

The Codar AT5 solves all problems by its dual personality. It is a 10-watt transmitter with full plate-and-screen modulation; a CW outfit that keys excellently; in short a transmitter that makes no concessions to its extremely small size. And the latter makes it eminently suitable for mobile work. A transistorised power supply unit for 12 volts is available, and also a conventional mains-driven PSU.

The actual size is remarkable—8½ in. long, 4 in. high and 4¼ in. deep. The PSU is half an inch taller, but otherwise the same size. The two units together will stand on one page of the *Magazine* and still leave quite a lot of print readable!

Circuitry

The VFO is a modified Vackar using an EF80, followed by another EF80 which is a buffer for the 1.8—2.0 mc band, and switched to serve as a doubler for the 3.5—3.8 mc range. Ingeniously, the designers have provided two separate scales on the VFO dial, using the full rotation of the condenser, one being calibrated for each band, although of course the VFO itself remains on Top-Band all the time.

The PA, a 6BW6, has a *pi*-section output circuit which covers both bands without switching, and this does necessitate some slight concessions to maximum efficiency on 80 metres, but performs excellently on Top-Band.

For AM telephony a crystal microphone (not supplied) is used to drive the conventional circuitry using a 12AX7 and a second 6BW6 as modulator, an auto-transformer being used to couple its output into that of the PA—*see* circuit.

The PSU includes a switching unit with three positions—Net, Stand-By and Transmit, and this takes care of the aerial switching, too, for those who wish to operate in this way.

With the aerial, or ATU, taken through a coax lead to the appropriate socket on the PSU, which is connected through two other coax jumpers to the

transmitter and receiver, all switching used for other bands within the station set-up may be disregarded. The "Net" position leaves the aerial connected to the receiver, and gives a weakish signal from the VFO only, the transmitter full HT being disconnected; at "Stand-By" the VFO netting signal disappears, and the neon on the front panel of the PSU gives a series of flashes instead of the steady glow; and in the "Transmit" position all voltages are on, and the aerial removed from the receiver and coupled to the transmitter.

The full HT given by the PSU is 250-280 volts, and the PA, when fully loaded, runs at about 50 mA. For strict adherence to 10-watt operation on Top-Band this is reduced to 40 mA by slightly reducing the loading under which condition the full 100 per cent modulation is obtained without difficulty.

The VFO runs at 150 volts, stabilised, and really is stable and quite immune from "pulling" by the PA. From the first few moments after switching on, the drift is very slight indeed; in fact the maximum drift measured during a long "soak" period on 1850 kc was less than 200 cycles. During normally short periods of operation it was of the order of 25 cycles only, which most people would not detect at all.

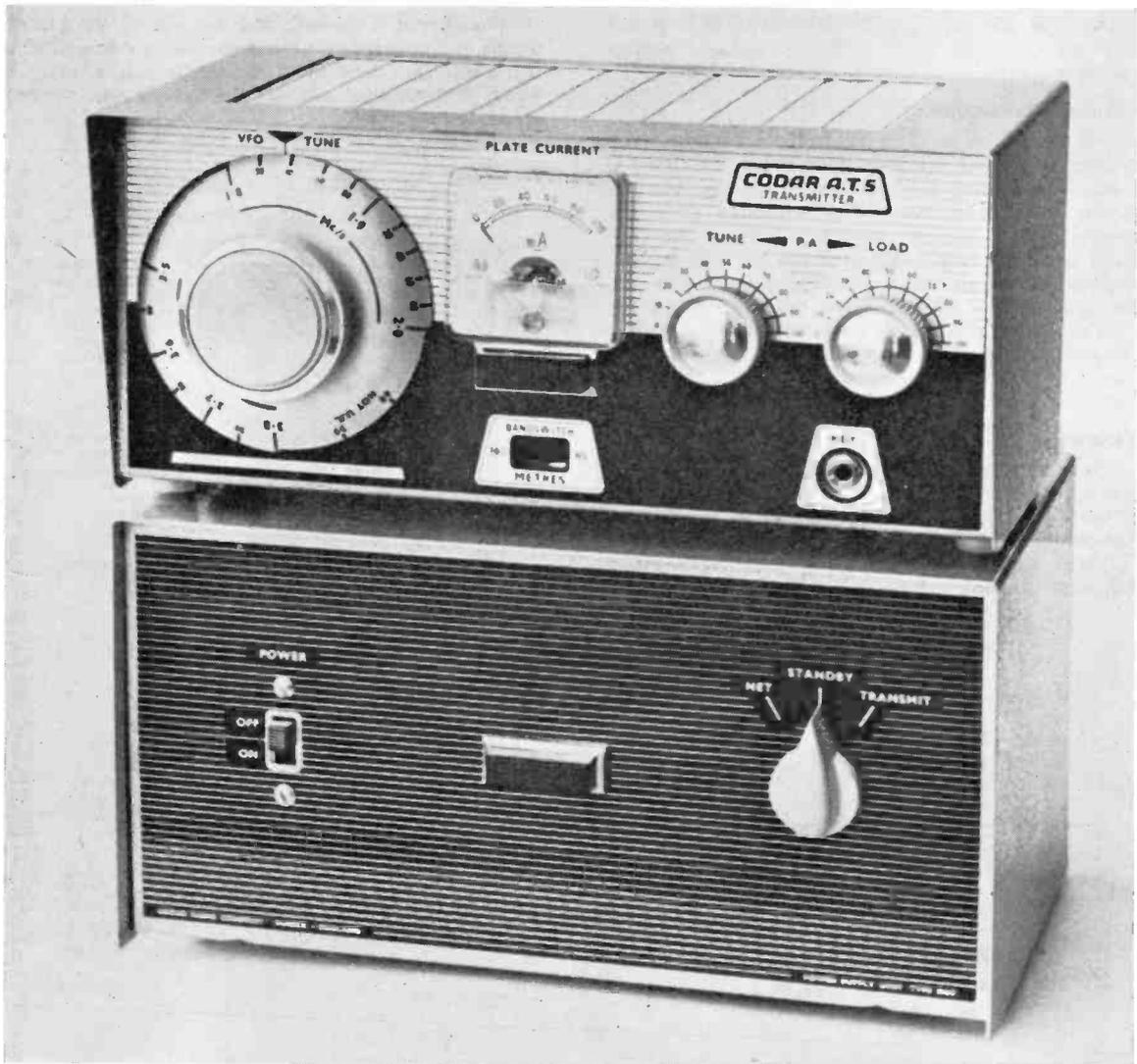
The 100 mA meter on the front panel measures anode current only; in earlier models it was in the cathode lead and therefore measured anode and screen current.

The change from Phone to CW is achieved by a small slide switch at the rear of the transmitter, and the depth of modulation is roughly indicated by the neon indicator on the front panel, which is said to glow on peaks of 70 per cent or over. The gain control for the modulator is a pre-set potentiometer at the rear, with a little key to operate it, conveniently kept in a small socket nearby. In practice it has been found that this control may safely be left at the maximum setting; slight over-modulation then occurs only if one speaks far too closely to the microphone (which, for this test, was an ordinary cheap crystal insert in a very expensive case!)

Operating Conditions

Unless the aerial is suitable for low-impedance feed, the use of an ATU is highly desirable. With a unit known to "look like 72 ohms," and normally in use with another transmitter for Top Band, the procedure outlined in the makers' instructions was perfectly satisfactory. With the loading set at minimum (fully clockwise on the control), resonance was found at about mid-point on the tuning scale. Loading was then increased, and tuning re-set, in the familiar manner, until an anode current of 40-45 mA was indicated. Under these conditions an RF output of roughly 6.8 watts was measured in a dummy load, and the ATU, combined with a half-wave aerial, tuned normally. Reports, over the air, were identical with those obtained from another transmitter running 10 watts to a single 1625 valve (but occupying roughly twelve times the space taken up by the AT5!).

The CW note was reported excellent, but was



The AT5 transmitter and the Type 250/S power supply are similar in size, and, standing as shown, take up an area of only 8½ in. by 5½ in. The three-position switch at the right of the PSU gives complete switching of both transmitter and aerial. The neon indicator in the centre of the PSU shows a steady glow on "net" and "transmit," and flashes intermittently on "stand-by"; that in the centre of the transmitter's front panel gives indication of modulation.

made slightly less "hard" and more pleasant to listen to by the use of an additional condenser across the key. The AM phone was reported as fully modulated and quite free of distortion by all stations worked, including locals who were receiving extremely strong signals.

On the 80-metre band the signal reports could only be compared with those obtained on a much higher-powered transmitter (input roughly 100 watts). The difference, in most cases, was surprisingly small—hardly ever as much as two S-points. But knowing about S-meters and their unreliability of calibration, to say nothing of reports by guesswork, this was not

taken as meaning very much.

The fact remains that no 80-metre station in the U.K. or Europe, called and raised on 100 watts, failed to give a good report on the 12-watt signal from the AT5 when it was netted on the same frequency and substituted for the 100-watter.

Aerial matching is not quite so satisfactory on 80 metres; in fact it appears impossible to arrive at an impedance of 72 ohms from the *pi*-output circuit, the L/C ratio of which is apparently too high for 80 metres. However, a 2:1 standing-wave ratio on the short length of coax between the transmitter and the ATU would not account for any measurable loss of

power. The addition of extra capacity directly across the output socket would probably make a perfect match possible.

Accurate Calibration

As received from the makers, the transmitter calibration was "spot on" for both bands. Provision is made for adjusting the oscillator frequency, but has so far been unnecessary. The calibrated scale can hardly be described as "bandspread"—but the Top-Band is spread over a sector of roughly 120 degrees, and the 3.5—3.8 mc band over 90 degrees. For export, the latter band is calibrated over the full 3.5—4.0 mc.

The tuning dial has a slow-motion drive with a reduction of approximately 6:1, which makes accurate netting extremely easy without giving too many turns to cover the whole band.

Versatility

Normally, with the mains PSU (250/S) the heaters are supplied with 6.3 volts AC; the changeover to 12-volt operation for mobile work is carried out automatically by using the alternative power supply (12/MS) and the power supply lead (with plugs) supplied with it.

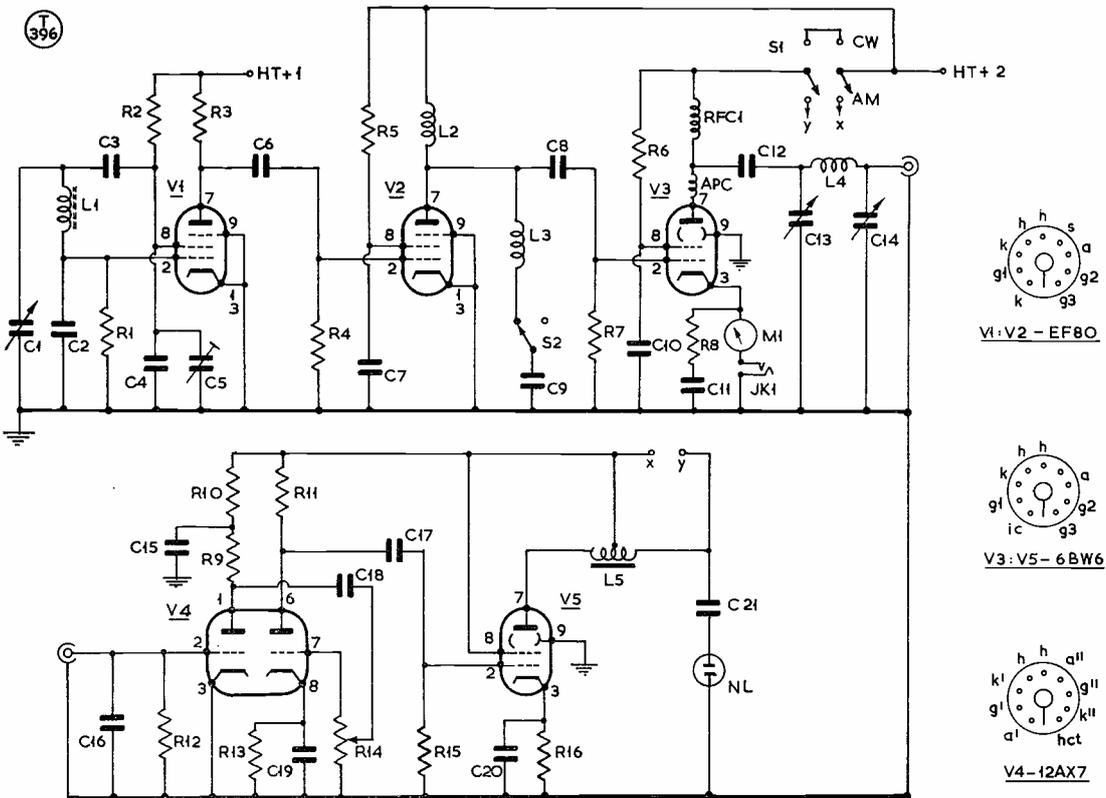
The chassis is earthed, and one side of the heater supply is connected to it—a point which needs watching when the transmitter is installed in a car, in which the positive side of the battery will almost certainly be earthed.

Table of Values

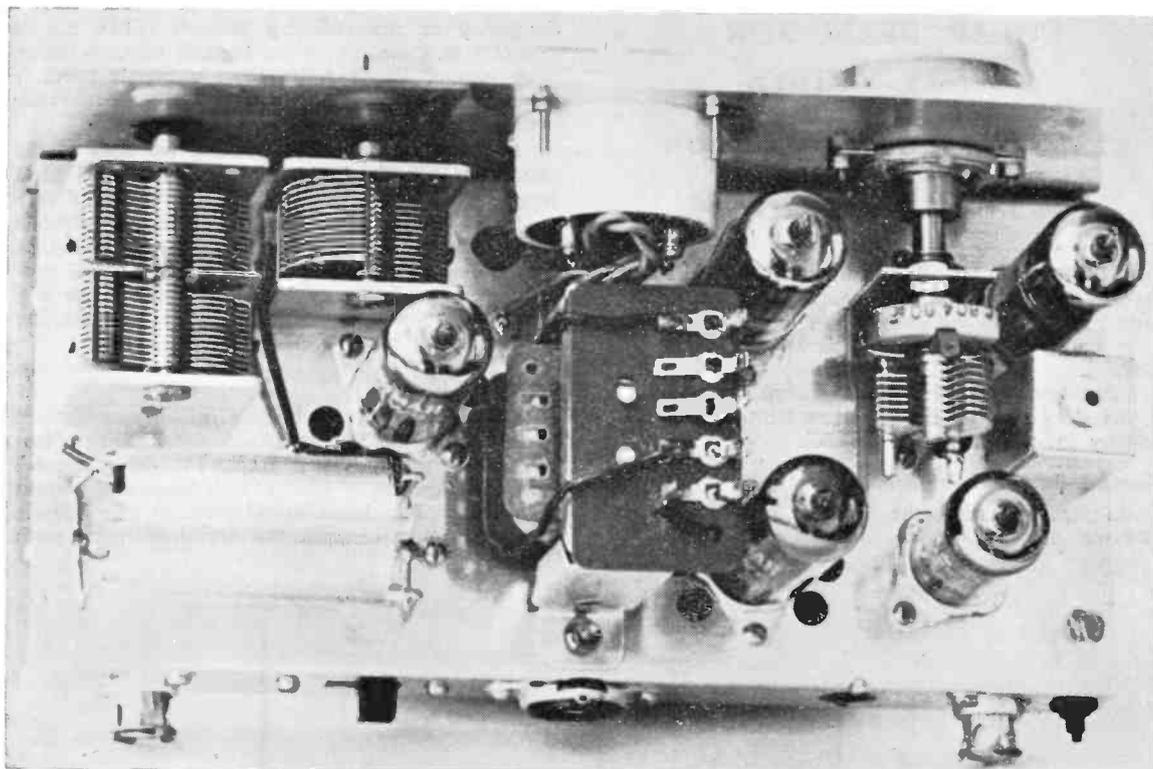
Circuit of the Codar A.T.5 CW/Phone Tx

C1 = 69 $\mu\mu\text{F}$, var.	R3, R5 = 22,000 ohms
C2 = .002 μF	R4 = 56,000 ohms
C3, C4 = 270 $\mu\mu\text{F}$	R6 = 12,000 ohms, 2w.
C5 = 10/40 $\mu\mu\text{F}$, temp. comp.	R8, R13 = 1,000 ohms
C6, C8, C16 = 100 $\mu\mu\text{F}$, cer.	R10 = 10,000 ohms
C7, C11, C18 = .01 μF , disc. cer.	R12 = 1 megohm
C9 = 22 $\mu\mu\text{F}$, cer.	R14 = 500,000-ohm potentiometer
C10, C12, C17, C21 = .001 μF , cer.	R15 = 470,000 ohms
C13 = 365 $\mu\mu\text{F}$, var.	R16 = 270 ohms, 2w.
C14 = 900 $\mu\mu\text{F}$, var.	L2 = 2.5 mH RF choke
C15 = 8 μF , elect.	L3 = 3.5 mc doubler
C19, C20 = 10 μF , 25v. elect.	L4 = Codarcoil T422S
R1, R2, R9, R11 = 100,000 ohms	L5 = Auto-xformer, TL10
	V1, V2 = EF80
	V3, V5 = 6BW6
	V4 = 12AX7

Notes: Items C3, C4, L1, R1 are in VFO can assembly. All resistors are rated $\frac{1}{2}$ -watt except as stated. NL is a neon indicator and APC an anti-parasitic choke.



Basic circuit of the Codar A.T.5, a very successful LF-band transmitter, producing a good clean CW signal and AM phone of excellent quality. The RF section is V1 (VFO), V2 (buffer/doubler) and V3 (PA). The speech amplifier is V4 and the modulator V5. There is no trickery about the circuit, which follows standard design principles, brought to a high standard constructionally. All values are given in the table herewith, and interior layout shown in the photograph opposite.



Five valves are used in the AT5; bottom right, 12AX7 (speech amplifier) and 6BW6 (modulator). Above them, from the right — EF80 (VFO), EF80 (buffer or doubler) and to the left, 6BW6 (PA). The same tank coil (bottom left) serves, without switching, for both 160 and 80 metres. At the back of the AT5 chassis are the aerial coax socket (left), the Phone/CW switch, the socket for the power supply cable, the pre-set audio gain control, the microphone plug and the key for setting the gain control.

Summary

From the fixed-station point of view we have practically no fault to find with the AT5; it has not, however, been tested under mobile conditions. Stations completely lacking Top-Band facilities can

now come on at a moderate price and with practically no demands on space. The equipment is stable, tractable and puts out a signal which should do credit to any station, both in quality and power. Its appearance is attractive and its compactness especially noteworthy.

AMATEUR STATION AT THE GERMAN RADIO SHOW

The German Amateur Radio Club (DARC) will be organising a special feature at the German Radio Show to be held in the Killesberg Grounds, Stuttgart, from August 27 to September 5, 1965. For the first time visitors will be able to see Amateur Radio operators making contact with other amateurs in Europe and overseas by radio and television.

A TV station built to conform with European standards will be transmitting, on the 70 cm amateur band, programmes filmed with a camera built—like the station—by amateur A/TV enthusiasts. Programmes will be received on a communal aerial in the Fair Grounds and translated to another channel

so that television sets being demonstrated in the Radio Show will be able to pick up the A/TV output as a fourth programme.

The amateur transmitting centre at the Radio Show will be easily found by the two 75-foot lattice towers with antennae—some of which will be rotary beams—for the HF and VHF amateur bands.

The Radio Show, organised by Stuttgart Exhibitions Limited, will cover the latest in radio and television sets, gramophones, tape-recorders, aerials and records produced by German industry. Further information about the Radio Show, admission tickets, party rates, travel and hotel accommodation can be obtained from the U.K. Agent, C.E.S. (Overseas) Limited, 225c Balham High Road, London, S.W.17. (Balham 4650).

"Short Wave Magazine" can be obtained to order through newsagents in practically all countries

CHEAP BEAM FOR TWENTY METRES

DESIGN AND CONSTRUCTION

From Notes by G3SZC

ILLUSTRATED here is a compressed three-element beam for the 20-metre band. It is cheap to build because with the exception of the loading coils, it is made entirely of odd pieces of TV aerial material.

All essential constructional information is given in the drawings, which are taken from the model actually in current use at G3SZC.

Element Data and Adjustment

As regards tuning, the director is resonated at 14.9 mc, and the reflector at 13.5 mc. The tune-

frequency of the radiating element (14.18 mc at G3SZC) is a matter of choice and depends upon what part of the 20-metre band is mainly used; it should be resonated for the centre of that band-area.

Final setting up is by adjusting the ends of the elements, with the beam temporarily erected at a height within reach—say, from the top of a step ladder. Ideally, of course, the tuning adjustments should be with the beam at its final height—but, in the amateur case, that is not always a practical proposition. The figures given for element length will be found to be near-enough to give a good starting point for any part of the 20-metre band.

Loading Coils

The formers for the loading coils at the element centres were made from *Radiospares* coil tubing, obtainable through any Radio/TV dealer, which comes in a packet of four 12-inch lengths of various diameters. The dealer would probably also be able to supply, quite cheaply, the necessary metal parts

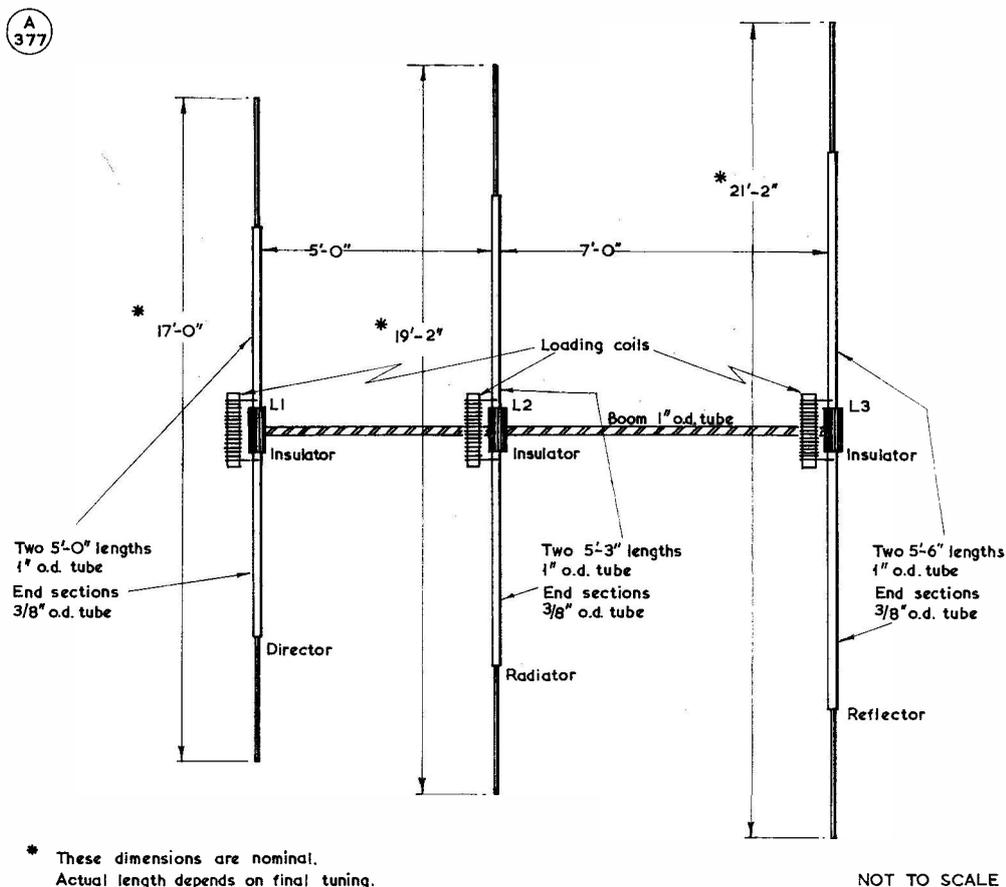


Fig. 1. General layout plan for the compressed 20-metre 3-element beam covered in the notes by G3SZC. Loading coil details are as follows, all wound to $\frac{3}{16}$ in. diameter using 14g. enamelled, spaced one wire diameter: L1, 41 turns; L2, 45 turns; and L3, 48 turns. Each coil is fitted with a 6-turn link winding for trimming the elements—see Fig. 2.

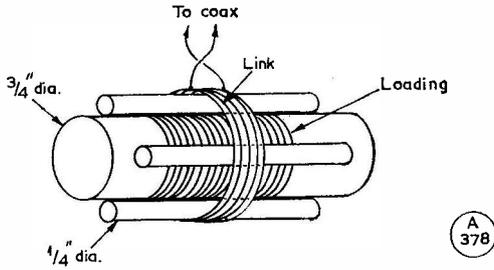


Fig. 2. Detail of an element loading coil, with its link winding for GDO connection. The total length of the former is about 10 inches, and turns data are given with Fig. 1. The spacing pieces on the coil are four 1/4 in. diam. insulating rods, and the formers themselves can be "Radiospares" TV coil tubing.

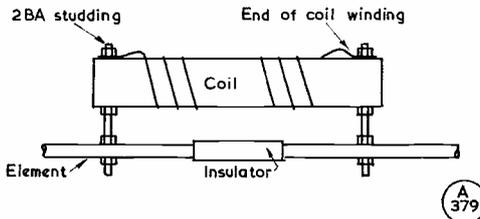


Fig. 3. Method of fixing the loading coils — as made to the detail given in Fig. 2 — across the element insulators.

