

The SHORT WAVE Magazine

VOL. XXVI

JULY, 1968

NUMBER 5

KW 2000A SSB TRANSCEIVER

The finest value available, with no extras to buy. 180 watt PEP operation on all amateur bands 10-160 metres, complete with AC psu, VOX control, crystal calibrator, Independent receiver tuning, Upper/lower sideband tuning, Top band included, Automatic linearity control or transmit. Special attention to TVI proofing.



KW VESPA Mark II

KW VESPA Mark II TRANSMITTER

Transmitter for all H.F. Bands. 220 watts PEP SSB, AM, CW. Now in full production, complete with psu.

KW 1000 LINEAR AMPLIFIER

1200 watts PEP complete with built-in psu and SWR indicator.

KW 201 Amateur Bands Communications Receiver

The KW 201 is now being manufactured with 2 detectors (i) product detector for SSB and CW, (ii) diode detector for AM. The KW 201 has been specifically designed for optimum performance on SSB. 11 ranges give coverage 1.8 mc/s. to 30 mc/s. A mechanical filter gives an IF selectivity of 3.1 kc/s. at 6 dB, and 6 kc/s. at 60 dB. A "Q" multiplier is available giving a variable range of 3.1 mc/s. to 200 cycles selectivity



KW 1000



KW 201



BUY KW EQUIPMENT IT'S BRITISH

Other KW Products

- KW Antenna Switch (3 position)
- KW E-Z Antenna Match Unit
- KW PEP Meter
- KW Match SWR Indicator
- KW Low-Pass Filters
- KW Trap Dipoles
- KW Balun
- KW Dummy Load
- KW Q Multipliers

There are alternative crystals available for full coverage of the 10 and 15 metre bands.

Write for illustrated detailed specification on the above and our list of KW Tested, 'Trade-in' equipment.

K. W. ELECTRONICS LTD.

1 HEATH STREET, DARTFORD, KENT

TELEPHONE: DARTFORD 25574 CABLES: KAYDUBLEW DARTFORD

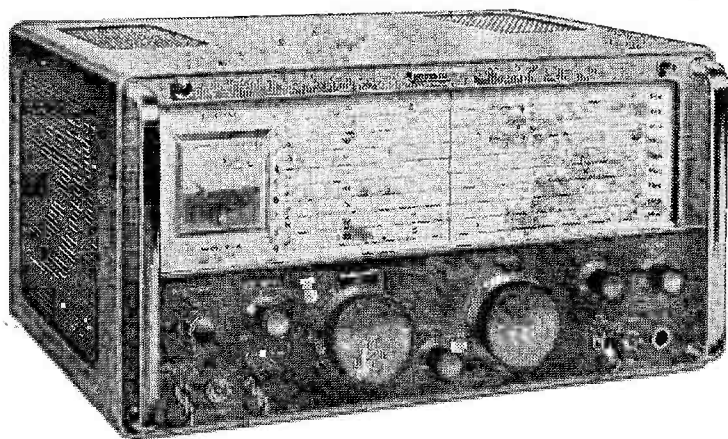
Eddystone



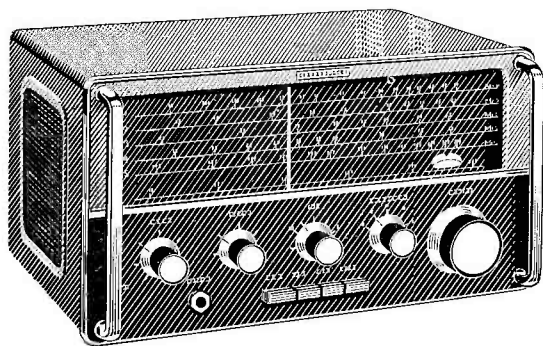
BRITISH MADE

Amateur communications receivers

EA12 An amateur bands double-conversion superheterodyne receiver, for a.m, c.w, and s.s.b reception. For all amateur channels between 1.8 MHz and 30 MHz in nine 600 kHz bands with 28 MHz to 30 MHz in four bands.

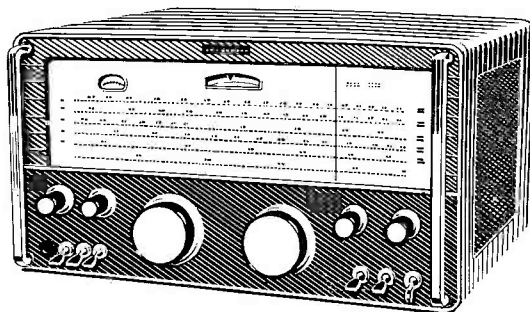


Primary features. Crystal-controlled 1st oscillator, 2nd oscillator with continuously variable selectivity to 50 Hz, muting switched or by external relay, twin noise limiters, for a.m/c.w, and s.s.b, short-term drift better than 20 Hz and less than 100 Hz in any one hour, 'S' meter calibrated in nine levels of 6 dB and dB levels beyond 'S9', two a.g.c time constants, deep slot filter, independent r.f, i.f, and audio gain controls with outputs for f.s.k and panoramic adaptor.



EC10 communications receiver

The fully transistorized EC10 communications receiver, supreme in its class, covers both medium-wave broadcasting and all shortwave service to 30 MHz. Incorporating the famous Eddystone tuning drive, with logging scale and auxiliary vernier, shortwave reception is particularly simple. Battery-operated or from optional a.c mains unit.



940 H.F communications receiver

An outstanding 13-valve receiver with two r.f and two i.f stages, silicon diode noise limiter circuit and high quality push-pull output. Built to a professional specification, facilities include provision for c.w, a.m, and s.s.b reception over the range of 480 kHz to 30 MHz in five bands. Suitable for 110/125 V and 200/250 V, 40-60 Hz a.c mains.

Comprehensive information from your Eddystone distributor or: Eddystone Radio Limited, Eddystone Works, Alvechurch Road, Birmingham 31. Telephone: 021-475 2231. Telex: 33708

N. W. ELECTRICS

52 GT. ANCOATS STREET
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G3MAX

Business hours : 9 a.m.-6 p.m. Tuesday-Saturday
CLOSED ALL DAY MONDAY

Stamped addressed envelope please, for any inquiries.

Low Resistance Headphones. 100 ohms, D.C.
Brand new, boxed, 7/6. Postage 3/-.

R.A.F. Modulator Ex. TR1986 VHF Transmitter. EF92-EL91-P.P.6C4. Circuit supplied, 15/-, post 4/6.

Control Unit, Type 384. Contains desyn indicator with illumination, suitable for aerial. 5m.A. right hand zero meter. 1½" dia. 6 variable resistors with gear drive for 2. 2, 1-pole 12-way ¾" dia. 1, 2-bank 8-pole 5-way 1¾" dia. 2-toggle DP. 2 push-button DP. switches. 3, 62 ohm. 2, 42 ohm. 5W Res. Really excellent value, 17/6, 4/6 P.P.

Compass Bearing Dial. ¾" dia. N.S.E.W. Marked at 10° points. Made for above desyn, 2/6, post paid.

RF24. Components as in RF25, 10/-, post 6/-.

RF 25 Bandswitched Converter. Pre-set frequency. Excellent component value. *Contains:* 15, 30pf Philips trimmers, ceramic switch, 1-pole 5-way, 3-bank, 3⅜ x 1" ceramic formers, 3 SP61 valves, 2⅜" Aladdin formers, standoffs, etc. The complete unit for 7/6. Postage 6/- unfortunately.

CT54. Valve Voltmeter. 4in. Meter. 0 to 480 Volts A.C. and D.C. in 6 ranges. With Multiplier for 2.4 Kv. Range. 0 to 10 Megohm in 5 ranges. Frequency response 20 c/s to 200 Mc/s., with Valve Type Probe. Power requirements 2 x 1.4, 75 and 15 volt. Batteries (not supplied). All tested before despatch. Price with circuits, £10 15s. P.P. 10/-.

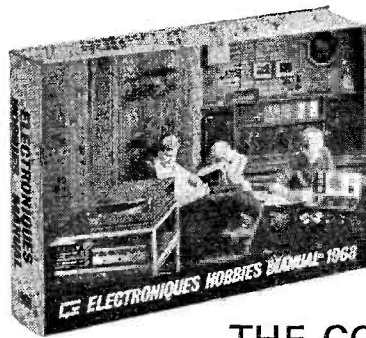
A.C. power supply components and gen., 28/-.

Only supplied with valve voltmeter.

BC221. Heterodyne Frequency Meter. 125 Kc/s. to 20 Mc/s. Harmonics can be used for high freq. These are absolutely Brand New in sealed carton. We will open and test on request. Power required 6 volt LT. 150 volt HT., £32 10s. P.P. 10/-.

We still have some items from previous adverts.

G3SMI



GET
THIS
960
PAGES

THE COMPLETELY
NEW 1968 ELECTRONIQUES
MANUAL
12 HOBBIES SECTIONS PLUS
OVER 12,000 COMPONENTS
AND SPECIAL VOUCHER
OFFERS COULD SAVE YOU
£25 IF YOU BUY THE MANUAL
NOW!



The 1968 Hobbies Manual now contains
KNIGHTKITS—a famous American range of electronic easy-to-build kits. **HALLICRAFTERS**—the Number One name in communication equipment and radios. **BOOKS**—over 140 titles. **AUDIO and HI-FI**—a wide, wide range including famous names like Goodman, Sinclair, Sonotone, Acos, Discatron, etc., etc. **HOME AND HOBBY**—something for every member of the family—microscopes, telescopes, radio controlled equipment, garage door openers, experimental and educational kits, etc. **MOTORING**—a special section with money-saving engine tuning kits, radios, seat belts, a car vacuum cleaner and many other useful accessories. **SHORT WAVE LISTENING**—exciting kits and finished equipment for world-wide reception. **TEST EQUIPMENT AND TOOLS**—a very wide range including multimeters, oscilloscopes, signal generators, soldering irons, cutters, pliers, breadboarding kits, etc., etc. **COMPONENTS**—over 12,000 items from more than 100 manufacturers. The most comprehensive range available from a single source—now bigger than ever before. **AMATEUR RADIO**—the best of receivers, transceivers, aerial rotators, aerials, Quilpax modules and lots more. **ELECTRONIQUES PRODUCTS**—boxes and assembly systems, transistor and valve Hamband and General Coverage tuners, crystal filter I.F. amplifiers, oscillators and other modules for effortless high performance. And finally **SEMICONDUCTORS AND VALVES**—a new section of famous brand names like STC, RCA Newmarket and Brimar.

Enclosed is a cheque/postal order for 16/6 (which includes the 5/- pp) made payable to Electronics (Prop. STC) Ltd. Please rush me my 960-page copy of the new 1968 Hobbies Manual.

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Send this coupon quoting the special limited-period offer to:
Electronics (Prop. STC) Ltd., Edinburgh Way, Harlow, Essex

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J. B. LOWE 50-52 Wellington Street, Matlock, Derbyshire

Tel.: Matlock 2817 (2430 after 6 p.m.)

In dealing with imported stuff, I find I have to spend quite a bit of time translating. Nor much use passing on an incomprehensible handbook. Usually it's pretty simple—electronisch stabilisierte spannung für oszillatoren." Nae bother. Occasionally though, they chuck in a sneaky one "Eingebaute oder Notsteuerungsschutz." for example. Delightful! Believe it or not, it means "A.L.C." However, this is easy compared to the manuals (in English?) I get from Japan. Dig this, "And next, oscillate high frequency and receive it. In that time, when it will be able to receive at high position of indicator than its normal frequency, displacement range must be limited, so that, adjust to put out A core and put in B core as to be able to receive at the indicator position of oscillating frequency." Another beauty—"One coil which covered all bands and disturb complicationize of circuit." I expect you can figure out what they mean, but it looks as if I'll have to do a little disturb complicationizing—damnit, they've got me doing it!—simplifying, I mean, and get a decent manual printed. Oh dear, more money, I suppose, and I've only just had to lash out on a new scrubbing brush for my wife (the Town Council don't supply 'em). The kid has already finished the bar of chocolate I brought her for Christmas. Spend, spend, spend. There's no end to it, is there? Looks like I'll have to cut out the Staff tea break. No, I can't very well do that 'cos Jean buys the tea, sugar and milk. Life is full of little problems. Incidentally, anybody seen C.Q. or Q.S.T. this month? Look at the prices of Star equipment in the States. ST-700 \$525, SR-700 \$395 and SR-200 \$119.95. At \$2.40 to the £1, this works out to £220, £165 and £50 respectively. In view of the cheaper freight to the States and the lower duty, I feel that at my prices (£135, £115 and £40 respectively) you are getting a pretty good deal. What lousy advertising Lowe! You feel the customer is getting a pretty good deal, eh? He's getting a DAMN! GOOD DEAL and you know it! Go on, Lowe, tell 'em the truth. In their respective price classes, Sommerkamp, Star and Inoue represent the best value for money on the market. No ifs and buts, unequivocally (and I hope I've got the spelling right) nothing, absolutely nothing, can touch it. That was my schizophrenic other self talking, but nobody believes a word he says. Nobody, except Sommerkamp, Star and Inoue owners, that is. He's quite right though—mind you, if something as good or better comes along, Bill Lowe will most assuredly flog it. The Trio sounds very good over the air—but just give me a little time to evaluate it thoroughly before I commit myself. Sommerkamp, of course, needs no boost from me, but Star and Inoue (pronounced as in phooey), are fairly new. I well remember when I first advertised Sommerkamp stuff—everybody said "cheap Jap rubbish," and it was a long time before I sold any. Rather different feeling today though. Everybody says "you've got to hand it to the Japs." Same with Star and Inoue—everybody just a wee bit scared at first, but the word'll get round 'ere long! By then of course, there'll be a two month delivery period! 'Twas ever thus! Never mind, press on. To those of you who appreciate the niceties of design, let me draw your attention to the Inoue IC-700R—as you know there is a certain optimum L/C ratio in Rx front end design, which it would be nice to have, but unfortunately it is spoilt by either L or C being variable. Inoue have obviously done a lot of head-scratching and come up with a neat solution—they have ganged the preselector capacitor with a permeability tuned preselector coil so that both L and C vary, but substantially maintain an optimum L/C ratio over the whole tuning range. Dead crafty. I don't know of any other Rx that goes to this trouble. Expensive to do, but very clever. It gets its selectivity from a very nice 2-4 kc/s, 9 mc/s. xtal filter with a 1-8 shape factor (6 : 60 dB). Having decided to lash out on an expensive filter in order to solve image problems, the way was then open to the designers to go all out for a single conversion path—again highly desirable. How to do it? Pre mix the oscillator? Good, but birdie trouble inevitable. H.F. Oscillator? Don't make me laugh—drift like the clappers! Wait a minute, though—it's all transistor (F.E.T.'s of course) so a stable H.F. oscillator is a possibility. This in fact, is what they've done, tuning 12.5-13.0 mc/s. for 80, 16-16.5 for 40, 5-5.5 for 20, 12-12.5 for 21, and 19-19.5, 19.5-20, and 20-20.5 for 10. No less than 3 VFO buffer amplifiers contribute to a remarkable 100 cycle stability. To the technical boys I need say no more except to add that an audio filter for CW is fitted. To the less technical it all adds up to a very sensitive, selective and stable Rx with a better than 60 dB image rejection and no internal spurious signals, all in a little 6½" x 11" x 8½" box. FET's ensure maximum sensitivity and minimum cross modulation. Either 12v. D.C. or 240v. A.C. supply and at £85 it has to be a best buy in its price range. At a later date you can add the IC-700T transmitter and IC-700PS power supply. The transmitter is designed to operate transceive with the IC-700R and in fact uses the Rx v.f.o. All transistor except PA's, driver and a buffer. The PA's are 2-6146B's operated very coolly with only 500v. on the plates for 120W. PEP. This conservative running ensures low distortion, minimal harmonic radiation, long life and all in all, a sweet sounding little rig. VOX, PTT, MOX. Same midget size as the Rx, and a midget price of £80, P.S.U. £30. As a package deal—Rx, Tx and p.s.u. £180. As this price there has to be a catch in it. Well, there are several—no top band, transceive only (it has R.I.T. though), no selectable

sidebands (although the correct sideband is automatically selected on each band) and the Tx p.s.u. is not suited for 12v. D.C. Mind you, 500v. mobile p.s.u.'s aren't too pricey these days, so all in all the snags don't amount to much. Another Rx which I rave about is the Star SR-200. It covers amateur bands only, 160-10 and again is beautifully designed. Single xtal filter at 1650 kc/s, separate oscillator with cathode follower, low noise 6AU6 mixer with cathode injection, excellent product detector, amplified a.g.c. "S" meter and xtal calibrator, £40. Yes, £40. How the heck they produce a Rx like this for the money I'll never know. Well, I've waffled on at some length this month. Haven't left much room for other stuff—but currently in stock in the new line:—

Sommerkamp FR-500, FL-500, FT-500, FT-150.

Star ST-700, SR-700, SR-200.

Inoue IC-700R, IC-700T, IC-700PS.

National 200, Fanon 28.5 mc. walkie-talkies, £12 10s. a pair; Hansen SWR bridges, £3 10s.; Bug keys, £4; Electronic keyers, DA1, £16. Low impedance headsets, padded, £2 2s. 6d.; Filters, 9 mc/s. xtal, 455 kc/s. mechanical 2-4 kc/s., 5 kc/s., 24 kc/s. for FM and 500 cycle, 100 kc/s. xtals £2; Tavas mobile whips, £12 10s. complete all bands, etc., etc., etc.

NEW :

Tubular trimmers either ½-5pF or 3-15pF, 1/- each, 10/- dozen; Feedthroughs 1000pF screw type 1/- each, 10/- a doz.; Disc ceramics .001, 3/6 doz.; .01, 5/- doz.; Standard coax sockets 1/- each; Standard coax plugs, 1/4 each; Plugs (Octal, BTG, B9A), 2/6 each; Electrolytics—brand spanning new can types, complete with mounting clips, 10mF 350V., 1/8; 20mF 350V., 2/3; 100mF 450V., 2/9; 100mF 350V., 5/6; 100-100mF 350V., 6/8; 100mF 450V., 7/2; 40-40mF 500V., 7/3; 100mF 500V., 7/9; 100-10mF 450V., 13/2; Silicon rectifiers—Current manufacture, NOT surplus, NOT seconds. You can rely on these. SE-05 1000piv 500mA, 4/5; 1S1066 1000piv 750mA, 8/-; Panel indicator lamps, for standard lilliput bulbs red or green 2/6; switches, jack plugs; miniature tantalum electrolytics, ¼W sub miniature metal oxide resistors, etc., etc. A s.a.e. will get you my lists of components, etc.

NEW SURPLUS :

Resistors, most values from 2d. each. Capacitors from 2pF to 150mF from 2d. each. Mica trimmers 1000pF, 1/-; 2,600pF solid dielectric variables—ideal top band loading, 1/-; Oil filled 8mF at 750V D.C., 2/-; Pots—from 5 ohms to 1 meg, 6d. each. I can make up a useful bunch of 25 for 10/-. The guts of the 19 set variometer, 5/-, post free.

SECOND-HAND RECEIVERS

| | | | | | | | |
|-------------------------|------|---|---|----------------------------------|------|---|---|
| HA-350. Mint ... | £60 | 0 | 0 | HR-22 ... | £80 | 0 | 0 |
| HQ-170 ... | £70 | 0 | 0 | TCS12 ... | £12 | 0 | 0 |
| SUPER PRO ... | £20 | 0 | 0 | TRIO JR500. Demo. | £50 | 0 | 0 |
| EDDYSTONE 750 | £45 | 0 | 0 | B40's. A1 ... | £20 | 0 | 0 |
| RA17—Choice of 2 | £180 | 0 | 0 | EDDYSTONE 770U | £100 | 0 | 0 |
| EDDYSTONE 770R | £100 | 0 | 0 | 888A ... | £65 | 0 | 0 |
| HAMMARLUND | | | | LAFAYETTE HA700 | £25 | 0 | 0 |
| HQ120. Good ... | £35 | 0 | 0 | FR-100-B ... | £95 | 0 | 0 |
| HEATHKIT RA1. | | | | FR-100-B (earlier model) | £75 | 0 | 0 |
| Mint ... | £30 | 0 | 0 | COLLINS 75A4, 3 filters, perfect | £225 | 0 | 0 |
| HALLICRAFTERS SX111 ... | £75 | 0 | 0 | | | | |

SECOND-HAND TRANSMITTERS

| | | | | | | | |
|---------------------------|-----|---|---|-------------------------------|------|---|---|
| S/F FL-100 linear ... | £80 | 0 | 0 | TW COMMUNICA-TOR 80m. | £35 | 0 | 0 |
| HEATHKIT DX60 HG10 v.f.o. | £40 | 0 | 0 | HAMMARLUND LG300 R.F. section | £20 | 0 | 0 |
| HALLICRAFTERS HT37 ... | £80 | 0 | 0 | HX50 ... | £110 | 0 | 0 |

TEST GEAR :

| | | | |
|--|-----|----|---|
| Laboratory audio oscillator, a thing of beauty | £25 | 0 | 0 |
| Lab. 0-30V at ½A p.s.u.'s Fully metered | £15 | 0 | 0 |
| Telegquipment S324A 'scope | £35 | 0 | 0 |
| Heathkit 1012U 'scope, mint | £27 | 0 | 0 |
| Cossor 1045 'scope | £25 | 0 | 0 |
| Solartron digital voltmeter, mint | £35 | 0 | 0 |
| Marconi TF390G 16-150 mcs. | £20 | 0 | 0 |
| Taylor Sig. Generator, 100 kc/s. to 45 mc/s. | £10 | 0 | 0 |
| Avo. Sig. Gen. 50 kc/s.-80 mc/s., mint | £17 | 10 | 0 |
| 455 kc/s. panadaptor | £25 | 0 | 0 |

I also have a bunch of tantalum capacitors at very low prices, ¼ watt sub-miniature resistors (metal oxide types, very nice).

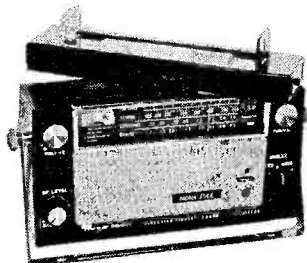
Postage : Allow lots (it's always more than you think), I'll refund any left over.

A large s.a.e. will get you a copy of my latest lists.

73,

Bandit Bill,
VE8DP/G3UBO.

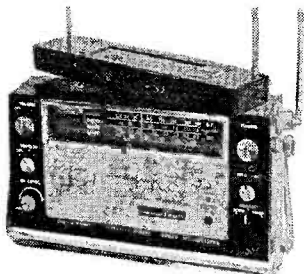
THE BIG FOUR BY NOVA TECH



NOVA PAL

3-band R.D.F. 9 transistors
 190-400 Kc. with rotating ferrite antenna
 550-1600 Kc. and connection for external
 1600-4500 Kc. aerial.
 Suitable for yachtsmen.

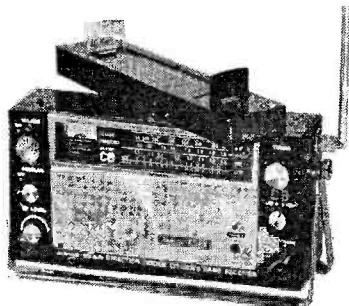
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AVIATOR II

12 transistor 4-band R.D.F./VHF.
 190- 400 Kc. with rotating ferrite antenna,
 550-1600 Kc. 3 removable telescopic whip
 1600-4500 Kc. antennas, twin plug antennas for
 108- 136 Mc. best air-borne reception. Long
 range extendable whip provides
 maximum signal input on the
 ground.

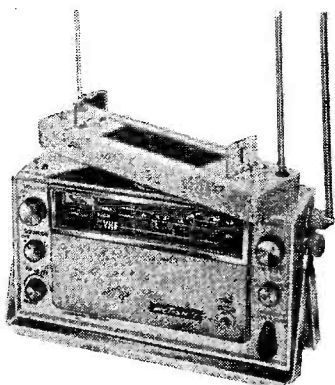
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NOVA CB.

13 transistors 5-band R.D.F./CB.
 190- 400 Kc. With rotating ferrite antenna
 550-1600 Kc. twin-plug antennas and tele-
 1600-4500 Kc. scopic antenna.
 CB low 27 Mc. For CB BAND SQUELCH
 CB high 27 Mc. CONTROL.
 23 channels over 2 Bands.

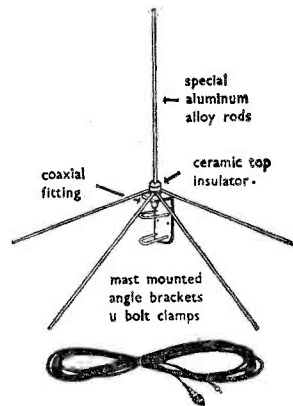
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ACTION

5-Band R.D.F./VHF. AM-FM. 14 transistors
 190- 400 Kc. with rotating ferrite antenna,
 550-1600 Kc. twin plug V.H.F. antennas,
 1600-4500 Kc. telescopic V.H.F. antenna.
 30- 50 Mc. For V.H.F. BAND SQUELCH
 (low AM-FM) CONTROL.
 150- 175 Mc.
 (high AM-FM)

£53 . 10 . 0



£7 . 15 . 0.

IMPROVE YOUR VHF RECEPTION WITH MODEL NT-4 ROOF ANTENNA

The Nova-Tech Model NT-4 Roof Antenna is designed to provide maximum signal input to your Aviator II. It consists of non-directional antenna cut to the aviation band, 4 drooping radials for positive ground plane, co-axial fittings and 50 feet of matching 52 ohm coax cable.

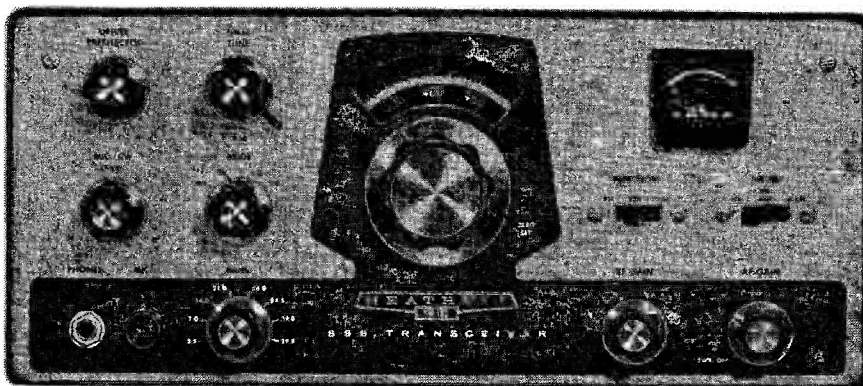
Units are completely portable and operate on 4 x 1.5v. internal batteries and are covered by our unconditional 10-day money back guarantee

FULL PARTICULARS OF TRADERS TERMS, AND LITERATURE from

nova tech inc.

72 WARDOUR STREET, LONDON, W-1. Telephone : 01-437 4589

NEW HEATHKIT HW-100 5-BAND SSB-CW TRANSCEIVER



£125 KIT

EXTENDED PAYMENT PLAN

Deposit £31 16 0

19 monthly payments £5 9 0

Total Credit

Price :

£135 7 0

You asked for it . . . a multi-band version of the Heathkit "single-banders" . . . low-cost SSB operation on 10 or 15 metres . . . an SSB transceiver equal or superior to many assembled rigs, but at *much lower cost*. That's the HW-100.

How did Heath do it? We expanded on the "single-band" design . . . borrowed from the heritage of the famous SB-101 . . . took a look at the competition . . . and produced the most SSB equipment you can get for the money.

Check the features and the specifications:

- Solid-state (FET) VFO ● 80-10 metre coverage ● Switch selected upper or lower sideband or CW ● 180 watts input PEP SSB—170 watts input CW ● Crystal filter ● Full coverage on all bands with 500 kHz. per band segment ● Smooth vernier control of frequency with patented Harmonic Drive™ dial mechanism ● Built-in 100 kHz. calibrator ● Separate offset CW carrier crystal ● TALC ● Quiet, enclosed relays ● Fixed or mobile operation with HP-23 or HP-13 power supplies ● Easy assembly with circuit boards and wiring harness.

Kit HW-100, 18 lbs. £125 0 0 P.P. 9/-

Kit HP-13, DC power supply, 7 lbs. £37 2 0 P.P. 6/-

Kit HP-23, AC power supply, 19 lbs. £30 18 0 P.P. 9/-

Kit SB-600, 8 ohm speaker, 6 lbs. . . . £10 2 0 P.P.n.c.

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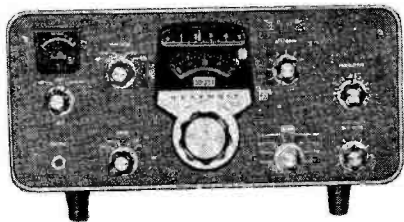
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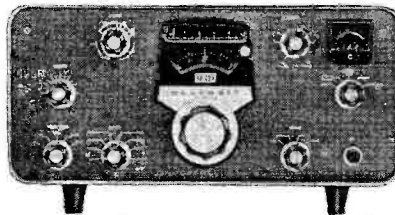
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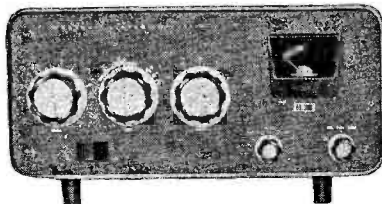
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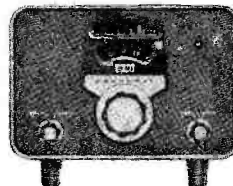
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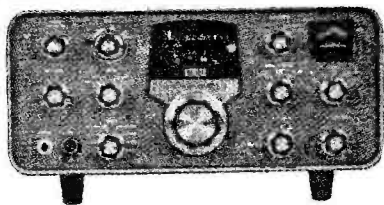
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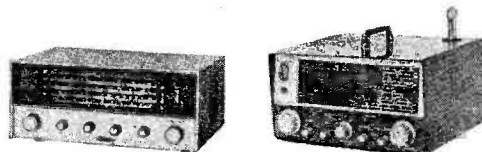
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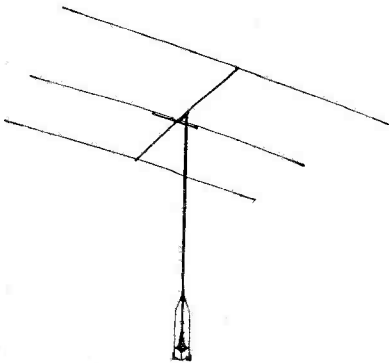
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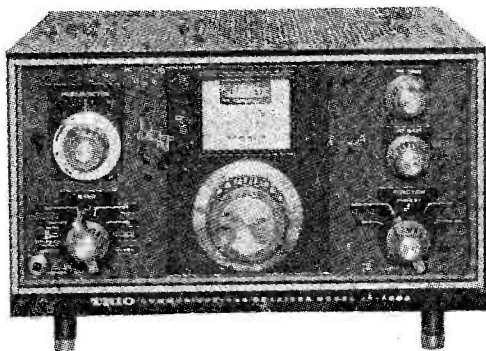


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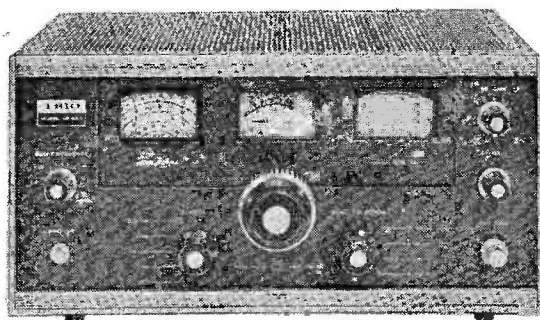
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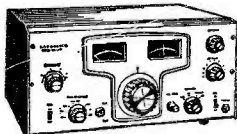
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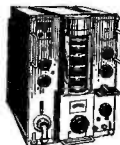
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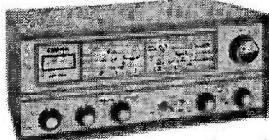
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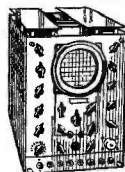


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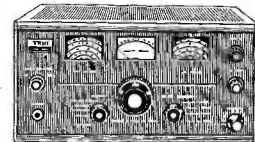
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The SHORT WAVE Magazine

EDITORIAL

Proportion *It should not be forgotten that there is still—readily available on the amateur market, in huge quantities—a wide range of exquisitely designed and delicately constructed electronic devices, manufactured to marvellously close tolerances. The reference is, of course, to the thermionic valve, in all its extraordinary variety—and they can be bought very cheaply.*

Moreover, thermionic valves in their basic variations—double-triode, pentode, triode-heptode, multigrid and many others—can be used in circuit configurations which the transistors commonly available cannot approach. There is no transistor yet in sight that equates with, say, the 12AT7 or the 6AK5, as regards the uses to which these types can be put—yet by modern standards they are obsolescent. And these examples could be multiplied almost endlessly, when the more sophisticated valve types are considered.

The point seems to be, therefore, that at the present state of the art there is no particular merit (in the strictly Amateur Radio context) in using transistors, unless it is for some definite advantage, such as VHF or Mobile.

Any usual fixed AT-station has a mains connection, space is comparatively seldom a really serious factor, there are still ample supplies of iron-cored components of every sort available (also to be had very cheaply), and the circuitry and principles of valve-operated apparatus are well established. As matters now stand, it is probably fair to say that—in spite of the great advances in transistor design, power rating and availability—the valve will have a big part to play, and for a long time to come, in the techniques of Amateur Radio, on the HF bands, where the basic requirement is the means to communicate.

From quite another point of view, as purveyors of technical information to beginners and embryo professionals in the fields of radio communication and electronics, a fact we always have to remember is that, as yet, the Radio Amateur's Examination pays little or no attention to transistors. On the other hand, in the more progressive schools where electronics are a part of the science syllabus, youngsters are nowadays being started on transistors, rather than on valves, and the tendency is for examination questions to be framed accordingly. Hence, we could in due time see a new generation brought up entirely on transistors, with no knowledge of valve techniques.

In view of the foregoing, it would seem to be high time that the R.A.E. question paper should include two or three questions involving the use of transistors.

*Austin Forster,
G6FO.*

PRACTICAL TWO-METRE SSB TRANSVERTER

DESIGN, CIRCUITRY,
CONSTRUCTION AND ALIGNMENT

Part I

A. H. DORMER, M.I.E.R.E. (G3DAH)

This is an essentially practical treatment of the current problem of using an existing HF-Band SSB transmitter to produce Sideband output on two metres. The transverter as described here to achieve this is complete in itself, requiring only SSB drive at 14 mc. While this Transverter as it stands can be regarded as an adequate medium-powered CW/SSB Tx unit, by using a smaller valve in the PA it could be operated as a driver for a high-power linear amplifier on two metres.—Editor.

