

The SHORT WAVE Magazine

3/6

VOL. XXIII

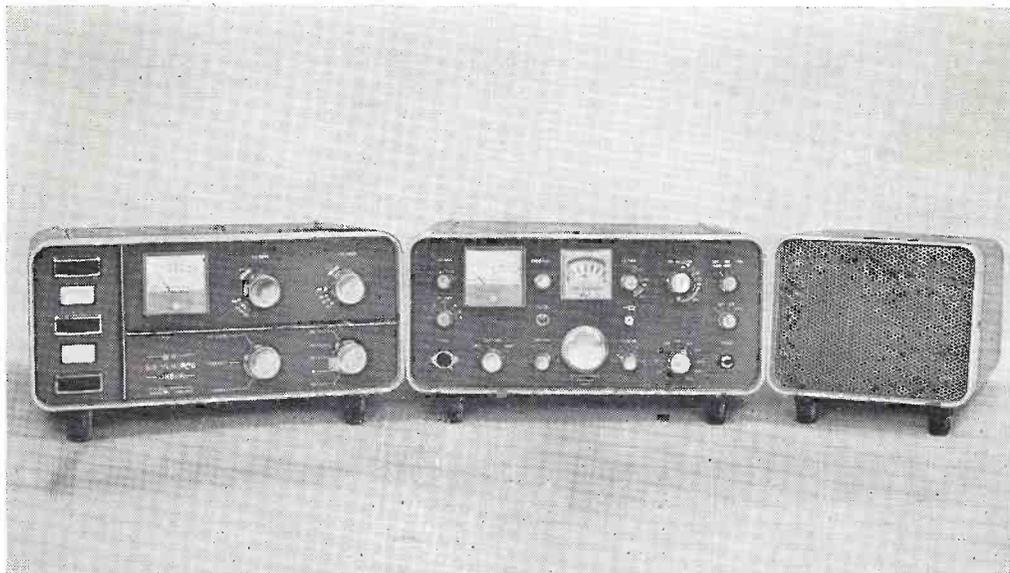
SEPTEMBER, 1965

NUMBER 7

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.

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TR11A 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

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Cables: KAY DUBLEW, Dartford

Phone: DARTFORD 25574

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 2MI000

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). $\frac{1}{2}$ wave lines in silver plated P.A. cct.
- PAWSEY STUB O/P CCT.**
- P.T.T. on microphone. Size : 11 $\frac{3}{4}$ " x 5 $\frac{3}{4}$ " x 16" deep.
- 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. 6AQ5 P.A. clamp.
- Price : **96 gns.** Delivery : from stock.

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- ★ 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.

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

NEW FACTORY

Availability of most of our already wide and expanding range of equipment is from stock, delivery on later equipment is being shortened. This improvement is the result of our recently acquired new Factory space in Tottenham, N.15, and the engagement of extra Staff. The GREEN, Hornsey Road, N.7, premises is now our U.H.F. Lab. Office and Showroom from which customers are invited to collect their equipment. Our October advertisement will contain an announcement of new equipment, and the complete production run of these items will soon be in stock. They are of interest to Top-Band and Mobile operators.

CARRIAGE

As our range of equipment now includes more expensive items, we would prefer that the Units are collected from our premises. The price of our equipment does not include carriage or special packing which is required if the equipment must be despatched by an outside Carrier/British Rail. Our packing cases are expensive and it is important that these be returned immediately an equipment is received or the amount charged for the case cannot be refunded.

H.P. and part exchange arranged

GREEN 70CM1000

High powered 70 cm. Tripler-Amplifier for use in conjunction with Transmitters like 2MI000.

- Mullard QQV03-20A tripler (clamped with 6AQ5).
- Mullard QQV06-40A amplifier (forced air cooled).
- 90 watts input. P.A. clamped with 6AQ5.
- 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 2MI000.

- 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.**

GREEN MOBILE

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.). Write for details.

NEW AERIALS

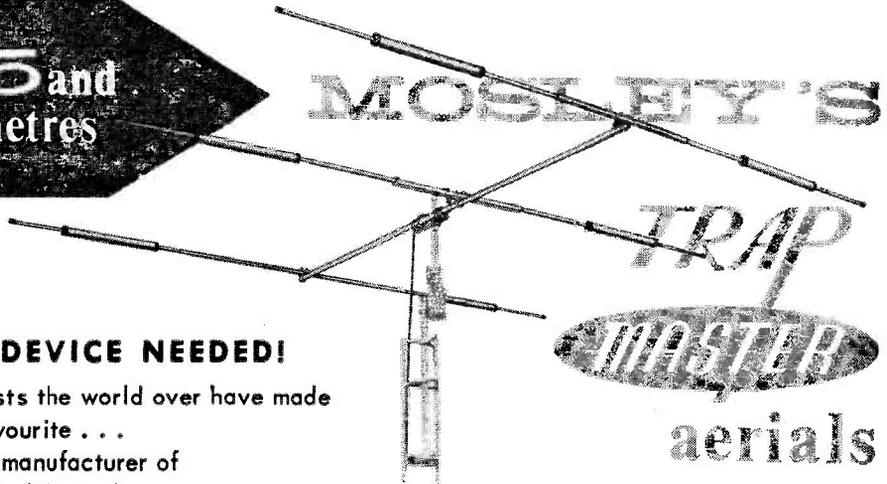
We now have in stock the following new Minimitter aerials. These are the completely re-designed versions and we are stocking them in preference to all other makes. 20 metre X.20 at **£14. 10. 0.**, the "FB5" 5-band ferrite loaded dipole, **£5. 0. 0** each (this remarkable aerial performs very well indeed) and the latest aerials made at our request, the 2 metre and 4 metre 4ZU birdcages at **£5. 0. 0** each. It is expected that a 70 cm. version will be available in the near future. These VHF/UHF aerials, which are impressively compact and can be very easily stacked, are extremely rigid in construction.

We have a number of used Receivers, Transmitters and Transceivers for disposal and this equipment is continually changing as we are now accepting more equipment in Part Exchange. We invite you to send details of your requirements, but please remember when offering your own equipment in Part Exchange, to state clearly its type, age, condition, if modified, and what allowance you expect. NCX-5 **£308. 0. 0.** HRO-500 **£705. 0. 0.** SR-550 **£59. 15. 0.** All ex-stock.

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104 HORNSEY ROAD LONDON N.7 TELEPHONE: NORTH 6871

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for 10
15 and
20 metres
its



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- NEW** RV-4 Vertical. 10, 15, 20 and 40 metres, requires no radials.
 V-4-6 Vertical. 10, 15, 20 and 40 metres.
 V-3 Jr. Vertical. 10, 15 and 20 metres.
 VTD-Jr. Vertical. 10, 15 and 20 metres. For chimney or pole mounting.
 TW-3X. El Toro. Vertical. 20, 40 and 80 metres, requires no radials.
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 SWL-7. Receiving Dipole kit. 11, 13, 16, 19, 25, 31 and 49 metres.
 RD-5. Receiving Dipole kit. 10, 15, 20, 40 and 80 metres.

- Beams** TA-33, TA-32, TA-36. 2 kw. p.e.p. s.s.b. 10, 15, and 20 metres.
 TA-33 Jr. TA-32 Jr. 700 watts p.e.p. s.s.b. 10, 15 and 20 metres.
 A-203-C. A-310. A-315. A-210. A-215. Single band power beams. 10, 15 or 20 metres.
 A-142. 14 Element 2 Metre Beam.

- Transmitter** Mosley Commando II S.S.B. 180 watts p.e.p. New styling.
 All Antenna Accessories. Rotators, Coax, Wire, Polystyrene Cord, Towers, etc.

- Indicator** S.W.R. will handle 10-500 watts continuously. Price £6 . 10 . 0.

- New** Polystyrene rope. $\frac{1}{4}$ -ton breaking strain, for supporting beams, etc. ML-6.
 No breaking up of guy ropes now necessary.

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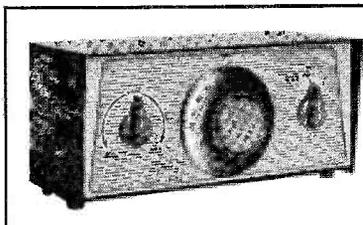
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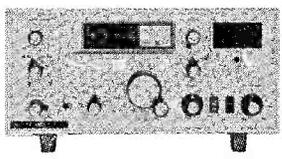
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PR30 £4. 19. 6
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- HIRE PURCHASE —
- PART EXCHANGE —

Write for details of our large stock of second-hand gear.

**NATIONAL
NCX-5
TRANSCEIVER**
10-80 M. 200W. P.E.P.
£255. 10. 1.



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100 yards from Surbiton station

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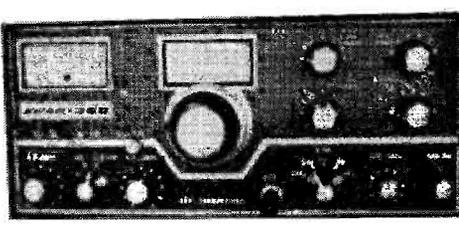
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for your SWAN-350 TRANSCEIVER

5 BANDS — 400 WATTS AND ONLY £205 IMMEDIATE DELIVERY

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- Transistorized VFO, temperature and voltage stabilized.
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- ALC . . . AGC . . . S-Meter.
- 5½ in. high, 13 in. wide, 1 1/2 in. deep.
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- Sideband suppression : 40db
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(Opposite sideband kit available.)



And in addition has the usual wide range of items, including :

Eddystone 640 1.8-30 Mc/s., 240 a.c. input. input. Xtal filter, etc. ... £25

G.E.C. BRT400D table model 150 kc/s.-32 Mc/s. 1005250 a.c. input ... £75

For the CW man the latest Hallicrafters Type HA5 Mixer VFO. Highly stable outputs from 80-2 Mtrs. Brand new ... £40

Viceroy Mk II with power unit, as new £95

Viceroy Mk I with power unit, as new £65
BY100 equivalents 6d. p.p. any quantity 4/6 ea.

- 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

- National NCXB, used two months only. With matching power unit £285 0 0
- Withers Topmobile. 160 metres, all transistor receiver ... £12 10 0
- Marconi CR100/8, as brand new. 60 kc.-30 Mc/s. 240 a.c. input ... £35 0 0
- AR88L/E completely rewired with pvc and fitted with new cabinet For the mobile man. Headsets fitted with boom low impedance noise cancelling microphone. Single earpiece ... £4 2 6
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- 50 ohm coax cable, good quality ... per yd. 1 0
- Hallicrafters HT37, 80-10 Mtrs., 150W. p.e.p. ... £95 0 0
- Collins 75A4 with 3-1 mechanical filter, pass band tuning, separate noise limiters for AM/SSB, etc. ... £220 0 0

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

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VARIABLE FREQUENCY ANTENNA SYSTEM

In one gloriously successful year, thousands of JOYSTICKS have been sold to stations throughout the world. PARTRIDGE ELECTRONICS have been inundated with testimonials from JOYSTICK users. Orders for this (pat. pend.) revolutionary variable frequency antenna system have so multiplied that new premises have been leased in order to cope with demand. ALL JOYSTICK orders are now dispatched immediately.

Every JOYSTICK System is supplied complete with feeder and an antenna matching unit—selected by you to suit your personal set-up. It is ready to go on the air and gives an unprecedented 'lift' to signal strengths especially for 'cliff' and 'cave' dwellers—EVEN FROM UNDERGROUND! Naturally the advantages of using the 'JOYSTICK' 'up-in-the-clear' are even greater!

This exclusive and amazing system possesses the unique property of an even performance over all frequencies between 1.4-30 Mc/s.

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New Joystick Range

There is now a whole new range of Joystick Systems—made to match *your* QTH, your rig and *your* pocket! The SYSTEMS cover TX/RX, SWL, indoor and outdoors, mobile and even a new JOYMAST! Made only in the finest materials the SYSTEMS are reliable and permanent!



ZL4GA WORKS G5WP ON 80 METRES

INDOORS—ZL4GA's JOYSTICK got him 569 on 3.5 mcs from G5WP on 21st February, 1965 at 0850 GMT. Alan had worked VE7BIY on 3.5mcs at 559 and also logged 59 countries on 14 m/cs by that date, including LU1HBS and 9M4LP.

Testimonials continue to pour in!

"Joystick in BASEMENT . . . 5FT. BELOW GROUND. Results same as doublet. 'Frisco (700 miles) 589. W7OE."
 "VQ9A. A real plum! G3NFV." "Put it under bed—UA2/559. T. Sterling (Newquay)." "Improved performance over dipole . . . takes a KW. CQ Magazine." "Worked all W call areas on 21 mcs/cw, G3OTX." "No TV! G6XD." "Very good success with Joystick—K5GDH." "Very satisfied, first call heard LA9MI/P Jan Mayen Islands at 559. G10513." "Amazed to receive Joymatch within two days of posting order. R. Kinghorn, N'berland."

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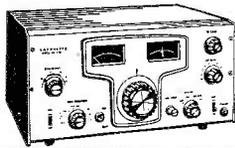
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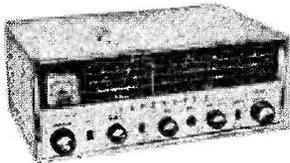
SWM



NEW MODEL I
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 calibr., crystal B.F.O., A.N.L., "S" meter, etc. Supplied brand new and guaranteed. 75 Gns. S.A.E. for full details.



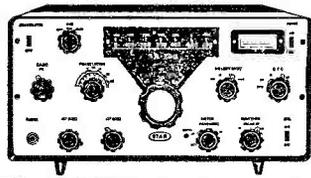
LAFAYETTE HA-230 AMATEUR COMMUNICATIONS RECEIVER
Supersedes model HE-30. 8 valves plus rectifier. Continuous coverage on 4 bands. 550 kc/s.-30 mc/s. Incorporates 1 RF and 2 IF stages, Q Multiplier, B.F.O., ANL, "S" meter, Electrical bandspread, aerial trimmer, etc. Supplied brand new and guaranteed. 33 Gns. S.A.E. for full details. Also available in Semi Kit form, 25 Gns.



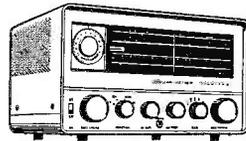
STAR SR.40 COMMUNICATION RECEIVER
4 Bands 550 kc/s.-30 mc/s. "S" Meter - BFO - ANL - Bandspread - Tuning - Built-in speaker. 200-250v. AC. Brand New, 18½ Gns., carr. 10/-.



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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 L/C 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.



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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.



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High quality Portable American Oscilloscope. 3" c.r.t. T/B; 3 cfs-56 kc/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/-

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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 21/32" square fronts.



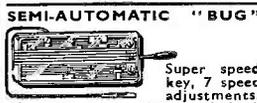
50µA	32/6	1-0-1mA	22/6	150mA	22/6	3v DC	22/6	500V DC	22/6
100µA	29/6	1mA	22/6	200mA	22/6	10v DC	22/6	750V DC	22/6
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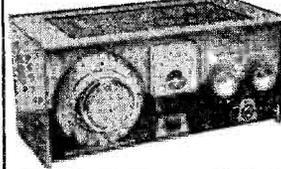
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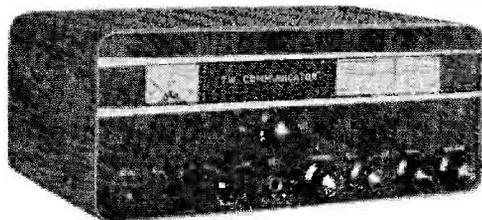
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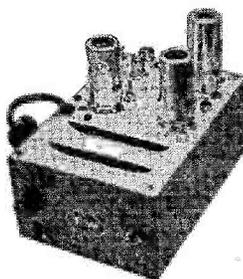
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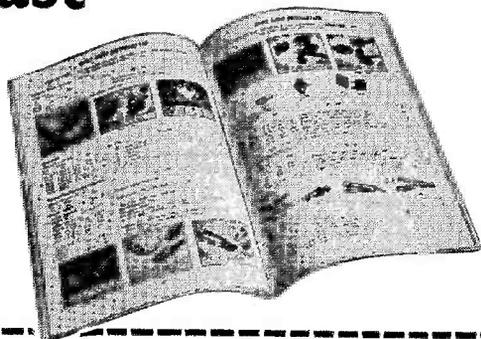
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The SHORT-WAVE Magazine

EDITORIAL

Answers? *Quote: "I should like to take up short-wave transmitting as a hobby and would be glad to have your advice. So could you please send me details of the equipment and prices for a medium-range short-wave amateur transmitting station, and how I get a licence if one is needed. Thanking you . . ."*

This is a genuine enquiry recently received and, indeed, is typical of many such—but each involving some particular personal problem. There are obviously several ways of dealing with such an enquiry: Advice to join the local club (there probably isn't one within 50 miles, so it could sound like a polite brush-off); recommendations as to literature (in which case he can think that all you are doing is trying to sell him books—and, anyhow, it doesn't answer the question); or you can try to give him the information you think he really needs (in this particular case, he needs it all) and that could run to a six-page letter. But that would only be a start; it could lead to a long and complicated question-and-answer correspondence, absorbing hours of time, "our hero" probably deciding in the end that getting going in Amateur Radio is far too complicated and expensive, anyway.

Obviously, it is totally impracticable for us to become involved to this extent in any one individual's problems. Our business, which takes us all our time, is to produce the MAGAZINE for 1000's of readers. But the problem still remains. He needs help and advice—how is he to get it?

The Editor would be glad to see your answer, which should be within the limits of an ordinary typewritten letter of about 1½ quarto sheets—or, say, 450 words at most. We will pay three guineas for the answer considered best for publication, with one or two guineas for any others we can use. Remember, not more than 450 words, typed double-spaced with wide margins, headed "Beginner Query," and sent to: Editor, Short Wave Magazine, Buckingham, to arrive before September 30.

*Austin Foster,
G66FO.*

CAMBRIDGE RADIO TELESCOPE

NEW INSTALLATION FOR DEEP-SPACE INVESTIGATION AND RESEARCH — NOTES ON THE PROGRAMME AND THE PROBLEMS

*From a Lecture by Martin Ryle, M.A.,
F.R.S. (G3CY), Professor of Radio
Astronomy, University of Cambridge,
Director of The Mullard Radio
Astronomy Observatory, Cambridge.*

More than 20 years ago, during the period of the last war, Martin Ryle was one of the most helpful and prolific contributors to the problem of fighting the enemy by radio countermeasures. By an odd chance, one of his contemporaries at the same establishment—T.R.E., Malvern—was Bernard Lovell, whose own major contribution was to design and perfect accurate bombing and navigational aids. In effect, therefore, while working to the same end—the winning of the war—they were on opposite sides of the radio fence, in the sense that the one was creating devices that could be detected by the enemy and used for the location of the Bomber Force,

while the other was concerned with making the approach of the Bomber Force secret, undetectable, or, at the least, confusing. After the war, both Bernard Lovell and Martin Ryle elected to devote themselves to the esoteric subject of radio astronomy—and continued to pursue entirely independent lines. The installation at Jodrell Bank associated with Sir Bernard Lovell is different, in practically every space sense, from that under the control of Prof. Martin Ryle at Cambridge. Both are supported by big firms able to make large financial contributions in the interests of pure research and also, of course, by considerable public funds. If between them Jodrell Bank and the Cambridge Radio Observatory are able not only to prove new principles in the physical sciences and about the structure of the Universe, but also to train a new body of scientists in more refined electronic and engineering techniques, the time, money and effort now entailed will have been well spent.—Editor.

THE post-war world has seen a rapid growth of radio astronomy, first in Australia and Britain and later in Holland, America, France and Russia; there are now radio astronomical centres in most countries with a scientific community. The main reason for this is undoubtedly the great scientific interest of the discoveries which have been made, for the use of radio waves in astronomy has revealed a wide range of new and unexpected possibilities—including that of exploring the Universe on the largest scale. The investigation of the physical processes occurring within the sources involves problems of a quite general interest such as the containment of high energy particles by magnetic fields whilst the recent discovery of "Quasars"—extremely compact objects of great power—seems to require the existence of some new source of energy, some hundred times greater than the most efficient nuclear reaction known.

Some of the results have direct relevance to space exploration. Radio astronomy provided the first evidence on the constitution of the moon's surface and the best estimate of the density of the moon's atmosphere. The density of matter in interplanetary space has been extensively studied and work is being done on the atmospheres of the planets.

On the engineering side, many of the developments in radio telescope and receiver design have been taken over for satellite tracking and communi-

cations. The automatic control of the instruments and the methods of automatic data handling used in the latest radio telescopes are some of the most advanced in the field of automation.

But perhaps the most important practical contribution is the training of research scientists, not only in the basic problems of research, but to supply the ever increasing need in the field of space research and space communication and in the many fields of electronics, automation and automatic computing where this country stands in urgent need. In spite of the greater financial investments which have been made in the U.S.A. and the U.S.S.R., Britain has maintained pre-eminent position in radio astronomy.

Radio Astronomy in Cambridge

At Cambridge a field station on the outskirts of the city was used initially but in 1955 it became clear that a new site was necessary both to accommodate more powerful instruments and to obtain a quieter radio environment. Some 3,000 square miles of East Anglia were explored and two good sites eventually discovered. The more remote of these, in the heathland south of Thetford, unfortunately had to be rejected because it was impossible to obtain assurances that there would not be interference in the radio astronomy wavebands from the various military bases in the area. The site at Lord's Bridge was therefore chosen, lying in an area of comparatively low population density with effectively no industrial activity. Through the generosity of *Mullard Ltd.*, and with the financial aid of the Department of Scientific and Industrial Research, a new observatory, the Mullard Radio Astronomy Observatory was built and two large radio telescopes were constructed as well as a number of smaller ones.

Research Programme at the Observatory

There are three main lines of research in progress:—

Two of the three paraboloid reflectors for the new radio telescope at the Mullard Radio Astronomy Observatory, Cambridge. This configuration gives the instrument an effective diameter of one mile. The dishes are 60 ft. across, and mounted equatorially. The dual frequency feed is at the focus, on the end of the supporting structure.

Courtesy Science Research Council.



(a) *Interplanetary Space*

The recent discovery at this Observatory that radio waves from quasars are diffracted and scattered by plasma clouds in the interplanetary space has provided a powerful new technique for making direct observations of the physical conditions in outer space. An experimental programme has just been initiated to measure the shape, size and density of these gas clouds; in addition, the motion of the clouds gives important information about the strength and direction of "interplanetary winds."

Only radio sources of very small angular size show diffraction effects and so the phenomenon can also be used to measure the angular diameter of radio sources. Many new quasars have been recognised in this way and a large-scale search is now in progress.

(b) *Study of the Milky Way System*

Most of the radio emission from our own Galaxy (and indeed from most radio sources) originates in "synchrotron radiation"—the spiralling of cosmic ray electrons in interstellar magnetic fields. A study of the radiation can therefore provide information both on the magnetic fields which are thought to

have played an important rôle in determining the structure and evolution of the Galaxy, and also on the origin of cosmic rays. Surveys have been carried out at the Mullard Radio Astronomy Observatory to determine the variation of intensity and polarisation over the sky at a number of wavelengths.

(c) *Radio Sources*

Most of our effort is concentrated in this direction. The work includes both the study of individual sources within our own Galaxy, notably those associated with the remains of supernova explosions, and the main group of sources which are extragalactic. A few of the latter coincide with nearby galaxies such as the Andromeda nebula whose radio emission is roughly the same as that from our own Galaxy. Many others are, however, found to be associated with particular distant galaxies, some of which are emitting a million times more radio power than are "normal" galaxies. One of the first of these "radio galaxies," *Cygnus A*, was identified as such by means of accurate positional measurements in Cambridge in 1950; its optical spectrum revealed a redshift corresponding to a distance of 500 million light years. Subsequently the source 3C.295 (from

the third Cambridge catalogue) was found to be associated with a very faint galaxy 5,000 million light years away. The relatively strong radio signals which reach us from this source were emitted before there was any life of any kind on Earth.

It now seems clear that the majority of the radio sources are these remote radio galaxies, while a substantial minority are the remarkable quasars, extragalactic objects with large redshifts whose dimensions are perhaps only one hundredth of the diameter of a galaxy, but which emit extremely powerful radio waves as well as having a hundred times the optical luminosity of the brightest galaxies known.

The existence of such powerful sources indicates the possibility of exploring the Universe on the largest scale—a comparison of the observations of distant and nearby sources allows one in effect to compare sample volumes of the Universe at different times some thousands of millions of years apart, and in this way to investigate any changes which have occurred over this period.

The study of Radio Galaxies follows two main lines:

(i) The problem of the physical mechanisms occurring within the sources, including the origin of the great supply of energy. This work requires detailed study of individual sources, *i.e.*, mapping with sufficient resolution to reveal the physical distribution of intensity and polarisation over a range of wavelengths. These results, together with the evidence provided by optical observations, form the basis of theoretical interpretations. Accurate positions are necessary in order to be able to recognise which of the faint optical objects should be associated with the source.

(ii) In applying observations of radio sources to the cosmological problem it is in addition necessary to extend as many of the observations as possible to the very weakest sources. The design of powerful radio telescopes and the completion of surveys of ever weaker radio sources has formed one of the major programmes of the M.R.A.O.

The New Radio Telescope

Since 1956, all the main radio telescopes at the M.R.A.O. have made use of a technique known as aperture synthesis, developed at the observatory. In this two or more small aerials are moved so that they occupy in turn the positions of the individual components of a much larger radio telescope. By combining in a computer the observations made at each of these positions, a resolving power equal to that of the large radio telescope can be achieved. In the new radio telescope, the signals are received by three paraboloidal reflectors, each 60ft. in diameter, two being fixed and one movable. They are arranged on an east-west axis and can be controlled to follow any point in the sky. Because of the rotation of the earth two rings of a much larger equivalent aperture are built up each day. By altering the position of the movable aerial on a rail track other rings are then filled in on successive days until a final resolving

power equal to that of a paraboloidal reflector one mile in diameter is achieved. This telescope observes at the two wavelengths 21 cm. and 75 cm. simultaneously, and it is a remarkable fact that it takes no longer to survey a given area of sky than would the complete large aerial it simulates. At 21 cm. the resolution or detail which it can detect is 23 seconds of arc—about three times better than the unaided human eye.

To obtain an equal resolution with a conventional paraboloid would require a large instrument capable of operating on a very short wavelength. This means that the telescope would have to be built with very great precision and correspondingly great cost, if indeed it could be built at all. The most accurate reflector of this type is the 140ft. instrument at the American National Radio Astronomy Observatory which has a beam of about 2 minutes of arc at a wavelength of 3 cm. and was built at a cost of more than £3 million. The new one-mile M.R.A.O. telescope at Cambridge has an angular resolution some five times better and about 100 times the sensitivity—and was built at a cost of £550,000.

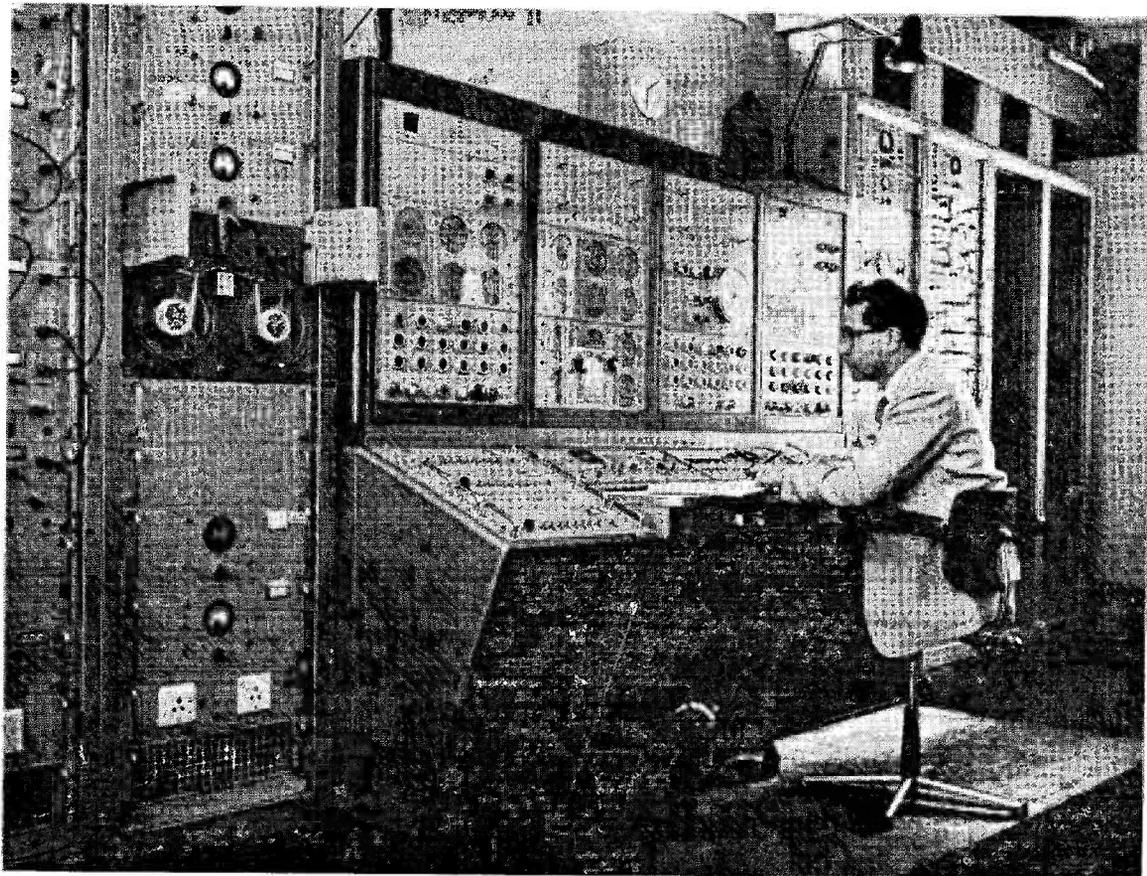
The one-mile telescope has now been in operation for seven months and it has been used in a number of different observing programmes. Its performance has fully come up to expectations, and it has already provided important new results. The positions of some 50 sources have been determined to within a few seconds of arc; detailed maps of a number of other sources have been obtained and a deep survey of a small area of sky has been made which allows the detection of sources some 30 times weaker than any that have hitherto been observed.