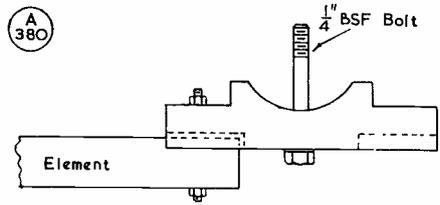


Fig. 4. How standard TV-aerial type insulators can be used to mount the beam elements and hold them to the boom, which fits over the 1/4 in. bolt — and see Fig. 5 for an end view.

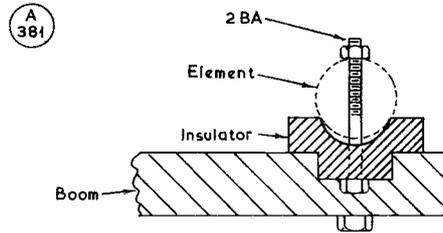


Fig. 5. An end-view of the boom-and-insulator assembly, using TV aerial tubing, clamps and insulating elements. The tube endings are fitted with wooden plugs so that bolting-up does not flatten the tubing.

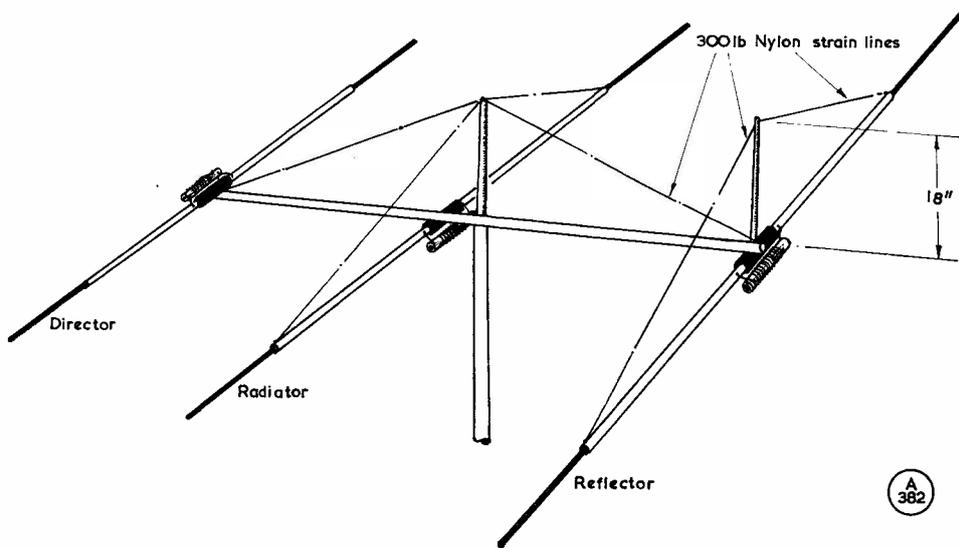


Fig. 6. General constructional layout for the 20-metre three-element compressed beam, showing how nylon strain lines are used to keep the structure mechanically in square, while permitting the necessary resilience under high windage conditions.

—which could be unwanted off-cuts from TV aerial assemblies.

For correct functioning and good results, the loading coils need to be carefully made, and fully weather-proofed after final adjustment. This is done by putting a five-turn winding, as a link, over the centre of each coil (see sketch) and then, with the elements on, feeding in the station GDO by a coax line to the link winding; coil turns and element ends are then trimmed to obtain resonance at the required frequency.

There will be some inter-action between the elements as the tuning process continues, and it is best to get the reflector and director on frequency before tackling the radiator. Having then got this on tune, the reflector and director sections should be re-checked and, if an adjustment is needed, the radiator may require retuning. The process is continued until the beam as a whole is "in balance" on the required frequency range.

Feeding

The radiator is fed by 75-ohm coax, at the link. Some adjustment to the coupling—number of turns, and spacing between turns—will probably be necessary to get a good standing-wave ratio. It is as well to check for frequency on the GDO, and to run the beam with an SWR meter in the feeder line, to keep an eye on it.

Construction

For the model, this is clearly suggested by the sketches, but other forms are possible, and no doubt

will be devised by those who think about building this beam. The emphasis should be on lightness with strength, which will ensure easy turning and minimum wind resistance. The nylon-cord stringers, rigged as shown, will be found helpful in obtaining a good shape with mechanical stability, and are almost essential in windy locations. Indeed, some extra bracing of this sort may be found necessary, and since nylon cord is itself an insulating material, no insulators are needed at the RF points of support.

At G3SZC, the beam is pushed up to a height of 33 feet on an extending mast, and can be reached from the roof of his shack which made tuning and adjustment easier than it might otherwise have been.

Results

Performance has been measured by QSO only, and in direct comparison with a dipole—which is the practical approach. The gain is shown to be at least one S-point, and on back-to-front tests, there is a drop of about 20 dB between full signal and the 180° position. These are acceptable figures for an amateur-built three-element beam, and show that a worth-while improvement in operating results could be expected by the use of this beam—more signal in the wanted direction, and less QRM from signals in unwanted directions.

For the general design G3SZC had the assistance of the *ARRL Handbook* and G3JES, for the fortnight or so that the work took before the whole assembly was completed and tested, ready to go on the air.

Do You Know That—

— You can wire a low-wattage lamp in series with your soldering-iron, with a shorting switch across it, to keep the iron warm on stand-by. Then, as you want full heat, the switch is closed to short out the lamp, which will glow at about half-brilliance while the iron is on "warm"; this not only prevents the tip from burning away due to over heating, but acts as a tell-tale for the iron circuit. The wattage of the lamp should be chosen to accord with the loading of the iron in use, e.g., 25w. for most instrument irons. (G3JBU.)

— When working with printed-circuit board, solder over-spill can be prevented by dabbing *3-in-One* oil on the insulated areas of the board. This will be found very helpful, because unwanted solder bridges on printed board can be difficult to break. The oil known as *3-in-One* is readily available from cycle shops, garages and D-I-Y stores, and is very useful for light lubrication purposes. (G3SSM.)

— When changing a valve-type PSU over for rectifiers of the modern silicon type, the 5v. heater leads need not be brailed away as no longer required. By using a voltage-doubler circuit, about 10v. of smoothed DC can be made available for the operation of transistorised equipment, and this supply can be regulated by putting in a zener diode. The circuitry

is quite straightforward and can be worked out by reference to the manuals. (J. L. Oliver, London, N.21.)

— The velocity-constant of any RF cable, whether coax or flat-twin, can easily be worked out by taking a given length—say, two metres—soldering a loop across both conductors at one end, and measuring the resonant frequency of the section using a GDO. The result is converted to wavelength (WL) and the velocity constant Vc is given by L divided by WL, where L is the length of RF conductor as measured. (G2HR.)

— When out working /P, a wire fence (which might be anything up to a mile long) will make a very good Top Band aerial. All you have to do is to couple into the fence through a .001 μ F condenser, and tune and load in the usual way. Even if the fence is earthy at various points, so long as it loads and tunes, radiation will be obtained, often to DX distances. (G3LLL.)

— If you are portable on Top Band, a wire fence connected to the earthy end of the ATU will provide a very effective counterpoise when the whole system is brought to resonance.

— A small neon connected across a fuse-holder will strike when the fuse blows, thus giving a visual indication of failure. In complicated wiring layouts, involving many fused circuits, the neons can be

brought out, on light wiring, to a labelled indicator board to give immediate fault location. (G3SWH.)

— Two sheets of *Polyglaze* (thin transparent material), obtainable from ironmongers or D-I-Y shops, can be stapled together to make neat and durable covers for circuit diagrams or layout drawings. Wax crayon, the XYL's eyebrow pencil, or those Japanese felt-tip pens, now on sale everywhere, can be used on the outside of the *Polyglaze* to mark alterations, make modifications or write notes. (G3SME.)

— For temporary working under /A or /P conditions, thin wire (such as 26g. salvaged from old iron-core components) is quite suitable for use as a transmitting aerial, with buttons as light-weight insulators. Three trousers-buttons in series at the voltage antinodes will be good enough for any 50-watt Tx under such conditions. (G3IOI.)

— The energising speed of a relay can be con-

siderably increased by putting a large-capacity condenser across its series dropper resistor from the supply voltage—the best value being a matter for experiment, depending upon line voltage and resistor value. As the supply is switched on and the parallel condenser charges, the initial current through the relay coil is high, ensuring rapid snap-on; the coil current decreases as the condenser charges and the circuit reaches voltage stability. Conversely, a slow-to-make, slow-to-release relay characteristic can be obtained by putting a condenser across the relay coil. (G3PHG.)

To get a half-guinea cheque for appearance in this space, you do not have to embellish on what has already appeared, nor to invent ideas. What we want is something of your own that you think is worth passing on, without circuits or diagrams.

—Editor.

PRACTICAL PHASE-SHIFT OSCILLATORS

USING PROVEN TRANSISTOR CIRCUITS

B. J. P. HOWLETT (G3JAM)

PEOPLE who go in for complicated circuits are either admired or ignored, and it is the fervent hope of the writer that after this little lot the latter response will not be his. However, in some cases a little complication in what is basically a simple circuit has its points and this is nowhere so clearly illustrated as in the (simple) Phase-Shift Oscillator.

It is so simple, that it no longer needs fully explaining—but try telling that to someone who is ruefully admiring the near square-waves coming off (especially a transistorised one) and see what answer you get!

The main trouble seems to be the absence of any sort of amplitude control; the sine-wave is there all right, at the base of the transistor, but does it ever get out of the collector circuit without getting itself twisted out of all recognition? Well, sometimes. If the stage-gain happens to match the loss through the shifter network everything is all right, but this is a critical condition to maintain over long periods.

Basically, there are two ways to overcome this trouble. The first, AGC, fairly cheap and easy; and the second, limiting without distortion, a little more involved and, of course, more expensive.

Circuit Details

Fig. 1 is, as far as transistor circuits go, of quite a venerable age, having been devised by the writer as long ago as 1960, and at least two London VHF stations have been using it successfully for almost

that length of time for producing an MCW tone, amongst other things.

The point of interest is not, of course, the fact that it is a four-stage network giving a readier performance than the more popular three-stage one, but that a portion of the collector waveform is tapped off through R1, C1, to a diode D1, and is applied through the smoothing network R3, C2 as a direct voltage into the bias circuit, in order to decrease the gain of the transistor in proportion to the strength of oscillation. R1, which determines the amount of AGC, was set for transistors with a *beta* of 80 approximately, when measured at 1 mA. Audio types are preferred, and a good OC81 suits the arrangement very well.

The second circuit, Fig. 2, attacks the problem the other way. Tr1 is the equivalent to Tr1 in the first circuit and feeds the phase-shift network as before. However, following it is a two-stage amplifier before the waveform is applied back to the base of Tr1. If we remember that each stage inverts the

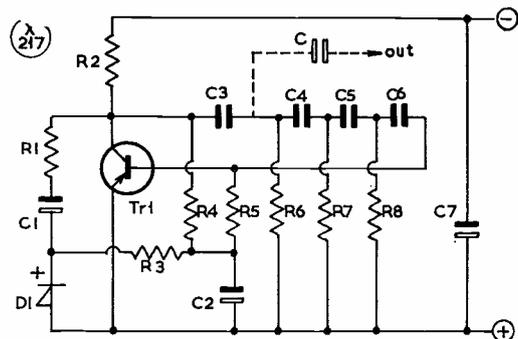


Fig. 1. A four-stage phase-shift oscillator with diode level stabiliser, for which the suggested values are: C1, C2, C7, 100 μ F; C3, C4, C5, C6, 0.1 μ F, or near; R1, 3.3K; R2, R3, 2.2K; R4, 22K; R5, R6, R7, R8, 1K; TR1, OC81, or similar; D1, germanium diode; supply voltage, 9v. and consumption about 3.5 mA. The coupling-out capacity C can be from 0.1 to 1.0 μ F.

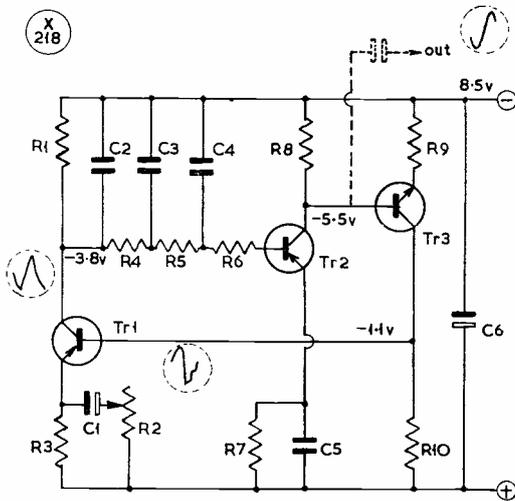


Fig. 2. Another version of a phase-shift oscillator (see text), for which values could be: C1, C5, 50 μ F; C2, C3, C4, 0.15 μ F; C6, 100 μ F; R1, 8.2K; R2, 5K potentiometer; R3, R8, 1.5K; R4, R5, 4.7K; R6, 6.8K; R7, R10, 1K; R9, 2.7K. Tr1, Tr2 are OC81; Tr3 an AC127, or similar. Voltage readings as shown were taken on an AVO-8 measured against the + line with 8.5v. supply.

wave once, we see that the phase is still correct for oscillation to occur.

Now the real point of the extra stages is to allow one transistor to overload, but to make quite sure that it is *not* Tr2, as this is destined to feed the output circuit. Assuming, then, that there is a large sine-wave on the collector of Tr2, we apply it directly to the base of an n.p.n. transistor Tr3, having an undecoupled emitter resistor R9, which gives high input impedance and not just low gain, but *no* gain. What, then, is its purpose? To invert the waveform and to provide a good buffering action against the dreadful distortion at the base of Tr1! This squaring off taking place in Tr1 constitutes the amplitude limiting, therefore an almost constant output appears at its collector for passing through the phase-shift network. The distortion products never get through to Tr2.

However, there are one or two provisos about this Fig. 2 circuit. In the first place, the gain of Tr2 must be watched, as this is going to have a predetermined level of input; so if its gain is too high, distortion may occur just where it is not wanted. A gain of 90 is as high as one would want to go, *plus* or *minus* 15, and, with a 9-volt supply, about 5 volts peak-to-peak is available at top gain. The gain of the other two transistors can vary more than this—Tr3 because it has 100 per cent feedback, and Tr1 because of the gain preset in the emitter circuit. Tr3 could be a Mullard AC127 (an upside down edition of the OC81), while Tr1 can be another OC81 or similar.

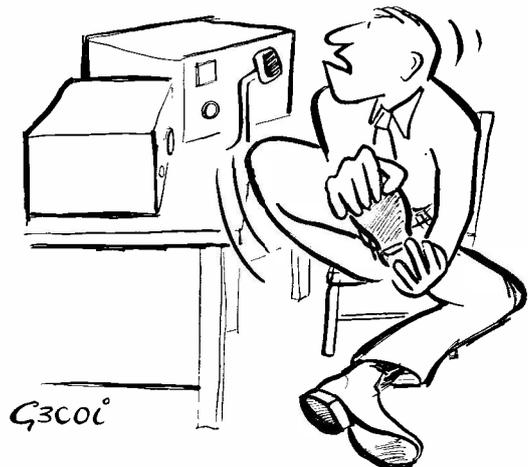
Since three stages working together are in theory degenerating when the output is connected to the

input, the writer has eliminated all inter-stage coupling components, and each transistor current is dependent on the other two (it didn't take all that long, really, to get it right!), so it is reasonably stable and free from funny effects. It did mean, though, that the phase-shift network was largely determined by the base current requirements of Tr2, and if a change of frequency is contemplated this must be done by changing the values of C2, C3 and C4. If a .01 capacitor is connected across R8, stronger, and lower frequency, oscillation can be obtained if Tr2 is of lower gain than recommended.

Another interesting feature is the ability to draw an output by connecting between the collector and emitter of Tr3, as shown in Fig. 2. The waveform is even larger and will stand heavier loads before distortion creeps in; the only trouble is that, normally, neither point is earthed—but a transformer (in series with a condenser) could be connected there for special purposes with advantage.

Conclusion

No one can claim that the Phase-Shift Oscillator makes a very convenient unit for a variable oscillator source, but its value as a *fixed* frequency source for signal generators and such is well established, and the writer hopes that these two 800 c/s units will find some use for somebody somewhere. In particular, one can recommend the Fig. 2 circuit, as, with a near sine-wave adjustment, a satisfactory waveform can be obtained from 18 volts down to 3 volts at one setting of R2—of course, with proportionately changing amplitude. With the suggested transistors, about 14 volts on the line would be a reasonable maximum—but with resetting of R2, even a U2 cell will get it to go.



"... QRX, and I'll try it barefoot ..."

RTTY Topics

DISCUSSING A NEW TYPE OF TWO-TONE TERMINAL UNIT— DESIGN AND CONSTRUCTION

W. M. BRENNAN (G3CQE)

This is a regular alternate-month feature, devoted to the amateur radio-teleprinter interest and covering all aspects of current RTTY activity. This time, our contributor deals with a new type of two-tone limiterless terminal unit.—Editor.

DURING the last few years there has been a great deal of re-thinking in terms of RTTY Converter (Terminal Unit) design. As far as amateur RTTY is concerned, this appears to have started when K6IBE browsed through some U.K. technical journals and drew the attention of the amateur fraternity to a new approach to the problems of overcoming the effects of selective fading on FSK signals. The outcome of all this has been a great deal of debate and the development of what is now generally known as the "Two-Tone Limiterless T.U." Such a converter has some quite valuable advantages over the familiar AF Limiter-discriminator type of circuit.

Discussion

An FSK signal can be treated as either an FM signal with a constant deviation of say ± 425 c/s (for 850 c/s shift) about a hypothetical centre frequency. The actual centre freq. is of course never transmitted in the case of RTTY FSK since the RTTY signal is always on either "mark" or "space." The alternative approach is that the FSK signal may be looked upon as two complementary CW (not Morse!) signals, noting simply that one is present when the other is not. In other words, one is switched on at the instant the other is switched off.

From a receiving point of view, both concepts are acceptable and the difference comes only when the method of detection is considered. The limiter-discriminator type of converter performs exceedingly well when there is a fair signal-to-noise ratio and the levels of the "mark" and "space" signals are approximately equal at the receiver. However, when selective fading occurs, it produces a continuous variation in the relative levels of both signals. The filters associated with the receiving set-up modify the received keying waveform somewhat (extreme filtering produces a waveform which is triangular) and because of the waveform modification, the incorrect relationship between the levels in the "mark" and "space" channels result in a keying bias which, when it attains a certain level, will produce mis-selections. Furthermore, a limiter type of T.U. will give some 25 per cent element error rate with a much higher character

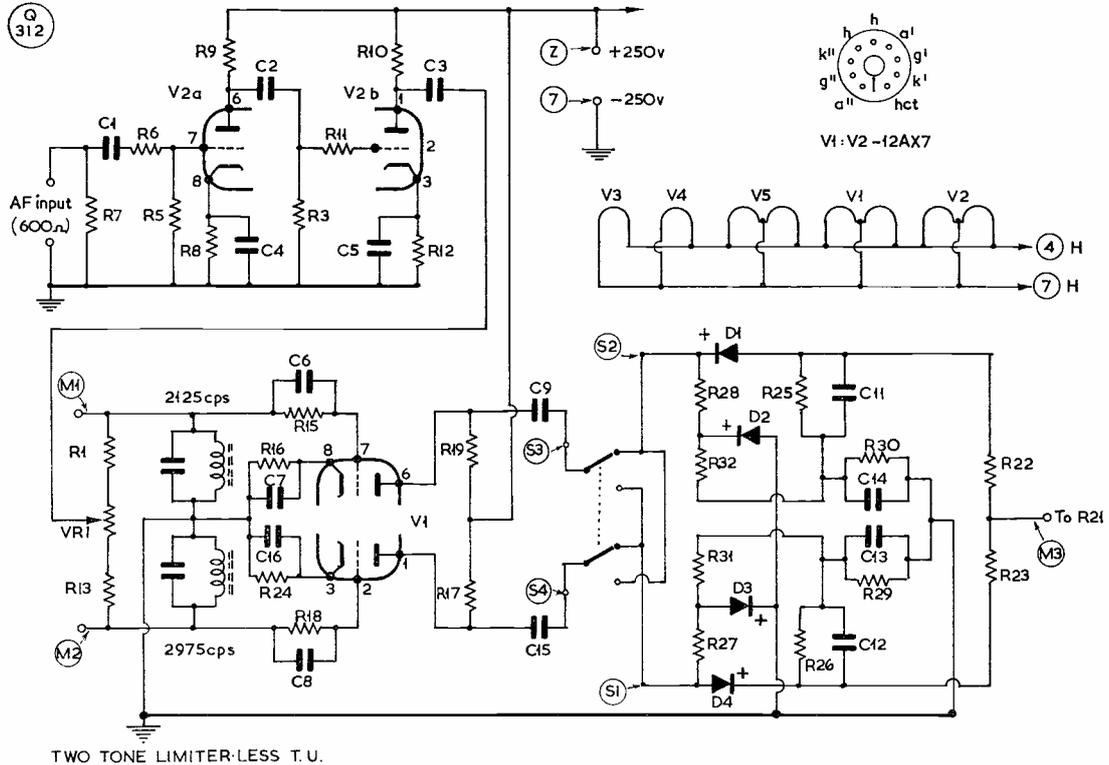
error rate if either the "mark" or "space" signals fade completely. It can be safely said that during periods of selective fading, the FM type of T.U. leaves a lot to be desired—and that selective fading is rarely absent on the HF bands.

The alternative approach to T.U. design is to treat both the "mark" and "space" frequencies as separate and completely independent channels. Such an approach is not in itself new and several T.U. circuits of the past have made use of this idea. However, various papers that appeared in the *Proceedings of the I.E.E.* in 1957 advocated the use of a circuit which contained a "Slideback Detector" for each channel, with the output of both combined immediately before some form of keying decision circuit, this latter determining whether the signal was to be a "mark" or "space." The Slideback Detector is in fact two detectors, one being used to develop the normal keying waveform and the other, possessing a relatively long time-constant, determines the amount of signal energy present. The two types of information are combined to produce a signal which is symmetrically arranged about the zero voltage reference line. This signal is combined with the output from the other channel—which should be an inverted image of the first channel if both "mark" and "space" signals are present. The net result is that we have a system which will key the T/P perfectly well when there is a radical difference in the levels of the "mark" and "space" signals at the receiver input—or even when one of the signals has completely faded out, providing that the remaining channel is still a little higher than the noise level. Where both signals are strong, the output from the two channels merely reinforce each other. This is in fact a true frequency-diversity system of reception.

Such a T.U. could be switched so that an operator could use either or both channels for reception. This would of course be useful if interference appeared on either the "mark" or "space" freq., enabling copy to be taken from the clear channel so long as the signal level in it remained above the noise. Clearly then there are several advantages in this type of T.U. and it is now generally agreed in RTTY circles that the "Two-Tone Limiterless T.U." will give an improvement of anything between two and ten times the error rate of the FM type of T.U. depending upon the depth of selective fading.

Practical Circuitry

The writer has in fact built two such T.U.'s of slightly differing design, the most recent being the circuit as shown on p.346. This is a modification of the K6IBE circuit by DL6EQ (who is also well known on RTTY) and who is in fact producing a printed circuit board for this unit on a modest commercial basis. The circuit is fairly straightforward and the various component numbers shown are as per the printed circuit. The AF input is 600 ohms at about 0.2v. The first valve in the circuit (V2) is a straight audio amplifier and it is important that these two stages are not overloaded by too high an input voltage since this will produce limiting and destroys the whole action of the circuit. After amplification, the signal is passed to the input of the two-tone discriminators



TWO TONE LIMITER-LESS T.U.