THIS article describes the design and construction of a practical two-metre transverter and PA. Nothing original is claimed for the design, which was to the following specification:

Self-contained with PSU and FET converter,
Output of the order of 60 watts p.e.p.,
Final to be a QQV06-40A,
Transceive and split working to be possible,
KW-2000 to provide the Sideband,
Complete coverage of the two-metre band,
Final stage to be capable of simple modification
to drive a 4CX250 linear.

Readers will recall the excellent articles by G3BA on two-metre SSB which have appeared from time to time, and for those who wish to modify existing transmitters for this mode, all the relevant information will be found in the January, 1968 issue of SHORT WAVE MAGAZINE. Considerable detail is also given there to guide those who are building from scratch.

Where this article differs is that it covers a complete design, including switching and receiving functions, power supplies and constructional data. The gear has been in use without substantial modification for some six months and from reports received during that time

appears to be functioning as it should. Cost has not been an overriding factor, although performance and appearance have.

Considerable liberties can be taken with the design to meet individual requirements, and these will be indicated in the appropriate section of the text. Explanatory notes on the reasons for the choice of certain circuit configurations are given under the relevant headings.

Circuitry

The block diagram at Fig. 1 shows the general layout. Separate diagrams give detailed circuitry and the functions of the major sections.

Fig. 2 gives the full circuit diagram of the Oscillator, Multiplier and Buffer Amplifier stages—see p.270.

The choice of crystal frequency was dictated by several considerations—the frequency of the SSB injection, the reduction of unwanted beats, and the production of a clean, stable signal using the minimum of valve stages. Let us look at these points in rather more detail. The SSB injection frequency is around 14 mc and this was chosen in preference to the higher alternative of 28-30 mc, for reasons to be given later. The coverage of the KW-2000 is in any case incomplete over that range and so no advantage was to be gained there. Agreed, an alternative might have been to have re-crystallised the KW-2000 to give full coverage and used a single crystal in the transverter—or even to have partially re-crystallised and used more than one crystal in the transverter—but other considerations as well as the expense and trouble of altering the KW-2000 made this an unattractive idea. As long as one was prepared to take the necessary precautions in the later stages of the transverter when using the lower frequency to ensure that the f1-f2 product from the mixer was adequately filtered (slightly more difficult with 14 mc as opposed to 28 mc injection) use of the lower frequency is quite acceptable on this score.

The final solution was, therefore, to use five switched crystals in the transverter and tune 14.0 to 14.4 mc on the KW-2000, so giving complete coverage of the two-metre band.

For those who are only interested in the SB calling frequency of 145.41 mc, a simplification is obviously possible. Coverage of the CW portion of the two-metre band in addition to 145.41 mc is likewise possible, of course, by using two crystals of suitable frequencies. Crystal frequencies in the 43 mc range were finally chosen.

The use of lower fundamental frequency crystals

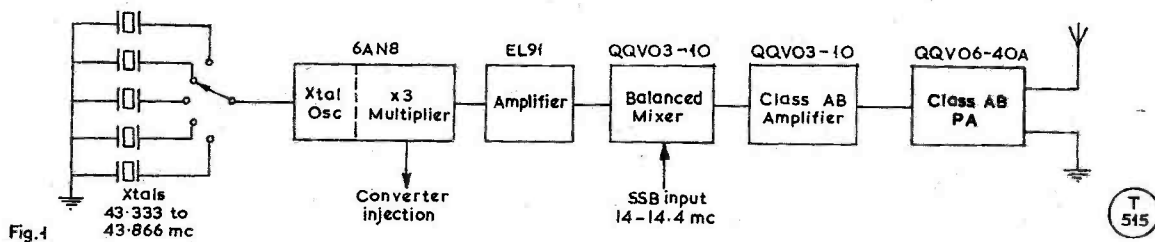
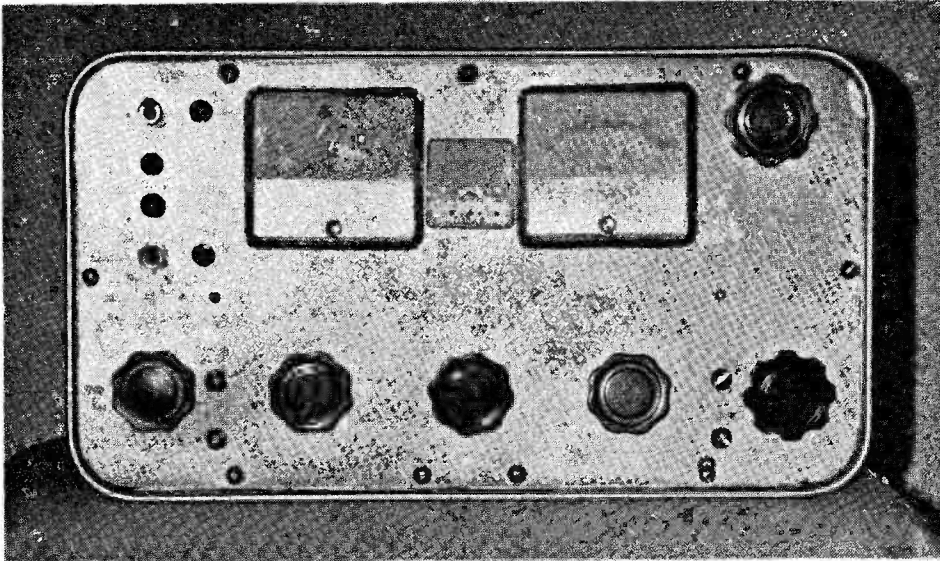


Fig. 1. Block schematic of the G3DAH Transverter.



Front panel arrangement of the Transverter by G3DAH.

was considered and rejected, since this would have involved the use of more multiplying stages and would have increased the possibility of unwanted beats in both the transverter and the converter. As long as HC/6U crystals are not overdriven in overtone circuits they can produce stabilities as good as the more usual 6 or 8 mc types; also they are smaller in size, and can yield adequate output from quite simple circuits. An enquiring eyebrow might be raised, with TVI in mind, at the choice of 43 mc as the oscillator frequency, but it was found that with the filtering and screening incorporated in the design there was no audible or visible interference on an adjacent television receiver.

The 6AN8 valve was chosen for the oscillator simply because it was available and because the pin arrangement is such that a neat layout was possible. Other triode-pentodes, such as the ECF80, would probably work just as well. It is operated with a low, stabilised anode voltage from a well filtered supply. The additional decoupling of 10K and 50 μ F should be noted. (The reader is referred to an article by G3KUM on p.740 of SHORT WAVE MAGAZINE for February, 1967, in which the advisability of including such a filter is explained.) The triode section of the 6AN8 operates as a straight oscillator with the anode circuit tuned to the crystal fundamental frequency, while the pentode section multiplies to around 131 mc. Self-supporting coils are used and the tuning capacitors are readily available at low cost on the surplus market. The circuitry adopted permits one side of the variables to be earthed, as would be the case if series tuning were used, but the coil is smaller and fits more conveniently into the layout space available. A single turn, loosely coupled link adjacent to the multiplier anode coil provides the injection voltage for the transistorised converter, the separation being adjusted to give the required level. (L3 in Fig. 2 overleaf.)

The EL91 buffer amplifier, in addition to providing

gain and isolation, reduces the amount of fundamental frequency, and harmonics of it, at the balanced mixer input, which is itself untuned. A 6AK5/EL95 valve was tried in this position and, if pushed a bit, gave sufficient injection at the mixer but, on the basis that it is preferable to underrun rather than overrun a valve, the larger type was selected. A single-turn link at the cold end of the buffer amplifier anode coil couples the 130 mc output into the cathode of the QV03-10 balanced mixer. Although this section of the circuit is not separately screened, if there is any fear about the 43 mc energy getting where it shouldn't, it is quite a simple matter to make up this portion of the circuit in a screened box with all the external connections, except the RF output, decoupled by feedthrough capacitors.

To set the circuit up, tune the oscillator anode to 43-600 mc, the multiplier to just above 43-333 mc and the buffer amplifier to just below 43-866 mc. Constant and adequate drive is then available over the whole range without further adjustment when changing frequency.

Balanced Mixer and Class-A Amplifier

The circuit of these stages is at Fig. 3, p.271. The first consideration here is the choice of the mixer itself. A single multi-electrode valve could be used but this is not recommended since no cancellation of unwanted frequencies by push-pull operation is possible, and if there is one thing which is highly undesirable, it is the production at the input to the final amplifier of a whole family of spurious and unwanted harmonics of either the injection or the SSB frequencies. A balanced mixer is therefore a must, and the QV03-10 is an obvious choice.

Let us look for a moment at the operation of a perfect push-pull or balanced mixer, ignoring for the time being the fact that one of the frequencies to be mixed is modulated. An RF voltage applied in phase at

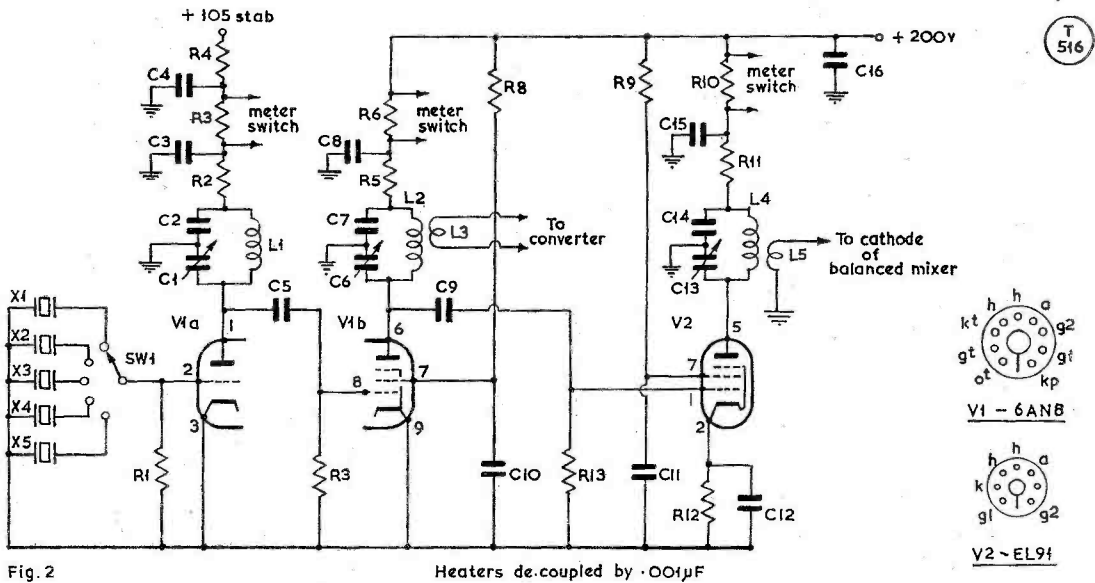


Fig. 2

Heaters de-coupled by .001 μ F

Fig. 2. Oscillator, amplifier and buffer amplifier sections.

the grids does not appear in the anode circuit since it is cancelled by push-pull action. An RF voltage applied to the grids in anti-phase is not so cancelled and appears at the anode in amplified form. Sum and difference frequencies also appear as a result of the mixing action and it is the sum frequency with which we are going to be concerned. Readers may note here the similarity between this process and the action of a balanced modulator used to eliminate the carrier in SSB generation. In the case we are considering, the SSB injected into the mixer may be regarded as modulating the oscillator frequency.

Now let us insert some numerical values into the above statement. Let us apply 130 mc to the grids in anti-phase and 15 mc to the cathodes, and therefore in phase at the grids. The output of the mixer will consist of the sum and difference frequencies of 145 and 15 mc, plus a large 130 mc component but no 15 mc energy. Now consider the reverse process and apply the 15 mc signal to the grids and the 130 mc signal to the cathode. Then the output will consist, as before, of the sum and difference frequencies, plus a large 15 mc component and no 130 mc signal.

In the case which we are considering, the anode circuit of the mixer is tuned to 145 mc so that discrimination against the 15 mc signal is high, is reasonably so against 115 mc, but is poor against 130 mc. Tuned circuits are therefore required after the mixer to eliminate this unwanted frequency, and the more there is of it, the greater the number of filters required. It is logical therefore to take advantage of the cancelling property of the mixer to reduce the 130 mc amplitude and so make elimination easier. Cathode injection of the oscillator frequency then has definite advantages.

However, mixers are not as perfect as we assumed and harmonics of both the mixing frequencies will also be present. Those of 130 mc are far enough removed

Table of Values

Fig. 2. The Oscillator, Multiplier and Buffer Amplifier

| | |
|---|---------------------------|
| C1, C6, C13 = 25 μ F | R4* = 10,000 ohms, 5w. |
| C2, C3, C7, C8, C9, C10, C11, C12, C14, C15, C16 = .001 μ F | R5, R11 = 1,000 ohms |
| C4* = 50 μ F, 200v. wkng. | R8 = 10,000 ohms |
| C5 = 22 μ F | R9 = 8,200 ohms |
| C9 = 33 μ F | R10 = 100 ohms |
| R1, R7 = 100,000 ohms, hi-stab. | R12 = 220 ohms |
| R2 = 1,000 ohms, hi-stab. | R13 = 100,000 ohms |
| R3, R6 = 100 ohms, hi-stab. | Sw1 = 6-pos., Yaxley type |
| | X1 = 43-333 mc |
| | X2 = 43-466 mc |
| | X3 = 43-600 mc |
| | X4 = 43-733 mc |
| | X5 = 43-866 mc |
| | V1 = 6AN8 |
| | V2 = EL91 |

COIL DATA

- L1: Seven turns 18g. enamel, $\frac{3}{16}$ in. diameter, close wound.
- L2: Three turns 16g., $\frac{3}{16}$ in. diameter, $\frac{1}{2}$ in. long.
- L3: One turn of 16g., spaced $\frac{1}{16}$ in. from L2.
- L4: Four turns 16g., $\frac{3}{16}$ in. diameter, $\frac{1}{2}$ in. long.
- L5: One turn 16g., $\frac{3}{16}$ in. diameter, spaced $\frac{1}{16}$ in. from L4.

Notes: Crystals can be Cathodeon, wire ended. Items marked* are on PSU chassis. All resistors rated half-watt except R4. Sw1 should preferably be of ceramic construction.

from the resonant frequency of the following tuned circuits to be effectively reduced to negligible proportions, and those of 15 mc., the 9th and 11th in this case since the even 10th harmonic is cancelled, are of small amplitude and in the final output should be at least 40 dB down. As already explained, the actual range of the SSB injection frequency in this design is from 14.0 to 14.4 mc. The 9th harmonic then falls between 126 mc and 129.6 mc, fairly well off 145 mc.

It may be noted here that if the oscillator frequency is

116 mc and the SSB injection frequency 29 mc, the difference frequency becomes 87 mc and therefore easier to eliminate in following stages—but the fifth harmonic of 29 mc, which is not cancelled by the push-pull action of the mixer, will be present at the mixer anode at some strength and will coincide with the transmitted frequency.

So far, so good, but we have not considered what happens when one of the signals, the 15 mc one, is modulated. Inevitably, the mixing process will introduce inter-modulation products and these may well be on or near the final transmitted frequency, but they will be no worse in the case of grid injection than they would be with cathode injection. By correct operation of the mixer in Class-AB1, *i.e.*, without grid current flowing, and by observing an amplitude ratio of 10 : 1 between the oscillator and signal input voltages, distortion products can be kept within bounds, as is evidenced by some of the clean signals to be heard on the two-metre band these days. From the foregoing reasoning it was decided therefore to use an injection frequency around 130 mc and apply it to the cathodes of the balanced mixer, the sideband signals being in the range 14 mc to 14.4 mc and applied to the grids.

Drive Power

It is essential with this system to ensure that the mixer is not overdriven by either injected frequency, particularly the SSB frequency, of which the smallest amount possible to give adequate drive to the following valve should be used. Subsequent amplification will look after final drive requirements.

In view of these considerations, the arrangement shown in the circuit diagram was finally adopted. It leads to a compact layout without the necessity for tuning the mixer grid circuit, so avoiding having to find room for yet another control on the front panel, and produces an acceptably distortion-free signal. Very

close coupling with high Q is provided by the ferrite toroid, and the SSB output from the mixer remains sensibly constant over the whole tuning range. The layout ensures that the link to the mixer cathode, V1 in Fig. 3, is as short as possible—an important point to watch.

The signal from the KW-2000 requires attenuation before application to the mixer and this is achieved by operating the transmitter on low power into a load, R1 in Fig. 3, consisting of ten 750-ohm, two watt resistors in parallel mounted in a can on the top of the chassis. A series 200 ohm variable resistor, R2 (ideally a non-inductive component), provides the necessary adjustment. Correct input levels will be indicated in the alignment

Table of Values

Fig. 3. Balanced Mixer and Class-A Amplifier

| | |
|--------------------------------|-------------------------|
| C1, C2, | R5 = 47,000 ohms, 1w. |
| C3, C4, | R6, R10 = 100 ohms |
| C7, C8 = .001 μ F | R7, R8, |
| C5, C6 = 10 + 10 μ F, var. | R9, R11 = 1,000 ohms |
| R1* = 75 ohms, 20w. | VR1 = 100,000 ohms, 2w. |
| R2 = 200 ohms, 3w. | V1, V2 = QQV03-10 |
| R3, R4 = 470 ohms | |

COIL DATA

- L1, L2: As for L1, L2 under Fig. 2 on p.270.
- L3, L4: On Mullard FX-1597 toroid. Sec. 21 + 21 turns 28g. enamel, wound bifilar just to fill space. Pri. 8 turns 28g. over-wound on secondary, spaced to fill toroid.
- L5: Four turns 16g., $\frac{1}{2}$ in. diameter, with $\frac{1}{4}$ in. space at centre to accept L6.
- L6: Five turns 16g., $\frac{1}{2}$ in. diameter by $\frac{1}{2}$ in. long.
- L7: Four turns 16g., $\frac{1}{2}$ in. diameter by $\frac{1}{2}$ in. long.
- L8: Single-turn link, 16g., $\frac{1}{2}$ in. diameter, centred on L7.

Notes: Resistor R1* can be made up in any way to give a soak load of 20 watts at 75 ohms. All other resistors are rated half-watt except as indicated. In L3, L4, note that start and finish of secondary bifilar winding should be as indicated by "S" and "F" in diagram or correct push-pull action will not be obtained.

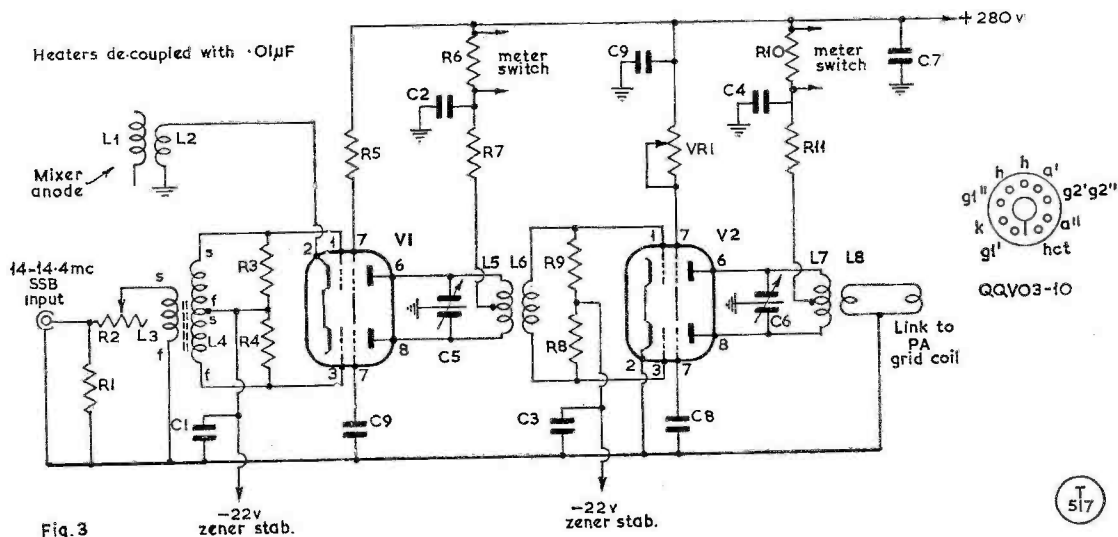


Fig. 3

Fig. 3. Balanced Mixer and Class-A Amplifier.



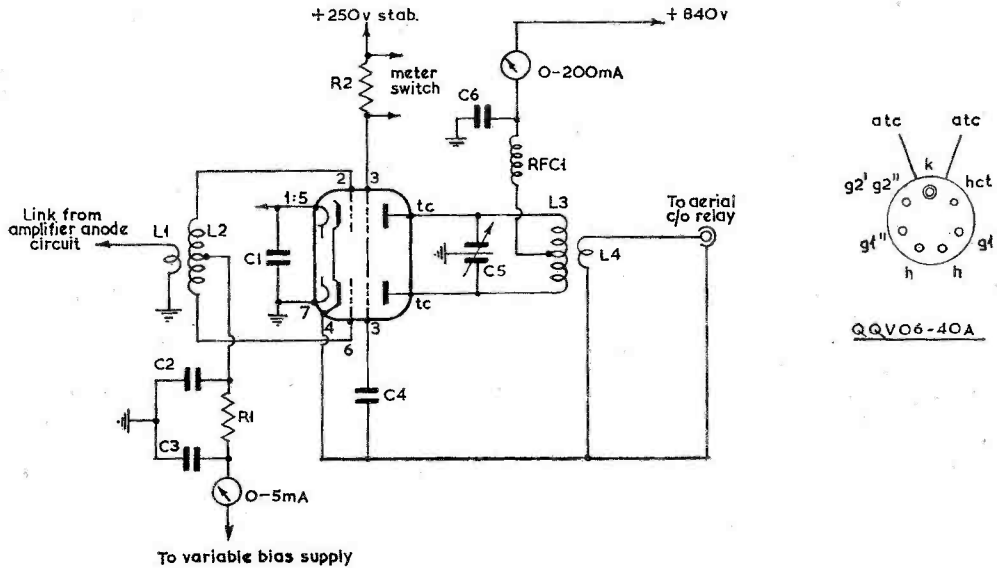


Fig. 4. The Class-AB Power Amplifier section.

section. This 200-ohm resistor could have been replaced by a variable capacitor for some 150 $\mu\mu\text{F}$ or so, but this meant one more bulky component on the chassis, and although it is a convenient way of adjusting the final output, particularly when a linear amplifier is to be used there are other methods which in this particular application were preferred.

One word of warning here: Do *not* attempt to reduce the drive by turning down the audio gain on the SSB generator. All this does is to alter the relationship between the carrier and the sideband, and carrier suppression on two metres will be inadequate and very audible!

Bias for the mixer and following Class-A amplifier is provided by zener stabilisers and drive is adjusted so that no grid current flows in either circuit. The coupling between L5 and L6 in Fig. 3 is made as loose as possible consistent with this condition. It is possible to obtain sufficient drive for the final directly from the mixer anode, but the tuned circuits associated with the amplifier give desirable additional rejection of the unwanted frequencies existing at this point.

The Class-A amplifier stage in Fig. 3 takes the usual form and requires little explanation. The grid circuit inductance is resonated with the input capacitance of the valve to 145 mc, the turns being adjusted to give the correct spacing. The grids are shown decoupled by 1K resistors and $0.001 \mu\text{F}$ by-pass capacitors, but the coil could be centre-tapped and one resistor only used—it happened that the layout was neater with the two. The grid coil L6 is inserted into the space left between the two halves of the mixer anode coil L5 and the exact position adjusted to give zero grid current on speech peaks. If the coupling is too close, the mixer anode tuning flattens and there will be inadequate rejection of unwanted frequencies and distortion. Note that the screen is decoupled.

Table of Values

Fig. 4. The Class-AB Power Amplifier

| | |
|------------------------------------|--|
| C1, C2, | L1, L2 = As L7, L8 Fig. 3. |
| C3, C4, | L3 = 4t. 12g., $\frac{3}{8}$ in. dia., |
| C6 = $0.001 \mu\text{F}$ | $\frac{3}{8}$ in. long |
| C5 = $8 + 8 \mu\mu\text{F}$, var. | L4 = 1t. 16g., centred |
| R1 = 1,000 ohms, $\frac{1}{2}$ w. | on L3 |
| R2 = 100 ohms, $\frac{1}{2}$ w. | RFC = 22t. 28g. enam. on |
| V1 = QQV06-40A | $\frac{3}{8}$ in. rod. |

Note: If this is to be the final PA stage, and not the driver for a Linear Amplifier operating at full power, better RF efficiency would be obtained by making L3 a tuned-line tank, with L4 as a U-loop link with a series condenser to tune out reactance. See text.

The variable resistor VR1 in the screen of the QQV03-10 amplifier sets the input level to the final amplifier and the control is therefore brought out to the front panel. The bottom of the zeners is lifted from earth on "receive," together with the bias on the final, and this effectively biasses both stages to beyond cut-off. The mixer anode, as already explained, is tuned to $f1 + f2$, i.e., 144 to 146 mc, and no screening has been found to be necessary between this circuit and the next which is on the same frequency, but if there is any indication of instability here, earthed screens should be fitted across the QQV03-10 valveholders. (They were required in the mock-up version which used a different layout.) Single-turn link coupling L8 is provided between the amplifier and the final grid circuit, which is resonated on 145 mc with the input capacitance of the valve.

Final Amplifier

The final Fig. 4 is quite standard and uses a QQV06-40A with some 850 volts on the plate and a stabilised screen supply of 250 volts. A milliammeter is connected permanently in the grid circuit and this should,

strictly speaking, read zero for Class-AB1 operation, but in practice it has been found that, with the low impedance bias supply used, up to two mA of grid current can be tolerated, indicating that the valve is being operated in Class-AB2, before any deterioration in quality becomes apparent. The output goes up considerably under these conditions. The input to the final is then about 200 mA peak indicated on the plate meter and the output is of the order of 60 watts p.e.p.

The output tank L3, C5 is not very efficient and considerably more output could be obtained with a better design, but bearing in mind that the transverter was planned with the object of producing a reasonable signal pending the completion of a 4CX250 linear, (to be described later) it is quite adequate. For those who contemplate running the gear "barefoot," tuned lines are to be preferred.

A word here on the PA bias arrangements. To allow for unpredictable environmental changes, the supply was made variable, the control being adjusted for a no-signal standing current of 30 mA in the final, and it

may be advantageous to bring this control out to the front panel where mains, for example, are subject to considerable fluctuation. In any case the bias supply should be of low impedance so that the flow of grid current under peak drive conditions does not change substantially the grid voltage, although it will inevitably have some effect on the loading of the previous stage. The cathode follower type of supply meets these requirements satisfactorily, the $1/gm$ of the 12AU7 with both halves in parallel being under 200 ohms.

The input to the final is varied as already shown by altering the screen volts of the preceding amplifier, and with maximum potential on the electrode the grid coupling link should be adjusted so that input speech peaks just produce maxima of 2 mA of grid current. It will be found that the grid can be driven up to 5 mA on peaks, but at this level flat-topping is very evident on the monitor 'scope, and there will be considerable splatter—so please don't do it.

(To be continued)

TESTING SILICON DIODES

DETERMINING PEAK INVERSE VOLTAGE

S. E. JANES (G2FWA)

WHILE the simple test for silicon diodes is a resistance check, remembering that different applied voltages give different readings, the low forward and the high backward resistance tells us only that the diode is usable. With unmarked diodes, however, there is the further question—what is the Peak Inverse Voltage?

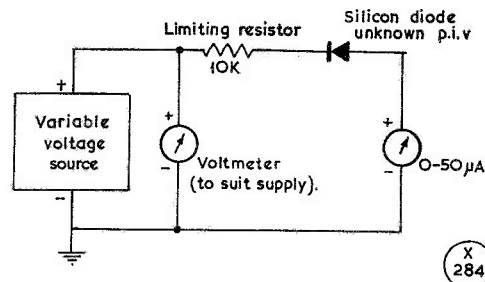
There is an inherent characteristic concerning silicon diodes whereby a sudden increase in inverse current occurs before the inverse breakdown voltage is reached. Therefore, known tapped voltages, or a variable unknown voltage with the addition of a voltmeter, can form the basis of an interesting check circuit. At this point it is well worth studying data sheets on various manufacturers' products. It will be seen that the Maximum Reverse Current can vary widely from less than $1 \mu\text{A}$ to 1 mA or more. This suggests that our indicating device should be, say, a $50 \mu\text{A}$ movement in preference to a meter reading 1 mA full scale. In the latter case, however, it should be pointed out that a deflection only the thickness of the pointer can be observed and is likely to be adequate and safe for the majority of silicon diodes used by the radio amateur. The rise in Inverse Current is then so rapid as the Peak Inverse Voltage (p.i.v.) is approached that we do not need a meter to measure this increase—only as a sensitive indicating device to warn when the breakdown voltage is near.

The first test should be carried out with only

a few volts applied across the meter, diode and a 10K limiting resistor connected in series. The diode must be connected correctly for this test (*cathode to positive*) and there should be no meter reading at this stage, thus indicating that the polarities are correct—including the meter which should not be giving a backward reading! (It is assumed that an initial resistance check has been made on the diode and has given a satisfactory result as mentioned in the first paragraph.) The applied voltage can then be increased gradually until a point is reached where the meter starts to indicate current flow. It would be risky to go beyond this point and if we accept the indicated voltage as the p.i.v. we then know much more about our unknown and even our unmarked and branded diodes.

The voltage of the source for this test can be accepted because the drop in the 10K "safety" resistor is very small when we are concerned with a current of only a few microamps.

In practice the p.i.v. is usually quoted at least 20 per cent below this avalanche point in order to provide a margin of safety and to keep within manufacturer's tolerances. It should be remem-



Circuit of the Tester for silicon diodes, as suggested by G2FWA.

bered, too, that temperature plays a most important part in the working p.i.v.

It is worth checking all silicon diodes before use, particularly when it is necessary to use them in series. By balancing the load on each there is then much less chance of one breaking down and putting strain on the remainder, with increased possibility of further breakdown. It will be found that branded types can vary quite widely—not necessarily in the downward direction but they may be much better than expected!

The writer has found a capacitor checker to

be very suitable for assessing the p.i.v., again making sure that the silicon diode is connected with correct polarities. The Heathkit IT-11 Tester has a leakage indicator for, in this case, mica and paper condensers, whereby the magic-eye closes at a leakage current of 2 μ A with voltages variable up to 600v. What more could one want?!

The foregoing is not applicable to germanium diodes. The reverse leakage is many times greater than the silicon variety and the inverse current rise is not nearly so sharply defined.

BASIC VFO FOR MULTI-BAND OPERATION

PRACTICAL DESIGN FOR STABLE OUTPUT OVER 10 TO 160 METRES

F. G. RAYER, A.I.E.R.E. (G3OGR)

THIS VFO is suitable for transmitters operating on all bands, 160 to 10 metres. Its power requirements are 0.9A at 6.3v. for the heaters, and about 40 mA at 200/250v. HT.

Fig. 1 is the circuit, where V1 is the oscillator, with V2 as amplifier, buffer and doubler. The HT supply to V1 is regulated by V3. This arrangement gives good frequency stability, isolation of the oscillator from following circuits, and a fairly high output.

The 2-pole 2-way switch S1/S2 allows the VFO to cover two frequency bands. L1 tunes 1.75-2.0 mc; the 1.8-2.0 mc sector of this band is employed for 160m. The 1.75-1.9 mc sector gives coverage of the 80m. band,

with doubling in V2 if required.

With L2 in circuit, oscillator tuning is from 7.0-7.2 mc, thus including 40m., and allows working on 14.0-14.4 mc by doubling, and over 21.0-21.6 mc by tripling. The same oscillator range will enable a transmitter also to cover 28.0-28.8 mc. This is a useful portion of the 10m. band. As the same fundamental oscillator range of 7.0-7.2 mc is wider than necessary for the 40, 20 and 15m. bands, only those portions of the range are used.

By having two oscillator ranges in this way, the need for frequency multiplication in later stages is reduced. There is also reasonable bandsread of the HF ranges.

Juggling with coil windings and condenser values to secure suitable VFO coverage can become quite a test of enthusiasm! To avoid this, C1, C2, C3 and C4 are 1% capacitors, and L1 and L2 have adjustable cores. This means that it is only necessary to set VC1 nearly fully closed, and rotate the core of L1 until the VFO is heard on 1.75 mc (or 3.5 mc). Then switch to L2 and adjust this core until the signal appears on 7.0 mc. Each band then has suitable ranges.

