

The

SHORT WAVE

Magazine

4/-

VOL. XXVI

AUGUST, 1968

NUMBER 6

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



SSB AT ITS BEST

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.

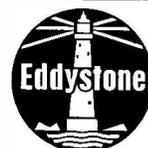
1 HEATH STREET, DARTFORD, KENT

TELEPHONE: DARTFORD 25574 CABLES: KAYDUBLEW DARTFORD

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

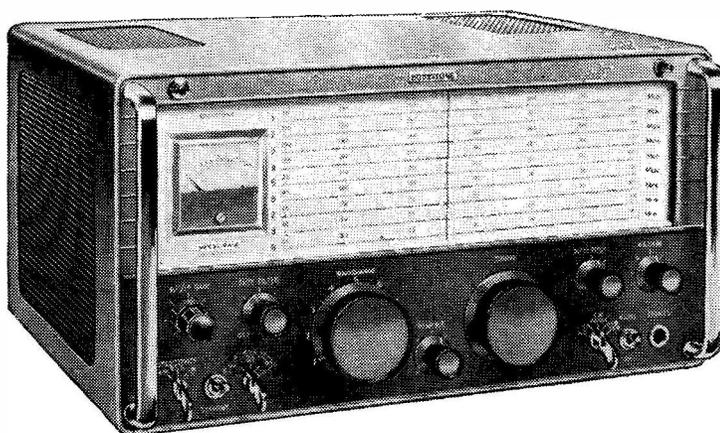
Eddystone



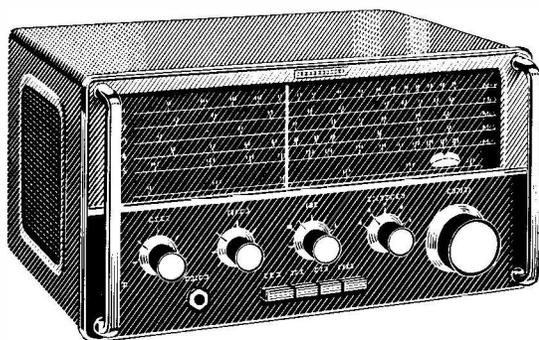
BRITISH MADE

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.

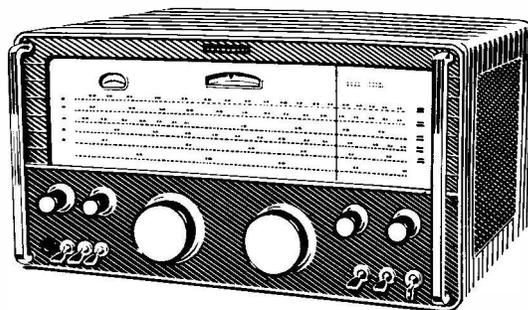


Primary features. Crystal-controlled 1st oscillator, 2nd oscillator with continuously variable selectivity to 50 Hz, muting switched or by external relay, twin noise limiters, for a.m/c.w, and s.s.b, short-term drift better than 20 Hz and less than 100 Hz in any one hour, 'S' meter calibrated in nine 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

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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 1½" 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. 3¼" 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/-.

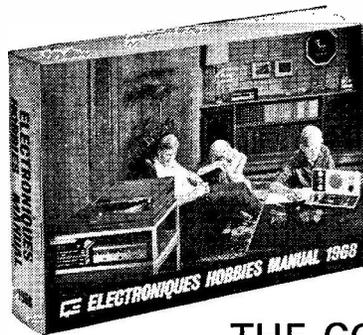
RF 25 Bandswitched Converter. Pre-set frequency. Excellent component value. Contains: 15, 30pf Philips trimmers, ceramic switch, 1-pole 5-way, 3-bank, 3⅜ x 1" ceramic formers, 3 SP61 valves, 2⅜" Aladdin formers, standoffs, etc. The complete unit for 7/6. Postage 6/- unfortunately.

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/-.

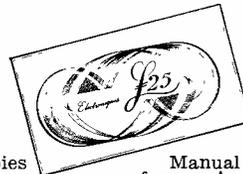
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Enclosed is a cheque/postal order for 16/6 (which includes the 5/- pp) made payable to Electronics (Prop. STC) Ltd. Please rush me my 960-page copy of the new 1968 Hobbies Manual.

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Just straight honest-to-goodness flogging this month. No rambling on, no wisecracks, nothing but a determined effort to induce you to part with loot. Somebody's got to pay for my week's holiday at Clacton!

NEW TRANSCIEVERS

Sommerkamp FT-150—This is the improved version of the FT-100, VOX, PTT, MOX. 80-10 (all 2 mHz of 10), 120W. PEP, switchable sidebands, transceiver vernier, SSB, AM, CW. Built-in p.s.u.'s for both A.C. and 12v. D.C. Built-in xtal calibrator. All transistor except driver and P.A.'s. Ideal mobile or fixed station. Complete, £215.

Sommerkamp FT-500—A 500W. PEP with all the gubbins—switchable sidebands, transceiver vernier, VOX, PTT, MOX, SSB, AM or CW. 100 and 25 kHz calibrator. The works. Complete with built-in p.s.u., £250.

Inoue 700 series—Although this comprises three separate units—IC700R Rx, IC-700T Tx and IC-700PS power supply, the three are designed as a transceiver in that the Tx uses the Rx V.F.O. (with transceiver vernier) and does not have its own.

IC-700R—All transistor Rx for Amateur Bands making wide use of FET's in the r.f., i.f., and oscillator stages to ensure maximum sensitivity and minimum cross modulation. It uses a top quality 9 mHz xtal filter for excellent image rejection and a single conversion chain for minimum noise.

Modes: AM, SSB, CW. (LSB on 80 and 40, USB on 20, 15 and 10) Coverage: 80, 40, 20, 15 and 10, (28-29.5 mHz) plus 10-10.5 mHz. Provision for xtal control.

Selectivity: 2.4 kHz at -6 dB, 4.5 at -60 dB (1.8 shape factor) 500 Hz audio filter for CW.

Sensitivity: Better than 1 microvolt for 10 dB. The Manufacturer is very modest here—typical figures are 1 microvolt for 25 dB.

Spurious signals: Not measurable.
Image rejection: Better than 60 dB.
Stability: 100 Hz.

Power supply: 240v. A.C. or 12v. D.C. built in.
Size: 11" wide x 6½" high x 9½" deep. Weight 12 lbs.

This is a very nice Rx indeed at the very attractive price of £85. IC-700T Transmitter—The companion Tx is the same midsize and is again all transistor except driver, PA's and v.f.o. mixer. It uses the Rx v.f.o. and of course covers the same Amateur Bands, with provision for xtal control if required. The two 6146B's in the final are very conservatively operated with only 500v. on the plates for 120W PEP. This ensures excellent linearity, minimum distortion products and TVI and gives long life. There's a lot to be said for operating the PA well within its rating rather than pushing it to the limit—and certainly this little beauty sounds very nice indeed. Price: £80.

IC-700PS—Matching A.C. p.s.u./speaker, £30.
Package Deal: Bought separately, the three would add up to £195 and still be top value for money—the three ordered together as a package deal—£180.

NEW TRANSMITTERS

Sommerkamp FL-500—Apart from cabinet styling, virtually the same as the well known and proven FL-200-B. A cracking good 240W PEP rig, 80-10 with all the gubbins. SSB selectable sidebands, AM, CW, VOX, PTT, MOX. Break-in CW and transceiver with the companion FR500 (or FR-100-B). Price—£145.

Star ST-700—SSB selectable sidebands, AM, CW, 80-10, 6146B's in PA for 200W PEP. Extremely accurate, stable and smooth v.f.o. VOX, PTT, MOX. Break-in CW. Transceiver with the SR700 or separate. I like this Tx very much indeed and have heard nothing but praise for it. Price—£135.

NEW RECEIVERS

Sommerkamp RF-500—160 to 10 plus citizen's band (oh boy!) Notch filter, 100,25 kHz xtal calibrator, fast/slow a.g.c., 4 kHz AM, 2.4 kHz mechanical filter for SSB and optional 500 Hz mechanical filter for CW. Direct readout to 1 kHz. Price—£130. Optional extras: 2m. converter, 500 Hz CW mechanical filter, FM discriminator, 24 kHz FM mechanical filter.

Star SR-700—30 to 10 plus 5 extra bands to cover any 5 600 kHz segments between 4 and 30 mHz with the appropriate xtal. 100 kHz calibrator, better than ½ microvolt sensitivity, 4 kHz, 2.5, 1.2 and 500 Hz selectivity, notch filter, 100 Hz stability. Very accurate v.f.o. reading to 1 kHz directly. Fast/slow a.g.c. Make no mistake, the Star SR700 is a good Rx. Price—£115.

Star SR-200—Low cost Amateur Band Rx. Covers 160 to 10m. (all of 10), 1 microvolt sensitivity, single conversion with a 1650 kHz single xtal filter, separate oscillator with cathode follower into the cathode of a low noise 6AU6 mixer. Product detector, amplified a.g.c., "S" meter, xtal calibrator, smooth slow motion tuning. How they do it for the money I'll never know. Price—£40. Inoue IC-700R—See under "transceivers" for a top-notch transistor Amateur Band Rx.

SUNDRY NEW EQUIPMENT

G.D.O.'s. Tech TE-18 mains operated 360 kHz-220 mHz—£11 10s.

S.W.R. Bridges, Hansen SWR3—50 or 75 ohms—£3 10s.

Bug Keys—£4.

Electronic Keyers: DAL 8-60 w.p.m. built-in monitor, mains or 12v. D.C., £16.

Katsumi EK-9X (4" x 2" x 6" deep), 8-30 w.p.m., battery operated, £7 15s.

CW monitor. Katsumi AT-8. Can be used with any key—plain, bug or electronic. The output relay has a spare contact for Rx muting. Excellent tool £7 15s.

Headsets. Low impedance padded jobs, £2 2. 6d.

Microphones. Teisco DM-501. Dynamic with PTT. High impedance. Another batch just off the boat, £2 15s.

Intercoms. 2 station, £3.

Bits and Pieces, New, not surplus, not seconds:—

Tubular trimmers either ½-5pF or 3-15pF, 1/- each, 10/- doz.; 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, B7G, B9A), 2/6 each; Electrolytics—brand spanning new can types, complete with mounting clips, 10mF 350v., 1/8; 20mF 350v., 2/3; 20mF 450v., 2/9; 100mF 350v., 5/6; 100mF 500v., 6/8; 100mF 450v., 7/2; 40-40mF 500v., 7/3; 100mF 500v., 7/9; 100-100mF 450v., 13/2; Silicon rectifiers—Current manufacture, NOT surplus NOT seconds. You can rely on these. SE-05 1000piv 500mA, 4/6; IS1066 1000 piv 750mA, 8/-; Panel indicator lamps, for standard illipit bulbs red or green 2/6; Switches, jack plugs, miniature tantalum electrolytics, 1W sub miniature metal oxide resistors, etc. PL259 plugs, 5/-; 100 kHz crystals, series resonant, very accurate to mil. spec., £2. H.D. Coax 75 ohm, 1/- a yard, 300 ohm ribbon, 6d. a yard. A s.a.e. will get you my list of components, etc.

New, Surplus:

Resistors, most values from 2d. each. Capacitors from 2pF to 150mF from 2d. each. Mica trimmers 1000pF, 1/-; 2,800 pF 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.

Odds and Ends:

Codar PR30, £3 10s. Walkie Talkies 100mW 28.5 mHz, £12 10s. a pair. AR88D manual reprints, 15/-. VHF/UHF 50 ohm dummy loads, £2 10s. (new, surplus). Xtals normal ½" pin spacing, 8025 kHz, 8061.25, 8068, 8192.3, 12/6 each.

Second-hand Receivers:

HA-350 mint	£60	HR-22	£80
HQ170	£70	TCS-12	£12
EDDYSTONE 750	£45	RA17	£180
EDDYSTONE 770U	£100	EDDYSTONE 770R	£100
888A	£65	FR-100-B	£95
FR-100-B (earlier model)	£75	COLLINS 75A4	£200
COLLINS 75A2—Mint...	£95	EDDYSTONE 940—Mint	£100
LAFAYETTE HA500	£35	BRT 402E	£60
HALLICRAFTERS SX140	£70	HALLICRAFTERS S27 ...	£12
HALLICRAFTERS SX111	£25		

Second-hand Transmitters:

S/K FL-1000 linear	£80	HALLICRAFTERS HT37	£80
HEATHKIT DK60 and		TW COMMUNICATOR	
HG10 v.f.o.	£40	80M	£35
VICEROY, excdilent	£85	COLLINS 32V3—Mint...	£60
VANGUARD, late model	£40		

SPECIAL: Last National 200, complete with p.s.u. kit ... £185

Test Gear:

Laboratory audio oscillator, a thing of beauty	£25
Lab. 0-30v. at 1A p.s.u.'s, fully metered	£15
Telequipment S324A "scope"	£35
Solartron digital voltmeter, mint	£35
Marconi TF390G 16-50 mc/s.	£20
Taylor Sig. Generator 100 kc/s. to 45 mc/s.	£10
455 kc/s. panadaptor, mint	£25

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

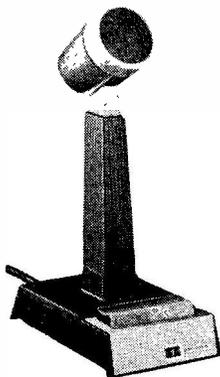
A large s.a.e. will get you a copy of my latest lists.

73,

Bandit Bill,
VE8DP/G3UBO.