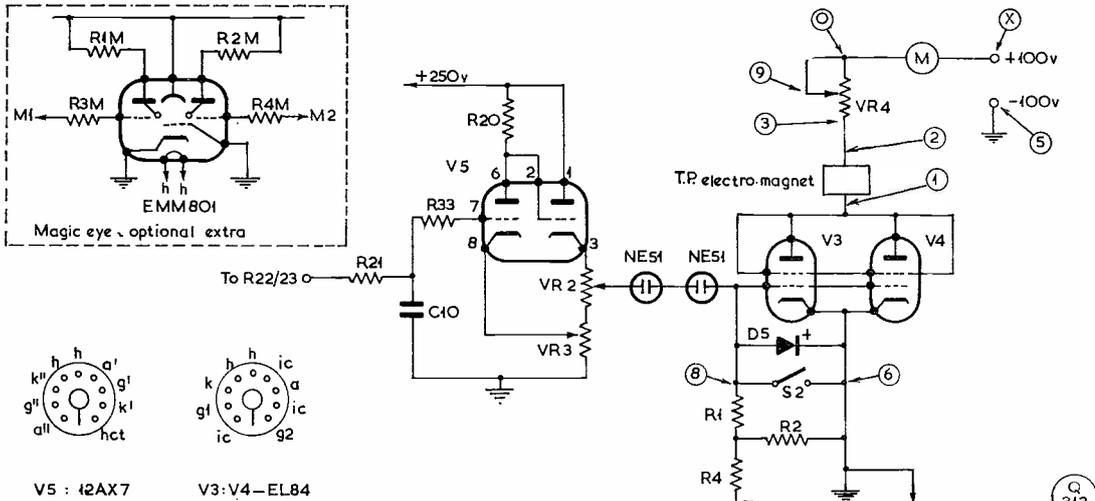
Circuit continued on next page

via C3 and the potentiometer VR1, which is adjustable to compensate for differences in the input levels to the two channels. It is a linear type of control and can be mounted on the front panel. The tone discriminators separate the two tones and these signals are then passed via a DPDT switch to their respective detector circuits. The function of the switch is the usual Reverse/Normal keying control found on most T.U.'s. The output from the two detectors is combined at point M3 and passed to V5 (Fig. 2) which is the decision stage. This is in fact the familiar "Schmitt Trigger" circuit, in which C10, R21 and R33 form a low-pass filter network to improve the keying waveform. The Schmitt circuit is adjusted to change its state at either side of zero grid voltage. The potentiometer VR3 is used for this adjustment. Still looking at Fig. 2, VR2 controls the level of drive voltage applied to the two NE51 neons and is used to adjust the current through them. (Excessive current will rapidly burn them out and too little will cause them to trigger erratically.) A slightly negative voltage applied to the grid of the first half of V5 will produce a positive voltage of something like 120 volts on the cathode of the second half. This will strike the neons which will then pass the voltage to the grids of V3 and V4. The latter are biased back by a negative voltage derived from the grid bias supply (Y) via the potential divider R2/R4. The positive signal voltage drives both valves to a high

anode current point, thus producing a "mark" signal in the winding of the T/P electromagnet, which is in their anode circuit. The keyer stage of this T.U. is intended for printers which use single-current operation (i.e., "on/off" keying) and most U.S.A. and Continental machines employ nothing but single-current keying. However, Creed T/P's are capable of being used either for single or double-current working, although for single-current operation a bias spring has to be supplied in order to hold the T/P electromagnet in the "space" condition when there is no signal on the coils. The normal current required by Creed T/P's for single-current working is 30 mA. The variable resistance VR4 in the anode circuit of the keyers is adjusted to give this figure when the keyer bias and drive voltage has been adjusted. S2 in the grid of the keyer stages is a control which holds the printer on "mark" when required. The diode D5 in the same circuit is a clamping device which ensures that the grid is never allowed to run positive accidentally.

For those who prefer double-current operation it would not be too difficult to modify the keyer circuit to drive a polar relay which possesses a bias winding. A very much smaller swing in current would be required and only one valve would be necessary. For further details of converting from one type of keying to another see Fig. 3, p.310 of the August 1962 issue of SHORT WAVE MAGAZINE.

The printed circuit produced by DL6EQ for this



The circuitry discussed in the text by G3CQE. In amateur radio-teleprinter working, a Terminal Unit of this type will give much improved results, because the effects of selective fading — which can affect either the “mark” or the “space” channel — can be eliminated. Though this particular design is attributed to an American source, in the strictly amateur context the idea was probably originated by G3BST, in his articles on a Diversity Unit for RTTY reception, in the July-August 1961 issues of “Short Wave Magazine,” this work being far ahead of its time.

T.U. is quite small, measuring some 7½ in. x 3½ in. It is supplied ready drilled and with the component location printed on the upper face of the board. In addition to the circuit board, the kit also includes seven valve bases suitable for mounting on this type of board, two of them intended for mounting the two tuned circuits. These can, of course, be the usual 88mH toroids with appropriate capacitors to tune one to 2195 and the other to 2975 c/s. However, the manufacturer of this kit will supply two pre-aligned tuned circuits mounted on B7G bases all ready for plugging in. Another extra to the T.U. board is a magic-eye tuning indicator, the circuit for which is shown above. This uses a EMM801 valve which has an unusual display; two separate displays, in fact. This particular indicator is an excellent aid to tuning-in an RTTY signal since it indicates the signal level in each channel with a separate display. The display consists of two parallel lines—one for each channel—and these lines “fill in” from both ends to the centre for correct tuning. This type of valve is not easily available in this country but the magic-eye kit, which normally consists of a small printed board together with a wooden frame and a cardboard mask for the eye and a small instruction booklet, can also be supplied complete with the valve.

Unfortunately, the instruction booklet provided with the circuit boards is in German and some slick operating with a German-English dictionary is necessary to sort things out. Also there are some errors in the instructions and a correction sheet

Table of Values

The Terminal Unit discussed by G3CQE

C1, C2 = .0033 μF, 125v.	R8, R12, R13, R14,
C3, C6,	R16 R24 = 2,200 ohms
C8, C9,	R20 = 4.7 megohms
C15 = .01 μF, 400v.	R21 = 220,000 ohms
C4, C5,	R25, R26,
C7, C16 = 20 μF, 15v.	R27, R28,
C10 = .005 μF, 125v.	R31, R32 = 20,000 ohms
C11, C12 = .033 μF, 125v.	R29, R30 = 1 megohm
C13, C14 = 0.22 μF, 125v.	R33 = 2.2 megohms
R1, R9,	VR1 = 1 megohm, lin.
R10, R17,	VR2 = 100,000 ohms, lin.
R19 = 200,000 ohms	VR3 = 5,000 ohms, lin.
R2, R3,	VR4 = 5,000 ohms, 10w. linear
R15, R18 = 50,000 ohms	D1-D5 = OA81 diodes, or similar
R4, R11,	V1, V2,
R22, R23 = 300,000 ohms	V5 = 12AX7
R5, R6 = 160,000 ohms	V3, V4 = EL84
R7 = 600 ohms	

Notes: Except for VR4, all resistors are rated ½-watt, and “preferred values” may be used. All condenser ratings are for working voltage. Neons NE51 can be any low-voltage type without base resistor. The EMM801 is a double-display magic-eye type not generally available in the U.K., but may be obtainable by special order.

(again in German) is provided. However, one error not mentioned was the fact that the clamping diode in the keyed grid is shown the wrong way round, both in the circuit and in the polarity indicated by the printing on the circuit board. This is corrected in the circuit shown here.

Construction

Apart from the above, the construction is pretty



simple and provided the parts are all to hand it should not take more than two or three hours. The two neons can be any small type with the base resistor removed. The writer used two of the wire-ended neons from the front and back ends of the "Command" receiver series. The circuit board is clearly labelled but care should be taken not to forget the required straps at B1, B2, B3 and an unlabelled one which connects the live side of the heater supply to V3 and V4 to the main heater line. Additional refinements that are worthwhile adding include an input volume control and a switch which disables either channel when necessary. R5 on p.346 was replaced by a 200K potentiometer (logarithmic) and the grid of the associated valve V2 taken to the slider. A two-pole three-way switch was added which, in one position, breaks the circuit between C9 and S3; in the other position it breaks the circuit between C15 and S4, whilst restoring the C9-S3 connection; and in the third position it completes both connections. This gives a "Mark Only," "Space Only" and "Both" control. As the input volume is quite important, it would also be worthwhile adding some means of metering this, too. Power supplies for the unit are quite modest; the T.U. proper requires 250 to 300v. DC at about 15 mA. The keyer stages require 40 mA or so at about 100 to 110v. This particular voltage could be taken from the 110v. motor supply which many owners of printers with DC motors already have in the shack. The grid bias supply to the keyer stage may be anything from 150 to 350v., the values of R2 and R4 being adjusted to suit the bias voltage available. (The values given are for a 300v. supply.) American and Continental T/P's usually require 20 or 60 mA for the coils of their operating magnets—depending on whether these coils are in series or parallel. If in fact 20 mA is the required current then one of the keyer valves may be dispensed with. Apart from the bias and anode current of the keyer stage, the only other adjustments that require setting up with care are the two associated with the trigger circuit of V5.

Adjustment

There are several methods of tackling this, but a simple and effective method is as follows:

- (1) Temporarily strap the point M3 shown on the diagram to earth,
- (2) Adjust the slider of VR2 to about one-third of its travel away from the cathode,
- (3) Set the slider of VR3 at the bottom (earthy) end of its track,
- (4) Gradually move the slider of VR3 up from the earthy end until a point is reached at which the two neons strike; note this setting carefully,
- (5) Return the slider of VR3 gradually towards the earthy end until the neons are extinguished. The correct setting is midway between these two points,
- (6) Remove the temporary strap from M3 and apply a small negative voltage between this point and earth. This should

be no more than $-1\frac{1}{2}$ v. and should cause the neons to trigger at once. The neons should be glowing with moderate brightness but if not, the neon current should be adjusted by varying the potentiometer VR2. If any adjustment is necessary then the steps (1) to (5) must be repeated; if not, remove the $1\frac{1}{2}$ v. test voltage.

The adjustment of the controls VR2 and VR3 interlock but it should only be necessary to repeat the steps (1) to (5) once. The T.U. is then ready for business.

General Notes

As with any T.U. a reduction in both noise and interference can be brought about by the addition of a band-pass filter in the region of 2-3 kc ahead of the T.U. input. Such a filter will shortly be available from DL6EQ. However, owners of the FSR or FSU types of commercial T.U. can make use of the excellent band-pass filters available in their existing gear and take a feed for the AF input to the two-tone T.U. from the output of the BPF. A socket is available for this in both cases. Unfortunately, the AC voltmeter which indicates the AF voltage input to the FSR/FSU T.U.'s is much too high in FSD for taking accurate input measurements to the additional units. However, if an input volume control has been fitted to the two-tone T.U. it can be turned down until 2v. on the voltmeter is around the correct (0.2v.) level for the new T.U. In this way both converters are receiving somewhere around their normal input and the addition of a selector switch between the T/P and the keying circuits of both T.U.'s will enable some very rapid comparisons to be made between the performance of the two units merely by throwing the switch.

Using this method, tests indicate that there is a very definite advantage with the two-tone unit when selective fading is bad—or on signals which have a flutter. Also when signals are weak and watery the two-tone T.U. will often give good copy when almost complete garble comes from the FSR.1.1X. Try it for yourself!

The cost of the printed circuit board, etc., for the T.U. from DL6EQ is about 14s. 2d. The two filters are priced at £1 1s. 8d. and the Magic Eye kit including the EMM801 valve is £1 9s. 4d. These prices include postage to the U.K. and are arrived at by taking the West German mark as equivalent to 1s. 10d.

Space does not permit the inclusion this time of the AFC circuit mentioned last month, and it must be held over. See you in October, then, and meanwhile enjoy the holidays. 73 de G3CQE.

Editorial Note: The address for the kits available from DL6EQ is: Hch. & Rud. Brumm, 6550 Bad Kreuznach, Traubenstrasse, 3 Kilianstrasse, West Germany. Those interested are advised that Customs dues may be demanded, and would have to be paid before delivery would be given in the U.K.

THE HIGHEST, THE LONGEST AND THE MOSTEST

L. H. THOMAS (G6QB)

WHATEVER it is that you want, it is likely that California can supply it. If you want surfing in warm sea in the morning, and skiing on cold snow the same afternoon, that's easy. If you want to drive 260 miles in four hours without exceeding the speed limit (65 m.p.h.) you can do that. If you care to travel over 1000 miles to visit a brother amateur, and still be in the 6th district . . . or, conversely, if you would like to visit 5000 other amateurs without leaving your own city, all this can be done, too.

During the course of an all-too-short holiday, it wasn't possible to do many of these things. But two experiences definitely not to be missed were visits to the famous "antenna farm" of W6AM on his ranch at Rolling Hills, and to W6YY's remote-controlled station on Mt. Wilson—5710ft. high, but only just outside the city of Los Angeles.

The Rhombic-Raiser

The invitation arrived from Don Wallace, W6AM, saying "Be here by 9.30 a.m. and coffee will be waiting." So we were, and it was . . . and the shade temperature was about 95 degrees. Outside, in the sun, we didn't dare to measure it, but we have never forgotten sitting on the black leather seats in Don's car, after it had stood in the sun for a few hours.

The W6AM "shack" is a very large building, but looks insignificant below his great forest of poles, several of them 140ft. high. These support a collection of rhombics, some of which must be 1000ft. long overall. There used to be 32 of these aerials, but Don sold half his land and now has to make do with about fourteen. (We did start counting them, but gave up, half blinded and half dazed from staring at the sky in that brilliant brassy sunshine.)

It's roughly fourteen, though, and *both* ends of each are brought into the shack by a maze of feeder lines supported by telegraph poles. The latter are probably about 25ft. high, but look like a collection of match-sticks below the big fellows holding up the rhombics. Some of the far ends are pretty remote, but they are all brought back into the shack through open-wire feeders, so that the terminating resistors are on the spot. (This makes it possible to arrange for some of them to be reversible, but Don seems to have enough choice of direction without bothering to do that.)

Inside, scores of relays do the switching, all activated from a rotary switch alongside the receiver position.

To anyone having (a) No choice of aerials at all, or (b) A possible option between two wires in different directions, this 14-position rotary seems like something out of this world. Each rhombic has, of course, a very high gain, which also means a very high rejection factor. Finding the best aerial for

the job is just a matter of rotating the switch for the strongest signal, but if there's any QRM on it, the odds are that another rhombic can be found on which *that* will be inaudible.

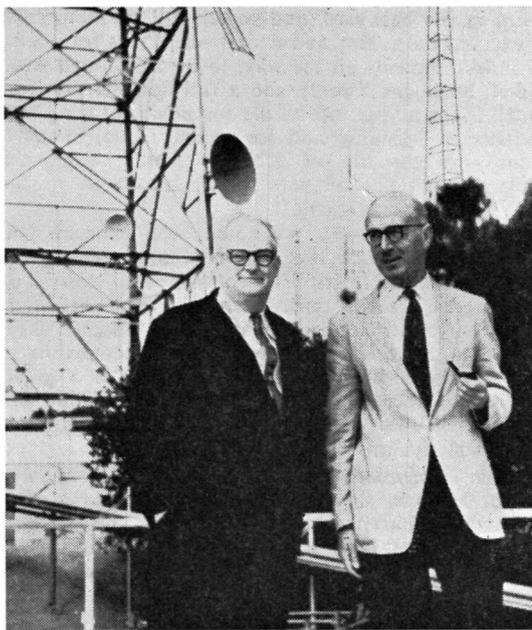
Outside the shack is the W6AM "pole store," with a score or more of 70ft. poles (all timber, of course) just waiting until a new rhombic becomes desirable. The real big ones are made of two 70-footers spliced together! We didn't get inside the "wire store," and got the impression that this garage-sized building was so stuffed with wire that opening the door would be hazardous. With about 20 miles of the stuff up in the air, the ground-based supplies didn't mean much.

The whole site overlooks the Pacific Ocean from a height of about 1200ft., and if it isn't a DX-er's Paradise, it must be something very like it.

So, after a long morning exploring the joys of operating under such wonderful conditions, out to lunch—and handling 300 watts of mobile CW on the way there. Don is a great exponent of the art of sending at 25 w.p.m. (bug key reposing on the seat alongside) while driving smartly through traffic. If the cars over there had right-hand drive, like ours, he would have had to learn left-handed sending! CW on the way out, phone on the way back, and contacts all over the States. (And since then a mobile CW contact with G6QB has given W6AM/M his WAC on mobile CW.)

Upwards

And so, after seeing the largest collection of amateur-band rhombics in the world, to another fantastic station. John Knight, W6YY, has worked



On the roof of the station building of KNBC, Los Angeles, which is at the top of Mount Wilson. W6YY, engineer in charge of KNBC since it was built, entertains G6QB (right).



At one of the meetings last autumn of the Northern California DX Club, W6GPB (left) presents the California Award to G6QB, in person.

many years for NBC, and is in charge of KNBC, Los Angeles—the TV station on top of Mt. Wilson. It shares the site with innumerable other TV, radio and VHF stations, with the famous Mt. Wilson Observatory—and with W6YY!

John has a formidable station at the garage at his home in La Cañada, but it is down in the valley and overshadowed by the mountain range of which Mt. Wilson is one of the highest peaks. This state of affairs couldn't be tolerated by a man who drove, every day, to his work 5700ft. higher up!

W6YY has big ideas all through. No VFO—a completely home-built frequency synthesizer. Band, mode and frequency all displayed by an illuminated "read-out" on the front panel. Full kilowatt, 4-el. beam in the backyard, and so on. But the mountain always nagged at him, and so now one drives for about 19 miles, upwards all the way, to be confronted with a 6-el. beam for Twenty and a full-size 3-el. job for Forty, right at the top of the mountain, braving the hazards of lightning and ice-storms. (Also, hanging from near the top of KNBC's 500ft. tower, an insignificant piece of wire which turns out to be W6YY's 80-metre dipole!)

The KNBC tower, we noted, was unusual. On the side facing Los Angeles there appeared to be about a hundred small VHF aerials—and, too true, there were! It seems that practically every VHF user in the city had decided to ask NBC whether they could rent space on the tower (which commands a most enviable position, of course), and so a great number of them now have something dangling on the side of the tower, and a small cubicle full of equipment underneath it.

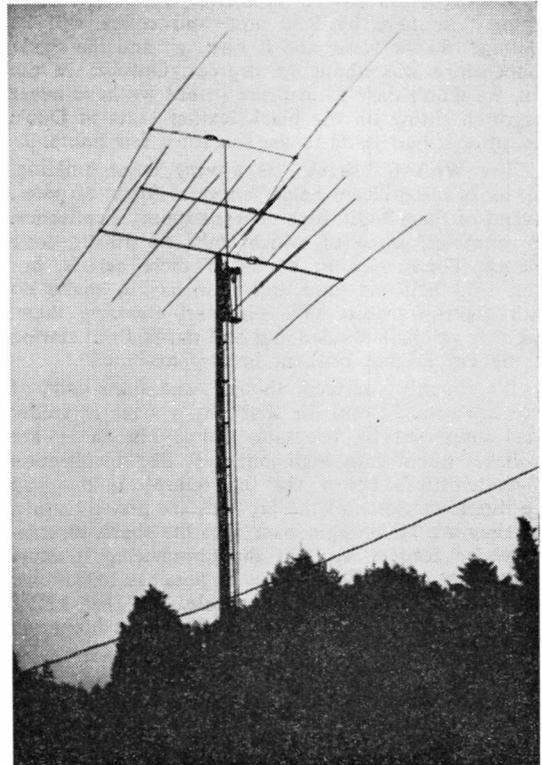
This is mentioned because it is what led W6YY to put his own station up there. He suggested, we understand, that if all these taxi firms and garages and ambulances and so on could have cubicles of their own, surely an old and trusted servant of the company was entitled to one . . . and so he *has* one. Inside this, in a very small space, is the remote-controlled W6YY. Some 28 channels in the 420 mc band are used for the complete operation (the transmitting aerials at the home end were shown on

p.687 of the January issue of *SHORT WAVE MAGAZINE*).

Beam rotation, band-changing, VFO control for receiver and transmitter—when the scheme is finally complete there will be nothing that cannot be actuated from the house down in La Cañada. But there are hazards, and we were shown beam elements of 2in. heavy-gauge aluminium which had fractured because of wind, snow and ice . . . and a length of very heavy coax fused into a solid lump after a bad lightning storm.

Results, John says, justify all the trouble he has taken—besides, it's his hobby! But several years have already been spent on perfecting the station, and the move from valley to mountain-top has been worth the best part of two S-points. No one but a dyed-in-the-wool enthusiast would have undertaken the job in the first place, but W6YY, after more than 40 years of Amateur Radio and nearly the same length of time as a professional radio engineer, is still keen enough to enter contests (and win them) and to be up on that DXCC Roll of Honour, with the best of them.

While on top of the mountain we took the opportunity to look at parts of the observatory, particularly one of the "sun towers," from which the surface of the sun is under continuous observation



Beam system at WA6SBO (San Diego, Calif.) consists, for 20m., of a 5-ele full-size array; above it, five elements for 15m.; and, on top of the whole thing, a shortened 2-ele beam for 40m. The whole assembly is on a track fitted to a heavy wooden pole—the raising-and-lowering gear simply slides the array up and down the track.

and spectrographic analysis. This would make a complete story on its own.

California Kilowatts

After a special vote of thanks to W6AM and W6YY (and, of course, to our host W6EBG who made the whole business possible), it might be of interest to give a few impressions of some of the more usual stations. The first is that the "top DX-ers" (meaning most of those in the 300-plus bracket) nearly all run a full kilowatt and a potent aerial system.

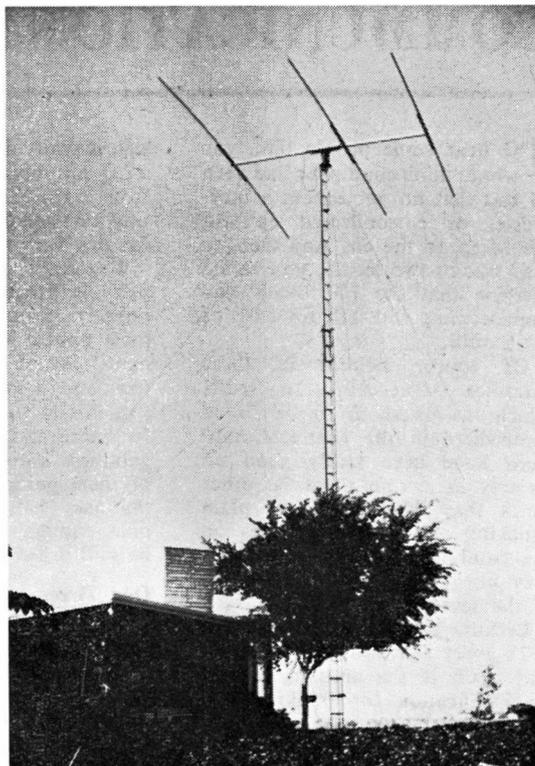
Nothing less than a full-sized 3-el. beam, about 75ft. up, is really considered to be worth using. And, in fact, 150-watt stations with stray "pieces of wire" for aeriels, would stand little or no chance against the tremendous QRO competition. Any G operator who privately thinks "I'd show these W6's how to work DX with simple QRP gear" would have the rudest shock of his life. We can only do it from this country because most of the competition comes from powers of the same magnitude.

The tremendous *enthusiasm* for DX has already been mentioned in an earlier article—this is the obvious driving force and the reason why W6 signals have become fabulous (in the true sense of the word) in many parts of the world.

But there are thousands of quiet workers on other lines, just as there are in all amateur fraternities. A lot of VHF activity goes on; a lot of traffic-handling; there are 40-metre and 80-metre specialists; and even W6YY has a soft spot for One-Sixty.

RTTY has its devotees . . . any side of the hobby that you can think of is bound to be represented. But California has been made famous by those colossal signals that are so often to be heard on the DX bands. And when you hear one that is outstanding even among these outstanding ones . . . try to imagine what's behind it. It could be W6AM's rhombics; or W6YY's sky-beams; or W6VSS's full-size 4-el. 40-metre beam, over 100ft. up and using a 100ft. aluminium tower laid horizontally as a boom; or just, perhaps, a more average station, well-designed, well-operated and representing the best that can be achieved by an amateur.

And don't go away with the idea that California is Paradise (although to a visitor it may seem pretty



A West Coast signal always prominent at the LF end of 20m. is W6EBG, Los Angeles. He uses a full-size beam on a 70-foot tower, with the additional advantage of being 2,000ft. a.s.l. During G6QB's visit to California, a regular CW schedule was maintained with G6FO without difficulty.

near it). Underneath and behind everything we have the same numbers of tinkerers, fumblers, queer signals, weak signals and even our old friends The Lids . . . but they don't often manage to make themselves heard.

One does, though, still gain a special kind of pleasure when a W6 says "Please be sure and QSL—you are my first G." It is reassuring to discover that they are not all supermen after all!

GETTING THE "MAGAZINE" REGULARLY

Though for the best part of 20 years it has been our aim and our intention to see that SHORT WAVE MAGAZINE could be picked up by casual purchase at any bookstall in the country, in practice it does not work out like that. In the first place, we cannot afford to trade with newsagents on a "sale or return" basis—because we would have to print 1,000's of extras which might be returned for credit after lying about for months. This means that newsagents can only order on us the number of copies they have a reasonable prospect of selling—and they, understandably, will only order the number of copies for which they have firm orders from reliable customers. SHORT WAVE MAGAZINE is not unique in this respect

—the same principle applies to any specialist periodical, whether dealing with radio or racing cars. It means that you must give your local newsagent a firm order.

But if you are really anxious about getting SHORT WAVE MAGAZINE regularly and on time, and are having difficulty about it, there are two courses open to you: Either take out an annual subscription direct with us, which will cost you 42s. post free for a year, 12 issues, or send in, by P.O., 4s. each month. This should be posted on the Tuesday before the Friday of publication, and will enable us to return you your copy, unincreased and in a flat envelope, to arrive by first post on the day of publication, anywhere in the U.K. (subject to G.P.O.!).

COMMUNICATION and DX NEWS

L. H. Thomas (G6QB)

TO hear some people talk, you would think conditions had been so bad that no one except a time-waster or a confirmed optimist would go on the air. And then, to read one or two letters, you would imagine that the HF bands had been teeming with DX for most of the month.

Of course, neither of these extremes represents the truth, which, as usual, is to be found somewhere in the centre. Conditions have been really good on *Twenty at certain times*; at other times they have been just plain shocking. And the best times on the band have been changing, as they always do with the progress of the seasons.

Because you can work W6's and W7's every afternoon in the spring and again in the autumn, that is no justification for thinking you can necessarily continue it throughout the summer. On the other hand, you will probably find excellent signals from them at, say, midnight and 0600.

It doesn't pay to assume that *anything* you can do on the bands will last for ever—or even for a long period. And this is the cause of so many moans about “ghastly conditions”—people are trying to do the wrong things at the wrong time.