Future of Radio Astronomy

The future of radio astronomy in this country has recently been the subject of a report to the Government, and it was recommended that continued generous support be given in the coming years. If this country is to retain its leading position we are dependent not only on adequate financial support being available for new and more powerful telescopes, but also on the provision of conditions under which we can use them. The observations are not easy because the signals are extremely weak. (The total radio energy so far picked up by all the radio telescopes throughout the world is just sufficient to raise the temperature of an egg-cup full of water by a millionth of a degree.)

Local Noise Factor

The signal from a faint radio source is about one-hundred millionth that of the signal received by a typical TV receiver and it is clear that despite the extremely low receptivity of a radio telescope in directions outside the beam, it will not be possible to make observations unless the sites can be given reasonable protection from interfering man-made signals, whether from radio equipment or electrical machinery. (And, it might be added, noise created by the overhead power lines of the Electricity Authority, from which we all suffer.—*Editor.*)



The control room for the new one-mile radio telescope at the Mullard Radio Astronomy Observatory, Cambridge. The dials on the console show the positions of the three telescopes (see text), which are automatically controlled by programme-tape, with read-out, in the equipment on the left. The receivers, which are of a very refined high-gain low-noise type, are grouped in racks on each side of the operating console.

Courtesy Science Research Council.

The importance of Radio Astronomy has now been recognised by the allocation of clear wave-bands, but because there may be harmonic or other unintentional radiation from transmitters and because of the leakage from television and radio receivers and the interference arising from electric motors and switch gear, overhead power lines, and so forth, radio telescopes must be sited in areas of relatively low population density. Yet if full advantage is to be taken of the opportunity for scientific training, the radio telescope must not be too distant from its parent University or Institute.

Having found a site at Lord's Bridge, Cambs., which satisfies these requirements, as well as being large enough and flat enough to contain the very large instruments which are now required, it is important to ensure that the local conditions are maintained. Pressure for increased development within a few miles of the site or the growth of industrial activity in the neighbourhood may seriously prejudice future work.

BRIEF TECHNICAL NOTES

Three paraboloidal reflectors are used on an east-west line, two being fixed 2464ft. apart and the third on a carriage on a 2600ft. rail track of 45ft. gauge. (For the required "one-mile diameter" of about 5000ft. it is more economical to have three aerials with 2500ft. of track rather than two with 5000ft. of track. The former arrangement has also the advantage of halving the observing time.)

The azimuth of the east-west line is known to within 0.14 sec. of arc. The survey (by the Ministry of Public Building and Works) is accurate to one in one million.

The paraboloids themselves, 60ft. in diameter, are equatorially mounted so that they can follow any chosen area of sky merely by rotation about a single polar axis. The aerials can normally be operated in winds up to 45 m.p.h. When stowed in the zenith position they are designed to withstand gales of 120 m.p.h. Their primary feeds consist of

dual concentric waveguides for 408 and 1407 mc.

Electronics

The RF signals are first amplified and then converted by diode mixers to intermediate frequencies of 45 mc—all at the focus. Because of the necessity for phase coherence a single local oscillator signal of high power at 363 mc is generated at the centre of the system and fed by coaxial cables to each aerial. After amplification, it is used directly to mix with the 408 mc signal and *via* a x4 transistor frequency multiplier to mix with the 1407 mc signal. The IF signals return to the central laboratory where the receivers are situated. Parametric amplifiers are being constructed for both frequencies. Twelve miles of RF cable are involved, buried about 2ft. deep to smooth out short-term temperature fluctuations which would otherwise alter the electrical length and upset the phase stability. The receivers are "phase-switching" which, in effect, measures the correlation of the signals from the separate aeriels.

The whole operation of the Telescope is controlled by a "programme tape" produced by the electronic computer when fed with the co-ordinates of the region of sky to be mapped. This tape is read automatically every 20 seconds and it turns the telescope drive on or off as required, switches in suitable lengths of cable to equalise the electrical paths *via* the separate aeriels, adjusts the rate of a "phase rotator" which slows down the interference fringes and actuates Creed teletype punches which record the receiver outputs digitally on paper tape. A total length of 400ft. of tape is produced in every 12-hour run and this is processed in the University Mathematical Laboratory. The contour maps are drawn automatically by a curve plotter attached to the computer. Almost all of the electronics and also such items as optical digitisers were designed and constructed by the staff of the Observatory.

OBITUARY

We very much regret to have to record the deaths of:—

— *Mrs. Joan Jones*, suddenly on June 6, the wife of Lawrence W. Jones, G5JO, of Cambridge. Joan was closely associated with radio and electronics, both as the wife of G5JO and also in business as the founder-director of Labgear, Ltd., which she started in 1939. She had been an active director ever since, and saw the business grow to success, employing more than 400 people, and now a member of the Pye Group. The managing director of Labgear, Ltd., is G5JO, one of the other directors being G2PU.

— *Alan T. Lee*, ex-LYX in the early days of amateur wireless, and 2DJ after the Kaiser's War, who passed over on June 11 at the age of 72. A founder-member of the Derby Wireless Club, and later of the London Wireless Club, during the First War he served in the R.N.A.S. and the R.F.C. In business after that as a radio manufacturer, he turned to specialising in electro-medical apparatus, and himself

trained as a radiographer, one of the first in the field. He was also a noted model engineer in the Derby locality, having a passenger-carrying railway in his garden. His funeral was attended by, among many others, the following old-timer members of the Derby & District Amateur Radio Society, contemporaries from the early days: ex-XDB, ex-URX and ex-5HT.

— *Kenneth Jay*, M.B.E., G2HJ, very suddenly on August 2, at Wantage, Berks. On the staff of the A.E.R.E., Harwell, and chairman of the local Club, Kenneth Jay was licensed in 1928, and was on the air only a few hours before his death. As those who knew him personally will be aware, he suffered severely from several disabilities, among others the difficulty of being confined to a wheelchair. But he was unfailingly cheerful, helpful and courteous, with an abiding enthusiasm for Amateur Radio and radio amateurs.

NORTHERN AMATEUR CONVENTION

Under the auspices of the Northern Radio Societies Association, an Amateur Radio Convention is being held at Belle Vue, Manchester, on Sunday, October 10. Ten club groups in the Lancs./Ches. area are affiliated, and the aim is to make this a really worthwhile occasion, with an exhibition, demonstrations, lectures and a programme of events for /M's and radio-controlled model boats and aircraft. The chairman of the Association is G3NUQ, the hon. secretary G3HIL, and the Convention manager is F. P. Short, 121 Mount Drive, Urmston, Lancs.

DOING OUR BEST

We get so many complaints about difficulties with newsagents being unable to supply SHORT WAVE MAGAZINE promptly and on time that again we have to say that all orders we receive through the 150+ wholesalers with whom we are now dealing are despatched two clear days in advance of publication. It is not possible for us (or our printers, who undertake all despatches) to do better than this. A prime example of newsagent non-cooperation (*see* Editorial, February '65 and p.351, August) was telephoned into the office only a fortnight ago—a reader was told by his newsagent that the *Magazine* could not be obtained because "that firm is now out of business"! What he really meant was that he did not want to be bothered. Fortunately, this is not a typical case, and up and down the country there are plenty of newsagents (quite unknown to us individually), who are able to supply SHORT WAVE MAGAZINE regularly and in proper time.

If you are in difficulties locally, in spite of having placed a firm order, you can obtain the *Magazine* by post direct from us for 42s., the year of 12 issues, starting any month. Alternatively, send in a 4s. postal order on the Tuesday before the first Friday of any month, with a note saying simply "copy — issue, please," and you should have it in time to get in with the Small Advertisements. Send to: Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

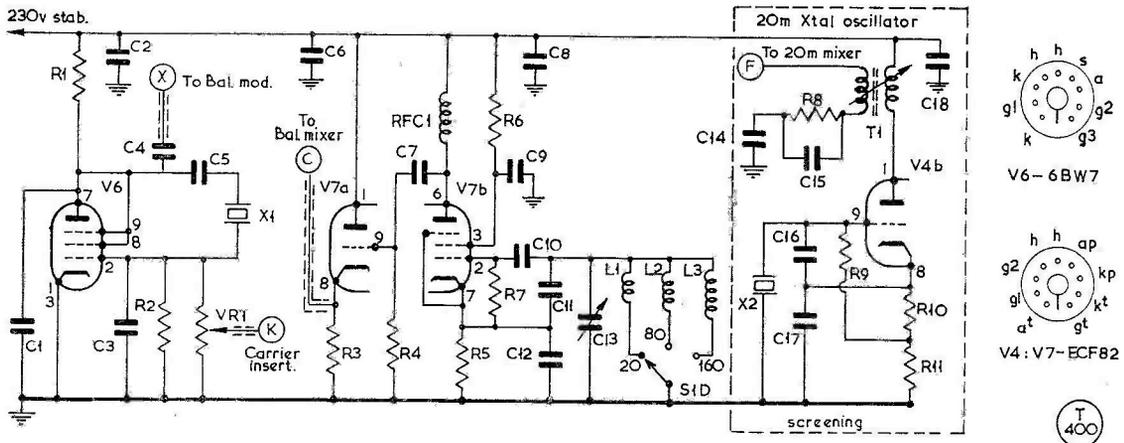


Fig. 1. Circuit arrangement for the originating stages in the Sphinx Sideband transmitter, showing the carrier oscillator V6 (a 6BW7), the VFO and cathode follower V7 (ECF82), and the crystal oscillator for 20 metres, the triode section of an ECF82.

NOTES ON THE "SPHINX" SSB TRANSMITTER

THREE-BAND DESIGN, FOR
20-80-160 METRES
—INCORPORATING INTERESTING
CHANGE OVER CONTROL UNIT

R. A. BUTTERWORTH, A.M.I.E.R.E. (G8BI),
S/Ldr., R.A.F. (retd.)

BEING unable to get much information on the Sphinx, the writer went to Derby, liked what he saw and bought it. This review is one man's opinion, completely unsolicited and in no way biased.

It gives SSB on three bands, 160, 80 and 20 metres. It can also be used on AM and CW on these bands, while 40 metres can be included in these modes by using the PA as a doubler stage. No exaggerated claims are made for this equipment but the maker does maintain that the speech quality is better than quite a lot of rigs, home brewed and otherwise. The suppression claimed is: Carrier 65 dB; Sideband 35 dB; Lower on 160 and 80m., and upper on 20m. Optional extras are Delta Control Unit and "Silplug" silicon rectifier instead of the conventional valve. Both these were used in the writer's version.

The case is the familiar wrap-round type, with vented lid and removable bottom cover. The back is integral with the case, a slot giving access to the aerial socket, terminal strip and PA bias control. Louvres in the base and sides, together with the vented lid, give excellent air circulation. The case and front panel can be obtained in a variety of

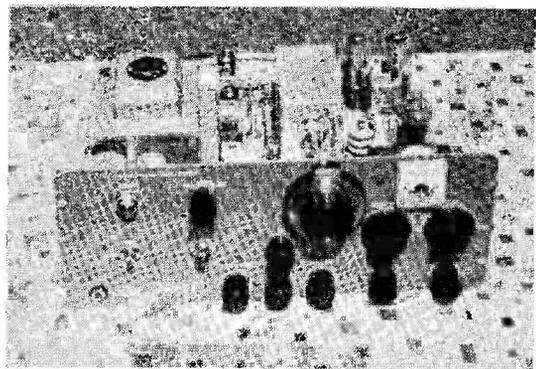
Table of Values

Fig. 1. Carrier Osc., VFO and Cathode Follower, Xtal Osc. for 20m. Mixer, Sphinx SSB Tx

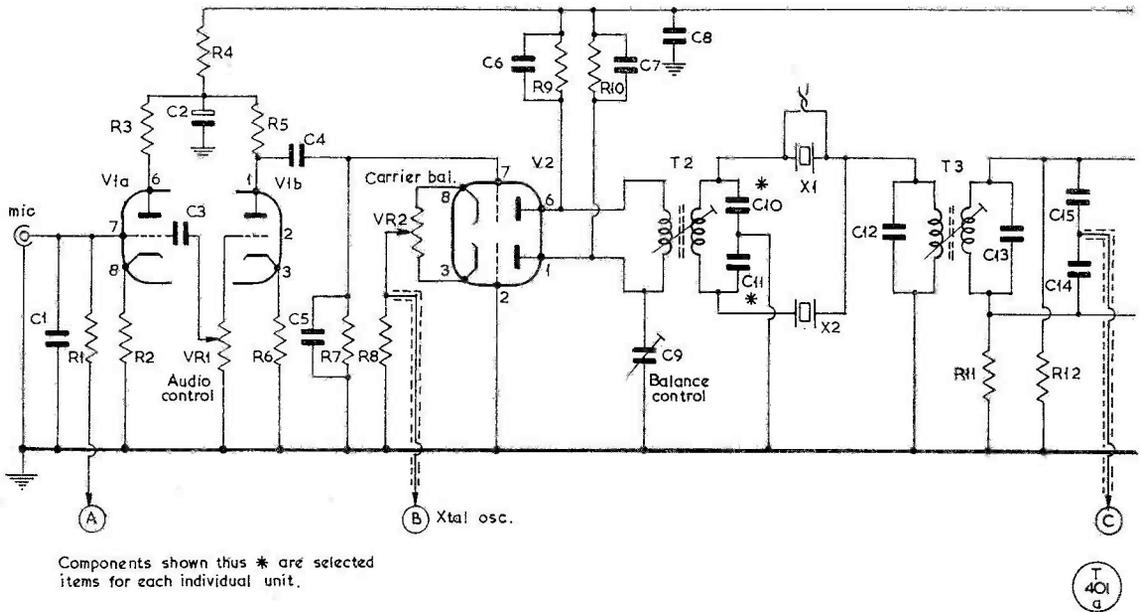
C1 = 100 μμF	R3 = 1,000 ohms
C2, C5, C6, C8, C9, C14, C15, C18 = .01 μF	R4, R6, R7, R9 = 100,000 ohms
C3, C4 = 56 μμF	R5 = 5,600 ohms
C7 = 27 μμF	R8 = 220 ohms
C10 = 36 μμF	R10 = 470 ohms
C11 = 500 μμF	R11 = 4,700 ohms
C12 = .0022 μF	VR1 = 250,000 ohms, lin. pot.
C13 = VFO tune	T1 = as fitted
C16 = 10 μμF	X1 = as required
C17 = 30 μμF	X2 = 10-55 mc
R1, R2 = 47,000 ohms	V6 = 6BW7
	V7 = ECF82

colours, to give two-tone if required to match other equipment.

All controls are on the front panel with the exception of PA bias, carrier and VFO balance. Also on the front are the mike and key jacks and a "Mains On" lamp. All controls have clearly marked



A general view of the Sphinx SSB Transmitter, designed for CW/SSB operation on the 20-80-160m. bands.



scales with good sized, easily manageable knobs. The VFO control, marked 0-100 with vernier, is smooth and positive with no backlash to speak of, and is the predominant feature of the front panel.

The chassis is of 16g. aluminium and front panel 12g., making a substantial base on which to mount all other components. Two cross-members stiffen the chassis and divide it into PU, exciter/mixer and PA units. Underneath, the components are good quality with generous tolerances. The wiring is substantial, stiff and very direct, giving excellent stability. All this is borne out by two tests made: First, the lid was slammed, the complete Tx dropped two inches on to a solid table, and finally the VFO box was thumped hard, all whilst in contact with other stations, whose reports were *no* frequency shift. The set was then set up on AM, input 20 watts to a dummy load, and left for 24 hours—result, no toasted or “drippy” components. The only casualty was an EF85 with low emission.

Results

Tests were carried out to check the specification claimed by the maker and found to be substantially correct. Tests on the air were with a 130ft. long-wire and a 20m. dipole. Reports confirmed the static tests, the most consistent report being “Excellent speech quality and very easy resolution of the signal.” The microphone used was the popular Japanese type and a Grampian DP4 was also tried, with its matching transformer. Reports were marginal in difference. On AM the speech was again reported as excellent, and on CW the note given as T9.

It would have been nice to have reported that some choice DX was worked. All round Europe and the Mediterranean the minimum report was S6 on Twenty, also in the U.K. on 80 metres. Although not

Table of Values

Fig. 2. Audio, Balanced Modulator, Filter and 20m. Mixer stages for Sphinx SSB Tx

C1, C18 = 50 μ F	R7 = 270,000 ohms
C2 = 16 μ F	R8 = 4,700 ohms
C3, C4 = .005 μ F	R11, R12 = 100,000 ohms
C5 = 500 μ F	R13 = 2,700 ohms
C6, C7, C8, C16, C21, C22 = .01 μ F	VR1 = 500,000 ohms, 1in.
C9 = Balance control	VR2, VR3 = 1,000 ohms, 1in.
C14, C15 = 47 μ F	T2, T3 = as fitted
C23 = 35 μ F	L4, L5 = as fitted
C24, C25 = 100 μ F	V1 = 12AX7
R1 = 1 megohm	V2 = 12AU7
R2, R6 = 2,200 ohms	V3 = 12AT7
R3, R4, R5, R9, R10, R14 = 47,000 ohms	V4 = ECF82

confirmed, it is probable that signals got into the States but the W's went back to the louder signal.

No equipment is perfect and the Sphinx has its faults. The chassis fits too tightly in the case for easy withdrawal. Some of the brackets appear to have been made up from scrap material and had vice marks. The PA anode and aerial loading controls would be better if they were stiffer. The meter is a little too well damped to get tuning right on the nose. Don't expect a fully illustrated instruction book on glossy paper and lots of diagrams—all you will get is a briefly worded copy of the tuning procedure for 160m., slightly amplified for other bands, a simple calibration chart and a connection diagram for the terminal strip at the back. In spite of these minor criticisms, the writer is satisfied that the value is in the set.

As shown here, there is no trick circuitry—it is simple, and therefore results in reliability. The Tx has been used and abused for a couple of months

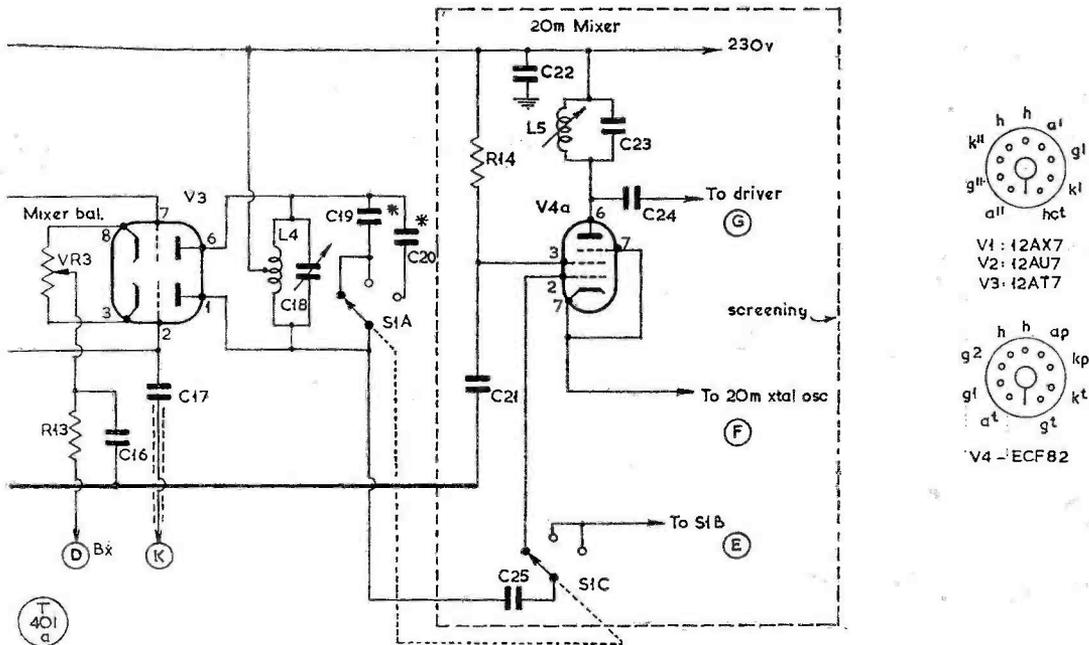


Fig. 2. This circuit, which should be read from V1 at the left-hand edge of the opposite page, shows the audio, balanced modulator, Sideband filter and 20-metre mixer stages. As indicated, certain component values are selected for each individual unit—most other values of interest are given in the table opposite. The lettered points are for inter-connection into other parts of the circuit as a whole.

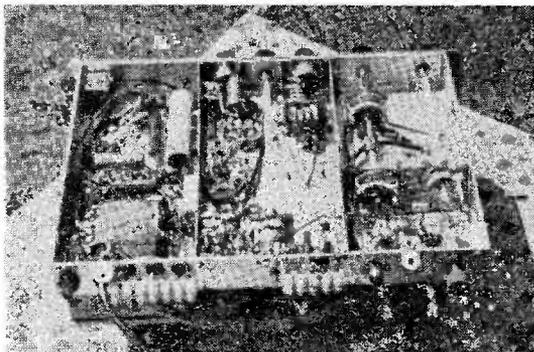
now and can be recommended to those who have not the time to roll their own but want to get their feet wet on SSB easily and at a very reasonable cost. It was mentioned earlier that the Delta Control unit and silicon rectifiers were used throughout these tests. These give, in the writer's opinion, two advantages, i.e., almost Vox operation and less heat and appreciably more power. A separate report is made on the Delta Unit since this can be used on other rigs.

THE DELTA CONTROL UNIT

Although this unit was designed for use with the "Sphinx" SSB Transmitter, its versatility makes it a very useful accessory for incorporation in other rigs. In addition to the aerial change-over (Tx/Rx) function, it has two single-pole C/O's and one single-pole make-and-break. Operation is either by a pressel button at the end of a yard of 4-way cable, or by a toggle switch on the unit for over-ride on long "overs." It is powered from AC mains, 200/240v., rectified to 12v. DC, to operate the relay and give a "Mains On" indicator light. Connections are made by three sockets for Ae, Tx and Rx, the relay contacts coming out to a ten-way terminal strip.

All these connections are at the rear so that all that is seen from the front is the indicator "On," the pressel-switch and cable, and the over-ride switch. There is no mains on/off switch since the consumption is less than ten watts. The case is very well made in 16g. aluminium, finished in hammer blue with chromium trims. Large rubber feet are fitted to avoid scratching and, together with its weight, prevent slipping about on the operating table.

The internal assembly is as good as its external appearance. The components are first-class; mains transformer fused at 1.5 amps, Sentercel bridge rectifier and relay—see diagram. The relay is a very robust job and unusual in that its movement is semi-rotary to operate a square-shaped cam actuating the contact springs. The coil has two windings, 10 ohms and 150 ohms. When the pressel button (or



An impression of the interior construction of the Sphinx. Good-quality components, proper screening, and sound design both mechanically and electrically contribute to stable, high quality output.

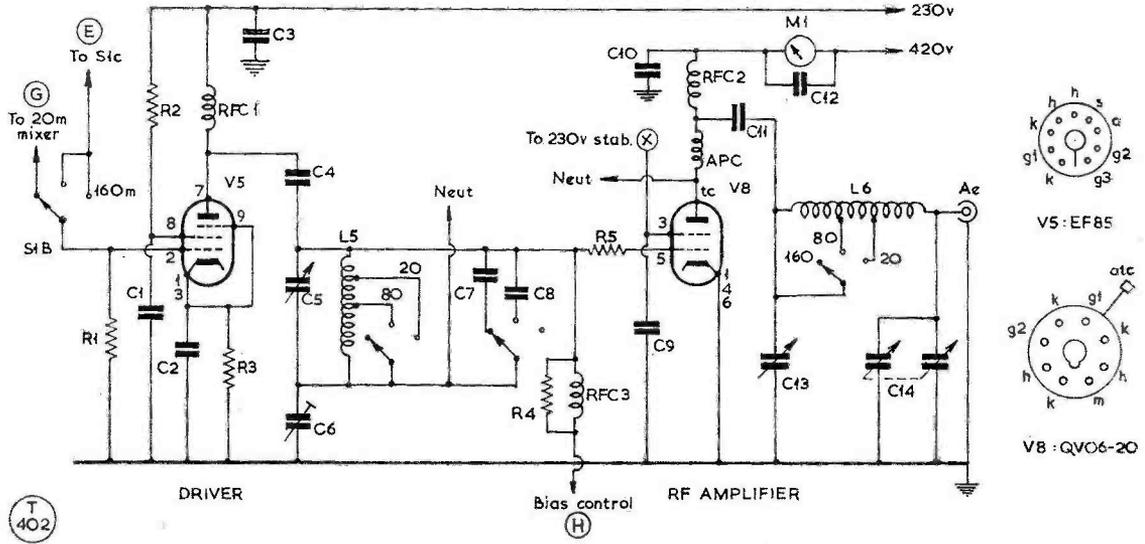


Fig. 3. In the Sphinx Sideband transmitter for 20-80-160 metres, the driver (V5) is an EF85, and the PA a QV06-20 with neutralisation, the screen voltage being stabilised. A great deal of design work has gone into the achieving of a stable unit capable of developing its full RF power output of about 70 watts p.e.p.

Table of Values

Fig. 3. Driver and PA Stages for Sphinx Tx

C1, C2, C3, C9, C12 = .01 μ F	R1 = 22,000 ohms
C4 = 100 μ F	R2, R4 = 10,000 ohms
C5, C6 = 50 μ F	R3 = 180 ohms
C7 = 200 μ F	R5 = 43 ohms
C8 = 47 μ F	RFC1, RFC2, RFC3 = 2.5 mH RF chokes
C10 = 0.1 μ F	L5, L6 = as fitted
C11 = .002 μ F	V5 = EF85
C13 = 300 μ F, var.	V8 = QV06-20
C14 = 2/528 μ F, var.	

switch) is operated, current is passed through the ten-ohm winding, which gives quick action and opens a contact to bring in the higher resistance coil, which passes just sufficient current to "hold on" until the circuit is broken. This design makes for low consumption and less heat.

Two of the change-over sets of contacts are of such generous proportions that they could carry several amps. One of these is the Aerial C/O. The other sets of contacts may look flimsy in comparison but they have substantial contact areas. The rather generous proportions of the Ae C/O suggest the possibility of losses due to the high capacity, but a test with an RF output wattmeter showed negligible insertion loss even at two metres.

Only adverse criticism might be that the terminal strip looks light in comparison with the rest, and the pressel-switch springing may feel a bit too strong for some. This can be adjusted to some extent, either by a little lubricant or re-setting of the springs.

The unit is very quiet and positive in operation and judging by the quality of the components, finish

and workmanship, it is a very good buy at the price it is offered.

It would be very easy to make a Chinese copy but it is doubtful if the components, even as surplus, could be purchased much below the cost of this unit.

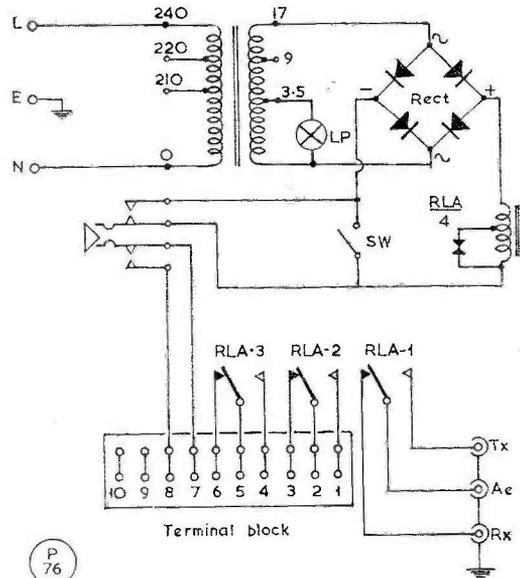


Fig. 4. The Delta Control unit used with the Sphinx SSB Tx, to give press-to-talk operation. As explained in the text, this is the sort of control circuit that could be used with any transmitter—it is just a matter of connecting the relay circuitry to give the c/o motions required.

SIMPLIFIED TRANSISTOR TRANSMITTER FOR THE LF BANDS

POWER CRYSTAL OSCILLATOR,
MODULATED SERIES-GATE—
RUNNING TEN WATTS ON TOP
BAND, UP TO 20 WATTS ON
EIGHTY—INCORPORATING
AUTOMATIC T/R SWITCHING
WITH LISTENING-THROUGH—
IDEAL FOR PORTABLE/MOBILE
WORKING ON THE LF BANDS,
CW OR PHONE

E. L. GARDINER (G6GR)

This design, for a compact 80-160m. CW/Phone transmitter, is of special interest because the power-CO is modulated series-gate which, being a true current-modulation system, is more properly applicable to a transistor RF stage than any method of voltage control. Another important feature is the automatic T/R ("send-receive") switch, which not only gives full Rx protection on "send", but also a signal lift on "receive". On CW, it operates instantaneously, thus permitting listening-through with full break-in. While the T/R function is not quite so good on phone, it is still good enough and, as our contributor suggests, could be further refined for telephony working. With proper adjustment, a ringing CW note can be obtained, of knife-edge stability, with full input on the 160-metre band. Frequency variation can be arranged by switching crystals, the 10X type being recommended for this circuit.—Editor.

AT the approach of the holiday season, the writer found himself faced with the usual desire for a simple, light, and compact rig with which to keep in touch and to while away the inevitable wet afternoons. This would have to be self-contained, battery operated, and suitable for use anywhere, in field or hotel bedroom, whilst being small enough not to add to the already insoluble problem of getting all the family gear into one medium-sized car. Moreover, it was realised (with horror) that little more than a fortnight remained in which to work out a design, construct it, and iron out the gremlins.