You can depend on Shure quality MICROPHONES For amateur radio communications

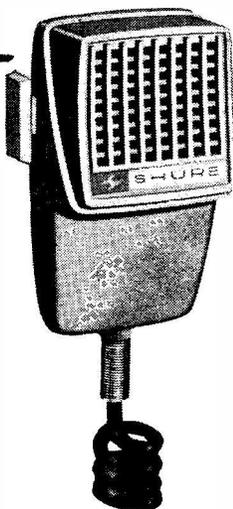
Shure Model 444 Controlled Magnetic Microphone



Specially designed for radio communications, giving optimum performance from single sideband transmitters as well as AM and FM units. Response cuts off sharply below 300 c/s and above 3,000 c/s, with a rising characteristic to 3,000 c/s. This results in optimum speech intelligibility and audio punch to cut through noise interference. High impedance. Dependable under all operating conditions. Complete with switch for instantaneous press-to-talk or VOX operation; finger-tip control bar; long-life switch; adjustable microphone height; sturdy, high-impact base and case; 7 ft. two-conductor shielded cable.

Shure Model 201 Diaphragm Type Ceramic Microphone

- *Provides clear, crisp, natural voice reproduction of high intelligibility
- *High impedance *Ideal voice response and omni-directional polar pickup characteristics
- *No humidity or temperature problems
- *Light, strong and compact
- *Heavy duty push-to-talk (non-locking) switch
- *Frequency response: 200 to 4,000 c/s
- *3-conductor retractable cable.



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"Exceptionally well designed and engineered job and most certainly worth more than the price asked. Tied to a fence immediately worked VP8, ZL worked 5-7-9."

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- 3/- each. OC139, OC140, 2N706, 2N708, 2N2894, BY100, RAS310AF, 2N914, BSY26, BSY27, BSY95A, AFZ12, BFY18, BFY19, BFY26.
- 7/6 each. RAS508AF, CRS3/40, BLY10, BLY11, BUY10, BUY11, ADY22, ADY23, ADY24, OC26.

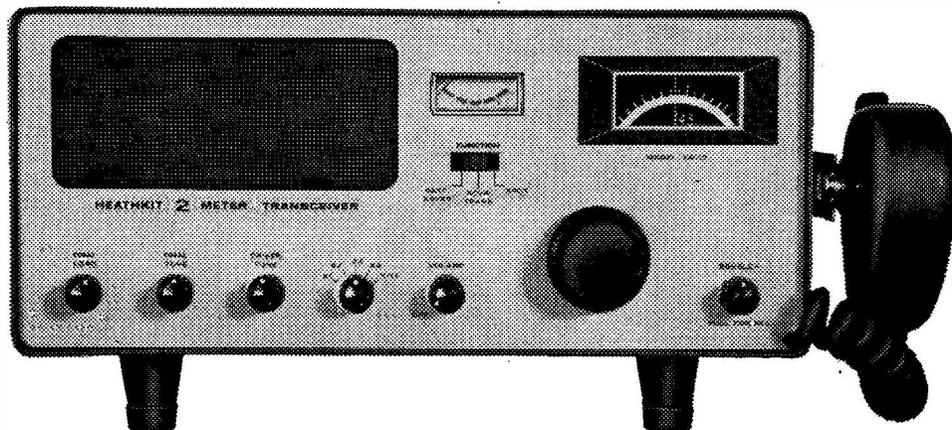
ZENER DIODES

- 3·9v. to 26v., ¼w., 3/- each. 1·5w., 4/- 7w., 5/- each.

D. Cursons

78 BROAD STREET, CANTERBURY, KENT
S.A.E. LATEST NEW LIST

NEW Heathkit Solid-State 2-Meter AM Transceiver



• Frequency Range 143.2 to 148.2 MHz • Solid-state, dual conversion superheterodyne receiver • Pre-built, pre-aligned FET tuner • Spot function for finding transmit frequency on receiver dial • Hybrid transistor-tube type transmitter design • 8 to 10 watts power output • 4 crystal sockets plus provision for external VFO such as Heathkit HG-10B (page 40) • Built-in 120-240 VAC power supply • Optional DC mobile supply (see below) • PTT operation, electronically switched • Front panel meter for signal strength and relative power output • Built-in automatic noise limiter and squelch • Lighted dial • Built-in speaker • Battery saver feature for low current drain during mobile monitoring • Low profile aluminium cabinet for easy mobile mounting • Gimbal mount included for mobile use • Ceramic PTT microphone included • 15 transistors, 20 diodes, 3 tubes, 2 circuit boards • Builds in about 20 hours.

The Heathkit HW-17 in detail. It's really a separate receiver and transmitter in one compact, versatile package (the only common circuitry are the power supply and the audio output/modulator). The solid-state dual conversion, superheterodyne receiver with a pre-built, pre-aligned FET tuner has a lighted dial with 100 kHz calibration, automatic noise limiter, squelch, and 1 μ V sensitivity. Selectivity is 27 kHz at 6 dB down. The front panel meter indicates received signal strength and relative power output. A 3-position switch on the front panel has a "Spot" position for finding the transmit frequency on the tuning dial, a Receive/Transmit position, and a Battery-Saver position.

A 3" x 5" speaker is built in.

Modulation is automatically limited to 100% or less. A front panel selector switch chooses any of four crystal frequencies or an external VFO (the Heathkit HG-10B VFO . . . is perfect for this job).

Front panel controls include Final Load, Final Tune, Crystal-VFO switch, Main Tuning, Squelch with ANL switch, Battery Saver-Receive/Transmit-Spot switch; rear panel has S-meter Adjust, Headphone jack, Power socket, VFO power socket, VFO input, and Antenna connector (50-72 ohms, unbalanced).

HW-17 SPECIFICATIONS—RECEIVER: Frequency coverage: 143.2-148.2 MHz. Dial calibration: 100 kHz. IF Frequencies: Double conversion: 1st IF: 24.965 MHz; 2nd IF: 2 MHz. Sensitivity: 1 μ V input for 10 dB S/N — N. Selectivity: 27 kHz @ 6 dB down. Input impedance: 50-72 ohm, unbalanced. Audio output: 1 watt @ less than 10% distortion. Headphone jack: Low impedance, accepts PL-55 type plug (standard 2-conductor $\frac{1}{8}$ " sleeve). Transistor complement: (2) 2N4416 RF Amplifier, 1st Mixer; SE5023 HF variable oscillator; (4) 2N3694 2nd Mixer, crystal oscillator, 1st IF amplifier, 2nd IF amplifier; (2) 2N3393 Audio Pre-amplifier, Squelch amplifier X29A829 Squelch Gate; 2N1274 Audio Driver; (2) 40050 Audio/Modulator output. Transmitter: Frequency coverage: 143.2-148.2 MHz. RF Power input: 25-30 watts. RF Power output: 8-10 watts. Mode: Type A3 (AM). Modulation: Automatically limited to 100% or less. Output Impedance: 50-72 ohm, unbalanced. Crystal sockets: Accepts FT-243 type holders, pin diameter .093", pin spacing .466" and HC6/U type in diameter .050", pin spacing .466". Transistor/tube complement: 7050 Oscillator/Amplifier Tripler-Tripler; 12GN7 Doubler/Driver; 8156 Power Amplifier; (2) 2N3393 Microphone Pre-amplifier, Microphone Driver. Temperature range: -20° to +50° C. Power requirements: 120 or 240 VAC input. Receiver Trans.—20 watts; Batt. Saver—8 watts; Spot—35 watts; Transmitter—100 watts. Cabinet dimensions: 14 $\frac{1}{2}$ " W x 8 $\frac{1}{2}$ " D x 6 $\frac{1}{4}$ " H including microphone and mounting feet. Net weight: 13 lbs.

Kit k/HW-17, 2M Transceiver (less crystals) 17 lbs. £69 2s. P.P. 10/6

Kit k/HWA-17-1, Transistorized DC supply, 5 lbs. £13 19s. P.P. 4/6

DAYSTROM LTD.,

Dept. SW-8

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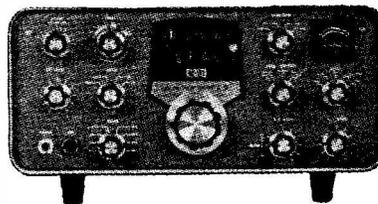
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HEATHKIT Amateur Radio Equipment

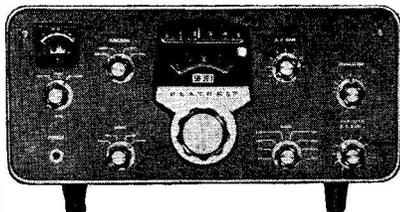
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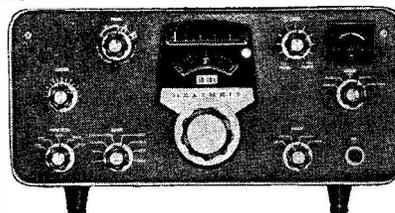
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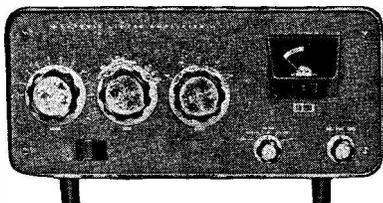
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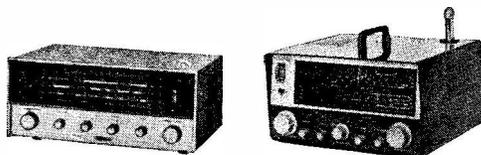
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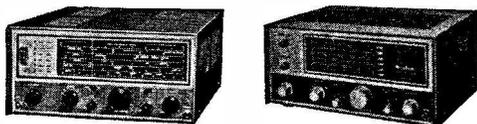
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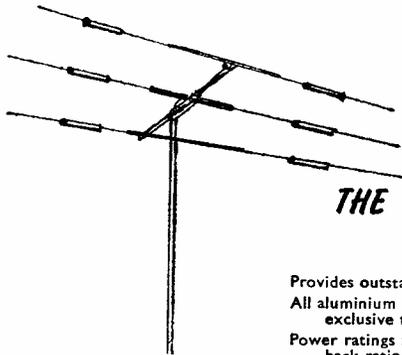
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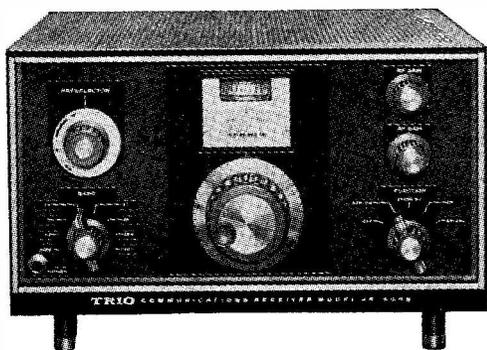
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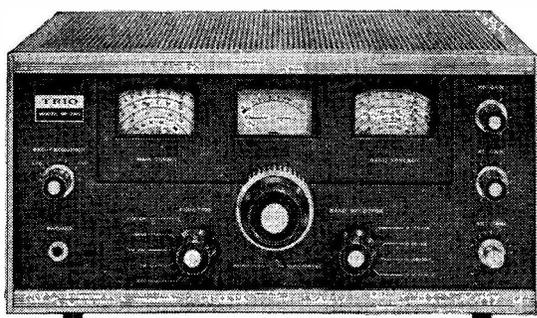
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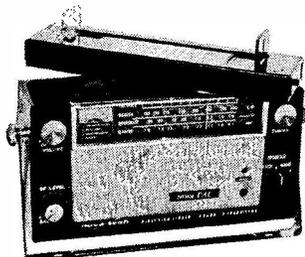
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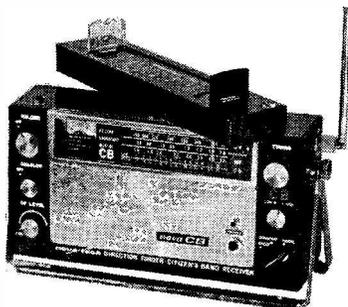
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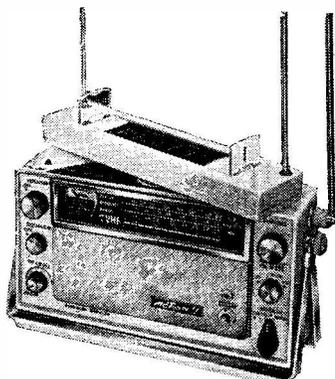
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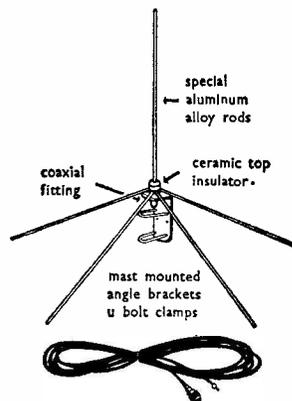
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SHORT WAVE MAGAZINE

(GB3SWM)

Vol. XXVI

AUGUST, 1968

No. 298

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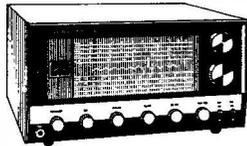
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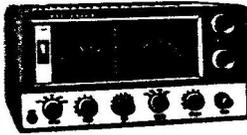
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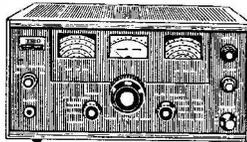
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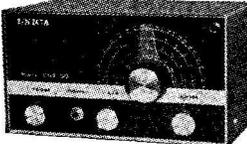


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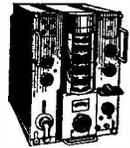
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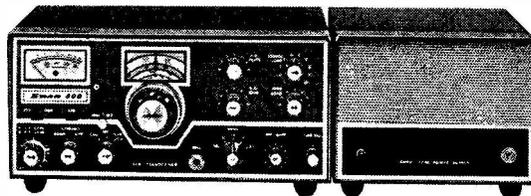
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The SHORT-WAVE Magazine