The height of summer (pause for hollow laughter) has passed, and, with it, the worst conditions we are likely to have for a long time. Not that they have really been so bad—but they have little to do but improve from now onwards, not only for the rest of this year, but, with luck, for the next three or four years at least.

Meanwhile, half the fun for those who are not completely obsessed with super-DX is to sample the bands at all sorts of odd times. One of the rules of this game is that you must not give up in less than a minimum of fifteen minutes—and half an hour is still better. To sweep over the 15-metre band, hear a few weak signals without even trying to identify them, and then to switch off with the usual

sigh is really a waste of time. Even a CQ call might produce something from a kindred spirit (quite a long way off) who has been searching for that very thing.

To take it to extremes: if *everybody* is listening on a band, and nobody transmitting, then that must appear to be a pretty dead band! So let your voice be heard now and then. (But we shouldn't like this to be taken as an appeal for more and more CQ calls . . . goodness knows there are enough of them going on all the time on the *busy* bands. On the “dead” ones, though, there's everything to be said in favour of regular CQ's.)

Odd Times

Among the unusual things reported this month by readers are a sudden outburst of West Coast W's on *Fifteen*, around 2200-2300 GMT (only one night, though); the arrival of very strong VK signals on *Twenty* at midnight (again, only once); and a couple of most unusual patches on *Ten*, with very little audible on the band except W4's and W5's (both in the afternoons).

As we move into autumn conditions the bands will become more stable; sporadic-E openings will become fewer; and these odd “spotty” openings will (we hope) turn into longer and more reliable sessions. But there will still be the need to stir up all the 10-metre and 15-metre enthusiasm we can raise, if only to relieve the absurd amount of pressure that 20 metres is subjected to, seven days a week and 24 hours a day.

Maybe the LF bands will once again turn up trumps . . . certainly there should be no lack of interest in Top Band this coming winter. In point of fact this particular interest *never* seems to die out, even in the summer, judging by the monthly mail. Those who go flat out for the DX in the winter seem to show their faces pretty regularly right through the year—just reserving a channel, perhaps?

Someone remarked on the air the other day that the QRM on

Twenty is now so shocking that Forty seems much better than it used to be! Not much to choose between them, we should say, from the point of view of European QRM.

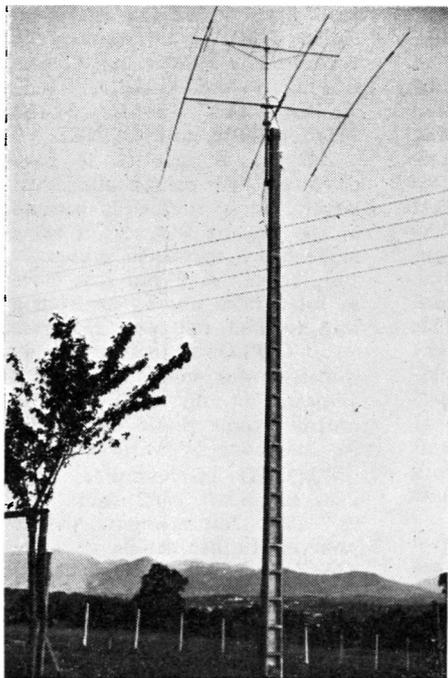
Anti-Noise Campaign

One of the most effective guns fired in the war against noise in the ether is in the hands of G3OQK. Writing from s.s. *Tynemouth*, he says “On board ship we carry the Radio Regulations agreed at Geneva in 1959 between most countries of the world. Here is a quote: Article 14, Section II (Industrial Interference). Para. 698.6: ‘Administrations shall take all practicable and necessary steps to ensure that the operation of electrical apparatus or installations of any kind, *including power networks*, does not cause harmful interference to a radio service operating in accordance with the provisions of these Regulations.’ Amateurs are operating in accordance with the regulations . . . so an international agreement is being broken when power lines radiate interference, and if the GPO refuse to investigate interference on AT frequencies, they must be ignoring their agreed-upon international obligations.” (We have italicised “including power networks” in case anyone should otherwise have missed the point!)

SWL H. A. J. Gray (East Dereham), who has been referred to before, has now had a visit from a radio interference officer, and a complete overhead inspection of the 33 kV line is promised. A defect has already been found, but “the bees are still buzzing.”

More QRP Notes

G3AM (Barnstaple) is running his daily skeds again, with his TTx on Eighty, and has hopes about tackling Forty and Twenty later. He has recently had a spell in hospital, but we are glad to report that he is now fit and keen to resume the battle. Meanwhile we hear from G3SVW (Manchester) that he has had reports of 569 over half a mile with an OC170 running



The home station of F2MO, operated by Michel Dort, from La Maison Gu-Biak, Villefranche, Bas-Pyrenees. He is one of the keen types who has activated Andorra under the PX prefix. Note the climbable beam support. The map on the wall at left is a copy of our original "DX Zone Map."

at 0.4 milliwatts—and you surely can't get much more QRP than that?

A W7, recently worked by G6QB, was 599 with his kilowatt, and 559/569 when he changed to a transistor Tx running 0.2 watts!

General Chat

G6GR's article on "Loop Reception on Top Band," in last month's issue, brings forth this comment from SWL D. Turner (Edgware): "The main, and unexpected, convenience of a loop is that it discriminates against unwanted stations . . . and we have several of them around here." (Now, now!)

ZB2AO (ex-GI3PLL) had been on Twenty SSB for three weeks when he wrote, and says that though breakers have caused a certain amount of annoyance, there have really been few cases of bad manners. He runs 150-200 watts p.e.p. to a transceiver and a dipole fed with plastic flex, is not short of DX, and says how pleasant it is to have the said DX calling *you*, for a change. He's usually to be found around 14100-14135 kc, 1800-2100 GMT, and is always on the lookout for U.K. stations.

Mal Geddes, ZE3JO, asks us to mention that he is on Top Band every Sunday morning (0400-0445 GMT), in hopes of a G contact. He and ZE3JJ are going into Bechuanaland again during the CQ Contest (CW) weekend, and will be using all bands on CW during the contest, and also on both Phone and CW for a couple of days either side. Finally, Mal recently used his now-famous 'tin leg' to get a 589 report from AC4H. Sometimes, he says, it's better than a beam . . .

SWL J. Dixon (Barrow-in-Furness) suggests that Top-Banders should look out for *under-water* transmissions from G3HQU, who has a mike in the face-piece of his suit, and the Tx on the surface—but is now tackling the water-proofing problem in the hope of taking the Tx down with him. (G3HQU/Sub-MM?)

Another SWL, H. Bluer, with the intriguing QTH of Nash Point Lighthouse, Glamorgan, was startled to hear that "QSO's are the most mysterious things in the Universe" and then that "One QSO can emit more radiation than a whole galaxy." The speaker was Patrick Moore, who was talking on BBC TV about Quasi-Stellar

Objects—and has unfortunately chosen "QSO" as the diminutive for them.

G3IRD (Bagworth) overheard a QSO on 14 mc SSB which just about confirms all the rude things we have said, at various times, about phonetics. DX Station: "Pse repeat your name." EU Station: "The name is Rudi." DXS: "Your name is Rudi, is that Charlie?" EUS: "No, the name is Rudi, who is Charlie?" DXS: "That is Roger." EUS: "Sorry, Queen Roger Mary." Someone once said that CW was the most reliable means of communication yet invented, and how right he was!

GM3IAA (Inverness) is well-known (to Old Timers) as the originator of the "VS1AA" form of Windom aerial, in which the tap was made to a point exactly one-third of the way along the top, thus keeping it in the same (relative) place for several bands. This tapping-point was compensated for by making the feeder of thinner wire than the top. (We mention this, because several newcomers have probably never heard of it.)

Anyway, GM3IAA himself is still using various assorted aerials

of this type, including one with 380ft. one side of the tap and 190ft. the other! This one almost forms a complete square, and results should be intriguing. Meanwhile, Jim has been on 21 and 28 mc with one of his 270ft. wires and finding short-skip conditions rather abnormal. But the hazard involved in owning so much wire is that it occupies an awful lot of space, and this piles up the hours needed for grass-cutting . . . the longer the wires, the less time on the air.

Incidentally, we heard this month of someone who is getting very good results, especially on the LF bands, with a long wire passing right over the top of the shack (which is nearly central) and feeding it, not with open-wire feeders or coax, but with a couple of Windom-type feeders which virtually become a gamma-match. The actual length is 132ft., and the feeders are attached at 44ft. from each end, but no doubt the whole thing could be halved (or doubled!) in size. Of course an ATU is needed, but so it is for open-wire feeders.

Top Band Notes

The real DX may have vanished, but the Old English Sport of county-hunting continues unabated—assisted by the occasional appearance of portables and mobiles. G5PP was going strong in July, from various Scottish counties, and reports as his best contact one with G3IUD/P at The Lizard (Cornwall). Bob was signing GM5PP/P from Sutherland, and reports were 5 and 9 plus, both ways on Phone. But his most interesting experience was a “rare county net”—a multi-way with Sutherland, Ross, Berwick, Ayr, Kinross and a G station! The only fly in the ointment has been the pile-ups, with many stations calling while GM5PP/P was transmitting.

G3PLQ has been up and down the African coast again, but sees the possibility of deserting Top Band if he can get his /MM permit (even if only for 28 mc and VHF). On Top Band, however, he reports as “coming on” such stations as 9J6AA and 9M6BM. And Rolf Rasp, that keen SWL in Rio de Janeiro, re-

ports much varied DX heard, including G3GRL, 3PU and 3NYQ. Between Las Palmas and Genoa, G3PLQ logged G3SED, 3SCE, 3RDT, 3TLY, 3SYS, 3TTK, 3TOU, 3OBW and G13NZZ.

5N2AAF is reported to have given up 160 metres altogether, largely, it is suggested, because of the way he was always being mobbed by the same crowd of “big boys.” (And you only have to listen from abroad or from a ship to find out who they are . . .) G3PLQ, by the way, knows someone who admits to using a kilowatt on the band—and is probably quite proud of it. (Not for long, one hopes.)

GM3IKD (Dunfermline) now joins the select band with “98/98” after their call signs. And he promises further details on some eight-foot aerials on which he has worked 1,500 miles.

G3SED (Portsmouth) is now the U.K. representative for the “International One-Sixty Society,” of which, in future, all details are available from him. He has been trying summer skeds with ZC4, 9H1 and OH, but static has interfered badly. However, a 569 report was received from an SWL in Malta.

Reverting to the International One-Sixty Society, we note from a leaflet that one of their objectives is “To set up a gentleman’s agreement to divide the band for AM-SSB and CW operation.” Another is “To assist interested groups in countries not now allowed 160m. amateur operation to obtain such permission.” Admirable objectives, but not easy to achieve, we should say. Good luck to them, anyway.

G2NJ (Peterborough) writes: “I listened to G5PP’s signals every night during his fortnight’s trip to GM-land, and consider these, particularly his Phone, to be his best ever from Scotland (and I have listened to all his expeditions since 1952) . . . The pile-ups of Phone stations wanting to QSO were some of the biggest I have heard. He is certainly a wizard at /P operation, and I wonder how many have seen Bob perform his amazing hammer act when rigging up an antenna for portable work? With cord attached, he

FIVE-BAND DX TABLE

Station	21 mc	28 mc	3.5 mc	7 mc	14 mc	Countries Worked
GW3AHN	299	151	21	71	323	333
G2DC	280	169	112	166	307	321
G13IVJ	260	177	83	102	310	319
G3DO	223	183	83	86	316	322
G6QB	195	143	56	117	284	310
G3NOF	190	132	39	32	259	281
G3IGW	129	123	67	115	153	189
G3FTQ	91	46	27	58	118	144
G3KMQ	90	3	54	95	208	233
G3PEK	88	18	75	119	142	175
G3IDG	66	60	17	27	53	96
GM3RFR	49	6	10	13	61	83
G3MDW	41	43	6	7	46	81
G3TJD	36	0	18	47	44	94
G3RJB	19	7	1	46	111	118
G3PLQ	15	1	20	6	34	76
G3UBI	14	5	21	3	53	67

can aim the hammer over a selected bough of a tree up to 50ft. high." (G5PP will doubtless be receiving many offers of week-end employment after *that* testimonial!) By the way, this was his tenth trip to Scotland, and he has now covered 14,000 miles over the Border.

G3KCR (Crowborough) has got going on the 160m. band, CW and Phone, with what he thinks is a new modulator (two valves and a diode). More details promised later, but meanwhile he would like reports.

G3TTK (Coalville, Leics.) says he has been active on One-Sixty during the mornings, and can nearly always raise *someone* in the London area (distance of about 100 miles) but the activity is very poor. There's no reason why this tradition of "Sunday mornings only" should persist . . . the number of Top-Banders who have weekday mornings free but don't bother to come on the band because "there's nobody on" must be fairly high.

This month, at least fifteen letters have come in from G3S- and G3T- stations, just giving their new figures for the Table. This keeps the said Table moving nicely, but doesn't provide much for us to pass on to readers. Just the odd scrap of news, please? How are you doing it, and what with?

Pirate Or . . . ?

Real Horse's-Mouth stuff, in the form of a (more or less anonymous) letter from the operator of NS1A. He says that, far from seeking publicity or notoriety, he merely wanted to operate from the superb QTH at which his place of work is situated. The pirating of a G- or a non-G call was not even considered, but he says that being in international waters at a fixed location is technically the same as being on an island. He operates from what is virtually a "self-governing state,"(?) which happens to have



Station of Colin Lobb, VK3AVU, 200 Elgar Road, Box Hill South, Melbourne, who has a nice multi-band outfit, working into a Triband TH4 beam. He and Thelma, his XYL, are shortly embarking on a 13-month world tour and will be in London during September, when they hope to meet many amateur friends in the U.K.

issued an amateur licence to him. A fee will be paid if requested, to the international authorities.

This may all be open to question, but the facts are not; NS1A operates in accordance with the GPO regulations, CW only, and is apparently breaking no laws *where he is*. He has a half-wave aerial (quarter-wave high, too) and finds noise level extremely low, with no trouble even from fish-fone. He comments on the excellent operating of some stations, but also on the "yellow creatures" who zero on him, swear at him on CW and themselves break the law by giving no call-signs. (We are still not absolutely sure of the position of stations who work him, but feel that it would be hard to prove that they are deliberately working "an unlicensed station," since he is beyond the jurisdiction of the GPO.) All very legally involved.

A few more short items: G5AQ has been in Shetland and visited GM3KLA; says there are *seven* amateurs on the small island of Unst. (Might well be the densest

amateur population in the world!)

. . . G3SJJ, while on holiday, visited G3PU and G3SED, and having seen their locations, realises that he can't compete. However, he is now off the air rebuilding the entire station—Tx, Rx, aerial and even the radials!

G3TBJ raised SP9AJN and says he *sounded* genuine—more so than ZB2AE, anyway . . . G3IGW was surprised by a mobile-to-mobile contact, Portmadoc to Cornwall—180 miles, mainly sea path, at midday. Phone, too.

The DX Bands

G3NOF (Yeovil) reports nothing of interest (at the times he has been on) from the 28 mc band, and not too much on 21 mc—mostly Europeans during the day and Africans in the early evenings, with the odd opening to U.S.A. at 2300. On 14 mc he found things very variable, with very strong short-skip (even from G's) at times. A few VK's and ZL's late at night have not been compensated for by the early mornings, and the afternoons have been poor until about 1600, when good signals from the Far East have appeared. Best worked (SSB): FP8, FY7, MP4TBM, VP2SM and 3JR, YA3TNC, VS9MB, ZD8HL, 8PI and 8TV, KH6EDX/M1. ZA1RR, also

Reporting the HF Bands

worked, was, we hate to say, a phoney.

GW3AHN (Cardiff) found the Pacific and Far East good in the mornings on 14 mc; on 21 mc some JA's were often available, and even the occasional Pacific Island just broke the noise level now and then. Odd DX news from GW3AHN:—KS6AW, who recently operated 5W1AG from Western Samoa, plans to go to VR5 and ZM7 . . . 5W1AZ has been on 14 mc SSB and was worked (QSL to K6EXO) . . . Some OD5's have in mind a trip to Damascus (Syria), whence YK1AA is occasionally on . . . Don Miifer (W9WNV/6) plans an extensive DXpedition to various rare countries in the Far East and Pacific areas, including Indonesia, for which he is said to hold a licence. Finally, 4X4DK and others hope to operate from a Neutral Zone between Israel and Jordan (which will probably count with ARRL/DXCC as Palestine (ZC6)!

G3SGH (Ashford, Kent), with an HX-50 and a TA-31Jr., raised CP5AQ and 5EZ, HR3JP,

KC4US, SU1IM and UA1KED in the late evenings (all 14 mc CW); early mornings, same mode, fetched in KH6's, KL7, W7 and VE6. A few afternoon sessions produced TA3AS, VU2GG and 9M4MT. For WAZ on CW he needs only a card from Chile.

G3IDG, in a casual sortie on to 28 mc, found ZD8BC, on CW, the only signal on the band. He was worked within four minutes for a new country, which shows that "it pays to look around."

More Shorts

G3IGW and G3JML will be in Scotland this month, looking for the perfect site for the CQ One-Sixty Contest (next January) . . . G3TRO (Spalding) had a Japanese SWL report on his 7-mc signals, and has just got a DSB rig going on 14 mc. He wonders whether anyone has the gen. on the "large triode" known as the 211 (which we remember way back in about 1930 as being the biggest we had ever seen at the time). Sinister, this—a new generation of linears?

G3IDG has a bad word to say for Europeans who, after starting a QSO on CW, ask you to listen for their Phone "because you are such an FB sig, dear OM"—without even getting your OK first. The band-plan is usually disregarded, making you look like a party to Phone working on the CW section. This happens quite a lot on Ten, where most people seem to regard CW as something you only use when you can't get through on Phone.

Nevertheless, G3IDG heard 28 countries on ten-metre CW during the month, including EL8X, ZC4GB/P, ZD8BC, 4X4WF, 5N2AAF/P, 7X2AH, 9G1FR, 9H1AB and 9J's (all early evening except the ZC4).

The former ZB1AR (Mike Crowther-Watson) is once more signing G3IAR from his QTH near Sevenoaks, and looks forward to battling with the QRM again after a lapse of some years.

G3FNF (Northampton), also known as EP2RH, AP2RH and VS1KW, will be on St. Helena for an eighteen-month spell, on Foreign Office secondment, and, of course, hopes to be on the air. He leaves home on October 26.

TEN-METRE ACTIVITY TABLE

(Starting Date, June 1st, 1964)

Station	U.K. Countries Worked	Countries Worked
9J2DT	32	113
G3OHP	9	50
G2CDI	19	31
G3OAD	17	27
G3IDG	5	22
G3HCU	13	19
G2DC	2	14
G3EHL	8	9
G3SQX	2	2

DX News from All Over

VP2GL, who was on from Grenada during late June and early July, was WASKQF. He had made 1,000 contacts by half-time . . . IICQD will be operating from Elba, until August 29; not a new country but fine for IOTA . . . For WPX-hunters, joy in the shape of YA7H (Gus, of course), ON8IZ (G5LC on holiday), DM8IGA, and (possibly) W9WNV/8F from Indonesia. Not to mention all the recent operations from YV-land with prefixes 4M2, 4M3, 4M5, 4M7, YV7 and YV8. (We can't help feeling that the original WPX idea is now coming unstuck, with so many deliberate operations with prefixes made-to-measure . . . it's getting a bit like collecting bus-tickets.)

Rumours that W9JF had a permit for Albania coincided with much phoney ZA operation. Very few W's having worked a genuine ZA station, any phoney can almost guarantee himself a pile-up (if he thinks that's a good thing).

TI2HP and EA2CA promise operation from Ifni, EA9, about September 20 . . . HR1CGT is WA5CGT, active thence until August 22 . . . WA2EFN expects to operate from Serrana Bank, KS4, mid-August or early September.

ZD8BC and ZD8HL are both working into Europe many evenings (2200) on 7045 kc SSB . . . DJØITU/M was operated from HB9AEQ while in Germany . . .

TOP BAND LADDER

(G3S-- and G3T-- stations only)

(Starting Date, January 1st, 1965)

Station	U.K. Countries	Countries
G3SYS	75	14
G3SED	74	21
G3TBJ	73	15
G3TTK	70	12
G3SWH	68	13
G3SJJ	67	11
G3TYK	65	14
G3TIK	62	13
G3TVW	62	9
G3SHY	57	8
G3SVW	54	10
G3SVL	50	10
G3TSS	50	7
G3SGC	45	12
G3SZA	45	11
G3TON	41	8
G3TQZ	40	8
G3SQX	40	7
G3TZM	34	7

FR7ZI leaves on a world cruise (MM operation) in October . . . OD5EE (mostly 14 mc CW) is W5LAK—QSL Box 1217, Beirut.

ZD7GP and ZD7IP are both active on 21 mc and liable to show up on 28 mc when conditions allow . . . ZPØBK (another one for the WPX hounds) is KØDQI, but QSL via ZP5DL . . . 9E3USA (yet another) was just another name for ET3USA.

PX1EQ was genuine (unlike so many PX's) and in the hands of DJ5PA, 8EQ and DL9JL . . . 7G1Q is a new one from Guinea, and appears genuine . . . The usual spate of summer FP8's duly appeared—FP8CK was W2JAE,



The ladies in this picture are, left to right: K2MGE and ON4AD. They were among those who came over for the very successful London SSB Dinner on May 29, organised by G3FPK/G3KZI and reported on p.298 of the July issue of "Short Wave Magazine."

**TOP BAND COUNTRIES
LADDER**

<u>Station</u>	<u>Confirmed</u>	<u>Worked</u>
<i>Phone and CW</i>		
G2NJ	98	98
GM3IKD	98	98
GM3KLA	98	98
G3PLQ	92	95
G3SED	81	92
G3RTU	71	75
G3SWH	66	78
G3PPE	63	77
G3OJE	62	63
G3LZZ	57	65
G3SGC	55	76
G3SVL	54	62
GW3PMR	53	72
G3IDG	53	58
G3SHY	51	68
G3SJJ	50	83
G3SVW	48	69
GW3TLW	47	59
G3TVW	37	64
G3SQX	31	64
G3TSS	30	50
G3TQZ	25	53
G3HOX	15	30
<i>Phone only</i>		
G2NJ	59	60
G3PLQ	55	58
G3MDW	43	62
G3RTU	35	37

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

FP8CM was VE2AFC, FP8CV was W2GKZ. More to come, without a doubt, as FP8 is a holiday area for East Coasters.

The Chatham Island (ZL3VB) activity, handled by ZL1ABZ, is now over; some 3,000 QSO's were made. A new expedition to Western Samoa, Niue and the Tokelau Islands is being planned . . . TA2BK and TA4SO have both been around on 14 mc CW, but no details . . . A spate of OHØ stations has also appeared, on all bands—this is a summer activity for the OH's, comparable with the FP8 operations for the W's . . . YJ8BG has been reported on 14150 kc AM Phone.

FL8RA and FL8AO are both to be found on 14 mc CW, mainly afternoons . . . Other nice ones (same mode) known to be on are FK8BG, 9M4GZ, VK9TG and 9M8RS—the latter very active around 14040 kc.

W6FET will be signing VP2MN (Montserrat) for about the first ten days in August—14040 CW and 14120 kc SSB . . . 9M8KW appears to be G3GPE from East Malaysia . . . VK9DR and 9XI both spasmodically active from Christmas Is., and there should be a linear (ex-CR8BH) on the island by now.

"Special activity" stations with GB callsigns have been almost too numerous to mention, but an unusual one will be GB3LPC from Lundy Island,

September 18-25. Mainly RTTY!

W6KG's Ten-Year DXpedition is due to start this month, but no details have yet reached us. However, with three operators, no shortage of gear, and ten years to spare, quite a lot of rare spots should fall to Lloyd (W6KG), his wife (KL7DTB/6) and daughter (W4ZEW/6).

Late Flashes

K7LMU, flying to Asia to make arrangements for the "combined operation" with W9WNV/6, hopes to stop off at 5W1, ZM7, 4J1, FK8 and other places. Order not known, but anything is liable to be happening by the time this is published. Frequencies: 14045-55 and 21045-55 kc CW; 14100-110 and 21400 kc SSB. Only signal reports and no queries about "Where next?"

W9JJF, who did *not* operate from Albania (no permit) has been on from 4U1TU and HV1CN, now hopes to visit EA9 and EAØ . . . OH1SUF (Scout Union Finland) is a special station on all bands, August 6-16.

Sign-Off

Deadline for next issue is **first post on Monday, August 16**, and address everything to Editorial Dept., *Short Wave Magazine*, Buckingham, England, marking your letter "Communication and DX News." 73, Happy Holidays, Good Hunting and—BCNU.

• • • The Mobile Scene • • •

MOBILE ACTIVITY PERIOD, SEPTEMBER 5—MINISTRY ATTITUDE TO /M DRIVER OPERATION STILL UNDEFINED—RALLY REPORTS, AND THE CALENDAR

We are asked to announce that the Amateur Radio Mobile Society propose a DX activity period for September 5, 0800-2000z, when all /M's are invited to be on, looking specifically for mobile-to-mobile, and mobile-to-fixed station, contacts both locally (own continent only) and on a world-wide basis. Mobiles are asked to keep on or near the following frequencies: 3740, 3880 (for U.S. /M's), 7040, 7230 (U.S.), 14130, 14320, 21350 and 28550 kc, using AM or SSB. Contacts within your own country do *not* score, and there is a multiplier system for stations worked either fixed or mobile, outside or within, your own continent. This, and all the provisos about QSO's with /AM and /MM stations, which call areas count as countries, awards and prizes to be won—and so on—make the full rules and log form too long to reproduce here, more particularly as the 160m. band (on which the majority of U.K. mobiles operate) is not brought into the picture at all. However, all details can be obtained on application to: L. S. Margolis, A.R.M.S., 95 Collinwood Gardens, Clayhall, Ilford, Essex. We would think that what this event really amounts to is a QSO-party for those /M's equipped for operation on the HF bands, results depending on DX conditions.