An all-transistorised equipment for the lower frequency bands appeared the obvious solution, and

whilst a multi-stage transmitter on conventional lines could undoubtedly give excellent results, most of those so far heard over the air had left something to be desired in regard to speech quality, and had not been entirely free from traces of frequency modulation. Moreover, published designs had been quite elaborate, and a number of very experienced amateur friends had been working in this field for many months without having reached any degree of finality. It appeared best to circumvent these problems, rather than try to solve them in the time available, and a careful study of the actual requirements led to the following specification:—

- (a) The transmitter could be crystal-controlled, thus eliminating any tendency towards serious frequency modulation or drift, and the need for several frequency-multiplying or buffer stages. Since in coastal regions on Top Band only a few clear channels are generally available, a minimum of well-chosen crystal frequencies should be adequate, whilst also helping more distant stations to know where to look for G6GR/P.
- (b) Approximately ten watts input should be available, with good quality full modulation on Top Band and CW operation from fundamental crystals at the LF end of 80m., and possibly also 40m. Break-in operation should be attempted without the use of relays.
- (c) Since the transmitter was not intended primarily for mobile use, it need not be restricted to a 12-volt, or to a positive-earthed supply. A higher voltage at lower current is more convenient when dry batteries are to be used. This makes possible a wider choice of transistors with higher collector voltage ratings, and better factors of safety, whilst also opening the door to the use of series modulation, and the elimination of a comparatively heavy modulation transformer.

Consideration of the power-output transistors available at reasonable cost led to the choice of the Mullard AU710, which has a relatively high collector maximum rating of 60v., and a reputation for ruggedness and reliability. This transistor has not been a popular choice for mobile equipment, because more than twelve volts are needed to obtain good collector efficiency, but the cases of unexplained losses by friends using lower rated transistors of theoretically higher efficiency had been

so numerous that this risk was not felt worth while. That the choice was a wise one seems to be borne out by the fact that the transmitter has been used for long periods with outstanding results, and with no signs of trouble, the transistors hardly becoming warm to the touch.

The simplest method of using the AUY10 possible is as a power crystal-oscillator, directly coupled to a suitable tuned aerial system. On theoretical grounds this system is only capable of some 60 per cent efficiency, in comparison with figures in the excess of 80 per cent said to be obtainable (although seldom achieved in practice) from a driven amplifier; but taking into consideration the power saved in driver stages, it is doubtful if this difference would be noticeable in actual use. It has also been claimed to be subject to harmonic radiation. This may be a valid comparison in the case of valve equipment, but when the nearly square-wave output of the typical transistor driven PA is realised, it seems probable that the harmonic content of a crystal-driven oscillator working near to the Class-A condition may well be lower; in fact, no undue difficulty has been experienced with the present transmitter. The circuit shown here was tried out with very satisfactory results, and forms the basis of the design.

Modulation Considerations

A transistor PA of any sort can be amplitude-modulated by the conventional transformer-coupled technique, but presents a far less consistent load to the modulator than in the case of valve amplifiers. For really good linearity both the transformer design, the drive conditions and the PA loading are critical, and the range of acceptable adjustment tends to be narrow. The transistor is always presented as essentially a current-operated device, whereas anode-modulation as applied to a valve Tx is a *voltage*-modulation process. The power-output from a transistor is not necessarily a linear function of collector voltage, and it has been claimed that perfect modulation by collector voltage variation alone is not possible. Whether or not this is strictly true, it is certainly a very difficult condition to maintain, and has led to the common practice of applying modulation to the driver stage of transistor transmitters in addition to the PA. By a careful choice of amplitude and phase of modulation applied to the driver, it is possible to compensate for much of the non-linearity arising in the PA, and to arrive at an acceptable compromise. But once again this adjustment is quite difficult, and is apt to disappear when the transmitter is tuned over a wide frequency range.

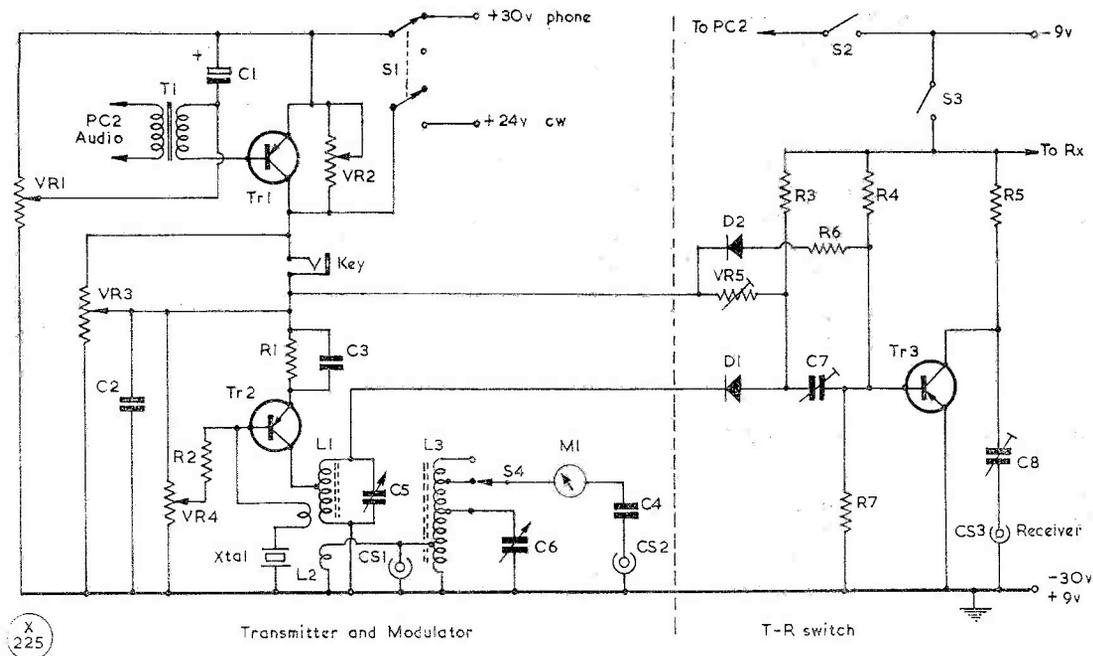
This technique cannot in any case be applied to the present equipment since there are no driver stages. There appears little doubt that the most correct method of modulation for a transistor amplifier or oscillator is by control of the *collector* current, and this can be achieved by means of a variable impedance in series with the collector supply. Another transistor is the ideal device for

this purpose, provided that the necessary additional voltage is available, and because the two transistors have closely similar characteristics which tend to vary similarly when the current is the same in both, it has been calculated that the major sources of distortion characteristic of voltage modulation do not arise because impedance matching is to a large extent automatic. Series modulation of collector current is certainly ideal for the present purpose, since it involves very few components, and saves the weight and bulk of a modulation transformer; with a few simple circuit additions it can be adjusted to eliminate any possibility of interrupting the carrier, or of stopping the crystal oscillator during negative peaks of modulation, whilst permitting a strongly incremental characteristic on positive peaks having some resemblance to a controlled-carrier transmission.

Circuit Details

The method of applying series modulation to the present circuit can be seen in detail from the diagram. An audio transistor of power dissipation and voltage ratings similar to the AUY10 is required as modulator, and, as it will also be of assistance to have a high current gain, the OC23 was selected from amongst those available. This choice is not critical, however, and constructors need not hesitate to try out other transistors of similar ratings. Most of those in the *Mullard* range of audio power transistors having a maximum collector dissipation in the region of 5 watts should prove suitable. For convenience in the use of existing supplies, the circuit is arranged with the positive rail "high", but the alteration to a positive-earthed supply would present little difficulty. The supply can be thought of as approximately 30v. at from 200 to 400 mA, but this will be considered more fully later.

The OC23 requires an audio drive to the base, which must be isolated from the rest of the equipment and suitably biased. Whilst a directly-coupled audio channel could be devised for this purpose, time and work can be saved by the use of one of the several small packaged audio-amplifiers now freely available on the market. That chosen by the writer was the *Newmarket* type PC2, rated to deliver up to 400 milliwatts from a 9v. supply. This was provided with a volume control, and with input from a crystal microphone via a 500K matching resistor, in the usual way. Collector supply is taken from the 9v. associated receiver battery through a "modulation-on" toggle switch, S2. (This audio channel is quite conventional, and is not shown in the overall diagram). The PC2 is designed to work into a load of 15 ohms or higher, and it was felt convenient to couple it into the OC23 by means of a very small transformer, T1, that used being one of the *Repanco* items listed as suitable for driving a pair of OC72 transistors from an OC71. The ratio used was 1.5:1, but any ratio between 1:1 and 2:1 should be satisfactory, and can be selected by trial in relation to the particular modulator transistor in use. The present arrangement employing a separate



Circuit of the LF-band transistor transmitter described by G6GR in his article. It is of particular interest because the power crystal oscillator, using an AUY10, is modulated in the series-gate mode, which enables full modulation to be achieved. The modulator is driven by a small packaged speech amplifier, marked as PC2 in the circuit. The circuit also incorporates a transistor T-R ("send-receive") switch to give rapid action and complete Rx protection, as well as a degree of signal build-up on the "receive" side. On "transmit," the RF stage can be run at up to 10w. input, CW or phone.

audio amplifier and 9v. supply has proved very satisfactory, as it avoids possible decoupling and stability problems. The gain and output power available from the *Newmarket* PC2 was found to be more than sufficient to drive fully the OC23 under close-talking conditions.

It will be seen that the modulator transistor is connected directly to the positive rail, and forms a "gate" through which current reaches the emitter-collector circuit of the AUY10. Its base is by-passed to this rail for audio by C1, and is biased from a 10K potentiometer VR1 across the main supply line. As the transmitter should normally be adjusted with care, and the modulator collector-current is limited to a safe value by the AUY10 and components in series with it, limiting resistors above and below this potentiometer were not fitted—but those feeling nervous regarding the safety of their transistors might well add fixed resistors of, say, 5K between the potentiometer and negative line, and 1K similarly to positive line to limit bias adjustment. It will be noted that the collector of the OC23 is taken through a shorting-type keying jack, and that an additional supply terminal is provided whereby a different supply voltage can be connected, if desired, when using CW. This provision is not essential, since the power drawn by the AUY10 can be adjusted by means of the modulator bias potentiometer VR1—however, changing to a lower col-

Table of Values

Circuit of the G6GR Transistor Transmitter

C1 = 10 μF	VR2 = 20,000 ohms, var.
C2 = 0.1 μF	VR3 = 50,000 ohms, var.
C3 = .01 μF	D1 = 1S44, <i>Texas</i>
C4 = .001 μF	D2 = OA81, <i>Mullard</i>
C5, C6 = 500 μμF, var.	T1 = 1:5:1, <i>Repanco</i>
C7, C8 = 25 μμF, pre-set	M = 0.500 mA RF meter
R1 = 12 ohms	X = Xtal, as required
R2 = 5,000 ohms	L1, L2,
R3 = 10,000 ohms	L3 = <i>see text</i>
R4, R5 = 4,700 ohms	TR1 = OC23, mod.
R6 = 20,000 ohms	TR2 = AUY10, RF osc.
R7 = 3,300 ohms	TR3 = OC170, T-R switch
VR1, VR4, VR5 = 10,000 ohms, var.	

Notes: Aerial goes to CS2, Rx to CS3. PC2 is a packaged pre-amplifier by *Newmarket Transistors* (see text). S1 is DPDT if phone and CW facility is required. S2, S3 are SPST.

lector voltage with the switch S1 permits the bias to be left undisturbed at the optimum setting for telephony, which is a comparatively precise one.

A further feature of the circuit are the two potentiometers VR2 and VR3. The former is wired as a variable resistor across the modulator, and is set up to pass a small current through the AUY10, just sufficient to maintain oscillation even when the OC23 is cut off during negative peaks of modulation. It is thus impossible to break carrier, with the attendant

radiation of "splatter" which this causes. The second potentiometer VR3 has a similar function, but for a different purpose, and works independently of the phone or CW positions. It may be used to bring the AUY10 crystal oscillator into very low-level oscillation, at about one volt on the collector, when receiving, thereby giving a marker carrier for netting, or for heterodyning CW signals when using a separate receiver—which may, perhaps, be a transistor portable fitted with "trawler-band" coverage, but not provided with a BFO. The control is simply turned to zero when a netting carrier is not wanted, and gives very pleasing results from signals which are themselves not exactly on the crystal frequency, as users of a crystal-controlled BFO will appreciate. It was not entirely successful in the case of the compact receiver built into the same aluminium box as the transmitter, as it was impossible to get weak enough injection without a degree of receiver "wipe-out." A very small independent transistor CO was therefore made up in a plastic case, as an accessory, into which the crystal could be quickly transferred for netting purposes, and which can also take 1000 kc and other crystals for band-edge marking or calibration.

The CO Stage

Considering now the circuit of the AUY10 crystal oscillator, certain provisions were found necessary to ensure a good keying and modulation characteristic. The oscillator having to be self-starting, it is therefore provided with an adjustable bias from the potentiometer VR4. This is not at all critical, and could well be pre-set inside the case, although in the actual transmitter as constructed by G6GR all bias adjustments are brought out to screwdriver spindle-locks for convenience in experimental work. This makes the unit appear much more complex than in fact it is, since at least half of these adjustments are seldom used. VR1 and VR2 should be easily accessible, but need not be fitted with control knobs; but VR3 if used should be a front-panel control.

The AUY10 takes with emitter bias from a 12-ohm resistor, R1, by-passed by C3, .001 μ F. The provision of this bias is important to maintain good wave-form and efficiency, but is not unduly critical, resistors between 10 and 20 ohms proving satisfactory, although higher values will tend to limit maximum power input. With certain crystals it was also found advantageous to introduce a small amount of positive feedback to ensure good keying, and to eliminate any risk of the oscillator dropping-out during negative peaks of modulation. Whilst not absolutely essential, it was found a great convenience to construct the coils in S.T.C. or Mullard Ferroxcube or equivalent pot-cores. This eliminates external fields to such an extent that no screening is necessary, and the coils can be safely crowded with other components into a very limited space. The use of air-cored coils would demand a considerably bulkier construction for the whole transmitter.

Note on Cores

It was feared that saturation effects might be encountered, but this was not so when the cores are assembled with a thin paper washer between the centre limbs. This washer also reduces the risk of cracking the cores when mounting or tightening-up. The size of core chosen appears relatively unimportant at these power levels. Those from the smallest made up to 2in. diameter (type FX2243) were tried out, and while the efficiency rose gradually with an increasing volume of ferrite, none were altogether unsatisfactory. That eventually chosen was type FX2240, approximately one inch in diameter, as a compromise between bulk and cost in relation to efficiency.

A major advantage of ferrite-cored coils is that the number of turns required is so small that alterations can be made in a few moments, and coil-winding ceases to be a major task. The collector coil for the AUY10 needed only five turns, tapped at three turns from the earthed-end for the collector connection. The coils were wound with a very thin p.v.c. covered flex that happened to be available, a different colour being used for each section of winding to avoid confusion. There is ample space within the pot-core.

As a relatively high-C circuit is desirable to match the transistor, tuning is by a 500 μ F miniature broadcast-type capacitor C5, and the inductance L1 is kept to the minimum required to give coverage from 3.8 to 1.8 mc. The loading of this circuit by the transistor is heavy, and is chosen for maximum RF output. Hence, tuning is not sharp, and although the circuit does not strictly tune to 7 mc, active crystals for this band will work in the circuit. A feed-back winding of one-quarter turn, *i.e.* in at one slot and out at the next, at ninety degrees, is in general sufficient. However, it was found safe to increase this to one-half turn, with benefit in the case of indifferent crystals. Any greater coupling may cause the oscillator to take-off without effective control by the crystal, and must be carefully avoided. In certain cases when using a particularly high-gain transistor, only a quarter-turn may be tolerable; this is sufficient in the case of Top Band only operation.

Crystal Selections

Considering the choice of crystals for use with a transmitter of this nature, it must be stated at once that only relatively large crystals similar to the Services type 10X can be regarded as altogether suitable. These crystals are mounted between substantial metal electrodes which assist in cooling, and will dissipate a reasonable amount of RF power. They appear perfectly safe through long periods of use. No measurements of crystal current have been made, and this may be expected to vary widely with differing adjustments and loadings, but it is not thought to be unduly large since there is insufficient to light a sensitive pea-lamp, and the slight frequency-drift (due to heating) often noted from transmitters employing relatively high-powered crystal oscillator



stages is conspicuously absent. If crystals are purchased for the transmitter, it is advisable to tell the manufacturer for what application they are

required.

In the writer's view it would be unwise to try miniature crystals in the circuit, and most certainly the sub-miniature varieties, and those vacuum-mounted in B7G envelopes, would be fractured. Fortunately, crystals of these constructions are seldom available for the lower amateur frequencies. A number of the metal-cased crystals having half-inch pin spacing similar to Services type 10XJ have been tried in the circuit. These are usually of gold-plated wire-mounted construction, and are widely used in amateur equipment. All have given excellent output, and with one exception have proved reliable; but one Top Band specimen failed in use, and may have been a defective unit. The ability of quartz crystals to withstand RF loading is very variable, and is not usually guaranteed by the manufacturers. Crystals having a slight flaw in the quartz blank will fail at a power level considerably below that which is safe for the general type. For absolute reliability only the larger 10X crystals should be used on Top Band, or those expressly supplied as suitable. Other types may be safe on 3.5 or 7 mc, where the voltages developed across the crystal will be lower, but there may be some risk in doing so. Plenty of ex-Service units of the larger types are available.

To be concluded

COMMUNICATIONS DEVELOPMENT IN THE CARIBBEAN

An order has been received by The Marconi Company for another tropospheric scatter link, which will be used to extend the Cable and Wireless Caribbean communications scheme and connect it to the proposed submarine telephone cable between the Caribbean and Bermuda. Marconi's are the prime contractors to Cable and Wireless (W.I.) Limited, for a number of radio systems in the Caribbean, and this order brings the total value of these contracts to over three-quarters of a million pounds.

The latest order is for a 220 mile tropospheric scatter link between Antigua and Tortola. It will be a quadruple-diversity system, using two aerials, two transmitters, and four receivers at each end of the link, operating in the 2000 mc band with transmitter powers of 1 kilowatt. The link will have a capacity of 80 telephone channels, using 3 kc-spaced channeling (frequency division multiplex) equipment.

All the radio equipment will be manufactured by Radio Engineering Laboratories (a division of the Dynamics Corporation of America) and the aerials, 30ft. diameter dishes, by the Kennedy Antenna Division of the Electronics Speciality Company. The radio drive and receiver equipment is fully transistorised and the receiver will incorporate a threshold extension unit using FM negative feedback to reduce the noise factor to 6 dB. The eventual aim is auto-

matic international dialling.

Installation will be carried out by Marconi engineers in conjunction with Cable and Wireless staff and the link is expected to be ready in 1966.

SPECIALLY ON THE AIR

Following are the stations that may be heard or worked during the coming month, operating in connection with some special event locally.

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.

GB2LSR, Sept. 18-19: At the Scout Rally, Hulton Park, near Bolton, Lancs., on 20 and 80 metres, and looking for contacts with all comers. QSL to: G3SCV, 574 Chorley Old Road, Bolton, Lancs.

GB2YC, Sept. 27-Oct. 2: Operated by members of the Yeovil A.R.C., at the Yeovil Youth Centre, for its "At Home Week," operating all bands 10-160m., AM/CW/SSB. Details from: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil, Somerset.

S-METER MODIFICATION FOR THE HRO RECEIVER

DESCRIBED IN DETAIL

F. W. T. ATKIN, A.M.I.E.R.E., M.T.S.

The writer's advice to any ambitious and optimistic amateur who has the itch to modify his HRO is, in general, the same as that of Mr. Punch in another connection: "Don't." The HRO is probably one of the least "modifiable" (to coin a word) receivers that has ever been manufactured. Not because of any physical difficulty—access to all the "works" is only too easy once the bottom plate has been removed — but simply because the designer did such a good job originally. The almost perfect balance between the circuit (which became the standard one for communications receivers for many years), the "Q" of the coils, and the characteristics of the valves then available, made it hardly possible to effect anything but marginal improvement in the efficiency and performance. The writer is aware that this will sound like weak-kneed heresy to those who have painstakingly replaced the original UX or octal-based valves by miniature types—but can they really maintain that the results were remotely worth the labour and time involved? Also (and very important) was the HRO working up to its specification *before* modification?

These doubts are based on considerable experience of extensive HRO modifications that have been tried by the writer — and then removed, either because the improvement was only marginal, or because the performance, whilst better on some bands, was actually worse on others.

But There Is One!

Having said all this, there is one minor modification that does seem well worthwhile, and does not involve any very drastic rebuilding work. This is the S-meter circuit, which in its original form has some irritating characteristics — for example, replacing any one of the RF or IF valves is liable either to upset the balance of the bridge circuit employed to an extent that it is impossible to zero the meter; and/or the sensitivity of the S-meter is drastically changed, so that a signal which read say S9 now reads S5 (or *vice-versa*). Also, at the writer's present location, mains voltage variations

between 220 volts and 240 volts are frequent, and with the HRO's original S-meter circuit, variations of this magnitude made it necessary to be constantly fiddling with the meter zeroing potentiometer (unless errors of up to 2 or more S-points were tolerated).

It is easy to see why all the above happens from a study of the unmodified HRO S-meter circuit (Fig. 1), in which the nomenclature of the components is as given in the HRO manual. It will be seen that it is a fairly conventional bridge arrangement, except that one arm of the bridge (R10) is returned to chassis *via* the internal screen/cathode impedances of the two RF and two IF valves, all in parallel. As the screen characteristics of valves are not normally held to very close tolerances, it is easy to understand why changing any one of these four valves can upset the operation of the S-meter, especially when it is realised that a form of DC negative feedback is produced by this use of the screens. That is to say, the application of AGC to the four valves in question reduces both the anode and screen currents, but by different ratios, so that a nett unbalance of the bridge is produced, and the meter reads, correctly, upward. (If the anode and screen currents varied in the *same* ratio, there would be no deflection of the meter).

Modification

The modified circuit of Fig. 2 retains R10 as the common screen dropper for V1, 2, 5, 6—which is its other function besides acting as an element in the S-meter bridge circuit—but with a new resistor (R36) added in series to maintain the screen voltage at its original value. (This resistor was omitted in the writer's first modification attempt, with an unwelcome increase in valve noise). With R36 in circuit, noise is acceptably low—as is proved by a quick test on the 28 mc band (which just at present

Table of Values

Fig. 1. HRO S-meter circuit, unmodified

R10 = 15,000 ohms (may be 25K on some models), 2w.	BSW = Remote HT switching terminals, on rear chassis drop
R11 = 2,500 ohms, ½-w.	S1 = HT switch, SPST
R30 = 2,000 ohms, ½-w.	S2 = Meter switch, SPST
R32 = 1,000 ohms, w/w	
M = meter as fitted	

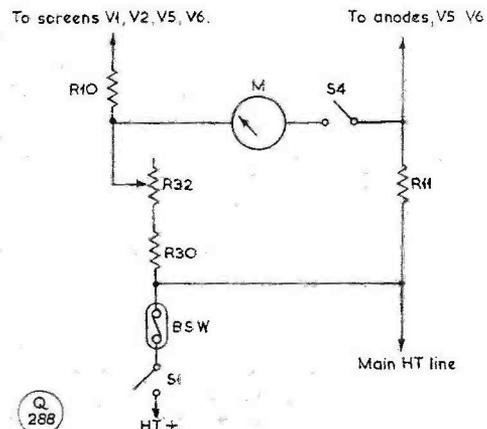


Fig. 1. The S-meter circuitry in a standard HRO receiver, which is worth modifying for the reasons explained in the article. The necessary circuit changes are shown in Fig. 2. Nomenclature here is as in the HRO manual.

Table of Values

Fig. 2. Modified HRO S-meter circuit

R10, R11,	R38 = 12,000 ohms, 2w.
M, BSW,	R39 = 1,000 ohms, 1w.
S1 = As in Fig. 1	R40 = 5,000 ohms, w/ wound
R36 = 3,300 ohms 1w.	
R37 = 30,000 ohms, 2w.	

Fig. 2. Circuit re-arrangement for the S-meter in the standard HRO, of which there are large numbers in regular use. The advantages of the revised circuit, shown here, are discussed in the text. If you have a good, clean HRO, already working well, this simple modification will make its S-meter readings more realistic; the maximum-reading calibration can be made against your local medium-wave BC station.

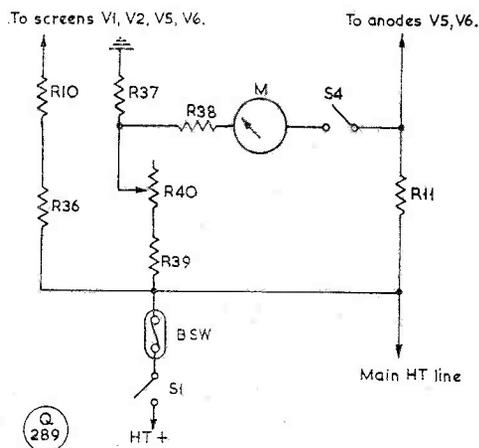
is mostly dead). With the aerial disconnected, the internal noise of the receiver is just audible on the writer's HRO-MX with the RF gain at maximum and the audio gain at notch 3. Connecting a "clean" aerial, i.e., one far enough away from sources of local electrical QRN to be said to be "noise-free," results in a just perceptible increase in noise; this means that the thermal agitation noise of the aerial is greater than the internal noise generated within the receiver.

In the new bridge circuit, Fig. 2, R10 is replaced by R37, which is connected to chassis. At the same time R30 and R32 in the original zero-adjust arm are replaced by R39 and R40—and the values of the two latter enable the meter to be zero'd under a wider range of conditions than before. (If, after modification, there is any difficulty in zero'ing the meter, with R40 near the middle of its travel, the value of R39 may be increased or decreased until a suitable value is found. This is the only component that may need changing from the values given.)

In the original circuit, the "DC negative feedback" effect is responsible for a very great decrease in sensitivity of the S-meter; consequently, with this effect removed, the sensitivity of the bridge now becomes too great, and necessitates the addition of a resistor R38 in series with the meter. This completes the very simple modification, which, with the appropriate additional components to hand, takes much less time to effect than it does to describe here.

Results

With the values given, the modified S-meter in the writer's HRO-MX operates very satisfactorily, the only initial adjustment necessary being the zero'ing of the bridge by means of R40 (after allowing the usual 10/15-mins. "warm-up" period.) This adjustment is made with zero signal input, i.e. with the aerial disconnected, and the RF gain control at 9.5 Thereafter, any slight change of S-meter zero due to variation of mains voltage is taken up by a small adjustment of the RF gain control—it has not been found necessary to touch R40 at all since the initial adjustment, except of course, when an IF



valve has been changed.

The sensitivity of the S-meter is exactly the same as before; in other words, what was an S9 signal is still S9. If, however, it is required to alter the sensitivity (and individual ideas of what constitutes "S9" very surprisingly widely), the value of R38 should be decreased or increased, according to whether the meter is to be made more or less sensitive. Changes in steps of 1,000 ohms will produce changes of meter deflection of about one S-point per 1,000 ohms.

The calibration and linearity of the S-meter scale is also unchanged—one S-point still represents a change of input signal level of 6dB, as before. Best of all, the effect of changes of RF or IF valves upon the sensitivity of the receiver can now be observed directly upon the S-meter, without the previous irritating side-effects upon the sensitivity of the S-meter itself—it is, of course, still necessary to re-zero the S-meter by means of R40 each time the IF valves, V5, 6 are changed, and possibly a further small adjustment of R40 would be necessary after a valve has "aged" somewhat. When making a check of the effect of valve changes in this way, a steady input signal should be used, such as the local MW BBC station.

Altogether, this seems to be a very worthwhile modification, particularly as the S-meter now appears to be much less sensitive to mains voltage changes—for a change from 220 to 240 volts, the meter zero now moves less than one S-point. And it is very nice to know that if one wishes to alter the sensitivity of the S-meter, it can now be done with the greatest of ease, by altering the value of R38. Personally, the writer has preferred to retain the original rather conservative sensitivity, but it is a free country, and those who wish to produce "S9 plus 40-dB" reports are at liberty to make the necessary modifications to the value of R38!

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SWL • • • • •

RECEPTION OF SSB—READERS and

“SUBJECT No. 55”—SOME DX/TV RESULTS

—SWL CONTEST COMING—THE HPX LADDER

—NEWS, VIEWS and COMMENT

MANY readers remark, from time to time, about the ease or difficulty of resolving SSB on various receivers. Quite a number ask our advice on the subject, and, of these, some are puzzled because they have a receiver complete with a BFO and still find SSB resolution pretty difficult.

A BFO is certainly a necessity (unless one uses some external oscillator) but there are BFO's and BFO's. The amount of BFO injection is an important factor, and with some old receivers it tends to be excessive (though with a few it is at the other extreme and is insufficient).

Stability of the tuning circuits, especially the local oscillator, is another factor which makes a huge difference. And, finally in our short list (although one could go on expanding this theme for pages) comes the shape of the response curve.

This last factor is the one which is misunderstood by our less experienced readers, and we can only supply a quick answer by saying that, ideally, the response curve of the receiver should be identical with (or at least similar to) that of the transmitter.

Square or Rounded ?

Many of the popular war surplus receivers are excellent for CW, and some of them also for AM phone. Now the response curve you want for CW, in today's crowded conditions, is a sharp one; a receiver which gives a width, halfway down the response curve, of 1 kc or less, will be pretty efficient on CW. For AM phone a much wider curve will be needed to give good intelligibility, and the width will possibly be as much as 5 kc on the older receivers—even more in some cases. Modern receivers provide a selectivity position of about 3.5 kc for AM phone.

But these veterans with their 5 kc bandwidth have a very *rounded* curve, the extreme “skirt” of which will be extremely broad, and thus all sorts of interference will come into the pass-band. If you tune in SSB stations on them, there will almost inevitably be monkey-chatter from other SSB stations quite a few kilocycles away. The ideal response-curve for SSB reception is square, straight-sided, with a sharp cut-off, and this (in general) you will only get from modern receivers which use either a crystal filter in the IF, or carefully-designed band-pass IF transformers at a lowish frequency. (The Drake-2B, for instance, does not have a crystal filter, but a three-stage band-pass arrangement at 50 kc, the width of which may be set, by front-

panel control to 0.5 kc, 2.1 kc or 3.6 kc. The ideal widths, one might say, for CW, SSB and AM respectively—provided the shape of the pass-band is *square*.)