Buffer Amplifier

S3 gives selection of an RF choke, L3 or L4. With the RF choke in use, the anode circuit becomes aperiodic,

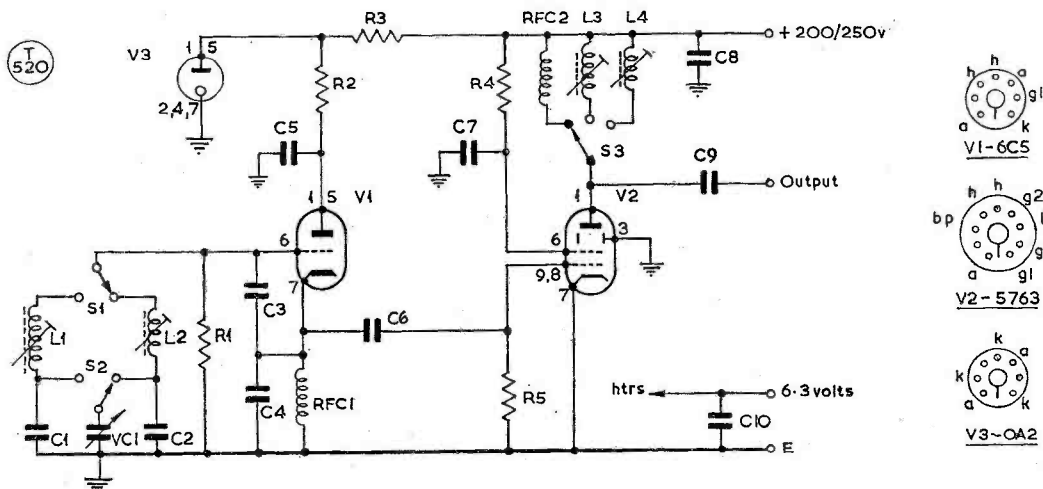
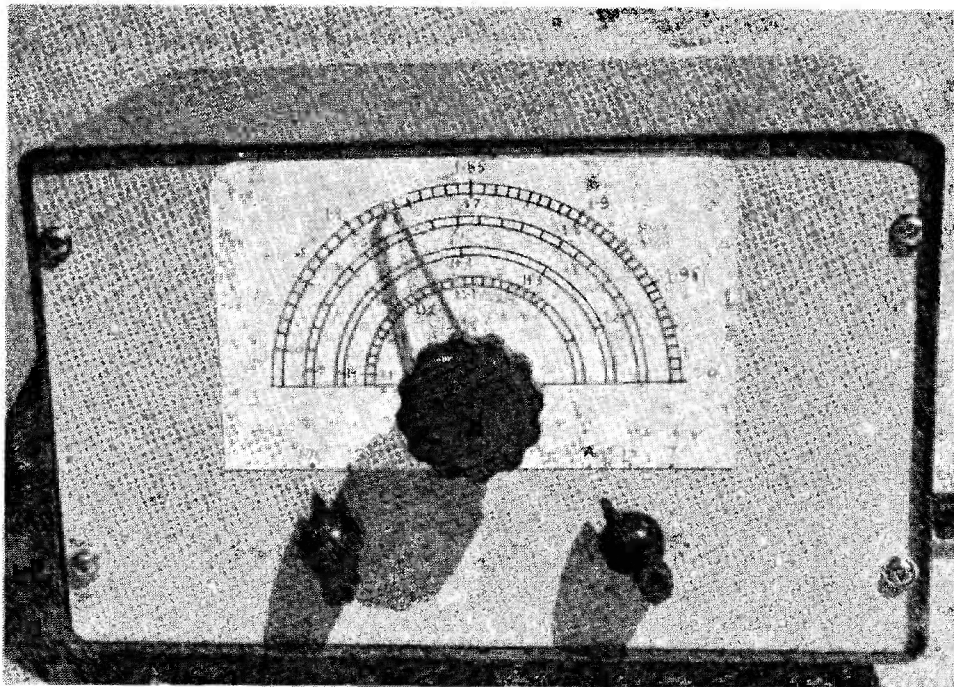


Fig. 1. Circuit of the Basic VFO, by G3OGR.



General appearance of the all-band VFO, as described.

for Top Band coverage. With some transmitters, this may also be most suitable for the 7 mc band.

L3 is core-tuned to about 3.65 mc, and allows V2 to act as a doubler. With a multi-stage transmitter, where 1.75-1.9 mc input is required for the 3.5-3.8 mc band, L3 will not be required. But it does allow the VFO to operate as a driver directly into a low-power PA, to work on 160 and 80 metres. In this way the VFO provides a large part of the RF circuitry for a small transmitter, suitable for Top Band and 80m., as required.

L4 is peaked at about 7.1 mc. It boosts output in the 7 mc range, when later stages in the transmitter will give

frequency multiplication for 14, 21 or 28 mc.

With other than very simple transmitters, the VFO will drive a stage in the transmitter itself functioning as a frequency multiplier. In the interests of stability, the first transmitter stage is generally employed as a doubler, at least.

With a transmitter to cover 28 mc, but incorporating a minimum number of stages, it may be found helpful to use V2 of the VFO as a doubler from the VFO oscillator range. This is easily done by having a 14 mc core-tuned coil, selected by S3. To get up to 28 mc, the transmitter multiplier need then only double (from 14 to 28 mc) instead of being required to give output on 28 mc from a 7 mc input. It is also possible to boost output, if necessary, by increasing V2 anode and screen voltages, which are considerably below maximum.

Table of Values

Fig. 1. Circuit of the VFO

| | |
|--|--|
| C1 = 150 $\mu\mu\text{F}$, 1% s/m | R5 = 100,000 ohms, 1w. |
| C2 = 500 $\mu\mu\text{F}$, 1% s/m | L1 = <i>Electroniques</i> , SL/T |
| C3, C4 = 680 $\mu\mu\text{F}$, 1% s/m | L2 = <i>Electroniques</i> , SL/J |
| C5 = .002 μF , disc ceramic | L3 = <i>Denco</i> , White Range 3 |
| C6 = 100 $\mu\mu\text{F}$, mica | L4 = <i>Denco</i> , Red Range 2 (see text) |
| C7, C8, C10 = .01 μF , disc ceramic | RFC1 = Midget 2.5 mH cored choke |
| C9 = 30 $\mu\mu\text{F}$, mica | RFC2 = 2.5 mH 60 mA RF choke |
| VC1 = 100 $\mu\mu\text{F}$, double bearing (<i>Jackson</i>) | V1 = 6C4 |
| R1 = 68,000 ohms, $\frac{1}{2}$ w., hi-stab. | V2 = 5763 |
| R2 = 2,200 ohms, $\frac{1}{2}$ w. | V3 = OA2 |
| R3 = 6,800 ohms, 2w. (see text) | |
| R4 = 33,000 ohms, 1w. | |

Notes: Additional items include 2-p 2-way rotary switch; 1-p 4-w switch; B7G, B9A holders with can; B7G holder; ball drive unit, knobs, etc.; four-sided chassis $8\frac{1}{2} \times 6 \times 2$ inches; *Electroniques* "Dinkcase," 10 x 6 x 6 inches.

Constructional Points—see pp.276-277

The layout and other details could be changed from those shown, to suit items available. However, all mechanical construction and wiring needs to be rigid. VC1 has double bearings. A higher capacity will increase coverage, unless some plates are taken off.

A ball drive is bolted to the panel, and fitted with a perspex cursor. Exact calibration is left until construction is finished.

Fig. 2 is the top of the chassis, with dimensions. Changes should not be too important. It is wise to keep valves away from L1, L2, and other components which determine operating frequency. V2 anode circuits are also clear of V1 and associated wiring, and C6 and R5.

Fig. 3 is the underside, with wiring. C1, C2, C3 and

C4 are directly from tag to tag, with short leads. Capacitors C5, C7 and C8 are RF by-pass condensers, also directly from the points concerned to the chassis.

A tag strip anchors power and other exterior leads. Black was used for chassis (HT negative and heater return) blue for 6.3v. and red for HT positive. Power is drawn from an associated transmitter, or separate power pack, as the case may be.

RF is taken *via* C9, through coaxial cable. As this circuit comes from V2 anode, a long or lossy coax lead will reduce the drive obtained. What can be allowed in this direction depends on the transmitter. Drive is maximum with the shortest feasible length of low-loss coaxial cable.

R3 results in a fairly low regulator current, to avoid too much load on the transmitter HT supply. The normal operating current through V3 should lie between the extremes of 5 mA and 30 mA. If R3 is too high in value for the HT voltage, V3 will not operate. On the other hand, should 300v. be available, R3 can be increased.

Coils

L1 and L2 are *Electroniques* SL/T and SL/J completely screened types. L3 is a *Denco* "White Range 3" coil, connections being to pins 1 and 3. It is resonated in the 7 mc band by rotating the core. L4 is a *Denco* "Red Range 2" coil, with the smaller winding removed, and 28 turns taken off the remaining (tuned) section. It is tuned into the 3.5 mc band by means of its core.

Frequency Calibration

This was done with a 100 kc crystal marker, VFO and marker signals being brought to zero beat on a

receiver. A perspex cursor with hair line is screwed to the ball drive.

For the 160 and 80m. bands, switch to L1 and RFC2. The receiver is tuned to the 3.5 mc marker harmonic. VC1 is almost fully closed, and the core of L1 is rotated until the VFO comes to zero beat with the crystal. The scale is then marked for 3.5 mc. The receiver is next tuned to 3.6 mc by the crystal harmonic, and VC1 opened until the VFO is on 3.6 mc; this is indicated as 3.6 mc for 80 metres and 1.8 mc for 160m. The procedure is repeated for 3.7, 3.8, 3.9 and 4.0 mc. Of these marks, 3.7 is also 1.85 mc and 3.8 is 1.9 mc. The 3.9 and 4.0 mc positions are not marked for 80 metres, but as 1.95 mc and 2.0 mc for 160m. The 160-metre band markings can be confirmed by tuning the receiver on 1.8, 1.9 and 2.0 mc by the crystal.

Harmonics in the 7 mc band can be used to determine the 3.55, 3.65 and 3.75 mc points in the 80m. band, just as harmonics in the 80m. band gave 1.85 and 1.95 mc points for 160 metres.

For the higher ranges, L2 is switched in, and the scale calibrated from 7.0 to 7.2 mc. For 20m., markings are 2x these frequencies, and 3x for 15m.

The VFO is then tuned to about 3.65 mc, and the core of L3 is rotated for maximum grid current in the following transmitter, on 80m. Then with the VFO tuned to about 7.1 mc, L4 is adjusted for maximum grid current in the 7, 14 or 21 mc bands.

Output Frequency

The best position for S3 will soon be apparent. However, the following has been found satisfactory:

For 160m., use RFC2. Also select RFC2 for 80m.

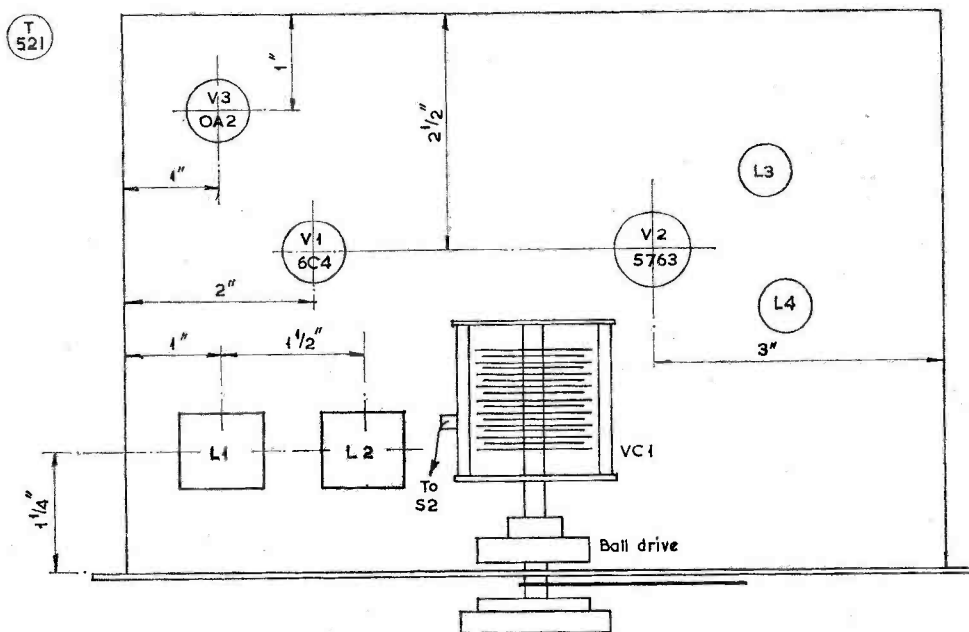


Fig. 2. Layout of the VFO above chassis.

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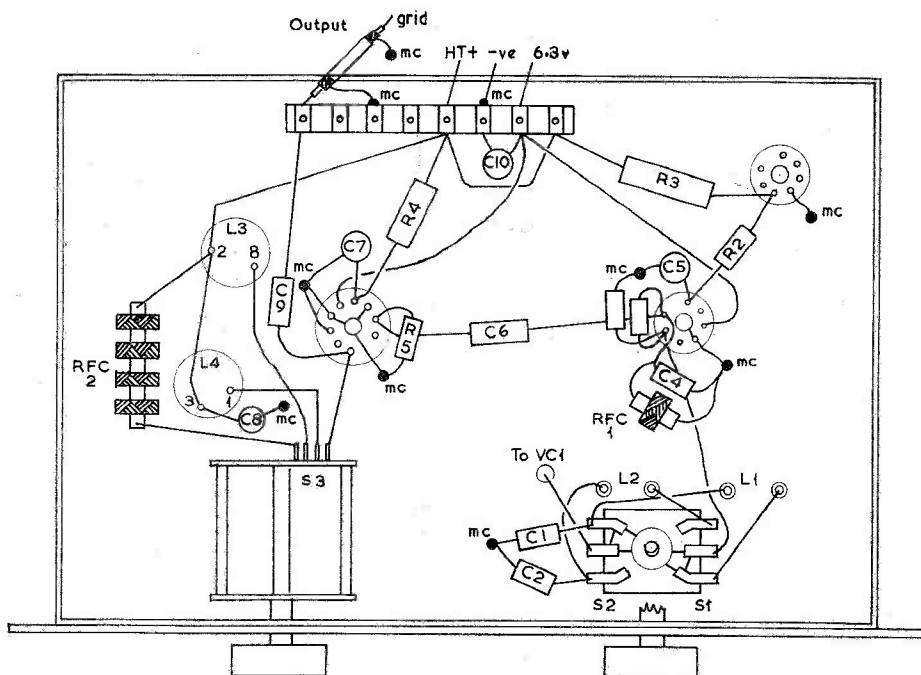


Fig. 3. Wiring and layout of the G3OGR VFO below chassis.

if the transmitter has a doubler. If the transmitter has no doubler, switch to L3 for 80m.

For 40m., use RFC2 when this gives adequate drive. (This will depend on the transmitter.) For maximum drive on 40m., and for the higher frequency bands, select L4.

VFO Trimming

If it is wished to modify the exact coverage of each band, this can be done by changing C1 and C2, in addition to having variable inductances in the L1 and L2 positions. This is most readily done by placing a stable air-spaced

trimmer across C1 and C2, both C1 and C2 then being somewhat lower in value. As an example, C1 may then be 125 $\mu\mu\text{F}$, with a 50 $\mu\mu\text{F}$ trimmer in parallel, and C2 could be 470 $\mu\mu\text{F}$, also with a 50 $\mu\mu\text{F}$ trimmer.

With the LF range, increasing C1 and reducing the inductance of L1 reduces the frequency coverage obtained on VC1. This may be useful for 160 or 80m. only.

In the same way, more capacity at C2 reduces frequency coverage, while less capacity increases the coverage. This may be of use if interest is in, say, 7 mc only, or if more coverage is wanted over the 10m. band. Also, of course, a smaller condenser at VC1 reduces coverage, while more capacitance here will increase it.

SMALL ADVERTISING

The keen and buoyant market for second-hand Amateur Radio equipment of every kind is well illustrated by the range and quality of the apparatus advertised every month in our Readers' Small Advertisement section—see pp.317-325 in this issue. For anything that you may want to buy, sell or exchange you cannot do better than use the small advertising space in SHORT WAVE MAGAZINE, which for years now has made the market for the U.K. The rate is but 3d. a word, with a minimum charge of 5s. (allowing 20 words, to include QTH). Draft your notice carefully and economically, using the abbreviations understood in the radio amateur context, and send it, with remittance, to: Advertisement Department, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1. Though we cannot guarantee

results, what we do say is that advertising in SHORT WAVE MAGAZINE ensures the largest and most effective coverage of the U.K. radio amateur interest.

CEDRIC BENHAM, C.B.E. (G4TZ)

One of the names in the recent Queen's Birthday Honours List was that of Mr. C. M. Benham, who is made C.B.E. He is head of Panton & Co., Ltd., of Northampton, well-known manufacturers of speciality equipment in the radio-electronics field. His honour is well deserved not only for the great efforts his firm has made in the exports field, but also in recognition of his own services within the electronics industry, as a member of several important committees. He holds the active amateur callsign G4TZ, and is on the air from his home near Towcester, Northants.

STATION CONTROL SYSTEM

IDEAS FOR CIRCUIT ARRANGEMENT — DESCRIBING A PRACTICAL CASE

The first problem that turns up for the new licensee after he has obtained the call, built or bought his transmitter and receiver, and found somewhere to put them all in the house where the XYL will not complain, is to couple them together such that they work as an entity—a problem that is often shelved in the joy of first getting on the air, until at last, after the novelty has worn off, it is realised that things could be better organised.

If a station is to operate efficiently for its owner, and give the maximum of pleasure, there are certain basic requirements to be met, given the presence of a reasonable aerial and a basically TVI-proof transmitter. These can be summed up as follows:

- (1) The ability to switch from "receive" to "send" by use of a single switch when operating Phone, including receiver muting and aerial change-over.
- (2) Key-controlled change-over at least, and preferably full break-in, when on CW.
- (3) No further risk of local TVI due to the control arrangement.
- (4) An adequate system of netting.
- (5) The same switch to carry out the change-over function to be used no matter which transmitter or receiver available in the station is connected at the time.
- (6) Facilities for changing transmitters or receivers as desired without breaking up a QSO, if necessary—the latter being a great help when a fuse blows in the power supply of the big rig!

General Layout

The solution finally evolved varies from station to station, and depends on the emphasis placed on one or other operating facility, as well as the particular types of equipment in service. Certain general points are, however, worth considering when laying out the space, before then deciding just how extensive the control circuitry may be if everything is to go on the bench neatly and tidily.

First, it does seem that the receiver is best controlled by the operator's left hand, leaving the transmitter, the control switch, the microphone or key (and the pencil) to the right hand. Secondly, the location of the key is of great importance if fatigue is to be avoided, and if the sending of "Martian Morse" is to be avoided. A few experiments will convince even the most hardened brass-pounder that if he has the straight key on the operating-table at normal height, and a chair of normal dimensions, then he cannot be comfortable if the key is eached with the right hand extended straight forward (in the elbow and yet have a comfortable posture for

the rest of his body. This way, when sending on a straight pump-handle, the elbow is called into play too much, as the table top inhibits the correct wrist movement with fingers and elbow acting only as pivots. As the writer's CW mentor used to say "Imagine the elbow and the fingers on a fixed support and the key being operated from the heel of the wrist—it seems comic at first but it's a darn sight less tiring!"

All of which means that the ideal proportions of table and chair for Phone working and for CW are just not the same, if the key is to be in its best location; and it was not until the writer once experimented with CW Mobile that the solution hit him. This was as a result of trying to use a knee-mounted key—and when a temporary little bracket was made up and the key mounted below desk level, experiments gave a best location as being as much as three inches down from desk-level to the top of the key-knob. This argument does not apply in the case of a bug or side-swiper key, and this usually ends up in front of the writer so that most of the arm from the elbow to the wrist is lying across the table and the key driven by the fingers, just where it gets in the way of convenient operation of the right-hand group of switches on the main receiver. The microphone is usually as far to the right of the table as possible, or on top of the receiver.

All this means that, apart from the arm lying across it, the centre part of the table is reasonably clear for log and pen, with the other operating aids, such as the call-books, on a shelf under the table on the left side which can be pulled forward so as to consult them without unnecessary waste of time—incidentally, a few minutes spent chatting up someone's secretary will obtain a supply of those handy "flags" they stick on card-files, which are very helpful when stuck on call-book pages and suitably marked to indicate the first page of entries referring to a particular country or call-area.

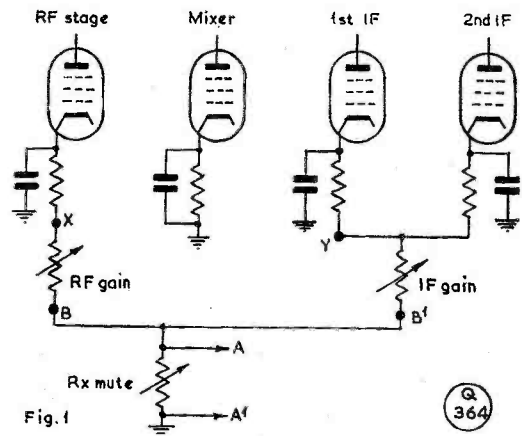


Fig. 1. Muting the receiver. As supplied, points B-B' will be earthed; if no separate RF gain control is fitted, points X-Y will be joined. The "Rx mute" facility may be, and often is, added as a modification, and mounted externally to the receiver. When A-A' are shorted, the Rx works normally; taking off the short here will mute it. However, on the Eddystone 888 point B is earthed, and the circuit positions of Mute and RF gain controls are reversed; thus A-Y are joined, also A'-B'—see text.

The speaker can well be in the same enclosure as the control unit, and be placed in the centre, between transmitter and receiver, with the change-over switch as far towards the right-hand side of the panel as may be; or, if a relay is used to carry out the change-over function, the c/o switch may be placed outboard of the control unit and yet further over to the right, some operators even making it foot-controlled.

Now, having said all this, it is pretty evident that not many station layouts get anywhere near the ideal in the space available—but the points are still worth considering to establish what is best in a given set of conditions.

Practical Example

To take a typical example, in a station comprising a K.W. "Valiant," Labgear Top-Bander, Minimitter MR-44, much modified, and an Eddystone 888, the outgoing signal is monitored on the lower frequencies by an oscilloscope. RF is led by coax cabling round the room to the window where the ATU is located. So as to get the best out of the available lighting, both natural and artificial, the only bench-lamp is reserved for the work-bench.

Two alternative PSU's are available for the Valiant, one of which contains a couple of stabilised 300-volt power-packs, one each for the RF side and the modulator. The other, which is used when QRO is desired, comprises a single transformer the secondaries of which give the maximum rated voltage and current applicable to the Valiant, also heater and relay supplies. Incidentally, the QRP pack also has a relay supply built in, and the packs are interchangeable just by switching of plug in the back of the Valiant. (Unfortunately, the Valiant has to undergo a resistor value change when the PSU's are swapped, and so the change is not made frequently.)

The Top-Bander and the MR-44 are regarded as the reserve equipment, and so it is accepted that in order to use them, the muting potentiometer shall be in the control unit, and the key plugged in, the bug being tied permanently to the other transmitter in the interests of TVI prevention. Muting in the 888 is by the facilities provided in the Rx itself, although there have been serious thoughts of using the same control as is used on the MR-44, by suitable switching, to avoid the minor nuisance of the muting control in the 888 being inside the receiver. This is got round at the moment by leaving the 888 lid propped open, which in any case reduces the warm-up drift somewhat.

The basic muting method adopted at this station for years now is the same as that fitted within the 888 and as used on the modified MR-44, and is shown in Fig. 1. The only point worthy of comment is that the leads coming out of the receiver are quite "cold to RF" but nonetheless they should not be routed in such a way as to enable them to wave about—they are brought out the back of the receiver, and taped to existing cable-forms, to ensure the run inside the receiver does not "get in the way." This arrangement is applicable to most receivers, and the wiring in many cases exists already, with a shorting-link applied to the external terminals at the back of the Rx.

Adjusting the potentiometer whilst transmitting will enable one either to listen to one's own CW, or Phone with headphones. For testing purposes, it will be found

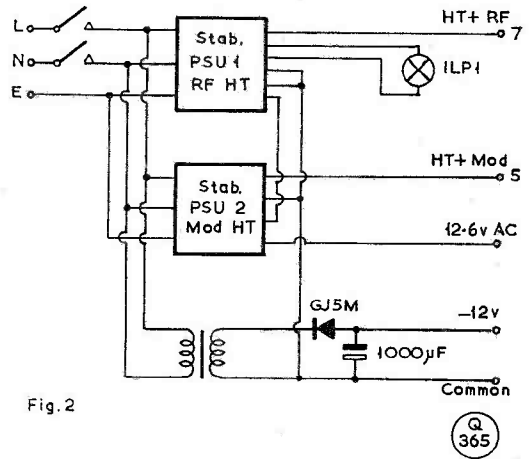


Fig. 2

Fig. 2. Suitable QRP power pack for the K.W. Valiant. The two stabilised PSU's are commercial types, taken from old equipment, each rated 300v. 150 mA. The diode shown in the 12v. DC line is enough for most relays, as is the condenser value, but with other relays the smoothing may have to be increased and a diode rated for higher current used. When energised, the relays should be quite silent.

that very little AF out of the speaker will be required to produce one of those horrible yowls due to audio feedback.

All this is, of course, just dandy—until you chase DX and want to work split-frequency, when you have to think up some sort of separate, untuned CW monitor. However, as such a device can be knocked up using a transistor or two and adequately powered by the stray field from the transmitter, it is not included in the control circuitry as such. Anyone seeking such a circuit will not have to look far to find an RF-powered monitor, as there are many in the books.

A stumbling-block to all this can be the construction of a suitable box to match the outline of transmitter and receiver and just fill the available width and depth. The answer to this appears in the *Electroniques* catalogue, and in more detail in the professional version put out by *Electronic Services-STC*. This is the basis of the MCS system they sell. The point here is that the bits and pieces are put together like Meccano, and if you can cut a flat bit of aluminium to size, and cut holes in it in the right places—there you are! At first sight the prices look a bit terrifying, until you sit down and think that you already have, or can lay hands on, the sheet al., so you only need the separate bits and pieces such as four rails and a length of the tapped strip; in the end a 10s. investment in these bits can be made into a collection of re-usable parts capable of casing virtually any shape or size of circuitry; on the other hand, the purchase of a complete MCS chassis ready-made comes rather expensive. Careful study of the catalogue pays dividends, particularly if a few minutes are spent sketching what is needed first, separating what can be made at home, and buying just the essential parts with a view to their possible re-use later.

Circuit Arrangement

Now to the circuitry and details. A six-way mains-

socket board is screwed to the rear of the bench, and the lead from that terminated in a plug to mate with a convenient power-point; the writer prefers to use the 13-amp flat pin type throughout, as the sockets are shuttered. The wall-plug on the end of the lead is pulled out whenever the station is not in use. Each unit has a separate mains switch, that for the Valiant being on the power-pack, and some indication that the thing is switched on, either by way of dial lamps or jewels.

The QRP power-pack is shown in circuit form in Fig. 2. Each stabilised PSU has its own fuse, and so a separate one at the input was not considered to be necessary. As will be seen, the Valiant is run on a 12-volt heater line, obtained by series'ing two 6.3 volt windings, care being taken to ensure the right polarity to obtain supplies—reversal of one will put them in phase opposition, with a consequent lack of glow in the valves. There are two heater windings on each PSU, so one winding on each is used in this manner to even the load. One of the spare ones is for the "Mains On" lamp indication. A separate transformer provides a nominal 12-volt DC supply for relays (simply because it lay in the junk-box). S1 switches both sides of the mains, while S2 is connected in the HT positive rail for the modulator, to enable this to be disabled rapidly—a great asset if any mixed AM/CW contacts are made. Pin numbers shown are to an octal socket, which is used to take the outputs to the control unit.

Control Unit

This is diagrammed in Fig. 3; five lines come in from the power-pack—namely, common; minus 12 volts DC; 12 volts AC; and the 300-volt lines to the RF side and the modulator, *via* a flying-lead and octal plug mating with the socket on the power-pack. Originally, the Valiant had a socket on the back for its supplies, but this meant the HT being on a free plug, and so plug and socket were reversed for safety. Pin connections here are as for the Valiant. (Incidentally, this transmitter was reviewed and described in *SHORT WAVE MAGAZINE* for January 1960.)

Before describing in detail the operation of the circuit, it is as well to note that the Top-Bander has its HT rail broken at the centre-tap of the mains transformer secondary; hence in order to net, this contact closes at the control unit, the key being left up while netting is in progress. This is a bit of a bind if the Top-Bander is used for Phone working, but in the case discussed here was not felt to be a handicap as it is not used in this mode except in emergencies.

Reverting to the circuit, S1 connects whichever receiver is to be used to the aerial circuit, S2 doing likewise for the transmitter aerial circuit. S3 provides the net facility for the Top-Bander, and is of "biased-off" construction, so that it will only remain closed while pressure is maintained on the dolly. S4 is the change-over switch, for when operating Phone or using Top-Bander, while S5 connects whichever receiver is to be used to the one speaker.

Action of Circuit

Consider now the relay circuitry. When either S4a or the key is closed, all three relays operate. "C" is

the keying relay, and follows the key, but "A" and "B" are slugged by the capacitor C1, which is prevented from affecting the "C" relay by the backing-off diode D1. If the relays have been operated by S4, all stay up until S4 is opened, when "C" immediately falls away, followed a moment later by "A" and "B." Incidentally, "A" and "B" could no doubt be replaced by a single relay if a suitable type could be found, but the junk-box did not yield one which would give the desired lag in release with any of the capacitors also available—however, all junk-boxes are different!

Turning now to the contacts, all the "C" relay contacts are paralleled up and used to key the Valiant, the plug being either in the original cathode key-jack (which keyed the PA) or another one which gives grid-block keying to the PA. S4b puts HT on the Top-Bander whenever this switch is in the "send" position. Contact A1 opens when the relay operates, and hence mutes the receiver, while A2 performs a like service for the MR-44; in the latter case RV1 enables the muted level to be set, it being remembered that the muting level is adjustable on the 888 Rx by its own internal variable. The "B" relay contacts are used in parallel to change over the aerial circuit at B1. Contacts A3 and A4 make when the relay is up, and connect HT to the modulator and RF side of the transmitter. The Valiant needed contacts in both HT lines, as it was found that the receiver hooted when attempting to net occasionally. The lead labelled "VFO Net" is taken off before the contact and taken into the Valiant *via* the power plug-and socketry, where it runs to the "VFO Tune/Normal" switch on the transmitter front panel.

Immediately after construction it was found, when making TVI tests, that the Valiant produced some TVI when the transmitter was operated through the control unit into the dummy load built into the ATU. This was traced down to radiation of harmonic energy within the control unit aerial connections due to a complete absence of screening in this area. This problem was solved by connecting a low-pass filter between the Valiant output and the input to the control unit and a spare one similarly between the Top-Bander and the Control Unit. A neater solution would be to complete the screening and use a single LPF between Control Unit and ATU, as was originally envisaged.

Severe local key-clicks on all bands were found to be generated when the Valiant was keyed. This was not unexpected, and so a couple of RF chokes and capacitors were added as shown to contact C1; another couple of condensers and an RF choke on the key—in the *minus* 12 volt lead, the other one being earthed—were also fitted and it is now possible to work all bands (other than 21 mc) free of TVI, in an area where the local Band I signal is on Ch. 1 and distinctly weak at that. A high-pass filter is fitted to the Tv Rx.

The station earth is connected to the gear at the ATU; it travels by way of the coax outer to all receivers and transmitters, and appears on the chassis of the control unit through the shell of the coax sockets. The common lead from the power-pack to the control-unit and the transmitter is grounded at both ends, thus earthing the former without creating any hum-loops. On each PSU transformer, the Faraday screen connection is grounded.

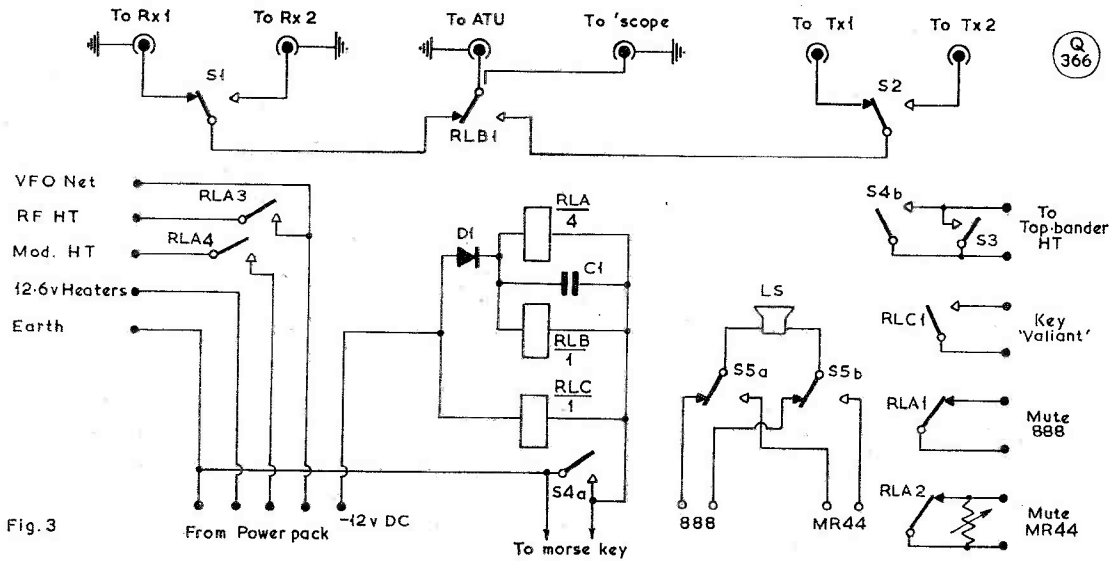


Fig. 3

Fig. 3. The main control unit—for circuit operation, see text. The centre lead from the coax socket marked "To 'Scope" is taken near to the inner of the ATU connection to give a small amount of capacity coupling, adjusted for the oscilloscope in use. D1 can be a GJ5M; for the value of C1, see text.

Operating Results

Regarding the value of C1, this was found to be 500 μF with the relays used, to give a nice sequence of operation, with the whole system flopping back to "receive" between words when sending at about 12 w.p.m.—thus BK. The value mentioned for C1 should be regarded as a starting-point for experiment, to end up with a value appropriate to the relays and the timing preferences of the operator.

A final word on circuitry: It has been found in general knock-about operation of the *Eddystone* 888 that the muting is vastly improved by tying the RF stage to the internal muting potentiometer. This can be done very easily by lifting the RF gain control earth, and connecting it to the junction of the mute pot. and the IF gain control—but look out, it's not as easy as that! A glance at the 888 circuit shows that the IF gain control is at the earthy end of the chain, with the muting potentiometer between it and the IF cathode resistors and, what is more, the earthy end of the pot. is soldered to the can so that it is grounded to the panel into the bargain. The process, then, is to lift earth from the RF gain control pot. and shell, and similarly from the IF gain control pot. and shell, taking care that the common earth run is not disconnected from the adjacent switchery in the process. Reversing the circuit positions of the mute and IF gain control pots. can then be done without disturbing the muting control sub-assembly if the wiring is carefully traced out to the tag points on the underside of the main chassis; the contacts of S12, the "send-receive" switch, remaining connected across the muting potentiometer. This being done, the earthy end of the RF gain control is now connected by a new wire

to the junction between the muting and IF gain controls. Summarising, there are six steps: (1) Lift RF gain control earth. (2) Lift the IF gain control from earth, and the pot. shell, taking care not to disconnect earth from the BFO switch in the process. (3) A lead, brown and white, is transferred from one end of the gain control to the other. A similarly coloured wire will be found underneath the receiver chassis, also disappearing through a grommet to the muting-pot. sub-assembly. (4) take this lead off its tag-strip and transfer it to earth at a nearby tag. A new wire is then run in to joint the brown/white lead in its new position on the IF gain control back to the RF gain control tag lifted earlier from earth. (5) A second new wire is run in from the tag on the IF control from which the brown/white wire was transferred, and its other end connected at the tag-point from which the wire was removed in step (3), and the receiver can then be tested for correct operation of the RF and IF gain control on "receive."