On the subject of amateur mobile operation with the vehicle on the move, the Ministry of Transport has still not (at the moment of writing) come out with any final ruling. There have been conflicting

press comments about the Minister's intentions, mainly revolving round the G.P.O.'s new "Car Telephone Service," which opened on July 5, with coverage in the London area. This, while not only being pretty expensive—about £350 for the approved vehicle installation, with a licence charge of £3 10s.—also involves (for a driver not *au fait* with radio operating) a certain amount of complication, in that a suitable control station has to be selected depending upon which of three districts in London the car is situated. As frequency-changing is also necessary, for calling up and subsequent duplex working after the call has been connected, our (radio-inexperienced) driver finds himself faced with a kind of console on which there are *eleven* push-buttons—and then, when he has got all this sorted out, operation is with an ordinary G.P.O.-type handset. Well may the Minister be a little alarmed! But that does not in any way justify restrictions on *amateur* /M operating procedures, established by years of practical experience.

* * *

Under the spotlight this time are five Mobile Rally events, held during the last few weeks. Though Saundersfoot in West Wales is a long way from the main centres of amateur activity, the Pembroke & District Radio Club had a good turn-out on June 20, in warm and sunny weather, the total attendance being about 120 people in 45 cars, of which 18 were



General view of the Rally site and car park for the Saltash & District Amateur Radio Club's event, for which they had fine weather and a good attendance. The Rally was regarded as highly successful by those who were present.

Picture by G3GMN.



One of the personalities of Amateur Radio is George Courtenay-Price, GW2OP, actively an amateur for more than 40 years (he was originally G2OP, in Cheltenham) and now living in retirement in Pembroke-shire, West Wales. He presented the prizes at the Pembroke & D.R.C. Rally at Saundersfoot on June 20.

A G3GMN print.

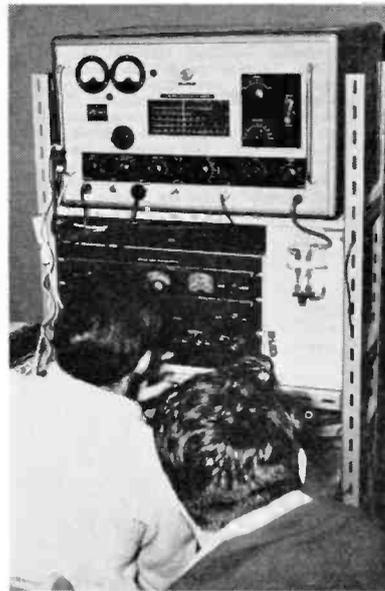


For the Red Cross Gala at Chelmsford on June 26, the Amateur Radio Mobile Society kitted out a very effective station, using a KW-2000A loaned by K.W. Electronics, Ltd.; a Swan-350, provided by K6IWG; and a Hy-Gain 16AVO vertical aerial. World-wide contacts were made and the station, here seen operated by G3NMR of A.R.M.S., was a continual focus of interest for the public. Talk-in was also provided, using separate stations, on two metres and 160m.

Picture by G3NMR.



These three fortunate (?) chaps are, left to right: G3NKE, Cornish Club; G5ZT, Plymouth Club; and G3SN, Saltash Club, engaged in the difficult and thankless task of judging "the best mobile installation." The occasion was the Saltash Mobile Rally on June 7, and the judges were the presidents of their respective Club groups. They picked out G3JFH/M (Cheltenham) as the winner.



The 80-metre control station for the Pembroke Club Rally at Saundersfoot was operated by GW3RPR. Though a remote location, they had a good turn-out in very nice weather.

A G3GMN print.

Pictures from Rallies at Saltash, Saundersfoot, Chelmsford, Barford and Petersfield in these pages



The talk-in station for the Saltash Mobile Rally at Calstock, Cornwall, on Whit-Monday, signed GB3SAL for all bands. Here G2DPFH is seen taking the 160-metre stint, on which band most /M's were worked.

Picture by G3GMN.

This could have been you! In fact, this horror-picture is of a "demonstration crash" arranged by the British Red Cross Society in collaboration with the Essex Constabulary to show what might happen if, caught at an awkward moment, you use a hand-held microphone while driving. The occasion was the special Rally organised by A.R.M.S. in connection with the Red Cross Charity Gala at Melbourne Park, Chelmsford, on June 26.

Picture by G3NMR.



General view of the parking area at the Regency Hall, Saundersfoot, Pems. for the Pembroke Club Rally on June 20, when it was bright and sunny all day, and for which they had a total attendance of about 120.

A G3GMN print.



Seen at Saundersfoot, June 20. GW3MOP/M has his 160m. gear in a neat wooden case; the rig consists of a Command Rx and Codar A.T.5 Tx, easily removable for /P or fixed-station use.

A G3GMN print.



Seen at the R.N.A.R.S. Rally — a Top Band whip of somewhat inordinate length. The loading coil is about half-way up the aerial run.



Shown at the Barford Rally — the very fine 20-80-160m. Sideband transceiver built by G3HVX (Hereford). Beautifully constructed, it has a separate dial (left) for the IF incremental tuning control on the Rx side; this enables the receiver to listen off the Tx frequency. *A G3GMN print.*



Not an aerial photograph of a warship in the Channel, but a model frigate under radio control on the swimming pool at H.M.S. "Mercury," when a very good demonstration, using several powered models, was given by members of the local model engineering society.

One of the talk-in stations for Barford was on 4 metres, signing G3BXI/A. The equipment used was the T.W. "Communicator," and G3RST was operating when this was taken. *A G3GMN print.*



fitted mobile. With the rally-point only a hundred yards from the sea, the event could hardly fail to be a success with that sort of weather.

At Loughton Hall, Debden, Essex, on June 26, the local Club group laid on a show which attracted 300 visitors in 70 cars, of which 30 were fitted for mobile. Their base station, signing GB3LOU, had more than 200 contacts on three bands, including 45 mobiles—many of these latter being on their way to the clashing event at Chelmsford. In fact, the Loughton & District Radio Society feel pretty sure they would have done much better in the way of attendance had they had a clear field in their part of the country, even though June 26 was a Saturday, now realised to be a bad day for an amateur /M occasion (which is what we were emphasising in this space five years ago). However, for those who were there, the Loughton event—which included closed-circuit A/TV by G6MJZ/T—went down very well, and the local group need have no misgivings on that score.

Now one of the well-established events, the West of England Rally at Longleat, Wilts. on June 27, attracted an attendance of more than 700, arriving in about 250 cars, with talk-in on three bands. Those present enjoyed warm and sunny weather for the whole day, and among the prize-winners were Bill Brennan, G3CQE/M (of our "RTTY Topics" feature) for the best mobile installation—he having won this same prize, on the same ground, on a previous occasion; G3KMT/P did best in the frequency-measuring contest, getting to within 744 cycles of 1933 kc (a harder test than you may think using strictly /M gear); and G3ABU/M, who made the best M/DX contact with control on Top Band.

For the Torbay Amateur Radio Society's event at Newton Abbot on July 11, they had really shocking weather—it rained all day. In spite of that, they had about 250 people to support them, 42 of the cars being fitted /M. It was a pity the Wx was so much against them, as this was not only a well-organised Rally, but the Royal Signals authorities at Denbury Camp had provided for only 5s, a lunch of real "five-star" quality. The prize-winners included G4IK (Chard) for the best home-built installation; G3HZP (Cambridge), for the best /M equipment over-all; and G3NUE, G3SRL, G3HRW and G3IWV for making longest M/DX contacts with control; and G3SXW emerged as the winner of the CW contest. The prizes were presented by the C.O. of the Camp, Lieut.-Col. D. E. Higgins, M.B.E., Royal Signals.

Another Rally severely affected by weather, and also on July 11, was that organised by the South Shields & District Amateur Radio Club at Bents Park, South Shields, up in Co. Durham. However, the number of cars turning up, at 70, was the same as last year, though the heads counted were about one-third less. The driving competition, always a feature of this Rally, was won by G3NCE/M; the prize for all round mobile efficiency, including safety of equipment, went to G3LCZ/M; and G3RIX/M won the quiz contest, which was based

on radio problems. The prize-list included no less than 70 items, and the Rally committee felt greatly heartened by the support they were given, in spite of the miserable Wx.

* * *

MOBILE RALLY PROGRAMME

Events to be played off are now as follows, which brings us near the end of the Mobile Rally season—but not the season for mobile operating, which goes on all the year round.

August 15: The big Rally organised annually by the Derby & District Amateur Radio Society has now become an established event in the mobile calendar, attracting attendances of several thousand people, for which a wide variety of displays, demonstrations, exhibits and competitions is laid on, as well as a trade show and the famous "Derby Junk Sale." The location is Rykneld Schools, Derby, and there will be local sign-posting. Adequate refreshment facilities, free admission, and ample parking space on hard standings. The organiser is: T. Darn, G3FGY, Sandham Lodge, Sandham Lane, Ripley, Derbyshire.

August 30: (*Bank Holiday*). Peterborough Mobile Rally to be held in the large park by the River Nene, with plenty of free parking and picnic space, and a large swimming pool nearby. Talk-in will be by G3EEL, 1920 kc; G3DQW, 1980 kc; G3RED, 70·26 mc; G3KWY, 145·35 mc; and also on 144·47 mc, by G3EEL. Further information from: D. Byrne, G3KPO, Jersey House, Eye, Peterborough, Northants.

September 12: U.B.A. (Belgian) International Mobile Rally, for which temporary /M permits are being issued to visiting foreign amateurs. Those requiring these licences should apply forthwith to: M. le Directeur-Général des Radiocommunications de la R.T.T., 42 Rue des Palais, Bruxelles 3, Belgium, enclosing: Photostat of your U.K. amateur mobile licence, your car registration number, full home address, date of entry into Belgium and duration of visit (up to one month allowed for radio amateur operation). There is no charge for the licence, which will be posted to your home address by the Belgian issuing authority.

To take part in the Rally programme itself, an entry application should be made by remitting 100 Belgian francs (about 14s. 6d.), by cheque or international money order, to: Compte Cheque Postale No. 21.53.20 de Marcel Godon, 85 Rue de l'Institut à Rixensart, Bruxelles, Belgium. This application should be in before the end of August. The meeting point for the Rally is at Court St. Etienne, 25 km. SE of Brussels, between Wavre and Nivelles, Brabant. Note that 160m. operation is *not* permitted in Belgium and that for Rally purposes either 80m. or two metres, as chosen, should be used.

September 12: RSGB Rally, Woburn Abbey, Beds. (*as last year*).

September 26: Harlow A.R.S., at Magdalen Laver, Essex.

VHF BANDS

A. J. DEVON

IT should not need your A.J.D. to tell you that big things have been happening on VHF since last we met. If you were not around on the morning of Sunday, July 4, at least thirty U.K. VHF operators—who have written in with enthusiastic and exciting stories about EDX worked or heard—could tell you all about it.

Roughly, what happened was that just before the RSGB's portable contest was due to start, one of those mysterious sporadic-E clouds settled over *Mittel-Europa*, to produce, for an hour or so, loud and steady two-metre signals from exotic areas like YU, I, HG and OE, easily workable from the U.K. by those who could attract attention (and battle through the QRM).

This was one of the most interesting—not to say startling—VHF manifestations of recent years, very rarely encountered to be so effective on frequency areas as high as our 145 mc band. Sporadic-E is a stray phenomenon, quite unpredictable, its effect being to produce, suddenly, a highly-ionised reflecting layer at an abnormally low level—well below the E-layer. It is thought to be due either to a sudden solar flare (hardly to be expected at this stage in the sunspot cycle) or to intense meteor shower influence—but according to our astronomical crib, no such major meteoric appearance was to be expected around July 4.

Whatever its cause, the effect

is to give one-hop communication over distances of 600-1,400 miles, depending (a) On the height and stability of the layer, and (b) Its impermeability to VHF in terms of maximum usable frequency. Normally, spor-E effects are most marked at frequencies between about 30 and 60 mc, e.g., when European TV is coming through on Band I, but can extend to frequencies as low as 20 mc (taking in our 15-metre band) and as high as 150 mc, covering our two-metre band, as in the present instance. The presence of sporadic-E can be checked by reference to the 10-metre amateur band (when you find EU's numerous and coming through at

considerable strength) and to your TV receiver, which will exhibit strange interference patterns, with European stations tunable.

Be all this as it may (and your A.J.D. is not posing as an expert on such esoteric propagation phenomena—*where does he get these words from?* — Ed.), what happened on the morning of July 4 was that those who chanced to be around at the time were able to work, or hear, luscious EDX on the most extraordinary scale.

People who have only been on two metres for a year or three were happily peeling off rare VHF/DX, the like of which has never been heard by experienced operators who have been on the

THREE-BAND ANNUAL VHF TABLE

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL pts.
	Counties	Countries	Counties	Countries	Counties	Countries	
G3BNL	30	3	47	12	25	4	121
G3EDD	15	2	54	14	18	2	105
G3OWA	34	4	38	8	—	—	84
G2BJY	32	2	41	6	—	—	81
G3SKR	49	5	21	5	—	—	80
G3HRH	15	2	47	9	5	1	79
G3FIJ	21	2	31	6	14	3	77
G3LAS	14	2	39	15	—	—	75
G2AXI	22	3	40	8	—	—	73
G3BOC	23	4	35	10	—	—	72
G3AHB	—	—	38	12	18	2	70
G3PTM	—	—	39	10	16	1	66
G5UM	16	2	27	3	12	3	63
G3EKP	20	6	22	6	6	3	63
G2CIW	—	—	17	5	26	7	55
G3TKQ	12	1	27	6	2	2	50
G3TNO	—	—	38	6	—	—	44
G3TLB	—	—	35	6	—	—	41
G3OHH	34	6	—	—	—	—	40
EI6AS	6	4	23	6	—	—	39
G5FK	12	1	14	1	5	1	34
G3HWR	14	3	6	1	7	1	32
G2DHV	9	2	12	1	1	1	26

Scores are since September 1st, 1964, and the Table closes on August 31st. All operators entered above are asked to let us have up-to-date scores for the Final Table to appear in the October issue. This "Three-Band Annual VHF Table" will open again immediately, w.e.f. September 1st, to run till August 31st, 1966. All VHF operators are invited to send in claims, set out in the form shown here, so that the new Table for 1965-'66 can be started as soon as possible. Position is shown by last-column total, as aggregate of all scores. Own county and country score as one each. Entries may be made for a single band, any two, or all three. Claims should be sent in as often as possible to keep the table up-to-date.

band since it was first opened for amateur working 17 years ago. The only factor making these contacts in any way difficult was the QRM and the competition. If you were not there, you missed an opportunity you may not get again for a very long time—on the other hand, another such sporadic opening could well have occurred before you see this in print.

One at least of our leading VHF men knew how to anticipate the opening. Having checked 10 metres and found the near-EU's coming through at terrific strength, Harold of G5YV (Leeds) was on the ball at 0945z, as the two-metre band opened for EDX; it became full of YU's, and he knocked off *nine*, and then started gunning for countries not previously worked, thus raising two I's before the EDX finally evaporated at about 1115z. This effort, combined with MS results earlier in the period, puts Harold up to 28C in Countries Worked on two metres, all-time. Now happily in the hot seat (or is he?) G5YV has a comfortable two-country lead over the nearest contenders.

Which brings us to EI2W. By working YU1EXY (Belgrade), it looks as if a new European distance-record for two metres has been set up. Anyway, anyone claiming anything better will have to beat 1,394 miles within the Continent. Whether this stands or not, we congratulate Harry not only on a very fine QSO (he got RS-58 from the YU) but also on his 25th "First" on VHF for Eire. Such results do not come easily, or without the know-how. And not only does EI2W work, consistently, three VHF bands, but in the Two-Metre All-Time he is now well out in front with 100 counties booked in (U.K. and Eire). Harry made sure of YU by working also YU2GE; he heard seven more YU's, as well as OE3ORA and OE6BRG.

GI5AJ (Bangor) worked four YU's in the Zagreb-Ljubjana area, and therefore got near the record distance, but unless some GM of whom we have not heard has done better, it looks as if the EI2W/YU1EXY contact has it.

More EDX Reports

Looking now at the G results, G3LAS (Berkhamsted) worked ten YU's, three HG's, also OE and YO; he heard 15 YU's, four HG's, OE6BRG and a doubtful SP. John says he was satisfied with this!

G3EDD (Cambridge) raised YU2JH, heard four other YU's, and also I1LPR and an OE7—but his best bit of EDX heard, by far, was IT1BCK in Sicily! (Yes, we're still talking about two metres!) Brian remarks that F3DF told him the F's were getting into UA and SP, but did not appear to be hearing what the G's were working.

From Guernsey, GC2FZC raised OK3KDX, and heard four more OK's—but nothing of the other stuff already mentioned. This shows in what an extraordinarily selective way a sporadic-E cloud can propagate. SWL Finn (Marlow), who says his hollow in the Chilterns is really an impossible location for VHF in the ordinary way (which we can well believe), booked in six YU's, HG1KZC/P and OE6BRC—so he, too, is happy with such results.

G3COJ (BBC, London) worked YU1IOP/P, heard seven more YU's, also DL7HR and HG1ZJ. Brian says it was "all rather reminiscent of the 5-metre band in the 1946-'48 period"—how true! But he found the EDX weaker and more variable, making contacts difficult—as one might expect having regard to the considerable frequency difference.

From Pencoed in South Wales, GW3FSP had a CW contact with HG3GG, 589 both ways, and his heard-list includes OE, YU, OK and I1EX; the QRM beat him for further contacts.

The Cornish boys had a good time, G3NVJ/P working four HG's and two OE's, while G3XC/P got four OE's and two HG's—they were on site for the contest (which, incidentally, was something of a flop, as apart from the fact that tropospheric conditions were very poor, people were too excited about the EDX!).

GW3SYE (Cardiff) remarks that "conditions were fantastic" — he worked HG2RD and YU3ZW, and heard seven more stations from the same general area, including

OE6LOG; an I1 was also noticed, but not identified. All stations were up to the S8/9 mark, the QRM was terrific, "like 80 metres on a Sunday morning," and for GW3SYE it was his "greatest thrill since being licensed." (And that just about sums up the reactions of a lot of people.)

G2BJY (Walsall, Staffs) says "I suppose everyone was staggered"

FOUR METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 8
From Home QTH Only

Worked	Station
52	G3IUD
50	EI2W, G3OHH (249)
49	G3SKR (265)
43	G3EHY
38	G3JHM/A, G3OWA (311)
37	G2OI, G3PJK
35	G3BOC, G3MOT (261)
33	G2BJY, G5JU
32	G3NUE, G5FK
30	G3BNL, GM3EGW
29	G3PMJ
26	G3LQR, G3LZN
25	G3AYT
24	G2AXI
22	G3FIJ, G3HWR, GI3HXV
21	G3PPG
20	GC3OBM
19	G5UM (122)
17	G5CP
16	G3BJR, G3FDW, G3OJE
15	G3RDQ
14	G3OKJ
12	G3TKQ, G5DS
11	G3LHA, G3SNA
10	G2BDX, G3ICO
9	G3EKP, G3TOT
8	G3NNO, G3PRQ, G8VN

This Table records Counties Worked on Four Metres, on an all-time basis. Claims can be made as for the other Tables, e.g. a list of counties with the stations worked for them, added to from time to time as more counties accrue. QSL cards or other confirmations are not required. Totals in excess of 100 different stations worked can be claimed and will be shown in brackets after the call.

—he worked three YU's, and heard three more, also the HG3GG worked by GW3SYE. For G3PTM (Solihull) the best EDX was YU1NPW worked at 1,150 miles, his stations-heard being seven more YU's, OE6BRG (consistently reported), and OK3KTO. G3BOC (Manley, Ches.) got in with YU1IOP/P and heard IIDL at it with G5YV, all tape-recorded.

G2CIW (Birmingham) did not find the opening until it was nearly over—but managed a QSO with YU2GE, seven other YU's and HG2RD being heard. "Quite exciting, really," says Jack! G3AHB (Slough) raised YU1EXY/P, and G3IGW (Halifax) worked YU2AKL/P and YU2SRH/P on CW, good strong signals both ways, and heard himself being called by an unidentified HA3, entered in the log as "what a thrill, what a miss!" G3IGW identified five I1's, also three more YU's.

G3IOE (Newcastle)—and this is interesting—heard *only* I1's and worked two of them: I1AIM and I1PDN, both in Padova. GW3CBY (Swansea) heard six EU countries in the space of an hour or so, and worked YU2BO/P for a 1,140-mile contact—and probably the GW/YU "First." G3BLP (Woldingham, Sy.) also accounted for YU2BO/P, and in addition Johnny raised HG3GG, HG5KDQ/P and YU1NPW. G3KWH (Welwyn Garden City) heard a lot of the EDX, but didn't get through to work any of it. Some time of Stevenage, Herts., *ex*-G3JLA is now EI6AS of Dun Laoghaire, Co. Dublin and, of course, in full cry on two VHF bands; he heard a lot of the EDX, but likewise did not connect.

G3CCH (Scunthorpe) worked a YU, and heard many others, as well as I1's, but was unable to raise any of the latter. However, Johnny has been very busy on even more important ploys, as we shall shortly see . . .

For the record, YU1EXY/P, in a list forwarded *via* EI2W, gives a total of ten U.K. stations worked—nine G's, and GW3MFY.

So much for the remarkable EDX happenings of Sunday, July 4, 1965, during the two-metre

sporadic-E opening lasting from about 0900 to 1115z. There is a lot more that could be said about it, but there are many other matters requiring attention.

KP4BPZ on Moon Reflection Tests

KP4BPZ, Puerto Rico, had arranged to carry out another run of 70-centimetre Moon Reflection tests on July 3 and July 24, for which he has temporary use of the large radio telescope operated out there by the U.S.A.F. for communication purposes. Of course, we have had all this once before—see "VHF Bands," July 1964—when G2HCG, G2JF, G3CCH and G3LTF had varying degrees of success.

On July 3, G3EDD (Cambridge) started hearing KP4BPZ, just coming up out of the noise, until at 2200z his CW was peaking 549, and a QSO with W1OOP could be followed solid; at 2215 he went on to SSB, and Brian was able to resolve a few words. This was with a beam consisting of a pair of 9-ele Yagis, stacked.

G3CCH was listening at the same time and, apparently, getting a better signal than G3EDD—at any rate, Johnny gives him as "around S5-6 most of the time." The SSB sounded a bit rough, probably due to multipath reflections, as the same effect was noticed on the CW note. No actual contact resulted, as G3CCH had blower-motor trouble.

By the second test, on July 24, all this had been put right, and G3CCH is able to report as follows: "I had a solid QSO with KP4BPZ on 432 mc by E-M-E at 1145z on Saturday, July 24, with his SSB at 57, very little fading, my report from him being RST-439. I was able to copy him solid for 2½ hours! Tx input here 300w, to single 4X150, using the same 12ft. dish as last year, with better aiming and control; Rx side was aided by a new transistor pre-amp., and could have been even better, but the parametric amplifier just refused to work!" So, very well done, Johnny, and congratulations on a really noteworthy piece of work. Incidentally, G3CCH acknow-

ledges all the help he has had from G3LTF and G3MNO in getting the gear tee'd up and on the top line.