This is probably the main reason why some of these elderly HRO's, BC-348's, AR-77's and 88's, and so on, are a little difficult to handle on SSB, although they have stable BFO's and other circuitry.

Incidentally, the question of BFO injection can usually be settled by the operator. If you need more signal and less BFO, you simply use more RF gain; if the BFO injection is on the weak side, keep the RF gain right back, and bring up the audio gain to give reasonably strong signals.

On a more modern receiver with a product detector, much depends upon the design, and it is to be hoped that the BFO-to-signal ratio has been properly set in the first place. If it has, the RF gain control can be operated more or less where you like.

Final point—countless SSB transmissions have been passed by as “unreadable” simply because the listener has the BFO on the *wrong side* of the signal. Find your centre position (where the general “mush” is at the lowest pitch) and mark it. Then find a position on either side (probably between 1.5 and 2 kc away) in which CW signals peak nicely, first on one side only, and then on the other, and if you mark those two positions also, you will have your guide to the BFO setting for SSB. It will vary between bands, as Upper Sideband is the general rule on the HF bands, and Lower Sideband on the LF bands (40, 80 and 160). If your receiver is adjusted for USB, there's nothing you can do that will make an LSB signal intelligible, although you may think you are getting near it. Just swing the BFO, and success will be yours (unless you have got one of those teasers that really doesn't go through zero at all, in which case you had better get it properly set up).

Comings and Goings

This column must be almost unique in one respect—we are of course delighted to welcome new readers, but we are just as delighted to say good-bye to older ones, since their departure means that they have passed their R.A.E. and Morse test and are on their way to becoming licensed operators. In many cases this is the goal for which their SWL existence has been a long preparation. So, whether “coming” or “going,” the occasion is cheerful and not sad.

Barry Curnow (Plymouth) has been an SWL for nearly seven years, during which time he has climbed to the top of our CW HPX ladder. He now has his own callsign G3UKI—see “New QTH” page—and will henceforth be reporting to another section of the *Magazine*. He says that he has an invaluable file on several thousands of amateurs, all of whom it will be a thrill to meet on their own ground, so to speak. We wish him all the DX that's going, and all the luck that he'll need to exploit it fully!

Another one reporting for the last time is *M. Vincent (Cheltenham)*, who passed the Morse test

two days after getting his R.A.E. result (a pass, of course). He is all set for 25 watts of phone and CW on 160, 80 and 40, and he wants to thank G3AHB for providing a healthy junk-box which has kept him out of the local electrical shop! He has been an SWL for about 4 years, and now leaves us, with our best wishes for what we might almost call his new life.

David Kirby (Manchester) has passed R.A.E. and takes the Morse test in September. Many others who took R.A.E. in May were still at the nail-biting stage when they wrote. We hope they all passed. Alan Dailey (Leeds) achieved an R.A.E. pass and will know his Morse result by now—in any case he says he has lost all interest in HPX and asks to be removed from the ladder.

By contrast, one of our newest readers, L. Case (Widnes), writes: "My main ambition at the moment is to see a real live amateur transmitting station, or, if it comes to that, even another SWL station!" Welcome to him and numerous other "first reporters," whose names will be seen on the HPX Ladder for the first time.

Quotes from Readers

We don't intend to prolong the life of the CW/Phone controversy (which shouldn't be a controversy anyway), but can't resist quoting M. Woollin (Leeds), who says: "When I hear DX on CW I feel I have achieved something, but when I hear some on phone I know that *anyone* could do it." Well—maybe; but it's surprising how many can't even hear it on phone either! Roy Read (Ebbw Vale) agrees with our various suggestions for learning Morse by "just listening". . . he's now on the way.

Lots of queries about various prefixes: CR3AD (D. H. Foster, Rainham) seems to be the new one for Portuguese Guinea. 7X6FT (J. Fitzgerald, Great Missenden) is apparently OK for Algeria. 4M3

and 4M5 (R. Turlington, Braunstone) were used by Venezuelan club stations for a short time. The latter have been queried by many other readers.

P. Crust (Loughborough) asks whether there are any GØ, G1 or G7 stations. There are *not* (not legal ones, anyway). And also he wants to know whether /MM, /A, /P and /M stations count for HPX. Only /MM's count, owing to some curious convention that grew up with the craze. The others just stand on their actual prefix, and the suffix makes no difference.

James Brown (Llandaff) rushes to the defence of the 19 Set, which he has found better than an old HRO, and he points out that it is more modern than many surplus receivers, using later types of valves. He has a Mk. III and wonders if it is much better than the earlier marks.

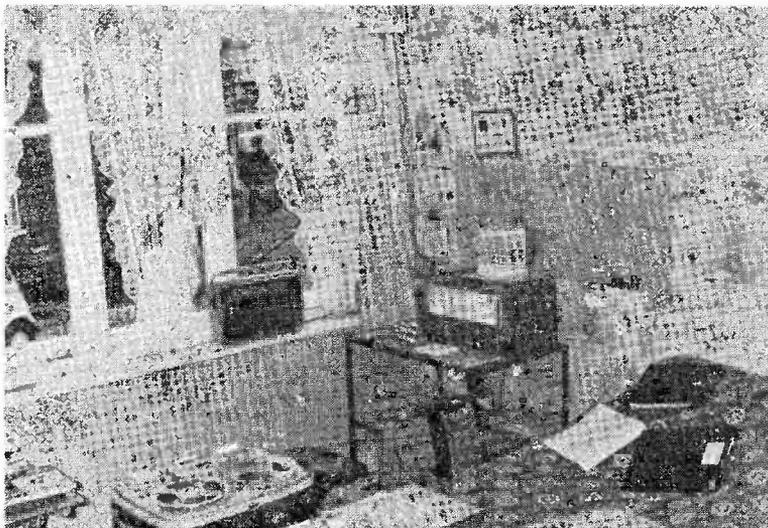
R. Belshaw (Newcastle) asks for the significance of SM3CXS/3. Merely what we should designate /A, but the /3 shows that he is still in the third district of Sweden. (You will hear U.S.A. stations signing W3—/6, and so on, but they would also sign /3 if they were portable in their own district.)

D. Kirby (Manchester) runs a TCS-12 with RF 24-27 converters for the Fifteen, Ten and Four-metre bands, has lots of test gear, a 4-el. Yagi for 4 metres, and a 160-ft. long wire, and is now building an SSB rig (the one described by G3KFE in the July issue of SHORT WAVE MAGAZINE) for the happy day when he comes on the air, which should be soon.

Two Hundred in One Week

GM2HCZ writes: "Out of curiosity I started noting prefixes heard whilst working 20-metre CW, and find I listed 204 between July 15 and July 20. Not solid listening by any means. So 200 shouldn't be too big a target for starting on the ladder. I'm surprised that the top Phone score is so much higher than the CW." He adds some ideas for an

The SWL station of Peter Benson, 46 New Village, Ingleton, via Carnforth, Lancs., who spends a great deal of time—6.0-8.0 p.m. every evening, and all the weekend—listening on the amateur bands, mainly 20-80m. SSB, with a "Joystick" and an Eddystone receiver. At present, his main interest is in getting all Zones confirmed.



SWL Contest, which will be discussed further on.

Talking of HPX, *John Fitzgerald (Great Missenden)* says: "With all these newly independent nations, surely the sky's the limit". . . *H. M. Graham (Harefield)* has just acquired an S.840 and "can now cope with the SSB boys, so the score should increase by more next time" . . . *Alan Dailey (Leeds)*, with the need for a transmitter just over the horizon, "got a temporary job (easy when you have six weeks' holiday) and rapidly accumulated some pound notes." Then he bought a chassis and some aluminium sheet, which he sawed, bent, drilled and fixed, and now has a beautiful-looking piece of equipment; "Not," as he says, "representative of my usual rubbishy produce . . . which just shows what can result from loving care and a few new components."

Andrew Niblock (Chester) writes in for the first time, although he's been logging amateurs since July 1962. The usual progression: BC set, PCR-2, CR-100 and now also a PR-30 preselector. He looks forward to hearing 10 metres really open for the very first time.

R. G. Preston (Norwich) has moved from the spare room into an outdoor shack, and has a 15-metre rotary which, he finds, is very much better than his long wire; he hears things very strongly on the beam which can't even be identified on the LW. *R. J. Basford (Nottingham)* started logging prefixes on June 4, and reached the 200 mark some forty days later—using a Canadian Marconi 52 set and listening almost entirely on Twenty.

Steve Wilson (Ossett) is a 15½-year reader who joins the ladder on the CW side with a score of 252, and complains about the growing number of amateurs who seem to have no time for CW. (Never mind, there will always be enough key-bashers to keep everyone busy). He uses a three-valve TRF set covering all bands, with a 132-ft. wire.

W. C. Torode (London, W.C.1) says you can't beat the advice of Terry Popham about covering the right band at the right time. Any time spent in studying the freaks of propagation, skip distance and direction of arrival of signals is well repaid. *D. H. Foster (Rainham)* queries CR3AD (see earlier) and RAEM. The latter is an amateur station, with a very strange story behind him. Ernst Krenkel was a naval operator, and his ship's call was RAEM. For his services in a disaster he was made a Hero of the Soviet Union and allowed to use RAEM as his amateur call, which makes him unique in the entire world of Amateur Radio.

D. S. Smith (Stanmore) is one of quite a group who would like to see the HPX Ladder scrapped and re-started at intervals of, say, two years. This, he says, would encourage "more intensified listening by those at the top, as those at the bottom would stand a better chance of catching them up." It would also encourage such a howl of protest that we doubt if our ears would stand it! (But we had seriously thought of beginning a new ladder with each 11-year cycle . . . any comments?).

P. J. Lennard (Wartling) finds that he has logged

21,500 stations since he started in November 1958. He was in the Forces at the time, and says: "I was started on the trail by G3MOJ, whom I have to thank for everything, including the Morse I hear day and night, plus all the twitches and clenched right itching fist!"

P. D. G. Milloy (Doncaster) would like to correspond with other CR-100 owners "to discuss problems;" his QTH is 23 Park Avenue, Sprotborough, Doncaster. *John Singleton (Hull)* is another of the growing band who want to acknowledge their gratitude to "the locals" (in his case G5GX, G3AGX and G3TKA). He is aiming at his own call before long.

Chris Freeman (Nuthall) is concentrating on Twenty, having put up a ground-plane for that band and found it well worth while. *D. Edwards (Leicester)* is another "first-time" reporter, and he, too, wants to thank his "local," G3PRP. He's off on a R.A.E. course in September and aims at a callsign "in 1967!"

DX/TV

This branch of SWL remains quite a minority interest, but those who go in for it certainly become keen. *F. Smales (Pontefract)* reports some fine openings, on April 19, May 28-29 and June 13-16, during which he identified programmes from Bucharest, Yugoslavia, Tallinn, Moscow, Barcelona, Holland, Italy, Kiev, Carcassonne, Norway, Sweden, West Germany and Portugal—all on Band I. On Band III he has received Lille and Rouen, both on 819 lines, and now plans to investigate the UHF bands as well. His target is R.A.E., and eventually TV transmission, and we hope he succeeds.

David Fitzgerald (Dublin) is another convert to this sport, and has received eight European countries. He tells us that Portugal issues a "TV-QSL" card in answer to reports.

Denis Boniface (Ripon) found the first two weeks of July very good, and received Belgium, Yugoslavia and Sweden—all new ones for him. He now has four dipoles, and has taken down the beam. Twenty stations in 14 countries is his current score, all on Band I. But acquaintance with some local amateurs has inspired him to learn the code and move towards R.A.E., so he will soon be starting on a 10-transistor double-superhet with plug-in coils, and would also like to make an R-1392 work on two metres.

For Keen Top-Banders

The International One-Sixty Society, devoted, as one would expect, to the investigation and use of Top Band, now has an SWL section, for which the contact for SWL's, the world over, is *David Douglas*, 20 Fleuchar Street, Dundee, Angus (himself a keen reader of these columns and a regular correspondent). Their newsletter (*Long Wires*) contains quite a fair proportion of SWL news.

More Shorts

An old-timer SWL who has been inactive since 1957, *A. G. Scott (Liverpool)* "discovered" the new

mode (to him) of SSB, which revived his interest. So he joins the HPX Ladder with a score of 312! Way back, his main interest was Forty, but nowadays he can't work up much interest in it, and has some nice catches on Ten and Fifteen instead.

"During the last two months I have found Fifteen open nearly every day, 1900-2100 GMT" (G. S. Taylor, Wolverhampton) . . . "At the moment I am experimenting with ground communication, and would be glad to hear from other SWL's who may be keen on this means of communication" (David Nicholls, of 107 Ravenhill Road, Lower Knowle, Bristol, 3) . . . "Regarding 'SWL,' I think an occasional technical or constructional article would not come amiss, but the general friendly atmosphere of the feature should not be disposed of" (C. Dillon, Bath).

"Just had my 23rd and 24th countries on One-Sixty confirmed—ZB2A and ZE1AZD" (David Douglas, Dundee). SWL Douglas, whose address is given three paragraphs back, would like to hear from SWL's P. Crust (Loughborough) and F. C. Reid (London, W.7) . . . "I usually go mad on

Next appearance of this feature—November 1965. All correspondence and photographs (of SWL stations and equipment) by October 1, addressed to Editorial Department, Short Wave Magazine, Buckingham, England. Head the letter "SWL."

SWL'ing for two weeks, sometimes staying up till 1 a.m., then I never go near the shack for a week or so, although I've been an SWL for four years" (J. Roze, Penrith) . . . "If you suffer from time-base interference, fit an extension speaker to your set, take it right near the TV receiver, and vary the fine tuning on your local station. You will find you can lower the strength of the QRM until it is not so troublesome" (Stephen Shaw, Stockport).

Pete Cayless (Exeter) contributes yet another strange prefix to our bunch of queries. He heard 3T3AE, giving QTH as Peking! To us this sounds like yet another bad joke, but you never know . . . SWL Cayless had a big surprise when Ten, in a single evening, yielded TN8AW, 9G1FR, YV5, PY7, MP4QAQ; and he finds Fifteen often very good, but not until 1830 or later.

Referring back to the Editorial in the July issue of the Magazine (concerning the hearing of stations which we are not allowed to listen to!), Stephen Shaw (Stockport) mentions that many short-wave BC stations reply to SWL reports with some form of QSL. Some of them, being extremely DX, give a pointer to conditions on the amateur bands.

SWL Contests ?

The consensus of opinion on Listening Contests seems to be that we should revive the old "Set Listening Periods" from time to time. Any contest based on confirmation of claims is obviously out (QSL's might not arrive within a year or so!); any event based on the checking of scores of logs is also out (what is there to check them with, and how does one spot phoneys?). All that is left is to set our listeners a kind of task, and see which of them fare best, on a given band at a given time. If an SLP were to coincide with a transmitting contest, that would not be a bad thing. Watch this space in the next instalment—we promise you some organised homework during the late autumn and throughout the winter . . . and conditions will probably be marvellous by then.

Agonised Plea

Please, please will readers wishing to join the HPX Ladder send something a little better than sheets full of prefixes, which the compilers of this feature are supposed to add up for them? For first entry, a list of prefixes heard, in alphabetical order and numbered; for future entries, all further prefixes heard, and numbered consecutively, carrying on from the original figure. (Many readers already do this, and we are very grateful for it . . . now if we can induce everyone to follow suit, things will be much easier, and we shall have time

HPX LADDER

(Starting January 1, 1960)

Qualifying Score 200

SWL	PREFIXES	SWL	PREFIXES
PHONE ONLY		PHONE ONLY	
T. R. Popham (Exeter)	851	A. Papworth (Over)	287
P. A. Cayless (Exeter)	812	G. Christie (Gainsborough)	275
D. Douglas (Dundee)	745	B. J. Turner (Westcliff)	271
A. W. Nielson (Glasgow)	702	P. D. G. Milloy (Doncaster)	261
S. Foster (Lincoln)	616	W. J. Angerson (Leeds)	260
P. Etheridge (Hull)	601	M. Silverstein	
D. S. Smith (Stanmore)	572	(London, N.W.7)	254
R. G. Preston (Norwich)	525	C. Freeman (Nuthall)	243
B. Curnow (Plymouth)	520	B. Smith (Hexham)	240
A. Huggett (Lamberhurst)	495	D. Nicholls (Bristol)	239
D. Poulter (Morden)	488	C. G. H. Ivermee (Reading)	238
M. Woollin (Leeds)	485	D. Rollitt (Navenby)	237
K. C. Staddon (Stroud)	478	J. Dixon	
D. Dewar (Morden)	477	(Barrow-in-Furness)	230
M. Vincent (Cheltenham)	463	C. Dillon (Bath)	227
P. Baxter (Winchester)	450	R. J. Basford (Nottingham)	226
P. J. Lennard (Wartling)	445	P. Edwards (Birmingham)	222
G. Wyllie (Elderslie)	433	G. Cowling (Goole)	222
J. E. Hart (Leeds)	432	K. F. Ballinger (Worcester)	220
R. Turlington (Braunstone)	424	P. F. Elgar (Woking)	218
M. G. Allen (Heston)	414	J. N. Robson (Corbridge)	217
I. A. Mackay (Dingwall)	411	G. Beesley (Worcester)	215
B. Dale (Congleton)	398	P. Crust (Loughborough)	214
A. Niblock (Chester)	397	B. A. Jones (Worcester)	211
J. P. Fitzgerald		G. P. Mortimer	
(Great Missenden)	390	(Stourbridge)	211
S. W. Edwards (Warwick)	355	W. Moncrieff (Hampton)	210
M. J. Summers		D. Edwards (Coalville)	209
(Market Harborough)	352	W. C. Torode	
A. Parker (Chesham)	340	(London, W.C.1)	208
D. C. Parker (Redditch)	335	C. Case (Widnes)	208
J. Butler (Bargoed)	326	P. J. Williams (Doncaster)	207
W. Smith (West Bromwich)	315	S. Shaw (Stockport)	205
A. G. Scott (Liverpool)	312	Janet I. Martin (Strood)	204
D. E. Fitzgerald (Dublin)	310		
S. Wilson (Ossett)	308		
D. H. Foster (Rainham)	306		
A. D. Jones (Chertsey)	304		
J. Singleton (Hull)	300		
M. Hammersley			
(Newcastle-on-Tyne)	300		
R. Hooper (London, N.16)	296		
H. M. Graham (Harefield)	293		
G. S. Taylor			
(Wolverhampton)	290		

(NOTE: Listings include only recent claims. Failure to report for two consecutive issues of "SWL" will entail removal from the table. Next list, November issue—deadline October 1.)

to write a couple of extra paragraphs instead of doing unnecessary arithmetic !)

Final

Conditions, on all bands, at the time of writing this, are improving rapidly after a rather poor spell during our so-called summer. We suggest that SWL's who are sated with the QRM on Twenty should move off and really concentrate on Ten and Fifteen for a month or so. These bands may well be erratic, but there should be some time of day when something worth while can be heard on both of them; furthermore, QSL's to DX stations will mean more, and will probably bring in a better return.

Finally, just a reminder that the next deadline (for the November issue) will be **Friday, October 1**. Good Hunting until then, and may all the bands

stay open all the time.

Editorial Note: All correspondents who wish their letters to be covered in this feature are asked to note that we must have them by the due date, given each time. An increasing number of letters are coming in late—sometimes as long as a fortnight!—and this is as disappointing for us as it is for the correspondents concerned, because we cannot take in anything received even a day late. The reason is, of course, that Magazine work must be done to a schedule—we would never get to press if we waited for every last item. So please watch it—and remember that the address can be simply: **Short Wave Magazine, Buckingham.**

THE EFFECTIVE UTILISATION OF SPACE

IDEAS AND SUGGESTIONS
FOR THOSE WHO FEEL
HEMMED IN

E. P. ESSERY (G3KFE)

This is a very practical article, which will be helpful even to those who know it all—though it is intended for the guidance of the less experienced.—Editor.

SOME time ago, the writer was having a natter with one of the old-timer SWL members of the local club. As a result of this, other members of the "persistently non-licensed" category were tackled and some attempt made at noting the reasons for the lack of a call. This nosey-parkering provided quite a lot of food for thought; it was found that only about 10 per cent were not interested in possessing a call, and of the remainder, the reason could be put under three main heads. The first was the doubt as to whether they could pass the R.A.E. or, more often, the Morse test; the second the question of the cost of getting even a simple rig on the air with any hope of reasonable results; and, thirdly, a very large number said that they could not find enough space either for putting a rig into the house, or finding "space in the air" to put up an effective aerial system.

As for the first problem, the writer can only recount that a certain amateur acquaintance started off in August not knowing what a resistor was, and, without any formal instruction whatever, took and

passed the November exam. two months later; this was a man in his forties who had not done a calculation or a technical job of any sort since leaving school at the age of fourteen. He was a little slower on the Morse but was on the air in under a year from the day he started to study. No further comment is needed!

As for the second, the writer has a very poor junk box these days but would be prepared to say he could get on the air for less than a pound if he set his mind to it, without using any of the existing receiving equipment.

Problem of Space

Now for the most important one of all, this question of lack of space. When one listens round on Top Band one is struck by the numbers of QSO's that have a background noise of TV sound, or the rattle of tea-cups. The limit in, this line comes from a station not fifty miles from the writer's QTH who used to have to shoo away his budgerigar from its favourite perch, on his head, during contacts.

There are many and various problems that can arise in setting up a rig in a house without a separate room for a shack; but they are none of them insoluble, and it is fun in itself, trying to find ways of getting around them. In the next few paragraphs it is proposed to indicate some of the ways and means that have been used either by the writer, or by various amateurs of his acquaintance. Some of these may sound odd, some just plain comic, but in every case the writer is prepared to vouch that someone is using the method with success, and that the writer has seen such gimmicks himself.

Perhaps it would be as well to commence by consideration of aeriels. Two of the big problems are (a) Absence of the needful real-estate, and (b) A ban on outside aeriels. Consider the latter: If you cannot put up a visible aerial, what is

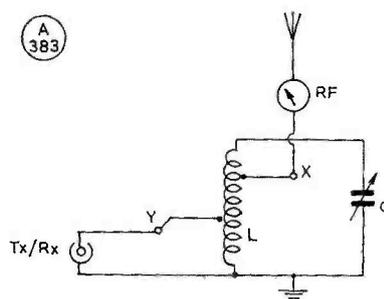
the matter with an invisible one? Someone known to the writer uses an aerial which is made of 36g. enamelled wire, end fed against earth, and gets very fine results with it. The secret is not to expect the thin wire to hold up too much weight; bits of the polythene inner from some old coax act as insulators, and the support strings are very short pieces of black, nylon-core, lacing twine. As the rules forbade aerials and any form of erection in the garden, and as there was no decent tree in sight, he decided that the house the garden of which backed on to his own was going to act as a pole. The neighbour was carefully cultivated, and there was his nice new aerial erected. However, the writer must say that with the "invisible aerials" he has tried, it is quite a thing to get the wire up without breaking it; one such parted after catching the head of a tulip in the garden.

An intermediate stage between the invisible aerial and the full-blown wire favoured by the majority is an aerial made of 28g. copper, insulated by plastic curtain-rings from Woolworths, the supporting line being the black p.v.c. nylon-core lacing twine which has the advantage of being elastic within limits, particularly if a longish length is used. This is handy for aerials supported in a tree; two trees in a wind always seem to get into opposite phase, leaving the aerial the choice of stretching or breaking—and it never chooses the former. However, the *Suflex* type lacing twine does stretch and so saves the aerial. Incidentally, it is also a fair insulator in its own right and does not cut through the plastic curtain rings used for insulators.

The Indoor Aspect

Turning now to the question of indoor aerials, there are again many possibilities. One operator known to the writer used a half-wave dipole in his loft, fed with coax, the thing being strung zigzag fashion in the loft as symmetrically as possible; it put out a fair old signal and worked OK and the other EU stuff that was about on Top Band. Another such used Top Band and 21 mc, the latter only in the summer. The Top Band aerial was an invisible wire, the 21 mc device a ground-plane. The reason? The ground-plane vertical went up the chimney, and the radials were disposed around the picture rail and in similar cunning ways. However, there had to be a fire in winter, and so the ground-plane was down for a few months. The owner of this one did not seem to miss much that was to be had on 15 metres.

As for the actual configuration of aerial to be used, there are many possibilities, and all have their advantages and snags. Unless you are knowledgeable on the subject, stay with the simple arrangements. If you still feel a little out of your depth, then string up some wire of some old length (bearing in mind the principle that the less sky visible from the shack the better the DX) and then find a good earth, and feed the whole bag of tricks with the ATU given in the diagram. This system should resonate when the condenser shows about $1\frac{1}{2}$ $\mu\mu\text{F}$



A simple aerial tuning unit for use with a random-length wire fed against ground. Adjustment is discussed in the text and, for multi-band operation, the coil may be tapped and switched as at X and Y, using a third wafar on a ganged ceramic switch. The construction of the coil should be such as to give the best possible Q-factor. The RF meter, which can be an 0-500 mA or 0-1 amp. thermo-couple instrument, will be found very useful for adjustment.

per metre of wavelength approximately, *i.e.*, 120 $\mu\mu\text{F}$ for 80 metres, and the coil may be pruned to achieve this. The adjustment of the taps on the coil should be such that the ATU tuning is fairly flat, and the link tap Y set to a point that results in the desired power up the spout at a setting of transmitter tuning and loading that is right for a 75-ohm dummy load. By using a three-gang ceramic switch the G3KFE version is preset to each band and all that is required to put the Tx on a new band is to change the transmitter over, switch the ATU and reload—all done in less than ten seconds.

Earthing

Incidentally, on the matter of earth connections for indoor aerials and for the rig, it is *essential* that this receives close attention, both from the point of view of safety and of noise. Water pipe earths are a snare and a delusion as far as RF is concerned; and make sure it is not polythene piping before you start scraping. Under no circumstance should the mains ground be used for RF earthing—the noise level can rise by a couple of S-points and you may be actually endangering yourself and your gear. If no other earth can be had, then it is better to try a layout which is balanced and does not require an earth as a part of the system.

Equipment Installation

To turn now to the question of the gear, there are literally thousands of ways of organising things. If the main interest is operating then, of course, one can lash out on one of the new all-in-one transceivers and sit it on a shelf or in a bookcase by the fireside. It is quite possible to build a one-band device of this nature at home, on the kitchen table, and if the external finish is well done it will not offend the XYL. The inside of a bureau can be made to take a more conventional rig and will again not offend when it is closed up. However it is fair comment that most of us prefer a shack of our own somewhere, and it has its advantages (even as a dog-

house). The pre-war type of semi-detached house usually has a little cubby hole under the stairs, where the meters and things live, and this has made the writer a fine shack, although it has to be admitted that care has to be taken over ventilation. It was used in conjunction with a T2FD aerial in the stair-way, which was taken down when not in use, and in that same tiny shack was the ATV station gear as well, this being the main interest in those far-off days. It was so tight that the cushion on the op's chair had to be removed if the door was to be shut, so as to gain a little leg room; nevertheless it was a fine shack, and served its purpose well. Later, a scout around the house revealed the only spare space was in the coal cellar; a great vault of a place, it ran under the whole house and was open to atmosphere at one end by way of a grid in the pavement through which the coal was shot. With an electric heater, some timber, and hard-board, a section was partitioned off and warmed; a good scrub and it was ready to receive the new gear brought from the upper shack. It was never really used, because of a change of employment took G3KFE to another town.

A friend of the writer had a very fine set-up in the kitchen which was of quite a decent size for living in. It had the great advantage of being near the source of sustenance and it gave him the chance to paint the console instead of going to all the fuss of using french polish.

What about the possibility of a shack up in the loft? A DL of the writer's acquaintance had an extra room up there built around the chimney brick-work, with a small dormer window, which was a delightful little place in every way. Another friend built a shack in the loft, by buying a sectional type shed and taking it piece by piece up into the loft, erecting it and putting all the gear inside after lining it and putting in all the necessary wiring. A retractable ladder and—"I'm all right, Jack."

The garden shed or the garage is a place to avoid if you can, because of the drawbacks of heating and condensation. If you must use one, leave a bulb of about 25-40 watts below the bench running all through the winter to keep the rust at bay.

Reverting to the case where the rig has just got to be small and neat enough to get XYL approval for the fireside, clearly the main thing is to "lose" all the stray wiring, make the parts look nice, and "style" the front panel. This needs thought and pre-planning; to be successful you have to think for a long time and then draw out exactly what the finished job is going to look like before you even consider what the innards are going to be. Then when you know the shape and style are approved get down with paper and pencil and draw it all up, making sure you can get everything in, and not forgetting the *criteria* of good electrical layout. Use nice components on the front panel and keep the junk out of sight inside. When you are satisfied with the drawings, leave them a few days and study them again to make sure all goes together; if you are not very experienced, take the drawings to another more

experienced hand and ask him for his comments on the circuit and layout, and think with great care over what he says, before modifying the drawings if you think they need it.

Constructional Forms

Consider carefully the possibilities of using transistors, the possibilities of *Veroboard*, and the possibility of making circuits up on paxolin boards fitted with *Harwin* or similar pins, laid out such that the boards look like the circuits for easy servicing. One can even use *Veroboard* in three dimensions for small AF applications, by mounting components on a board vertically with their other ends made off on to another bit of the same material, using wire to connect this to a third piece of board with components connected between it and a fourth piece, ending up with an AF amplifier that is shaped like a sausage and will go into an IF can of reasonable size. (Incidentally, this can be adapted to get some more gain out of an existing device by using the EF173 series valves to make up a two-valve amplifier to plug directly into the base of an existing stage on a noval or B7G base.) Such a circuit must be tested first, though, as it is difficult to service once it has been assembled into its final form.