Connection to the muting contacts on the relay in the Control Unit can be done in either of two ways, to choice. The first is to rearrange the wiring from the send-receive switch on the 888 so that the "external relay" contacts to the same end of the switch as the muting pot. connections, and leaving the switch on "send" all the time, control being effected by connecting the Control Unit leads to the external relay terminals on the 888. Alternatively, the relevant end of the "send-receive" switch of the 888 can be connected to a pair of wires brought out to the Control Unit through a gap in the rear of the case; the latter is considerably less convenient but involves less internal rectification should the receiver be disposed of later. Again the 888 is left permanently on "send," and controlled from the C.U.

THE MOBILE SCENE

MOBILE NEWS AND PICTURES—MORE RALLY ARRANGEMENTS

It was a beautiful and a sunny day on May 12 for the Thanet Radio Society's Rally near Ramsgate—with an attendance of 46 cars, it was the best yet held by this group. Prize-winners were G3LXJ/M (longest distances travelled and worked to control); G3WPR/M, best on two metres; and G3FRV/M, on 4 metres.

* * *

Interesting mobile calls to be heard and worked over the period July 15 to August 15 will be ON8IE/M, PA9GH/M, G3MOE/DL/M, G3MOE/LX/M and F0HH/M—all to emanate from Ford Zephyr, 2340-PK, owned by G3MOE, Cheltenham, *QTHR*. He will be using SSB only (and mainly during daylight hours) on frequencies around 3750, 7055 and 14225 kc, running 200 watts p.e.p. with an NCX-5 transceiver and Hustler whip on the car. He will be looking for U.K. stations and as much in the way of DX as he can raise—all contacts will be QSL'd. This should be an interesting exercise in the mobile context.

* * *

The international Amateur Convention at Knokke, Belgium, during September 13-15, has also become something of a Rally event, at which visitors are expected from all over Europe and the U.K. A reciprocal licensing agreement is, of course, in force with Belgium, though 160m. operation is not permitted.

* * *

And for the information of planners who may be thinking about *next* year's Rally season, it should be noted that April 20, 1969, has already been booked for the Midlands event at Drayton Park.

Mobile Rally Calendar, Season 1968

June 30: Amateur Radio Mobile Society's Annual Rally, being held this year on the U.S.A.F. Base at R.A.F. Mildenhall, Suffolk. It is one of the largest American Air Force bases in the U.K. Take the A.11 Newmarket—Thetford and look out for the the 5-way roundabout at Barton Mills. (The "Bull" there is one of the best stopping places in the area.) Entry to the Rally will be on the basis of the purchase of raffle tickets at the gate. There will be the usual A.R.M.S. rally attractions, and a big show is expected.

June 30: Annual Mobile Rally at Longleat Park, Warminster, Wilts, organised by Bristol Group assisted by the Bristol Amateur Radio Club.

June 30: Pembroke Radio Club Rally at Regency Hall, Saundersfoot, near Tenby, West Wales, with talk-in on 1876 kc and 144.35 mc—R. J. Wilcox, GW3TSH, 33 Treawen Road, Pembroke Dock, Pembro.

July 7: South Shields Mobile Rally, the ninth in their series, put on by the South Shields & District

Amateur Radio Club, at Bents Park Recreation Ground, Coast Road, South Shields. Talk-in will be given by G3DDI on 160m. and G3KZZ on 145.8 mc, opening at 11.0 a.m. There will be a number of Trade stands, competitions for visitors, and light refreshments will be obtainable on site.—Organiser, Derek Forster, G3KZZ, 41 Marlborough Street, South Shields, Co. Durham.

July 6-7: Cheltenham Festival Rally, arranged by Cheltenham Amateur Radio Society and local RSGB group members, covering a wide range of tastes and interests, to coincide with the Cheltenham Festival of Music, which for years has been one of England's intellectual occasions. As regards arrangements for radio amateur visitors, there will be a dinner on Saturday evening, July 6 (price 25s.) at the Lilleybrook Hotel, Charlton Kings (just outside Cheltenham, on the Cotswolds side) bookings to be made with G3LDA/G3MOE, *QTHR*, 14 days in advance, numbers limited to 80 persons. Overnight accommodation can be booked direct with the Hotel, *Cheltenham 25861*, at 14 days' notice as the Festival imposes a heavy load on the local tourist accommodation. Caravan and camping facilities, at 5s. per night, on Cheltenham Racecourse, a fine site for VHF or /P operation, can be arranged at three days' notice with G3MOE, *QTHR*. Rally talk-in stations will be: G5BK, 1925 kc, AM; G3MOE, 3725 kc, SSB; G3OLN, 70.25 mc, AM; and G8ML, 144.4 mc, AM. Cheltenham is a lovely town, and whether you go there by car or caravan, to stay for the day, a weekend or the full week of the Festival, you can be sure of an enjoyable visit. Full details as to the programme—which will include a working RTTY demonstration, arranged by G3SBH—charges and accommodation

[cont'd p.284



G8FU/M (Quinton, Birmingham) runs a Morris 1100, fitted with Cedar equipment—T.38 Rx, A.T.5 Tx, control panel and solid-state 12v. PSU, the aerial being a 3F1F whip with coils for 80/160m. Control is by a combined headset and microphone, making operation quite safe under running conditions—but G8FU/M says that what he really likes is to let the XXL drive while he does the operating. To comply with the Post Office regulations about "non-interference by unauthorised persons," a large locking cubby-hole was built in to take the gear, and finished to match the interior of the car. G8FU/M also carries a small tape-recorder, to "take down" any specially interesting contacts.



Judging the /M entries at the North Midlands Mobile Rally. On right, G3JDJ (hon. sec., M.A.R.S.) with G3UD (centre) of Stoke-on-Trent, the two Clubs jointly responsible for the event. More than 150 mobiles were inspected—it must have been quite a job for the judges!



One of the Trade stands at the highly successful North Midlands Mobile Rally at Drayton Manor, Tamworth, Staffs.



One of the hard workers for the cause—G3BAC of the Thanet Radio Society, organisers of a very successful Rally on May 12, when they had their largest attendance yet—46 cars arrived, in fine and sunny Wx.



G8AKQ/M was at the Northern A.R.M.S. Mobile Rally at Harewood House on May 12—those in the group are, left to right, G8AKQ/M, G8BBG, G3UHS, G3TUL and SWL Cole. The aerial is an 8/8 J-Beam for 70 centimetres, below which is a 2-ele array for two metres. The G8AKQ/M gear for 70 cm. is a 10-watt Tx, with a JJK converter into a home-built transistor receiver, the tunable IF range being 12-14 mc. The two-metre /M rig runs 25w. and the Rx is a transistor converter feeding into the same receiver.

More pictures on p.284



At the Thanet Mobile Rally near Ramsgate on May 12—left, G3WYV, with G3JMB.



G3MGI (hat) calls out the winning tickets for the raffle at the Northern Amateur Radio Society's Mobile Rally at Harewood House, near Leeds, on May 12.



Glimpse of part of the crowd at the Northern A.R.M.S. Rally, Harewood, May 12—can you see yourself anywhere?

arrangements from: J. H. Moxey, G3MOE, 11 Westbury Road, Leckhampton, Cheltenham, Glos. (Tel.: Cheltenham 24217, or STD 0242-24217.)

July 14: Annual mobile picnic organised by the Reading Amateur Radio Club, at the Childe Beale Trust, an attractive picnic spot just off the A.329, Goring-Pangbourne. Ample car parking, and attractions include the peacocks and fountains in the grounds, with pleasant walks along one of the most beautiful stretches of the Thames. Admission is reduced to 2s. 6d. per car (including occupants) if a free wind-screen sticker is obtained from G3LFM, *QTHR*. Talk-in will be given on two metres and Top Band, and possibly also on 4m. This is an informal get-together for radio amateurs, so bring your own picnic—and your QSL for the “who’s here” board. Details: L. F. Taylor, G3LFM, 58 Nightingale Road, Woodley, Reading, Berks.

July 14: Mobile Rally to be arranged by the Colchester Group at Colchester Zoo—with “new faces in front and behind the bars!” Talk-in will be by GB3ZOO on the 2-4-160m. bands. Information: V. Levitt, Park Street, Stoke-by-Nayland, Suffolk.

July 14: Second Mobile Rally put on by the Worcester & District Amateur Radio Club, at the Hill County Secondary School, Upton-on-Severn, one mile west of the town, with adequate local sign-posting. There will be trade stands, an amateur TV demonstration, model aircraft display, raffles and competitions, with ample cover in case of bad weather. Talk-in will be given on 2-4-160m., and the Rally will start at 2.0 p.m. Details from: R. L. Avery, G3TQD, 24 Alexander Road, Droitwich, Worcs.

July 21: Cornish Amateur Radio Club's annual Rally at Pentire Headland, Newquay, Cornwall, with talk-

in on 4-80-160m. Hon. Secretary: W. J. Gilbert, 7 Poltair Road, Penrhyn, Cornwall.

July 28: Saltash & District Amateur Radio Club annual Mobile Rally, to be held this year at Saltash Grammar School, Wearde Hill, Saltash, Cornwall, with the facilities and attractions of recent years. There will be talk-in on the 2-4-160m. bands, with control signing GB3SAL. The Rally will be opened at 2.0 p.m. by none other than Arthur Edwards, G6XJ. —Hon. Secretary, J. A. Ennis, 19 Coombe Road, Saltash, Cornwall.

August 18: Torbay Amateur Radio Society Mobile Rally, at Dartmouth, South Devon.

August 18: Derby & District Amateur Radio Society eleventh annual Mobile Rally at Rykneld Schools, Derby, as in previous years.—T. Darn, G3FGY, Chairman and Hon. Rally Organiser, 1 Sandham Lane, Ripley, Derbys. DE5-3HE.

August 25: The Swindon Club's annual event at Lydiard Park, near Swindon, Wilts.

September 2: Peterborough Mobile Rally. Venue is on the riverside park, between the swimming-pool and the boat-house, with plenty of space for free parking and picnicing. Commence 2.30 p.m., but talk-in station G3DQW will be 1980 kc from 1 p.m. Special exhibition of old-time wireless gear—please bring anything you can produce from the 1920's. Trips down the river. Usual trade-stands and lucky dip! Further details from the hon. sec.—D. Byrne, G3KPO, Jersey House, Eye, Peterborough. (*Eye 351*).

September 2: Mobile Rally at Pipers Hill Common, south of Bromsgrove, Worcs., on the B.4091, organised by the Bromsgrove & District Amateur Radio Club, with talk-in on Top Band.—J. Dufrane, 44, Hazelton Road, Marlbrook, Bromsgrove, Worcs.

September 13-15: Fourth International Amateur Convention at Knokke, Belgium, with a varied programme

for all comers, as in recent years. Full details from: Lucien Vervarcke, ON4LV, Lippenslaan 284, Knokke I, Belgium.

Closing date for Rally reports and Mobile notes to appear in the August issue: *Monday, July 8*, addressed: "The Mobile Scene," SHORT WAVE MAGAZINE, BUCKINGHAM. Any Rally photographs offered for publication should be sent in as soon as possible, and in any event not later than *July 5* for the next issue.

AMATEUR RADIO SYMPOSIUM

A meeting for teachers, youth leaders and interested young people is being arranged for the afternoon and evening of Friday, July 12, commencing at 4.30 p.m., at the Holloway School, Hilldrop Road, Islington, London, N.7 (nearest tube station *Kentish Town*). Short lectures will be offered, and there will be a discussion, on the general theme "Why Amateur Radio?", with a view to increasing interest in the subject among young people. Refreshments will be provided and an exhibition with a live amateur station will form part of the arrangements. Those wanting to respond to this notice are asked to inform K. L. Smith, G3JIX, at the School address given.

NO NOVICE LICENCES IN ZL

Correspondence recently published, between the NZART and the Radio Division of the New Zealand Post Office, discloses that the ZL authorities do not view at all favourably the idea of introducing a lower-grade or novice licence for ZL amateurs. Broadly, their contention is that the existing examination standard is well within the reach of candidates of average ability with a serious interest in Amateur Radio. As regards the Morse Test, they likewise consider the 12 w.p.m. requirement to be reasonable. So, no Novice Licence in New Zealand.

This picture is of particular interest because it shows Eric Willis, one of entrants in the single-handed race across the Atlantic in his ketch-rigged trimaran "Colla," accepting a Hallicrafters CR-50 D/F receiver for use as a navigational aid during the voyage. The CR-50 is also designed as a general-purpose Rx for small craft, and covers the MW/LW/BC bands as well as the marine D/F channels. At right is David Little, of Electroniques (S.T.C., Ltd.), U.K. factors for all Hallicrafters equipment.



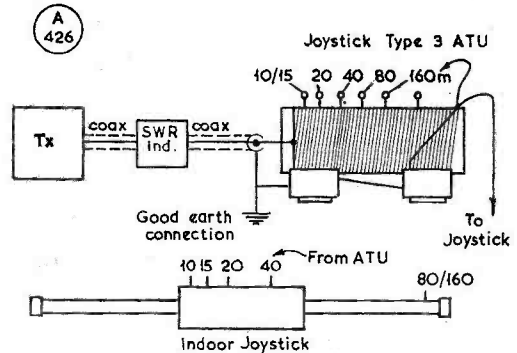
NOTES ON JOYSTICK OPERATION

LOADING UP—USE OF ATU AND SWR INDICATOR

P. HANCOCK, B.Sc. (GC3WOW)

APPARENTLY, some operators have had difficulty in loading up the Joystick satisfactorily. The writer has found that this need not be the case, even when an Rx-type ATU (close-wound inductance, mica-spaced condensers) is used. Successful DX QSO's can be expected using even an indoor Joystick if the following points are watched:—

- (1) A good earth (thick-wire connection to large tins buried in moist earth) is essential.
- (2) The lead from the ATU to the Joystick must be at least 8ft. long.
- (3) The manufacturer's recommendations as to ATU and aerial band tappings must be fairly closely adhered to (see examples in diagram).
- (4) A SWR indicator, such as the one described on p.15 of the March 1967 SHORT WAVE MAGAZINE, should be inserted using 72-ohm coax between the Tx and the ATU.



- (5) The condensers on the ATU should then be tuned for minimum reflected power, with the transmitter reasonably fully loaded up. Small adjustments of the ATU can nearly always reduce the reflected power to zero. (If the Joystick and the operator are in the same room, mutual movement can upset this!) Finally, the transmitter is accurately loaded to full power in the usual way.

Using a Type 3 receiving Joymatch, no flashover has yet occurred at this QTH. Very occasionally it has been found advantageous to use tappings adjacent to the recommended one on the ATU inductance. The 80m./160m. connection on the Joystick itself can often be loaded on the HF bands with a small sacrifice of SWR.

SPECIALLY ON THE AIR

This space is available for the publicising of Amateur Radio stations to be established for the public interest in connection with local events—such as fêtes, galas, flower shows and the like. The G.P.O. will usually grant a special “duration-only” callsign for the occasion. Notices should be sent out in the form shown here, and include the name, callsign and QTH of the individual accepting responsibility on behalf of the Club or local radio amateur group concerned. Closing date for the August issue, *July 8*, addressed: “Specially on The Air,” SHORT WAVE MAGAZINE, BUCKINGHAM.

GB2LO, July 8-20: Organised by the Radio Society of Great Britain in connection with the City of London Festival, using equipment (loaned by K.W. Electronics, Ltd.) to operate SSB only on the 10-80m. bands.—Sylvia Margolis, p.r.o. RSGB, 95 Collinwood Gardens, Clayhall, Ilford, Essex.

G3MBL, G3WCE, July 12-13: Operating at the Finchley Carnival, Victoria Park, London, N.3, on all bands 10-160m., also two and four metres, AM/CW and possibly SSB.—A. G. Edwards, G3MBL, 244 Ballards North Finchley, London, N.12.

GB2LAD, July 13: For the Air Day at R.N. Air Station, Lossiemouth, provided by the Moray Firth Amateur Radio Society and operating on 20 and 80m., CW

and SSB. Visitors welcomed to the flying display and the static exhibition.—C. Hollins, 66 Lossiemouth Road, Bishopmill, Elgin, Moray, Scotland.

GB3NEW, August 5-10: To be provided by the local College of Further Education Radio Society for the Welsh National Eisteddfod, to be held this year at Barry, South Wales. This is the first time Amateur Radio will be represented at this internationally known event. Further details later.—D. H. Adams, GW3VBP, College of Further Education, Colcot Road, Barry, Glam., South Wales.

DISTRIBUTION THREATENED BY POSSIBLE RAIL CHAOS

As this issue was being prepared, the news was full of talk about threatened go-slow, work-to-rule, no-overtime action on the railways, to start on June 24. According to dead-pan Sydney Greene, who runs the railway union, “a-work-to-rule-could-only-lead-to-delays-and-public-inconvenience” — which in anybody's language means chaos. This in turn means that distribution of this issue of SHORT WAVE MAGAZINE could be considerably delayed, because essentially all distribution, whether by mail or parcels to retailers and wholesalers, is by the railway system.

SMALL TRANSISTOR Tx FOR TWO METRES

GIVING ABOUT 100 mW OUTPUT

B. COLEMAN (G8AZU)

THE transmitter shown here is a simple, cheap and easy-to-build solid-state Tx, which will probably interest those making a start with transistors on VHF. It could be used to drive a valve-PA, or another transistor amplifier, to produce a good deal more RF power output. While no modulator is described, any amplifier which can be matched into 200-1000 ohms and produces a watt or so of audio will drive the Tx successfully. It would be advisable to modulate on driver and PA stages simultaneously, Tr3 and Tr4 in the diagram.

Power requirements are 18-20v. at 15 mA, and 9v. at 22 mA for the PA, running about 170 milliwatts input. The preferred transistor line-up is BSY26, 2N708 and P346A-P346A.

The prototype was built on a sheet of copper-laminate 3½in. x 6in., leaving space for additional stages or variations as later required. About 4in. of the board was divided into three spaces by vertical walls of laminate 1¼in. high x 3½in. long. Two of the spaces so formed were further sub-divided into two by 2in. by 1¼in. pieces of laminate, to make compartments about 2in. square. It is advisable to drill the holes for the feed-through capacitors before fixing the screening, which can easily be soldered to the copper-laminate base piece.

Layout stage-by-stage follows the circuit arrangement, using miniature components throughout. Coil details are as follows: L1, 22t. 22g. enam. on ⅜in. former with iron-dust core; L2, 6½ turns 18g. tinned copper, made ½in. dia. by ⅜in. long, self-supporting; L3, 2½ turns 18g. tinned copper, made ½in. dia. by ⅜in. long, mounted vertically; L4, 2 turns 18g. tinned copper, ½in. dia. by ¼in. long, mounted above L3 and with one end soldered to copper base; L5, 2½ turns 18g., ½in. dia. by ⅜in. long, mounted horizontally; L6, output

link, 2t. 18g., ⅝in. dia. by about ¼in. long, coaxial with L5. The choke RFC1 is made up of 36 inches of 30g. enamelled, pile wound on a 100K resistor body.

Adjustment and Operation

The zener diode should be rated half-watt for some voltage between 9v. and 12v. A reasonably active 8 mc crystal should be used in the oscillator, as old ones may not go off too easily.

Procedure is to tune all stages for maximum current. A helpful device in setting up is an indicator consisting of a single-turn loop across a diode and an 0-1 mA meter with a 100 µF by-pass condenser. The pick-up loop is held close to the coil in the circuit being tuned, adjustment being for maximum deflection on the meter. To avoid hand-capacity effects, use an insulated tool to fidget the condenser.

Of course, care must be taken to select the correct multiplier sequences. This applies particularly to the tripler stage, Tr2, since transistors do not triple as readily as they will double or quadruple. As a guide, in the prototype all stages tuned correctly with their respective condensers about half-mesh.

A 6-volt 40-60 mA bulb can be connected to the PA output as a dummy load, and will light up to a maximum when the PA is correctly tuned. The PA adjustment is, in fact, not particularly critical, but it must be peaked (as indicated by the bulb) for good modulation.

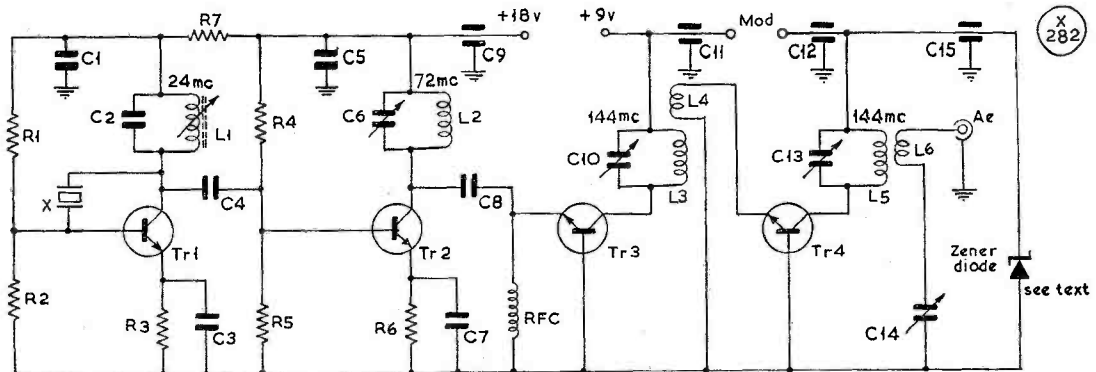
Some other points: The tripler stage Tr2 will double

Table of Values

Circuit of Two-Metre Transistor Tx

| | |
|------------------------------|----------------------|
| C1, C3 = .01 µF | R1 = 22,000 ohms |
| C2 = 15 µµF | R2, R5 = 10,000 ohms |
| C4 = 20 µµF | R3 = 120 ohms |
| C5, C7, | R4 = 100,000 ohms |
| C9, C11, | R6 = 2,700 ohms |
| C12, C15 = .01 µF, feed thru | Tr1 = BSY26 |
| C6, C10, | Tr2 = 2N708 |
| C13, C14 = 3-30 µµF, var. | Tr3, |
| C8 = 33 µµF | Tr4 = P346A |

Note: For coils L1-L6, details RFC1 and zener diode choice, see text. Condensers C6, C10, C13, C14 are bee-hive type, for adjustment by insulated tool.



Circuit of the transistor two-metre transmitter.

with condenser C6 fully in and quadruple when it is at minimum capacity, so the tripler peak should be between these settings. To guarantee success, use a new 8 mc FT-243 xtal in the oscillator. Keep the battery voltages up; it makes a lot of difference to the output!

Editorial Note: The foregoing is based on an article by G8AZU which appeared originally in a recent issue of the Echelford Radio Society's Newsletter.

BOOK REVIEW

RADIO HANDBOOK, 17th Edition

THE *Radio Handbook*, the seventeenth edition of which is to hand for review, is often picked up by browsers at the Exhibition, and as rapidly returned when they realise the price! However, it is well before doing so to consider what this fat volume offers.

Basically, it covers the ground so admirably dealt with by the ARRL *Handbook* each year, but to a standard aimed rather higher. A chapter on Radio Calculations at the end of the book includes much that is not otherwise easily accessible to the amateur.

As has been indicated, the *Radio Handbook* is aimed at the advanced amateur and the professional engineer, and so the constructional projects are quite complex in several cases; an instance is the single-band SSB transceiver designed for any band 1.8 to 14 mc; a three-band SSB transceiver; and the HBR/HBT receiver and transmitter pair, all of which are right at the front of modern design.

Indeed, the HBR receiver is probably the best home-construction receiver project available at the present time; it is an up-to-date and *de luxe* version of the design originally produced by Crosby, W6TC, and embodies just about the ultimate in performance obtainable from a receiver which can be constructed, tested and aligned by the average home-constructor. The companion transmitter uses a pair of 6146B's and generates the SSB signal at 9 mc. This also is a complex piece of apparatus, but is well-thought out and should present no serious difficulties to the competent home-constructor with Sideband experience. In both cases the alignment and setting-to-work procedures are given in detail.

Power supplies are very well dealt with, with an explanation of the factors which go to make an SSB transmitter power-pack so much lighter than the equivalent AM job; when this is accompanied by useful details on the selection of transformers to achieve the desired result from the junk-box, one can well imagine the chapter alone saving the constructor more than the cost of the book!

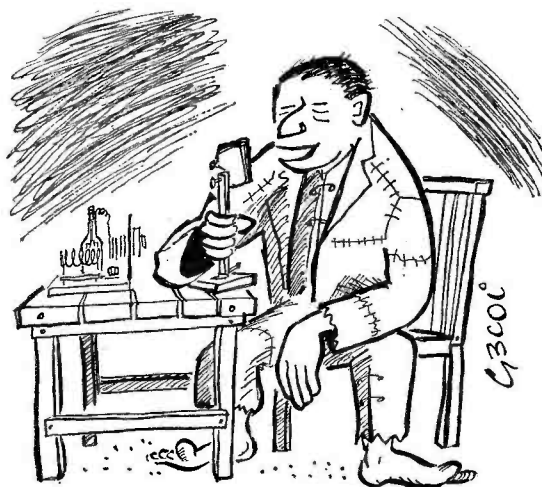
As has already been said, the *Radio Handbook* is aimed at the advanced amateur, and no doubt it is expected that the owners will rapidly wear out the covers by hard service, so the hard-back binding is used. Likewise the pages are printed on heavier paper

than is usual—all 800-odd of them, which adds up to something which is intended to spend more time open on the bench than sitting tidily on the shelf. All your reviewer can add is that the contents of those pages make its heavy usage by an owner certain.

Though this is probably the most expensive book of its kind available to the "professional amateur" and advanced AT-station operator, its value lies in its coverage, wealth of detail, accurate technical treatment, and interesting constructional projects covering the whole field of radio amateur design and engineering. Fully illustrated in line and half-tone, of 800 pages, the *Radio Handbook* costs 88s. 6d., post free, and is available from stock, of the Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

ALWAYS WANTED

Photographs of radio amateur interest—equipment, stations or personalities. Prints should be good quality black-and-white glossy, of almost any size (but preferably half-plate or near postcard), with a lightly attached slip giving the details—which should *not* be written on the back of the picture itself. Payment is made for all photographs that we can use, immediately on publication. Though as stated they can be of almost any size, we are a bit allergic to enormous full-plate views full of "sky" and those minute negatives from ciné film. In fact, we do not like negatives at all, and cannot use colour prints—or smudgy black-white positives taken from colour negatives—unless they are of exceptional interest, with good colour grading. It is a fact that we have to reject, for one reason or another, about 75% of the pictures sent in. Photographs offered for publication should be addressed to: Editor, SHORT WAVE MAGAZINE, BUCKINGHAM, England.



"... Yes, everything here is home constructed ..."

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

AT a time of year such as this, when the countryside is at its best, a time of bird-song and the crack of bat on ball on the village green, it seems less than appropriate to come back to things like politics, engineering, and publicity. But refer to these things we must, in view of the news that the Don Miller *versus* ARRL contest has come to the point where an action by W9WNV against them and their General Manager, for alleged libel, has been filed, to the tune of \$550,000. Another action is believed to be pending against the publisher of 73.

What your scribe foresaw in this context appears to be coming to pass, with both pro-Don and anti-Don factions busily raising smokescreens and slinging mud at each other. Even if the business ever does come to trial and is decided in the courts, that will not be the end of it, for a certain Middle East operator, now back in the U.K. (for whose integrity the writer can vouch) said that he had himself witnessed the operations of stations working with calls legitimately obtained but physically located outside the country in which they purported to be.

Piracy is yet another thing, and this appears to be on the increase; apart from the operations of such phoneyas as "ZA1BY," there are the pathetic efforts of the characters who infest our bands, using calls which have been obtained after much toil by genuinely-licensed amateurs, thus bringing those calls into disrepute, quite apart from the mindless mobs of hooligans and children equipped with Jap transistorised handy-talkie sets—which at the time of writing are on open display at a market a few miles away from where your scribe sits at this moment.

Is it not pertinent to ask ourselves just what has happened to our hobby; and why it is that the authorities in this country permit such happenings? Admittedly, we have no control over the operations of pirates in other

countries, but at least we could reasonably expect something to be done about the morons who use these handy-talkies to disrupt the operations of the model-control enthusiasts, greeting the crashing of the fruit of months of labour with hoots of laughter—and is it any wonder the model-control people blame it on the licensed amateurs? This is said to be a "permissive society," but as far as this writer is concerned, a rapid and enforced reversion to the society we knew years ago by sharp police action to enforce the regulations is long overdue. The powers are there, but they are just not being used . . . The result could be violence, because the victims of these electronic assaults, provoked beyond bearing, are liable to turn upon their tormentors, with dire consequences.

* * *

Considering that we have just come through a sunspot peak, if the forecasts were to be believed, conditions have been far from good, and the mean sunspot count seems to have been well below the predicted level. Couple this with the call of the outdoors, and the usual noises on the LF bands, add into the mixture the fact that some reports appear to have gone astray in the post—and a far better "chef" than your scribe could ever aspire to be would be wondering how to express himself without burning a hole in the page!

Ten Metres

G2DC (Ringwood) takes a pessimistic view of things on this band, but regards the problem as mainly one of inactivity. Jack has several times hooked a rarish one and then sat back to watch the pile-up

SIX-BAND DX TABLE
(All-Time Post War)

| Station | Countries | 28 mc | 21 mc | 14 mc | 7 mc | 3.5 mc | 1.8 mc |
|---------|-----------|-------|-------|-------|------|--------|--------|
| G2DC | 335 | 169 | 307 | 327 | 163 | 108 | 20 |
| G3DO | 334 | 188 | 231 | 327 | 90 | 83 | 9 |
| G3NOF | 310 | 153 | 201 | 294 | 34 | 39 | 1 |
| G3LZQ | 246 | 119 | 153 | 194 | 71 | 38 | 8 |
| G3IGW | 204 | 123 | 152 | 167 | 122 | 86 | 42 |
| G3IAR | 192 | 81 | 125 | 171 | 64 | 56 | — |
| G8DI | 186 | 80 | 132 | 163 | 77 | 46 | 8 |
| G3NYQ | 147 | 35 | 70 | 107 | 40 | 30 | 21 |
| G3PQF | 138 | 80 | 42 | 69 | 84 | 49 | 8 |
| G3VDL | 130 | 45 | 93 | 95 | 45 | 22 | — |
| G3IDG | 121 | 71 | 87 | 54 | 27 | 19 | 11 |
| G3MDW | 115 | 46 | 66 | 82 | 20 | 15 | 7 |
| G3SED | 85 | 2 | 18 | 55 | 38 | 32 | 37 |
| G3WJS | 50 | — | — | 40 | 22 | 35 | 11 |

Note: Placings this month are based on the "Countries" Column.

develop—but with no takers; the DX station has simply called CQ until he got fed up and disappeared! On the other side of the picture, the G2DC home area is served by Ch. 5 for the BBC/TV which tends to discourage the 28 mc activity—the second harmonic at 56 mc falls nicely where it can do most harm! From the DX point, there is the undoubted fact that the thinning of our Forces overseas has removed from the picture an awful lot of stations operated by serving personnel—as instance the relative shortage of 9V1 types of late. As far as G2DC was concerned about the only regular DX was with JA's, but CR7IZ, VK3AKN, VS9MB, UL7JV, UL7OE, XW8BP, XW8CAL and 9J2HZ were worked.

A welcome return to the fray for GM3IAA (Inverness) who has been "in" for an operation, but has now recovered to the point when the mower can be pushed around the lawns. Jim heard 6W8XX and 7P8AB but failed to bring them back; during the time he was on both were mainly working DJ/DL, but Jim was somewhat incensed when an F, having raised 7P8AB, proceeded to try out his French at great length. If the DX *wants* to chew the rag with a particular station, then it is discourteous to spoil the QSO, if it is known that he will give others a chance later—but this is not always evident.

Orpington saw G3PZF pleasantly surprised at a QRP contact he had with SM6BD. The latter was using two watts to a ground-plane, at 30 feet, while G3PZF had a K.W. Vespa running 45 watts carrier-plus-one-sideband to a ground-plane only eight feet in the air at the point of feed. Reports both ways varied from 57 to 58, with the SM using straight AM. G3PZF believes this was due to the excellent match given by careful loading—the SM claimed no visible VSWR, while G3PZF measured only better than 1.25 : 1 on his own aerial. It is suggested that the contact is evidence of the need for correct matching, so that power is insignificant—an argument your conductor, for all his ravings elsewhere in the *Magazine*, would not be prepared to accept without considerable reservations. Assuming the normal loss of the feeder when correctly matched to be 2 dB—

which is quite a long line at these frequencies, a hundred feet or more possibly—then the *additional* loss due to a VSWR of 1.5 : 1 is about 0.1 dB or a sixtieth of an S-point. Your scribe would rather go along with the theory that the two ground-plane aeriels were putting out a pretty potent proportion of the signal in the right direction and polarisation to give a good signal at the other end. What is probably more important about the absence of VSWR on the feeder could well be the absence of distortion of the polar diagram.

Now to G3NOF (Yeovil) who found things pretty awful on Ten. No W signals were heard during the month, but there have been openings to Southern Africa at around 1000 and 1800z, and to South America also at the latter time on occasion. SSB QSO's were made with PY's, ZS's, ZD8RB, 8R1S and 9J2DT.

Fifteen

Two letters to discuss this month from GM3JDR (Golspie) who posted for last month in time, although it landed too late to take in; and so now we have two months' working to review. Taking the earlier epistle first, the story was one of very erratic conditions, with the band dead all day one day, and the next open for business by 0700, and carrying on till 2330z, following this on the third day by producing nothing but UB5! Don made up the speech-clipper described in the May issue of *SHORT WAVE MAGAZINE*, the whole works being embodied in a two-ounce baccy-tin. One VE gave him a report of a 1½ S-point improvement with the device in circuit. The second report from GM3JDR, covering the recent period, considers the band was passable, going on to record CW contacts with CE's, CO2BB, CR6LV, CT3OM, CX1FB, DU1AA, FG7XJ, HC1GC, HCIJQ, HL9KQ, HP1IE, JA's, K1FNA/KG6, KG4DO, KP4BBN, KZ5JO, LU's, PY, TA1QR, UA0's, UI8KBA, UM8KAA, WB2PXZ/VP9, VP9WB, VS6FX, VS9MB, assorted W's, YS1XEE, YV, ZB2A, ZD8HAL, ZE1AV, ZS, 5A3TP, 4W1ADO, 6W8XX, 7X2ED, 9J2's, 9L1, 9V1NV and 9Y4AT. On the SSB front the list is rather shorter—

CR6GM and LV, EA8FF, EI0RF, IT0ARI, IZ6KDB, JA's, LZ0WYF, OD5FB, VQ9V/F, VS9MB, ZD8Z, 5R8CJ, 5Z4KX, 9M2MF and 9V1OA being the highlights.