All this happening pretty well on the dead-line, we have no further hard news on the KP4BPZ tests, though G3LTF is known to have been trying, too

TWO METRES

COUNTRIES WORKED

Starting Figure, 8

- 28 G5YV (DL, EA, EI, F, G, GC, GD, GI, GM, GW, HB, HG, I, LA, LX, OE, OH, OK, ON, OZ, PA, SM, SP, UA, UP, UQ, UR, YU)
- 26 ON4FG (DL, EA, EI, F, G, GC, GI, GM, GW, HB, HG, LA, LX, LZ, OE, OH, OK, ON, OZ, PA, SM, SP, UA, UP, UR, YU)
- 26 G3LTF (DL, EA, EI, F, G, GC, GD, GI, GM, GW, HB, HG, LA, LX, LZ, OE, OH, OK, ON, OZ, PA, SM, SP, UA, UP, UR)
- 26 UA1DZ (DL, DM, G, HB, HG, LA, LX, LZ, OE, OH, OH0, OK, ON, OZ, PA, SM, SP, UA, UB, UC, UO, UP, UQ, UR, YO, YU)
- 24 UP2ON
- 22 G3LAS
- 21 G3CCH, G3HBW
- 19 OK2WCG
- 18 G2JF, G3BLP, G6NB, ON4BZ
- 16 G2CIW, G3AYC, G3BA, G3CO, G3EDD, G3GHO, G3KEQ, G5MA, G6RH, G6XM, PA0FB
- 15 G2XV, G3DKF, G3FZL, G3HRH, G3PTM, G3RMB, G4MW, GM3EGW, UR2CQ
- 14 G2FJR, G2HDZ, G3AOX, G3FAN, G3HAZ, G3IOO, G3JRH, G3KPT, G3NUE, G3PBV, G3SAR, G3WS, G4LU, G5BD, G5DS, G6LI, G8OU
- 13 EI2W, G2HIF, G2HOP, G3AOS, G3DMU, G3DVK, G3EDD, G3EHY, G3GPT, G3GWL, G3HIT, G3LHA, G3NNG, G3OHD, G3PSL, G6XX, G8VZ
- 12 EI2A, F8MX, G2BJY, G2CDX, G3AHB, G3BNC, G3BOC, G3GFD, G3GHI, G3JAM, G3JLA, G3JXN, G3OBD, G3WW, G5CP, G5JU, G5ML, G8DR, GC2FZC, GW2HIY, GW3MFY
- 11 G2AJ, G2AXI, G2CZS, G3ABA, G3BDQ, G3FLI, G3GSO, G3IUD, G3JHM/A, G3JYP, G3JZN, G3KUH, G4RO, G4SA, G5UD, G6XA, IK1VR, PA0VDZ
- 10 G2AHP, G2DHY, G2FQP, G3BK, G3DLU, G3GSE, G3KQF, G3LAR, G3LRF, G3LTN, G3MED, G3OSA, G3RTF, G3XD/A, G5MR, G5TN, G5UM, G8IC, GW3ATM, GW5MQ
- 9 G2BHN, G2DVD, G2FCL, G3BYY, G3FUR, G3GJY, G3OWA, G3SXX, G4LX, G8GP, GC3EBK, GI3ONF, GM3DIQ, GM3LDU
- 8 G2BDX, G2DDD, G2XC, G3AEP, G3AGS, G3CCA, G3EKX, G3FNM, G3GBO, G3HCU, G3HWJ, G3KHA, G3PKT, G3MPS, G3VM, G5BM, G5BY, G8SB, GM3JFG

—so perhaps we shall hear from Peter in due course.

A sidelight on these later tests came up in Jack de Manio's "Today" programme on the BBC's Home Service on Tuesday morning, 27th, with a group being interviewed at Dunfermline, complete with recording of the KP4BPZ signal. The roar of sharsh made it almost impossible to follow, but there was something there. In the usual BBC fashion, there was also a lot of rubbish-talk about "hams," and

what some of them did for a living—but not a single GM call-sign was mentioned. What did emerge was that these Dunfermline chaps had a 15-foot dish, and were the first amateurs in Scotland to try E-M-E reception. None of this is in any way to denigrate the efforts and results of the Dunfermline GM group, as we presume them to have been — but when the Press or the BBC do get hold of an Amateur Radio story, the reporter always seems to conduct the interview in the manner best calculated to irritate anyone listening who knows something about it.

And now to other matters.

North-West VHF Convention

This will be on September 18, at the Grosvenor Hotel, Deansgate, Manchester, opening at 1.30 p.m., with G3CCH and G3LTF talking on E-M-E and MS working, together with a programme of visits, a trade show and an exhibition of amateur VHF equipment. G3UHF/A will talk-in on two metres, with feed from a /P station on high ground. The Convention Dinner — for which G6FO, Editor of *SHORT WAVE MAGAZINE*, has been invited to take the chair—will start at 7.30 p.m., followed by a raffle and prize-ticket draw. Overnight accommodation at the Grosvenor (or other hotels in the neighbourhood) is available. Tickets for the Convention and Dinner are 25s. inclusive, obtainable from T. Davison, G3AGS, 18 Boardman Road, Higher Crumpsall, Manchester, 8. (Tel. *Cheetham Hill 2762*.) He can also arrange accommodation. For general information, write: Geoff Barnes, G3AOS, 5 Prospect Drive, Hale Barns, Cheshire. (Tel. *Ringway 2415*.) This is always a very good VHF occasion, supported from all parts of the U.K., so your booking should be made early, as accommodation is necessarily limited.

DX-Pedition Notes

From his usual Sutherland holiday haunt G3BOC (*QTHR*) will be signing GM3BOC/A from the 22nd until Sept. 9, on two and four metres; never yet having

worked *anyone* on 70 mc from Brora, he hopes he will break his duck this year—and so do we! After all, he will be in one of the rarest of rare GM counties.

GM3RUF/P, operated by G3UAW and G3KXA (*QTHR*), will start up on August 27 from "one of the rarer GM counties," activity being during evenings and for a couple of hours or so each morning, 0700-0930 clock time. Their frequency will be 145.95 mc, and skeds can be arranged through G3BA (*QTHR*), as Tom will be in daily contact with the expedition. Counties to be covered are Clackmannan, Kinross, Stirling, Perth, Roxburgh, Dumfries, Renfrew, Dumbarton and *etc.* This is going to be a slap-up affair, running two Land-Rovers, 100w, into a 10-ele J-Beam, and three separate receivers for really efficient band monitoring. To make the most of the opportunities, G3KXA /G3UAW consider, quite rightly, that firm skeds, with accurate timing and frequency setting, are a "must."

As previously reported, the GB2GC party, to be on Alderney from Aug. 18 until Sept. 7, will be working all four VHF bands, with sked arrangements in the hands of G3SHZ (*see p.304, July*). Their main working channel will be 144.15 mc in the two-metre band, operating every evening from 6.0 p.m. onwards, covering all sectors of the U.K. from southwest round to the London area and then on to the Continent at about 9.0 p.m., the idea being to discuss results and fix further skeds for the other VHF bands.

Conclusion

Regretfully, we must leave it at that, with much correspondence of great interest not covered—but in the hope that everything of immediate importance has been dealt with adequately. For the September issue, deadline will have to be **Monday, August 23**, with everything VHF addressed: A. J. Devon, "VHF Bands," Editorial Dept., *SHORT WAVE MAGAZINE*, BUCKINGHAM. Careful over Bank Holiday, look out for sporadic-E, and *Don't Worry*. CUAGN September 3, all being well. *73 de A.J.D.*

TWO METRES

COUNTIES WORKED SINCE
SEPTEMBER 1, 1964

Starting Figure, 14

From Home QTH only

Worked	Station
54	G3EDD
52	G3SAR
41	G3PSL
47	G3HRH
39	G3LAS, G3PTM
40	G2AXI, G2BJY
38	G3AHB, G3CO
37	G3OWA
36	G3FNM
35	G3TLB
34	G3GWL, G3TNO
33	G2CDX
31	G3FIJ, G3KWH
29	G4LU
28	G3JHM/A
27	G3TKQ
26	G5UM
25	G3IOE, G3SML, G13SLI
23	G3THC, G8VN
22	G3SXX
21	G2BDX
20	G3KQF
18	G3GSO
17	G3CKQ
15	GW3CBY
14	G5FK

This annual Counties Worked Table will close on August 31, 1965. All two-metre operators entered above are asked to bring their claims up-to-date, so that the Final Table for the year 1964-'65 can appear in the October issue.

whose Morse was as difficult to read as that of the candidate—but the outcome was the issue of the present call, G8NY, who says it was just as well that he did get his licence then, as the temptation to let the 10-watt Tx “leak” into a 40-metre Zepp aerial was becoming too much for him!

Much and varied equipment was constructed in those pre-war days, involving such items as Collins couplers, Bliley vari-gap crystals (the first “rubber xtals”) and the first rotary beam, a W8JK-type, erected in 1939—just in time for it not to be used, as G8NY got his call-up for the Royal Signals, and departed for more serious radio work, which for him ended in the Middle East in 1947.

On return to civil life, the call sign was re-activated and a lot of new gear built, with an HRO as the main station receiver. In due course, this developed into the installation seen in the picture, comprising a K.W. Viceroy Mk.III with its associated linear PA, and a KW-77 receiver, other items including an electronic key, SWR meter, Heathkit HO-10E monitor 'scope, frequency meter and various pieces of test gear.

Outside, a dipole for 80 metres is flanked by a Hy-Gain TH33 beam, at 37ft., and operated on the 10-15-20m. bands. This is fitted with a Selsyn-driven direction indicator working over the world portion of a SHORT WAVE MAGAZINE great-circle *DX Zone Map*. The ship visible in the photograph is the Swedish vessel *Albatross*, signing SHF1X, with which G8NY maintained contact throughout a long voyage of exploration in 1948.

We could also have shown you another photograph, of G8NY with his charming 14-year-old daughter Kay, who helps not only with the QSL's but with the household chores, for he is a widower. G8NY, who job-wise is a senior district engineer with the Eastern Electricity Board, also has a married daughter and three grandsons—her husband being G3EKL, ex-VS1BA, now of Shrewsbury, who met his wife as a result of keeping a weekly schedule with G8NY from Singapore, back in 1947. So radio has been part and parcel of G8NY's life for about the last 60 years—and we are glad to have had the opportunity of seeing such an interesting contribution for this feature.

EDDYSTONE RADIO LIMITED TO CONTINUE AS MARCONI SUBSIDIARY

Stratton & Company Ltd., manufacturers of the well-known *Eddystone* range of radio communication receivers and accessories since 1923, has now been officially renamed Eddystone Radio Limited. This follows the announcement that the Stratton radio interests had been acquired by English Electric, and that the company would be operated as a subsidiary of The Marconi Company.

The board of directors of the new company will consist of Mr. F. N. Sutherland, Deputy Chairman and Managing Director of The Marconi Company, who will be the chairman of Eddystone Radio Ltd ;

Mr. R. Telford, General Manager of The Marconi Company; Mr. H. N. Cox, formerly technical director of Stratton; and Mr. A. C. Edwards (G6XJ), formerly commercial director of Stratton. Mr. Cox (58) and Mr. Edwards (59) will retain executive responsibility for the new company, and the existing structure will be disturbed as little as possible—both have been with the firm for nearly 40 years.

Eddystone Radio produce a range of radio receivers which runs through the frequency scale from 10 kc to 1000 mc. The company has a world-wide reputation, and Eddystone receivers have been sold in practically every country in the world. Over 50 per cent of the output is now sold directly into the export market, and considerably more passes indirectly through other companies such as Marconi, who themselves export equipment bought from Eddystone.

ANOTHER SUCCESS STORY

A letter recently received, which we are glad to publish, reads as follows:

“I am pleased to advise you of my new call sign/address and it may interest you to know that I am 69, and retired. After a few years of retirement I realised that it would be necessary to take up some hobby, if my mind was to remain active, otherwise I felt I would sink into despondency. In October 1963 I went to the Amateur Radio Exhibition and was so impressed by the enthusiasm of everyone I met there that I determined to join in the fun. That day I forwarded an order to my newsagent for *Short Wave Magazine* to be delivered regularly. At the same time I bought a copy of the *Radio Amateur Handbook* and a number of other books from your stand at the Exhibition.

“I settled down to serious study and cleared out my brick-built outhouse, installed lighting and heating, and turned it into an ideal shack. After six months of intensive work I sat for the R.A.E. in May 1964, and secured a pass. In March of this year I took the G.P.O. Morse Test and passed with no difficulty, having been a wireless operator in the Royal Navy from 1913 to 1921 (though I had not touched a key since then).

“By the long and painful process of saving a little each week (I am an old-age pensioner) I have gathered together the components and built a communications receiver, with a Q-multiplier. I have also constructed a GDO, a signal generator and a transmitter PSU, and collected sundry small items for transmitter construction.

“Now I am a lecturer on radio construction at the local College for Further Education for two hours a week, the payment for which will help me with equipment for my station.

“With all good wishes, and many thanks for an excellent *Magazine*.”

John Colbert, G3TZY,
132 Coldnailhurst Avenue,
Braintree,
Essex.

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 U.K. section 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.

- G3RFG**, H. S. Brown, 36 Three Star Caravan Park, Lower Stondon, Henlow Camp, Beds.
- G3SNU**, K. G. Selleck, Coplands Farm, Dartington, Totnes, S. Devon. (Tel. Totnes 3040.)
- G3SSN**, J. W. Brand, 40 Mowbray Avenue, Blackburn, Lancs.
- G3THJ**, S. Cheetham, 98 Lynton Road, Hillside, Southport, Lancs.
- G3TLD**, M. F. J. Selwyn, 3 Edinburgh Place, Broadwell, Coleford, Glos.
- G3TVU**, I. D. Brown, 36 Glenlyon Road, Eltham Park, London, S.E.9.
- G3TXJ**, R. D. Dadds, Fiesta, Bush Road, Cuxton, Rochester, Kent. (Tel. Medway 78349.)
- G3TYD**, D. W. Hughes, 36 Robin Hood Road, St. Johns, Woking, Surrey. (Tel. Woking 61157.)
- G3UAR**, R. H. Sear, 48 Lonsdale Road, Southall, Middlesex.
- G3UAV**, J. D. Beddows, 86 Gillhurst Road, Harborne, Birmingham, 17.
- G3UAW**, P. S. Beddows, 86 Gillhurst Road, Harborne, Birmingham, 17.
- G3UCE**, L. B. Uphill, 160 Heysham Road, Morecambe, Lancs.
- G3UCO**, A. Macdonald, 57 Laugherne Road, St. Johns, Worcester.
- G3UCA/A**, A. Macdonald, Gracie Hall, Wake Green Road, Moseley, Birmingham, 13.
- G3UEV**, K. G. Turk, A.M.I.S.M., 94 Heysham Road, Southport, Lancs.
- G3UFH**, T. J. Moss, 26 Dunblane Avenue, Oldpark Road, Belfast. 14. (Tel. Belfast 747558.)
- G3UFL**, F. H. Ladd, 4 Wellington Close, Melbourne Park, Chelmsford, Essex.
- G3UFM**, E. R. Baldwin, 22 Ashgrove Road, Ashford, Middlesex.
- G3UFQ**, D. W. E. Eckley, M.P.S., 24 Fernwood Road, Sutton Coldfield, Warks. (Tel. Erdington 6642.)
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- G3UGU**, E. Peel, 254 Brownhill Drive, Blackburn, Lancs.
- G3UGV**, A. Gay, 50 Kennel Lane, Priestwood, Bracknell, Berks.
- G3UGW**, M. Woodcock (ex-5N2SMW), 4 Legion Court, Green Lane, Morden, Surrey.
- G3UHG**, Radio Club, College of Electronics, Leigh Sinton Road, Malvern, Worcs.
- G3UHH**, J. E. Price, 2 Hotham Road, Cranswick, Driffield, E. Yorkshire.
- G3UHR**, C. G. Noakes, 5 Brean Road, Hillcroft Park, Stafford.
- G3UHS**, E. Houltyb, 9 Bayard Street, Gainsborough, Lincs.
- GM3UIE**, B. F. M. Dennis, 2 Brankholm Lane, Rosyth, Fife.
- G8AHA**, S. Taylor, 46 Old Church Road, Bell Green, Coventry.
- CHANGE OF ADDRESS**
- G2TP**, C. W. Andrews, M.C., Ends Meet, Newdigate, Dorking, Surrey.
- G3CRH**, H. H. A. Sanders, The White Cottage, Hammerwich, Walsall, Staffs.
- G3DQQ**, D. Winterburn, 47 Hilda Avenue, Tottington, Bury, Lancs.
- G3GVM**, F. L. Robins, 59 Titchfield Road, Stubbington, Fareham, Hants.
- G3IUZ**, Rev. H. R. Davis, 128 New North Road, Hainault, Ilford, Essex.
- G3KCR**, D. W. Payne, 2 Nevill Road, Crowborough, Sussex.
- G3KML**, R. Whitfield, 1 Wellington Terrace, Berwick-on-Tweed, Northumberland.
- G3LEX**, R. Reed, c/o Sgts' Mess, R.A.F. Station, Changi, c/o G.P.O., Singapore, Malaysia.
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- G3NUE**, G. W. Tibbetts, 25 Greenford Gardens, Martley Road, Worcester.
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- G30MM**, Mrs. Mary I. Shaw, 7 Prince's Gate, Savile Park, Halifax, Yorkshire.
- G3PPB**, J. M. Perkins, Bryony, Belfield Park Avenue, Weymouth, Dorset.
- G3PQY**, J. Lawrence, 150 Hull Road, Cottingham Road, Hull, Yorkshire.
- GW3RFQ**, A. J. Nadauld (ex-G3RFQ), 47 Romilly Road, Canton, Cardiff, Glam.
- G3SDN**, Dr. E. Savundra, White-walls, The Bishop's Avenue, Finchley, London, N.2. (Tel. MEAdway 2668.)
- G3SIL**, E. A. Rudolph, 29 Pangbourne Drive, Stanmore, Middlesex.
- G3SKO**, P. M. Wingfield, Cobblers Cottage, Winterbourne Kingston, Blandford, Dorset. (Tel. Bere Regis 331.)
- G3STG**, G. A. Griffiths, 27 Milburn Road, Kingstanding, Birmingham, 22C.
- G3TKI**, D. Bradshaw, 50 Grindsbrook Road, Radcliffe, Lancs.
- G3TKO**, E. E. Snow, 47 Norwood Drive, North Harrow, Middlesex.
- G3TRU**, H. Bates, 29 Enmore Road, Taunton, Somerset.
- G3TZV**, P. Fry, 30 Western Road, Flixton, Manchester, Lancs.
- G3UCS**, N. Smith, 19 The Patios, Franche Road, Kidderminster, Worcs.
- G4KO**, H. Staff, 50 Carrow Road, Thorpe Hamlet, Norwich, Norfolk. NOR.21.T.
- G5KJ**, K. Morton Evans, Pond End House, Blackmoor, Liss, Hants. (Tel. Bordon 105.)
- G6KR**, E. R. Westlake, 2 Greenway Park, Galmpton, Brixham, Devon.
- AMENDMENT**
- G3KQY**, R. J. Disley, 89 Duddle Lane, Walton-le-Dale, Preston, Lancs. (Tel. Preston 36018.) (July issue.)

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for Next Issue: August 13)

(Please address all reports for this feature to "Club Secretary" Editorial Dept., SHORT WAVE MAGAZINE, Buckingham.)

IT is usual to announce, in our August issue, the dates and preliminary details for the annual "MCC" (Magazine Club Contest on Top Band). This year the event is fixed for November 13 and 14, 1700-2100 GMT. The rules will not be changed, and the details for the event are exactly the same as last year—see pp.498-499 October 1964 issue for reference. Despite individual criticisms, it is felt that the set of rules, and the scoring mechanism, now arrived at represents the fairest compromise that can be found.

Last year's event attracted a record entry; in fact the total entry has never yet failed to show an increase on the previous year. Let us hope that the 1965 Contest (the Twentieth of the series, by the way) will once more break the record, now standing at 107. Actually 110 logs were received for the 1964 MCC, and even more clubs than this took part . . . but we hope to see more still in November 1965.

Start planning *now*—don't get caught out, as has happened so often in the past, by some small oversight which has cost many points. Form an MCC committee, get them to work and co-operate with them. Any club could win this event—given the aerial and the operators. Why not yours?

CLUB ACTIVITIES

Bromsgrove continue to meet on the second Friday, 8 p.m., in the Co-operative Rooms, High Street. They are arranging with the local Evening College to run an R.A.E. Course for 1965/66, and Morse tuition is held before the monthly meetings. On August 13 there will be a lecture, but the subject is not yet fixed.

Chesham report a satisfactory month, and have secured four new members. They meet every Friday at the rear of 5 Bois Moor Road (their own premises) and have a good series of talks and lectures lined up. They also ran a stand at the Amersham Fête, with no troubles, many contacts and good reports. Finally—a club net on Sundays, 10 a.m. to midday.

Reading will gather on August 28 to hear G5XB on "Antenna Systems made to Measure," and their big event of the year occurs on August 20-21, when members' equipment will be on show at the Silver Jubilee Reading Show. A station will also be in operation thence.

Slade will be debating whether to "go commercial" or not (for their club transmitter) on August 6; on the 20th they will be rehearsing for their TV show, "Slade '65," to be held on October 2. And on September 3 the subject of the meeting will be

RTTY. Wednesday meetings at the club station continue as usual—all at 7.45 p.m.

Surrey (SRCC *Monthly News*) met at the Blacksmith's Arms, South Croydon, on July 13 to hear G3TR talking on Air Traffic Control. He is an authority on the subject and showed a number of slides; the talk was "biased on the radio side" of the subject.

Salop, still without a fixed meeting-place, continue formal meetings on the second Thursday at the Morris Hall, Bellstone, Shrewsbury, and informal get-togethers at the Old Post Office Hotel on the fourth Thursday. Recent meetings have included a talk on Construction Technique and a film about the Royal Observer Corps (at their own Hq.). On August 30 the club station (G3SRT/A) will be in action from the Church Stretton Traction Engine Rally (also recommended to those interested in veteran and vintage cars or model engineering).

Purley recently held their AGM and elected G3GKF chairman, G3FTQ secretary and G3OGO treasurer. They meet on the first and third Friday, at the Railwayman's Hall, Whytecliffe Road, Purley, and new members are always welcome. On August 6 they will devote the time to CW practice and a ragchew; on the 20th there will be a portable expedition to Headley Heath. (*News-Sheet*, July, acknowledged.)

Peterborough continue their Friday evening sessions at the clubroom in the Old Mill (behind the Peacock Inn, London Road); monthly meetings will recommence at the Technical College in the autumn. **Magnus Grammar School** (Newark) have been more than usually active, with a talk from a police officer who demonstrated his radio equipment, a D/F event and a talk about radio control of model boats. A party is to visit the local RAF station to see the engineering and electronic workshops.

Halifax have had a demonstration of two-metre gear, at the home QTH of G3IGW, and a visit to the RNVR Communications Centre in Bradford; on August 24 there will be a talk by G3MAK, and a visit from the Huddersfield Radio Society. **East Wores.** report good turn-outs for their summer meetings (on the second Thursday at the Old People's Centre, Park Road, Redditch). Their winter session will begin on September 9 with a talk and demonstration of Cryogenics. It is hoped to form an R.A.E. class at the Redditch College of Further Education—interested members and prospective students please contact G3TOI, 12 Crabtree Close, Redditch.

Derby will meet on August 11 to discuss preparations for the Eighth Annual Mobile Rally (on the 15th at Rykneld School). August 18 is a D/F practice night, August 25 a Quiz, and September 1 a Junk Sale.

Cheshunt heard a talk from G2YS at its July meeting, and showed their "progressive outlook" by talking the visiting lecturer in. Combined with the meeting was a junk sale, proceeds going to Club funds. There will be no August meeting, but on September 3 they will be hearing G4GA on "The Good Old Days."

Coppull is a newly-formed club, meeting at the Scout Hq., Charter Lane, Charnock Richard, near Chorley, Lancs. At present they gather every Saturday at 3 p.m., and they already have a modern receiver, a Top-Band half-wave and a two-metre beam. See panel for secretary's QTH.

Northern Heights had an inter-club visit to Manchester (return visit on September 1), ran a demonstration station at the Halifax Gala (complete with mobile in the procession), and held a very successful junk sale. On August 7 they visit Calder Hall atomic station, on the 14th they will be in evidence at Halifax Agricultural Show, and on the 18th will have a repeat of WIBB's Top-Band lecture, on tape.

South London Mobile Club will hear the second part of G3OLM's SSB talk on August 14, and on the 28th there will be a Film Show by G3DPW—both at Clapham Manor Baths, 8 p.m. The club now have their own permanent shack on the premises of the 1st Wandsworth Common Scout Group Hq., and reports on their transmissions from the new shack (G3SLM) will be welcomed.

Stoke-on-Trent recently honoured G8IX, who has been active in radio for 50 years, by making him an honorary member of the club (which, incidentally, is no newcomer, having been founded in 1924). On August 26 WIBB's lecture will be featured, and on September 9 there will be a closed-circuit TV demonstration by one of the junior members. The two club transmitters are being restored to working condition, and the job is nearly finished.

Acton, Brentford and Chiswick will hear about a Transistorised Double Superhet from G3IGM on August 17. 7.30 p.m. at 66 High Road, Chiswick, as always. **Cannock Chase** reports a membership of over 60, so a new and larger meeting-place has become necessary (that's the sort of news we like to hear). On August 12 they will be at the Bridgtown Social Club, Walsall Road, Cannock, to meet W2HWA, who is an honorary member. (Local members of FOC and TOPS are invited to meet their fellow-member on this occasion.) Further Cannock evenings will be the first and third Thursdays.



By the glow from a "hart-buttl," G3NPY (left) and G2ABK operate the Skegness club station for the recent field-day event. At about the last minute, according to G3SCD (who sent the picture), G3NPY and G3OTD built and air-tested a 50w. VFO rig for three bands, in time to put the group on the air.

Chester is running a full programme, with a discussion on future constructional activity on August 10, a talk or outside visit on the 17th, a Radio Quiz on the 24th, a talk on Building a Two-metre Converter (G3SQP) on the 31st, and a Net Night on September 7. All meetings 8 p.m. in the YMCA, Chester.

Coventry, likewise, fill up the month with a "Night on the Air" (subject SSB, by G3SCJ) on August 9; a visit to the local telephone exchange on the 16th; a Top Band night-on-the-air on the 23rd; but nothing on the 30th this month (Bank Holiday). Meetings are now at Westfield House TA Centre, Radford Road, Mondays at 8 p.m., and during September there will be an all-out drive for new members, to which end a very active and interesting programme has been planned.

Nottingham, from whom we have not heard for years, are now determined to get out of the doldrums; no fixed programme to announce as yet, but there will be a special general meeting on September 21 in the Clubroom, Sherwood Community Centre, and ordinary meetings are being held on Tuesdays at 7.15 p.m., with the Thursday meetings probably being reinstated.