If "printed circuit" techniques using *Veroboard* or similar are to be used, it is worth giving some thought to going the whole hog, and mounting them vertically front to rear of the panel, and thus gaining the best ventilation characteristics. Such boards can be used with valve circuits by mounting the valve bases on angle brackets, attached to the board by suitable nuts and bolts—or, if the valves are to be perpendicular to the board, by using the special valveholders made by the *Vero* people for the purpose, which directly fit the track of the *Veroboard*. Most of the ploys mentioned are simple and none beyond the scope of the kitchen-table "bench," given enough care in the planning and first thinking.

Considering the possibilities in the way of making the front look nice: If space permits an idea the writer has seen is to make a double front panel, and between the two to fit drive mechanism to give the front panel a symmetrical layout. The writer has seen this done but for a different reason—to get the controls in the best place for operational reasons. Another way of using the double front panel idea is to use an "overlay" label immaculately finished to cover the whole thing and hide the mistakes. There are methods and materials by which this can be done very effectively.

As far as the case is concerned, of course it has to be metal, and is preferably made commercially unless you are sure of your ability to make it good-looking. Of course, if you can arrange almost to fill the available space, then the top and sides are not visible and so you can get away with home-construction of the case.

One final comment: The finest home-constructed gear this writer has ever seen, without exception, was made by two amateurs, one of whom is blind, and the other having to work on the mat in front

of the fire when the XYL has gone to the cinema, because there just is not room in the kitchen. Neither of them likes home construction much, but both seem to achieve an immense satisfaction in using gear which they have put their own stamp on.

And it is noticeable that a similar spirit prevails in the Evening Institute class which the writer conducts in radio construction; some of them are

taking the R.A.E. course as well and at the same time are preparing in a practical way by building their gear at the evening institute. These practical classes are a help to people with no home facilities, and most Education Authorities will arrange such a class if the demand can be shown to exist. The Principal of the local Evening Institute will, it is certain, welcome such suggestions and do all he can to help.

Miscellany

COMMENT ON STRANGE THINGS

Words, words, words . . . the constant stream of time-wasting, space-consuming verbiage goes on without ceasing. There must be something about Amateur Radio that brings out the preacher in all of us. Put a man behind a microphone, and he says things he would not dream of saying in everyday life. Heard recently on the air, for instance: "When your transmission is at its peak intensity it is clearly audible above the noise level; but at times it sinks just below it, and then I have difficulty in receiving it one hundred per cent." (In other words—"You are fading somewhat.")

Amazing Quote, from the current issue of the bulletin of the International Short Wave Club: "Notice to Amateur Organisations—We are receiving many letters from listeners complaining about the trespass of radio amateurs in the short-wave broadcast bands. Quite a lot of interference is being caused by radio amateurs who are using the commercial broadcast bands. Stop it." (Could this be directed towards amateurs who are operating between 7000 and 7100 kc? If so, it's good news!)

"9M2GD now has a little all-band homebrew rig. We mean little when you consider that he put a Geloso VFO, a 6146 final, a screen-grid modulator and the power supply all into a 6 by 12 by 10in. box . . ."

(MART'S "Newsletter," Malaysia)

"I would like to read of what gear people have not got . . . and, to start the ball rolling, here are my 'have-nots': no phone, no beam, no bug, no loudspeaker (indeed, no output stage to drive one), no break-in. We might unearth quite a number with no VFO, no outside aerial, no superhet, and perhaps no key, or even no socket to plug one into."

(Letter from G3IDG)

A research team at the National Physical Laboratory (working on Laser applications) report the discovery of an intense and practicable source

of radiation by stimulated emission on a wavelength of 0.34 mm.—"a region of the spectrum that has not hitherto been readily accessible." Since radiation at this wavelength is not easily absorbed by the atmosphere, it may find novel practical application.

(Ministry of Technology Press Notice)

It is possible, writes a reader, to have a QSO with a distant station without ever hearing him. And he goes on to describe a contact with a UA3 on 14 mc, while his own receiver was on Top Band and a member of a local net not only told him the Russian was calling, but relayed the details. (Not strictly legal, we fear—so the people concerned must remain anonymous.)

Built-in obsolescence was referred to in an earlier instalment, with special reference to rounded-versus-square corners. G3BID writes to say that he recently bought a new piece of gear because of its *performance*, and didn't even notice what shape it was. He adds: "If the shape of the corners or squiggly patterns on the front panel influence the amateur, he deserves all that is coming to him. Even the most elementary course at the College of Sales Resistance deals with such beginners' stuff!"

CW corner (it always creeps in!) G3HKK, in a North Kent newsletter, recommends the book *U-Boat Killer*, by Capt. Donald Macintyre, in which you may read of Lt. Walker, R.N.V.R., known to all as "B-Bar," from the opening signal of U-Boat transmissions. This officer, an ex-Marconi operator, could distinguish the individual "fists" of U-Boat W/T operators, and his facility was invaluable to the Escort Group in which he served, as he could keep track of each separate U-Boat and even tell when the operators changed watches. He was also an expert in such oddities as the sound of a signal transmitted on a wet aerial (therefore coming from a boat that had just surfaced) and could distinguish ground-wave from sky-wave. (And some still say that CW is "impersonal"!)

COMMUNICATION and DX NEWS

L. H. Thomas (G6QB)

OUT of the doldrums? It certainly seems as if we are. From the middle of July conditions began to improve, and during mid-August the difference was so apparent that some correspondents even call it "spectacular." Pacific DX is back on *Twenty*, nearly every morning. *Fifteen* has been open almost every day, sometimes to areas that have been poor for a very long time. *Forty* still carries its fair share of DX, and, but for the static and high noise level, it seems that *Eighty* and *One-Sixty* would be doing likewise.

So the "radio weather" forecast is pretty favourable, and, to come down to brass tacks, the sunspot numbers for the coming months should average out at rather more than twice the figures for corresponding months in 1964.

So far, so good. What of the debit side? Well, it may be only a coincidence, but it seems that as the conditions improve, so do the intruders multiply. If we could transport ourselves back to *Twenty* as it was, four or five years ago, the band would seem half empty. The HF end is in a sorry state. (Remember when there was nothing between 14300 and 14350 kc except SSB, mostly DX? Take a quick look at it now, but don't stay long unless you're a masochist.)

Twenty is an exclusive amateur band (so-called), so none of us need have the slightest scruples about trying to upset these pirate commercials, who just park themselves in *our* band because there seems to be less opposition there than elsewhere. Let's make them see that they made a poor choice of frequency!

Always choose one of the cluttered frequencies for tuning-up operations—at least you won't be interfering with other amateurs. And amateur QRM can prove annoying enough to shift some of these interlopers, especially when they are using RTTY. (G2DC and others confirm this). Remem-

ber that they may be trying to work some part of the world where their own signals are not too strong, and a mere 150-watt amateur, with his beam facing in the right direction, may often succeed in upsetting the apple-cart.

Goodness knows, as amateurs we have little enough in the way of "rights" . . . we had better fight to retain what we have, and we can probably do it more effectively for ourselves than by complaining to official bodies.

In any case, most of the offending stations are in countries who are not signatories to any Convention, and couldn't care less about the rights of small fry such as amateurs. Warm up those linears, chaps, and go to it. (Shortly after writing this, your conductor was carried away screaming "Unfair to Amateurs!" . . . "The Democratic Assembly of the World's Amateurs demands Justice!" and similar slogans, but it turned out that he was only acting and hoping for a part in a TV production about injustice to minorities, and he was returned to his home in a white Zodiac with a blue light on top.)

Have a bash, therefore, and if your 5763's won't stand it, get something bigger. You have nothing to lose but your PSU's.

Globe Trotters Ad. Lib.

This DX-pedition business is certainly catching on in a big way, the only snag being the little matter of expense. What with Gus (W4BPD) bouncing gaily round Afghanistan and coming up with calls like YAØH, YA2H, YA6H and so on, all cut to measure for the prefix-hunters; W9WNV and K7LMU promising operation from ZM7, ZK1, ZK2 and others, and already putting out a big sig. from 5W1AD; a VK coming on with the startling call of YJ8XX; and the 4X4 boys brandishing 4X1 calls from a Neutral Zone whose existence no one suspected . . . what with all these

and the promise of the 10-year DX-pedition to end them all (by W6KG and family) it seems that there's plenty for the chasers to get their teeth into. We also have a 4W2 on the air, and a 9M4 in Singapore attracting big pile-ups with the possible promise of yet another new country status for Singapore. And, as if that's not enough, the CR3 prefix has appeared on the bands for the first time (from Portuguese Guinea).

New prefixes, by the way, seem to be ten-a-penny these days, and the way of life of those who have chosen WPX as their goal, rather than DXCC, has become a lot more exciting. After all, it's not too easy to invent a new country (although there are some people with signs of genius in that direction) but almost anyone can cook up a new prefix when there's no one looking—and, it seems, get away with it. Maybe it's all rather like collecting bus-tickets, but a large number of apparently sane, sensible people seem to get a big kick out of it, and who are we to deny them their fun (even if we could!).

More about all this under "DX Shorts" further on, but we thought you'd like to know in good time, without ploughing through too many pages.

The Noise Generators

Long, long letters continue to flow in concerning the iniquity of electricity generating authorities, and precious little satisfaction is reported by the dissatisfied customers. G3SM (North Harrow) has started a running fight with the GPO Interference Department and has, of course, strongly stated his hatred of the idea of paying for an investigation. They have eventually promised to investigate (at some time in the future) but a transmission engineer of the Central Electricity Board has actually called on G3SM and listened to the noise, which is at least a step in the right direction.

G3KPT (Birmingham), a former VHF/UHF diehard, has moved to a QTH that's no good for those pursuits, and has accordingly started exploring Top Band. He, too, is horrified at the intensity of the sharsh that comes from three nearby power lines with the slightest fall of rain or misty conditions. His snap decision was to float up a large Met. balloon with an earthing cable attached, but he really wouldn't gain much by stopping the noise and cutting his own power off at the same time . . .

And SWL H. A. J. Gray, the Disgruntled Customer in East Dereham, Norfolk, continues his long struggle and even adds to it by refusing to pay electricity bills (though this little discussion stems from an incorrectly-read meter!). With this business, as with the former one concerning the Intruders, it pays to help yourself and nothing will be achieved by keeping nice and calm and passive. If we've got teeth, we might as well use them.

On the HF Bands

Although Top Band still seems to be the most popular of the lot, judging by the mail, the HF bands come in for a little more comment than of late. GW3AHN (Cardiff) was one of the lucky ones to raise Tom Christian. VR6TC—and he did it on Fifteen for his 300th country on the band. The only time you can get this character is on Mondays between 2100 and 2145 GMT, Fifteen CW. 5W1AD was also worked, on Twenty at 0730, and was said to be moving off to ZK1 or ZK2. Contrary to previous reports, it seems that he will already have finished his ZM7 (Tokelau) operation by the time you read this. The big event will come when (or *if!*) he and K7LMU succeed in getting going from Indonesia, for which they are licensed and have FCC approval.

Over the next three or four months these two plan to operate from various Far Eastern countries, and will also lend the equipment to two (Chinese) operators who will work it from BY (CW only).

G3NOF (Yeovil) was bothered

with the short-skip on Twenty (aren't we all?) but heard sundry KJ6, KH6, W6-7 and the like in the mornings, though no VK or ZL have broken through. Best QSO's—HKØQA, VP2KD, YA2A, 4X1DK, 5W1AD, 9M2OV and 9M8KZ. Fifteen was found very patchy, also with short-skip troubles, and Ten yielded nothing but 9J2DT on AM, and many Europeans.

Talking of Ten, G3IDG (Basingstoke) heard an SM7 and an HB9, both working WØ's, who were inaudible with him. But it's a good sign. With him, too, 9J2DT was the only DX heard, and he thought band conditions were poorer, since only 16 countries were heard (14 of them on CW).

GM3JDR (Golspie) stuck to Twenty, where CW fetched in a few nice ones such as F7GM/HZ, FP8CK, JA's, KC4US, KH6DQ,

VK's, YA2, 6, 8, Ø, ZD8BC, 4X1DK, 4XØTP, 5W1AD, 7G1Q and 9M4GZ. SSB on the same band raised EA6AR, ET3DR, KH6's, VE8's, YA, 4W1C, 4W2AA, 4X1DK, 4XØTP, 5X5IU, 5W1AD, 9M2OV and 9M8KZ. He was surprised at the ease with which 5W1AD was worked on both modes, especially since he was the first station even *heard* from that area.

G2DC (Ringwood), as always, used the slack period for a general overhaul of gear and aerials, and is now QRX for some really good conditions. (A major job this year was the lopping of trees that were screening his 40-metre ground-plane—celebrated by a nice QSO with LU6FA, 579 each way at 2130). On Twenty the main attraction has been the Pacific, and Jack comments on the prominence of Samoa, with 5W1AD,



For the last 15 years, Nan Yathe has been serving as a W/T operator in the Naval Station at Singapore. As if this were not enough, at home he is 9M4JY, banging it out on the HF bands, using a Hallicrafters SR-150 into a Cubical Quad. 9M4JY says his hobby is DX-chasing—which must make him a very valuable member of the Singapore Naval Station operating staff.

5W1AZ and KH6FIF/KS6 all coming through most days. The 0700-0830 period has been occupied with VR2DK, KJ6DA, KG6IF, YJ8BJ, CR3AD, the Samoans and "KH6's too numerous to mention."

In the afternoons, between 1400 and 1700, such goodies as YAØH, ZD5M, DU1RS, AP2AR and a few others have been worked (the latter said that all AP licences were probably being withdrawn). Fifteen came up with some pleasant surprises including VR6TC on 21065 kc CW, and Forty has been good late at night, but those nice Pacific periods in the mornings are still rather too early—around 0500. We shall have to wait a few months before Forty is really interesting at a civilised hour such as 0700-0800.

Finally, G2DC sums up Ten by saying "the same old gang are there every weekend, the 9J2 stations always pumping in good signals, but DX from outside Africa is still a rarity."

G3FYR (Orpington) raised KH6 and VE8 recently, and predicts that one year will make a huge

difference to the sunspots (he is comparing 1965/66 with 1955/56, when he used to observe them through a theodolite with a dark filter). He thinks Ten will be open for worldwide DX by 1967—which even seems a little pessimistic to us.

Profile—ZE3JO

It's all too seldom that anyone will tell us enough about himself, his gear and his location to form the basis of a few interesting paragraphs. This month, however, ZE3JO has filled the bill nicely, and we hope others will follow suit—especially overseas stations.

Mal Geddes (ex-G2SO) has a five-acre plot on a hill ten miles NE of Salisbury, Rhodesia, 5,185ft. a.s.l. Despite having to live with a "tin leg," he built himself a real shack out of indigentous rocks from the plot, which took six months of weekend work.

He runs a Viking Ranger II and an Eddystone 888; has a TA-33 Jr. for the three HF bands, plus a ground-plane for Twenty, dipole for Forty and 250-ft. wire for Eighty and Top Band. Mostly CW,

with about 10 per cent phone. Eighty and Top Band, Mal says, are pretty useless, but on One-Sixty he has worked WIBB (the one and only QSO between W and ZE), ZS1, 2, 4, 6, 9, 9J2 and ZE. The normal state of that band, however, even at 0530, is "commercials only, and not a trace of any amateur signals."

An interesting comment from Mal: "On Forty, over here, we get the usual 20-minute 'over,' same as you do, and usually a load of drivel, which bores me rigid." (They're everywhere . . . you can't dodge 'em!)

The proposed trip into Bechuanaland with ZE3JJ is "off," largely because ZE3JO has managed to organise some leave in the U.K. He sails next February and hopes to have eight weeks in England, renewing old acquaintances and even, he hopes, running his former call G2SO for a short while. And he will be getting a new "tin-leg" (a new aerial for trying out his portables on!) from Roehampton, so hopes to make some personal contacts in and around London.

Well, we certainly hope Mal will enjoy the experience of being a plain-ordinary G once more, but imagine it will send him back to his five-acre plot with more joyful anticipation than ever before!

Top Band Topics

A few days ago this paragraph might have started with some phrase like "There's no DX showing up as yet"—but that's all out-of-date now. Things have started happening, VO1FB has started his listening skeds, and has already been worked by G3SED, G3SWH, G3TBJ and G3TTK. He will be QRX at weekends, 0030 onwards, transmitting on 1801-4, listening on 1825-27 kc. (So the "clever" ones who reply on his own frequency are doomed to disappointment.)

G3U - stations are already abroad on the band in some numbers and one who reports, and joins the ladder with 60 counties already worked, is G3UBW (Sevenoaks). As soon as he managed to change from a small aerial to a half-wave, he raised

FIVE-BAND DX TABLE

Station	28 mc	21 mc	14 mc	7 mc	3.5 mc	Countries Worked
G3DO	183	223	316	86	83	322
G13IVJ	177	260	310	102	83	319
G2DC	170	281	307	166	112	321
GW3AHN	151	301	324	71	21	333
G6QB	143	198	288	117	56	314
G3NOF	132	190	262	32	39	282
G3IGW	123	129	153	115	67	189
G3IDG	60	66	53	27	17	96
G3FTQ	46	91	118	58	27	144
G3MDW	43	41	46	7	6	81
G3PEK	18	88	142	119	75	175
G3RJB	11	24	112	46	1	119
GMBRFR	6	50	62	13	10	85
G3UBI	5	14	53	3	21	67
G3KMQ	3	90	208	95	54	233
G3PLQ	1	15	34	6	20	76
G3TJD	0	36	44	47	18	94

about 20 new counties and found he could work the OK's, GM's and so on with no trouble. He uses the band on weekday mornings, too, and confirms our suspicion that there's no one around (except himself and G3TTK!).

One of the latest calls heard on the band is G3UKV, emanating from ex-SWL Martyn Vincent of Cheltenham—with a pretty potent signal, too. Some of these "old-timer" G3T-types will have to look to their laurels.

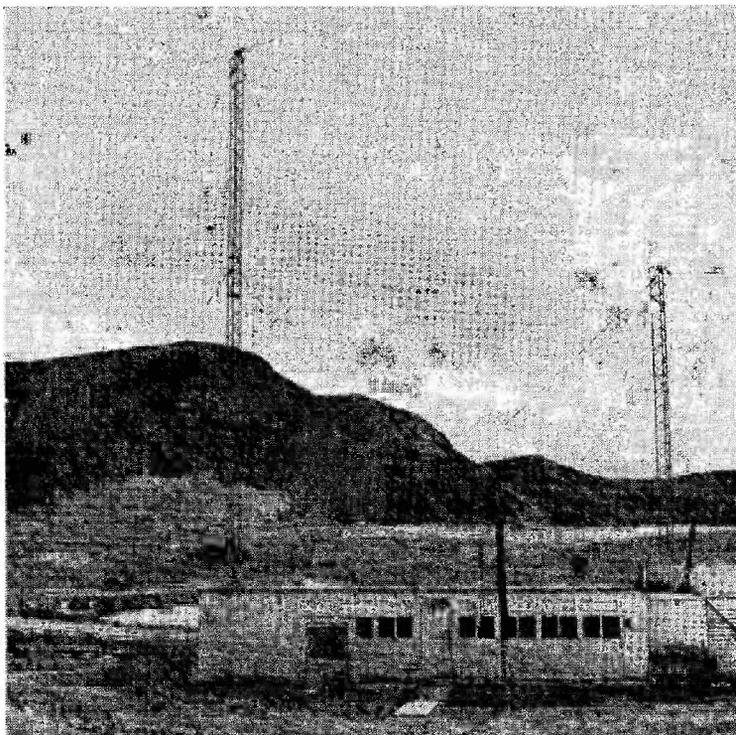
W1BB writes with the dates of the Trans-Atlantic Tests, which have been fixed as December 5 and 19, January 2 and 16, February 6 and 20. December 19 and February 6 have been set aside as "First Timers' Mornings," when it is requested that only those who have never "crossed" before shall call CQ. The others are asked to QRX or get some beauty sleep. We will have more to say on this as the time draws nearer.

"First Timers' Mornings" for the W/VE stations are being added, too, in between the dates of the regular tests. As always, W and VE stations will be asked to keep below 1820 kc, because 1823 and 1827 kc are the best spots for low-powered Europeans to stand a chance of being heard.

Stew hopes to have an even more potent signal this year, having fixed up his Inverted Vee (265-ft. high at the apex) with open-wire feeders. Meanwhile, he mentions working G3SED during July, and being reported 599 by GM3TMK for over an hour on July 18.

G3KPT has already been mentioned (in connection with mains noise). As a new boy to Top Band, he asks "How does one read DX in the bottom 10 kc of the band? My Rx is full of continuous ship-shore carriers in that part." (Ours, too—it's just one of those things).

G2CUZ (Ainsdale) worked a portable one-man session from Cardigan during July. Lack of



This picture, of the radio amateur set-up at Sondestrom in Greenland, is of more than usual interest because it was taken by G3IZJ, ex-VP8AZ, who thus has visited both the Arctic and the Antarctic, with radio amateur interests and activity in mind. This must make him just about unique (certainly in the U.K. amateur context)—but, regrettably, we have to say that at the moment there is no certificate offered for "having visited All Arctic Circles!"

wind spoiled his hopes of kite-flying, but he did very well on a loaded whip and proposes to make up a 30-ft. vertical which he can substitute for the car whip on future sorties. He is just two QSL's short of the 98/98 bracket, and asks what one can possibly do to make some people cough up a card. These two are both owed him by one person, and three SAE's have produced no response. Bitterly, he asks "If a chap is not going to QSL, why the heck can't he say so in the first place?"

G3UJE (Orpington) is another newcomer—licensed on July 22 and already getting worked up about the Trans-Atlantic tests! About 50 locals raised so far, and county-chasing starting very soon.

Quite a lot of amusement about the NSIA character and his life on that "Independent State". . . G3TBJ would like to know whether they have yet issued licenses to white slave traders, head-hunters, nuclear-device testers, and whether they have received offers of aid from a foreign power, including missiles for defence purposes? G3IDG asks whether they have a president, issue their own stamps, have an ambassador in all the main capitals, and are represented at the U.N. The inhabitants, too, obviously have to produce passports before entering the U.K. And he ends: "What possibilities! One could licence oneself for a kilowatt, even on Top Band. And what price a 'Worked All Dogger Bank' certificate?"

G3PLQ continues his travels up and down the African Coast, but thinks he may also have a period in the Mediterranean. He says

Reporting the HF Bands

that the commercial station mentioned by G3TBJ (on 1876 kc) is Radio Barcelona, and adds "you should have heard the wretched thing when we passed close to the Spanish coast to and from Italy."

Other news from G3PLQ, in brief: 9L1TL is in the U.K., but 9L1HX will still be active during the DX season; ZD7GP also returns to the U.K., so he's no longer a "possible"; ZS1XR is listening on 160 and 80 metres for G's and W's; new beacons have been "discovered," which might be of interest in forecasting condi-

tions . . . WCC, Chatham, N.J., on 2036 kc; WNU, Slidell, Mississippi, on 2048 kc; KPH, Bolinas, Calif., on 2045 kc. The latter has been 589 when the W6's have been heard off the 9L1 and 5N2 coasts.

G3SWH (Bristol) has changed to a 45-ft. semi-vertical with 100ft. radials, and says it has put him up *four* S-points in GM and OK; and he was yet another to work VO1FB in late July . . . so he will be taking the DX seriously this coming season.

G3IDG raised GW3OGE/P (Brecknock) and GM3IGW/A (Wigtown), and has now been at the WABC business for 13½ years! He still wants QSL's from Angus and Cambridge.

John E. Parry, radio officer of the m.v. *Susan Constant*, says there's some misunderstanding about "Fish-Fone," much of which is trawler ship-to-shore traffic. But, as he says, QRM can be minimised by selecting a clear channel, using minimum power necessary, and also keeping the calls to a minimum. And he adds that on a few occasions while making R/T calls from his ship he has suffered QRM from amateurs! (But what a lot of people think of as fish-bone—ourselves included—is the frightful over-modulated splatter from foreign trawlers, very near our coasts, bawling at each other over a range of a few miles, or possibly yards! Anyone who doesn't know about this should come down to the South Coast and hear for himself the bedlam that goes on in the Channel . . . and the skippers always use the mike as if it were a loud-hailer. How they understand *each other* is a mystery).

General Chat

A new line in piracy has befallen G3CWL (Leatherhead), who formerly held the call 3A2DA, which is now changed to 3AØDA (all Monaco calls for non-residents have been similarly changed). A pirate has got hold of the old 3A2DA call, and G3CWL is being flooded with QSL's and pleading letters. The trouble is that the pirate actually tells his contacts to QSL via G3CWL, uses his name



On the right, Bob Palmer, G5PP, who has done such sterling work in the DX-pedition field. This was taken when, with GM3LIB, he spent five days in Inverness and Sutherland, six other countries also being covered under the GM5PP/P callsign. Bob says that it was his most successful tour so far.

and generally goes on in the manner in which the original 3A2DA operated—mostly Twenty CW. If anyone can supply useful information about this bod, who can't gain anything by what he is doing, but causes G3CWL a lot of trouble, please speak up!

SWL John Fitzgerald (Great Missenden) puts in a plea for more use of Fifteen, especially by SSB stations. On occasions he has found West Coast U.S.A. stations pounding in (headed by W6AEZ on AM), and he suggests that some of the big SSB boys who clutter up Twenty would be quite welcome on Fifteen.

Concerning the prefix mania, he tells us that all six 4U stations (1ITU, 2ITU and so on) will be active from Geneva on September 19, and HB7ITU will be on at the same time (from Montreux). The Geneva stations, on the last occasion, actually changed the figure in their prefix at regular intervals, presumably to make it possible to work all the different prefixes on all bands. A strange pursuit, but still not so bad, perhaps, as "inventing" new countries . . . or is it?

G3IDG refers to G3TRO and his query, last month, concerning the "big bottles" known as 211's. The gen. on them, says 'IDG, is still to be found in the *ARRL Handbook* . . . but he asks us not to turn this feature into an "Auntie Cynthia's Advice Column"

TOP BAND COUNTIES LADDER

Station	Confirmed	Worked
<i>Phone and CW</i>		
GM3IKD	98	98
GM3KLA	98	98
G2NJ	98	98
G2CUZ	96	98
G3PLQ	92	95
G3SED	81	92
G3RTU	71	75
G3SWH	68	80
G3PPE	63	77
G3OJE	62	63
GW3PMR	61	72
G3LZZ	57	65
G3SVL	54	62
G3IDG	54	59
G3SHY	53	70
G3SJJ	50	83
G3SVW	48	69
GW3TLW	47	59
G3TVW	37	64
G3TSS	36	53
G3SQX	31	64
G3UBW	28	60
G3TQZ	25	53
G3KPT	17	66
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.)

—and we will try hard to resist that temptation.

The Royal Signals A.R.S. has two expeditions coming off in September. From the 18th to the 25th, GB3LPC will operate from Lundy Island, the main object being to work RTTY, though CW and SSB will also be used. Then GD3RWF will be on from the Isle of Man, September 15 to 26, with SSB and CW on all-bands. Skeds may be arranged beforehand, with G3RWF.

G3PLQ remarks that SSB has indeed invaded the world of marine communications, and his company's flagship is now fitted with an SSB transceiver for all shipping bands—1.4 kilowatts p.e.p. or 700 watts CW. But, he says, "try to explain to some of them about PEP and SSB generally, and you're knocking your head against a brick wall. And as for trying to tell them that we mere amateurs have been using it for years . . . well!"

By a late letter, the very latest G call to cross our path has turned up! G3ULY is the callsign of



A group of very active G3S/T's—standing, left to right, G3TKF and G3SED, one of the leaders in our G3S/T Top Band Counties ladder, and a very potent signal in the South Coast area. Seated, left to right, are: G3SJJ (who got the picture while on holiday), G3SZA and G3SWH. It seems that because of "information received" during this encounter, G3SJJ (Nottingham) decided that the only way he could compete on Top Band would be by rebuilding his whole station, including the radial earth system!

TOP BAND LADDER

(G3S-- and G3T-- stations only)

(Starting Date, January 1st, 1965)

Station	U.K. Counties	Countries
G3TBJ	79	16
G3SYS	76	14
G3SED	74	21
G3TYK	72	14
G3SWH	71	13
G3TTK	70	12
G3SJJ	67	11
G3TIK	62	13
G3TVW	62	9
G3SHY	60	8
G3SVW	54	10
G3TSS	53	7
G3SVL	50	10
G3SGC	45	12
G3SZA	45	11
G3TON	41	8
G3TQZ	40	8
G3SQX	40	7
G3TZM	34	7

D. Youngman (Penrith), who is an Australian ex-radio officer, Merchant Navy. He's not yet on the air.

"CQ" Worldwide DX Contest, 1965

Despite the very small entry of actual logs from the U.K., the Contest that seems to attract the greatest number of G's is always this CQ affair, the most fast and furious of them all.

The dates this year are: **Phone Section, October 23-24; CW Section, November 27-28.** It starts and finishes at midnight, as usual, and the rules are unchanged.

The number exchange consists of RST (or RS) followed by the Zone number (14 in the case of the U.K.), not a running serial number. The multiplier consists of the added totals of (a) Countries, and (b) Zones worked on each band; the contact points are 3 for different continents, 1 for different countries, and none for the same country (though the multiplier thus obtained may be counted).

Logs, postmarked before December 1 for the Phone section, or before January 15 for the CW section, to CQ WW Contest Committee, 14 Vanderventer Avenue, Port Washington, L.I., N.Y. 11050, U.S.A.—and don't forget to indicate clearly whether they are for Phone or CW.

Not in 9M4-Land!

Recent remarks about the "LF bands being temporarily closed for DX" have brought forth a letter from Bob Snyder, 9M4LP, refuting this and telling us that in the last few weeks he has worked GW3AX, GI3OQR and DL5UW on Forty SSB, all 5 and 9 both ways; several other Europeans and U.K. stations, same mode; 5WIAD on Forty CW; GI3OQR on Eighty SSB; and EI9J on Eighty CW. Not one of these contacts was pre-arranged.

He has found DHJ59, on 1830 kc, strong in the mornings, and on August 3, at 2245 GMT, heard a G station (but unidentified) at 369 on 1838 kc CW. Bob has also been very active on Twenty and

Fifteen CW and SSB, but on Ten he hasn't heard a single thing except when he worked DL7AA on an SSB sked (July 11). 9M4LP and his family will be on vacation until late October, so it's not much good looking for him now!