At the other end of the country G3NOF reports 15 metres open from early morning till the small hours. JA's between 1000 and 1300 over the short path, with the same route providing S.E. Asia around tea-time, and the W's in the evening. As usual SSB was used to effect QSO's with JA, MP4BGE, VP2AW, VS5RCS, UA9BE, W6's, 6O1GB, 9G1GD, 9V1OC among others.

In terms of DX, G2DC feels 21 mc to have been the band where most of the pay-dirt lay; in the evenings particularly. Fifteen really opened up with good strong DX signals from the Far East and South America. VS5RCS gets a particular mention as an outstanding signal from 1800 to 2000z on 21245 kc SSB. Jack heard no CW from them on Fifteen and so he took a chance and nipped up there and gave them a blast on the key; back first call, complete with the tip that they were to be found on Twenty CW if he cared to look for them. Others worked were CE3ZW, CX1JM, EL2NJ, JA's, HK7UL, KG6AAY, PJ5MG, OA4UZ and ZP, UJ8AA, VK9LR, VP8JH and 'JR, VS6FX and 'AA, XW8CAL, YA1DAN, 4A1ZV, 6W8DW, 9V1OB, (ex-G3WHN, incidentally), and PY4LA.

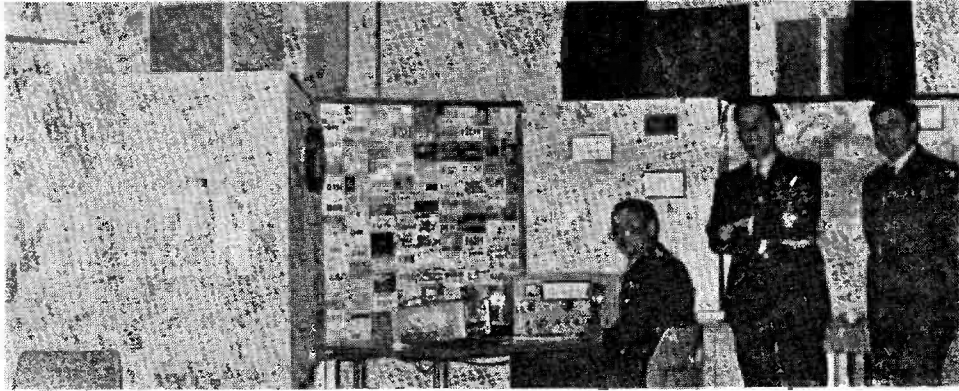
The General Chat

First in the field is the letter from G8DI (Liverpool) who has not increased his score at all, thanks to the call of duty in organising the opening and dedication ceremony of the new school building, equipping

ALL-BAND ZONES AND PREFIXES TABLE

Starting date: January 1, 1968

| Station | Zones | Prefixes |
|---------|-------|----------|
| G3LZQ | 40 | 240 |
| G3SED | 24 | 110 |
| G3AAQ/M | 21 | 183 |
| G3PQF | 19 | 241 |
| G3IDG | 19 | 71 |
| G3WJS | 15 | 171 |
| G3VPS | 11 | 134 |



DL2ZN was the exhibition station of the R.A.F. Rheindahlen group at the recent Hobbies/Handicrafts Exhibition laid on by the Royal Air Force in Germany. This was a three-day stand and in the picture are, left to right, DL5XR, DL5XD and DL5XC (who are, of course, all British servicemen). Their gear included a KW-201 receiver, K.W. Viceroy transmitter and the usual ancillaries, with (outside) a TA-33Jr. on a CDR rotator, up at 70 feet. The group normally runs CW/AM/SSB on all HF bands, and has a lot of home-constructed equipment.

it, and raising their share of the boodle instead of the DX. And what does all this achieve for Bert—more responsibilities!

ZC4GM comes in with some comments about the Cyprus *Newsletter* which he produces. Time for Gordon has been rather short of late due to a conflict with his deadlines and his other duties as balancer-of-books and maker-of-other-subtle-reckonings for the Mess accounts. However, to come to the main point of his hurried note, that 5B4SS/P signal which came on during NFD was quite OK, and, joined with VS6AJ/P, should between them have contrived to create quite a stir during Field Day.

A tongue-in-cheek suggestion comes from G2HKU (Sheerness) on the important matter of easing the garden work-load—he suggests that those with a rotary beam may well be able to use a good strong article on the subject of how to modify the aerial system to act also as a water-sprinkler! Again your E.P.E. must demur; it would only increase the work of weeding!

A regular correspondent in “another place” has now graduated to the ranks of the licensed amateurs, with the call G3XGD, and wonders how to begin his first letter to CDXN. To this, the answer is easy; how you like, provided it arrives before the deadline each month! Seriously, one of the fascinations of writing this piece is

the enormous variation in the letters, from “Dear Sir” right through to “Hi there!” Glyn has already been through three aeriels, from a Joystick, then a Top Band quarter-wave to a very bent 150 feet, part of which runs through a passage-way. The fourth essay in this line should improve things somewhat, but depends on success in negotiations with the neighbours.

G3LIQ (Hull) asks for information on how to claim WAC for Top Band. A quick look at the 1968 ARRL *Handbook* for the latest gen. says that the award is issued by the IARU, and should be submitted through the IARU member-society of the country concerned. However, the fly in the ointment is that special band endorsements are only issued in the case of WAC on 50 mc or 3.5 mc, according to the *Handbook* paragraph.

After a year of operating from 9V1, 9V1ON “reviews his reactions.” Ron, who is ex-G4AY and has also held a couple of ZL calls, is surprised at the number of G’s who boldly announce during their contacts that they will not QSL. As he says, it takes some courage to do this, and at least it has the advantage that one knows from the start that no card will come, rather than waiting with diminishing hopes for a QSL. The W Phone-patch traffic and their tendency to try to “order other stations off the frequency” comes in for some hard words—and

justifiably so, at that. The participation in the S.E. Asia net on 14320 kc, with 4S7PB “in the chair,” is a pleasure keenly anticipated. Finally, a *cri de coeur* for earlier information on coming contests, so that the overseas readers can hear about them in time to take part. Fair enough, but the snag is that many Contests are not advised to us until the last minute—some, indeed too late for any mention at all.

Contests

First, a correction to last month’s notes, p.228. G3FKM writes to point out that G3LSF, and *not* himself, was top G on 21 mc, an error for which your scribe must hang his head in shame. In addition, the reference to G3AAM should have been G5AAM, a slip which occurred somewhere in the transcription from the typescript to the printed word. Our apologies to the good folk concerned, and thanks to John for pointing it out.

As predicted, the CQ CW DX Contest results are now to hand. In the single operator all-band Top Ten, G3HDA appears in the tenth spot; G3HCT is the winner of the 21 mc category; and G3JVJ appears at fifth position in the 1.8 mc listings, which is won by ZC4RB—as forecast on p.160, May. The Top Band first six listing, incidentally, is entirely filled by European calls. Turning to the U.K. placings, here we see G3HDA leading the all-

band; G3POI/A the 28 mc; G3HCT the 21 mc; G3FKM top of the 14 mc listings, and G3ESF on Forty. As for Scotland, of the four entries noted, two are from our GM5 friends, with GM3JDR leading the all-bands, and GM5AFF the 14 mc; Shetland gets a list of its own with GM3SVK leading the all-bands, and GM3KLA on 3.5 mc. Wales shows GW3GHC on Ten; Ireland E1SF; and Northern Ireland GI3RXV. In the multi-operator single-transmitter category G3SSO, GM3SHF, and GW3VPS/A represent the three countries. Our congratulations to all on a fine effort.

Grafton Radio Society report the results of their annual shindig, with the non-members listing showing G3RVM, G3LIV, and G3IGW in the first three, while the first three members are G3VYF, G3SIL and G3THQ.

The *VK/ZL Oceania DX Contest* results for 1967 are to hand. The Phone section shows G3IAR and G3KSH as leading G entries, while on CW G3RJH heads a rather longer G listing. However, compared with the others, this Contest does not seem to have been well supported in the U.K.

Contests forthcoming include the *World-Wide RTTY* affair over the weekend October 5/6, with sixteen trophies, no less, to be fought over. Anyone interested—and we know this one is of interest to quite a few G's—should write for the full details, the address being VE3RTT Canadian Amateur Radio Teletype Group, 85 Fifeshire Road, Willowdale, Ontario, Canada, preferably enclosing an IRC.

A little nearer is the *DARC WAE Contest*, with CW on August 10/11, followed by Phone September 14/15. For the rules on this one contact DJ6QT, An der Klostermauer 3, D-6471, Hirzenhain, West Germany. Incidentally, this Contest has a couple of interesting features in the QTC rule and the inclusion of a separate category for stations licensed less than one year.

Odds and Ends

First one to mention here is that the Indonesians are to change from the PK prefix to the series YB, YC, YD. YB's will be Class One operators, licensed to 500 watts; YC's to 75 watts; and YD's, ten watts.

However, there will be PK's about for some time yet, as we gather the Bandoeng PK8 chaps are legal, and are to be required to apply for a Y-type call within twelve months. It is interesting to note that the YB's must speak English, pass a technical test, and the Morse, have resided in Indonesia for several months—and may not use commercial gear, albeit kits are allowed.

Grafton will hold their annual field Day once again, on Tumulus Hill, Hampstead Heath, over the weekend July 6/7, with gear on all bands 1.8 to 144 mc. As always, visitors are welcome to this event, which is in the nature of a pleasant Club weekend together rather than a competitive occasion.

A note from G3XMX entering his name and address to the "New QTH" column mentions that the nice shiny new call has to remain dormant for a few weeks while the A-Level inquisition is being completed, but 4 watts of RF up the spout was enough on Top Band to break the barrier with GW3FQZ. The main point here is that G3XMX, if he becomes addicted to Top Band, will remove a further country from the list of the rare ones—he is in Cumberland.

Two of our letters this time have the glow of triumph about them, and both with reason. The first one comes from G3UYK (Ilford) who has just received DXCC, although he had, at the time of writing already gone up to 146/110. Most of these were obtained using an RA-1 on the receiving side, with the RF generated by a FL-200B, both being used in conjunction with a trap dipole.

As for the other, G3IDG (Basingstoke) is also the happy recipient of DXCC; with Allan it has been an aim right from the beginning, albeit not one pursued to the exclusion of all else. In fact *QRP* for April 1953 has Allan on record as saying "only 94 countries more to go for DXCC!"

Twenty Metres

Coming back to our mutttons, G3NOF found the early mornings best, with West Coast W's, Central and South Americans, plus VK's. Not a lot was heard from the Pacific area other than a few FO8's, KH6's and KS6's. Around 1700z there have been short-path openings to S.E.

Asia. SSB contacts were booked in with FO8AB, HK0BXX, JX6RL, K7UGA, KH6BZF, KV4CF, MP4BGE, MP4TCD, MP4TCE, TG9EP, TG9RN, UA0TC, VK's, VP1RC, VQ8CS, VSSRCS, VU2NFM, W6's, WA7ITP (Nevada), XW8AX, YA1DAN, YN1GLB, ZE's, ZL's, 9G1GD, 9M2TC and 9N1BG. Gotaways included FR7ZS, KS6CN, VQ9B/F, VR6TC, and ZL1FFE/KS6.

G2DC regarded the early-morning period as somewhat disappointing, albeit for anyone after the rarer W7 districts it was good, full of W7 with a sprinkling of W6 and South Americans. HP1AC, HK4JC, KZ5EM, VK2-9, VS5RCS, VE, and W, 4A1WS and 4A1EK were all worked on CW.

Twenty for G3UYK included

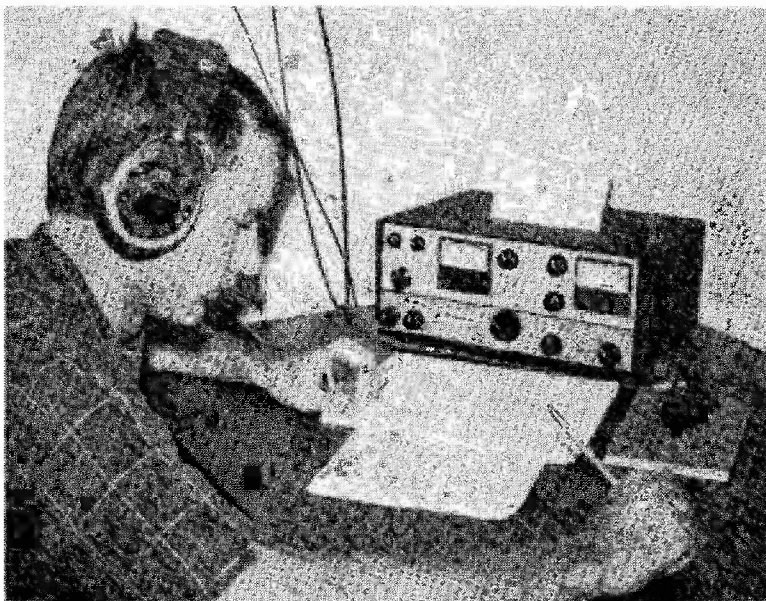
TOP BAND COUNTIES LADDER

| Station | Confirmed | Worked |
|---------------------|-----------|--------|
| <i>Phone and CW</i> | | |
| G2NJ | 98 | 98 |
| GM3UVL | 90 | 95 |
| G3VYF | 86 | 88 |
| G2HKU | 78 | 82 |
| GW3PMR | 72 | 78 |
| G8HX | 68 | 83 |
| G3WDW | 62 | 83 |
| G3WQQ | 58 | 73 |
| G3VMQ | 55 | 73 |
| G3IDG | 55 | 59 |
| G3VTY | 54 | 86 |
| G13WSS | 45 | 65 |
| G3VLX | 45 | 71 |
| G3UGF | 36 | 76 |
| G3WJS | 21 | 56 |
| G3XGD | 4 | 26 |
| G3SVK/A | — | 78 |
| <i>Phone only</i> | | |
| G2NJ | 96 | 96 |
| G3VYF | 73 | 78 |
| G3MDW | 57 | 73 |
| G3VMQ | 38 | 54 |
| G3UGF | 36 | 73 |
| G3PQF | 20 | 51 |

(Failure to report for three months entails removal from this Table. Claims may be made at any time.)

R. H. Benny (P.O. Box 582, Bathurst, Gambia) holds callsign ZD3G and runs a Swan transceiver.

Picture by G3BID



TT8AN, YK1AA, HKØBKW, HC1MF, CE3FI, HP1AC, VU2JA (CW), TI2XL, 9G1GF, HR1KAS, CT2AA, 8R1S, MP4BBW, UH8AD, 4A3RE, PZ1BF, VP9's, PJ2CU and 'CB, HK4BNI, 6Y5SR and many others, all on SSB unless otherwise indicated. As Peter says, working this little lot involved being at it till 0300, but after all, when one is on holiday, who cares?

A good monitor of band conditions is a regular sked, and G2HKU (Sheppey) had great difficulty and some failures on his regular QSO

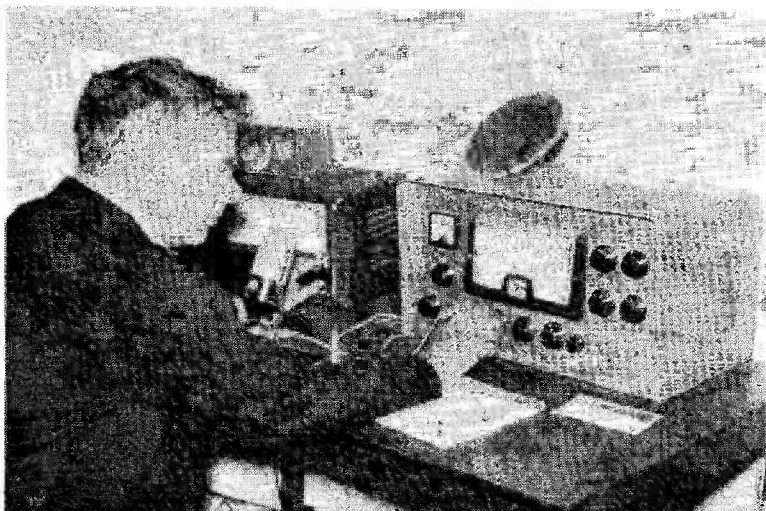
with ZL2KP, conditions being very poor for VK/ZL at 0700z.

The LF Bands

Here there is a great dearth of reports on Forty and Eighty but the usual large crop for Top Band. Nothing is said about Eighty by anyone, while Forty gets a mention from only G2DC and G2HKU. The former found both bands full of static in both the morning and evening periods, and only made one contact outside Europe, namely UL7IE. As for G2HKU, Ted

worked CN8BV, WØNEU/LA, EA8ES, PY7ARP, ZC4RB (all SSB) while CW yielded a QSO with UA9KAB.

Now to the *Top Band* clip, where possibly the most interesting letter is one sent us by GM3FSV, received from SWL Allen of Perth, W. Australia. It seems SWL Allen was listening on 160 metres at 0525 local time on January 29 (which would be 2125 January 28 here) when he heard a station signing off a QSO with OK1AWQ on 1882 kc. Unfortunately, although he copied the first



Station of C. P. Booth, ZD3E, Box 257, Bathurst, Gambia, who runs a K.W. Vanguard, an Eddystone 888A receiver and a Codar ATU.

Picture by G3BID

part of the GM call, a static crash made the latter part doubtful copy, and Murphy's Law made GM3FSV sign only once. However, SWL Allen had it almost right, as GM3FSY, and so made a few enquiries, which proved abortive, until he wrote to the OK QSL Bureau, asking them to enquire of OK1AWQ who it was he was working. After a time the OK Bureau came across with a statement that OK1AWQ was indeed on the band at the specified time and frequency, working GM3FSV. So . . . a report was sent out to GM3FSV, who is justifiably pleased about it. SWL Allen is located about seven miles from the centre of Perth and five miles from the Indian Ocean. The receiver in use is an HRO, kept in tip-top condition, fed by an inverted-Vee aerial with the apex about 45 feet up in the air, and his Top Band loggings include G's, W6, W7, W8, W9, and W0.

G3XGD is, as already remarked, a fugitive from Justin Cooper, and is using a 5763 PA and 8 watts Phone and ten on CW. On the receiving

Reporting the HF Bands

side he kicked off with an R.1155A modified to give Top Band coverage, a device which has now given way to an HE-30. His best effort on the Joystick was a contact with G3TJM in Portsmouth from Sheffield, while the later aeriels have made CW QSO's possible with OK's, GM and GW. Incidentally, it rather sounds as though Glyn is one of the dwindling band of CW addicts.

G3UGF comes in at this point to say that, much as he appreciated our mention (p.227, June) of the DX-pedition he and G3UBI are doing, we forgot the call they would be using. GB2NI it is, and although there have been a few snags they are quite determined to carry out the programme as outlined in this piece last month.

G3SVK/A still contrives to elude your scribe, by managing to appear just when the '3KFE rig has to be switched off, or by himself going QRT the instant he appears in the speaker. Nonetheless, we'll have him yet! As to his own results, Fred mentions what a pleasure it was to work G3LSF/LX/M in Luxembourg recently, and follow it up the next evening with OE3UJ/P another G3LSF disguise—quite apart from HB9T, GM3UGC in Peebles for a new county and sundry others. In all, 78 counties and 19 countries since January 1, 1968, is pretty smart going on Top Band.

Examinations restricted G3VMW (Wakefield) somewhat, but he has managed to be pretty active and goes up in the Table. The aerial in use here is an inverted-V tuned against a radial earth system; there is also gear for the HF Bands and for 70 mc.

A long and thought-provoking letter from G8HX adds another call in the Table. G8HX is mainly CW, as he has been for the past fifteen years, and exclusively Top Band. Frank has a point when he mentions that 1910 kc seems to be a recognised frequency for calling during the day, and suggests that the CW types could well use a similar sort of arrangement at their end of the band. Frank says

that although he has to leave for work at 0830 clock, he would like a daily CW sked with a station at 50-100 miles from Mansfield for the exchange of reports and weather, lasting about five minutes; over a period of time the reports of such a sked could be useful. Anyone interested should contact G8HX direct, *QTHR*.

Anyone looking for Norfolk may well have their problems solved during July, as we understand G3WDW, along with G3XKL, will be at a Cadet camp there from July 15 to 23.

G3VLX (Sidcup) is nothing if not lucky, where DX is concerned; he was working G3EFS up the road and found he was being QRM'd by SSB. It turned out to be G3SVK/A, who was therefore raised, and the contact was immediately followed by one with G3RPC, before there was time to QSY. G3RPC, of course was a new county in the G3VLX bag. The only problem left in the way of English counties now is Hereford, from whence there still proceeds a deafening silence in terms of Top Band activity.

Still talking about Fred, G3SVK, Allan G3IDG describes him as the "Gus Browning of Top Band," and remarks that Cumberland is his only missing English county. Allan has recently returned to Top Band after a period of absence and finds it pleasant that people can find time to describe the gear even when the heat is on, instead of just a report and not even the courtesy of "73," as sometimes occurs on the HF bands.

Another summer DX-pedition, by G3XIQ, G3XCK, G3UID, and G3WUW, will activate some of the Welsh counties. August 23 and 25 will see them in Brecon, August 26 in Radnor, then a night each in Montgomery, Merioneth, Cardigan and Carmarthen, which latter they reach for the 30th. The calls will be GW3UID on Top Band SSB, and the VHF side will be GW3WUW.

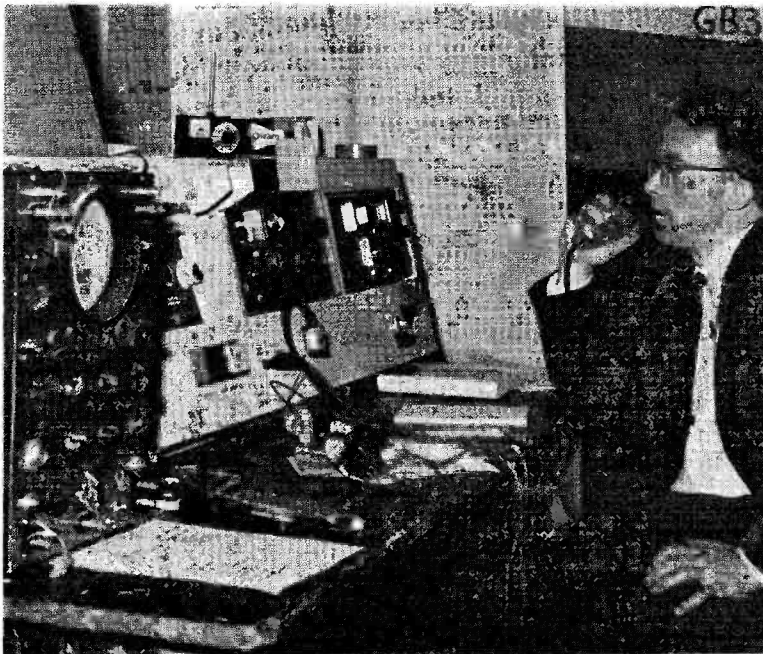
Last man in is G2HKU, who attributes his lack of activity not so much to gardening, as to preparing for the erection of a rotating mast,

TOP BAND LADDER

(G3V- and G3W- stations only)

| Station | Counties | Countries |
|---------|----------|-----------|
| G3VMW | 96 | 20 |
| G3VGR | 94 | 16 |
| G3VYF | 88 | 19 |
| G3VTY | 86 | 13 |
| G3WDW | 83 | 9 |
| G3VLT | 80 | 16 |
| GW3VPL | 78 | 16 |
| G3WUD | 74 | 14 |
| G3VMQ | 73 | 16 |
| G3WQQ | 73 | 15 |
| G3VLX | 71 | 9 |
| G1WSS | 65 | 9 |
| G3VMK | 63 | 17 |
| G3VES | 63 | 16 |
| G3VOK | 61 | 15 |
| G3VSL | 60 | 11 |
| G3WJS | 56 | 11 |
| GW3WWN | 54 | 7 |
| G3WDG | 52 | 8 |
| G3VPS | 43 | 13 |
| G3VWC | 34 | 7 |

Alan Davidson, GM3FAO, operating as GB3AYR at the Ayr Chamber of Commerce Exhibition, May 7-11. This special station was manned by members of the Ayr Radio Amateur Group, using equipment loaned by GM3RGJ, GM3MQO and GM3FAO himself. During the run of the show, 24 countries were worked on the 20-metre band.



so that a beam can be put up for the HF bands. Nevertheless EI9AW/P was worked, in Donegal, and GW3XJC, DL1VW, OK1AJM—all CW—and ZC4RB on SSB heard. All these stations popped up around the 2200z time of day.

A note from G3SEA points out that although he has not been on for three years, he seems to have been elected "the QSL manager for

CT2AY." Cards with IRC are being returned to their originators, but the rest will have to be destroyed, as G3SEA is *not* the QSL manager for anybody!

Conclusion

At this point we come to the end of the pile; all the claims which came in have been entered, but, as

already remarked, some mail may have gone astray, so we hope you will check your table position, and if necessary correct it in your next letter—for which the deadline will be **July 8**, addressed to CDXN, SHORT WAVE MAGAZINE, BUCKINGHAM. And now for those weeds!! For the next few months, deadlines are, Mondays: *July 8, August 12 and September 9, 73 es GL.*

HENRY'S RADIO — EXPANSION

We are informed that the well-known firm of Henry's Radio, Ltd., have opened an additional Electronics Centre at 309 Edgware Road, London, W.2—where they will be specialising in hi-fi, audio, intercomm. equipment, microphones and a wide range of test gear. Shortly to be published is a new catalogue, the 9th edition in their series, running to 280 pages and listing some 6,000 stock lines. This will be a well-illustrated production, costing 8s. 6d. post free, but including vouchers worth 10s. against purchases. We are glad to hear of yet another comprehensive catalogue for the radio enthusiast, produced by an old-established firm—and we can well imagine what a job of compilation, proof-reading and printing such a catalogue would be! For years, the firm has been controlled and directed by the French family, and they have made a very large contribution to the interests and requirements of

the successful home-constructor, radio amateur and those interested in the recording and reproduction of sound. Henry's Radio, Ltd., Electronic Component and Radio Equipment Specialists, 303 Edgware Road, London, W.2. (Tel.: 01-723 1008.)

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VHF BANDS

A. H. DORMER (G3DAH)

AT long last there has been an improvement in propagation conditions. Several good openings to the Continent have been observed, including a mini-Aurora on the night of June 10-11.

Best propagation during May on Two Metres was on the 27th and 28th, when PAØ and DJ/DL were coming in at good strength during the evenings. Favourable paths on those occasions appeared to be east-and-west, contrary to recent observations, which have indicated that the north-south paths have been consistently the more productive directions for long-distance QSO's. Seventycems was also good on those evenings, and at times the reported signal strengths were better on that band than they were on Two. Minor lifts occurred on May 13 and 20th/21st. On May 13, the path to GI was open to the South of the country, G13GXP (Co. Down), coming through on SSB at RS 56 with some QSB. Stations in the Midlands and further north—notably G3LKV in Burton-on-Trent and G3A00 in Manchester—were also good signals, although GW3RBM in Denbighshire was not up to his usual standard. A few French stations were also audible, although the only ones worked were FIRQ and F1ABB, both in the North.

Conditions during the Contest on May 19 were only average, as was the activity level. However, the GW portables seemed to be getting out very well, as usual. GW3BA/P from Montgomery was a good signal for most of the day although nothing was heard of him at Herne Bay on SSB. GW3NUE/P in Brecon was RS 58 or thereabouts whenever he had his beam east and seemed to be knocking up a very fine score. GW3ITZ/P, although working from the usual location in Flintshire was not as strong as he has been on previous occasions from the same site.

May 20 and 21st showed favourable conditions for PAØ and F with F9FT, as always, booming in. F3XY in Paris was also a good signal later in the evening. GW3RBM and GW3PDI, both in Denbighshire, are being heard a little more regularly of late but are subject to heavy QSB most of the time with peak signals around the S8/9 mark in the south-east.

The night of May 27-28 was good, as could have been, and indeed was, predicted by reception of the new German beacon station on 145.978 mc. (Callsign is DLØER and location Essen.) Signal strengths varied from S3 in the early afternoon to S2/3 by the evening. He has been heard regularly in Herne Bay for the past week and is going to be a very useful pointer to Continental conditions. Operation is continuous with the call sent at about 12 w.p.m. at 40 second intervals. On the evening of May 27, EU activity started to build up around 1700z with strong signals from PAØ. PAØACG and PAØHVA were worked at RS 59 both ways at just before 1800z. Around 2100, the path was open to the more northerly and easterly Dutch stations, such as PAØTRA in "DM65h" PAØWZM in "DM11e" and PAØKVA in "DM37d." Only a few German stations were heard, the best being DJ2HI in Oberhausen (Ruhr), with whom a three-way contact with PAØPAL was maintained under good conditions for about 40 minutes. An interesting signal was that from PAØSTW in "CL26j" with whom contact was made when he was running 750 milliwatts. Signal strength was R4/5 S2.

By the 29th-30th the east-west

path had virtually folded but north-south was still good with regulars such as G3LLE (Sheffield) at RS 59+ and the Ilkeston twins, G3LKG and G8BMC, both around the RS 5 7/8 mark, again with heavy QSB. The extent of the signal strength swings during these periods was quite remarkable, G3NVE (Goole, Yorks), varying between S8 and SØ several times a minute.

June 4 showed some promise quite early in the day with Frenchmen coming in at good strength. F5DA (Oisemont) was RS 57/9 at 1300z, but little was heard of them after dark. A visitor to the West Country, G3NEO/P (Sheffield) was worked at RST 569 at 2130 when he was at Newton Abbot, and EI5BH was heard and called repeatedly between 2200 and 2300 without success; for the county hunters this is one to look for; his frequency is 145.870 mc and the county is Offaly. He is reported to be active most evenings with EI6AS from 2200z onwards.

Conditions to the Continent were again reasonable on June 9, PAØCML and PAØACG were both worked at RS 59 and DJ9DL (Witzhelden) at RS 57 but activity died out fairly early on in the evening.

Seventy Centimetres has been predictably quiet, apart from the poor conditions, with so many of the G8/3's now piling up the Counties on Two and ignoring Seventy. However, the suggestion made last month that there might be an Activity Period on that band has borne fruit and may lead to more doing on 70 cm. on at least one night in the week. G8APQ (Tadworth, Surrey) and G8APZ (Hounslow, Middlesex) have been assured of support for their scheme to operate Monday nights as Activity Periods, starting at 1900z, and it to be hoped that the idea will be adopted widely.

Four Metre DX

The highlight of operations on four metres this month has been the opening to Gibraltar which produced a first GC/ZB2 contact and QSO's between EI6AS and ZB2VHF and ZB2BO on May 22. The beacon was first heard in Eire at 1900z and '6AS called on the 14.260 mc channel and reported reception. The resulting QSO was

conducted with signal strengths of RST 579 both ways. A few moments later ZB2BO was contacted and another successful QSO concluded. '2BO runs 10 watts to a two-element Yagi, so hardly QRO. EI6AS has 25 watts to an 832A and a four-element Yagi at 40 feet, from a site 150 feet above sea level; he also has a 20m. dipole cut for the low end of the band so that it becomes five half-waves at 70 mc and offers a fair impedance match. Rx inputs and switched so that 14.260 mc and 70.260 mc can be checked rapidly at will. G3TTG (Wadebridge, Cornwall) also made contact with both the Gibraltar stations on the same day. EI9AD/M (Limerick) heard and called ZB2VHF but was unable to make contact. Reception was also reported by Heinz Stelberg, a SWL in Bonn, Germany.

On May 30, G3GVM (Fareham, Hants.) worked both ZB2VHF and ZB2BO; the former also raised G3LVP (Wanstead) and the latter G3JVL (Portsmouth).

There was another long opening on June 3 when ZB2VHF was worked by G3JVL, G3GVM, G3PLX, G3JHM, G3TCT, G3WBQ and G3WYQ. G3VEL and G3VLY were heard but not worked. ZB2BO worked G3JHM and G3VPK.

Unconfirmed reports show contacts by '2VHF with G3WYQ, G3XBX/A, G3GVM, G3JVL, G3DOR, G3JEQ, G3WPK, G3LVP, G3RIN and others. The path opened at about 1900z and closed at about 2000 when both the Gibraltar stations dropped out after being S9 at times. Incidentally, ZB2BO normally operates on 70.197 mc but can go to 70.260 mc. He gets a bit fed-up with sitting there while Big Brother works all the DX, so have a look on the lower frequency as well!

Best 4-metre opening was, however, on June 9 when ZB2VHF had QSO's between 1300 and 1615z with G3's DOX/M, FTW, HBG, JVL, KMI, LQR, OSS, PPU, RZO/A, SMU, SUV, SZM, TCT, THQ, TJW/A, TXI, VCV, VOF, VK, VSA, WBQ, WMQ and G5NU. ZB2BO also had a good day, and contacts were made between 1300 and 1545z with G3's DOX/M, FTW, HBG, KMI, KYV, LVP, OJE, PPU, SZM, SXT, TCT, THQ, TJW/A, TTG, TXB, TXI,

VCV, VPK, VSA, WBQ and G5NU. This is probably the most extensive VHF opening yet on the 70 mc band and has brought the totals worked by 'VHF and 'BO to 99 and 30 stations respectively! Congratulations go to all concerned—and thanks to G3JHM and G3WBQ, who have had all the hard work of co-ordination and reporting.

Propagation on these 4m. occasions was *via* Sporadic-E, which may of course occur at any time over this path. Signals were specular for most of the time, but a scatter-type characteristic was observed for short periods as the ionisation decayed and produced rapid fading.

A new record for four metres has been set up by GC3OUF (Jersey) and ZB2VHF who were in contact on June 9 at 2200 GMT. Reports were RST 599 both ways. QSO's were also completed between Jersey and G3JVL, G3SMU, G3FDW and G3UVR on the first day of operations in the Channel Islands. First two-metre contact was with G3DAH (Herne Bay, Kent) at 2000z on Monday, June 10 with signal strengths of 5 and 9 on both Phone and CW. It is hoped to include a more comprehensive report of the activity of this DX-pedition in the next issue.