RAFARS (Newsletter No. 15) report changes in their officials, results of several contests (in all of which G8FC made high scores) and details of several members, mostly serving overseas. **Radio Club of Scotland** (*GM Magazine*, June) reports much of the activities north of the Border and contains, as usual, a good set of technical notes; 150 copies are circulated each month.

Southgate (Newsletter, July) hold a meeting on August 12, but as it is in the holiday period no lecture has been arranged; there will, however, be a junk sale. August 27-28 will see the club at the Southgate Show in Brookfield Park, Palmers Green.

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North Kent (*Newsletter* No. 91) have held some very successful meetings, although one was concerned with the sad business of disposing of the late G4CW's gear. Technical matter in the *Newsletter* includes details of a pneumatic telescopic mast (G3ONR) and an article on Wide-Band Couplers (G3HKX).

Dudley (*Local Oscillator*, June) continue to gather on alternate Friday evenings at the Art Gallery, the next dates being August 13 and 27. **Crystal Palace** (*Newsletter* No. 116) will meet to hear a tape talk, with slides, on a DX-pedition; August 21, 7.30 p.m.

Norfolk (*NARC Challenge* No. 7) keep things lively with discussions on that old topic of CW *versus* Phone, Top-Band Aerial Problems, and a few words on "turning commercial." Club meetings are held every Monday.

Cray Valley (*QUA*, July) hold their main meetings monthly, and the speaker at the August gathering (for which we can't find a date) will be G2MI. Some social events are being organised for the future, with G3TCC as social secretary.

Cornish (*The Cornish Link*, July) combined a 70 mc Field Day with their Mobile Rally at Newquay on July 25. VHF and Top Band do, in fact, play a large part in this club's activities. **AERE, Harwell** (*QAV*, July) get together on the third Tuesday, and the speaker at their July meeting was G3TEL, on

his transition from SWL to transmitting operator. Their well-known member G3HS is planning a round-the-world tour, starting on December 1, and operating from each port of call where the licensing authorities are co-operative.

With the Universities

More and more University clubs are reporting each month, and we are glad to welcome them. **University College of Swansea** are "taking steps" and their club will be open to anyone interested in Amateur Radio, whether a member of the University or not. Their inaugural meeting will be held in September, and further details may be obtained, meanwhile, from the secretary (*see* panel for QTH).

University of East Anglia have been fortunate enough to acquire the call sign G3UEA, and will soon be transmitting on all bands with a KW-2000 and a two-metre transceiver for local contacts.

Oxford University (G3OUR) are transferring their equipment from the former noise-ridden site to the Scout and Guide Hut, St. Ebbe's Car Park, and are hoping to increase their membership and to cater for all branches of interest. They will have a stand at the Freshmen's Fair, in the Town Hall on October 8, and meetings will be held at 8.15 p.m. every Wednesday. All interested persons, whether licensed or SWL's

Names and Addresses of Club Secretaries reporting in this issue :

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 BURY & ROSSENDALE: K. Drinkwater, G3RHR, 16 Linddale Avenue, Accrington.
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 CHESHAM: D. Kind, 19 Hollybush Road, Chesham.
 CHESHUNT: B. B. Charge, 16 The Green, Church Lane, Cheshunt.
 CHESTER: R. Trickey, G3DRB, 31 Penzby Avenue, Chester.
 COPPULL: R. Calderbank, 165 Preston Road, Coppull, Chorley, Lancs.
 CORNISH: M. J. Harvey, Oak Farm, Carnon Downs, Truro.
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 CRAWLEY: R. G. B. Vaughan, G3FRV, 5 Filbert Crescent, Gossops Green, Crawley.
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 HALIFAX: J. Ingham, G3RBQ, Lambert House, Greetland Halifax.
 HAVERING: P. J. Moore, G3TUW, 1 Bonns Farm Cottages, Stapleford Tawney, Romford.
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 MAGNUS GRAMMAR SCHOOL: R. Wallwork, G3JNK, Magnus Grammar School, Newark-on-Trent.
 MEDWAY: M. J. Winter, G3OHP, 47 Watling Street, Strood, Rochester.
 NORFOLK: A. Marcantonio, G3TLC, 24 St. Lawrence Avenue, Norwich, NOR.86Z.
 NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogdon, Halifax.
 NORTH KENT: P. G. Wells, G3UFR, 25 St. David's Road, Hextable, Swanley.
 NOTTINGHAM: E. C. Weatherall, 16 Avebury Close, Clifton, Nottingham.

OXFORD UNIVERSITY: A. J. Shepherd, G3RKK, 3 Cearn Way, Coulsdon, Surrey.
 PETERBOROUGH: D. Byrne, G3KPO, Jersey House, Eye, Peterborough.
 PLYMOUTH: B. J. Curnow, 112 Mount Gould Road, Plymouth.
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 READING: N. C. Taylor, G3TOQ, 83 Stoneham Close, Reading.
 REIGATE: F. D. Thom, G3NKT, 12 Willow Road, Redhill.
 RODING BOYS: R. J. Phipps, 51 James Lane, London, E.11.
 ROYAL SIGNALS: J. E. Hodgkins, G3EJF, 2 Squadron, 8 Signal Regt., Catterick Camp, Yorkshire.
 SALOP: Dr. K. E. Jones, G3RRN, Greystones, Shrewsbury Road, Church Stretton.
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 SLADE: D. Wilson, 177 Dower Road, Four Oaks, Sutton Coldfield.
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 SPEN VALLEY: N. Pride, 100 Raikes Lane, Birstall, Leeds.
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 TORBAY: Mrs. G. Western, G3NQD, 118 Salisbury Avenue, Barton, Torquay.
 UNIVERSITY COLLEGE OF SWANSEA: R. Murray-Shelley, GW8AFB, Elec. Eng. Divn., School of Engineering, U.C. of S. Singleton Park, Swansea.
 UNIVERSITY OF EAST ANGLIA: D. Drake, University Village, Wilberforce Road, Norwich, NOR.77H.
 VERULAM (St. Albans): G. Slaughter, G3PAO, 6 Leggatts Wood Avenue, Watford, Herts.
 WAKEFIELD: E. Price, G3TQV, 23 Elmwood Grove, Horbury, Wakefield.
 YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil.

Overseas

AERONAUTICAL CENTRE, Oklahoma: Postal Station 18, Oklahoma City, Okla., U.S.A.
 EX-G RADIO CLUB: N. F. Thompson, W8YHO, 1368 Roslyn Avenue, Akron 20, Ohio, U.S.A.
 MALAYSIA: Box 777, Kuala Lumpur, Malaysia.

or interested in any branch of electronics, are asked to contact the secretary (*see* panel).

Overseas Clubs

The **Ex-G Radio Club** (for amateurs born in the U.K. and domiciled abroad) is one of the group of clubs whose only meetings are on the air. Their Worldwide Net meets on 14010 kc (CW) on Saturdays at 2100 GMT, on 14345 kc (all modes) on Sundays at 1900 GMT, and on 21395 kc (all modes) on Sundays at 1500 GMT. Membership is worldwide and details are available from W8YHO (*see* panel for QTH) or G4MJ. A monthly bulletin, full of news about members, is circulated.

The **Aeronautical Centre, Oklahoma** (*The Collector and Emitter*) at least introduce us to a new word in club vocabularies, for on June 4 they held a Swapfest! Worthy of adoption over here, maybe? Their club station, illustrated in this issue of their journal, runs to a complete S-line desk for SSB/CW, a separate station for AM/CW, and an operating position for Two and Six metres using Clegg gear. And at the time of writing they were all involved in preparations for the West Gulf Division Convention in Oklahoma City.

Malaysia ARTS (*Newsletter* No. 2) mourn the loss of 9M4GT, electrocuted when leaning over to switch off a desk lamp while operating his gear. It seems that the mains, and not the transmitter HT, were responsible, but it is still a grim safety warning. The *Newsletter* is strong in technical notes, but correspondence and news from members also take their place in it.

More Home Activities

Bury and Rossendale will meet at the Old Boar's Head, The Rock, Bury, on August 10 at 8 p.m. G2BTO will be talking about TVI Troubles. Their R.A.E. Course, under the instruction of G3PVG, will be held on Fridays at Bury Technical College, 7.30 p.m., with enrolment starting in September.

Havering, now meeting at Goodchild House, 54 Western Road, Romford, will have a demonstration of Laser Beams on August 12, and on September 1 the subject of the talk will be "Safety Regulations."

Yeovil had a very successful operation with GB2YC at the Leisure-Time Exhibition between July 5 and 10 (*see* p.284, July issue). Some 550 stations were worked, in 66 countries, and about 4000 people visited them in the Yeovil Technical College. Their clubroom is now being decorated, and a tape-and-film show, from ZD8PI, will be given in the near future.

Wakefield held their first meeting, attended by 33 amateurs and SWL's. As a school is their headquarters, no more meetings until

September 23, then October 12 and 26. On September 30 they have been invited to visit the Spen Valley club, and they also hope to call on the Police and Fire Service control centres, to keep the members together while headquarters are not available.

Huddersfield will begin their alternate-Thursday meetings again in September, after a summer break, and now report that they are very active on Two Metres. **Saltash** (*Tamar Pegasus*, July) are still attracting new members and good attendances at meetings; on August 13 they will have a Mobile "Evening Out," and on the 27th a Constructors' Evening.

Plymouth (*QUA*, July) look forward to an inter-Club picnic on Dartmoor (Sunday, August 15) with representatives from Yeovil, Torbay, Exeter, Saltash, Kingsbridge and Cornish . . . which could be quite a gathering! G3PRC/P will be talking-in on all bands, as well as G3LMG/P on Four Metres. Visitors to the area are invited to pay a call on the club (G3PRC), although the premises will be closed for the first half of August. Informal meetings will be held, however, on Plymouth Hoe (outside the Aquarium) at 8 p.m.

Reigate (*Feedback*, June) have had some very successful meetings, and the next after publication will be on August 21 (at the George and Dragon, Redhill), when G3NKS will hold one of his popular Quiz programmes. The first lady member (Mrs. Sylvia Hubbard, wife of G3OVL) has been welcomed to the club's ranks.

Torbay report a most successful Mobile Rally on July 11, with an attendance of over 250 people, 89 vehicles, 42 mobiles. Only the weather failed to co-operate—it rained all day! **Crawley** will hold their annual Sale of Surplus Equipment at their August meeting, with G3FRV "on the hammer." Everyone with junk (or money) for disposal will be welcome.

Roding Boys put on a show at a Garden Fête arranged by the Community Centre where their Hq. stands. And one evening a party of members packed into the van and visited a similar group at Welwyn—the Rollswood Boys' Society—started by an ex-member



The Bradford Amateur Radio Society had G3NN/P in action for the RSGB field-day in June. Left to right, we see here: G3HMY, G3SAO and SWL Hill, one of the loggers. Other operators in on the party were G3MFJ, assisted by his YL and SWL Wells.

of Roding, who moved to that district.

Burslem were joined by the Stoke-on-Trent club for their July meeting, which took the form of a Film Show. No more meetings at Burslem until September 21, which will be the AGM, followed by another Film Show. This will be at Moorland Junior High School, Burslem, Stoke-on-Trent.

South Shields held their Mobile Rally on July 11, and attracted an attendance of about 200, with 70 vehicles. The longest-distance prize was won (not for the first time) by G3MQT from Hastings. In view of the bad weather, they were very gratified by the number who turned out.

Up at **Spenn Valley** they have commenced the new session with the annual general meeting, at which G3HPD was elected president; G3PXF, vice-president; Mr. L. A. Metcalfe as treasurer and, in the all-important job that he has been holding down for many years, Norman Pride as hon. secretary; committee members are Mr. J. A. Pamment, G3GJV and G3JQG. The club is now in recess until September 18.

From *Mercury* for July 1965, we get it that the **Royal Signals** Amateur Radio Society have two interesting DX-peditions planned—Lundy Island, in the Bristol Channel, where GB3LPC will be operating CW/SSB and RTTY (the main object, in this case), September 18-25; and from the Isle of Man during September 15-26, with CW/SSB on all HF bands, signing GD3RWF. Skeds can be fixed via G3LPC/G3RWF (QTHR).

The **Verulam** (St. Albans) group have dates on August 18, when G5UM, the well-known VHF operator, will talk on 70 cm. and matters UHF'fy; and on September 15, for the film "Friendship Seven," which is all to do with manned space-craft. A good forward programme is being planned, and another matter in hand is the important one of fund-raising. Meetings of this active club, for which G3LXP produces a very informative *News Sheet* (we are looking at No. 15), are at the Service Dept., Hedley Road, St. Albans—and prospective new members will always be welcome.

SPECIALLY ON THE AIR

In spite of the weather, local outdoor activities go manfully on as scheduled, in the hope that when the time does come round, it will be a fine and sunny weekend. We trust that those who have undertaken the responsibilities listed here will be so favoured. What is certain is that they will have worked hard, in the preliminary stages, to make their contribution a success in the radio amateur context.

GB3SFS, Aug. 6-8: For the Shields Flower Show organised by the South Shields Corporation, Co. Durham, in their Bents Park, the South Shields & District Amateur Radio Club will be laying on an AM-Phone station working all bands 10-160 metres, depending on conditions. A poster display and a variety of amateur equipment will form part of the GB3SFS stand. Any amateur in the district over the weekend is invited to

check in, and further details can be obtained from: Derek Forster, G3KZZ, hon. secretary, S.S. & D.A.R.C., 41 Marlborough Street, South Shields, Co. Durham.

GB3FRC, Aug. 8: Organised by the Fylingdales Radio Club (formed at the well-known Early Warning station near Bridlington in East Yorkshire) for a demonstration to the public of Amateur Radio in action. A well-equipped station will be working over all bands 10-80m., with six local operators, and skeds for anyone interested can be arranged through: W. Burton, hon. secretary, Fylingdales Radio Club, 14 Westbourne Road, Castle Park, Whitby, Yorkshire.

6Y5RA/P, Aug. 9-19: Arranged by the Jamaica Amateur Radio Association in connection with the Girl Guides Golden Jubilee International Camp at Kingston, Jamaica. All bands 10-80m. will be worked as conditions permit, and CW/AM/SSB used as opportunity arises. The address for QSL's is: Peter Windle, 6Y5XG, hon. secretary, J.A.R.C., Red Cross Bldg., 70 Arnold Road, Kingston 5, Jamaica, West Indies.

GB3HRS, Aug. 28-29: To be put on by the Harlow & District Radio Society for the Harlow Town Show, a two-day event of an unusually ambitious nature, covering a wide variety of interests—including commerce, industry and farming, as well as local cultural activities. Special car park facilities near the GB3HRS marquee are being arranged for visiting mobiles, who can call the station for talk-in. Further information is available from: G. O'Donald, G3TLJ, hon. secretary, Harlow & D.R.S., Great East, Roydon Road, Roydon, Harlow, Essex.

G3SFT/A, Aug. 30 (Bank Holiday): Station provided by the Salop Amateur Radio Society on the occasion of the Church Stretton, Shropshire, Traction Engine & Veteran Car Rally, started four years ago by a local group of engineering enthusiasts. A 5-figure attendance is expected at what has become a very popular event. G3SRT/A will be operating on the 20/80m. bands, and further information about this (and the Rally) can be obtained from Dr. K. Jones, G3RRN, Greystones, Shrewsbury Road, Church Stretton, Salop.

GB3WBS, Aug. 30 (Bank Holiday): The Colchester amateur group will run an all-band, 2m. to 160m., station manned by seven local operators, in connection with the West Bergholt Show. Enquiries to: B. W. Garnham, G3SJO, 17 Sutton Park Avenue, Colchester, Essex.

GB3RH, Sept. 11-12: At the symposium on Amateur Radio, to be held at the Youth Centre, Ollerton, Notts., the station will be provided and operated by the Magnus Grammar School Radio Society, assisted by the Mount School Radio Society, using the 20/80/160m. bands. A special QSL card is being issued to confirm all contacts and verified SWL reports. The QSL address is: G3PAW, Magnus Grammar School, Newark, Notts.

PAINTON EXPANSION

Painton & Co. Ltd., electronic component manufacturers of Northampton, have acquired the whole of the issued share capital of Elcom (Northampton) Ltd., manufacturers in the same field. The Board of Painton expect the business of Elcom to continue as in the past with only minor changes of emphasis. This addition to the Painton Group of Companies will materially assist in the Group's expansion, and Painton's well established overseas selling organisation will be used to increase the Elcom export business. Mr. C. M. Benham (G4TZ), continues as chairman of the Group.

INSTRUCTION FOR THE R.A.E.

At this time of year, we usually publish lists of local centres at which instruction is offered for the Radio Amateur's Examination—Subject No. 55 in the City & Guilds of London Institute examination syllabus—in preparation for the next R.A.E. sittings, to be held in December and May 1966.

These centres are, in general, additional to the usual arrangements made between local Education Authorities and the City & Guilds—in other words, even if you cannot find your own locality in our lists, it could well be that an enquiry at the local office of your Education Authority will show that a course is available at some centre within convenient travelling distance. In any such enquiry, always quote "Subject No. 55, Radio Amateur's Examination, City & Guilds."

In most cases, these courses are charged at nominal fees only, are taken by competent and experienced instructors, are arranged for evening periods, and many are *ab initio*, no prior knowledge of radio being required, with the minimum of maths.

For centres not listed here, all enquiries should be made to the local office of the Education Authority, which will have (or should be able to obtain) the City & Guilds' own list of centres at which instruction for the R.A.E. is given every year. In no case can any such enquiries be dealt with by us, since local arrangements differ and it is not possible for us to publish, or even to file, all the details.

Though local Technical Colleges and Evening Institutes are in recess until about the beginning of September, prior enrolment is usually required, so it is as well to get your enquiry in early.

Barry, Glam.: At the College of Further Education, Colcot Road, for two-hour periods on two evenings each week, starting September 20, covering R.A.E. Theory, Morse Test and Practical Work, enrolment at the College September 8-10, during 6.0-8.0 p.m. each evening, when further information can be obtained.

Basildon, Essex: At the Fryerns Evening Institute, on Mondays 7.0-9.0 p.m., commencing on September 20, arranged by the Basildon and District

Amateur Radio Society in co-operation with the Basildon Education Committee. Those interested should apply to: Secretary, Basildon and District A.R.S., Milestone Cottage, London Road, Wickford, Essex.

Bradford: At the Technical College, on Wednesday evenings 7.0-9.0 p.m., registration and enrolment at the College during the week beginning September 13. The fee for the course is 30s, for over-18's, and free for students under this age.

Brighton: At the Technical College, on two evenings a week, under the direction of Richard Canning, G6YJ, with practical work in the College station, G3TCB. Enrolment and registration any evening September 9, 10, 13 or 14, 6.30-8.0 p.m. at the College, Richmond Terrace, Brighton 7. Details of this and other engineering courses can be obtained on application to the Registrar.

Cannock Chase, Staffs.: At the Mining and Technical College, running from September to May 1966, under the direction of C. J. Morris, G3ABG, for the 13th successive year. Morse tuition will also be provided. Prospective candidates should apply to the Registrar for details, or to G3ABG (*QTHR*).

Crawley, Sussex: At the Sarah Robinson Evening Institute, Ifield, Crawley. Dates and arrangements to be announced. In the meantime, apply to: A. J. Gibbs, G3PHG, 6 Dairyfields, Gossops Green, Crawley, Sussex.

Doncaster: At the Technical College, Waterdale, starting on September 22, on Wednesday evenings 7.0-9.0 p.m., with enrolment at the College any day or evening September 13-15 inclusive. The course fee will be 46s. 6d. inclusive.

Dover: At the Y.M.C.A. Youth Centre, commencing September 6 at 7.0 p.m., organised by the Dover Y.M.C.A. Amateur Radio Club. All enquiries to the General Secretary (G3KAW), Y.M.C.A. Youth Centre, Godwynehurst, Leyburne Road, Dover.

Glasgow: At Allan Glens School, Cathedral Street, on Tuesdays and Thursdays, 7.0-9.30 p.m., covering R.A.E. Theory, Morse Instruction, GPO Regulations, Aerials, BCI and TVI, under GM3AXX, GM6MS and GM8MJ. Courses start on September 14, enrolment and registration at the School any evening September 6-9 after 7.0 p.m., course fee 20s. No previous knowledge of radio is either assumed or required. Any further information from: GM3AXX (*QTHR*).

Halifax: At the Percival Whitley College of Further Education, enrolment during week commencing September 6, at the College, when an amateur station will be in operation.

Leicester: At the College of Technology, commencing on September 22, in two classes, covering Morse Instruction 6.30-7.15 p.m. and R.A.E. Theory 7.15-9.15 p.m. For enrolment, apply at the Department of Electrical Engineering, September 14-15.

London (Beckenham): At the Evening Education Centre, 28 Beckenham Road, Beckenham, every

Thursday evening, starting on September 30. Morse instruction will also be available on Monday evenings, commencing September 27. Fees are graded according to age up to a maximum of 40s. Further details and any information required from: M. D. Bass, B.Sc., G3OJE, 42 Clevedon Road, London, S.E.20—or at the Centre during enrolment, September 20-22.

London (Hounslow): At the Brentford Centre for Adult Education, Clifden Road, Brentford, on Monday evenings, starting on September 21, enrolment during evenings September 9, 10, 13, 14 and 15, 7.0-9.0 p.m.

London (Ilford): At the Ilford Literary Institute, Cranbrook Road, Ilford, starting on September 20, with enrolment September 6-9, 7.0-8.30 p.m. This course has been running continuously since 1948, with one of the best success-records in the country, under the same instructor, W. G. Hall, G8JM, to whom application should be made in first instance, with s.a.e., at: 48 Hawkdene, North Chingford, London, E.4. The course fee, R.A.E. only, is 40s.; for Morse tuition it is 27s., or for the two, an inclusive fee of 50s.

London (Kennington): At Walworth Evening Institute, Bethwin Road, on Monday and Friday evenings, 7.30-9.30 p.m., under B. R. Meredith, G2CYV, as course instructor. Applications for prospectus, enrolment dates and fees to the Principal of the Institute.

Norwich: At the Thorpe Evening Institute, Longfields Road, Norwich, on Monday evenings from 7.30 p.m., starting on September 20, with enrolment at the Institute during September 13-17, 7.0-9.0 p.m.

Peterborough: At the Technical College, Eastfield Road, Peterborough. Information from G3KPO, QTHR, or the Principal of the College.

Sheffield: At the Western Road Evening School, Sheffield 10, starting on Wednesday, September 22 at 7.0 p.m. Enrolment during week commencing September 13. Full details from J. Bell, G3JON, 25 Edale Road, Sheffield, 11 (Tel.: 61281).

Weybridge: At Brooklands County Technical College, on Monday evenings, 6.30-9.0 p.m., with Morse instruction to be provided later. Enrolment at the College during September 14-16, evenings. Information can be obtained from the assistant lecturer, J. E. Lacey, G3GLB.

Woking: At the Sheerwater Evening Institute enrolment September 16-17; full details from Mr. J. Harrison, at the Institute.

York: At the Central College of Further Education, on Wednesday evenings 7.0-9.0 p.m. Full details from Mr. W. E. Wadman, Head of the Department of Engineering, at the College.

Further information for this space should reach us by *August 14* for the September issue, addressed: Short Wave Magazine, Buckingham.

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SBE SB-34 Transceiver, with SB1 Mic., full warranty, £200. Eddystone EC-10 Rx, £38. Heathkit Mohican Rx, £22 10s. Heathkit Type OS-1 'scope, £15. KW-77 Rx, £90.—**Mocean Electronics**, Westbury Road, Cheltenham (24217), Glos.

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SALE: Lafayette HE-30, little used, in original box, with manual, £27.—**Leppard**, 15 Church Road, South Park, Reigate, Surrey.

SELLING: K.W. Vanguard, factory built, 10-160 metres, spare valves, £30. HRO, B7G-type valves in RF/IF stages, five bandspread coils, mains PSU, £10. (Gone SSB.)—**N. Addison**, 17 Wilberforce House, York Road, London, S.W.11.

WANTED: Hallicrafters S.20R. Good price paid for receiver in original unmodified condition.—**Ogilvie**, 25 Crescent Park, Stockport, Cheshire.

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SALE: CR-100 Receiver, excellent working condition, £11; also Jason J/TV tuner, only used twice, £10; buyer collects.—Baverstock, 45 Chestnut Close, Hockley, Essex.

WANTED: By CCF Unit, recommended mains PSU, ex-Govt., for T.1154/R.1155. Also TCS-12 or similar Rx. State condition and price.—Lamb, 27 Carlinghow Hill, Batley, Yorkshire.

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WANTED: Receiver R.1155N, R.1132, R.1392, or offers? Must be in good condition, SALE: Multi-meter AVO-7.—Rowlatt, 13 Church Drive, Orton Longueville, Peterborough, Northants.

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FOR SALE: Heathkit RA-1, Q-Multiplier, Crystal Calibrator, Z-Match, Top Band Tx, "Electroniques" oscillator unit, power pack, phones, microphone, key, spare valves and mains transformer, load of good junk, £50 or W.H.Y.? Buyer collects, or carriage extra.—52 Station Road, Patrington (262), East Yorkshire.

SALE: Geloso G.209 Rx, double-conversion, AM/SSB, in unused and mint condition, complete with manual, £35.—G3RDZ, 38 Ash Close, Peterborough, Northants.