Sortie to GC

G2HFD made another of his trips to Alderney between July 24 and August 14. He worked mainly on SSB with his KW-2000 and home-brew linear, into a 41-ft. vertical with radials, and also a 250-ft. wire. Nearly 1000 QSO's were made, from 75 countries, although conditions were disappointing.

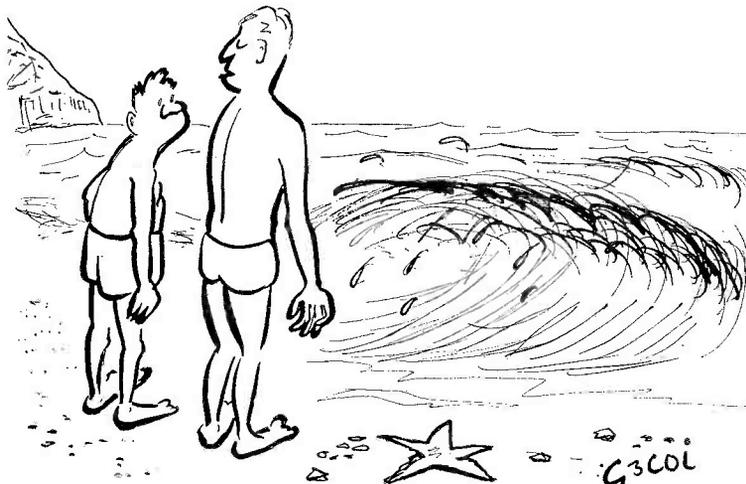
Some of the best raised on Twenty SSB were ZD5D, ZD8HL and 8TV, HS1F, HKØQA, 9M4LP and 4MX, LA/P's on Jan Mayen; and a few stations were worked on both Twenty and Forty, including 0X3JV, 7Q7PBD, ZS's and so on. An unusual QSO was with W6GVM—it gave him his 320th country!

Howard says things are not too easy in Alderney, since air freight is the only satisfactory way of getting the gear there, and the number of good locations is limited. Electricity is 1s. per unit (not that that matters much for a short operation, but it might keep any permanent stations a little more QRP than they would otherwise be!).

RTTY Contest

The first *Alexander Volta* RTTY DX Contest was held on May 22-24, 1965, and organised by the SSB and RTTY Club (Box 144, Como, Italy). There were 145 entrants from the U.S.A., 22 from Italy, 7 from the U.K., and small numbers from several other countries.

The three top scorers were I1AHN, SM6CSC and G2HIO, all of whom worked five continents (Asia was not represented). The numbers of QSO's for these top three were 129, 103 and 76 respectively, in 18, 15 and 14 countries. The five DX bands were used, and the level of enthusiasm was high, judging by the participants' comments which are published along with the results. Entries were received from 24



“... Shall we stand by for the breaker ...”

countries and 29 States.

DX Shorts

YJ8XX has already been mentioned — the operator was VK2AEY; but no sooner had he started the bands humming than YJ8WW showed up! And this turned out to be Don, W9WNV, in the course of his tour. Latest news of Don (in Mid-August) is that he now holds the calls VR2EW, ZM7AJ and also has permits for two Pacific reefs which have been given the OK for separate DXCC status. But as the two Chinese operators are now available for the BY activation, Don and Chuck (K7LMU) will hurry to Asia, returning to the Pacific after their 8F and BY exploits.

Danny Weil, ex-VP2VB and all the other calls associated with *Yasme* and her travels, is now an American citizen. He is president of the revived *Yasme* Foundation, which will sponsor W6KG's 10-year DX-pedition (and, by the way, G2DC is now a director of the foundation).

9F3USA is another “special,” activated by FL8AK and members of the ET3USA club... 9M8KS (not 8KW as stated last month) is G3GPE, operating CW on 7040 and 14080 kc and looking especially for G stations... KX6BQ is Martin, ex-VR30, now on Eniwetok.

W5LAK, another well-known

globe-trotter, may appear from BV and VU before returning to his OD5 location (he is now OD5EE)... VQ9J has been reported on 7003 and 14035 kc CW, various times from 2000-2300... VKØTO (Macquarie) is on 14175 kc AM, but replies to SSB stations... Pacific activity, all on SSB, includes KJ6DA, W7MHI /KJ6, KS6AW, KS6BO, KS6BQ, KØHGM/KS6, WB6PSV /KS6, KX6BQ and KX6NK. Take your pick, if you can find 'em!

DJ2KS/PYØ is expected on from Fernando de Noronha, possibly September 13-14, mostly Twenty SSB... ZA1AD, ZA2BBL, TA1DB and VQ9J, recently—all phoneys!! But there is a genuine VQ9J around, too... There may be a DX-pedition to Ifni (EA9) about September 20 — beams, linears and the lot.

PY operators were promising operation from *Trinidad* Is. (PYØ) at the end of August or beginning of September. Maybe it hasn't yet happened, so it's worth looking out for.

DI2DR has been stirring up the WPX-hunters—it's the call used by DJ2KS aboard the *Research Vessel Meteor* in the South Atlantic.

Sign-Off

So now we must dash off to finish installing that RTTY-mobile in the Mini. All that's holding it up is the design of the log-periodic

halo to go with it. (Send your subscriptions *now* to STOIC—the Society for Tuning-up On Inter-Looping Commercials).

Next month's deadline for all

your news will be **first post on September 13**. We hope there will be a lot of it, as the bands open and the holiday season closes. Address it all to Editorial Dept.,

Short Wave Magazine, Buckingham, England, and mark the letter "Communication and DX News." Until then, we wish you 73, Good Hunting, and—BCNU.

• • • The Mobile Scene • • •

MINISTER DECIDES NOT TO PROHIBIT DRIVER- OPERATION UNDER MOBILE CONDITIONS

As many people interested will already know, it was announced on August 4 that the Minister of Transport had decided that there was no case for prohibiting the use of hand-held microphones while on the move—but that the position would be reviewed in two years' time. So that's that. However, it is clear that an independent microphone mounting, with either foot-controlled or flick switch change-over, so that both hands can be kept on the wheel while operating, should be the objective in any properly thought out amateur /M installation. In fact, as amateurs we can get ahead of the commercials in this respect, since most of the latter involve

a GPO-type hand-set, with a pressel switch.

On July 18, the Worcester & District A.R.C. held a very pleasant get-together at Callow End, for which they had a turn-out of about 45 vehicles, most of them equipped /M, and it was a warm and sunny day for their 100 or so visitors. A buffet tea was laid on by the wives and YL's of members, there was a good raffle with what are described as "mixed prizes," and the only slight *contretemps* was the failure of the VHF Tx for talk-in. However, the Worcester boys will see to it that that doesn't happen again.

[cont'd on p.427]



The Cornish boys had a bad day for their Rally at Pentire Head, Newquay, on July 25. It rained most of the time, with strong winds at an exposed location—which otherwise should have been bathed in sunshine, with golden sands spread out below. Nevertheless, there was a muster of nearly 40 cars equipped for mobile operation, and by 4.0 p.m. GB3CRC had worked 28 /M's on 160 metres. It was a good Rally, spoilt only by the weather.

A G3GMN print

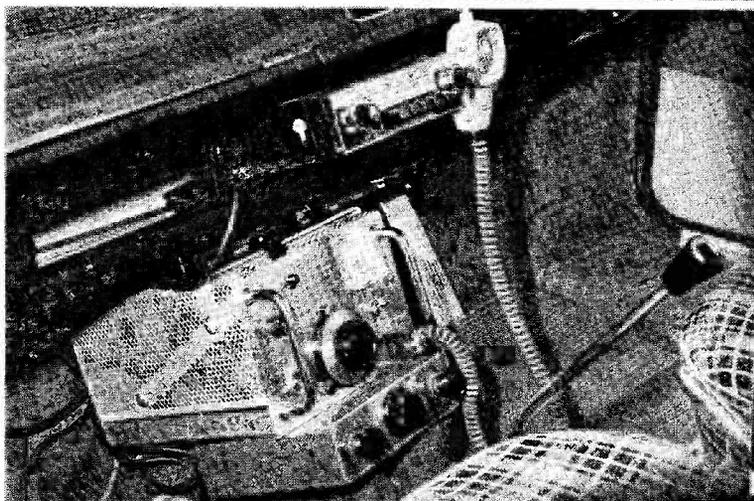


Impression of the Worcester Club's Rally venue at Callow End, for which they had a warm and sunny day.

A G3GMN print.

The tenth anniversary Rally was organised by the Oxford & District Amateur Radio Society, whose trophies are shown here, together with a copy of the November 1955 issue of "Short Wave Magazine," reporting the first-ever Mobile Rally held in the U.K.

A G3NMR print.



Seen at the Worcester Club's meeting at Callow End: The G3SMT/M installation for 160m, fitted in his MG-1100. The rig is a 10-watt Tx with a 160-metre converter feeding the car receiver as IF/AF amplifier.

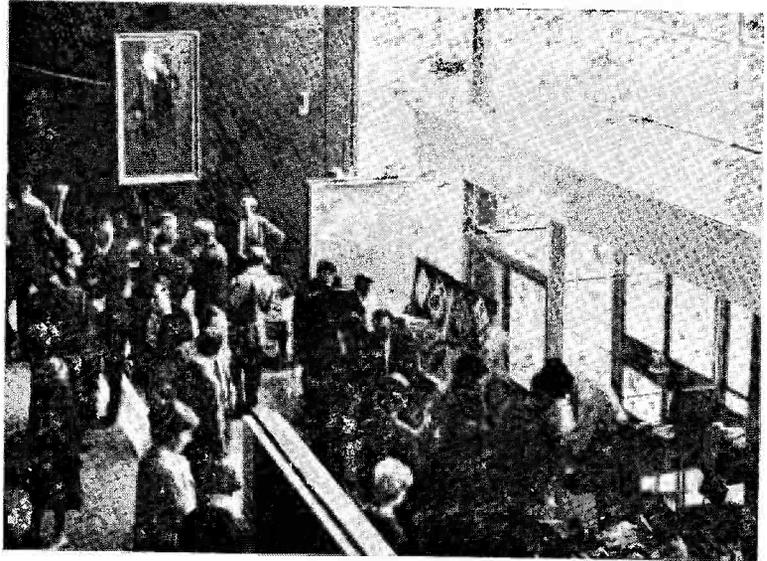
A G3GMN print.



For their Rally on July 18, the Worcester & District Amateur Radio Club ran the usual raffle—here we see G3NUE officiating.
A G3GMN print.

General view in the foyer of the College of Advanced Technology, Headington, Oxford, where the Tenth Anniversary Mobile Rally was held.

A G3NMR print.



For their event at Newquay the following weekend, July 25, the Cornish R.A.C. were most unfortunate with the Wx—it was wet and very windy on the exposed Pentire Headland, with poor visibility. Of the 65 vehicles in the park, about 40 were /M's, and GB3CRC worked 28 mobiles on 160m. This was a well-organised Rally spoilt only by the weather. Prize-winners for the best home-built mobile rigs were G3KVF/M, G3GMN/M (who also took the pictures), and G3PVB/M

Though no report on the Derby Rally on August 15 is yet to hand, we have one on the Annual Inter-Club Picnic held at Harrowbeer, Roborough, Devon, on that day, in brilliant sunshine. The event attracted contingents from the Exeter, Kingsbridge, Saltash, Yeovil, Cornish, Torbay and Plymouth Clubs, the latter being the organisers, with visitors from the London area. The Torbay group arrived in a bus hired for the occasion. G3PRC/P was operated (by

Barry Curnow, G3UKI) on 80m. Phone, and he was kept hard at it for two hours of contest-style operating. The VHF talk-ins were G3BRJ/P on two metres and G3LMG/P on four, several /M's being worked by both. The affair is described as an unqualified success, and it is interesting to note that it has grown from a small picnic-meeting first held about five years ago.

Rallies now scheduled are the Belgian International Meeting on September 12 (see p.362, August issue); the RSGB Rally, on the same date, at Woburn Abbey, with GB3RS and GB2VHF giving talk-in on 2-4-80-160m., always a well-attended event, as there is much to see and do at Woburn; and the Harlow & District R.S. Rally on September 26, at Magdalen Laver Village Hall, Potter Street, near Harlow, Essex, with talk-in by GB3HRS, for which, we are informed, "many interesting things have been arranged."

VHF BANDS

A. J. DEVON

UNDOUBTEDLY, the big news this month is the lofting of the Dutch balloon, carrying a two-metre translator all-same *Oscar III*—this was early on the morning of Sunday, August 22 (why do these things always have to happen right on the dead-line!). It was a very intelligently conceived operation, under the general direction of PAØIJ, and the PAØ boys are to be congratulated on the great success of their effort.

Briefly, the idea was to put the balloon up, under suitable Wx conditions, carrying the equipment, and let it rise till it burst, at a height of about 30 km., when the gear would be lowered by parachute for eventual recovery. (How this latter part of the operation went we do not know at the moment). From the U.K., it was available from about 0600 till 0715z, when the balloon apparently burst, because functioning ceased abruptly. Power on the transmit-channel is given as 300 mW, but the strength of the transponded signals was such as to suggest a good deal more than this. They were, in fact, about

45-50 dB above Rx noise; as G3BA says, this goes to prove that the *Oscar III* receive-channel must have been faulty, and the trouble there was not Rx overload by QRO signals, plenty of which were about on August 22.

Indeed, the QRM was terrific, and it seemed that practically everybody trying was getting a repeat—the 40 kc of the balloon's transmit-channel sounded like 20 metres when it is open for DX. From the reports so far received, it would seem that everyone would have had a better chance if more CW and less phone had been used. As the balloon gained height, so a greater area was brought within operating range, which for U.K. stations meant mainly the northern part of Europe, with some chances for GDY.

G2XV (Cambridge) heard, via balloon, 14 different stations, from DL, ON and PA, eight of them being G's. G3HRH (Welwyn) logged 12 stations, six of which were G's—G2JF, G2XV, G3BA, G3EMU and G6AG; the others were DL's and PA's. Ray says he found the presence of strong SSB phones very trying, and G2XV agrees with that opinion.

The only "worked" report yet received is from G3BA (Sutton Coldfield); Tom raised G6CW, PAØLBF and DL3SP, in that order, with a couple more half-contacts QRM'd out. His opinion is that the AM/FM stations were the real pest on this occasion, some of the SSB's with a poor transmission characteristic also causing a great deal of unnecessary QRM. On the other hand, those with a good, clean signal (like G3MED, who had seven or eight contacts) only produced what one might call a normal-QRM condition.

It is to be hoped that this experiment will be repeated, if possible with longer notice and wider publicity—though the actual time and date of launch will always be governed largely by the weather and the local forecast. As has also been suggested, it would likewise be a good thing if the U.K. VHF fraternity could

give some material assistance with the project. In the meantime, our thanks to the PAØ group for a very fine effort, and again our congratulations on its success.

More MS Results

During what must have been the *Delta-Aquarids*, normally a relatively insignificant Shower, G3CCH (Scunthorpe) worked UA1DZ for his 22nd country. This was on July 28, 2200-0005z, with what Johnny describes as "a colossal burst" at 2244-45, when both calls and report were received. UA1DZ got all he needed from the G3CCH signal at 2236, and the "R" at 2339, the final "R" being given at 0002.

That *Delta-Aquarids* was far from insignificant on this occasion is shown by the report from EA4AO (Madrid), who worked DM2BEL on July 29, his signals being particularly good, at S6 for most of the time and occasionally up to S8. Martin reckons the *Aquarids* did very well for them, as there were pings of great frequency and some good long bursts, which enabled them to finish the QSO within two hours.

EA4AO was also on for the *Perseids*, August 10-14, and his sked with OK2WCG produced some signals every night, but it was not till the 14th that the full QSO was made, when long bursts gave them contact in the relatively short time of 1 hr. 40 mins. The skeds were kept daily, 0100-0400z—which shows what hard work this EDX by MS can be—and attempts were also made by EA4AO with SM6CSO and SP9AFI, but neither of them were heard in Madrid. Martin is now at his new QTH, out of the local screening, and the Tx is running 500w. to a pair of 4X150A's, on 144-102 mc. Incidentally, harking back to the sporadic-E manifestation of July 4, as reported in our last, Martin mentions that SM7ZN worked EA3JR and EA3LL, the Swedish station reporting that EA3JR's signals were so strong that he could hear the birds in his garden! Several other interesting EA/I/SM contacts also took place on the same occasion, and it seems

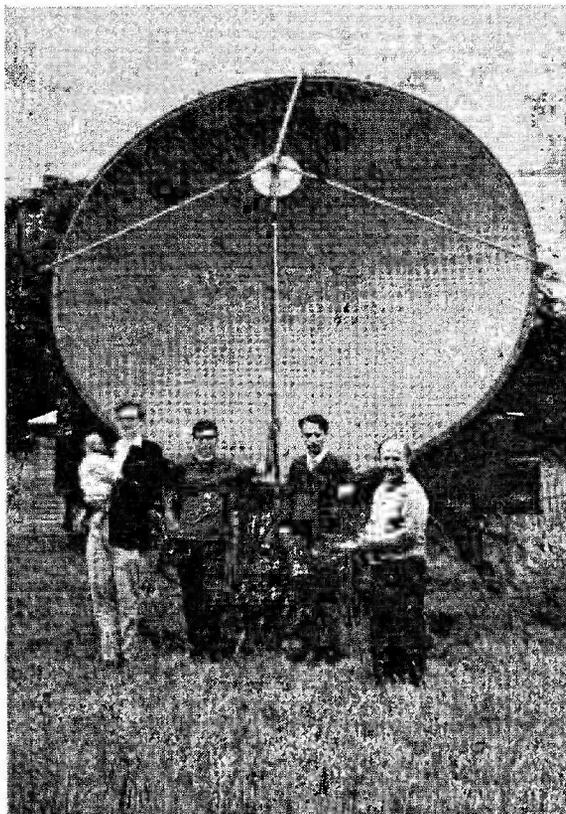
that there is quite a lot of EA activity on two-metre phone.

G3LTF and KP4BPZ

Peter of G3LTF (Galleywood, Essex) now reports on his 70-centimetre results with KP4BPZ, over the E-M-E path. On July 3, he was a very good SSB signal, at G3LTF, 57 or so most of the time. Peter got a CW contact, with a 549 report, his gear consisting of a 15 ft. dish with dipole feed, the Rx involving a parametric amplifier into a pre-amp., with a xtal mixer, a first IF of 12 mc and second of 5.5 mc. His Tx takes a 4X250B in the PA, and the frequency is 432.031 mc.

During the test on July 24, the most exciting result for G3LTF was to hear *via* the Moon, at 339 on CW, WA6LET, who was using the 150 ft. dish at Stanford University, Calif. (This had nothing to do with the KP4BPZ tests, as WA6LET was working independently—it just happened that they were both using the Moon at the same time). Another CW contact G3LTF/KP4BPZ was duly obtained, with a report in of 569. Peter says that though he tried it on both occasions, he was quite unable to raise KP4BPZ with his SSB—this could well have been because the Rx at the other end was full of strong W/K signals, G3LTF only being noticed as DX when he was recognised on CW.

Main improvements in the gear at G3LTF since last year lie in the Rx side. The dish has been lifted to give a better horizon, its dipole feed has been improved, and the pre-amp. now works properly, giving a gain of about 15 dB in a bandwidth of 300 kc or so. The main Rx is an R.1475, filtered down on the output side to a 100-cycle bandwidth for CW, or 2.5 kc for SSB phone. Effort to improve the gear goes on all the time, Peter's objective being to hear his own echo from the Moon, this being about the ultimate, as it would prove that two-way VDX working should be possible. Apparently, W1BU, also an E-M-E specialist, can hear his signal coming back, at 25 dB above noise in a 100-cycle bandwidth—but he has a 28ft. dish.



Using a dish borrowed from the University of Birmingham, G3PAC and G8AEG (centre two in this picture) made an attempt on KP4BPZ for the 70-cm. test on July 24. Though these boys had the aerial, they had to work round the clock to make the gear function, eventually getting about 50w. of RF out of a QOV6-40A tripler. Their Rx was a converter using two GG RF stages into an AR88. With this set-up, they measured the minimum detectable CW signal as 0.1 μ V, compared with a calculated return-signal from KP4BPZ of 0.3 μ V. The DX was duly heard on 432 mc, and for three hours from 1110z, KP4BPZ was clearly readable on CW at signal levels from RST-549 to a very good 579 at times. His SSB was a bit difficult to resolve, but was RS-56 on occasions. The whole KP4BPZ manifestation was tape-recorded and about a dozen QSO's were followed, including G3LTF/KP4BPZ. In spite of repeated calls, the Birmingham group were not able to make contact. But we congratulate them on a very good effort.

DX-Pedition News

The GB2GC boys are, of course, still over on Alderney, and doing very well; they have handed out some good QSO's on three bands at least, but we have no news of any 23-centimetre results. The sked-keeping and making arrangements seem to be running smoothly, and a feature of their operation is the consistency of their two-metre signal on the mainland. They had rather a bad time on the night of Friday, August 20, when there was a storm in the GC area, necessitating a major reorganisation of the

two stations (as A.J.D. was in this storm himself, the news is *via* G3HRH).

G3HRH also reports nice contacts with the G3SIC/G3STW expedition into West Wales; very sensibly, they were using CW as well as phone.

As previously reported, the home end of the GM3RUF/P operation was in the hands of G3BA, as regards arranging skeds and so forth. At the moment of writing, they had not, of course, started out, but we hope to be able to discuss results next time.

[over

According to G3BHT, conditions for his trip to Eire during the early part of the period with G3SKT and signing EI2AX/P, were generally very poor. However, they worked two metres and four metres from the counties of Carlow, Wexford and Wicklow—all rare enough, one would say—and raised about 10 different G's on both bands. G3BHT remarks

that the most consistent signal on two metres was G5MA, and on four metres G3EHY. EI2AX/P heard and called a fair number of stations without response, and G3BHT says that it seemed people were not listening carefully enough. When contacts were made, reports were about what would be expected for the power in use.

VHF Convention Reminder

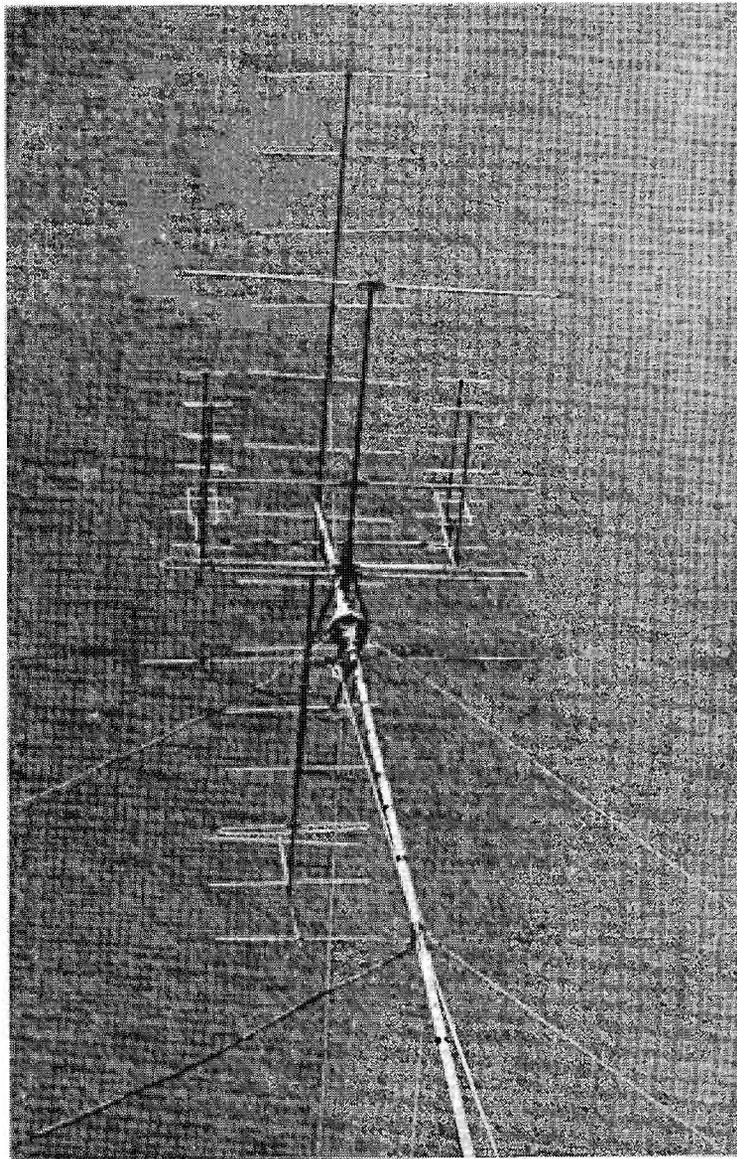
We are asked to remind all interested of this important event, to take place at the Grosvenor Hotel, Deansgate, Manchester, on Saturday, September 18. The booking office is in charge of Tom Davison, G3AGS, 18 Boardman Road, Higher Crumpsall, Manchester, 8 (Tel. Cheetham Hill 2762), and the inclusive cost is 25s. He can also arrange overnight accommodation, though not necessarily at the Grosvenor, at this stage.

The North-Western VHF Group have laid on a very good programme, and the lecture by G3CCH/G3LTF on E-M-E operation, timed for 5.15 p.m., will be preceded by some interesting visits, for those who wish to know what goes on in the control centre for Ringway Airport; or the GPO's radio/TV centre at Manchester; or at the Nuclear Reactor Centre, Risley. Transport will be available, at a small extra charge per head. Since accommodation for these trips, as well as at the dinner table itself, is necessarily limited, you should get in touch with G3AGS right away.

Two-Way Amateur TV

A most interesting report from G5ZT (Plymouth), who is also G6ABC/T on the A/TV front. Taking all that gear out portable, to Kit Hill in Cornwall, he worked back to G6ARE/T in Plympton, near Plymouth, sound and vision both ways! This was on the evening of August 7, and is certainly a record of some sort. The gear at G6ABC/T/P consisted of 20w. Tx, portable 14-ele beam, and transistorised converter for 432 mc, into a standard TV receiver (405-line). G6ARE/T, who is also G3ARE for the other bands, runs 100w. input for TV transmission, with a 4X150A in the PA, an 8/8 beam, and a 432 mc TV tuner into a standard 405-line receiver.

G5ZT says that, as G6ABC/T, he and G6ARE/T intend to go out further to extend the range, and are open for skeds (*QTHR*), the point being that from the high ground in the neighbourhood, he reckons that stations in Bristol, Bournemouth and London should



VHF aerial set-up at EI6AS, Dublin, who is ex-G3JLA of Stevenage, Herts. Here we see a 13-ele beam for two metres, at 44ft. (upper array). Below that is a 6/6 Yagi for 70 centimetres, the 430 mc band. Underneath is a 4-element beam for four metres. The whole lot is turned by a CDR rotator. Now fully equipped, EI6AS is competing for Eire on the VHF bands.

have a good chance of receiving their A/TV signals. They are both very keen on running skeds to try for DX in the amateur TV context. (Some of our DX/TV SWL's might note this.)

Still on 70 centimetres, G5ZT also reports a QSO with GB2GC on August 21; for straight AM work on 70 cm, the TV transmitter is used, with normal plate-screen modulation.

GC2FZC (St. Peter Port, Guernsey) is now on 70 centimetres, and during the period worked G3JGI, G3MPS, G5ZT and G8ADP, with heard-reports from GW3MFY and GW4CG. His Tx runs at 24w. and the beam is a 10-ele Yagi—and, needless to say, he would much appreciate co-operation from any mainland stations operating on the 430 mc band.

Another to have worked GB2GC on Alderney on this band is G2XV, which puts Gerry up to 43C in the Seventycem All-Time, and still out in front. (This is one of the several tables we hope soon to have space to show again.)

G3KQF (Borrowash, Derbys.) reports that he now has the 70 cm. gear fully operational, with a CC converter using an A.2521 RF stage, a 10-ele J-Beam at 40ft., and the Tx taking 24w. to a QOV06-40A as a straight amplifier.

Four-Metre News

Another of the Eire expedition stations was EI4AW/P (G3JHM on holiday), who worked G13HXV (Belfast) on 4 metres while in Co. Wicklow. The latter reports that GM3RIK/P and GM3RWM/P gave the GI boys some useful contacts—and G13HXV was calling himself GM3HXV/P for a recent holiday fortnight, but was rather disappointed with the 4-metre activity in those parts.

G3TLB (Tunbridge Wells) has now got going on 70-476 mc, using a QRP rig consisting of a Pye "Reporter," modified for tuning on the Rx side, and a 2-ele beam. With only 3w. input, eight counties have been worked, including GB2GC with an RS-45 report.

From up in Macclesfield,

G3OHH at 50C in the All-Time has got his total of different stations worked on the 4-metre band up to 264.

G3TNO (Horsham, Sx.) has made a few changes to the 4m. rig, with what he calls "encouraging results." Incidentally, he is now active on all bands, two metres to Top, with all the gear home-built—which is worth a mention somewhere, so we say it here.

According to G3PMJ (Abbey Hey) 4-metre activity is pretty high in the Manchester area, most people using either Pye "Reporters" or B.44's, modified, with quarter-wave verticals—all right for local work, but G3PMJ himself now has a 5-ele beam at 35ft. for 4 metres.

G3LAS (Berkhamstead) has got to 26C in 4m. Counties, and G2DHV (Sidcup), who has not been very active, reports 9C for that table.

EI6AS (Co. Dublin) says he is in a go-condition for four metres—in fact, on all nine bands 70 cm. to 160m.—and shows 5C worked, including GD3FOC and EI2AX/M as two of the more interesting ones.