June 10 was another good day for EU contacts on Two. First indication of a possible opening was the reception of the German beacon at Garding on the Danish border. The signal was RST 599 for some hours during the early evening, and this was surprising because the station, callsign DLØPR, on 145.971 mc, runs quite low power and is beaming north for Polar reflection tests. The Essen beacon, which is omni-directional, was only S2 at the time. Contacts with OZ and SM were being made from DL and PAØ by 1900z and PAØKWY was heard calling "CQ LA," but as far as can be ascertained no contact resulted. G3KWY heard, but did not work, OH2NX on June 8.

By 2100 GMT the band was wide open to PAØ and DJ/DL with DL6SS in "EN62s" one of the strongest signals and DC6KX in "DN49e" close behind him. A few French stations were also heard at this time, notably F9FT (Rheims) who runs 900 watts to a 64-element array and was RS 58, but the most

productive path was certainly to the north-east and this followed the boundary pattern of the high pressure system. EI5AJ (Co. Down) was heard in QSO with G3LLE (Sheffield) on A1 but could not be raised from Herne Bay and was quite a weak signal—presumably he was beaming away from the south-east.

The Aurora, for which a warning had been issued to cover June 10-11, materialised at about 2330z on the 10th, bearing between North and NNE. GB3GM was then audible but weak with a T5A note. Signals built up until by 0130 he was 30 dB over the noise. At this hour both LA9T and SM5DWF ("JT51g") were RST 565A. The Swedish beacon, SM4MPI, which appeared to be a little low in frequency, was at about the same strength. (GB3GM was T5A on four metres also.) In spite of much chit-chat about an auroral opening earlier in the evening, activity was very low, presumably because of the lateness of the hour and the weak and unstable effect. There was a slight repeat performance during the evening of June 11, with GB3GM again audible, but the effect appeared to be spasmodic and localised and no widespread activity was heard or has been reported.

Pressure charts for the month show a uniform 1030 millibars for much of the time with variations limited to plus and minus three millibars.

Beaconry

The following supplementary information on active VHF Beacons has come to hand.

DLØER, located in Essen, is now in continuous operation with 5 watts to an omni-directional antenna. Frequency is 145.978 mc and the keying cycle is about 45 seconds. Characteristic is a long dash followed by the call at about 12 w.p.m.

DLØRG is reported as now running 100 milliwatts from "DK14," which is in the Cologne area.

DJ9CRA is a new one. Location is near Cuxhaven in "ENO5c." Frequency is 144.034 mc. Power is 8 watts and operation is continuous. Radiation pattern is not known as yet.

Further news of the projected French beacon. Although this is not

yet active, it should be on by next month. Callsign is F3THF and the frequency will be between 144-000 and 144-100 mc. The antenna will look south from Brittany and power will be 10 to 15 watts. Unless he has a very good front-to-back ratio, he should be audible, at least in Southern England, and should give a very useful indication of conditions.

VHFCC Awards

Certificates for this Award are now with the printers and should be available to claimants shortly. In the meantime, the following claims are acknowledged:— G3JFO, G3OZP, G3EKP, G3UIK, G3WRD, G3UUT, G3FVC, G3NLR and G3LAS. Thanks to those who have included details of the station and operating conditions. One fact which emerges very clearly from letters accompanying these claims is the QSL rate on the VHF bands is very low. One operator who has worked over 300 different stations on Two has had to wait over three years for the 100 cards! The rate seems to be even worse on Four.

Contests

To coincide with the Region I VHF Contest over the weekend of July 6/7, the RSGB have laid on a special two-metre Open Contest. Times are 1800z on the Saturday to 1800z on the Sunday. Logs should be submitted within 14 days of the end of the Contest to:—VHF Contest Committee, Summerleigh, Beltinge Road, Herne Bay, Kent. Rules will be standard for this type of event.

DX-Peditions

G3WUW (25 Station Road, Over, Cambus.), will be signing GW3WUW/P on two metres in various Welsh counties during August 24-30. Six evenings will be spent in six different counties. Operation will be A3, further details on frequencies, etc., to follow.

Final details of the expedition to GM by G3UQL and G3VAG are now to hand. The itinerary is as follows:— June 29—*Roxburgh*; June 30—*Berwick*; July 1—*East Lothian*; July 2—*Clackmannan* (or *Kinross*); July 3—*Kincardine*; July 4—*Banff*; July 5—*Moray*; July 6—*Nairn*; July 7—*Sutherland*; July 8—*Cathness*; July 9—*Ross and Cromarty*;

July 10—*Inverness*; (or *Skye*), July 11—*Argyll*; and July 12—*Kirkcudbright*. Frequencies are 144-054 mc and, on Top Band 1800-1830 kc for reports and liaison. Operating times from 1900 GMT daily. Requests for skeds to G3VAG, *QTHR*. This is certainly one of the most extensive GM programmes for some time and will give stations in the South something to work for. Failing an Aurora, it seems very unlikely that many two-metre contacts will be "on" from some of the more remote sites, but that shouldn't stop us trying! The equipment on Two will run 60 watts to a J-Beam 14-element Parabeam at about 25 feet. Special QSL cards are being printed for the trip and one will be sent for each contact. The card will give the exact location with QRA and National Grid reference, and if a large s.a.e. is sent they will be posted off to claimants at the end of the fortnight, otherwise they will go off *via* the Bureau in the ordinary way. QSL cards are not required for each QSO, but should be sent for the *first* one, with either GM3UQL/P or GM3VAG/P. And the best of luck to all concerned.

The G3UBI/G3UGF expedition to GI will be taking 70 cm. gear with them now. Operating frequency on that band is not known as present, but the two metre CW frequency is now to be 144-07 mc, callsign GB2NI. Latest date for skeds is July 6.

Project Oscar

Further news from Bill Browning, G2AOX, on the *Australis Oscar* due for launch this month. It is *not* a translator type package, as were the last two Oscars, but will emit identical signals on the 144 mc and 28 mc bands, with eight telemetric channels, including the usual "hi-hi" identification on CW. Keying will be two-tone FSK and not MCW. The satellite is powered by two 20v. alkaline-manganese batteries with an expected life of two months. The 28 mc transmitter will be switched on and off by command signals from ground stations to conserve battery life.

The VHF transmitter will emit a continuous AM signal and telemetric information on 144-050 mc with a power of 50 milliwatts in the following sequence:—

Channel 0, hi-hi; Ch. 1, battery current in mA; Ch. 2, X-axis sensor; Ch. 3, battery voltage; Ch. 4, Y-axis sensor; Ch. 5, internal temperature; Ch. 6, Z-axis sensor; Ch. 7, skin temperature.

In all cases the parameter is specified by the audio frequency of the signal, and not by a time count as previously. Each channel will operate for approximately 6½ seconds, giving a total of 52 seconds for the complete cycle. The frequencies will vary from about 500 c.p.s. to 1500 c.p.s. Charts showing the correlation between the received frequency and the parameter being measured are available from G2AOX (*QTHR*), on request.

In order to decode the telemetry information it is recommended that an oscilloscope and a calibrated audio oscillator be used. The received signal should then be fed into the vertical amplifier and the audio source used to supply the X-plate deflection. This set-up, when correctly adjusted with as little sync. as possible, will give a Lissajous figure from which the frequency can be determined. If an oscilloscope is not available, a reasonably accurate measurement can be made by matching the audio note received with the note from the signal generator aurally. The best method, for those who can manage it, is to use a direct reading digital read-out frequency meter.

A stop-watch is essential to ensure that the correct channel is being monitored, as if two adjacent channels are on the same, or very nearly the same frequency, there will be no apparent break to identify the change.

For the first time in an amateur-built satellite, an attempt has been made to stabilize the package in order to ensure reliable reception free from the fading due to spin, roll or tumble, and this is being achieved by associating the energy generated by the spin with an array of permalloy wires and with eddy currents in the aluminium casing. A powerful bar magnet is also built in and this is intended to align the X-axis with the Earth's magnetic field.

It should be noted that, as all the signals are amplitude modulated, it will not be necessary to use the BFO for reception and resolution.

The same telemetry sequence will be transmitted on 29.450 mc, and this 250-milliwatt signal will serve as a useful indication of propagation conditions on that band.

Special report forms are being prepared and the use of these is mandatory as they will be fed into a computer for analysis. They may be obtained from G2AOX and should be returned to him on completion for sending on to Melbourne University.

Tape recordings of the signals to be emitted by the satellite, for check and comparison purposes, have been made and are available from G2AOX on request—with a 4s. postal order to cover costs.

Modulation

From comments received on the notes about modulation last month, it appears that some additional information may be useful. Let it be quite clear that the indiscriminate application of large amounts of audio in excess of 50 per cent of the input power to the final amplifier stage was not and is not, advocated. What is a demonstrable fact which has been apparent to VHF workers for many years is that, in many cases, the transmitted signal as received at the distant end has all the characteristics of under-modulation even though the modulator and PA valves specified are such that full modulation could have been expected. The requirement is that the modulator should be *capable* of an output of about 80 per cent of the final input power and operating conditions should then be arranged so that the signal is 99 per cent modulated in the negative direction and more in the positive direction if possible.

Omitting those instances where, because of fear of TVI or incipient instability, the modulation is deliberately restricted, we are left with the hard core who try to produce 100 per cent modulation but fail to do so. No hard facts and figures are available in every case to show why this should be so, but the most probable causes are those already stated, *i.e.*, bad matching, and failure to modulate the screen fully. Other causes which suggest themselves are lack of, or incorrect, drive to the PA; inadequate and/or incorrect voltage swings; and a touching faith in the belief that

THREE-BAND ANNUAL VHF TABLE

January to December, 1968

| Station | FOUR METRES | | TWO METRES | | 70 CENTIMETRES | | TOTAL pts. |
|---------|-------------|-----------|------------|-----------|----------------|-----------|------------|
| | Counties | Countries | Counties | Countries | Counties | Countries | |
| G3LAS | 35 | 3 | 37 | 6 | 10 | 1 | 92 |
| G3DAH | 17 | 2 | 40 | 9 | 10 | 1 | 79 |
| G8BBB | — | — | 27 | 2 | 25 | 3 | 57 |
| G3COJ | 3 | 1 | 24 | 2 | 17 | 3 | 50 |
| G8AAZ | — | — | 19 | 4 | 16 | 1 | 40 |
| EI6AS | 5 | 6 | 20 | 4 | — | — | 35 |
| G3AHB | — | — | 19 | 5 | — | — | 24 |
| G8BJK | — | — | 19 | 3 | — | — | 22 |
| G8AYN | — | — | 13 | 1 | 5 | 1 | 20 |
| G3XFW | — | — | 1 | 1 | 11 | 3 | 16 |

Scores are from January to December. Position overall is shown by the total in the last column. Scores for individual bands will be summarised from time to time to show positions. Entries may be made for a single band, any two or all three. Claims should be sent in as often as possible to enable the Table to be kept up-to-date.

quoted performance figures can be achieved under all conditions. It might be said that all these factors are equally applicable to the HF bands, and indeed they are, but there is little doubt that it is easier to produce drive at low frequencies than it is at VHF, where losses are greater, and this is obviously a significant factor.

Another theory that has been put forward is that transit time at the grid is a contributory factor at VHF, and the writer would be very grateful if someone could explain this to him. It has also been suggested that a strong spacer wave could influence the modulation index, and this seems quite feasible since it would be contributing to the unmodulated output power, unless the screen grid of the driver valve were also modulated.

Whatever the cause of the phenomenon, there is no doubt that the best way of ensuring that the modulation is full is to use an oscilloscope for setting-up. It is unwise to rely on movements of the PA anode meter, or output meter, alone.

It's all a bit fiddling—drive has to be right, driver screen modulated, audio and DC voltages on the PA screen correct, matching accurate, antenna loading carefully adjusted and the PA itself must be operating under optimum conditions and be carefully resonated, as detuning

here often has a considerable effect on the modulation. Given all these conditions it is possible to radiate a good clean signal which will show the carrier dropping to zero on negative peaks and reaching as much as 150 per cent of the unmodulated carrier amplitude on positive excursions.

News Items

Stan Brown, G3RFG (Lower Stondon, Beds) was fortunate enough to be operating at ZB2VHF when the EI6AS contact already mentioned was completed. Ossie must have been polishing up his crystal ball that night since he predicted quite accurately the opening to the U.K. Operation started at 1835z and the EI call came through at 1900, the band folding at 2005. Nice going! It is apparently felt out in Gibraltar that not enough information is available on the operation of ZB2VHF, so the following is repeated: The beacon sends "ZB2VHF" followed by a six-second dash or a six-second listening-through period. Stations wishing to work Gibraltar should send their call signs, preferably on CW, during the six-second quiet period. If anyone wishes to fix a sked, ZB2A is always on 14.260 mc at 1800z each evening, and can make the necessary arrangements. (The ZB2VHF QSL cards are

most attractive.)

The French licensing authorities are out of F5 calls, having now issued the whole series; new licensees are receiving F6 calls. Should you hear a station signing FØ it is not necessarily a pirate. These notations are issued to visitors, as our G5/3.

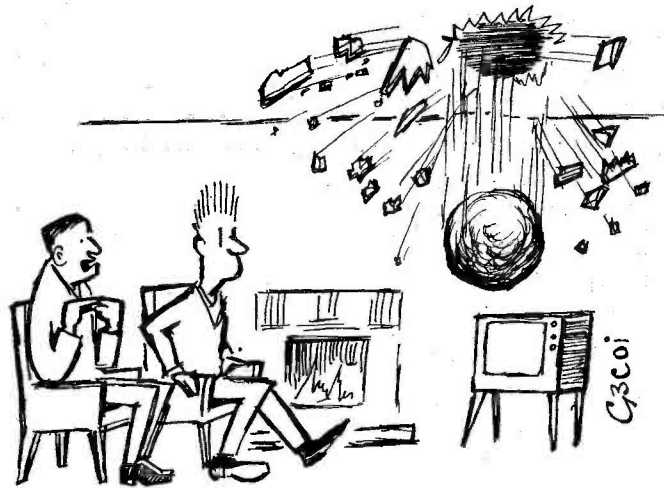
An interesting suggestion from Tom Douglas, G3BA (Sutton Coldfield), that, during Contests, those operators who have SSB equipment should transmit every hour on the hour for contacts using that mode. How about that?

From G8BNN (St. Helens, Lancs.) and rockbound on 145-630 mc, comes a plea for a design for a VFO suitable for use on Two. As it happens an article is now in course of preparation. The gear is quite simple to construct and uses readily available components. It can be heard in operation from G2JF (Ashford, Kent) on 144-675 mc most days.

During another 1296 mc E-M-E test with WB6IOM, G3LTF (Galleywood, Essex) received signals 7 dB above noise into 100 cycles bandwidth at 1812z on June 1. Peter's signals were not received over there, nor were those of HB9RG who also participated in the tests. G3LTF was using much the same gear as for his highly successful tests earlier—as already reported—but modifications to the antenna feed had resulted in an extra 2 dB of gain, and the frequency stability had been improved by the use of phase-lock circuits. On June 2, WB6IOM tried again to raise HB9RG, but again without result. It was subsequently learned that he was having trouble with radar QRM and this may have been the cause of the failure.

Still on Moonbounce, G3CCH (Scunthorpe, Lincs.) is pressing on with his equipment. He now has the converter and paramp. working and is doing final solar noise checks. The antenna dish and the feed arrangements are complete.

The Finns successfully launched a balloon with 144 and 28 mc repeater beacons during the weekend of May 23. A height of 40,000 metres was reached, but even this was



“... Oh, don't worry, it's only my auto-alarm for MS on Two...”

insufficient to give line-of-sight into this country. However, many reports were received from those who could hear the beacons, and this has encouraged the Finns to try again. Details when they become available.

And if you hear or work DL2ZN on two metres, it will be the R.A.F. Rheindahlen A.R.C. station, running 130 watts with an 8-over-8 J-Beam at 85ft. The group can be reached through B.F.P.O.40.

Deadline

Deadline for the next issue is **July 6**, addressed “VHF Bands,” SHORT WAVE MAGAZINE, BUCKINGHAM. Cheers for now. On a personal note, your letters are very welcome, but time does not permit a direct reply to them all, so please no umbrage-taking, but accept this as thanks. 73 de G3DAH.

Late Flash Items

Just as we were closing for press, news came in that Peter Blair, G3LTF, had received from WB6IOM a pen-recording of what actually reached him in Los Angeles during the E-M-E test mentioned at left. An analysis of this recording shows that, in fact, the G3LTF signals on 1296 mc did arrive at WB6IOM.

* * *

Late EDX reports indicate that over the weekend June 15/16 good extended tropospheric conditions developed across the North Sea, between the north of England and Scandinavia. On the evening of the 16th/17th, the general path direction changed to south-west with respect to Norway, and LA4FE, LA9OD (both in Bergen) were very good signals in the south-east of England. It is interesting that during this period, the nearer EU's (DL, ON, PA) were conspicuous by their absence, suggesting a well-defined path SW-NE. Nothing was heard from the direction of southern France.

* * *

It is reported that GB3CTC, the beacon on 144-10 mc at Redruth in Cornwall, is in operation again. It should be a very useful conditions indicator.

* * *

A manifestation of the Aurora was forecast for the night June 17/18. If you were on that evening, please report any VHF results or observations—even if negative—in good time for the next issue.

73 de A.J.D.

Always mention “Short Wave Magazine” when writing to Advertisers — it helps you, helps them and helps us.

BENEFITS OF GOING MOBILE

BEATING THE TEDIUM OF TOWN MOTORING

by "Stroke Mexico"

TO those who, even though they may be car drivers, have never tried using radio gear in a vehicle, this article is addressed. There are quite a few who feel that operating is a full-time job anyway and thus is incompatible with driving and I am not arguing with this conception—if one feels this way it is obviously better to leave operating to the comfort of the shack.

However, there must be a large number who, due to the nature of their everyday job, are confined to a personal vehicle for much of their time, and such is the weight of traffic nowadays that even modest journeys of five miles or so can take up to an hour. Amateurs in country districts may boggle at this but it is very true and the frustration and tedium of such periods every day can only be imagined. To these 20th century cogloidytes the /M licence can come as a boon and a mind-saver by offering many advantages at a relatively modest cost. I will say straight out that the band to be used is 160 metres—this is pure prejudice on my part as I have only tried two other bands, 80 and 2 metres, but dropped them after finding that at my sort of travelling times 80m. was inactive and 2m. was dead *all* the time. Hoots of protest from 2-metre protagonists there may be—but I gave the band a good going over for three long months and must have called CQ three thousand times. The net result was one QSO. I admit I had other QSO's by sked but that was the picture in 1964—with the arrival of the G8's things by now may be different. I hope so, because tests showed me that two metres would be an excellent band for /M on several counts. The antenna can be quite modest and XYL proof, the distance workable can be on average twice that of Top Band and best advantage of all it is possible to work at any time of the day or night, summer or winter.

Band To Use

Top Band remains my favourite and that of the large majority of /M's for many reasons. First, I suppose because the gear is reasonably easy to construct and get working and very quickly after this comes the fact that activity is high in many areas. The other reasons for choosing 160 metres are not so urgent as these two but are nonetheless valid. Many cars are already fitted with a domestic radio so with the addition of a simple converter the would-be operator is half way there. Then there is the fact that there are a great number of stations to be worked who are still using AM—on the other HF bands SSB is almost obligatory and this creates problems for the man who is contemplating going mobile on, say, 80 metres.

But what are the benefits lying in wait for the chap who decides to instal gear? I suppose the one having the deepest effect is the complete victory achieved over the boredom of modern car travel. When one first "goes mobile" the initial weeks are spent in adjusting the gear, if home built, and the aerial, while making certain that the performance is at least equal to that of fellow mobiles. On 160 metres, anyway, it seems that a certain level of performance can be attained which is seldom exceeded, and the fact that all stations, fixed and mobile, are restricted to 10 watts makes it possible for the average good mobile signal to compete and hold its own very effectively with anyone on the band. When the rig is working satisfactorily and one is over the honeymoon period, then comes the steady daily logging of very satisfactory QSO's. Of course, in any particular area one soon becomes very familiar with the "regulars"—however, there are always new calls coming up and in three years I have worked no fewer than 70 stations—and still the new ones come on at the rate of about one each three weeks.

What are the ergonomic problems associated with mobile operation? Very few, really—it is much more difficult to grope in an inner pocket for one's handkerchief when the XYL asks for it just as you are overtaking a panttechnicon! The transmit/receive switch should be one-knob and near at hand, and the microphone should be suspended on a simple contraption around the operator's neck—the many versions one sees merit an article on their own! In my own case I have used a bent-wire coat hanger with 100 per cent success for many years!

What You Discover

Operating mobile certainly brings a new aspect to the long-time shack-bound operator. Now he can understand why there are no stations on Top Band in a certain district—the noise level there is tremendous, and as he passes through the area he observes where the level suddenly drops back to normal. He will observe how, when in a heavily built up street, he sometimes gets reports of an increase in signal strength—on the other hand, when reaching the top of a hill his incoming report will show no apparent betterment. He will note how the loading of his PA is affected by objects such as lamp posts, etc., that he passes. The tuning of a loaded whip is extremely sensitive to its surroundings—this is why it is important to test mobile aerials actually on the vehicle and not anywhere else.

When one's shack time is limited by the pressing demands of business, the XYL, other hobbies, the XYL, relatives, the garden, the XYL, it is then that the /M licence offers a rich vein of operating in time which hitherto has been not only wasted but spent in suffering the slings and arrows of outrageous zebra crossings, diesel fumes, traffic lights, radar traps and the like. Astonishing as it may seem to the hardened car driver, /M operators have even been known to take a *longer* route to a particular destination so that they can finish a QSO properly—and even I, participant in more QSO's than I care

to recall, will go by a different route to put out a better signal to a particular fixed station.

So, if you're hovering on the brink, go mobile! You can always sell your gear quickly if you don't find it useful, after all—there's always a ready market for /M gear in the *Short Wave Magazine* Small Adv. section!

INTERNATIONAL INSTRUMENTS, ELECTRONICS AND AUTOMATION EXHIBITION

Olympia, London

THE Sixth International Instruments, Electronics and Automation Exhibition was held during the week commencing May 13, 1968.

Although the sophisticated equipment displayed on many stands had no obvious application to Amateur Radio, some firms were showing components and assemblies of interest to us.

Daystrom were introducing the latest Heathkit instruments which included a new solid-state, high-impedance Volt/Ohm/milliammeter, the IM-25, giving nine AC and DC voltage ranges from 150 millivolts to 1,500 volts; seven resistance ranges from one ohm to 1,000 megohms; and eleven current ranges from 15 microamps full scale to 1.5 amps. The AC response is good to 100 kc and the instrument works off either an internal battery or from the mains. Price is £48 10s. (this being a professional instrument) and external appearance and internal construction appear excellent. The IM-16 is another instrument fulfilling much the same function although with a reduced number of ranges and a lower input impedance, which sells for £28 8s. The Heathkit solid state power supply IP-27 is an improved version of the IP-20U, giving an output of 0.5 to 50 volts at up to 1.5 amps with a regulation of ± 15 millivolts. Current limiting prevents damage to either the supply or the external apparatus and an overload relay protects against a direct short or heavy overload.

Avo have introduced a new measuring device known as the Avo Digital System which consists of a main display unit and plug-in modules. The first of these to become available will be the MM-110 and with this unit the system functions as an integrating digital multimeter, giving a wide range of voltage, current and resistance readings. An optional AC converter card is available which can be plugged into the multimeter module to provide the same measuring capacities on AC as on DC. This will be followed with a plug-in 20 mc timer/counter and LF signal generator, to provide a comprehensive measuring system.

In addition to their well-known range of communication receivers, **Eddystone** were showing panoramic display units and a transistor version of the "Edometer." This useful instrument functions

as a standard dip oscillator, an absorption or heterodyne wavemeter, a simple modulated signal generator, a modulation monitor and an audio tone source! Frequency coverage is from 380 kc to 115 mc with plug-in coils and the instrument is powered from an internal PP3 cell. An FET transistor functions as the RF oscillator and mixer and a bi-polar type as the audio amplifier and tone generator. Diodes in a voltage-doubling circuit detect the signal across the tuned circuit and the resultant DC is applied to a sensitive meter. As a wavemeter, the audio output is amplified to a comfortable headset level.

The Royal Radar Establishment were showing a novel type of oscillator using a platelet of cadmium sulphide. Amplification of ultra-sonic waves by the motion of electrons occurs and causes the platelet to resonate at a high harmonic of its fundamental frequency. This vibration drives an alternating current through the platelet at a frequency in the VHF/UHF range. A working transmitter using this principle was generating one milliwatt at about 800 mc.

Ernest Turner had on display their 600 Series meters in transparent cases and the new 400 Series which is available in two sizes and is designed to reduce to an absolute minimum the panel space occupied for a given scale length.

A new comprehensive catalogue is now available from **Electroniques** to replace the well-known *Hobbies Manual*. This is simply crammed with useful information on a wide range of components in common use by amateurs. Some idea of its size can be got from the weight, which is 3½ lbs. Cost, including postage, is 16s. 6d.

SASCO and **STC** have also issued new and comprehensive catalogues. The STC issue includes a useful summary of semiconductors. Full data sheets and application notes are available on request.

ARTICLES FOR PUBLICATION

Though at any time we hold more than enough material for several issues of the *Magazine*, we are always in the market for good articles of Amateur Radio interest that could be used immediately—either constructional, technical, descriptive or theoretical. Upwards of £100 is regularly paid each month for the outside contributions used in any issue of **SHORT WAVE MAGAZINE**.

Requirements are that articles should be carefully drafted, typed double-spaced with wide margins, having all circuitry, diagrams and tables of values shown separately, and written to follow our setting convention, e.g., PA, mA, μF , HT, etc., etc., which can be gleaned by looking through the technical matter appearing in any issue of the *Magazine*. The aim of any author expecting to be paid at a fair rate for his work should be to set it out in typescript exactly as he would expect to see it in print.

All material that we can use is paid for, immediately on publication, and anything offered should be addressed to: Editor, **SHORT WAVE MAGAZINE**, BUCKINGHAM, England.

• • • **SWL** • • •

SHORT WAVE LISTENER
FEATURE

POINTS ON RECEIVERS, AND RECEIVING—
MOBILE POSSIBILITIES—KEEPING EQUIPMENT
RECORDS—READERS' NOTES AND NEWS—THE
THE HPX LADDER

By Justin Cooper

SOMETIMES at the start of writing this piece, your S.J.C. agrees with Samuel Johnson that "No man but a blockhead ever wrote, except for money" as he chews his fingernails and searches for inspiration; at other times there is so much to discuss that one is asking, like Job, "Canst thou draw out Leviathan with a hook?"

Just such a situation arises this time, and reader C. P. Davis (*Leicester*), among others, creates it. It will be remembered, no doubt, that last time round, Peter was mentioned as anti-CW; and this time he proves it by entering the CW Table! While it is true that SSB has done a mighty lot to reduce the superiority of CW over Phone, it is also fair to say the gap is far from completely closed, and measurements referred to in an American scientific journal make CW something like 17 dB ahead of Sideband, which in turn is streets ahead of AM. On the other hand, there is the basic slowness of communication by having to spell out each letter in dots and dashes—which is cancelled anyhow by the inability of many Phone operators to avoid "waffle" even in their rubberstamp QSO's.

Receiver Points

Our second thought-provoker, H. Brown (*Galashiels*), writes in after a break of over two years, during which time he has had three changes of QTH, and also changed the rig. He now has an NC-190X receiver, which he feeds with a PR-30X preselector and 132 feet of wire. This Rx has a fault that is not usually reported of the type, in that it appears to suffer from an effect rather akin to IF breakthrough, but which is more noticeable on 21 mc by day, and 7-14 mc at night. Obviously, it is hard to locate faults by remote control, but one suspects that if the preselector is removed the sensitivity will not fall—after all, there should be more than enough front-end gain in the basic receiver—and if the aerial is coupled to the receiver through an ATU which is *not* a *pi*-section, then the difficulty should disappear. The reasoning is that the breakthrough is caused by the Northern BBC transmitter on 1151 kc, and the excessive front-end gain given by the preselector-plus-receiver combination is enough to cause the breakthrough. The object of the ATU is to attenuate the unwanted signal—hence the use of a configuration other than the *pi*, which is a *low*-pass section—and to boost the wanted signal by matching it to the receiver input impedance. And now watch Hammy prove your scribe wrong!

An HRO with a miniaturised front-end, and an indoor aerial, provide the Rev. D. P. Brewster (*Oxford*) with

relief from a noisy junior op. and a change from parochial life; David first came into radio by way of National Service in REME, gave it all up for several years, and returned to the fold with the HRO (which is also used to keep up his French and Arabic on the BC bands). Now, of course, the ticket is being considered, although active work for it must wait till commitments are reduced.

From P. Wilkinson (*Princetown, Devon*) comes in a first list for the Ladder; all were heard on SSB/AM, using a home-brew nine-transistor portable covering 160 to 15 metres, a Joymatch ATU and 40ft. of wire round his room. Peter mentioned in particular the help he has had from G2BSW, G3SCW and G3VUC in his efforts, and hopes to take the R.A.E. next year and work some of the many friends he has made through SWL'ing. His ladder total goes up two, but the other of his three queries—XP1AA—receives the "thumbs-down," as it is not truly an amateur set-up.

It is not often one hears of a station using a T-aerial, with the single-wire feeder tapped on to the centre of a 35ft. top, tuned against earth, but this is the system used with some success by Ian Gildersleeve (*Newton Abbot*) who has it hooked to an RA-1 receiver. The R.A.E. has already been taken, and a TA-33Jr. beam is "in the pipe-line" ready for the great day.

A couple of brief notes, from D. Sapsworth (*East Ham*), and D. Richards (*Welwyn Garden City*), bring their Table entries up to date. By contrast, M. G. Toms (*Ilford*) has a long letter with many points of interest; he has been on two-pin mains from the beginning and was more than a little startled at the effect of putting down a ground, both by way of the increase in signal strength, the potential of the receiver above earth (120 volts!) and, possibly more important, the reduction in TV timebase QRM on Top Band. Mick wonders why ZA call signs are always regarded with suspicion, when other countries are allowing a resumption of amateur activity. Fairly easy to answer, this one, in that there has never been any activity in Albania, and their Govt. has repeatedly stated there is no intention of permitting Amateur Radio activity; in various other countries a suspension of licences has occurred, but this is a vastly different matter from a complete refusal to countenance AT-station activity at all, which is the situation in Albania. Mick has heard ZA1NI, ZA1HI, ZA1AR, and ZA2AB of late, the latter at 9 + 40 on 7 mc, giving LZ1AG as his QSL manager, and finding plenty of takers. At least they are good for a chuckle.

[over

"To Justin Cooper from Justin Time" was the theme of *Geoff Bowden's* letter from *Crawley*—and a very Good Idea it is, at that. Geoff has another bright scheme in mind, which is to amend the scoring in the Table to be a running total of prefixes divided by the number of valves and/or transistors in the receiving set-up. *Cor!*

Always busy is *John Singleton (Hull)* who has been chasing around trying to organise a mortgage in addition to keeping the YL interested, SWL'ing and working all sorts of odd hours. However, the odd hours seem to have had their reflection in the log, as the Ladder entry shows clearly.

Like many others, *K. M. Southgate (Leigh-on-Sea)* took the R.A.E. recently—and like the rest, cursing himself for silly errors in his answers next day! However, it all comes out in the wash; and if the errors were not fundamental they should not affect the result, but if they *were* then more preparation is needed to be able to justify the possession of a call. The standard called for, indeed, is not really high enough in these days of QRO and highly-congested bands.

Another R.A.E. taker is *I. Cooper (Alnwick)* who feels fairly confident, but less so of the GCE examinations which will be upon him by the time we go to print—and so he is nose-down to the grindstone and no HPX'ing at all till the exams are over. Very sensible indeed, when the R.A.E. is hobby material, and GCE is vital to one's earning capacity in later life!

Yet another R.A.E. hopeful is *R. Schofield (Liverpool)*, who makes no comment on his hopes other than to say more time will be available for listening now it is over. It probably means Roy is sitting with his fingers firmly crossed until the results!

A fortnight in ON-land caused a slow-down in the activities of *H. M. Graham (Harefield)*, but things are now back to normal, and the usual entry in the Table is noted. An odd one was HB9MD/Airborne who was a *Colossal* signal on April 7. It transpired he was in a DC8 from New York to Frankfurt, at 37,000 feet over Reading; the operator said he was navigator, off duty; and that there was a full complement of passengers.

Term exams have rather restricted the activities of *R. C. Waterman (East Lothian)*, but Richard has contrived a new aerial tuner using plug-in coils, which has worked quite well. Richard queries IZ6, VEØ, VK9, and 6W6 as prefixes. Of these, the first-named is on Ponziane Is. (QSL via VE3ACD), VEØ is the tenth Canadian District; VK9 covers the ninth Australian district, broadly Papua, New Guinea and Norfolk Island; and 6W6 is Ungood.

P. Scragg (Stockport) spent less time between the headphones than usual, as conditions did not seem to have been too good. The time was far from wasted, as the aerials in the loft were rearranged, to have a more direct run to the receiver, by way of a newly-made hole in the ceiling. Additionally, the dipole for 14 mc, which did not earn its keep anyway, has been removed.

Two letters came in this month from *S. Haseldine (West Bridgford, Notts)* who makes his first entry in the HPX Ladder, collected with the aid of 132 feet of wire at 30ft., coupled to an ATU to a preselector and a R.1475 receiver, injection for SSB being by a Class-D wavemeter at the front-end. Modifications to the 1475 include

the embodiment of a Selectoject in the space formerly occupied by the Guard Channel plug-in, a Q-Multiplier, and a transistorised S-meter. Steve's total for his first claim is for 320, but drops to 319 on account of a "thing" claiming "NA2" as its call, located in the Black Sea. Such is the stuff of piracy!