E D I T O R I A L

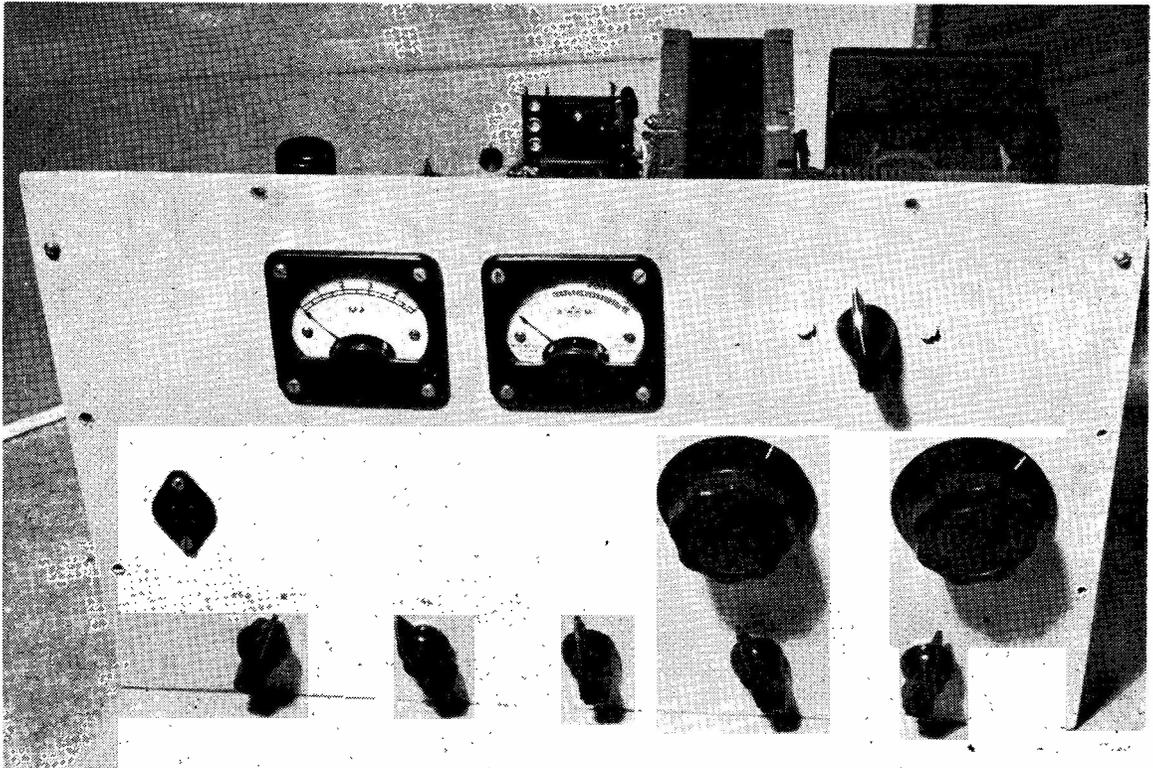
Communication *Many years ago, it was said in this space that radio amateurs were privileged still to use the simplest, most elegant, accurate, reliable and unambiguous method of radio communication yet devised. They still are—and we refer, of course, to the art and practice of CW telegraphy.*

It has often been said since (though never by us) that “CW has had it,” or “Why do we need to know Morse, anyway?” or “Most amateurs never touch the key again after passing the Morse Test.”

Well, the answers are that a large proportion of AT-station operators, all over the world, still do use CW as a regular thing—because they find it an interesting and entirely satisfactory method of communication. As to why the Morse Test is a necessary qualification for a radio amateur licence (for the HF bands) in every country of the world, there are several answers: The most cogent are, first, that by international agreement Amateur Radio is defined as a self-training service, and to justify this concept, then radio amateur operators ought to be able to communicate by telegraphy. Secondly, the requirement to learn Morse, and pass a test, effectively separates those who take Amateur Radio seriously from those who would just like a licence “to talk to their friends over the air.” (Of course, there are infinite shades and variations of this proposition, but it is a fair generalisation.) Thirdly, while it is probably true that many amateurs never do use the key after passing the Test, this does not justify its abolition. Learning Morse is like learning to swim—once you know how, the ability is never lost, even if the execution is indifferent due to lack of practice.

What it comes to is that since the objective of the great majority of radio amateurs is to communicate, and CW is one method of communication, it is just as important in the amateur context as telephony—and a great deal more efficient!

*Austin Forster,
G6FO.*



AM/CW TRANSMITTER FOR THE BEGINNER

FOUR BANDS, 25-40 WATTS INPUT
— SCREEN-GRID MODULATED —
CRYSTAL OR VFO CONTROLLED —
SELF-CONTAINED FOR POWER —
SIMPLIFIED DESIGN AND
CONSTRUCTION

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

A POWER input of about 25-30 watts screen-grid modulated AM, and 40 watts or so CW, proves to be very useful under practical conditions. The transmitter described here is for this power, on the 3.5, 7, 14 and 21 mc bands. Though SG modulation lacks some of the advantages of high level AM, it greatly reduces the size and power rating of the modulator, and can give acceptable speech quality.

Fig. 1 is the RF section, using crystal control, but with provision for plugging in an external VFO—see July

SHORT WAVE MAGAZINE. Crystals are best used on their fundamental frequency or 2nd harmonic. That is, 160m. crystals for 80 metres, 80m. crystals for 80 or 40 metres and 40m. crystals for the 40- or 20-metre bands. There is then ample grid drive for the PA. When using a 7 mc crystal for 21 mc, or a 3.5 mc crystal for 14 mc, grid current becomes marginal or low. It may be sufficient with some crystals, but not others. However, a couple of crystals can provide spot frequencies in two or three bands.

The crystal oscillator V1 has anode coils L1, L2, L3 and L4, selected by S1 and tuned by VC1. With this crystal circuit, oscillation does not depend on V1 anode tuning, but S1 is used to select the frequency band (in conjunction with a suitable crystal) while VC1 allows adjustment for required grid current.

S2, in conjunction with the tapped coil L5, is the usual *pi*-output tank configuration for 3.5, 7, 14 and 21 mc bands.

Since control-grid bias for V2 is obtained by grid rectification and developed across R3, individual meters M1 and M2 are fitted, for grid and anode current. This avoids having to switch backwards and forwards to grid and anode positions with a single meter, and allows grid current to be monitored continuously. Best grid current is around 2 to 2.5 mA. The PA must *never* be switched to "transmit" unless at least 1.5 mA grid current is showing.

This transmitter is eminently suitable for a beginner or newly-licenced operator wanting to start an amateur-band constructional project with a reasonable certainty of success. It will give a very good account of itself as a CW transmitter on the 15-20-40-80m. bands and, by using the principle of screen-grid control for modulation, it will be found to work well on telephony—though of course not giving the full-blooded output of an AM Tx using anode-and-screen modulation of the PA. Screen-grid control, though not much used these days, is not only a good, practical way to obtain modulation but also, from the point of view of the beginner, is neat and inexpensive as well as being very instructive on the principles of modulation. The design is fully self-contained, with incorporated PSU, is suitable for either crystal or VFO control, and should eventually take its place as a reliable stand-by in the progressive amateur station.—Editor.

Operational Switching

S4 applies HT to V1 only (and the VFO, if used). This allows tuning up for grid current on M1, or spotting the transmitter frequency on the receiver.

S5 and S6 switch the transmitter on, by applying HT to all stages. It is important that HT be supplied only to the modulator when S6 is closed, because V2 must not receive SG voltage with no anode supply. This must be watched when wiring S5. S5 and S6 are two poles of a single switch. It is in order to use other poles on the same switch to operate a change-over relay, or to switch the aerial from L5 to the receiver, or to mute the receiver speaker.

Coils

L1, L2 and L3 can be wound on small 1/2 in. diameter formers of the type taking an adjustable core, no core

Table of Values

Fig. 1. RF Section of the G3OGR Transmitter

C1 = 22 μ F	VC3, VC4 = Two-gang, 500 μ F, var.
C2 = 220 μ F	R1 = 22,000 ohms, 1w.
C3, C11, C12, C13, C14 = .002 μ F	R2 = 100,000 ohms, 1w.
C4, C6, C7, C8, C9, C16 = .01 μ F	R3 = 27,000 ohms, 1w.
C5 = 100 μ F	R4, R5 = 47 ohms, 1w.
C8 = .005 μ F, 1 kV,	R6, R8 = 47,000 ohms, 1w.
C10 = .001 μ F, 1 kV,	R7 = 4,700 ohms, 1w.
mica	R9 = 82,000 ohms, 1w.
C15 = 0.5 μ F, 350v.	R10 = 100 ohms, 1/2w.
VC1 = 75 μ F, air-spaced, var.	L1, L5 = see text
VC2 = 250 μ F, double-spaced	M1 = 0.5 mA
	M2 = 0.250 mA
	S1, S2 = 1-pole, 4-way
	S3, S4 = 1-pole, 2-way
	S5/6 = 2-pole, 2-way
	S7/8 = 2-pole, 2-way
	V1 = 5763
	V2 = 6146

Keying

With S3 in the AM position, cathode circuits are completed through contacts in the key jack, which close with no plug in place. When S3 is in the CW position, V2 has a higher SG voltage, through R7.

The key breaks both cathode circuits, controlling V1 only on "Net" and V1 and V2 on "transmit." Unwanted cathode coupling is prevented by C11, C12 and C13, close to V2. These capacitors and R10 with C16 were found to give very good keying. C3 by-passes RFC1 for RF only, when using a VFO.

As is usual with SG modulation, the average SG voltage needs to be lower than the optimum value for CW. This is why S3 is required.

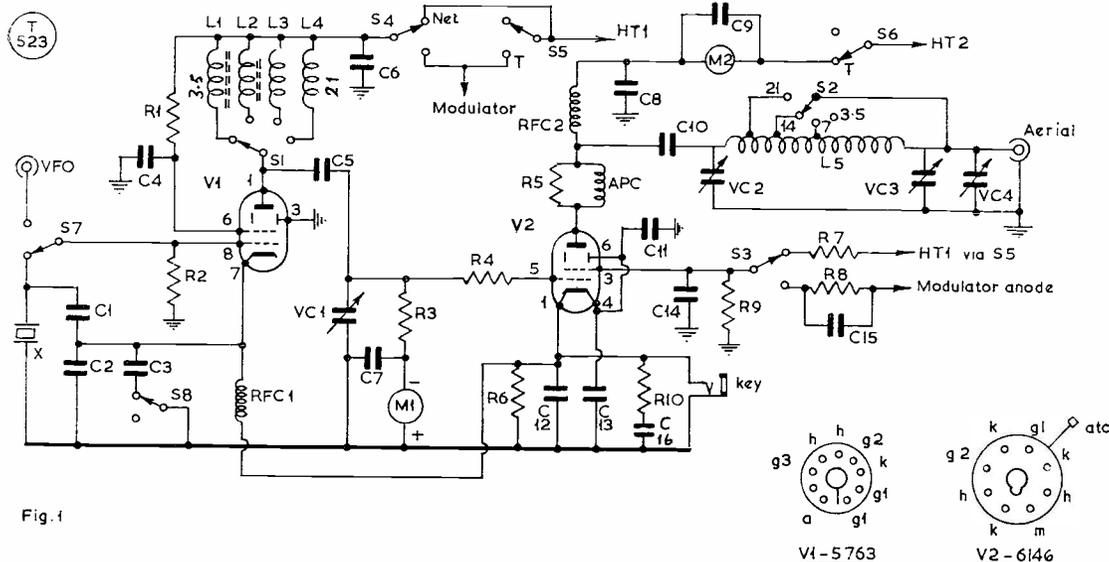


Fig. 1

Fig. 1. The RF section of the Transmitter.

being placed in L3. L1 has 50 turns in a compact pile; L2 40 turns side by side; and L3 15 turns, also side by side. All windings are 32g. enamelled. L4 is self-supporting, connected directly from S1 to C6. It is of 13 turns 18g. enamelled wire, 1/2 in. outside diameter.

With coils and values as shown, it should not be possible to hit wrong harmonics of 3.5 mc. But with home-built equipment it is wise always to check with a wavemeter. This can be done by inserting a 3.5 to 3.8 mc crystal, and noting that VC1 can be adjusted for ample grid current, with the "net" switch closed. If not, rotate the core of L1.

With a 3.5 to 3.55 mc crystal, VC1 should allow peaking L2 from 7.0 to 7.1 mc. If not, again adjust the core.

When a 7 mc band crystal is in position, L3 should tune the 14 mc band with VC1 nearly open; similarly, L4 should cover the 21 mc band with VC1 near minimum capacity.

The actual setting of VC1 for the 3.5 and 7 mc bands is not very important. But for the HF bands, grid current is at maximum when L3 and L4 have sufficient inductance for VC1 to be at low capacity.

The PA coil L5 is wound on a paxolin tube 3 1/2 in. long and 1 1/2 in. in diameter, Fig. 2. A tapped and spaced winding of 18g. wire covers 21 and 14 mc, with extra turns of 20g. wire, closer spaced, coming into circuit for the 7 and 3.5 mc bands. The resonant position for VC2 depends on the frequency in a band, and VC3/4, but it should generally be found that VC2 is almost fully open for 21 mc, a little more closed for 14 mc, around half-closed for 7 mc, and well towards maximum for 3.5 mc.

The anti-parasitic choke APC is 5 turns of 18g. wire, 3/4 in. outside diameter, with turns slightly spaced. R5 is inside. The APC and R5 are connected together with the minimum length of lead, and soldered immediately adjacent to the valve cap.