Squeezed Out

There are those who may wonder why Two Metres has not been getting full coverage recently. The reason is that there has been so much else to talk about that time and space have run out before we could get round to what is, after all, our basic VHF band, on which nearly everyone starts, and which for years has been the foundation for all VHF activity in the U.K. All we can do now is to acknowledge two-metre reports from: G3TNO (Horsham, Sx.); G3HRH (Welwyn, Herts.); G3SKR (Wembley); G3TKQ (Colchester); G3DVQ (Purley); G3GSO (Derby); G3FYR (Orpington); G3OWA/G3PRQ (Coulsdon, Sx.); G3BNL (Keyworth, Notts.); GW3CBY (Swansea); EI6AS (Dublin); G3LAS (Berkhamstead); G3KWH (Welwyn); G3PTM (Solihull); G3UAW (Harborne, B'ham); G3EKP (Belthorn, Lancs.); G3HWR (London, N.W.3); and G2CZM (Chesham, Bucks.).

All claims made have been noted for the various tables. Which brings us to:

The Tabular Matter

Final placings for the Three-Band VHF Annual and the Two-Metre Annual will appear in the October issue. They ran until August 31, so we must allow time for any further claims up to that date to be received.

The Three-Band has now reopened, for the year to August 31, 1966, and the new Table will be started as soon as a reasonable number of claims have been staked—we anticipate that this should be possible by the November issue. So put in whatever you have for any of the three bands as soon as you can.

It looks as if the Three-Band Annual will suspend, if not eliminate, the separate listings band-by-band on an annual basis. But we will keep to the All-Time, for all bands separately, as under the present system. (Unless anyone has other suggestions to make?)

As mentioned on p.46 of the March issue, it could be that, when the new Table gets under way, we shall juggle on the loadings a bit, by using multipliers, to give the various bands differing points-value. But, as promised in March last, this will not be done without at least a month's notice. And also, as hinted in February, a small prize will be given to the emerging leaders, band-wise; this will be worked out by your devoted A.J.D. when the final Table has been prepared for the October issue.

Dead-Line

The next time we try to bring you some interesting VHF news will be on October 1—which makes the dead-line about as tough as they come. It means that we must have all your news, views, claims, ideas, opinions and criticisms by **Monday, September 20** latest, addressed: *VHF, Short Wave Magazine, Buckingham*—which is good enough to find your A.J.D. Watch the Wx charts, call CQ every now and then even if the band sounds dead, and look for interference patterns on your TV/Rx. 73 de A.J.D.

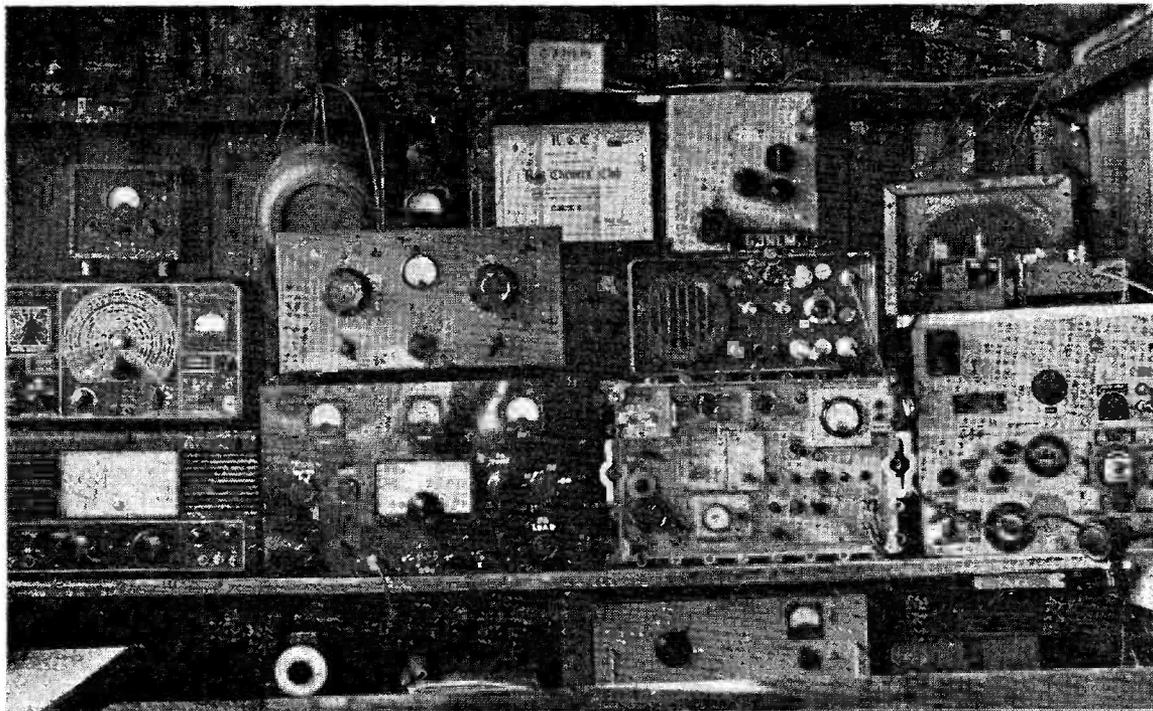
NEW QTH's

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.

- G3FIM**, C. M. Cummings, 6 Molesworth Road, Plympton, Plymouth, Devon. (*re-issue*).
- G3KGZ**, W. J. Wallace (*ex-DL2GZ*), c/o Sgts' Mess, R.A.F. Station, Uxbridge, Middlesex.
- G3TML**, T. H. Lloyd (*9LITL*), c/o Atkins Filling Station, Burton Road, Findern, Derby.
- G3TOC**, H. N. Bagby, 129 Enfield Road, Hunt End, Redditch, Worcs.
- G3TOQ**, N. C. Taylor, 83 Stoneham Close, Tilehurst, Reading, Berks. (*Tel. Reading 28893*.)
- G3TSD**, F. Scowen, 29 Queens Road, Wallington, Surrey.
- G3TUE**, R. G. Parsonage, 5 Milman Road, Reading, Berks.
- G3UAP**, P. P. Parker, 60 Franklyn Road, Canterbury, Kent.
- G3UEX**, R. G. Thompson, 12 Evolina Street, Belfast, 15.
- G3UGD**, Mrs. Louise Niman, 9 Montgomery Drive, Unsworth, Bury, Lancs.
- GW3UGI**, F. R. Pritchard, Holly Brae, Rhyddyn Hill, Caergwrle, Wrexham.
- G3UHK**, J. E. C. Baldwin, 7 Oldbury Court Road, Fishponds, Bristol.
- G3UHP**, T. L. Smith, 19 Durham Drive, Draycott Park, Rugeley, Staffs.
- G3UHT**, W. Garner, 16 Dale Street, Brighouse, Yorkshire.
- G3UHU**, D. Hampton, 4 Ferens Close, Gilesgate, Durham.
- G3UHV**, C. J. Sutton, Braehead, Old Lane, Brown Edge, Stoke-on-Trent, Staffs.
- G3UIJ**, M. J. Peake, 5 Seaton Close, Whitton, Middlesex.
- G3UIS**, A. P. Stone, 3 Queens Road, St. Annes-on-Sea, Lancs. (*Tel. St. Annes-on-Sea 25312*.)
- G3UJE**, B. D. R. Gale, 49 Chelsfield Lane, Orpington, Kent. (*Tel. Orpington 24329*.)
- G3UJF**, J. W. T. Ashcombe, 47 Arcadian Avenue, Bexley, Kent. (*Tel. Bexleyheath 4220*.)
- G3UJQ**, J. D. Scott, 6 Ravenslea Road, Wandsworth Common, London, S.W.12.
- G3UJS**, D. L. Smithdale, Police House, Snettisham, Kings Lynn, Norfolk. (*Tel. Snettisham 205*.)
- G3UJX**, H. G. Lee, 30 Manor Drive, Upton, Wirral, Cheshire. (*Tel. ARRowebrook 1518*.)
- G3UJY**, J. Kirk, Merriscourt, Churchill, Oxford. (*Tel. Kingham 270*.)
- G3UKE**, P. W. Adams, 15 Ollards Grove, Loughton, Essex. (*Tel. LOughton 1812*.)
- G3UKI**, B. J. Curnow, 112 Mount Gould Road, Plymouth, Devon.
- G3UKO**, E. I. Owen (*DL2IL, ex-ZDIEO*), T. A. Centre, Horns Road, Barkingside, Ilford, Essex. (*Tel. VALEntine 2066*.)
- G3UKR**, D. Cotter, 4 Radstone Court, Hill View Road, Woking, Surrey.
- G8AIA**, A. R. Clemmetsen, 4 Kings Drive, Whitley Bay, Northumberland.
- GW8AIB**, W. C. Brown, A.I.E.R.E., Pendref, Caersws, Montgomeryshire.
- G8AIV**, W. Symes, 12 Coniston Road, Irby, Heswall, Wirral, Cheshire. (*Tel. Irby 2988*.)
- CHANGE OF ADDRESS**
- G2QY**, G. P. Anderson, 5 Ratcliff Lawns, Southam, Cheltenham, Glos.
- GW3DUC**, E. H. Williams, Oakdene, Grange Road, Bronington, Whitchurch, Salop.
- G3GNR**, R. E. Short (*ex-GM3GNR*), 3 Park Meadow, Princes Risborough, Bucks.
- GM3HAM**, Lothians Radio Society, c/o J. Gorrie, 32 Allan Park Grove, Edinburgh 11.
- G3IAR**, M. Crowther-Watson (*ex-ZBIAR*), Highfield House, West Kingsdown, Sevenoaks, Kent.
- GW3IEM**, D. M. Lewis, 4 Camberwell Avenue, Cefn Glas, Bridgend, Glam.
- G3MCW**, R. A. E. Fronius, 30 Rowan Green East, Brentwood, Essex.
- G3MJK**, J. C. Clinch (*VS2ER/DL2ER/9M2ER*), 22 Coldstream Gardens, West Hill Road, London S.W.18. (*Tel: VANDyke 7910*.)
- G3MPB**, A. R. Smith, Pencraig Post Office and Stores, Pencraig, Ross-on-Wye, Herefordshire.
- GW3MQX**, P. Lane, 4 H.M. Coastguard Houses, Holyhead, Anglesey.
- G3MUM**, P. Odell, 3 Briar Grove, Redcar, Yorkshire.
- G13NEB**, J. E. Wilson, 76 Castlemore Avenue, Upper Knockbreda Road, Belfast, 6.
- GM3NHQ**, T. Harrison, 7 Cults Gardens, Gottenstone, Broughty Ferry, Dundee, Angus.
- G3OLY**, J. E. Boylett, 6 Wheat Hill, Letchworth, Herts.
- G3PMT**, J. S. Russell, c/o Sgts' Mess, R.A.F. Station, Bawdsey, Woodbridge, Suffolk.
- G3RKH**, J. L. Marshall, 12 Ellesmere Road, Chorlton-cum-Hardy, Manchester 21. (*Tel: CHOrlton 3134*.)
- G3SAG**, R. T. Matthews, 59 Enfield Road, Hunt End, Redditch Worcs. (*Tel. Astwood Bank 2573*.)
- G3SAH**, R. J. Matthews, 59 Enfield Road, Hunt End, Redditch Worcs. (*Tel. Astwood Bank 2573*.)
- G3SSM**, N. A. Currey, Wardens Flat, St. Albans Court, Walingford, Berks.
- G3TAZ**, R. Davies, 5 John Knight Road, Collycroft, Bedworth, Warks.
- G3TJP**, D. J. Pratt, 32 Cornwall Avenue, Clayton, Newcastle, Staffs.
- G4CO**, A. P. McCabe, 7 The Crescent, West Kirby, Wirral, Cheshire. (*Tel. Caldy 6946*.)
- G18ACY**, C. J. Champion, 27 Ethel Street, Lisburn Road, Belfast, 9.
- G8DR**, D. R. Aston, 214A Station Road, Edgware, Middlesex. (*Tel. STOnegrove 7924*.)

AMENDMENT

- G6PXX/T**, J. J. M. Phillips (*ex-G3PXX/T*), 52 Allans Meadow, Neston, Wirral, Cheshire.



THE OTHER MAN'S STATION

G3NLM

INSIDE the station of G3NLM—K. J. Singleton, 8 Westmoor Grove, Heysham, Morecambe, Lancs.—who has his shack in the back garden.

From left to right, the equipment consists of an Eddystone S.640 receiver, with a Triplett signal generator and Model 1632 frequency meter and, on top, an S-meter using a 19 Set panel instrument. Next is the 10-80m. transmitter, this being a Miniciter exciter unit driving parallel 807's to 75 watts. Above is a Z-match with incorporated SWR indicator.

The tin enclosing another 19 Set meter is a field strength indicator for the 70 mc band. The "object" at the back is not, says G3NLM, an old Wehrmacht helmet fitted with a fan, but his speaker! To the right of the R.C.C. Certificate—the only such diploma likely to be gained for G3NLM, he also remarks—is a B.46 receiver covering 1.4 to 15 mc, having an S-meter to a SHORT WAVE MAGAZINE design. Above it is a B.44 Tx/Rx converted to 4 metres, and on top of that is the 5-watt 160m. transmitter. On the right is a 52 Set with two converters for the 144 mc band. At centre, under the bench, is a version of the "Natterbox" Sideband transmitter (SHORT WAVE MAGAZINE, June, 1961), and to the right of that, though not visible, is an S.440B transmitter for two-metre work. Thus, all bands are covered.

Various aerials have been hung out from time to

time, that at present in use being a type of doublet having the dipole legs in inverted-V fashion. Operating times are somewhat spasmodic and mainly confined to discussing equipment—since it is the ambition that ultimately all the gear at G3NLM shall be home built.

For those interested in photography, he took the picture in natural daylight on 35 mm. FP3 film, using an Akarelle with f3.5 Xenar, one second at f11.

CORNER COMMENT

Further to the editorial comment in the July issue of SHORT WAVE MAGAZINE, the odd twist in the situation is that the information about frequency allocations—for all services, in every part of the world, covering the whole usable spectrum—is freely published by the I.T.U. itself. For instance, the *Chart of International Frequency Allocations*, which you can get from us for 8s. 6d., is digested into tables of Frequency Allocations appearing in many a radio-electronic diary or pocket-book.

But the fact still remains that, for the private individual, it is against the law to listen to any station not coming within the definition of "broadcasting or amateur."

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for Next Issue: September 10)

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

ROUGHLY six times a month your Club Secretary replies to a reader's letter, full of questions impossible to answer, with a short note saying "Join your nearest Club," and, if possible, giving the secretary's address.

This month we should like to publish, without further comment, a letter received from a reader—Richard J. Constantine, G3UGF, of Halifax.

"Almost three years ago now, I ventured, purely by accident, into the weird and wonderful world of Amateur Radio, a subject on which I was, to say the least, totally illiterate. I was persuaded by a friend to join the local radio club. I was a little dubious at first, but on my first excursion to the club I was surprised to find a warm welcome and many friendly faces.

"In the last three years I have had many happy hours of short wave listening and enjoyment. Never once have I regretted joining a club—the technical knowledge, information and comradeship have been but a few of the things I have gained.

"Now that I have become a licensed amateur, I can look forward to even more fun and enjoyment. Obtaining my licence has not been easy, and without the help of my fellow-members I would not have even started to take the exam. The R.A.E. was passed first time, as the club had organised an evening course at the local Technical College. When it came to the Morse test, this was not so easy—in fact it took me three attempts before I succeeded. Many of the licensed members gave up evenings and afternoons in order that I should pass, and one of them ran a taxi service for me, back and forth from the nearest coastal station.

"The purpose of my letter is threefold—firstly to thank the Northern Heights ARS and its members for their help during my first three years (the names of those who helped me are too numerous to mention); secondly, to press home to would-be SWL's and licensed amateurs the need for joining a society; thirdly, to radio amateurs everywhere—help newcomers and younger members of your society, who will be the amateurs of tomorrow and form the traditions of Amateur Radio for the future."

ACTIVITY REPORTS

Bromsgrove, meeting on the second Friday of each month at the Co-operative Rooms, High Street, will hear G3GVA on "Home-Brew Receivers" on September 10. Morse practice will precede the

meeting, at 7.15 p.m. Their Mobile Picnic, in August, attracted some 16 cars and more than 50 people, and was blessed with fine weather.

Clifton have their club station once more on Two metres, using a 6146 PA and a 5-ele. Yagi. They plan a Transmitting Field Day on September 12, and meet every Wednesday and Friday, 8 p.m. at 225 New Cross Road, London S.E.14.

Peterborough, meeting every Friday in their club-room at the Old Windmill on the London Road, will be glad to welcome visitors from 8 p.m. onwards. Their monthly lectures in the Technical College will restart in October.

Northern Heights have slackened off during the holiday period, but will meet on September 15 (G3ADQ on "Further SSB Comments") and September 29 (G3NFH on the G2DAF Receiver). On the 30th they will visit the Spen Valley club for a talk on Propagation, and plans are afoot for the Jamboree-on-the-Air in October.

Crawley will have an informal meeting on September 8, and a more formal affair on the 22nd. The latter will be at Trinity Congregational Church Hall, Ifield, but the subject is yet to be arranged. **Skegness** will be holding a meeting and Junk Sale on October 15, 7 p.m. at the Bull Hotel, Spilsby, where drinks and refreshments will be available. Further details from G3OTD or G2ABK.

Derby, still in full swing despite holidays, have a technical Film Show on September 8; a D/F Practice Night on the 15th; a talk on Magazine Production on the 22nd; and a talk on Applications of Glass Fibre on the 29th. October 3 is the date for the President's D/F Trophy Contest.

Loughborough recently held their AGM—note change of secretary's QTH, in panel. Their autumn and winter programmes are now being prepared, but have not yet arrived. **Reading** have a new meeting place—St. Paul's Hall, Whitley Wood Lane, where meetings will be held on alternate Tuesdays from September 7 onwards. It will be possible to install a club Tx there, and a call sign has been applied for. The next few meetings will be devoted to organising the new home.

Manchester have filled up their month with five Wednesday meetings, the first of which is prior to our publication date. On the 8th, a lecture by G3IO on frequency measurement; 15th, R.A.E. and CW practice; 22nd, Talk by G3RTU on An All-Band Transmitter with Break-In; 29th, Activity Night, August 4, by the way, was a "Repair Night," devoted to raising the 132ft. aerial once

more, and to reviving the front end of the club's AR88.

Slade have a lecture on RTTY, followed by a demonstration, on September 3, and on the 17th the subject will be Hi-Fi, again with a demonstration. The club station is open every Wednesday evening for slow Morse and constructional projects.

Torquay report that two SWL members are successfully through their R.A.E. and that a third is now licensed as G3UIQ. At a recent meeting the members heard an interesting talk on pre-war communications system in India, by member J. Bennett.

Magnus Grammar School have a fine write-up in their school magazine, and explain that with such a closely-knitted club there is little point in producing a news sheet. They are very active despite their constantly changing membership, and record four successes in R.A.E., ages from 14 to 16. The last of the founder-members have now left them, having been members throughout their school life. A recent visit to the local R.A.F. station proved full of interest.

Acton, Brentford and Chiswick will be meeting on September 21 for a talk on Earths, by G5ZA. The time, 7.30 p.m., and place 66 High Street, Chiswick, as usual. All interested visitors will be warmly welcomed.

Ainsdale report no summer slackening, and continue to meet as usual. On September 15 the subject will be G2CIP's receiver on the 29th, R-C bridges and on October 13 a Film Show at G3FXI. Normal meetings are at 77 Clifton Road, Southport, 8 p.m., but new portable gear and some outings are being planned for the future.

Chesham have had the loan of a 40ft. portable mast, and after several impromptu attempts at finding the right way to erect it, it duly went up. They are now going ahead with a 150-watt Tx, as well

as a Top Band rig. Lectures, field events and club projects are all under way for the coming season.

Maidstone (YMCA) devoted all their July and August meetings to R.A.E. matters and Morse tuition, but opened September with a Junk Sale on the 1st. On the 8th, another R.A.E. class, and "How to Wire It." On the 15th, G3REM (their new secretary) on Paint Spraying; and on the 22nd, Old Timer G6NU on "The Zepp" and Radio in the Early Days. September 29—Transistors for Beginners (G3ERY) and on October 6, a 20-30 watt All-Transistor Modulator for 12-volt mobile work (G3REM). At the recent AGM, all was reported in fine order, and the club intends to go ahead with Contest work.

Mid-Warwickshire are continuing their Monday evening lectures and demonstrations in September, but during August they were devoted to informal discussions. Work on a two-metre rig is proceeding, and a halo is already up in readiness.

Purley (News Sheet, August) will meet on September 3 and 17, and October 1, at the Railwaymen's Hall, Whytecliffe Road. On September 3, members will describe their own equipment; on the 17th G3GKF and G3JSQ will talk about their recent trip to GM-land; and the October 1st event will be informal (they also hope to inaugurate the Top-Band transmitter).

Saltash (Tamar Pegasus, August) now have a membership of 40 and report several successful events. On September 10 there will be a Tape-and-Slide show of one of the FP8 DX-peditions, and on September 24 they will hold a return Quiz match against the Plymouth club. **South London Mobile Club** will be meeting on September 11 and 25, the latter being a Junk Sale. October 9 has been provisionally fixed for a weekend camp.

Stratford-upon-Avon held their AGM on July 30

General view of the Bristol A.R.C. camp for their field day in June. The 45 ft. mast to the left supported $\frac{1}{2}$ -wave aerials for 40-80-160m. Note the petrol-electric set in the foreground, for general power supply. The site, on Dundry Hill, overlooks the City of Bristol.



and re-elected G8TO president, with G3FTG chairman and G3OOQ secretary (see panel for QTH). Membership fell during the year (because of members leaving the district) but it is hoped that R.A.E. results will increase the amount of on-the-air activity. Next meeting, October 1—a get-together with refreshments, and slides of the club's activities, which, it is hoped, will attract some new members.

University of Keele Radio Society lost nearly all its founder-members at the end of last term, but it is hoped to recruit some new blood from among the Freshers when they arrive in October. The club station will be active from the Students' Union during the Freshers' Mart on October 9.

Swindon held an AGM and elected a new committee, but the secretary is unchanged. Membership has steadily increased, especially on the younger side, and R.A.E. lectures continue and are well supported. G3JO has presented the club with a silver cup, to be a prize in a home-construction competition, and it is hoped that this will encourage newer members to "have a go." Coach outings are being arranged to Burnham Radio and to the I.R.C. Exhibition in October. Meetings are fortnightly at the Deer's Leap Hotel, Penhill, on Wednesdays at 7.30 p.m.

Southgate (Newsletter, August) have unfortunately lost the use of their QTH and are seeking a new one, which they hope to have found in time for a September meeting. They report a very busy and successful time at the Finchley Carnival (July 17), and were also much involved in the Southgate Show (August 27-28).

Melton Mowbray will hold their AGM on September 16 (7.30 p.m. at the St. John Ambulance Hall, Asfordby Hill), when they will devote time to compiling the programme of winter activities. Another R.A.E. Course has been arranged for Wednesday evenings, and the next three meetings after the AGM will be on October 21, November 18 and December 16—details later.

The next meeting at **A.E.R.E. (Harwell)** will be on September 21, there having been a gap in August. The title will be "A Little Flutter on VHF" and the speaker Paul Sollon, G3BGL, an old hand at the subject. The August Newsletter is, as always, strong on the VHF side and includes an interesting piece on Tunnel Diodes.

Blackpool and Fylde will hold an Open Evening on September 6, and again on the 27th. The 13th will be devoted to Part II of Aeronautical Electrics

Names and Addresses of Club Secretaries reporting in this issue :

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersby Avenue, London, W.3.
 A.E.R.E. (HARWELL): V. J. Galpin, Building 374.3, A.E.R.E., Harwell, Didcot.
 AINSDALE: N. Horrocks, G2CUZ, 34 Sandbrook Road, Ainsdale, Southport.
 A.R.M.S.: N. A. S. Fitch, G3FPK, 79 Murchison Road, London, E.10.
 BLACKPOOL & FYLDE: J. Boulter, G3OCX, 175 West Drive, Cleveleys, Blackpool.
 BROMSGROVE: J. K. Harvey, 22 Elm Grove, Bromsgrove, Worcs.
 BURY & ROSSENDALE: K. Drinkwater, G3RHR, 16 Lindadale Avenue, Accrington.
 CHESHAM: D. Kind, 19 Hollybush Road, Chesham.
 CLIFTON: J. Rose, G3OGE, 63 Broomfield Road, Beckenham, Kent.
 COPPULL: R. Calderbank, 165 Preston Road, Coppull, Chorley, Lancs.
 CORNISH: M. J. Harvey, Oak Farm, Carnon Downs, Truro.
 COVENTRY: A. J. Wilkes, G3PQQ, 141 Overslade Crescent, Coundon, Coventry.
 CRAWLEY: R. G. B. Vaughan, G3FRV, 5 Filbert Crescent, Gossops Green, Crawley.
 CRAY VALLEY: S. W. H. Harrison, G3KYV, 30 Plaistow Grove, Bromley.
 CRYSTAL PALACE: G. M. C. Stone, G3FZL, 10 Liphook Crescent, London, S.E.23.
 DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby.
 EAST WORCS.: M. J. Nicholas, G3TOI, 12 Crabtree Close, Lodge Park Estate, Redditch.
 HARROW: C. J. Rees, G3TUX, 17 Colburn Avenue, Hatch End, Pinner.
 LOUGHBOROUGH: D. Winters, G3IPL, 52 Walton Street, Leicester.
 MAGNUS GRAMMAR SCHOOL: R. Wallwork, G3JNK, Magnus Grammar School, Newark on Trent.
 MAIDSTONE (YMCA): J. E. Austin, G3REM, 40 Cross Keys, Bearsted, Maidstone.
 MANCHESTER: K. Kahn, G3RTU, 12 Cliffdale Avenue, Manchester 8.
 MELTON MOWBRAY: D. W. Lilley, G3FDF, 23 Melton Road, Asfordby Hill, Melton Mowbray.
 MID-WARWICKSHIRE: H. C. Loxley, 51 Guy Street, Warwick.
 MIDLAND: C. J. Haycock, G3JDJ, 29a Wellington Road, Birmingham 20.
 MID-WARWICKSHIRE: H. C. Loxley, 51 Guy Street, Warwick.
 NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogdén, Halifax.
 PETERBOROUGH: D. Byrce, G3KPO, Jersey House, Eye, Peterborough.

PURLEY: A. Frost, G3FTQ, 62 Gonville Road, Thornton Heath, Surrey.
 QUEEN'S UNIVERSITY, BELFAST: D. V. McCaughan, B.Sc., G13RTS, 69 Gaiwally Park, Belfast 8.
 R.A.I.B.C.: Mrs. F. E. Woolley, G3LWY, 10 Sturton Road, Saxilby, Lincoln.
 RADIO CLUB OF SCOTLAND: A. Barnes, GM3LTB, 7 South Park Terrace, Glasgow.
 READING: N. C. Taylor, G3TOQ, 83 Stoneham Close, Reading.
 REIGATE: F. D. Thom, G3NKT, 12 Willow Road, Redhill.
 ROYAL SIGNALS: J. E. Hodgkins, G3EJF, 2 Sqn., 8 Sig. Regt., Catterick Camp.
 SALTASH: D. Bowers, 95 Grenfell Avenue, Saltash.
 SKEGNESS: W. J. Spilman, G3OTD, 65 Wainfleet Road, Skegness.
 SLADE: D. Wilson, 177 Dower Road, Four Oaks, Sutton Coldfield.
 SOUTH BIRMINGHAM: J. Rowley, G3TQO, 195 Castle Lane, Solihull.
 SOUTHGATE: R. E. Wilkinson, G3TXA, 23 Ashridge Gardens, London, N.13.
 SOUTH LONDON MOBILE: J. R. Doughty, 17 Hookham Court, Patmore Estate, London, S.W.8.
 STRATFORD-UPON-AVON: M. Webb, G3OOQ, 14 Townsend Road, Tiddington, Stratford-upon-Avon.
 SURREY (CROYDON): R. Morrison, G3KGA, 33 Sefton Road, Addiscombe, Croydon.
 SWINDON: D. J. Goacher, G3LLZ, 51 Norman Road, Swindon.
 TORBAY: Mrs. G. Western, G3NQD, 118 Salisbury Avenue, Barton, Torquay.
 UNIVERSITY OF KEELE: V. J. Reynolds, G3COY, Dept. of Comms., University of Keele, Staffs.
 UXBRIDGE: F. J. P. Offord, 43 Grays Road, RAF Uxbridge.
 VERULAM: G. Slaughter, G3PAO, 6 Leggats Wood Avenue, Watford.
 WIRRAL: A. Seed, G3FOO, 31 Withert Avenue, Bebington, Wirral.
 YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil.

Overseas

AERONAUTICAL CENTRE, OKLAHOMA: Postal Station 18, Oklahoma City, Okla., U.S.A.
 CEYLON: I. Woller, 457IW, Radio Society of Ceylon, Box 907, Colombo.
 EAST AFRICA: P.O. Box 5681, Nairobi, Kenya.
 EX-G CLUB: N. F. Thompson, W8YHO, 1368 Roslyn Avenue, Akron 20, Ohio, U.S.A.
 MALAYSIA: Box 777, Kuala Lumpur, Malaysia, and Box 777, Singapore.

For this year's field day, the Bristol A.R.C. not only had efficient assistance for the culinary department, but the staff (consisting of members' wives and YL's) was provided with gas cookers and water-heating, to keep food and drink of the highest quality going all through the week-end.



(G8JU) and the 20th to a visit to St. Ann's Radar Station, to see some of the items described by G8JU. October 4—"Junk Sale—and tidying up afterwards!"

Queen's University, Belfast, are in recess, but will hold an Open Day on October 8 at 22 Malone Road, when all their equipment will be on display for the benefit of the "Freshers."

Reigate report that their total membership is now 42, of whom 28 hold licences. Their September meeting will be on the 18th, 7.30 p.m. at the George and Dragon, Redhill, when G2RD will talk about Equipment for 1296 mc.

South Birmingham (QSP, August) will have a demonstration and talk on Eddystone equipment on September 16; the following meeting, on October 21, will be their AGM. Meanwhile they are very busy with rallies and with their own exhibition station at the Marston Green Flower Show.