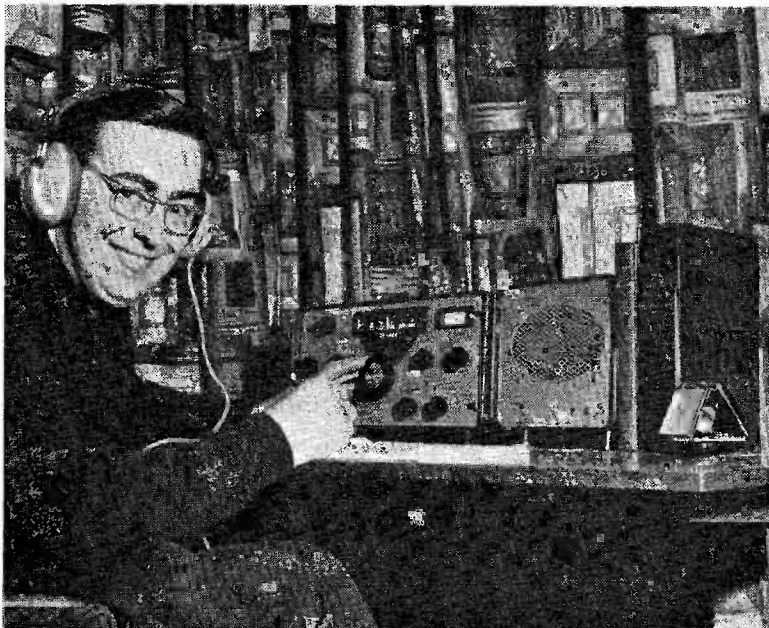
Gardening is the reason given for lack of activity by *M. A. Lount (Leicester)*, who was hoping for rain all the time he was cutting the hedges. SWL Lount is rather worried about the status of the Yemen stations—quite OK, as a reference to the "Overseas Listings" of the *Call Book* will readily show. Not so the 4K2, we fear; he seems to carry a smell of fish around the band with him!

Mobile Operation

This is not a usual topic for SWL's, but rather the licensed types; however, there is much to be said for SWL'ing in the car to while away the hours on a long journey. *I. Bateman (Bradford)* wonders what is needed in the way of suppression—a tall order indeed! Basically, the noise-creating items are the dynamo, the regulator, and the ignition system. Dynamo "D" lead needs by-passing at the dynamo end by a 0.5 μ F (in parallel with a 0.001 μ F for the HF bands) to earth; if this is not enough, a tuned trap may be called upon in addition. A capacitor from the regulator "A" terminal to ground will reduce the regulator hash, its value being about the same as that on the dynamo. As for the ignition, apart from the plug suppressors, the SW terminal on the coil needs by-passing to earth via a capacitor of similar value to the others. The engine may then be retimed and carburation checked, before going on, if it proves necessary, to suppress such things as the petrol gauge. Much depends on the band on which operation is desired; the higher in frequency, certainly up to 144 mc, the more suppression is called for, and of course the aerial system needs much thought and correct feeding if the results are to be at all successful. (A useful article on the subject of Mobile Suppression appeared in the September and November, 1967, issues of SHORT WAVE MAGAZINE.)

A complete change of tack results from the letter this time from *R. Allisett (Guernsey)* who wonders why more amateurs do not go in for transceivers, and so save the cost of a separate receiver and transmitter. The reasons are many and various but in the main spring from the desire for split-frequency working and the cost of commercial and the complexity of home-built transceivers. Many transceiver designs do not provide any facility for operation on other than the receive frequency, and so if either station drifts to any extent, the QSO "walks up and down the band"; where split-frequency facilities are built in, as in the KW-2000 and KW-2000A, then the free-tuning range is only a few kilocycles, and if an attempt is made at cross-band or true split-frequency operation, with the transmit and receive signals well separated, the transceiver needs to be supplemented by an additional piece of gear, as an accessory—and so you end up with more boxes than if you started off with a separate receiver and transmitter! All of which is not to say that the modern transceiver is not indeed a fine and useful piece of apparatus—it is, particularly in the case, so frequent these days, where the

The Northern Area photographic representative for "Short Wave Magazine" is Chris. Cooper, 11 Cyprus Terrace, Garforth, Leeds, Yorkshire. This is his SWL set-up, consisting of a Star SR-600, used with a 16ft. vertical aerial; an inverted-Vee is in hand, to be about 50ft. high at its apex. Over the last few years, Chris (who is a professional photographer) has supplied many of the pictures you may have seen in these pages.



rig lives with the family, and there is no shack in the accepted sense.

More Reader News

A new entry to the Ladder and to this piece is sent in by *R. Walters (Etwell)*, who starts at 368 on HPX, taken with an Eddystone 358X receiver and end-fed wire; a crystal-controlled converter for Ten has just been finished, but Murphy's Law stepped in at that point and a valve in the main receiver gave up the struggle.

Norman and David Henbrey (Northiam) have been building and fitting out a new shack—the house was getting too full of gear!—and this, as well as the attractions of cricket at the weekends, have slowed down progress on R.A.E. somewhat.

A Trio 9R59 is the receiver used by new entrant *S. Jassel (Newcastle)* for his listening; he has it coupled to what he describes as a multi-dipole for the three HF bands, of which his favourites are 14 and 21 mc.

After a year with an RA-1, *Dion Stuart (Caistor)* has added several modifications to mould it closer to the heart's desire, and now has only one fault to find, which is drift on the 14 mc band. Odd, as the several specimens that have been through the writer's hands have all been outstandingly good in this respect, compared with other receivers using tunable-oscillator front-ends, and certainly quite satisfactory for most transmitting purposes.

Thirty years is quite a long time—and there are marked changes in the patterns of behaviour in the DX chase as seen after this lapse of time, says *T. W. Hyder (Southampton)*, who is back on the bands with an HRO, a Joystick, and a long-wire. Changes or no, there seems little doubt that SWL Hyder finds the battle as interesting as ever.

D. Bushell (Cirencester) uses a long-wire and a 14 mc dipole in conjunction with a Heath GR-64 receiver and

an ATU, but of late has been able to try an AR-88 on an "aerial farm," of which he has mainly favoured the 21 mc beam; it all adds up to a first entry to the Table which contains an unusually large proportion of the DX calls.

RTTY is the main grouse from *A. Hydes (Enfield)* who recently found no less than six at one time, sitting between 14150 and 14350 kc, with signals all better than S8; two indeed were really big ones. Alan nonetheless takes his HPX score up to a nice round 600, and presses on towards the Morse Test, which he hopes to button up fairly soon.

Promotion for *B. Gilbert (Aylesbury)* to night duty superintendent (*plus* the normal QRM from wife and small daughter) has reduced the amount of late-night listening Bernard can put in. He queries 8R1S as an "odd fish" but of course this one is quite OK, being the prefix for Guyana.

Up to 640 claimed goes *D. Skidmore (Derby)*, and to 639 in the Table, the difference of one being accounted for by the deletion of XP1AA from his list. The receiver remains as before, but the opportunity has been taken to put the aerial another ten feet up in the air, to 50ft., which has no doubt made quite a difference.

Somehow your scribe slipped up last time out in referring to *C. R. Adams (Manchester)* as having a 19 Set, at which he is a little cross; in fact, the gear is a PCR3, with various modifications, a preselector and an ATU, all of home-spun weave. However, the time for listening has been somewhat severely restricted between CSE and GCE examinations, which follow each other in quick succession.

Keeness is the prevailing impression from *R. A. Gape (Leigh-on-Sea)*, who seems to have come a long way since he has been with us. He has now built the G3BKQ FET converter for 144 mc, featured in the

SHORT WAVE MAGAZINE a few months ago, and can vouch for the improvement in the cross-modulation characteristic from the results when G2JF is beaming on him—the S-meter hits the pin but no cross-mod occurs! Robin is also very keen on aerials and VHF propagation, and adds a very interesting analysis of the reasons for his QTH being good for VHF—a line of reasoning with which your J.C., knowing the spot in question, would agree.

J. Fitzgerald (Gt. Missenden) writes in briefly, just to keep a place in the Table, with his final exams. only a few days away; hence, to get that coveted degree he has to shun YL's, and radio—but we sense a note of rebellion—"not before I've watched the Cup Final, though!"

A new receiver graces the shack of *D. Palmer (Fareham)*, a Denco DCR-19, which came out just after the war and was years ahead of its time in its design, with turret tuning, good circuitry and miniature valves, which has resulted in the old CR-100 being relegated to the LF bands only.

A first entry to the Table on Phone, which will shortly be joined with an entry on CW, comes in from *R. Lewis (Oswestry)* who is finding great interest in the LF end of Eighty and has already collected 183 CW prefixes on that band. A weirdie heard on Forty recently was a "thing" signing PWØ on Sideband—what will the pirates think of next?

From *Eastleigh, K. Plumridge* writes in to say the best time for listening is the morning period from 0900 to 1000 GMT on Fifteen and Twenty; but *H. N. Plumridge* claims his best catch of the month as a W7 Maritime Mobile in Colombo Bay, Ceylon, around nine in the evening.

CR-100, end-fed wire and ATU is the recipe for HPX of *A. Walshe (Elland, Yorks.)* who has it all in a cosy bedroom shack. His claimed 228 goes down to 225, by way of another of those infernal ZA pirates, 4C4 and 6N1—the latter are probably misreadings.

Quite an event! A first entry for the HPX Table from *R. Hyde (Oakham)* is for the CW end—and this is what we like to see, because people who put in entries for this usually end up, when they eventually graduate to a licence, as better CW operators. And, be it noted, better operating techniques, be they Phone or CW, all tend to make for less avoidable QRM.

Talking about HPX, *J. Weiner (Coventry)* found a mix-up, and so sent in a revised entry, but at this end your poor old short-sighted J.C. has quite a job to read some of Jon's list, although it all came out right in the end. But please, may this be used as the excuse to ask for clarity in list sent in—we have so many to check through each month!—and if a prefix is copied on to the list wrongly, for Pete's sake strike it out and rewrite it rather than ink it over till we can't tell what it might be. The more you chaps co-operate in this respect, the more time J.C. gets on the bands himself!

A score of 235 shoots up to 430 for *N. Whiting (Leeds, 17)*, who has now put an RF-24 in front of the 19 Set, and hence arrived on 21 and 28 mc, although, as yet, not on 14. An RF-27 unit has also been used (on loan from G3WSZ) and quite a few stations on Four heard, particularly at the Harewood Rally. Neil's friend, *I. Poole*, from the same district, mentions a rather neat way of hanging up the incoming QSL cards on the wall without sticking pins in them. He mounts them to postcards by means of photo-corners, and then pins the postcard itself to the wall, so the QSL hides the drawing-pin and remains itself undamaged. Rather neat, and a scheme capable of considerable expansion.

Pirates again! *Stewart Foster (Lincoln)* comes back on this one, and reports that Box 88 has disowned "BY2AA," as well as definite information that "5AØZZ" is unlicensed. Pressing on, he goes on to have a good chuckle about the current crop of ZA's and the chances of a genuine one ever being heard in the foreseeable future. Stew queries our ruling on I9RB/4U, which we will term a 4U9 in accordance with the existing rules, rather than a zero as provided for by the recent amendment to the WPX put about by our distinguished contemporary, *CQ Magazine*, which would give him the status of 4UØ. No, sir, we stay with our own rules. Incidentally, while this one has been accepted into all lists so far, there seems to be an element of doubt about the use of the 4U suffix at all by I9RB, according to the IARC.

IZ6 appears as a query in most letters, particularly the one from *B. Geary (Leicester)* who was put off a bit by the QQ7A thing claiming to be from the same place. No, IZ6 is quite OK and was fairly well publicised beforehand along the "usual channels," which tell the DX addicts what is currently on. Brian also wants to know the status and whereabouts of 4K2A and FG9GP. Both, to the best of your J.C.'s knowledge, are among the Ungoods.

Still on the theme of weirdies, one of the factors often forgotten is the presence, quite legitimately, of other services in some of our bands. Many of these have calls which are very similar to the form of the normal radio amateur callsign. Such a one, possibly, is the "AE1QG" and others of like ilk reported on Eighty by *D. J. Reynolds (Dudley)*, which may well be an Army cadet group. David also found an "M5FC" on the same band—about the only sure thing here is that it was not the real McCoy.

That triband beam at the QTH of *D. Rollitt (Navenby)* has been taken down, cleaned up and endowed with a new, low-loss, feeder, plus some attention to the station earth, all of which has done good to the reception. David has been having trouble with the rotation of his beam by the "Armstrong" or "Handraulic" method, using a couple of ropes—but on a windy day he just lets go of the rope and the beam twiddles by itself, at one moment giving ZS and the next aiming at W—variety is the spice of life but J.C. prefers to know which way the

thing is heading without having to guess, or go out to look!

Keeping Records

G. T. Theasby (Keighley) bids his fond farewells as he is now G8BMI and newly-married—so congratulations are due to Geoff on both counts. Incidentally, it may be remembered that back in March your J.C. mildly queried the sensitivity figure as measured by G8BMI of his 19 Set, and ended by remarking that Geoff would come back and shoot him down. And so he did—but it says a lot that G8BMI still had precise details of how the measurement was carried out and with what instruments. So many measurements which later turn out to be of doubtful use often cannot be repeated due to there being no record of the essential data. Your J.C., in his little shack, has always kept a notebook in which all his experiments are written up, indicating how the lash-up was rigged, any cross-checks made with other gear, and the results. Also, notes are made whenever the gear is recalibrated and recorded in the same book, with modifications to test equipment, and so on—so that it is possible to repeat results months later. These notebooks also contain tables of voltages recorded on the various pins of the station equipment, under specified conditions—the slow deterioration of, say, a receiver, as the valves age is most easily checked in this manner—and the notebook is a godsend when things go wrong around the shack!

Husthwaite, York, is the home of A. Wood, who writes in to put it "on the map," with the help of an R.1155, converters for 21/28 mc, and another for Top Band. Alan wonders about U5ARTEK—quite OK, and like RAEM, from Russia.

TV/DX Results

Only one letter on this, from Frank Smales (Pontefract) who is still laid low with bronchitis, but sitting up and taking a little notice; apart from a long list of TV/DX, Frank raises an interesting point which to your scribe's belief has not been noted before, namely the reception of the Swiss TC on Channel E3 two or three days before a major opening covering most of Europe—the odd bit being that the Swiss TV stations are normally the hardest to find. One would suppose this is due to reception by a very indirect path—Sporadic-E, possibly? The log, April 7 to May 9, shows reception of 18 countries and heaven knows how many different European TV stations.

Where to send QSL cards for the Finnish stations, asks S. Walker (Baldock)—answer, to the SRAL QSL Bureau, P.O. Box 10306, Helsinki, 10. Incidentally, SWL Walker complains mildly about QRM from Father when he is wanting to listen on the AR77 and Dad wants to put G3CBW on the air. Rather funny, this, as it seems only a few years ago G3CBW and your scribe were sitting outside the tent on NFD, sunning ourselves, saying this problem would never happen to us—and it has, to both!

Some GM/SWL owes J.C., at the very least, a pint of mild-and-bitter. The handwriting is small, and so familiar that your scribe has been scratching his head till he has a bald patch, trying to identify it, for days, because there is no signature or identification on it.

HPX LADDER

(Starting January 1, 1960)

Qualifying Score: 200

| SWL | PREFIXES | SWL | PREFIXES |
|-------------------------------|----------|--------------------------------|----------|
| PHONE ONLY | | PHONE ONLY | |
| S. Foster (Lincoln) | 976 | S. Haseldine | |
| D. Rollitt (Navenby) | 923 | (West Bridgford) | 319 |
| A. W. Nielsen (Glasgow) | 889 | D. Richards | |
| J. Singleton (Hull) | 839 | (Welwyn Garden City) | 315 |
| K. Southgate (Leigh-on-Sea) | 813 | H. N. Plumridge (Eastleigh) | 311 |
| W. Felton (Lincoln) | 770 | G. W. Brind | |
| C. Squires (Saltash) | 738 | (Kingston-on-Thames) | 308 |
| R. G. Preston (Norwich) | 670 | G. T. Theasby (Keighley) | 302 |
| J. Fitzgerald (Gt. Missenden) | 640 | R. C. Waterman | |
| D. Skidmore (Derby) | 639 | (East Lothian) | 306 |
| G. Bowden (Crawley) | 628 | M. L. Jones | |
| J. Dutton (Ilkeston) | 626 | (Leamington Spa) | 305 |
| A. Hydes (Enfield) | 600 | T. J. Bucknell (St. Albans) | 302 |
| R. T. Jackson (Leigh-on-Sea) | 597 | D. Stuart (Caistor) | 301 |
| N. Hembrey (Northiam) | 596 | D. Robinson | |
| R. Allisett (Guernsey) | 593 | (Birmingham, 26) | 299 |
| C. P. Davis (Leicester) | 587 | J. Weiner (Coventry) | 292 |
| M. A. Lount (Leicester) | 583 | P. Duvoisin (Witham) | 290 |
| W. Moncrieff (Hampton) | 582 | R. Bence (Cardiff) | 285 |
| M. G. Toms (Ilford) | 580 | B. W. Lowe (Worsley) | 282 |
| I. Poole (Leeds) | 574 | H. Symonds (Manchester) | 278 |
| J. P. Scragg (Stockport) | 567 | B. G. Bashford (Worthing) | 276 |
| Mrs. M. Worbey (Dartford) | 533 | D. J. C. Bushell (Cirencester) | 273 |
| D. Sapsworth (East Ham) | 514 | R. E. Barrett (Manchester) | 271 |
| B. Thomas (Castleford) | 499 | S. M. Phillips (Dukinfield) | 270 |
| A. P. Legg (Sutton) | 496 | M. Watson (Williton) | 267 |
| J. Edwards (London, S.E.20) | 490 | J. A. Ennis (Saltash) | 259 |
| K. Plumridge (Eastleigh) | 477 | R. Schofield (Liverpool) | 259 |
| D. Hembrey (Northiam) | 470 | R. Hodge (Gloucester) | 249 |
| W. C. Torode | | R. Lewis (Oswestry) | 232 |
| (London, W.C.1) | 456 | A. Walsh (Elland) | 225 |
| B. Geary (Leicester) | 455 | A. Wood (Husthwaite) | 221 |
| H. M. Graham (Harefield) | 455 | C. R. Adams (Manchester) | 214 |
| C. Claydon (Kinghorn) | 453 | I. Bateman (Bradford) | 214 |
| N. Whiting (Leeds) | 430 | K. M. Duggan | |
| I. Cooper (Alnwick) | 423 | (Huddersfield) | 211 |
| M. Broadway (Selby) | 417 | S. Jassel (Newcastle) | 211 |
| S. Cusworth (Wakefield) | 406 | Rev. D. Brewster (Oxford) | 210 |
| R. Woods (Slough) | 388 | T. W. Hyder (Southampton) | 210 |
| D. Henry (North Berwick) | 379 | D. Palmer (Fareham) | 210 |
| D. L. Hill (Edinburgh) | 378 | P. Wilkinson (Dartmoor) | 209 |
| P. L. Spindler (Ilford) | 376 | | |
| R. Walters (Etwall) | 368 | | |
| J. E. Jenkinson (Oxford) | 360 | | |
| A. Long (Coventry) | 360 | | |
| B. Gilbert (Aylesbury) | 353 | | |
| A. Pyne (Budleigh Salterton) | 352 | | |
| L. Rowland (Birkenhead) | 351 | | |
| I. Gildersleeve | | | |
| (Newton Abbot) | 348 | | |
| J. M. Dunnnett (Singapore) | 326 | | |
| K. Jeeves (Huddersfield) | 322 | | |

(NOTE: Listings include only recent claims. Failure to report for two consecutive issues of "SWL" will entail removal from the Table. Next list, September issue, for which the deadline will be July 19.)

Whoever wrote it, mentions GM-SWL "firsts" and percentage QSL return at 65 per cent, among other things, and seems to have been around since at least 1962.

Aerials and Propagation

R. E. Barrett (Worsley), wants to know why it is that DX stations are heard at, say S9, working G's on the HF bands, but not the G's they are in QSO with, unless the latter are very local. The point here is that the signal radiated can be regarded as being in two parts, one going along the ground and rapidly being attenuated by absorption in objects on the ground, together with the normal effect of spreading—rather like the light from a street lamp, in fact. The other component is fired into the sky, albeit at as low an angle as can be engineered, and goes on into the ionosphere, where it is reflected in the F-layer—or, rather, refracted, as the effect is not

SWL's TO NOTE

Next appearance of this feature is in our September issue, due out on August 30. Closing date for all SWL correspondence is Friday, July 19, addressed "SWL," Short Wave Magazine, Buckingham. Remember also that we are always interested in good photographs of SWL stations (and operators), any that can be used in these columns being paid for on publication—but they must be clear, sharp prints.

so "sudden" as is implied by the word reflection—so that it returns to earth perhaps at ranges of thousands of miles, and is heard. Between the end of the ground-wave and the point where the sky-wave becomes audible is the skip distance, where the signal is not to be heard. For DX, the lowest angle of radiation secures a skip distance of about 2,500 miles maximum, and so signals farther than this are propagated by more than one hop. (A good book on the whole subject of radio wave propagation is *Short Wave Radio and The Ionosphere*, 11s. 9d. post free, from our Publications Dept.)

Problem No. 2 is not so easy: SWL Barrett has 25ft. of wire running from an upstairs bedroom window to the corner of a shed in the garden, and wants to know of a better aerial system. This is a question to tax the wisdom of Solomon! All we can say here is that, in general, one should go for an aerial as high as possible, and as much "in the clear" as may be. Centre-fed systems for a single band are easy to get going, as dipoles for instance, but often one is stuck with end-feeding. If the latter is the case, or if a vertical is tried, it is essential

to use the best possible *earth* system, which means burying radials—easier than it sounds, as the ground can be cut with a spade, the wire dropped in a few inches, the ground tramped flat and the next cut made with the spade to gain the next few inches, so that a radial lies a couple of inches under the ground and no actual turning of the soil is required—as many as possible of these radials, even if they are shorter than the theory suggests. Home-brew verticals and end-fed wires all need an ATU at the point where aerial and earth come to the shack, to match them to coax which is then run to the receiver. It is not normally successful to run an end-fed wire straight on to a bit of coax without an ATU, as the effect of the capacitance is to remove all the signal unless the matching is correct. Of course, the ideal system is a monoband beam on a hundred-foot tower for each band 7 mc to 28 mc, and inverted Vees with the centre at the same height for the LF bands!

R.A.E. Results

Finally, a word to all those who sat the May paper and are now eagerly awaiting the results. Our best wishes and hopes are with you all—and if, when the results come out, you have come unstuck, don't give up, but enrol again at the local Tech. and have another go!

Deadline

That about wraps it up, except to say that in addition to the letters mentioned in the piece, several containing simply Table entries are acknowledged and taken in. For next time, the deadline is **Friday, July 19, latest**, addressed, as always, "SWL," SHORT WAVE MAGAZINE, BUCKINGHAM. Till then, good hunting.

INCREASE IN LICENCE FEES

The G.P.O. announces that with effect from October renewals, the annual £2 amateur licence rate will become £3, and the fee for mobile permits 30s. There is also an increase in the Model Control fee, to be 30s.—but this particular category of licence is valid for five years.

NEW HEATHKIT INSTRUMENTS

We are informed that Daystrom, Ltd. can now offer, from stock, a *de luxe* solid-state volt-ohm Meter, Model IM-16, incorporating seven ohms ranges up to one megohm; eight AC/DC ranges, from 0.5 to 1,500v. full scale; and designed to operate either from internal batteries or AC mains. The other main characteristics of the IM-16 are its high-impedance input (11 meg. on DC ranges), separate function switches and attractive modern styling. Price of the kit, K/IM-16 is £28 8s., plus 6s. 6d. post/packing.

Also in the same category is the new Heathkit Model M-25, which is a volt-ohm-milliamp Test Meter, having somewhat similar ohms-volts coverage as the IM-16, with the addition of 11 current ranges from 15 μ A to 1.5 amps. This is a very fine modern instrument, capable of precision measurements up to laboratory standard. Kit K/IM-15 costs £48 10s., post/packing 7s. 6d. Both instruments can be supplied assembled, at prices on request.—Daystrom, Ltd., Gloucester, England.



"... Must QRT as I'm wanted for lunch ..."

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for August Issue: July 5)

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

ONE makes no apology in a piece devoted to Clubs for returning to the theme of Publicity, and in particular publicity in local newspapers. The thought arises from some excellent examples passed on by the Bury and Rossendale group, published in the *Bury Times* on two successive Saturdays recently—pieces that not only make them known to interested parties but present Amateur Radio activities to the public in a simple and dignified manner, showing amateurs to be sane and responsible members of society. Another one, which the writer himself came across, was in the *Liverpool Echo*, and referred to the new mast which G3PXX was putting up at the end of his garden in terms of helping international relationships by his contacts; one small criticism of this one could be that the cost of the G3PXX rig was mentioned but no comment made on how economically a home-brew station could be set up in contrast. The piece included a good photograph, and mentioned both Liverpool group and the Wirral club, for whom G3PXX is now Hon. Sec.

Most local papers are only too keen for pieces of this kind, particularly if the material is "pre-digested" so as to require a minimum of attention by the paper in getting it to print. This means contacting the editorial staff and getting to know how to present material on the one hand, and on the other presenting material which is of interest to the casual reader of the paper and preferably "boosting" the town in the wider scene—mentioning the fact that amateurs in Bloggstown contact amateurs in Australia or Russia is of more interest to the average reader than details of a lecture on some esoteric topic dear to amateurs or SWL's. Regular bits of this nature will keep the Club in the public eye, as will references to contest activities, all of which make the casual reader who will never be a member of the Club proud of his hometown.

And, changing tack a little, there is also such a thing even in these days as the "Spirit of Amateur Radio" which deserves a boost now and again. Your scribe found it very much in evidence on a recent visit to Yorkshire.

Now—to the reports, once again in area order, and starting with the North of England.

Perhaps the easiest way of finding the Otley lads is to listen for the Club station which appears on the Top Band on Tuesday evenings—a pity that we remembered to note our file address was incorrect but did not obtain the correct one for the Hon. Sec. while there. Pudsey get together on Wednesday evenings at the Game Cock

Hotel, Pudsey Road, Leeds, 13, and a good programme is finalised. For details of it, contact the hon. sec. at the address in the Panel.

What a record! Spen Valley have recently been celebrating their coming-of-age, and in the report it is revealed that Mr. L. A. Metcalfe has been the only hon. treasurer the Club has had throughout its life. A suitable presentation to him was made by G6LD of Emley Moor in his capacity as president.

Midland are just about on the borderline we have arbitrarily selected this time; they get together at the Midland Institute in Birmingham on the third Tuesday in each month unless otherwise notified—and in case there is any Brummie who doesn't know where the Midland Institute is, Margaret Street is the place to look for.

July in Halifax means Northern Heights are in session three times, on July 3, one of the staff of the Baird TV Company in Bradford is coming in to give a talk on Colour TV, but on the 17th there is only a ragchew booked, it being the time of the local holidays. The last meeting of the month is slated for the 31st, when a talk on Satellites will be given. The hon. sec. would be delighted to pass on the details of the group to anyone interested—see Panel.

Quite deliberately, nothing has been arranged for the July evenings at Sutton Coldfield, so as to give the lads a chance to catch up on the Project—it has been somewhat neglected due to the frenzied activity of recent months, which culminated in a display at the Sutton Town Show on June 29. They are to be found in the Clubhouse of Sutton Town Football Club, and the July dates are Mondays 8th and 22nd.

We have already mentioned the Wirral group, and now the gang are mentioned once again, by the 1st Barnston Scout group who have formed a Club, which welcomes Scouts anywhere in the area to its meetings every other Saturday afternoon. The Club is running courses for the relevant Scout badges and the R.A.E., and wishes to place on record the help so willingly given by various Wirral members whenever it has been needed.

Over the water from Wirral is Liverpool, where the lads are pre-occupied with the preparations for the annual Liverpool Trade and Agricultural Show on July 18, 19, and 20. There is to be an Exhibition station, using AM/CW/SSB, signing GB2LS, covering all bands from Top to Ten.

The George Hotel, Bury, July 9, starting at 8 p.m. is briefly the July story for Bury and Rossendale, and it is understood the lecture will be given by G3RSM on

Colour Television. Such formality as a lecture is scorned on the other hand at Mansfield, where they get the selected victim to talk, and on the night sit him down behind a large pint of ale to get on with it; they say it reduces the nervous strain on the speakers.

Electronic Organs are to be discussed at Bradford group's July formal, on July 2 at Bradford Technical College, Great Horton Road, Bradford, 7, the speaker being G3USH. An informal and committee meeting is down for July 16.

UA9MR rather startled the York crowd by dropping in to one of their recent meetings—he was in York with a party of Russian students, and took the chance to look in on the locals, which resulted in a jolly old rag-chew session much enjoyed by all. As a memento of his visit the group presented him with a copy of the G callbook. Incidentally, UA9MR reads SHORT WAVE MAGAZINE—so the York chaps therefore want to take the opportunity to pass on their greetings to him. Turning to the more “domestic” details, the British Legion Club, 61 Micklegate, York, is the place to look out for, on any Thursday evening.

Peterborough are still in full cry after items for their exhibition stand on September 2, the theme of which is to be “The Early Days of Wireless.” Thus for all the other details, we refer you to the hon. sec., vital statistics in the Panel.

Every Friday evening appears to be the form for the Hull crowd, who get together at 592 Hessle Road. There seems to be something of interest pretty well every meeting, as is evidenced by the August programme, which shows a talk on Shack Wiring, Printed Circuits, Single-switch control of the Station, a Quiz, and a talk on a Simple Valve Voltmeter.

Wirral come into the picture on their own account now, and we hear that they meet on the first and third Wednesday in each month at the Scout Hq., Harding House, Park Road West, Cloughton, Birkenhead. July 3 is to be a Members' Surplus Equipment Sale with G2AMV doing the selling, and on July 17 an evening Direction Finding Contest.

On now, to South Shields, who get together at Trinity House Social Centre, Laygate, South Shields on most Friday evenings; July 12 is given over to a talk by G8BIE on Radio and Television Servicing; the previous weekend is set aside for the Mobile Rally. Further on in August, on 9-10-11, there is the South Shields Annual Flower Show, during which they hope to have a display station working.

In contrast to others, Nottingham have to report the loss of no less than sixteen members during the year—six have moved out of the district, five are working away from home and four have gone to University or Tech. All this results in a committee of all-unlicensed members, but one notes that the hon. sec. once held the call G2FUB. The late Secretary takes the opportunity of his last report to us to thank all the chaps who made such efforts to smooth the path for him during the years he was in office—but we would guess they are just as thankful to him for the sterling work he himself did! Meetings are each Tuesday, at the Sherwood Community Centre, Woodthorpe House, Mansfield Road, Nottingham.

A change of name for Fulford—they now call themselves the Fulford (York) A.R.S., as they suspect no one

outside York knows where Fulford is! Nonetheless, they disclaim with proper pride all connection with the rival establishment in the city—and it all means to your scribe that there is a good spirit in the Clubs in the York area, of competition and enthusiasm, which will make them all better, and more active—thus more worth joining.

Rather a bright idea the Leicester lads—and lasses—had for their stand at the “Leisure '68” Exhibition locally; they had a garden-shed with one wall removed to show a typical amateur shack inside, from which they signed GB3LRS. As the show overlapped NFD, the GB call was used and the normal club one for the Field Day event. One could comment that any group with enough strength and enthusiasm to put both events on simultaneously must be pretty good.

Wales and the West

Here Swindon are top of the clip; the AGM having been disposed of during June, July will be occupied by an informal at Hq., Penhill Junior School, Penhill, Swindon, on July 3, and an evening Mobile Rally on July 17 at Barbury Castle, Swindon, for which there will be Top Band talk-in facilities.

Rhyl seem to get together on the second Tuesday in each month; for May the programme was a talk by G5FU, Eric Foulkes, on the early days of commercial radio in the district, which sounds to have been most interesting. June saw a talk on Test Equipment for the Beginner, given by GW3JGA, the chairman of the Club. However, sad though we are to have to say it, there are no details on the July meeting or the venue—so it will be necessary to contact the hon. sec. at the address in the Panel for current information.

Tamar Pegasus is the organ of the Saltash and District crowd, who are at Burraton Toc H Hall on alternate Fridays unless otherwise occupied with an outside event. The present pre-occupation is preparations for their Mobile Rally which is slated for July 28 at Saltash Grammar School.

Another group who are working up to their Mobile Rally is Torbay, who are still getting together on the last Saturday in each month at their Hq. in Bath Lane, rear of 94 Belgrave Road, Torquay. A little out of the ordinary for a radio amateur group was their May lecture, for which the subject was Marine Biology, given by Mr. Barlee of the Royal Naval College, Dartmouth, and illustrated by sonar recordings of the noises made by various denizens of the deep.

And still a third Rally in the West—this time Cornish, who have it on July 21, in addition to all their other activities. July 4 is the next main meeting, at the SWEB Clubroom, Pool, for a talk on TVI by G3VWK, and there are also separate VHF and SSB sections, who get together at the Barley Sheaf in Truro.

Chippenham have been having fun with their mini-D/F affairs, a recent one of which resulted in the hidden transmitter being unearthed by the Law, after the latter had received reports that “there be some queer goings-on in the Old Quarry!” Another one is due on July 9, and a lecture on Topical Techniques by G3UFW comes up on July 30. For all the other details, it is necessary to refer to the Secretary, as in the Panel.

The London Area

Here the Harrow crowd come in to bat first; a get-together each Friday is the form, with something doing each week to interest everyone, from lectures and junk sales to practical work and outside activities. However, G3JVM forgot to make a note of the venue in the last issue of *QZZ* and so we have to refer you to him at the address in the Panel.

Surrey recently cleared the AGM hurdle, and a constructional contest at the Blue Anchor, South Croydon. For detail of the current month and its doings, contact the Secretary.

At Crystal Palace the change of venue to Emmanuel Church Hall by Dulwich Library has paid off in terms of new members—an unexpected bonus from the enforced move from the old place. July 20, starting at 8 p.m., there is to be an inquest on Field Day and a discussion on Aerials, by G30OU.

A rather good idea comes from Echelford this time, by way of a members' activity contest, set to run from April 1 to March 31 next year, covering all bands 1.8 to 432 mc, allotting points for every new prefix, county, country, zone, each new station worked on VHF, and each new club member, nicely balanced to give all sorts of operators from G8/3's to the Top Band-only types an equal chance. A prize of a tankard will go to the winning transmitting member and the best SWL. For all the other details on this very fine and active group, contact the hon. sec.—see Panel.

Prospects for the 1969 NFD event—which will mean looking at the current year's effort—will form the subject-matter at Acton, Brentford and Chiswick on July 16 at 66 High Road, Chiswick, London, W.4.

Over at Southgate they get together at Parkwood Girls School, Bounds Green Road, just behind Wood Green Town Hall, on the second Thursday in each month; and they put a newsletter out which your scribe always enjoys reading as he is an old member of this group. Much has changed since he was a member, but the keenness and enthusiasm remain the same.

Civil Service have a session on July 16, when as many members as possible are asked to turn up—for an informal discussion on the one hand and active work on the control console for the Club station on the other. As the cable run from the shack to "daylight" is no less than 80 yards, they would like the help of an aerial expert—as daylight is at ground level, and they still have to get up in the clear with actual skywires, when the nearby buildings are of 22 storeys!