Modulator

Fig. 3 is the circuit of this section. C1 helps to keep RF out of the audio amplifier, and in conjunction with C5, and C2 and C4, gives a strong middle register. The

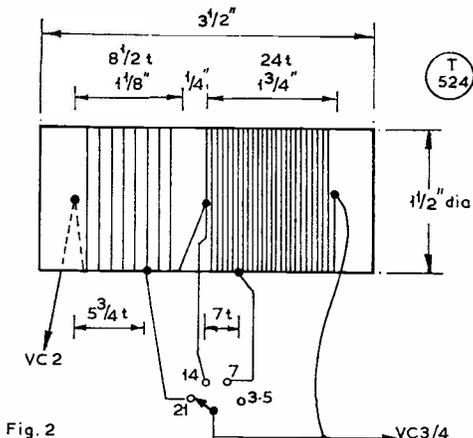


Fig. 2. PA tank coil detail.

whole amplifier needs slightly less than 20 mA, and V2 provides about 1 watt power output, which is easily sufficient. A crystal microphone is used.

Other circuits of similar type would no doubt be satisfactory. The choke Ch. is actually a speaker transformer, with the secondary unused. The whole circuit is easily checked by applying about 200v. to 250v. HT, and temporarily connecting a loudspeaker

Table of Values

Fig. 3. Speech Amplifier and Modulator

C1 = 35 μF	R5 = 3,300 ohms, 1/2 w.
C2, C4 = .002 μF	R6 = 470,000 ohms, 1/2 w.
C3 = 2 μF, 350v.	R7 = 680 ohms, 1/2 w.
C5 = .01 μF	VR1 = 1 megohm, log. potentiometer
C6 = 25 μF, 25v.	Ch. = Pri. speaker transformer
R1 = 1 megohm, 1/2 w.	V1 = 12AX7
R2 = 220,000 ohms, 1/2 w.	V2 = 6AM5
R3 = 100,000 ohms, 1/2 w.	
R4 = 22,000 ohms, 1/2 w.	

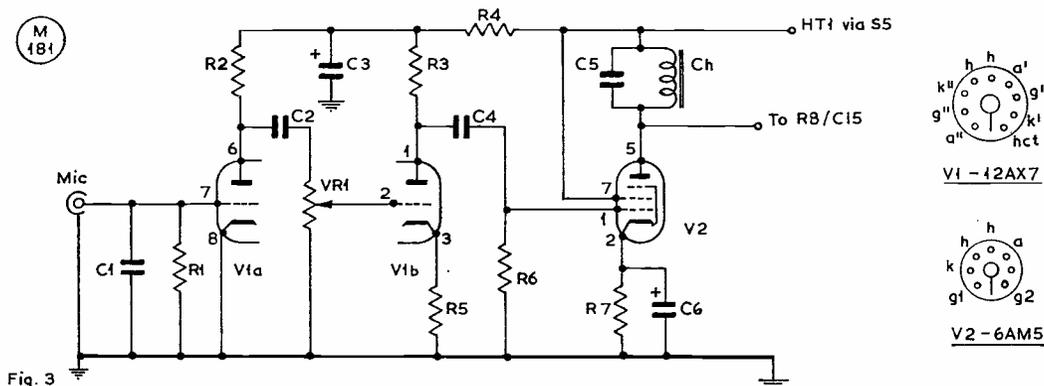
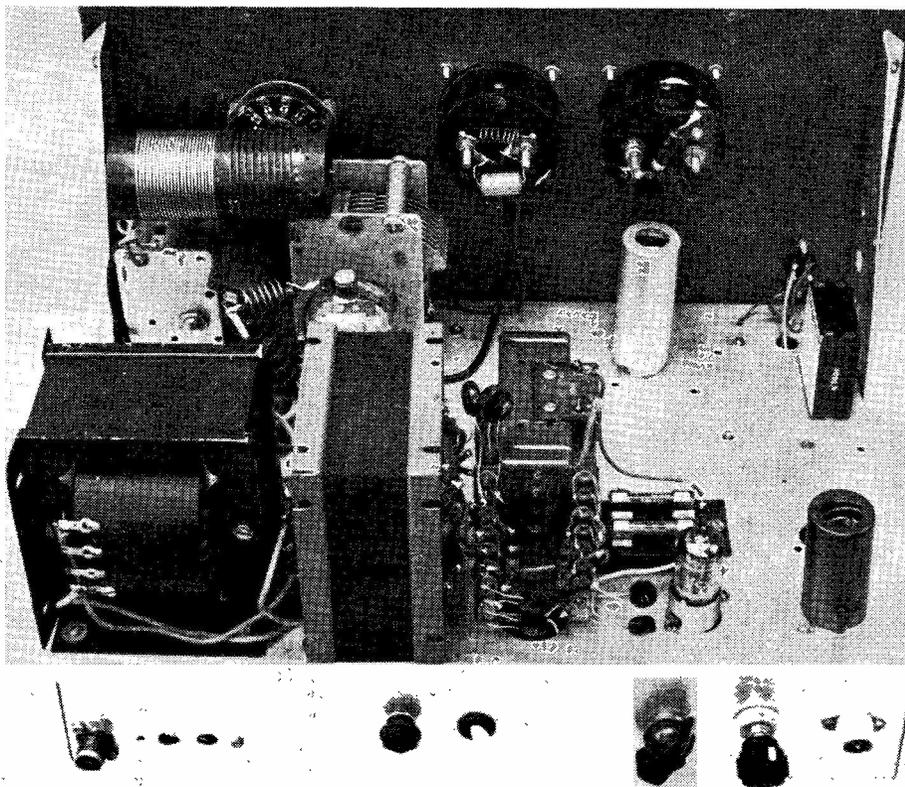


Fig. 3. Speech amplifier and modulator.



View of the Tx, showing rear, left, aerial loading and PA tank tuning condensers with pi-tank coil and mains transformers. At centre, the smoothing choke and rectifier tag-board assembly, with fuses, and speech amplifier stage in adjoining right corner. On the chassis back runner, left to right, are the Ae. output, key jack, mains lead, AM/CW switch, microphone pre-set gain control and mic. input socket.

to the secondary of Ch. Speech in the microphone should be loud and clear. (Microphone and loudspeaker must be well separated, or there will be howling round the loop.)

Power Supplies

The supplies incorporated endeavour to keep cost down, and require no great space. Readily available receiver and amplifier type transformers are used, as in Fig. 4, p.344.

The high-voltage supply HT2 is for the PA anode only. The 120 mA 300-0-300v. winding produces 60 mA at 500v. with choke input and four silicon rectifiers. The voltage regulation obtained was as follows: *No load*, 680v.; *45mA*, 520v.; *75mA*, 505v.

Normal operation is around the 60 mA level (30 watts input). Since the transformer HT secondary rating is for 300v. 120 mA continuous running (also 30w.) this does not cause overloading. As full current is not required from the 6.3v. windings, and operation is intermittent, some increase in the VA loading of the HT secondary is permissible. A PA input of 80 mA at 500v. is 40w., and this seems quite in order. With other transformers, it

is suggested the intermittent VA rating could be tried at 20% above the continuous rating. If the transformer grows too warm, this has to be reduced. Results depend somewhat on the actual transformer (generosity of rating).

The receiver-type transformer T2 supplies HT for the audio section, buffer and PA SG. This gives 340v. off load, falling to 200-210v. on load. (R5 is merely a safety bleeder.) Choke input is used because a higher voltage is not wanted. Capacitor input is practical, if more HT is required.

Other similar power supplies should be satisfactory, if to hand. For best SG modulation of the PA, an adequate anode voltage is required—preferably at least 400v. For CW, higher anode efficiency is obtained and the anode voltage is less important. If an available pack can supply the current, the PA can be loaded to 100 mA input. This is 30w. for 300v., 40w. for 400v., 50w. with 500v., and so on. (These inputs cannot be reached with SG modulated AM, because the SG voltage then has to be lower.) HT fuses afford some protection against shorts.

As many heaters as possible are run from T2. T1 supplied the crystal oscillator and PA, the audio section

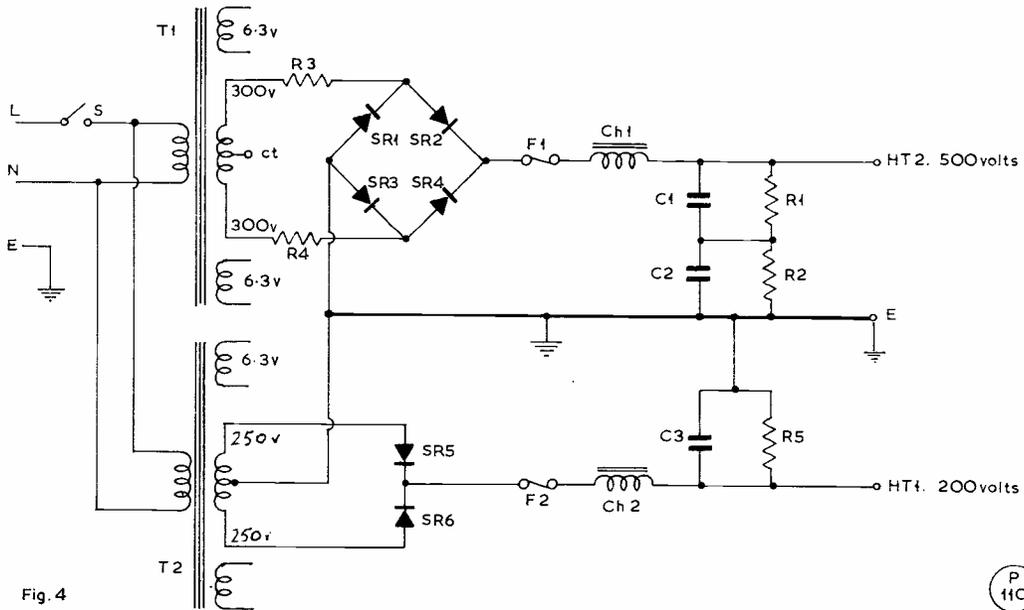


Fig. 4

P
110

Fig. 4. Suitable power supply unit for the transmitter.

receiving heater current from T2. T2 also provides 6.3v. at the multi-way socket used in conjunction with the VFO.

R1 and R2 need to be 6-watt or larger due to the no-load voltage. There is no doubt some latitude in capacitor and other valves and components, as in the other circuits.

PA Anode Current

HT which flows into the PA and produces no useful RF output is dissipated as heat in the valve itself. The off-tune anode current can be high, especially with the switch at CW, or in the absence of grid current. Therefore the usual procedure is to obtain grid current first, as mentioned, then switch to "transmit" and immediately rotate VC2 for the dip in anode current which shows resonance and produces RF output. Loading on the PA is then increased by opening VC3/4, meanwhile slightly re-adjusting VC2 for minimum anode current.

It is quite a good plan to connect the output to a 60-watt household lamp, for a first test. But remember a lamp is not a good load for CW.

For the very cautious, temporarily taking R3 or R4 to the centre-tap (Fig. 4) will halve the PA anode voltage.

Screen Grid Modulation

Screen-grid modulation can provide good speech quality, but more care is necessary when adjusting audio gain, grid current, and aerial loading than is required with anode-and-screen modulation circuits. With the latter, good speech quality is often achieved over a wide range of PA inputs, according to loading. But with

Table of Values

Fig. 4. Power Supply for the G3OGR Tx

C1, C2,		Ch.1 = 10 Hy, 120 mA
C3 = 32 μF, 450v.		Ch.2 = 10 Hy, 60 mA, Rx type
R1, R2 = 22,000 ohms, 6w.		
R3, R4 = 22 ohms, 1/2w.		
R5 = 220,000 ohms, 1w.		T1 = 300-0-300v. 120 mA, 6.3v. sec's (see text)
F1 = 250 mA fuse		
F2 = 100 mA fuse		
SR1- SR6 = SE-05 silicon rectifiers (J. B. Lowe)		T2 = 250-0-250v. 60 mA, Rx type (see text)

SG control, speech quality deteriorates badly if the PA is not sufficiently loaded by the aerial.

This means that the aerial loading capacitor must be adjusted until the resonant dip found with the PA anode tuning condenser has become very slight. This corresponds to heavy loading of the PA. Dipoles will give this condition, and also end-fed wires employed with a tuner (where required). If the aerial does not allow the PA to be fully loaded, an aerial tuner or other customary means of correcting this will be necessary. With SG modulation, light aerial loading can cause extremely bad distortion.

Another cause of bad quality in the transmitted signal is over-excitation of the screen grid. Quite a low level of audio power only is required here.

If a 'scope is available, the best method of checking modulation is to load the transmitter into a 60-watt domestic lamp, or other artificial aerial, and provide a sine wave input from an audio oscillator. The transmitter can then be quite easily adjusted to give a good modulated

envelope display, with modulation up to about 90%. Insufficient aerial loading or too much audio squares up the envelope and results in bad speech quality reports.

If no oscilloscope is available, signals can be monitored on the receiver. This is a useful method, but care is needed to avoid feedback between speaker and microphone, and the receiver itself must not be overloaded. The Rx aerial will have to be removed, or shorted to ground at the receiver itself, and the RF (and IF) gain turned well back.

Another method is to place a crystal diode in series with a few turns of insulated wire, and connect headphones to this. The loop is then brought towards the tank coil, for speech monitoring. Again, such a loop and diode can be used to feed audio signals into a tape recorder. Playback will then allow you to hear your own signal, as transmitted. The recorder itself should be clear of the transmitter, a screened lead running from loop and diode to the recorder input.

Failing any of these methods, good results should be obtained by adjusting for 2-2½ mA grid current, and loading to about 25 watts input (50 mA at 500v.). The audio gain is then slowly turned up until QSO's report that distortion has set in. The best point is just below this.