Wirral (News Sheet, August) hold a "Symposium on Power Packs" on September 8, and an Open Night on the 22nd. Recent meetings were taken up by the popular W1BB tape-lecture and by a very crowded Junk Sale. The AGM is fixed for October 6.

Yeovil have finished their decorating chores and their club station G3CMH will soon be back on the air. Visitors will be welcome every Wednesday, 7.30 p.m. at the Youth Centre, Park Lodge, The Park, Yeovil, and at an early meeting they will be hearing a tape from ZD8PI.

Bury & Rossendale report a good August meeting, at which the subject was TVI Troubles. On September 12 G2FMU is scheduled to talk on Tuned Circuit Calculations, 8 p.m., at the Old Boars Head Hotel (Private Room), The Rock, Bury.

Coventry face a very full month, with W1BB's tape on September 6, a visit to Sutton Coldfield (BBC TV) on the 11th, a Film Show on the 13th, a Night on the Air on the 20th, and the AGM on

September 27. Their *CARS Newsletter* contains other interesting details of the Club's activities.

Crystal Palace have decided that they should have their own call, and have made the necessary application. This will then be exercised at Field Days and the like. The subject for the September meeting (on the 18th) is Amateur Television, and the speaker G3SYY. At their August meeting they saw and heard the tape-slide lecture on an FP8 DX-pedition, and say that it compensated a little for the lack of an English summer this year.

Uxbridge took part in the Hounslow Horticultural Show in August, with their station G3SDW on the air, mostly on Top Band SSB. In October they will be operating GB3UBS from near Stoke Poges, in the Jamboree-on-the-Air. The club has made contact with several "exiled Americans" with the U.S.A.F., who are asking for R.A.E. classes and Morse tests, so that they will be able to take their own FCC exams with confidence when they return. Meetings are at the Scout Hut on the third Monday only.

East Wores. will be meeting on October 14 and November 11 (so presumably no September meeting) at the Old People's Centre, Redditch, 8 p.m. **Midland (News Letter, August)** hold their AGM on September 21.

Harrow report a sharp rise in the number of licensed members, caused both by new calls and by the return of some older members. Total membership is now at least 100, and half of them hold call-signs. A new club project for the autumn is being prepared—probably a stage-by-stage receiver project. On September 17 there will be a Junk Sale, and on the 24th a Practical Night. October 1 is set aside for a demonstration (either K.W. Electronics or J-Beams, they hope).

Verulam (News Sheet No. 16) will hold a Film Show on September 15, and report a good level of activity at recent meetings.

MORE COURSES FOR THE R.A.E.

A first list of about 20 centres at which courses of instruction for the Radio Amateur's Examination are being offered appeared on pp.375-376 of the August issue of *SHORT WAVE MAGAZINE*, together with explanatory notes.

Briefly to recap.: Even if your locality has not been listed, ask about it at the local office of your Education Authority, quoting "Subject No. 55, City & Guilds, Radio Amateur's Examination." If you want to see the question papers for previous examinations, send a large s.a.e. with a P.O. for 2s. to: Sales Section, City & Guilds of London Institute, 76 Portland Place, London, W.1, quoting the same reference. Should you be embarking for the first time on these problems, and wish to know what is involved in getting a U.K. amateur transmitting licence, write to: Radio Services Dept., Radio Branch (Amateur Licensing Section), G.P.O. Headquarters, St. Martin's-le-Grand, London, E.C.1, asking for the regulations and conditions for the granting of an AT-station licence.

In no case should enquiries about any of these matters be directed to us. The Postmaster-General is responsible for the issue of amateur licences, on evidence supplied by the City & Guilds (production of a pass-slip) that the candidate has passed the appropriate exam., *i.e.*, Subject No. 55. The Morse Test (also necessary for the issue of a full licence) is likewise arranged by the G.P.O.

Since all R.A.E. Courses, up and down the country, will have started before we go to press with the October issue of *SHORT WAVE MAGAZINE*, no further listings of examination centres will appear. The foregoing should be read with the notes on p.375 of the August issue.

Bristol: At the Technical College, to be held on Mondays, 6.45-9.15 p.m., commencing Monday, September 20. Registrations at the College, Ashley Down, Bristol, 7, September 9, 10, 13, 2.30-4.30 and 6.30-8.30 p.m., fee 20s. for the Course for candidates under 18, and 50s. for older students. The College operates G5FS as its own station, and the Course is under the direction of G5UH.

Bromsgrove, Worcs.: At the College of Further Education, a Course arranged in co-operation with the Bromsgrove & District Amateur Radio Club. Details from the College, or from: J. K. Harvey, 22 Elm Grove, Bromsgrove, Worcs.

Cottingham, Yorks.: At the Evening Institute, Harland Way, on Monday evenings, 7.15-9.15 p.m. Applications to the Principal of the Institute, or details from: C. R. Bell, G3NUE, 211 New Village Road, Cottingham, East Yorkshire (*Hull 845739*), who will be in charge of the Course.

Harlow, Essex: Courses for the R.A.E. are again being arranged for the autumn, and full information can be obtained either from G3KFE or G3TLJ, both *QTHR*.

London (Wembley): At the Evening Institute, Copland School, High Road, on Mondays, 7.0-8.0 p.m. for Morse, and 8.0-10.0 p.m. R.A.E. Theory. If the demand warrants it, an additional session will be held at the same time on Wednesday evenings.

The Course will be under the direction of G8PD, who has been taking it for many years. Enrolment at the School, September 13-16, 7.0-9.0 p.m., classes starting the week following.

Plymouth: At the College of Technology, offering Morse and Practical for the R.A.E., on evenings to be arranged. Apply during the week commencing September 9 to the Principal at the College or the lecturer, A. F. Ward, G3HSP, Heather Holme, Shaugh Prior, Plymouth.

Portsmouth: For the 16th successive year, under the direction of G6NZ, an R.A.E. Course will be held for those interested at the North End Evening Institute, Drayton Road. Applications and enquiries to: The Secretary, Eastney Modern Boys' School, Portsmouth.

Weston-s-Mare: Evening Course offered by the Engineering Dept. of the Technical College, enrolment during the week commencing September 13. to start week following. Other City & Guilds telecommunications examinations also covered. Apply: Head of Dept. of Engineering, at the College.

The next Radio Amateur's Examination sittings are in December, and in May next year, at convenient centres all over the country.

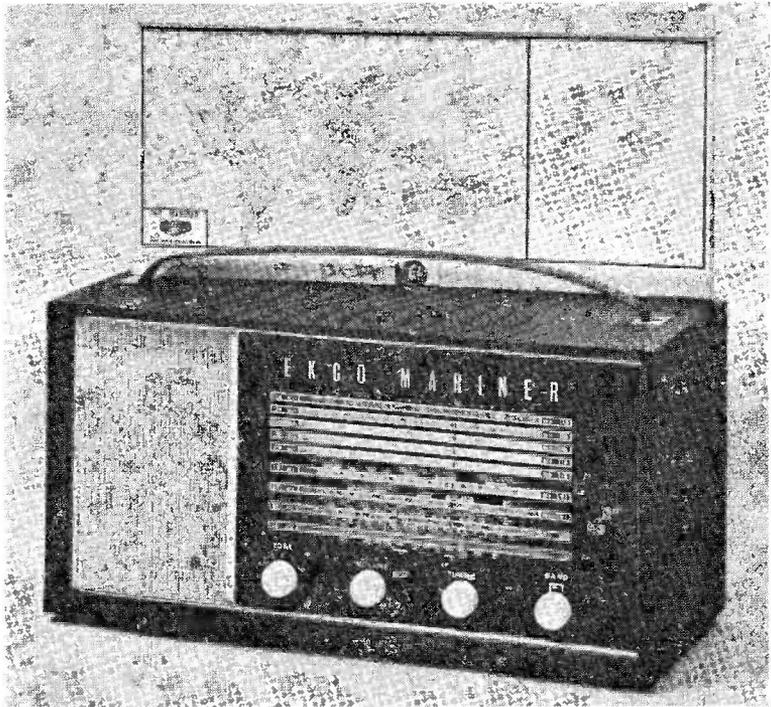
EDDYSTONE EQUIPMENT SUPPLIES

We were glad to see that the firm of Imhofs, 112-116 New Oxford Street, London, W.C.1, have taken over the London agency for Eddystone equipment. Imhofs have been in the radio-retail business for many years, maintain a large selling and specialist manufacturing organisation, and have a great deal of experience in customer relations. Six of the standard Eddystone receivers are kept in stock for off-the-shelf sales, together with various other items of Eddystone manufacture.

INTERNATIONAL AMATEUR CONVENTION

Already mentioned on p.278 of the July issue of *SHORT WAVE MAGAZINE*, there is still time to remind you of the Convention being held over the long weekend Sept. 17-19, organised by a group of ON4's at Knocke-le-Zoute, nr. Ostend, for which the information centre is the Albert Plage Hotel, Meerminlaan 22, Knokke 1, Belgium (*Tel: 050/65964*). All-in accommodation is being offered at attractive rates according to length of stay and service required, and the Convention programme itself covers all Amateur Radio interests, including an all-band all-mode station open to all licensed amateurs, with lectures, group meetings for specialist interests such as DX, VHF, SSB, ATV, Mobile, and so on, as well as a bus tour to Bruges and a boat trip by canal to places of historic interest. Full details from: M. Luc Vervarcke, ON4LV, Lippenslaan 284, Knokke 1, Belgium, who will quote inclusive charges under various headings, with the hotel brochure. Visitors are expected by land, sea and air under at least ten different prefixes, as well as a U.K. contingent. It is understood that British United Airways (ask at any B.U.A. office, or through a travel agent) are offering fare reductions for group bookings to Ostend Airport.

The new Ekco "Mariner" is a general-coverage receiver intended primarily for shipboard use, where there is an AC/DC supply of anything from 110-125v./200-250v. which may be at 25-100 c/s on the AC side. The frequency range of the receiver is LF-HF, taking in all the usual broadcast channels, with a large well-calibrated dial including five on bandspread for the HF ranges. The set is strongly constructed, in cloth-covered wood, and is competitively priced.



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CANADIAN MARCONI 52 RECEIVERS. Superhet receiver covering 1.75 to 16 mc/s. in 3 Bands. 10 valves plus 3 valve crystal calibrator. Crash limiter. Broad/sharp selectivity. 500 microamp valve check and signal level meter. Power required 150 volts DC, 60 mA., 12.6 volts DC or AC, 1½ amps. In new condition, packed in original ministry crates, £10/15/-, carriage paid, complete with reprinted handbook with all circuits, etc. Send S.A.E. for leaflet. Handbooks only, 5/-, post paid.

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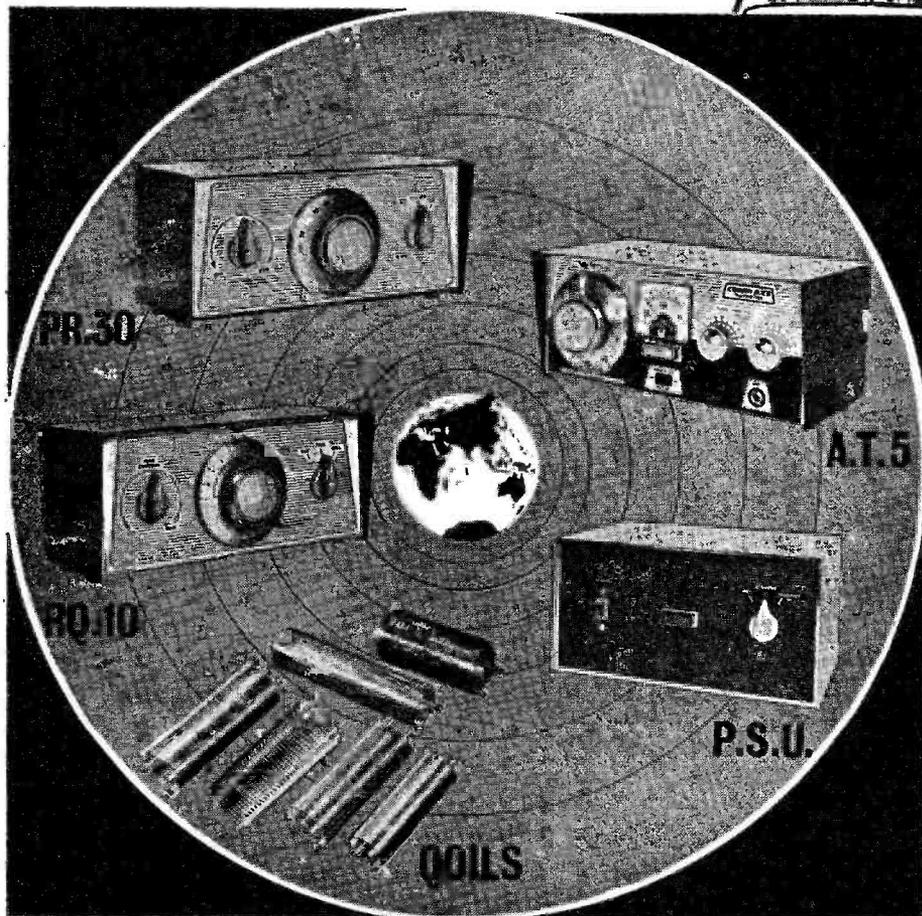
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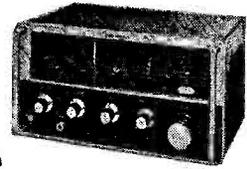
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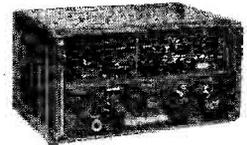
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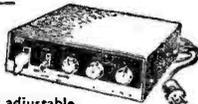
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SMALL ADVERTISEMENTS, READERS—continued

WANTED: Heathkit SB-10U SSB Adaptor, built up or in kit form; must be in good condition.—G6FV, 12 Station Road, Teynham, Nr. Sittingbourne, Kent.

CLEARING SHACK: Command Rx's for 80m. and 160m., on twin rack, all mods. and complete for 12v. mobile, £16. AR88D mains transformer, new, 50s. Mobile aerial c/o relays, 6s. Collins control unit, new, 37s. 6d. Q'Fiver with built-in mains PSU, £5. Pye PTC-112C Transceiver, for 4 metres, with control unit, microphone and manual, £8. Hallicrafters HT-7 Frequency Standard, giving 10-100-1000 kc pips, 25s. Modulation transformer rated 30 watts, 27s. 6d. Class-D Wavemeter, with spares, 45s. Wavemeter 100 kc to 48 mc, £5. Type 234A PSU for 132, new, 55s. Eddystone 358X coil 20-31 mc, 10s. AR88D speaker, new, 55s. Q'Fiver, new, £5. Command Tx type BC-457A, 25s. Command triple rack, new, 25s. SCR-522 modulation transformer, 15s. Command dynamotor, 12v., 30s. Manuals for Eddystone 358X and 400 receivers, 25s. Please send s.a.e. for other items, or phone Bushey 3387. WANTED: For a KW-2000, the DC/PSU.—Box No. 4165, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Complete station, fixed/mobile. Sideband Engineers SB-33 transceiver, SB1MIC dynamic microphone with press-to-talk, SB2DCP transistor mobile power supply, SB1MP mobile mounting bracket. See p.517 November "Short Wave Magazine" for technical description, and Cover iii January, 1965, issue for illustration. Perfect throughout, price £150; will not separate.—G3RDG, 40 The Vale, London, N.W.11. (Tel. SPEedwell 8831.)

SELLING: An AR88D in mint condition, £46 o.n.o.? Also Hallicrafters S.36, £25 o.n.o.?—G3OIE, c/o 76 Tulketh Street, Southport, Lancs. (Ring Southport 56437, 9 a.m. to 6 p.m.)

WANTED: Equipment for 420 mc band, Rx and Tx. An ASB8 and APN1 are specially required.—Mulley, 59 Coote Lane, Lostock Hall, Preston, Lancs.

FOR SALE: B.44 Mk. III Tx/Rx, modified 4 metres, complete with xtals, transistor pre-amp, built into microphone, dipole aerial, heavy-duty 12v. battery with charging unit, price £9 15s. Xtals: 3505 kc (certificate), 15s.; 27103 kc (new), 20s.; 11752 kc (new), 20s.; and 3513, 3530, 7040 kc, at 5s. each. Two OC24 transistors, new, 15s. each. Type P.38 jack-plugs, new, 1s. each. Belling-Lee connectors Type L789/CS/Socket, 1s. 6d. each; L789/FP/Plug, 1s. 6d. each. G.E.C. styli pressure gauge, 20s. Hand microphone, 500-ohm, 20s.—G3HJG, 17 Torbay Road, Urmston, Nr. Manchester.

SALE: R.1155A receiver, good working order, £7 o.n.o.?—Charlesworth, 39 Anson Close, Kenley, Surrey.

FOR SALE: Mosley TA-33Jr. Triband Beam, in good condition. Price £10. Buyer arranges carriage.—Poulter, 279 Aragon Road, Morden, Surrey.

SALE: K.W. Viceroy Mk. IIIA, with extra half-lattice filter, £115. Olympic loaded Z-match, 250v. version, £5. Joystick and ATU, £2. Various valves and components, s.a.e. list. Carriage extra.—Richardson, Post House, Puttenham, Guildford, Surrey.

SELLING: A Hammarlund HX-50, with latest zero-beat modification, £110. Hammarlund HQ-180 Rx, with Telechron auto-timer, £100. Inspection or demonstration willingly. Will pack for despatch anywhere, buyer paying carriage.—Robinson, G6RJ, Brown's Farm, Holbrook (407), Ipswich, Suffolk.

WANTED: B.44, Pye or similar 4-metre Tx/Rx, also 2-metre Tx/Rx, SWR bridge, and xtals for 160m.—Box No. 4167, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Collins 32S1-3, in any condition—LeMoine, Laburnums, Chertsey Road, Chobham, Woking, Surrey. (Ring Chobham 8483 or GERard 5532.)

SMALL ADVERTISEMENTS, READERS—continued

WANTED: Collins Receiver 75A or 51J, or similar. also SSB transmitter or transceiver.—G3NNT, 23 Southport Road, Ormskirk (3209), Lancs.

WANTED: Mobile Rx for 80/160m., Minimitter preferred.—Knight, 45 Wearish Lane, Westhoughton, Nr. Bolton, Lancs.

SELL or EXCHANGE: B & W 2Q4 unit and transformer; K.W. SWR Bridge; Minimitter Q-Multiplier; BC-455; 931 Multiplier and case; LM-14 manual; xtals and valves.—Brown, G3LPB, Marlborough Farm, Falmouth, Cornwall.

FOR SALE: Hammarlund HQ-180E receiver and matching speaker, in as-new condition, coverage 540 kc to 30 mc, with bandsread tuning over amateur bands, built-in 100 kc crystal calibrator, S-meter and automatic timer. Price £125.—Ring BATTERSEA 3650.

SALE: Prop-pitch motor, £5. Pair 3in. Magslips, the receiver in wood case with 6in. Great Circle map face and pointer, £2 10s. AC power supply for same, 24v. AC for motor, 45v. for Magslips, in steel case, £2. All in excellent condition. Prefer buyer collects.—H. H. Eyre, 9a Woodstock Road, Barnsley, Yorkshire.

WANTED: Eddystone 888/A, with matching speaker and S-meter; also K.W. Vanguard, 10 to 160m. coverage.—43 Park Lane, Whitefield (5165), Manchester.

FOR SALE: 19 Set, portable or fixed Tx/Rx, all complete with PSU, etc., £6 10s. Joystick, 35s. 46 Set, 5-9 mc walkie-talkie, complete with crystals and batteries, as new, £3. 38 Set transmitter-receiver, as new, £2.—Box No. 4168, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Eddystone 888A Receiver. Good price offered for late model in clean condition.—24 Norfolk Avenue, Sanderstead, Surrey.

SALE: Brand new QY3-125, £5. 4-250, with base, £7 10s.—G3AMF, QTHR, or ring WANstead 6578.

SELLING: A Marconi CR-100, in mint condition, with S-meter, noise limiter and xtal filter, well aligned, coverage 60 kc to 31 mc. Price £18 10s., including carriage. Delivery arranged.—Porter, 11 Cranmore Avenue, Liverpool, 23.

FOR SALE: National 190X, £70. Nordmend Globe-trotter transistor portable, 15 bands, in teak case, cost £84, used four weeks only, take £64. Q-Cord battery, mains and car tape recorder, £25.—Sutcliffe, 103 City Road, Bradford 8 (76556), Yorkshire.

SALE: DX-100U, as new, £65, carriage extra.—Acton, 20 St. Blaise Road, Sutton Coldfield, Warks.

G3ERB Still Sorting Redundant Equipment! Large s.a.e. for latest lists units, valves, components, tapes, etc. No callers.—56 Kings Lane, Bebington, Cheshire.

WANTED: K.W. Geloso 10-80m. Converter, any model since 1962. Must be in excellent conditions, as regards both appearance and performance. Please state price.—Taylor, 38 Allerton Road, Sprowston, Norwich, Norfolk. NOR.69.R.

WANTED: By SWL, Morse Record Course; also Joystick, with Joymatch, for receiving.—C. Egan, 64 College Grove, Preston Road, Hull, East Yorkshire.

FOR SALE: Teletypewriter Model 15 page printer, £25. Teleprinter, Creed 7B, page printer, orientation device fitted, £18. AR88 Receiver, mint condition, 540 kc to 32 mc, in original carton, with spare valves and headphones, £55. Army 48 Set, transceiver, 6-9 mc, £4. Navy P.58 UHF receiver, 300-650 mc, £8. R.C.A. keying unit, FS No. C1, range 1-0.6-7 mc, £9.—J. Barry-Peters, 41 Hallville Road, Mossley Hill, Liverpool, 18. (Tel.: CHUdwall 5827.)

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SELLING: Pye PTC-114, 25w. 4-metre mobile/portable transceiver, narrow-band IF, speaker/control unit, 12v. input, complete ex-crystals, manual, £8. CR-100, EF80-EF85 RF, NL and other mods., manual, £17. Deliver 50 miles.—D. White, 14 Landscape Dene, Helsby (2625), Cheshire.

SALE: Mohican Receiver with AC/PSU, £21. HRO, fitted noise limiter, with speaker, PSU and coils, new crystal included, £16.—H. A. Spashett, G3RK, Bungay (88), Suffolk.

SELLING: Eddystone 888A, Panda PR-120V, BC-221 with power pack, all unmodified. Mosley TA-33Jr., rotating and indicating gear. Relays, preselector, mike. The Lot in good order, £115. No offers or separate sales. Purchaser inspects and collects. Ring Norwich 35658 after 7.0 p.m.

FOR SALE: Eddystone S.640 with S-meter; very good condition.—G3TLX, Ring Stonegrove 4931.

EXCHANGE: Robuk RK-3 Tape Recorder for RA-1, 888A or similar, in good condition, or will consider sale.—Ashton, The Green, Stowupland, Stowmarket, Suffolk.

SALE: DX-100U, factory built by Heathkit and modified by them for SSB operation, in new condition, first offer over £60. Delivery within 100 miles.—G3SLP, 6 Briar Close, Billericay, Essex.

FOR SALE: DX-40U and VF-1U, with handbook, excellent condition, £30 o.n.o.? Buyer collects. Also a G3HSC Morse Course, with three records and two booklets, £3, post paid. — G3UCK, 14 Coniston Grove, Bradford, 9, Yorkshire.

SALE: Seven volumes Newnes "Radio and TV Servicing" £4. Valradio Electronic DC Converter, Type 230/100v., input 200-250v. DC, output 200-250v. AC 50 c/s 100w., new, £6. Eddystone 840A, £25. **WANTED:** Two-metre Tx, also "Radio and TV Servicing," 1962-'65. — Jones, 24 Forest Avenue, Foresthall, Newcastle-on-Tyne, Northumberland.

SELLING: Due to increasing deafness, Eddystone 840C, in immaculate as-new condition, £37. Also an AR88LF, in good condition, spot on frequency, with S-meter, phones and handbook, £17. Genuine reason for selling. Prefer buyers collect.—Lyons, 5 East Street, Leigh-on-Sea, Essex.

WANTED: T.W. Twomobile. **SALE:** Eddystone S.640 Rx with matching speaker, fitted neon stabiliser, £15.—40 South Road, Edgware (0937), Middlesex.

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FOR SALE: Heathkit RA-1 with crystal calibrator, in mint condition, professionally built. This is an excellent Rx for resolving SSB. Price £30, o.n.o.?—Mould, 21 Parnell Square, Congleton, Cheshire. (Or ring Congleton 3613 after 7 p.m.)

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WANTED: 2,500v. meter. **SALE:** In new condition, 500 kc-30 mc No. 10 Crystal Calibrator, with manual, £2. Pullin-100 10 kv 20-range meter, unmarked, £4.—Rayer, G3OGR, Reddings, Longdon Heath, Upton-on-Severn (312), Worcs.

SMALL ADVERTISEMENTS, READERS—continued

FOR SALE: Heathkit DX-100U and SB-10U, in mint condition, with factory mods. for Top Band, £75 o.n.o.—G3GWU, QTHR. (Ring Rugby 6509.)

FOR SALE: Receiver Type R.5032A, 98-155 mc, in good condition, £15. Also Rx Type ZA.11324, 26-130 mc in five bands using plug-in coils, needs slight attention, £10 o.n.o.—Barton, 40 Knights Way, Hainault, Essex.

DX-100U with Heathkit mod. for SSB adaptor, £60. SB-10U £30; also another, DX-100U, as new, £60.—G3STS, 188 Broadhurst Gardens, London, N.W.6. (Tel. Maida Vale 6638.)

SALE: Geloso G.209R receiver, Top Band mod., £40. Two-metre converter, £6. AVO R-C Bridge, £7 10s. Woden, UM2, £2. New Jap filter, £7 15s. T.1540 two-metre Tx, £5. New TV turret tuners, 15s. Anode chokes, 15s. Triplexers, 7s. 6d. Also transformers, meters, crystals.—G3IDW, Orchard Cottage, Hook, Swindon, Wilts.

SELLING: DX-100U, late 1963 construction, factory tested, in new condition, price £60, carriage extra. Going SSB.—G3RAQ, 12 Christchurch Avenue, London, N.W.6.

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FOR SALE: SP-600JX Hammarlund receiver in table-top cabinet, first-class condition inside and out, £145. Marconi HR-110, modern miniaturised communication receiver, 0.5-30.0 mc, 100/250v. AC, as new, £40. AR88D, excellent condition, one owner, £42.—G3JNG, The Huon, Branksome Hill Road, Bournemouth.

SALE: PCR-1, with power supply, £4 10s. R.107, no case, faulty, but with manual, £3 10s. R.108, with coils, £3 10s. Will EXCHANGE or part-exchange for Marconi Canadian Receiver No. 52. Details, s.a.e.—Nolan, 50 Albert Road, Gurnard, Isle of Wight.

SALE: COLLINS 30L-1 linear amplifier, in new condition, complete with 4 spare new R.C.A. 811a valves, £165.—G3LB, 134 Whitcliffe Lane, Ripon 1033 or Ripon 737.

SALE: HRO Table Model, 9 coils, int. speaker, x-former, v.g.c., £19 o.n.o.? Bendix Rx RA1B, 0-15 mc, 6 ranges, essential mods., only £4 o.n.o.? Three new QV06/40A makers' boxes, £2 10s. each.—Box No. 4171, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: CR-100 Communications Receiver, S-meter, speaker, £18. Evenings and weekends only, buyer collects.—St. John, 25 Dial Road, Gillingham, Kent.

FOR SALE: KW.2000, mint condition, £170.—Box No. 4172, Short Wave Magazine, 55 Victoria Street, London, S.W.1.

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.

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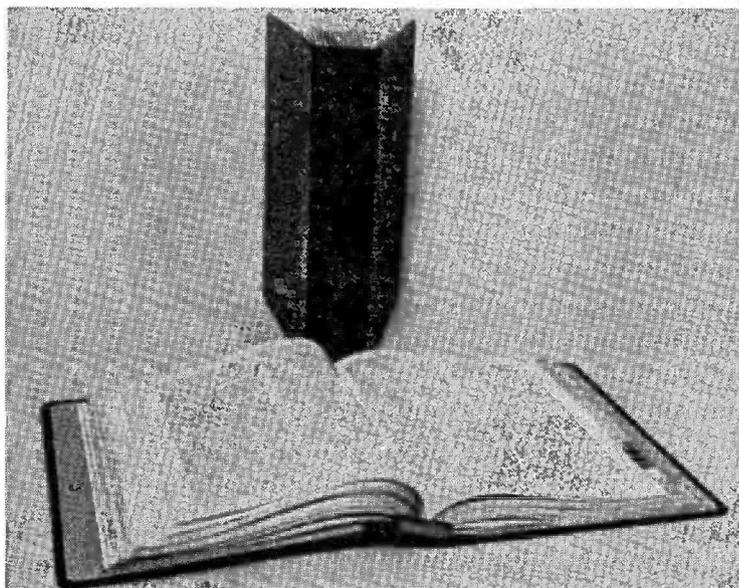
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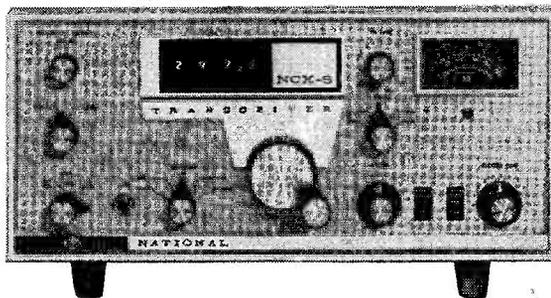
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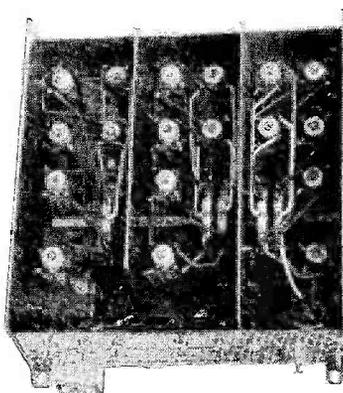
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