The SARA group of Purley, Wimbledon and South London Mobile seem to be going like the proverbial bomb; Purley recently had an AGM at which a rise in membership to 110 was reported—a 20% rise over the year. In view of the AGM, the July programme is in the melting-pot, but the dates are July 5 and 19, at the Railwaymen's Hall, 58 Whytecliffe Road, Purley. Wimbledon and South London Mobile are combined now, and are to be found at the St. John Ambulance Hall, 124 Kingston Road, South Wimbledon, on the second and last Friday in each month; on July 12 G3PDB tells all about RTTY.

Silverthorn have their Hq. in a "stately home" and hence have plenty of room for aerials—lucky chaps! Details of the meetings of this well-supported group can be obtained from the hon. sec.—see Panel.



At the Thanet Radio Society's annual dinner recently at Ramsgate, G2IC was the recipient of their transmitting trophy—as he happens also to be Thanet's president, the presentation was made by his wife, Mrs. Chapman. G2IC is now putting out a masterly signal on two-metre SSB.

The National Groups

Here we lump in all those who have no local boundaries, such as RAIBC, who do so much for the section of our community who are disabled. Apart from the contact with others, one of the objects is to see that every member has a receiver and an aerial system; with an average expenditure at £15 per member they still manage to break even. Obviously, those who are invalid or blind should join, but it is possibly less obvious that for every member there has to be a supporter if the work is to be got through expeditiously. Then there are such jobs to be done as carting receivers from one end of the country to the other on occasion, servicing, and so on. There is a minimum of four bob a year for the magazine *Radial*, but of course no one will object if you put in more as a donation!

The Ex-G Club caters for all those born in the U.K. and now living abroad; there are regular nets by means of which they keep in touch, and to which G stations are invited to call in; and of course there is the *Ex-G Bulletin*. For all details, the U.K. hon. sec., G2FUX, at the address in the Panel, is the chap to ask.

Royal Navy men, past and present, make up the membership of RNARS over the world. The magazine they put out shows various activities, such as the Mobile Rally, certificates and code-practice runs, plus QSL cards at very reasonable rates. The *May News Sheet* has a rather amusing typing error in it when it heads a paragraph about G6XJ with the words "Retirement of a fiend." It is to be hoped he has a good sense of humour!

South of England

Top of the clip here is Harlow, who notify us the change of Secretary indicated in the Panel. Meetings are held on Tuesday evenings, Thursdays and a junior section on Friday evenings, at Mark Hall Barn, Harlow, where there is a great big sign outside to make the place easy to find. On the last Tuesday in each month there is

a tape lecture.

Medway are busily constructing D/F receivers for use in their outdoor summer activities whenever the weather is fine. For details of the indoor goings-on, contact the hon. sec.

Not far away is **Bishops Stortford**, where the British Legion Club is invaded by the locals on the third Monday in each month; for July the lecture will be on the home-construction of Printed Circuits, to be given by G8BBO. The British Legion Club is located at the top of Windhill, turning up the hill from the traffic-lights at the centre of the town almost to the point where the road forks. Park on the left-hand side of the road or immediately outside the British Legion building, and look for them in the front room upstairs—or if you are early, which implies between seven-thirty and eight, look in the bar downstairs, from whence the members are prised sharp at starting-time!

North Kent have recently had a very lively AGM, and continue to get together twice a month at the Congregational Church Hall, adjacent to the Clock Tower, Bexleyheath, on the second and fourth Thursdays.

After a short period of silence it is nice to hear again from **Worthing**, who are to be found every Tuesday

evening at the Rose Wilmot Youth Centre, Littlehampton Road; details of the programme are not given, but we understand that in addition to the other doings, there is a short session of Morse practice to start the evening.

On to **Maidenhead**, where the lads have decided not to have a formal programme for July as so many are on holiday, but instead to put the Club call on the 144 mc band and generally to catch up on the ragchewing. They are "at home" to visitors, of course, for all their meetings, which take place on the first Monday and third Tuesday each month.

A pleasant chatty letter from **Hereford** points out that the group has now worked its way through its first year of existence and is still expanding, which seems to have surprised a lot of the locals no end. The new Hq., at Trinity Hall, has proved to be a vast improvement over the other place, and it is here they may be found on July 5. Again this is informal as quite a few of the lads will be on holiday.

An informal on July 10, for details of which the hon. sec. should be contacted, and a formal on July 24 at Trinity Congregational Church Hall, Ifield, Crawley, is the programme for the **Crawley** group; at the formal meeting G3BPM is to talk about Transistor VFO's—

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 1ST BARNSTON SCOUTS: J. Jones, G8AZT, 88 Barnsdale Avenue, Thingwall, Heswall, Wirral, Cheshire.



The chairman of the Norfolk Amateur Radio Club receiving the Bristol Trophy from some of the members of the winning team. Left to right: SWL Cooke, G3LDI, G3PTB, G3IOR and G3VYG. The Club is one of the most active of the East Anglian groups and—sustained by the enthusiasm of G3IOR, in particular—has made very good progress in recent years.

a subject which should be of very great interest to all those who have struggled to make such contraptions produce the desired T9 note!

July 4 is the date for the formal at Cray Valley, at the Congregational Church Hall Court Road, New Eltham, when they will listen to the tape lecture by the late Captain P. P. Eckersley on "Radio over the Years." This is one of the best of the tape lectures, and puts over the story of the early days with humour and from a standpoint of inside knowledge—"P.P." was the first Chief Engineer of the BBC. This is followed by the usual informal at All Saints Church Hall, Bereta Road, New Eltham.

Since we made the dividing-line between North and South a line drawn through Birmingham, Coventry fall in the South. They are now safely in new headquarters at the City of Coventry Boy Scout Hq., 121 St. Nicholas Street, where they get together each Friday evening. July 5 is set aside for a mid-summer Dinner, and July 19 sees a slide show which will recall CARS activities to the lads. The other two evenings, July 12 and 26, are set aside for exercising the Club KW-2000.

The set programme is rather in abeyance at Mid-Warwickshire, at least until the end of August, and in the meantime they will be at Hq. in Hamilton Terrace, Leamington Spa. In August—August 17 to be precise—they are putting on a station at a garden party being organised in aid of the Coventry and District Spastics Society, and they would like to arrange skeds with any other groups of handicapped people on Eighty to Two Metres. Skeds may be arranged through the hon. sec.—see Panel.

Now to Mid-Sussex, where the July meetings are down

for the first Thursday and the third Wednesday in each month, at Marle Place Further Education Centre, Leylands Road, Burgess Hill. However, it should be noted that there are *no meetings in August*. The current copy of the *Newsletter* contains a most comic piece on the difficulties experienced with his new rig by the chairman, and particularly its remarkable ability to work TV sets.

The first Wednesday in each month is the date, and the venue the George and Dragon in Cromwell Road, Redhill, for the Reigate chaps. The secretary hints that he would like us to point out that members who have failed to receive their copy of *Feedback* have probably failed to complete the feedback path, which goes through the hon. treasurer's books in exchange for a subscription!

St. Paul's Hall, Whitley Wood, 8.0 p.m. on July 2, with a practical demonstration of the art of receiver alignment, starts the Reading group's activities for the month. July 16 is a constructional evening, and July 30 is given over to Coils, by way of theory, construction, and calculation. All are welcomed at these affairs.

Rugby have very rapidly followed up their first meeting by finalising on a regular Hq., in Drury Lane, adjacent to the main Rugby shopping area, where three rooms are available to them. They already have gear fo

SECRETARIES—PSE NOTE!

The correct address for this feature is: "Club Secretary," Short Wave Magazine, Buckingham. Closing dates for the next few months are, first post Fridays: July 5, August 9 and September 6, for the issues dated August, September and October respectively.

Phil Harman, G3WXO, winner this year of the junior section of the Mid-Herts A.R.S. constructor competition—his entry being a beautifully finished stand-by station for Top Band, with separate Rx and Tx. Another winner in this competition was G3AAZ, for his QRO linear amplifier. The judges were G2NR and G3GGK.



a Club station and hope to have the call G3BXF back in business soon—just as soon as the paint-pot operators have finished and the place made nice. All we can add to that is “More power to their elbow!”

The dates for Fareham in July are easy to recall! July 7-14-21-28. The “forty-metre” date is set aside for another evening of experimenting with aerial rigs, and the following week for a talk and demonstration of the SWM Mobile transmitter/receiver, to be given by G3VOR. July 21 sees a general discussion on business matters and the further programme, while the 28th is given over to an evening of CW, for which event you bring your own audio oscillator.

Norfolk have a new home, at the Brickmakers' Arms public house where they are to be found every Monday. The second Monday in each month is an informal in the bar, as on that evening the room is in use by another organisation, but nevertheless the Club station is installed, apart from the aerials. July 1 should be interesting—a debate on the subject “Is VHF worth while?” and on the 8th, there is the informal. On 15th, G3IOR talks about Resistors, while the 22nd is to be a Mystery Night—a mystery even to the hon. sec.! The month is rounded off by an inquest into NFD.

From Shefford we hear that all is well with the group, who have Hq. at the Church Hall in Amphill Road where the meetings are weekly. July 4 is an Open Evening and Surplus Sale, to which visitors (with cash) are cordially invited. On July 11 there is a visit to Sandye Place, the QTH of G3TDW, while July 18 is a beginners' evening. Finally, July 25 sees them hard at work planning the programme.

A Late Flash

Just as this went down we heard from the hon. sec. of Northern Heights, G3MDW, that the book which they sent to W1BB, containing signatures of many keen Top Band types, had been taken by the latter to the ARRL Convention where Stew was to give a talk on the lines of the very popular tape lecture which has been going the rounds of the Clubs. This one is still in circulation, and contact should be made with G3MDW for it—but we also hear that in his letter of thanks, W1BB says he is preparing another one, which it is hoped will be ready about the end of September. Bookings for this should be passed to G3MDW—see Panel—and if the last was anything to go by, the new one should be well worth hearing. All we can add is that W1BB deserves a medal for this sort of thing which does so much to keep the Top Band flag flying; and G3MDW another for doing all the work of keeping it in circulation in addition to his duties as Secretary of Northern Heights.

Deadline

And that, my masters, is the lot for this month. It remains only to say we believe a few reports may have gone astray in the mail, and hope therefore that we have got all the regulars in. The deadline for next month is first post Friday, July 5, addressed to “Club Secretary,” SHORT WAVE MAGAZINE, BUCKINGHAM. In the meantime, take care, and every success with the Club.

Editorial Note: Reports, which arrived too late to cover in this feature, were also received from the following Clubs: Verulam, Dunstable Downs, Ardeer (Stevens-ton), Guildford, WAMRAC and Sutton & Cheam.

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.

GM3VQC, D. R. Thomson, Shawsburn House, Ayr Road, Larkhall, Lanarkshire.

G3WPI, H. P. Shelvey, 124 The Green, Welling, Kent. (Tel. 01-303 6681.)

G3XDC, H. E. Olley, M.B.E., 124 Warrington Road, Paddock Wood, Tonbridge, Kent. (Tel. Paddock Wood 677.)

GW3XEJ, Cardiff Radio Contest Club, c/o R. N. Graham, Little Began, Began Road, St. Mellons, Cardiff.

G3XIW, Mrs. K. M. Priestley, 43 Raymond Road, Langley, Slough, Bucks.

G3XJT, G. B. Widnall, 5 Heslington Croft, Fulford, York.

G3XKW, K. R. Hamilton-Wedgwood, 17 Linley Court, Thicket Road, Sutton, Surrey. (Tel. 01-643 2725.)

G3XKZ, C. W. Edwards, 73 All Saints Road, Warwick, Warks. (Tel. Warwick 43721.)

G3XLH, Fulford and District Amateur Radio Society, Social Hall, School Lane, Fulford, York.

G3XLL, J. L. Lockwood, 17 Stephen Road, Kesgrave, Ipswich, Suffolk. (Tel. Kesgrave 4113.)

G3XME, C. W. Wright, 17 Lansdown View, Kingswood, Bristol. (Tel. Bristol 671002.)

G3XMG, M. B. Graham, 14 Albert Road, Waterloo, Liverpool, 22.

G3XMH, P. J. Brumfitt, Home-Port, Northgate, Beccles, Suffolk.

G3XMI, M. J. Prior, 153 Bordesley Green, Birmingham, 9.

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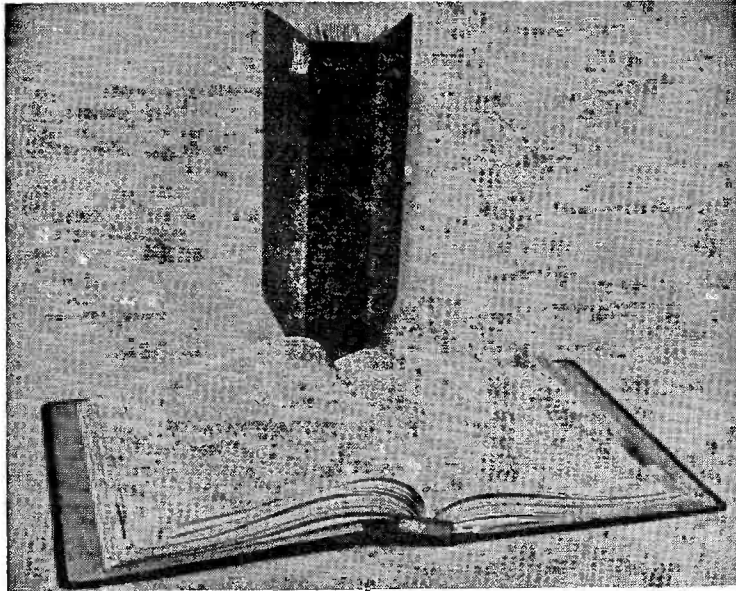
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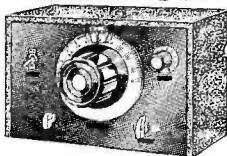
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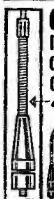
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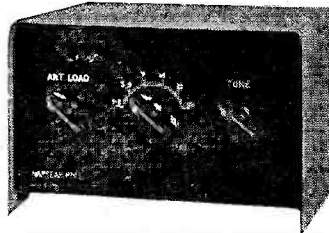
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SMALL ADVERTISEMENTS, READERS—continued**SALE:** Lafayette HE-30 receiver, £24 or near offer. Denco coil turret, 50s. Three-gang condenser pack, 15s. — Ling, 10 Chaffinch Close, Crawley (20324), Sussex.**WE DO NOT** give space in these columns away — but we do guarantee the largest and most effective coverage of the U.K. radio amateur interest! Basic rate is but 3d. a word, minimum charge 5s. (allowing 20 words, to include QTH). Add 25% for bold-face appearance, and 1s. 6d. for a Box No. — Small Advertisement Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.**SALE:** Minimitter MR.44 receiver, Mk. II, double-conversion, amateur band, in excellent condition, £30, prefer buyer collects. WANTED: FT-241A xtal for Ch. 331.—Dillon, G3WCD, 140 Mount Road, Southdown, Bath, Somerset.**WOULD** Anybody Like to buy the following valves, removed from TV receivers, all at 3s. 6d. per dozen: PL81, PY82, PL82, EF91, ECL80, 6L18, 10F1, PL83, PCF80, PCC84, PCL83, 6AL6, 20D1, EF80, 20F2, EB41, EF50, 6F1, 20L1. Post/packing 2s. per doz.—Simpson, G3NJQ, 50 Vicarage Road, Norwich, Norfolk.**SELLING:** National HRO, with nine coil packs, PSU and speaker, in good condition, £18 or near offer. Also test equipment, s.a.e. enquiries.—Kerry, 47 Cottenham Road, London, E.17.**FOR SALE:** Woden UM2 mod. xformer, 20s. Smoothing chokes, 5s. 807's, 4s. each. Miniature valves, 1s. Microphones: BM3, 15s.; DM2 with stand, 50s. Tape recorder, £12. Mains xformer, 500-0-500v. 200 mA, 5-0 to 6-3v., also many good items going cheaply, and radio magazines free. Write or call. — Breeze, G3JAB, 38 Stafford Road, Newport, Shropshire.**MANUALS:** Original with circuits, etc., for R.216, £5; Marconi 52 Set, 10s.; R.220, 30s.; R.1132A and R.1431, 30s.; PSU Type 3, 10s.; VHF Aerial Type 3, 5s.; VHF Aerials Type 2A and 10, 5s.; Crystal Monitor Type 4, 10s.; R.208, 20s.; UHF Test Set Type 28, 10s.; VHF items, all at 20s., R.3039A/E, R.3084, R.3131, R.3132/B, R.3066. Rx 26, R.3102A, Indicator Type 20-48A, Modulator Type 20, Tx T.3065/A/B, VHF Crystal Calibrator Type 18, 10s. Indicator Units Type 6, A/B/C, 10s. American Loran, Rx R9/APN-4 and Indicator ID-6/APN, 40s. VHF Communication System, 25s. VHF Test Set Type 102, 25s. Complete manual for Gee master and slave Tx/Rx units, 50s. Circuit diagrams: Type 31 (BC-1000), 5s.; VHF Special Mk. II, 5s.; R.1475 (Type 88) Communications Rx, 10s. Please include s.a.e. with enquiries.—Hayward, Sunnyfields, Light-house Road, St. Margaret's Bay, Nr. Dover, Kent.**FOR SALE:** In immaculate condition, Lafayette Starflite Tx and VFO, with four 7 mc crystals and spare modulator valve, price £30 plus carriage (delivered free to ferry terminals on mainland). Codar A.T.5, plus PSU, immaculate, £20 plus carriage (free delivery to ferry terminals).—Berden, G3RND, Bridgecourt Farmhouse, Godshill (606), Isle of Wight.**SELLING:** Heathkit SB-101 transceiver, brand new. Towers: 30ft. self-supporting, £30; 40ft., £40; and 70ft., £70. These are sectional steel, galvanised, and additional sections are available up to 160ft.—Perkins, G3NMH, 24 Hook Street, Hook, Swindon, Wilts.**FOR SALE:** Lafayette KT-340 receiver, coverage 550 kc to 30 mc, excellent condition and working order, £18 or near offer. Lafayette KT-320 (similar to KT-340), semi-built but complete with all parts, £12 or offer. Also Lafayette HA-500 amateur-band receiver, coverage 6 to 80 metres, perfect condition, £36 or near. No reasonable offer refused. Buyers collect, please. (Herts.). — Box No. 4665, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS, READERS—continued

SELL: National HRO-5T (table model), octal valves, in new condition, with four HRO band-spread coil packs for 10-20-40-80m., PSU and 33-page manual, £25. CDR rotator (AR22), complete with control box and 60ft. cable, £16. K.W. Balun, 20s. Admiralty-type dummy load, 80-ohm, 10s. Eddy-stone bug key, 60s. New HRO, amateur ill. S-meter, 35s. Hallicrafters 35ft. by 2in. diameter steel mast, in seven sections, complete with eight nylon root-proof guys and hinged twin-socket base (for easy erection); base calibrated in degrees to assist alignment of beam; mast can be bolted to concrete base; price £15. Two 100ft. coils quarter-inch wire rope for making guys, 15s. per roll. Buyer collects or carriage extra.—Stone, G3JFC, 39 Purrett Road, Plumstead, London, S.E.18.

FOR SALE: K.W. Vanguard Tx, coverage 10 to 160m., factory built in hooded-style cabinet, a bargain at £40 or near offer. Microphone and LPF included. Prefer buyer collects.—Gillies, G3VWM, 15 Hart Road, Byfleet, Weybridge, Surrey.

MANUALS: B.40, BC-312, Collins, Corsor, 38s. each. AR88LF, AR88D, 75A, P.104, 20s. each. AR77E, 62H, R.1132, SX-24, S.20, S.36, 12s. 6d. each. SX-28, S.27C, 25s. each. R.216, R.206, 19 Set Tx/Rx, 16s. R.107, R.209, R.208, 358X, S.640, HRO, NC-100, 12s. 6d. each. All plus postage, pse.—Brooks, 5 Farrant House, Winstanley Road, London, S.W.11.

SALE: KW-201 receiver, with xtal calibrator, virtually unused and in mint condition, cost £111 six months ago, price £85.—Bence, 12 Ladysmith Road, Penylan, Cardiff CF2-5DT, South Wales. (Tel.: Cardiff 34700, 7.0 to 8.0 p.m.).

SELLING: Eddystone 680X receiver, £68. T.W. Top-mobile, at £15. 3F1F whip with 160m. coil, 70s. Dow-Key relay, Type DK-60, 50 ohms, activation 6v. DC, £4. **WANTED:** T.W. Twomobile, Gonsett two-metre Communicator, or what-have-you; consider part exchange.—Perrin, 30 Franchise Street, Kidderminster (61752), Worcs.

Heathkit Mobile Rx/Tx and PSU, Commanche and Cheyenne units, complete with mobile aerial base mounting and whip lengths, all in excellent condition. Best over £45 secures.—Ring White, G3HCU, Abinger 215 (Surrey).

OFFERING Up to £20 for an Eddystone S.640; £40 for S.750; £45 for 840; £70 for 680X or 888A; £85 for 940—against new Eddystone receivers. Pse. send for quote.—Snowden, 4 Market Place, Pickering, Yorkshire.

STOVE-ENAMEL: Let us spray-paint your new (or old) cabinets, in hammer, polychromatic, matt or plain finish to choice, stove enamelled. Cost depends on condition, e.g., a CR-100 in fair condition, 50s. plus carriage.—Bourne, G3VYD, QTHR.

TRANSMITTER, Receiver, Mast and Aerial Equipment for sale, or what-have-you. Wanted: KW-1000 Linear.—Levy, 174 Holders Hill Road, London, N.W.7. (Tel.: 01-346 4468).

ACCOMMODATION Required: G3TDL seeks accommodation in area of Tadworth, Surrey, for six weeks from August 12. Please send full details.—Davis, 91 Hanbury Road, Dorrridge, Solihull, Warks.

WANTED: Labgear Antenna Switch. For Sale: Loaded Z-match tuner; SWR bridge with dummy load; two relay PSUs; Taylor multimeter; CW/Phone monitor. Price £12 or near offer. —North, G8IO, Grafton Manor, Bromsgrove (2151), Worcs.

SALE: Stereo hi-fi cabinet, 45in. x 33in. x 17in., space for turn-table, tuner-amplifier, two speakers, record storage. Price £5.—Butcher, G3LAS, 7 Barclay Close, Hertford Heath, Herts.

SALE: Heathkit RA-1 receiver, with crystal calibrator; QPM-16 Q-multiplier; matching speaker; preselector/aerial tuning unit. All at £28.—Dawes, 94 Snape Hill Lane, Dronfield, Sheffield S18-6GP, Yorkshire.

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SMALL ADVERTISEMENTS, READERS—continued

FOR SALE: Eddystone S.740, in good condition, with instruction manual, £15 or near offer, Codar PR-30X preselector, £4. Admiralty B.40 receiver, brand new, with instruction manual, £30.—Davidson, 19 Cavendish Avenue, Finchley, London, N.3. (Tel.: 01-346 4353).

WANTED: Grundig TK-5 or Grundig TK-8 tape recorder; good working order essential. —Watts, 62 Belmore Road, Thorpe, Norwich, Norfolk. NOR.72.T.

SALE: Eddystone 840C, three months old, as new and still under guarantee, owner buying transceiver, price £48 or near. — Ring Culling, 01-857 2593 (London).

FOR SALE: Halson 3FIF whip 80/160m. coils, £4 10s. Copies "Short Wave Magazine," Vol. XXV, Nos. 6, 8, 9, 10, 12 and RSGB "Bulletin," Vol. 43, Nos. 3, 7, 8, 9, 10—all at 1s. 9d. each. Home-built cascade two-metre converter completed but untested, 30s. carriage paid. (East Anglia).—Box No. 4666, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: CR-100, in good condition, £14. Marconi Mercury marine Rx, perfect, £20. Unused 100-watt 5-channel transmitter with AC/PSU, offers? Valves and other gear available free if collected.—Cain, G3DVF, 18 Oaky Balks, Alnwick, Northumberland.

DISPOSAL: Factory built HW-32A, few hours' use only; also HW-12 professionally modified to HW-12A specification. Both in immaculate as-new condition, price £50 each or near offer (owner purchasing HW-100). Heath microphone with p-t-t, 50s.—Osborne, G4OV, Pucks Knoll, Marshwood, Nr. Bridport, Dorset. (Tel.: Hawkchurch 392).

FOR SALE: Marconi C.52 receiver, coverage 1.75 to 16 mc in three bands; good condition and in working order, price £10 or offer. Also rotary converter, 12v. DC to 250v. DC, 20s. or near offer. Buyers collect. — Harding, 12 Assisi Road, Pauls Dene, Salisbury, Wilts.

SELLING: Eddystone EC-10 receiver, condition as new, £35, buyer collects. (London). — Box No. 4667, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR Sale: In very good condition, KW-500 linear amplifier, snip at £40 only. — Powell, G3OQU, QTHR, or ring Kinver (Staffs.) 2642.

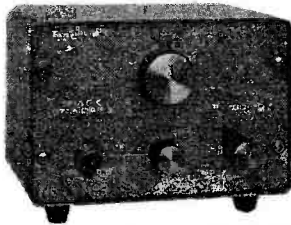
SELLING: As new, Sommerkamp FR-100B receiver, includes 160m. coverage, in spotless condition, little used, price £90. Pair 50v. 50 c/s Bendix 3in. Selsyns, 40s. Geared reversible motor, 240v. AC, with chain and split gear wheel for 2in. pole, 60s. Beam indicator with potentiometer, 20s. Prefer buyers collect.—Newey, 23 Lea-House Road, Oldbury, Warley, Worcs.

AUGUST issue appears July 26. Single-copy orders, 4s. post free, to reach us July 24 to ensure despatch on the 25th, for delivery on publication day (in the U.K.).—Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Heathkit RG-1 receiver, in good condition. Also T.W. two-metre converter. Straight exchange my RA-1 for your RG-1.—Gorrill, G8BOV, 30 Ashburnham Road, Furnace Green, Crawley, Sussex.

SALE: Lafayette HA-500, £39 or near offer. Eddystone S.640, £6. Avo Signal Generator, coverage 100 kc to 80 mc, £7. FET two-metre converter, IF 27.9-29.9 mc, less cabinet, 60s. Printset 1-watt two-metre Tx, in cabinet with PSU and speaker, £4. All at 10s. each: Crystal microphone with switch, 6146, 100 kc crystal, S-meter 1 mA, Taylor 0-1 mA meter, 4in. x 4½in. FT-243 crystals, at 3s. each: 6800, 7125, 7550, 7850 and 8625 kc; Type 10X, 5300 kc, 4s. Also 34 useful valves, for 20s. the lot. Collect or carriage extra.—Case, G8BJQ, 42 Squires Avenue, Widnes, Lancs.

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WANTED: Mobile Rx for 160m.; also crystals Type FT-243 on 5-333 mc and 7-833 mc. For Sale: R.C.A. Signal Generator, 100 kc to 30 mc, with internal 100 kc xtal oscillator, £5 or near offer.—Baldock, 19 Theydon Avenue, Woburn Sands, Bletchley, Bucks.

WANTED: Good VHF receiver, covering 30 to 180 mc or thereabouts. Pse. write with full details.—Ashworth, 6 Ventnor Street, Rochdale, Lancs.

FOR SALE: AR88 Rx, in excellent condition, price £35, will deliver to 50 miles. Also BC-221 at £20, and CT.52 Oscilloscope, £18. — Lord, G3PHN, QTHR. (Tel.: Swadlincote 7537).

SELLING: Eddystone 940 receiver, with speaker, purchased January '68 and in as-new condition, price £90, owner emigrating. Also Hallicrafters Model HA-18A Morse code oscillator, unused, boxed and as new, price 60s.—Box No. 4664, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: K.W. Gelooso converter, price £9, plus carriage. — Taylor, GM3UNJ, 23 Haughgate Terrace, Leven, Fife, Scotland.

WANTED: Circuitry or manual for TCS receiver, your price paid. Also good HF-bands converter.—Handy, 105 Humber Avenue, Coventry, Warks.

SALE: KW-77 receiver, in good condition, price £65.—Bottomley, G3TQQ, 9 Brant Avenue, Illingworth, Halifax, Yorkshire. (Ring Halifax 44393 after 5.30 p.m.).

FOR SALE: R.107 Rx, needs realignment, with manual, price £7 10s., buyer collects. Send s.a.e. for details if interested. — Bunyan, 20 Gayhurst Drive, Sittingbourne, Kent.

WANTED: Hallicrafters SX-100, or R.216. For SALE: Gelooso 209R, mint condition, with handbook, £36. AR77E receiver, £15. Tx/Rx TR.1986, covers 120 to 150 mc, £5. Tx/Rx BC-645A, 40s. HRO; handbook, nine coil packs, plus set UX valves, £8. AM/FM radiogram chassis, with circuit but less valves, 35s. R.3673 Rx, 20 to 90 mc, RF unit 6337, 20 to 90 mc, ten channels, tunable, 40s. 'Scope, needs attention, 40s. Tuning Unit BC-306A, 20s. Tuning Unit TU5B, 30s. Collect or carriage extra, please.—Earnshaw, 104 Hunter Street, Middleton, Manchester. (Tel.: 061-643 5272).

SALE: Wavemeter Class-D No. 1, heterodyne frequency meter, covering 1.9 to 8.0 mc, and higher; converted to AC mains operation, complete with manual, £4 10s. (Hants.).—Box No. 4668, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

OFFERING: Hallicrafters VHF receiver S.27 and S.36A, coverage 27 to 143 mc, both in very good condition. Inspection and offers invited.—Jesson, 181 Kings Acre Road, Hereford. (Ring 3237, evenings).

WANTED: Labgear LG.50 Tx, must be in excellent condition, and with handbook or circuit. For SALE: Heathkit RA-1 receiver, in excellent as-new condition, offers? Will collect/deliver to reasonable distance.—Critchley, G3UTK, 63 Rachael Gardens, Park Hill, Wednesbury, Staffs.

OFFERING: As-new KW-2000A, with AC/PSU, 18 months old, checked by K.W. Electronics January this year. Reasonable offers, pse. (Going VHF).—Foster, G3NRU, QTHR.

SALE: Lafayette HA-350 receiver, as new, with xtal calibrator and speaker, at £50, or Exchange for two-meter Communicator in good condition. Also available HRO PSU 10s., and boom headset xtal microphone, 3s. — Pawley, G8AWV, Sumatra Road, West Hampstead, London, N.W.6.

FOR SALE: Marconi Rx CR-150/2, sensitive 12-valve receiver, coverage 1.5 to 22.0 mc, with xtal calibrator, built in mains PSU, in perfect condition, price £32. (Surrey). — Box No. 4669, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1. (Or ring Duddy, 01-330 5857).

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| Swan 350 | SSB transceiver, 80-10 metres | 216 | 0 | 0 |
| Swan 230-XC | power supply (to suit 500 or 350) | 49 | 0 | 0 |
| Swan 410 | VFO and adapter | 61 | 15 | 0 |

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| Hallicrafters Equipment: | | £ | s. | d. |
| SX-130 | Communications receiver | 86 | 15 | 0 |
| SX-122 | Communications receiver | 148 | 5 | 0 |
| SX-146 | SSB receiver, 80-10 metres | 137 | 5 | 0 |
| HT-46 | SSB transmitter, 80-10 metres | 192 | 5 | 0 |
| HA-1 | electronic keyer | 42 | 15 | 0 |

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| Eddystone Radio Ltd.: | | £ | s. | d. |
| Eddystone EA12 | Amateur bands receiver, 160-10 metres | 193 | 0 | 0 |
| Eddystone 940 | Communications receiver | 143 | 0 | 0 |
| Eddystone 840C | Communications receiver | 70 | 0 | 0 |
| Eddystone EC10 | receiver | 53 | 0 | 0 |
| Eddystone EB35 | receiver | 62 | 10 | 0 |
| Eddystone EB36 | receiver | 56 | 5 | 0 |

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| Trio Communications Receivers: | | £ | s. | d. |
| Trio JR-60 | 14 tube amateur communications receiver, 540 kc/s-30 mc/s, plus 142-148 mc/s | 61 | 19 | 0 |
| Trio 9R59 | 9 tube communications receiver | 34 | 13 | 0 |
| Trio 9R59DE | 8 tube communications receiver | 39 | 15 | 0 |
| Trio JR505E | Amateur bands receiver 80-10m. | 68 | 0 | 0 |
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| K.W. Vista Mk. II | transmitter (with P.S.U.) | 135 | 0 | 0 |
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| Jet Set | Aircraft receiver | 12 | 0 | 0 |
| Sky Bandit | Aircraft receiver | 23 | 10 | 0 |
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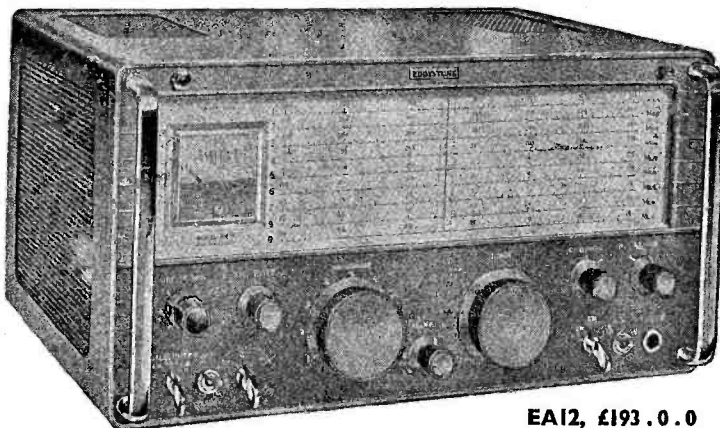
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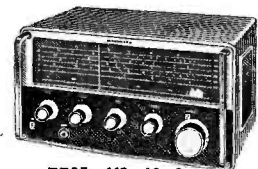
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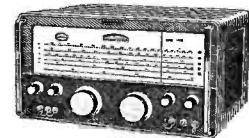
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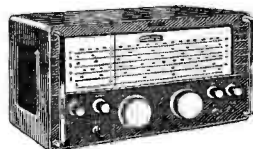
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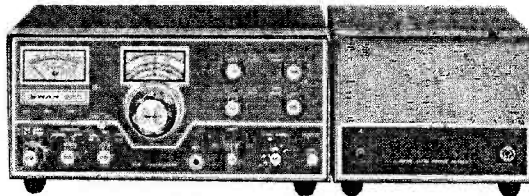
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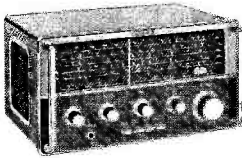
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