Actually, there is no special difficulty with SG modulation. But if contacts say that audio quality is unsatisfactory, the trouble may be located and cured in this way. If "good" reports cannot be obtained, it may be worth checking the audio amplifier by operating it directly into a loudspeaker.

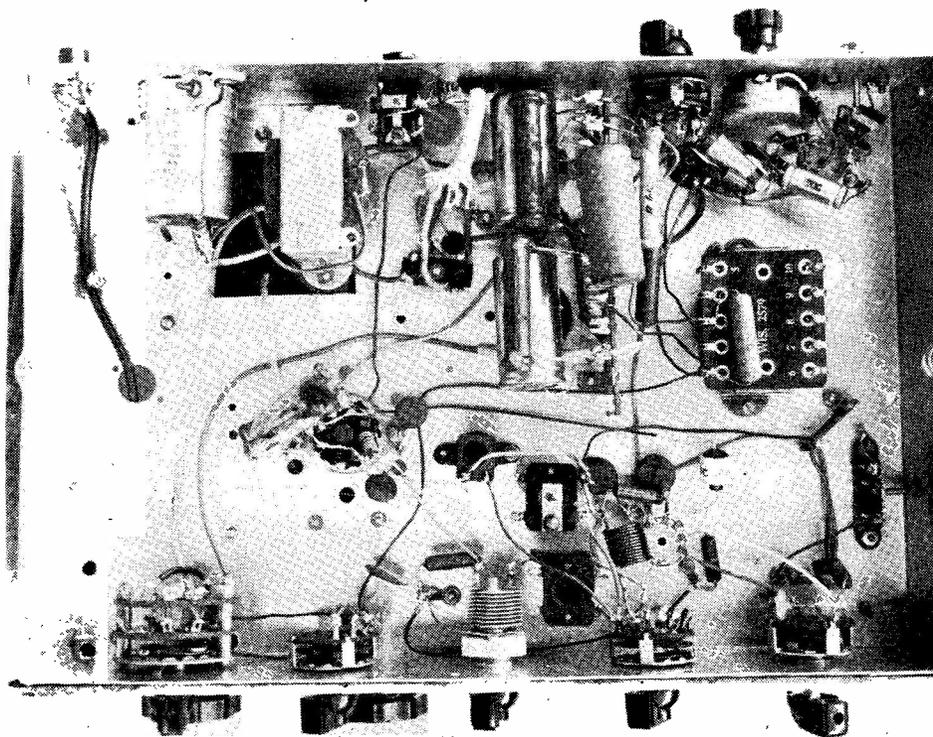
Construction

A chassis 13 x 9 x 2½ in. deep will readily accommodate all the components. The panel is 14 x 9 in. and Fig. 5 shows the layout of controls, with dimensions. No doubt reasonable variations to suit an existing case or other parts would be satisfactory. The panel is strengthened by brackets. (Certain *Magazine* advertisers can supply panels, chassis, brackets and cases to almost any dimensions.)

The CW/AM switch, and microphone gain control, are on the rear chassis runner. So are microphone and aerial coaxial sockets, and the key jack.

The silicon rectifiers are wired to a tag-board, Fig. 6. This is mounted vertically on brackets near the rear of the chassis. Well-insulated wire should be used for HT circuits, and especially for the high-voltage connections.

C1, C2 and other large items of the power circuit



Underneath the Beginner's AM/CW Tx. Left to right, top rear: Coax output lead, smoothing condenser and choke, key jack socket, tag-board with smoothing and other condensers, CW/AM switch connections, modulator output stage, microphone gain control and speech amplifier assembly. Centre left, power amplifier and associated circuitry. Panel controls at bottom are: Transmit, net, grid tune, buffer bandswitch and VFO/crystal switch.

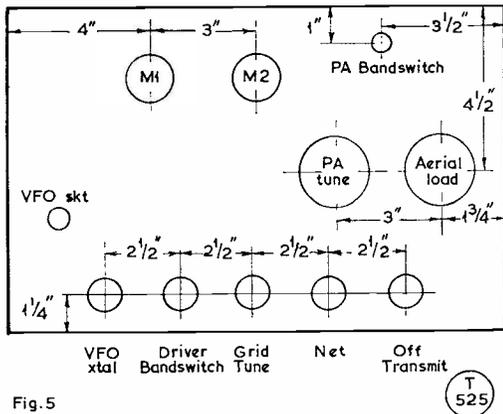


Fig. 5

Fig. 5. Showing general dimensions and panel controls,

were mounted on a tag strip as in Fig. 7. (This is spread to show connections, actual leads being short, with components near the tags.) Whatever means adopted, it should secure these parts so that they cannot touch other leads, etc. The can of C1 is at high voltage above chassis. The low voltage choke and smoothing condenser are fitted under the chassis.

A few other points may arise when constructing and wiring the transmitter, and these are mentioned below.

Wiring. All leads not carrying RF are run against the chassis. This includes heater circuits, HT connections, those to the key jack, "transmit" and "net" switches, to both meters, and in the audio amplifier section.

Mains Supply. This is via 3-core cable, from a 13A type plug fitted with a 3A fuse. Red runs from the fuse, black from neutral, and green from earth pin to chassis. These leads are anchored by a tag strip. There is no mains switch, because this was external, controlling other equipment. The usual switch may be added, of course.

RF Circuits. These are to S7/S8, S1, L1 to L5, V1, VC1 and V2, under the chassis. They should be stout, short and direct. This is particularly important for 14 and 21 mc circuits.

Above the chassis, connections from the PA valve cap to R5 and the anti-parasitic choke, C10, VC2, L5, S2 and VC3/4, should all be stout and very short, with a good earth-return from VC2 to VC3/4 frames, and to chassis. Coax cable runs from VC3/4 to the aerial socket.

By-Passing. For RF circuit positions, disc ceramic capacitors are preferred. Reasonable changes in the values of such items would probably have no effect on results. C11, C12, C13 and C14 are directly from the tags to chassis, with the shortest possible leads.

Meters. Any instruments which will allow grid current to be read around the 2 mA level, and anode current at 50-100 mA, should do. Sensitive meters can be shunted, to obtain suitable ranges.

Screening cans should be fitted over the 12AX7 and 5763. V2 metal shell is earthed via tag 8.

Adjustments

A few notes on first adjusting and testing the transmitter should prove helpful.

When crystals are used for a higher frequency (harmonic) this must of course fall in the related band. For example, a 1.85 mc crystal would allow working on $1.85 \times 2 = 3.7$ mc. But a 1.9 mc or higher frequency crystal would fall outside the 80m. band. In the same way, a crystal of, say, 3.52 mc would allow working on 3.52 mc in the 80m. band, and $3.52 \times 2 = 7.04$ mc in the 40m. band. But crystals of higher frequency than 3.55 mc will be unsuitable for the 40m. band. Any crystal between 7 and 7.1 mc will double the frequency to 14-14.2 mc in the 20m. band, and so on.

With a crystal in place, the appropriate band is selected by S1. With the "net" switch closed, M1 should show some grid current. Adjust this to around 2 mA, with VC1. As mentioned, LF band crystals will not provide enough grid current on the HF bands, which need 7 mc crystals.

The power amplifier V2 is worked straight through on the wanted frequency, so S2 must be placed for the

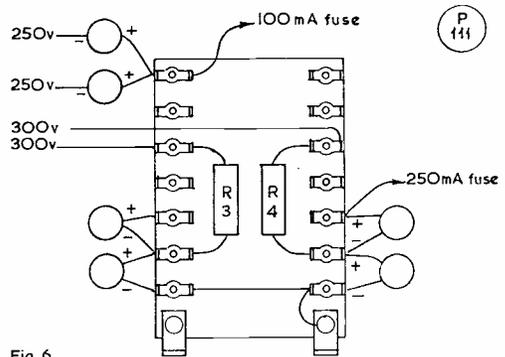


Fig. 6

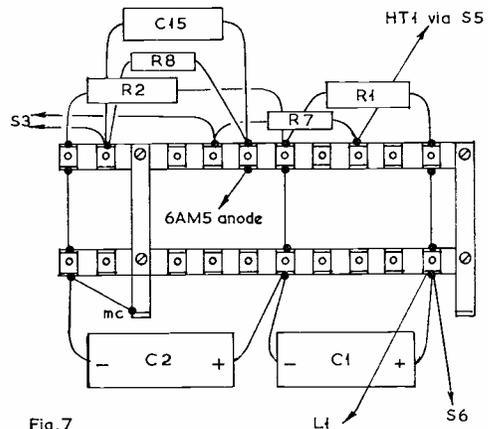


Fig. 7

Fig. 6. Silicon rectifier assembly. Fig. 7. High voltage circuitry.

same band as S1. The PA should not be switched on unless a suitable load is present, e.g. an aerial, or 40w. to 60w. household lamp.

Because of the lower SG voltage, the PA is more docile with S3 at the AM position. Tuning up is easiest on 80 metres. If a lamp is connected instead of an aerial, check grid current, close VC3/4, switch to "transmit" and tune VC2 for minimum anode current. Now open VC3/4, re-adjusting VC2 for *minimum* current. For the log book, PA input in watts = anode voltage x anode current. The voltage can be measured across C8. At 30-45w. input, a 40w. or 60w. lamp should light well.

In view of what was noted before, this may seem unnecessary. But the 6146, in common with many quite small but high rated valves, can be rapidly destroyed by lack of bias (in this case, insufficient grid current) or off-tune operation. That is, faults which cause a heavy anode current, with little or no RF output.

On the HF bands, the exact state of anode tuning will have an effect on grid current which is seen by movements of M1. This is usual. It is at minimum with least possible unwanted feedback from anode to grid circuits.

FRENCH/ENGLISH RECIPROCIITY

We understand that U.K. applicants for a temporary French AT-station licence should write in the first instance to the Ministry of Posts & Telegraphs (P.T.T.), 20 Avenue de Segur, Paris, 7e. There is no charge, maximum permitted input is 100 watts DC on all HF bands (*except* 4 metres, not open in France), and mobile operation is permitted without further formality. (Acknowledgement *IARU Region 1 Bulletin, April 1968.*)

UHF TETRODE WITH HEAT-SINK

The new STC 4KC/160M is interesting because, while being electrically similar to the well-known 4CX250B, it is built on its own heat-sink, using a new material of high insulating quality with good thermal conductivity—a most unusual combination. The 4KC/160M with its HS10A mounting block can be bolted direct to the Tx outer case, to dissipate the heat. The great advantage is, of course, that no forced-air cooling, involving blower motors and chimneys, is required. Like the 4CX250B (data as in the *ARRL Handbook*) the 4KC/160M is suitable for use as a high-power RF amplifier up to 500 mc.

IMPROVED FREQUENCY STABILITY, DROITWICH

The BBC's high-power long-wave transmitter at Droitwich, carrying the Light Programme on 200 kc, has for long been widely used as a reference frequency standard by industry and scientific bodies throughout Europe and the U.K. Since 1965, the long-term stability has been within ± 5 parts in 10^{11} , and with automatic frequency correction the excursion from the nominal 200 kc has not exceeded 1 part in 10^{16} .

This has now been further improved, the frequency-control source being a rubidium cell standard, provided

VFO Working

The VFO socket is a valvholder, into which a base is plugged. A coaxial connector for the RF circuit would do as well, with a 3-pin connector for chassis, 6.3v. and HT supplies.

To avoid feedback and other troubles, it is generally best to allow V1 to work as a doubler or tripler. As example, a VFO giving an output of 1.75-1.9 mc, calibrated at 2x (from 3.5-3.8 mc) will be satisfactory for 80m. coverage, V1 doubling. In the same way, if the VFO provides 7 mc input to V1, this will permit 14 mc and 21 mc operation, V1 acting as doubler or tripler.

The construction and calibration of a suitable VFO was described on pp.274-277 of the July issue of *SHORT WAVE MAGAZINE*.

To avoid possible disappointment with kit or commercially made VFO's, it should be noted that these differ enormously in the amount of RF power they can provide. Some could drive V2 directly on any band, V1 being virtually unnecessary. But others have a small RF output, and an extra stage would probably be needed ahead of V1, especially for the HF bands.

by the National Physical Laboratory. This has a day-to-day stability of better than 1 part in 10^{11} . The phase of the received 200 kc carrier is monitored continuously at the NPL during the hours of Light Programme transmission, and the values of mean daily frequency are maintained for reference.

CALLSIGNS FOR VISITORS TO EIRE

In future, the Irish authorities will issue—to visitors wanting temporary operating licences, under the usual conditions—callsigns in the new series EI2V-, the "V" to signify a visiting amateur. Nice thought on the part of somebody in the EI Licence Dept., showing that they welcome foreign radio amateurs to Eire.



"... find it a bit awkward with transistors ..."

PRACTICAL TWO-METRE SSB TRANSVERTER

POWER SUPPLIES AND
SWITCHING — METERING
— ALIGNMENT — POINTS
ON CONSTRUCTION

Part II

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

The first part of this article—in which circuitry and design points were discussed in detail—appeared in our July issue.—Editor.

COMING now to other aspects of the Transverter design—first the power supplies (p.350), which are quite conventional. The trick of using a bridge rectifier and taking a lower voltage from the transformer centre-tap is well known and the only point to watch with this arrangement is that the DC power rating of the transformer is not exceeded. Since the output voltage of the bridge is approximately twice that obtained from the usual full-wave circuit, and the power that a given transformer will handle remains the same, the manufacturer's load current rating must be considered reduced by half for safety. Under SSB operating conditions, additional power can usually be drawn on peaks without an alarming and expensive smell of hot windings but—you have been warned!