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WANTED: Good HRO, preferably with 28-30 mc bandsread coil, buy or EXCHANGE for Hallcrafters S.27 VHF Rx, 27-143 mc, AM/FM, with manual, £25, o.n.o.?—Ring G3LAS, Berkhamsted 1185.

SALE: KW-500 Linear Amplifier, mint, £55. Avometer Model-8 Mk. II, £17. Heathkit Valve Millivoltmeter, AV-3U, £11. Eddystone S-meter, £3. All brand new and unused.—Box No. 4151, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Complete manual or instruction book and two RG1-240A rectifiers, for PR-120V Tx.—Crutchley, 7 Cobham Close, Charford, Bromsgrove, Worcs.

SALE: Racal RA-17 Rx, as new, £220 or best offer. Can deliver within 50 miles (excluding Isle of Wight).—Pencavel, 17 Westover Road, Copner, Portsmouth, Hants.

OFFERING: a Barograph by Wilson, Warden & Co., Ltd., standard type in wooden case, 7-day movement, charts easily obtainable, complete with spare pen, and in excellent condition. Ideal for watching VHF conditions. £17 10s., delivered 30 miles, or post 25s.—G3PUR, 245 South Farm Road, Worthing, Sussex.

WANTED: Console type Power Supply for Collins KWS-1 transmitter, ALSO a first-class communications receiver, and two new 4X250B valves.—G3ODT, 6 Water Street, Skipton, Yorkshire.

FOR SALE: Lafayette HE-30, as new, complete with manual, and in original packing, £25 10s. o.n.o.? Carriage paid (inland).—Box No. 4154, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

COVETED Tx and ATU components, wide-spaced variables, all values from 25 mmF to 220 mmF, 5s. each. Ceramic coil formers, 2in. diameter by 5in. long, 2s. 6d; 6in., 3s. "National" Velvet Vernier dial and drive, 2s. 6d; all ex-BC375 TU Units. Postage extra. Also tons of components, Tx and Rx, valves, etc., priced from 1d. to 2s. 6d., suitable for students and others with limited capital. Too much to list. State requirements, with s.a.e.—Briscoe, 335 Eton Road, Ilford, Essex. (Tel. TRE 8141.)

CAN'T Get Into My Shack! Creed Auto-Tx 1C, £6 10s. Creed Keyboard Perforator 44, £1 15s. Marconi Impedance L/C/R Bridge, Type TF-373/B, £10. Type 11 Oscilloscope, 2½in. tube, working but could be improved, £6 10s. AR88LF Rx, just re-valved and realigned, really hot, £35. Class-D Mk. II Wavemeter, the improved mains-operated version with metal calibration charts, new, with spares, £7 10s. Mains operated Undulator, £6. Beckman 7160-101 Electronic Counter, 83 valves, £50. Transistors, "red spot" and "white spot," 28s. per hundred (minimum quantity, either type). **WANTED:** A.T.M. Cathode Ray Monitor, Type CRM.1.—G3LMR, 112 Groby Road, Glenfield, Leicester.

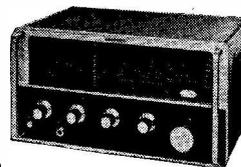
WANTED: Commercial all-band Phone/CW Tx, condition not important. **SELLING:** Receivers BRT-400, £50; Eddystone S.740, £16; R.107, £10. All these as new. Sig. Gen. Type CT-53, excellent, with charts, £9.—G3DVF, 18 Oaky Balks, Alnwick (2487), Northumberland.

WANTED: No. 12 Set Transmitter, also spare valves. Price and details to: Sunbury 4319.

EXCHANGE: For Grundig TK-6 Tape Recorder, Eddystone EC-10 Rx, in mint condition, genuine ten hours' use only, or sell £36 o.n.o.?—Stampton, 67 Medhurst Crescent, Gravesend, Kent.

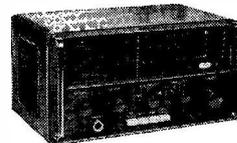
FOR SALE: CR-150 Rx, rewired in p.v.c., 6V6 output, in good condition, £28 o.n.o.?—P. Prickett, 31 Leopold Street, Loughborough, Leics.

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'JOY' NEWS No. 12

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SMALL ADVERTISEMENTS, READERS—continued

SALE: AR88D, modified for SSB, realigned, with new valves, spares and manual, in immaculate condition, £40.—Beavan, 18 Leamington Road, Davyhulme, Manchester.

FOR SALE: Tiger TR-200 five-band Tx, with 813 PA stage, £50. KW-500 Linear Amplifier, £50. Mosley TA-33J, £15. All in perfect condition.—Howard, G8TY, 92 Arlington Road, Southgate, London, N.14. (Tel. ENTERprise 3219.)

WANTED: Edystone S.940, £60 paid; Eddystone 840C, £30 paid. Owners to deliver in Essex.
SELLING: Bush mains FM-only Rx, £8.—Box No. 4158, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

APOLOGY! G3ERB regrets delay lists redundant equipment offered last month; these are now ready. Several hundred items on offer, including 300 valves; power supply units; TR.1986's, complete and stripped; Teleprinter gear. Send large s.a.e., please. No callers. BRT-400 Receiver available October.—Goldsbrough, G3ERB, 56 Kings Lane, Bebington, Cheshire.

SALE: Brand new Hustler Mobile Aerial with 20/80m. metre coils, and matching bumper mount. Cost £20, accept £15. Six 0.1 mF 600v. DC working. Sprague hi-pass condensers, any offers?—Box No. 4157, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: 60-watt Transformers for Transistor DC converters, 12-300 volts, with full data, 35s. Genuine HRO S-meter, original sealed box, 35s. Four-metre converter, ECC88 cascade, IF 28.1-28.7 mc, built-in PSU, £7. Two-metre 20w. Tx, QQV03-10 PA, could take your 160m. modulator and PSU, £8. Valves 866A's, T740's, 12EL's, 12s. 6d. each. All carriage extra. Many HV transformers, chokes and condensers; s.a.e. list.—Sandall, G3LKG, 21 Dale View, Ilkeston, Derbyshire.

WANTED: Manual or circuit details for R.216, buy or loan. Or would EXCHANGE manuals for R.1392, or R.1585.—John Tye, Woodgate, Swanton Morley, Dereham, Norfolk.

WANTED: A 150-watt AM/CW transmitter. Could collect up to 100 miles.—T. Codling, 42 Highfield Estate, Saxilby (482), Lincoln.

NOT going QRT—Only re-building once more!
Selling a G2DAF receiver, with mechanical filter, Electroniques components, Eddystone 898 dial, professional appearance, only £50. Also G2DAF-type Mk. 1 transmitter, less xtals for 10/15m., £40. Complete AM/CW/SSB station, including aerial change-over, low-pass filter and SWR bridge, £100 o.n.o.? Home-constructed Triband Quad, £5. Pye 4-metre Tx/Rx, £4.—G3LCS, QTHR.

SALE: Canadian No. 29 Transceiver, A and B sets, covering 2.0-8.3 mc with three pre-set positions and manual tuning, complete with control box, cables, plugs and headset, 12 volts, with home-built pi-tank tuning unit and mains PSU, in perfect working order and first-class condition, £20. A'so broad-band three-transistor pre-amplifier, suitable for any Rx covering 3.5-30 mc, switched for amplifier by-pass and on-off, will give nice RF lift to any weak signal, in plastic case, £4 5s. Also Heathkit Grid Dip Oscillator, type XGD-1, with five coils, little used, £9 10s.—Alexander Auld, GM3SLW, Halkirk, Caithness, Scotland.

FOR SALE: Hallicrafters SX-28 receiver, 550 kc to 42 mc, in mint condition, with manual, £30. TCS-12 Tx, £4. No. 10 Crystal Calibrator, £2 10s.
WANTED: Manual for S.27 Rx, and S-meter; also T.W. Twomobile, Gonsett G.66. EXCHANGE: Mohican Rx.—Perrin, 30 Franchise Street, Kidderminster, Worcs.

WANTED: An HRO-MX or HRO-5T, with band-spread coils, PSU, speaker, etc.—A. T. James, 18 Lonsdale Road, Heavitree, Exeter, Devon.

SALE: An Eddystone 504 Receiver, 550 kc to 30 mc, with crystal filter, S-meter and matching speaker, price £25.—G3JWN, Brighouse 799.

SMALL ADVERTISEMENTS, READERS—continued

WANTED: Four-metre Transmitter/Receiver for Mobile use. Must be in good working order.—G3MWZ, 31 Fiskerton Road, Cherry Willingham, Lincoln.

STATION Rx and Tx for Sale: R.1155B with internal PSU and output stage, separate RF/AF gain controls and variable BFO, FB Rx, £10. Also Type 53 Tx (807 driving 2/807 in parallel), range includes 40/80m., no internal PSU but 12-pin Jones plug connection at back, FB Tx, £3. Any offers of an El-Bug or small 'scope for checking modulation depth?—GM3SBS, 7 Hillview Terrace, Edinburgh, 12.

SELLING: Lavoie (U.S.A.) UHF Frequency Meter Type 105S, 375-725 mc, brand new and a precision instrument, £15. An AR88D, in new condition, with manual, £38 10s. Type CT.53 Signal Generator, 8-330 mc, brand new, with manual and charts, £12 10s. AVO Signal Generator, 50 kc to 80 mc, an excellent instrument and brand new in transit case with manual and spares, £16. Commercial stabilised PSU, 300-350v, at 150 mA twice, eight valves, with usual LT's, totally enclosed and fully metered, in louvered cabinet and in new condition, £11 10s. Command Rx, 190-550 kc, new in carton, £7 10s. All these items plus carriage. **WANTED:** Manuals for BC-342, CT-212 and CT-218. Also a BC-348 Rx, preferably in mint condition or little modified; an AM/TRC 913 VHF converter, and TS-47 and PRM-10 Test Oscillators.—Box No. 4159, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

I WANT a spare governor and brushes for a Creed 7B or 54N Teleprinter. Also a Tx to drive from an FSK-2 frequency-shift source. Realistic price. Items required to tide over own construction period.—Addie, G8LT, Corner House, Sulgrave, Banbury, Oxon.

FOR SALE: DX-100U, new condition, £60. Heathkit RA-1 Receiver, £15. Class-D Wavemeter, 30s. Buyers collect or will deliver 100 miles.—Tibbert, 397 Uttoxeter Road, Derby.

WANTED: Panda Cub. Will EXCHANGE mint CR-100/7 and 120w. Tx in matching cabinet, also Type 247 600-volt PSU; Tx is Gelson VFO and pair 807's. Moving to small flat.—Box No. 4164, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Gelson front-end Converter kit, used, cheap, £3 10s. ARR88 gear-drive, mint, £2. BRT-400 gear-drive, 25s.; manual, new, 27s. 6d. Pullin 100 Testmeter, movement u/s, £2. Mullard high-speed Valve Tester, £20. "CQ" for 1959-61, offers? **WANTED:** 2C39 and 3CX100A5 valves.—G3LHA, 112 Attoxhall Road, Coventry, Warks.

SELLING: Marconi CR-150, coverage 2-60 mc in five bands, built-in calibrator, S-meter, bandpass and bandspread switching, excellent condition, complete with home-built power pack, £25. Buyer collects.—Sharratt, 12 Pebblemoor, Edlesborough, Dunstable, Beds. (Tel. Eaton Bray 297.)

WANTED: Mint R.1155N, unmodified, in original Service trim. Offering unmodified R.1155A plus £3—or sell '1155A, £6.—Rowbottom, 29 Legion Street, South Milford, Nr. Leeds, Yorkshire.

WANTED: Rx Type S.27 or S.36. **FOR SALE:** TK-23 recorder, £25. Eddystone S.640, with speaker, £16. G.E.C. Rx, 1-8, 21 mc, £25. G.E.C. 'scope, £6. Ekco car radio, £7. 400 valves, new and used, £8. Marconi 2273A, £18. 12-in. speaker/tweeter, £4.—Newdick, 26 High Brighton Street, Withernsea, Yorkshire.

WANTED: Urgently, the first of the two articles on the G8BDQ (1962 issues) receiver, containing circuit, values and details. Will pay full price of one edition.—Crockatt, The Pines, Victoria Road, Formby, Lancs.

FOR SALE: Heathkit SB-10U, driver, power supply. SSB Linear Amplifier, power supply. Sell or Exchange, good camera or Vanguard transmitter. Cash either way.—G3RCO, Westleigh, Fore Street, Beer, Devon.

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WAVEMETER W1185A. 20-100 Megs. 4 band, xta. check points. 230v. input. Brand new and crated. Carriage paid	6	10	0
EDDYSTONE S640. Unmarked	21	0	0
Carriage paid	2	5	0
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K.W. Corner No. 12

(A monthly review of news, views and advice)

THE KW "G" LINE announced last month has been very well received and congratulations have been coming in from all quarters. The KW2000, KW2000A Transceivers and KW600 Linear Amplifier are still available on short delivery but with our increased production facilities we hope that before long this outstanding equipment should be delivered from stock.

CDR ROTATORS, TYPE TRIIA. This type of rotor is especially suitable for VHF beams, is still available under our special offer, advertised last month, at £12. 10. 0 each including 230/240 volt Control Unit. Buy now while stocks last—our next consignment from U.S.A. will cost about £2 each more.

SHORT WAVE LISTENER COMPETITION from New York World-Wide Broadcasting Service with prizes of Hallcrafters Receivers. Full details and Entry forms are obtainable from us. Please send S.A.E. Listen to the broadcasts and answer a few simple questions.

TRADE-IN EQUIPMENT announced last month has had a wonderful reception. Our stocks are continually changing but we keep them long enough to put every unit through our Service Dept. Models such as HQ170, Viceroy, 888A are frequently available and we are shortly expecting some NCX5's besides many more "as new" equipments.

STAR OFFER this month is a P & H one-kilowatt linear amplifier, only 14" x 3½" x 10½" deep, suitable for mobile or home station use, by using appropriate external supply. H.T. 1000 volt max. required. Case completely nickel-plated. Brand new, normal price £90, for a quick sale, £55.

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HALLCRAFTERS HT 33A LINEAR AMPLIFIER. Up to 1 kilowatt, 80 to 10, very little used	150	0	0
HALLCRAFTERS SX108. 550 kcs. to 32 mcs. Amateur bandspread. Excellent condition ...	44	0	0
EAGLE RX 60. 550 kcs. to 30 mcs., bandspread	17	10	0
NATIONAL NC270. Amateur bands, Xtal controlled 2nd Oscillator. Calibrator, 'S' meter, Notch filter	75	0	0
FT 241A CRYSTALS. Channels 0-15, 17-33, 36, 39, 40, 41, 61-68, 71-79, 273, 275-279 ... each	4	0	
LABGEAR LG 50 TX. 60 watts CW, 40 watts AM	29	0	0

New Equipment

RX 80 RECEIVER. 535 kcs. to 30 mcs. Amateur bandspread, Q multiplier, S meter, AM/CW/SSB	52	10	0
SPHINX SSB TX. Ex stock	75	0	0
EDDYSTONE 870A	36	10	4
EDDYSTONE 840C	66	0	0
EDDYSTONE 940	133	0	0
EDDYSTONE EC 10. New transistor receiver	48	0	0
EDDYSTONE EA 12. New Amateur bands receiver	185	0	0

Carriage extra on all the above

£65 allowed on your Eddystone 888A against a new EA 12

Radio Control gear by Grundig, REP, MacGregor, O.S., etc. Models by Keil, Veron, Frog, Graupner, Ripmax, etc.

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SMALL ADVERTISEMENTS, READERS—continued

FOR SALE: HRO Receiver, 12 months old, complete with power pack, headphones, coils, speaker, spares and leads, £25.—FitzGerald, 1 Despard Road, London, N.19.

SALE: Heathkit Apache Tx, professionally wired, perfect, £65 o.n.o.?—Box No. 4160, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Portable Aircraft-Band Receiver. Send details, price, etc. to:—Wilson, 24 Davidson Place, Newtown, St. Boswells, Roxburghshire, Scotland.

G3PHO, on QSY to ZL, has following for sale: Withers two-metre station, TW-2 Tx, power supply, cascode converter, aerial relay, BM3 mic, two xtals, 5-ele Yagi, £30 o.n.o.? Eddystone 358 Rx, £8 o.n.o.? R.A.F. Type 106 Sig. Gen., 5.55 mc, AC mains, complete with all connectors, £2 10s. Hallcrafters HK1B electronic key, £8. Surplus-type PSU's, all FB condition: 250v. 100 mA, 6.3v. 3A, 30s.; 500v. 200 mA, 6.3v. 4A., 5U4 rectifier, £2. Brand-new A.E.I. unit giving 500v. 250 mA, 6.3v. at several outputs up to 5A., several 150v. and 300v. stab. outputs; this FB station supply is heavy, but useful, £5. Transformers, all potted, 230-240v. AC input primaries: 300v. or 275v. 300 mA twice, 6.3v. 6A., 6.3v. 5A., 15s.; 813 fil. xfomer, 10v. 5A. twice, 10s.; 580-0-580v. 175 mA (no LT), 15s.; 350v. and 310v. 220 mA twice, 6.3v. 4A. twice, 5v. 6A., 25s. Valves: 813, 10s.; 811, 10s.; 829, 10s.; 6V6, 6L6, 807, all 1s. "QST," "Bulletins," "Short Wave Magazine," 1959-65 (few missing), what offers? Carriage extra all gear, but delivery 30 miles.—Day, 28 Oxford Street, Sheffield, 6.

WANTED: Stroboscope No. 19, 150 c/s, or information where obtainable. Any reasonable price paid.—R. Thompson, 2 Barleycroft, Hemel Hempstead, Herts.

WANTED: By Moray Firth Amateur Radio Society, an amateur bands-only Receiver, price to £45 cash.—GM3SDZ, 3 Park Place, Lossiemouth, Morayshire, Scotland.

SALE: Minimitter MR-37 Rx, amateur bands only, 10-80 metres, with Q-multiplier and S-meter, £20. Also Jennen-Trio JR.101 Rx (similar HE-80) cost £42 six weeks ago, £30. Q-Max Tx type B4/40, works FB, no mods, offers? Buyer collects, or carriage extra.—31 Boston Avenue, Reading, Berks.

WANTED: TCS Tx and Rx, preferably unmodified and in as-new condition. Also small crystal-controlled transmitter. —G3HCM, 11 Woodburn Close, Coventry, Warks.

FOR SALE: 12/24v. PSU for 29 Set, two rotaries, vibrator, 500 µA meter, etc., by R.C.A., £2. Brand-new 815's, by R.C.A., £1 each. Slide rule, 10s. Scrap R.1155, 10s. "Scope cabinet, with CRT, 15s. "B" set for 29 Set, 11 valves Tx/Rx, less input socket, 30s. All plus carriage. **WANTED:** Circuit, manual or information on TCS Rx. and TA-12. Buy, borrow or swap 19 Set manual, by R.C.A.—27 Old Bank Road, Dewsbury, Yorkshire.

SALE: R.1448 Receiver, 19in. x 13in. x 11in. high, 130 kc to 2.2 mc (four coils), with three additional coils 2.1-4.5 mc, 9-31 mc, separate PSU, in good condition, £8 10s. Astronomical telescope, 3in. O.G., on stand with mech. stage, £35—or would EXCHANGE both for good Tx. Buyer collects North London.—Box No. 4161, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Green & Davis Linear, unused and perfect, good reason for sale, £60 o.n.o.?—Box No. 4160, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Marconi CR-100 Receiver, 60 kc to 30 mc, £14. 80-metre "Command" receiver, with built-in PSU, £5.—G3RAD, 1 Approach Road, Broadstairs, Kent.

SALE: Transmitter/Receiver No. 52, mains and 12v. PSU, 813 final, complete and working, £15. Also Creed 3X printer, with PSU, paper and ink, £4 10s.—Ringing RAVensbourne 8776 after 6 p.m.

SMALL ADVERTISEMENTS, READERS—continued

WANTED: Amateur bands only Rx; RA-1, 888A, or similar. Price and full details to:—B. Dennis, 2 Brankholm Lane, Rosyth, Fife, Scotland.

WANTED: Panda Cub, must be in immaculate condition; also GJO. London or adjacent counties only. Price and details to:—G4BC, QTHR.

SELLING: KW-2000 with PSU, three months old, £175 o.n.o.? Mosley trapped Vertical, with coax, Eagle RX-60, £10.—G4HU, 34 Birch Avenue, Romiley, Cheshire.

DISPOSING of an R.C.A. ET-4336C self-contained Tx, 1.8-30 mc, 2/813 PA, 800w. CW, 600w. AM phone, 2/805 Class-B modulator, fitted with 10/150-watt power limit facility.

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Apply—G3HEJ, 5 Oak Close, Allestree, Derby. (59726.)

SALE: 50-watt Table Topper, Gelo VFO, 6146 PA, plate-and-screen modulated. Also Minimitter amateur band Converter; R.1155A with power pack and output stage; and heterodyne frequency meter, £45 The Lot—or EXCHANGE good reflex camera.—GW3MYZ, 72 Wood Lane, Hawarden (3000), Chester.

FOR SALE: Hallicrafters SX-28 Rx, 0.55-43.0 mc, rather rough, with circuit diagram, £12. Will deliver to 40 miles.—Melrose, c/o 19 Hill Street, Irvine, Ayrshire, Scotland.

WANTED: To buy or loan, manual or circuit for AR88LF receiver.—D. Buswell, 11d Rhodes Hill, Lees, Oldham, Lancs.

WANTED: QRP Tx for 7 mc band. **SALE:** HRO bandspread coil for 21 mc, £4 5s. Assorted 6v. valves, 7s. 6d. dozen.—Box No. 4162, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

EXCHANGE: Immaculate, almost new, Eddystone 840C, 500 kc to 30 mc continuous coverage in five overlapping wavebands, AC/DC, 110/250v.

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SALE: Eddystone 840A, mint condition, £30. Buyer collects.—23 Withins Close, Bolton, Lancs.

WANTED: Complete all-band SSB/AM/CW station and accessories. Price and details to:—GW3NJJ, 1 Dancyraig, Abertridwr, Caerphilly, Glam., South Wales (QTHR).

FOR SALE: Collection of radio junk, including faulty R.1155 and RF-24, also other small pieces of equipment and components. Offers?—31 Chester Road, Poynton, Cheshire.

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SELLING: Heathkit DX-100U, no modifications, excellent condition, £60 o.n.o.? Buyer collects.—G3ERY, 17 Northumberland Road, Maidstone, Kent.

SALE: Withers TW-2 two-metre transmitter and converter with mains PSU. as new.—Templer, Parsonage House, Woodbury, Exeter.

SELLING: Partly built "Hybrid Receiver for Mobile Operation", as described Sept. '62 "Short Wave Magazine," offers? Crystal Calibrator No. 10, 30s., also Eddystone type 898 slow-motion dial, £3, both unused. Woden UM3 xformer, £3. "Practical Wireless," April '58-May '63; "RSGB Bulletin," April '62-Dec. '64; and "Short Wave Magazine" to date—all 1s. 6d. each, including postage.—D. White, G3OHL, 14 Clepstone Avenue, Middlesbrough, Yorkshire.

WANTED: Johnson 240-305-2 SSB Adaptor. **FOR SALE:** Collins 75S-1, new condition, with manual, £140. Heathkit DX-40U with VF1U VFO, and manuals, £25.—Webb, G6XY, 22 Southbank Road, Kenilworth (52679), Warwickshire.

SALE: Johnson Viking Challenger Transmitter, AM/CW 10-30m., 90-watt CW, 60-watt phone, with VFO and microphone, in immaculate condition, £22.—David Morgan, G3MEM, Jevington, Hilltop Road, Earley, Reading, Berks.

FOR SALE: HE-40 Rx, 12 months old, in as-new condition, £17 or nearest, or part EXCHANGE for HRO.—Box No. 4156, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Eddystone S.940 general-coverage receiver, recently checked out by manufacturers on termination of 12 months guarantee, complete with plinth speaker, in perfect condition, £98 o.n.o.?—Coltman, G3TTH, 22 Willow Poole Lane, Sutton Bonington, Loughborough, Leics. (Tel. Kegworth 402.)

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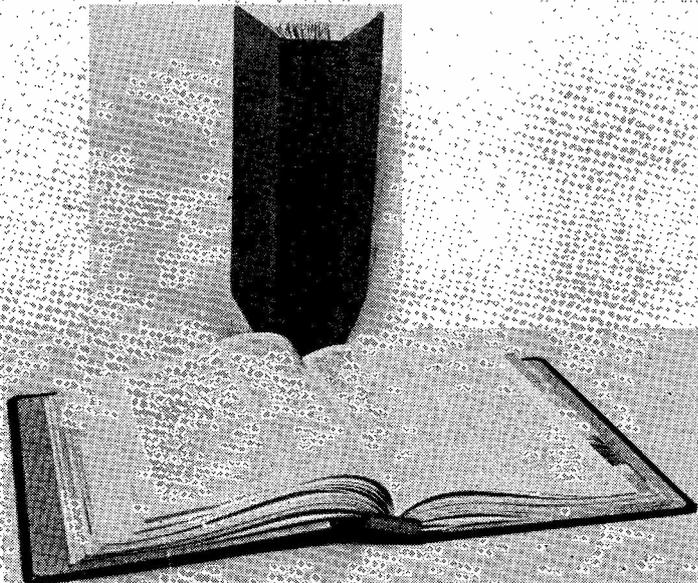
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