Separate transformers may, of course, be used for the various supplies, but it will be unwise to use higher values of input capacitance in the filters since the surge charging current is high and, unless the limiting resistors are increased in value, will damage the rectifiers. The BY238 silicones may be replaced by the more readily obtainable BY100, no changes being required in the parallel or series resistors. Additional protection against voltage spikes would be given by a $.01 \mu\text{F}$ 600-volt working capacitor across the primary of the transformer and a $.001 \mu\text{F}$ of a rating equal to at least 1.4 output voltage across the secondary.

The rectifiers for the high-voltage circuits are mounted on a paxolin printed-circuit board bolted to the main transformer frame. If this convenient placement is used it is advisable to keep the leads from the transformer to the board long enough to permit removal for replacement of components which are mounted on the rear.

The low-voltage supply for the converter is also quite ordinary. To obtain adequate filtering and therefore a T9 note, the trick is to use plenty of volts into, and therefore out of, the bridge. In this case the voltage across the first filter condenser is about 25, and the resistor as high as the required output voltage at the current drawn will permit. The $.01 \mu\text{F}$ capacitor across the transformer secondary will help to keep down the spikes.

Bias and relay supplies need little explanation except

to point out that the zeners are earthed through the operating relay on "transmit" and that this connection is broken on "receive," thus placing the full negative potential of the rail, some 80 volts, on the valve grids. Similarly, the cathode follower bias supply for the final is switched in such a way that cut-off bias is applied to the PA under "receive" conditions.

The 24-volt supply for the relays is obtained from the usual centre-tap arrangement.

Switching Arrangements

The diagram in Fig. 6, p.352, shows the relay switching arrangements. Operation of the transverter is controlled by Vox or p-t-t from the KW-2000. Contacts 1/1 select the indicating lamps, red for "transmit" and green for "receive." Contacts 1/2 operate the mute system on the external receiver. (Note that the Hammarlund HQ-145X used for split working requires the contacts to be closed for reception.) Contacts 1/3 lift the earth connections from the bottoms of the zener bias stabilisers on "receive" and contacts 1/4 perform a similar function for the QQV06-40A bias supply. A switch on the front panel overrides the 1/2 contacts to permit netting on the external receiver when using split operation.

RF switching functions are controlled by *Magnetic Devices* Type 951 relays. Relay 2 transfers the antenna between the internal converter and the PA for transceive operation and Relay 3 transfers the antenna to the external converter on "receive" and to the PA on "transmit" when using split operation. Under the latter conditions the aerial must first be transferred manually to the appropriate socket on the rear panel of the transverter.

Mains switching is *via* a control on the front panel, with a thermal delay device mounted on the rear panel. HT is applied to all circuits as soon as the apparatus is switched on, so caution is recommended when making adjustments. The usual fuses are wired into all supply circuits.

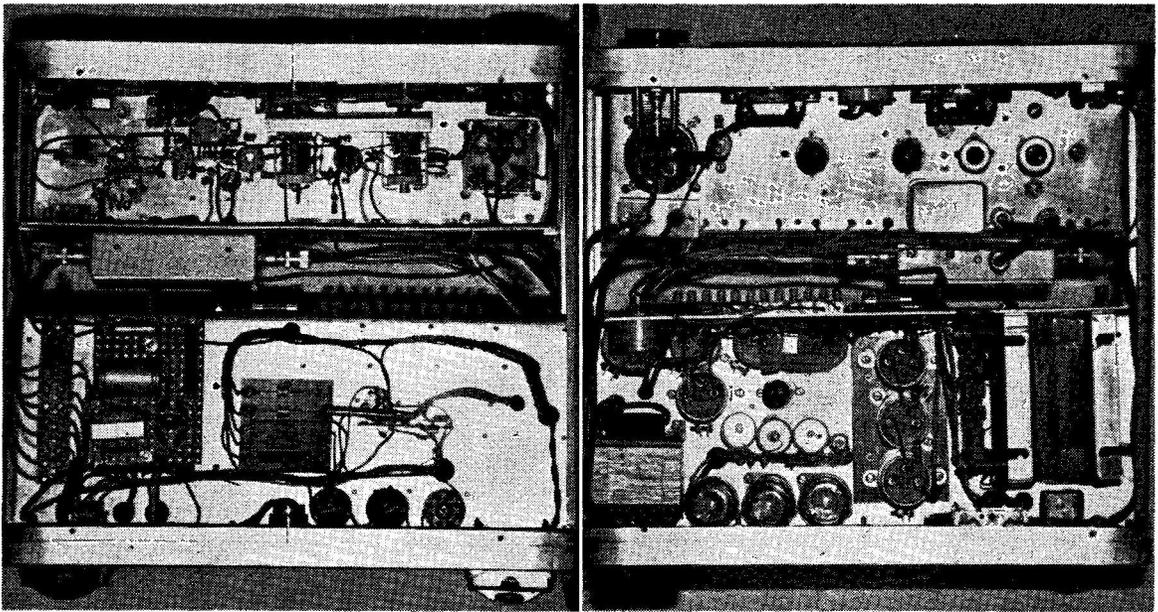
Converter

The FET converter is built into the same case as the

TABLE 1
Voltages and Currents

Valve	Electrode	Volts	Current (mA)
Oscillator	Triode anode	70	5
	Pentode anode	185	8
Amplifier Mixer	Anode	175	20
	Anode	250	25
	Grid	-22	0
Amplifier	Anode	250	Set to 25 mA for normal operation
	Grid	-22	0
PA	Anode	840	30-200
	Screen	250	0-13
	Grid	-27	2 mA max.

Note: Negative rail for first amplifier and mixer bias is at -70 volts. Rail for PA is -75 volts.



*Right, upper chassis view showing general layout.
Left, under the chassis of the two-metre Transverter.*

transverter and is of the type supplied by *JXK Converters*, specially for this purpose. It consists of an RF strip, high-Q break and IF output circuit, flat from 14.0 to 14.4 mc, the injection voltage for the mixer being picked up from the transverter oscillator chain *via* a coaxial socket on the side of the case. It is firmly bolted to the RF chassis in the transverter and the power supplies are drawn from a separate unit as explained above. No undesirable "birdies" have been observed and no special precautions have been found necessary to protect the front end from RF burn out. Inputs and outputs are through coaxial plugs and sockets. If there is any doubt in a potential user's mind about the lack of front end protection, it is *not* recommended that back-to-back diodes across the input are used since these will degrade the noise performance and increase the chance of cross-modulation from strong signals. The correct procedure is to arrange for another set of relay contacts, as near the input socket as possible, to earth the input of the converter when on "transmit." No IF breakthrough has been noticed, but if this is troublesome, a .01 μF condenser across the supply leads inside the case will usually cure it.

Metering

A 50 mA meter and a six-position switch monitor the anode currents of the early stages and also the screen current of the final. Resistors of 100 ohms are mounted on the switch contacts although these are actually in the supply leads to the valve electrodes. It was a matter of wiring convenience that they were located in this position and other layouts may make it simpler to mount them

directly at the valveholders and bring the leads back to the switch. A 5 mA meter is wired permanently into the PA grid circuit, and a 200 mA meter indicates the final plate current.

Alignment

Remove the HT supplies from the QQV03-10 amplifier and the PA. Connect all other supplies, setting the PA bias to -27 volts by means of the bias control.

Using the built-in meter to observe anode currents, and a GDO to ensure that circuits are on the correct frequencies, line up the oscillator, multiplier and first amplifier stages. Adjust the position of the coupling loop to the converter mixer as required for correct injection, and the link to the transverter mixer to give an anode current in that stage of 25 mA without SSB input. Now apply tone from the sideband generator and adjust the variable 200-ohm resistor associated with the 75 ohm soak load until the anode current of the mixer rises by 1 mA and no more. Check on a receiver that the output from the mixer is clean and on the correct two-metre frequency. There should be no significant radiation on adjacent frequencies. If there is, do not proceed any further until it has been traced and eliminated. Rectification at this stage will save much profanity and time-consuming investigation later. Under no circumstances should the transverter be operated on full power on an aerial until it is certain that there is nothing coming out of the mixer to indicate overload and/or incorrect mixing.

Apply HT to the QQV03-10 amplifier. The anode circuit of this stage and the grid circuit of the PA may now

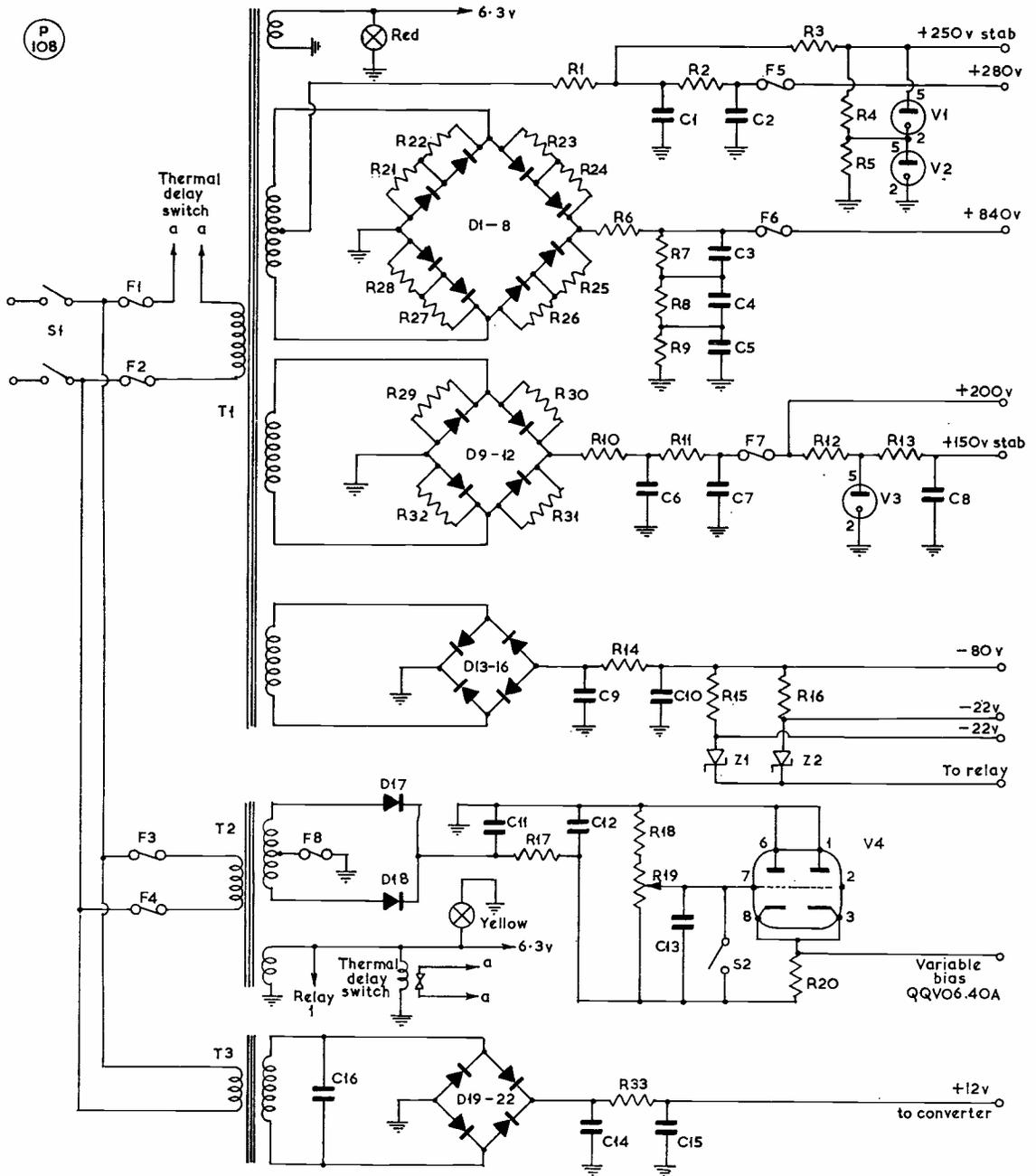
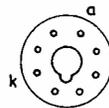
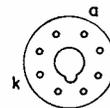


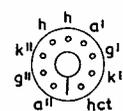
Fig. 5



V1, V3 : VR150



V2 : VR105



V4 : 12AU7

be resonated for maximum reading on the PA grid meter. With the drive control in the amplifier screen set to give maximum volts on that electrode, adjust the PA grid link until not more than 2 mA of grid current shows. Now recheck the stages from the mixer on. Use a minimum of SSB drive and reduce the various intervalve couplings as far as is consistent with obtaining the specified indication. There should be no grid current showing in the mixer or amplifier grids, and this can be checked by connecting a meter temporarily in the bottom end of the zenere supplies.

If at all possible a 'scope should be used to monitor the signal at this stage and after the final lining up has been completed.

Volts may now be applied to the PA and the output circuit resonated to give maximum power into a dummy load. Standing current should be adjusted to 30 mA by means of the PA bias control. Speech should produce peaks of about 200 mA in the PA anode. Under no circumstances should the linear amplifier be run without a load or without volts to both screen and anode. Now, and now only, plug in the antenna and adjust the PA tuning and the coupling link for maximum output. The loading on the PA should be as high as possible and the dip in anode current at resonance accordingly very shallow for the best results.

Table 1 shows the order of voltages and currents to be expected in the various stages—see p.348.

Construction

Construction is very much a matter of individual choice, depending as it often does on the availability of chassis and cabinets and space at the operating position. The following notes give guidance on certain aspects which are important whatever the layout. The reader is then left free to apply these in such a way that they fit his own particular situation.

It is advisable to build the transverter on two separate chassis, one for the RF section and the other for the

power supplies. All connections to the former are made *via* feed-through capacitors along the rear edge of the chassis, with the exception of those leads carrying RF, which are made to *Belling-Lee* sockets. The chassis is completely enclosed, a bottom plate being secured to it by self tapping screws. Variable capacitors for the oscillator, multiplier and first amplifier stages protrude through the top surface of the chassis with the shafts slotted to take a screwdriver and, once set to the correct frequencies, need no further adjustment. The mixer and second amplifier tuning condensers are mounted on a sub-chassis and have insulated couplers on their shafts to bring them through the front panel of the transverter to which the RF chassis is firmly bolted. Crystal and meter switches are also front panel mounted, as is the drive control in the screen of the QQV03-10 amplifier. Wire-ended crystals are soldered directly across the switch contacts with a single lead coming down to the oscillator grid.

The PA tank capacitor is mounted directly on the front panel immediately above the QQV06-40A, to which it is connected by short flexible leads of phosphor-bronze strip. The coil is soldered across the capacitor lugs, the single-turn link at the centre being supported on small stand-offs set into a perspex panel carried on 4BA studding to bring it to the correct position. This panel also carries the high voltage terminal. Coaxial leads from the link go to the aerial change-over relays. It is again pointed out that this is by no means the most effective way of arranging the tank circuit, but it achieves the purpose stated in the introduction to this article, and it fits the cabinet and layout. The remainder of the layout follows the sequence of the circuit diagram, normal VHF practice being observed as far as short leads and general placements of small components are concerned. Pictures on p.349 show the arrangement.

Valve cans are used on the first two valves but were not found to be necessary on others, although if instability occurs with other layouts they may be required. The output from both the QQV03-10 valves will drop if cans are used and an earthed screen above and below the chassis between the mixer and amplifier stages may be a better answer.

The high-voltage and PA bias components are mounted on top of the power supply chassis which is bolted to the rear panel of the cabinet. A vertical screen shields them from the RF field of the PA and also serves as a support for the fuses in each supply line and for the PA bias control. Mains input fuses and the thermal delay switch are on the back panel with all other inlets and outlets. The converter power supply and zener stabilisers are on the underside of the chassis, from which all connections are made *via* flexible terminal strips, which the exception of the 850-volt line which is brought out to a separate high voltage terminal. Note that the series filter capacitors in the high voltage supply must be insulated from each other and from the chassis which is at earth potential. This is done by mounting them on a paxolin sub-chassis. The bias filter condensers are positive-earth and so once again, if the cans are connected to the negative terminal as is quite usual, they must be insulated.

A word about the *Belling-Lee* sockets on the rear of the case adjacent to the coaxial relays: For normal

Table of Values

Fig. 5. The PSU for the G3DAH Transverter

C1, C2 = 100 μ F, 450v. wkng.	R14 = 470 ohms, 2w.
C3, C4, C5 = 60 + 100 μ F, 350v. wkng.	R15, R16 = 2,700 ohms, $\frac{1}{2}$ w.
C6, C7 = 60 + 100 μ F, 350v. wkng.	R17 = 70,000 ohms, 2w.
C8 = 50 μ F, 250v. wkng.	R18 = 15,000 ohms, 1w.
C11, C12 = 32 μ F, 400v. wkng.	R19 = 50,000 ohms, 2w.
C13 = 0.1 μ F, 150v. wkng.	R20 = 22,000 ohms, 1w.
C14 = 100 μ F, 15v. wkng.	R21- R32 = 150,000 ohms, $\frac{1}{2}$ w.
C15 = 160 μ F, 25v. wkng.	R33 = 1,900 ohms, 1w.
C16 = 0.1 μ F, 50v. wkng.	D1-D12 = BY238, or BY100
R1, R6, R10 = 25 ohms, 5w.	D13-D16 = BY235, or equiv.
R2 = 2,500 ohms, 10w.	D17, D18 = BY100
R3 = 4,700 ohms, 10w.	D19, D20 = OA81, or equiv.
R4, R5 = 470,000 ohms, 1w.	T1 = <i>Special to order</i>
R7, R8, R9 = 82,000 ohms, 1w.	T2 = 250.0-250v., 50 mA
R11 = 1,500 ohms, 5w.	T3 = 0.0-9v., <i>Henry's</i> <i>Radio</i>
R12 = 3,300 ohms, 5w.	Fuses = Mains 2 amp.
R13 = 10,000 ohms, 5w.	F5, F7, F8 = 100 mA
	F6 = 300 mA
	V1, V3 = VR-150
	V2 = VR105
	V4 = 12AU7

Note: Transformer T1 can be supplied by Light Electro-Developments, Ltd. The controlling thermal-delay switch for the PSU is a standard *Belling-Lee* item.

transceive operation, the antenna is plugged into the appropriate socket and the converter output and SSB sockets are connected to their respective receptacles on the KW-2000. For split operation, the antenna must be moved to the "split frequency" socket which is in parallel with the normal output socket, but has its own coaxial relay, and the "External converter" socket connected to the input of the second receiver. All transmit/receive switching is then by relays inside the transverter as before. Other arrangements to perform

the same operations are obviously possible.

The cabinet used has solid back and front panels each 15in. x 8in. to which are bolted lipped side panels 3in. x 15in., acting as supports for the perforated metal top and bottom which are secured to them and to the main panels with self-tapping screws. Rubber feet finish off the job.

Here then is a practical design for a two-metre transverter. It meets the specifications laid down in the introduction, performs well and looks reasonably tidy.

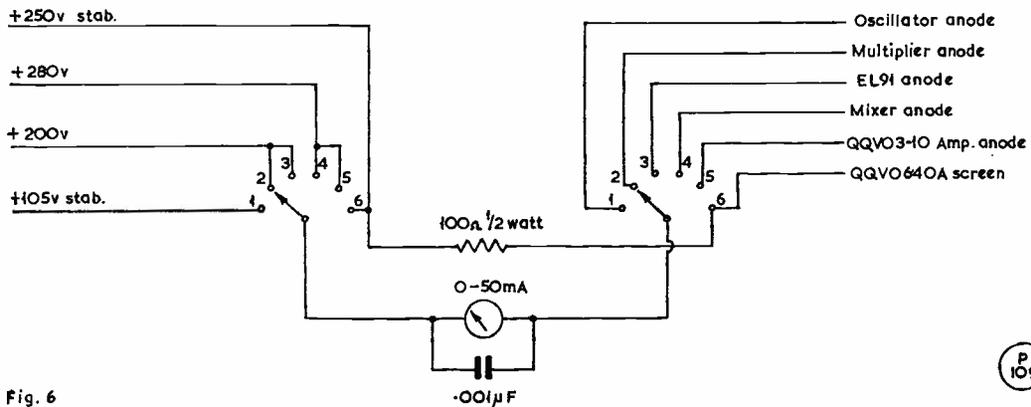
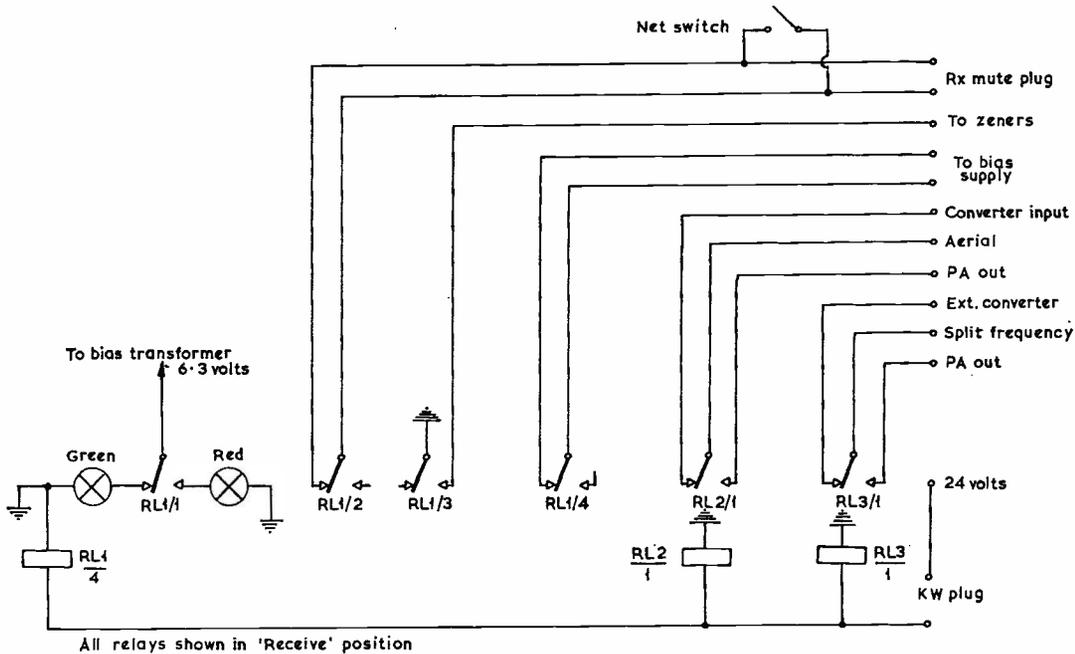


Fig. 6

Fig. 6. The switching and unit inter-connection.

The linear amplifier to follow it consists of a pair of 4CX250's and this will be described in a later article. The output as it stands is obviously well in excess of that required to drive these valves in AB1, and for those who

contemplate running a linear from the start, the QQV03-20A could be substituted for the QQV06-40A in Fig. 4, with suitable changes in the supply voltages and minor circuit alterations.

RECEIVER ATTENUATORS

CUTTING DOWN R_x INPUT TO AVOID CROSS-MODULATION

IT may seem extraordinary to say so but there are often receiving conditions when incoming signals need to be reduced in level to avoid severe cross-modulation — this applies particularly where transceivers are being used on the crowded 40-80m. bands, where we have to contend with strong "commercial competition."

G3NJY deals with this problem in the April issue of *QSP*, of the South Birmingham Radio Society. He suggests Fig. 1 as a useful resistive attenuator for receivers on these bands. Values are in ohms, and the unit goes in the aerial lead and as near the Rx as possible. This effectively prevents cross-modulation caused by powerful BC stations, in or near the band, and in a particular case revealed DX on 40m. not pre-

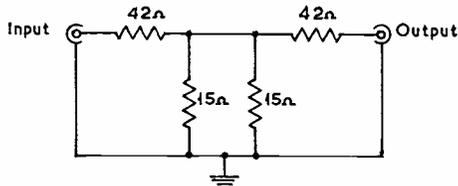


Fig.1

viously known to exist—of course, signals were down in strength compared with what they could have been (one can never expect something for nothing), but the point is that they were there.

The next move was to try a frequency-selective attenuator as a filter, as in Fig. 2, and this worked splendidly. Again in a particular case, a KW-2000A can be operated with full RF gain on the 40-metre band, without a trace of cross-modulation. Values for Fig. 2 are: C1,C5,C6, 68 μF ; C2,C7, .001 μF ; C3,C4, 1 μF , or two 2.2 μF in series; coils L1,L2,L3, are proportioned to resonate in the desired band. Capacities C3,C4, must be very small and probably could be made up by twisting short wire-ends together, if condensers of these small marked values are not available.

According to G3NJY's figures, his completed filter (Fig. 2) had a Q of about 70 on 40 metres, while a similar unit with coils for 80m. gave a Q of around 50, with a band-width of 70 kc at the 6 dB points. For 80m., therefore, two such filters would be necessary (with coils L1,L2,L3 resonated at the centres of the CW and SSB band areas) for adequate coverage of the 3.5 mc band.

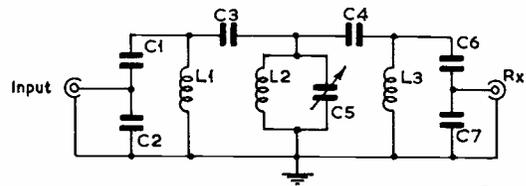


Fig. 2

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INSTRUCTION FOR THE R.A.E.

As in previous years, we shall be starting, in the next issue of *SHORT WAVE MAGAZINE*, listings of local centres at which coaching for the Radio Amateur's Examination will be available during the winter session 1968-'69, for the R.A.E. sitting in May, 1969.

At the moment of writing, it all seems a long way off—but those who are serious about the R.A.E. (the open-sesame for active participation in Amateur Radio) will be thinking about it now. Organisers responsible for R.A.E. course instruction for the coming session are asked to let us have details as soon as possible—and in any case not later than August 12 for coverage in the September

issue of *SHORT WAVE MAGAZINE*. Notices should be set out as shown on p.441 of our issue for September '67, addressed: Editor, *Short Wave Magazine*, Buckingham.

YET ANOTHER PMG!

Since the possibility of a beginner-licence was first mooted by the then Postmaster-General, there have been two changes in the office of PMG—the new Minister is Mr. John Stonehouse, MP, who took over on June 30. He is a keen and able young man and his appointment as PMG constitutes promotion for him in the Govt. set-up.

For anything Radio you may wish to buy, sell or exchange — use the Readers' Small Advertisement section of "Short Wave Magazine"

THE MOBILE SCENE

REPORTS AND PICTURES—

LONGLEAT, MILDENHALL and CHELTENHAM

PROTECTING THE FRONT END—

THE RALLY CALENDAR

Two big Mobile Rallies were held on June 30—the hottest day of the year so far—at Longleat in the West Country, with an estimated attendance of one thousand, and at R.A.F. Mildenhall, Suffolk, where some 1,100 cars were counted in and the maximum number of people on the ground has been worked out to have been no less than 8,500. Both events took place under near-ideal conditions as regards weather.

In addition to the well-known attractions at Longleat—the lions, the great house of the Marquis of Bath with all its antiques and historical associations, boat trips on the lake, barking seals and man-apes(!)—there was a good raffle and an array of trade stands. More than 300 licensed amateurs actually signed in—though quite a good proportion omitted to do this, with the added note to say how many they had brought. The West of England boys (the Bristol Amateur Radio Club and the Bristol Group) reckon this their best Rally effort yet, and G3PQE and his helpers deserve great credit for it.

* * *

At Mildenhall, the main features of the ninth annual event organised by the Amateur Radio Mobile Society were the magnificent aerobatic display given by the R.A.F.'s Red Arrow team; the music provided by the U.S. Third Air Force Band; the trade show, arranged by

G3AGP and attracting 50 exhibitors; and the raffle, for which the retail value of the prizes was about £200. On this A.R.M.S. occasion, entry to the Rally was by purchase of a car raffle ticket (10s. per vehicle) and though this may have seemed exorbitant to some—unfortunately, we were not given, in time for publication, any information about what these tickets were actually to cost—there is no doubt that it was for a worthy cause. In the event, a sum in the region of £250 was raised for this year's A.R.M.S. charity—the Friends of Normanfield, a school for mentally-handicapped children, at Teddington, Middlesex, in which Brian Rix, G2DQU, of the Whitehall Theatre, is interested. This amount of £250 must be by far the largest charitable donation yet raised at a Mobile Rally and subscribed to by radio amateur visitors.

The A.R.M.S. talk-in stations (operated by members of the Wimbledon & District Radio Society) signed GB2USA, and though many /M's were worked on Top Band, there were difficulties with the VHF elements on 4m. and two metres.

Norman Fitch, G3FPK, hon. secretary of the Amateur Radio Mobile Society, 76 Murchison Road, London, E.10, asks us to say that he would like to hear from any visitor to the Mildenhall Rally who has complaints or criticisms about the event—or ideas and suggestions for future occasions. Offers to help would also be appreciated!

* * *

For the Cheltenham "Do" over the weekend July 6/7, they started with a dinner on the Saturday evening at which some 36 people were present—mainly holders of call signs accompanied by the distaff side. In the course of the evening, entertainment was provided by

[cont'd p.356]



The waterborne-mobile station of G3DKS/M. His smart 25ft. fibreglass "Sea Sparrow" is a custom-built craft for inland cruising, and is moored at Yardley Gobion, Northants., on the Grand Union Canal, where they have a small local club. Of course, he is fully equipped radio-wise and the antennae include an interesting version of the ZL-Special, cut for two metres and made collapsible, with a base-loaded whip for the LF bands. As the boat has a fibreglass hull (a perfect insulator), earthing is by a bronze plate bolted to the keel and bonded to the engine and under-water drive unit. G3DKS, in his travels over the extensive navigable canal system—extending over 100's of miles—has found some surprisingly good sites in virtually uninhabited areas—for instance, the summit level of the Leicester Arm runs for 21 miles at 412ft. a.s.l., with hardly a soul in sight.



General view at Longleat, near Warminster, Wilts., for the Rally there on June 30 when the attendance (on the hottest day of the year so far) was estimated at over 1,000 people. In the background is the great house, home of the Marquis of Bath and one of the show places of England.

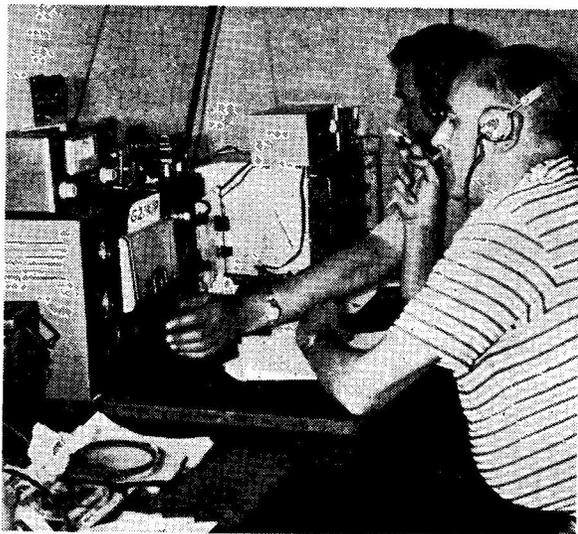


Taken at Bridlington Mobile Rally on May 26, showing members of the working committee—from the right, G5VO, G8AZH, G3VLM and G3PEJ, with SWL helpers. The attendance was in region of 500, in very good Wx, and over 140 callsigns appeared in the register.

At Longleat on June 30, left to right: G6GN, G5KT and G6GU, all of whom have been on the air for many years from down Bristol way.



The Mayor of Bridlington is also G2ACD, and here we see him, with G3GBH, during the judging of /M vehicles, of which there were about 50 in the car park, for the Bridlington Rally on May 26.



One of the talk-in stations for the West of England Mobile Rally at Longleat on June 30 was G2IK/P, on Top Band, 78 mobiles being worked. The two-metre station made 12 /M contacts.

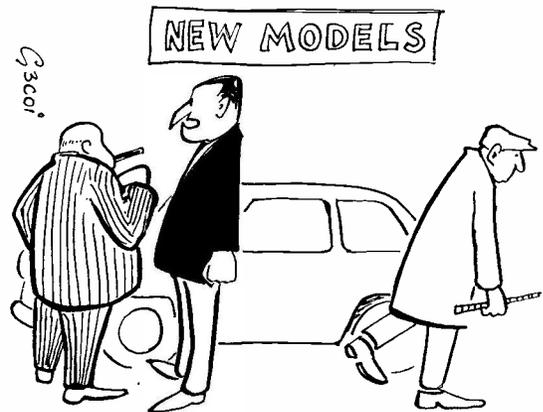
G3PSD, who is a professional able to give a 40-min. non-stop programme. On the Sunday, July 7, the Wx turned very sour on them, with heavy rain after mid-day. In spite of this, more than 200 people signed in at Pittville Park and about 75 vehicles equipped for /M were counted in the Rally enclosure. Though the Wx put a depressing dampener on proceedings, all those who were there felt it was a successful and worth-while meeting—especially those who were lucky in the prize draw. Tickets yellow 59, 329, 389; green 66, 148; and white 33, 47, 103 and 147 still remain to be paid out; they will be held till August 23 and then, if unclaimed, be disposed

of by local auction. Claims to G3MOE, QTHR.

The trade at the Cheltenham meeting was represented by *Lowe Electronics*—that man gets everywhere!—and by *Daystrom Limited*, with their fine mobile-caravan display. It seems that their enterprise brought them good business.

* * *

An interesting note in *Tamar Pegasus* for June, by G3HRW/M, discusses the problem of thermal runaway with unventilated transistor gear in a hot car during very warm weather—such as we had during the latter part of June and early July. If you wish to keep a check on your Rx, connect a milliammeter in series with the HT lead while the receiver is in normal working condition. Most transistor Rx's will draw about 10 mA under no-signal conditions, rising to 20-25 mA or so when a



“... No sale, gov'nor—says his rig won't fit, or something ...”

Our talented cartoonist, G3COI, describes this as "a self-portrait, taken 'al fresco' at home, with a loaf of bread, a can of Guinness and a Top Band rig."



strong local is tuned in—whatever this value, take a note of it. Then, if the receiver goes into thermal runaway, the current will start rising rapidly to a much higher value—then it's time to switch off, *quick*, and let things cool down.

G3HRW/M also deals with the well-known difficulty of protecting the transistor receiver front-end against very strong signals from near-by stations, suddenly tuned in, which can ruin any transistor. Though it will degrade performance to a certain extent, the trick is to fit a pair of diodes, in parallel but with their polarities reversed, across the Rx input. This will take care of overload signals.

The Rally Calendar

Following are coming Rally events, of which details as given here have been notified to us:

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. Talk-in stations will operate from 10.0 a.m. till 3.30 p.m., with G3ERD/A on Top Band and G2OJ/A on two metres. There

will be the usual grand prize draw, a junk sale and numerous field events. It will be a good day out for all the family, with refreshments available on site, free admission and ample parking, enough indoor accommodation if wet, and a display of trade stands. Anyone who has been to this Rally in previous years will know that it will be a Good Show.—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.—three miles west of Swindon, just off the A.420, Swindon-Chippenham, with local sign-posting. Talk-in will be by G3WEF/A on 1850 kc, G3SIR/A on 70.56 mc and G3LZZ/A on 144.12 mc, all on the air from 10.0 a.m., with secondary stations to assist. Attractions include competitions, raffle, trade stands and exhibits, model railway rides, and lucky-number programme. Plenty of parking space and ample covered accommodation. For further details, contact: I. S. Partridge, G3PRR, 104 Grance Drive, Stratton Margaret, Swindon, Wilts.

September 1: Mobile Rally to be held by the Preston Amateur Radio Society in the car park of the Preston North End Football Ground. There will be various indoor displays, and talk-in stations will be on the air from 10.0 a.m. Further information from: G. Windsor, 26 St. Gregory's Road, Preston PR1 6YB, Lancs.

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 picnicking. 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 1, Belgium.

Closing date for Rally reports and Mobile notes to appear in the September issue: *Monday, August 12*, "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 *August 9* for the next issue.

NOTES ON THE KW VESPA

DISCUSSING THE MK. I AND MK. II ALL-BAND VERSIONS

THE current production of the *KW Vespa* is the Mark II form, where a 6HF5 is used in the PA to give a 220-watt p.e.p. output on SSB; the earlier Mark I is similar in all respects saving only in the use of a 6146 PA, and a few minor changes of component values in consequence. The transmitter under review is a second-hand Mark I, with about 18 months' service on the log before purchase by the writer from K.W. Electronics, Ltd.

With a second-hand piece of equipment one is always inclined to expect minor faults, and so it might have been with this one; but it has to be said that the first owner of this specimen must have cherished it, for the appearance was immaculate, with the external finish quite as good as the day it first left the works with no evidence of retouching. And the Tx had, of course, been fully serviced by K.W. Electronics, Ltd. before resale.

The first contacts proved that the transmitter put out a good signal, approved by all stations worked and that, as compared with AM at the same sort of power level, the potential to raise them was greater—a situation which more than bears out the theory of SSB, particularly when the QRM is heavy.

Eventually, attention was turned to CW, and here an unexpected snag arose—sparking at the key, which wiped up the family TV set on all bands. A look at the transmitter schematic indicated that there was no obvious reason why the sparking should occur. A quick call was made to the firm, which brought forth a suggestion for a key-click filter circuit; this was hooked up and found to produce the sort of keyed signal which the text-books say a perfect transmitter should possess.

TVI Aspect

Some investigation was made of the TVI characteristics. At the writer's QTH, it is fair to say the Channel 1 signal is far from strong, and HF working during TV hours is normally a near-impossibility. However, SSB operation on 14 mc and 28 mc was possible without interfering with the domestic TV Rx provided that the PA was not "talked up" beyond the currents mentioned

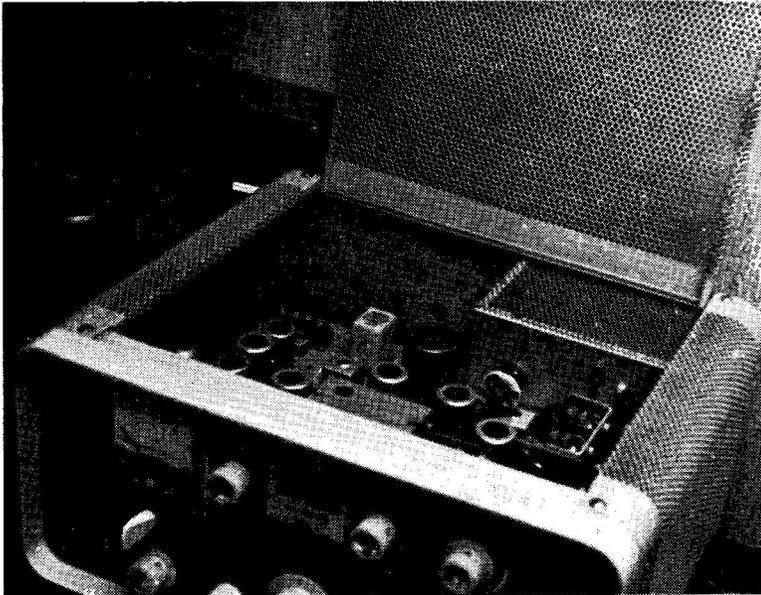
in the handbook. Of course, 21 mc is always the most difficult band when the local BBC is on Ch. 1, and is indeed normally regarded as impossible—but here we were surprised to find that the picture was not lost, but only a mild herring-bone was produced. It should be noted that not only were these tests related to a fringe-area signal on the most difficult channel of all, but that there was no more than the usual external high-pass filter on the TV Rx, and a low-pass filter, ATU, and three-band aerial on the transmitter. No complaints of TVI came in from the nearby viewers. The domestic Rx on 21 mc was cured by the simple expedient of putting the high-pass filter *inside* the Rx, and cleaning-up and remaking all the connections to the transmitting and TV aerials.

An interesting sidelight on this is that it was found that *none* of the TVI was generated by the transmitter itself—all was coming from the TV Rx set front-end when its RF stage ran into grid-current from the transmitter fundamental-frequency pick-up. It was also interesting to note that with a VSWR of 2 : 1 on the line between the ATU and the transmitter, the SWR indicator used generated far more TVI, until the thing was modified to have an "off" position on the forward/reverse switch, by which the diodes were cut out!

What it boils down to form the TVI point of view is this: With a Vespa, the transmitter is so designed that if *correctly operated* it will not generate TVI. However, that is not to say that incorrect operation, or external circumstances, may not produce some interference—but one has at least the consolation of knowing, when the complaint comes in, that the fault will not involve tearing the rig to bits.

Top Band

One of the joys of the K.W. Electronics range of equipment is the fact that they embody Top Band facilities. A high/low switch is fitted to the power supply, and all that has to be done for SSB working on 160 metres is to flip the switch to the low-power position, and follow the instructions. Operation on CW is not quite so easy, because the standing current on the PA valve is set for a dissipation of more than 10 watts. The answer is to tune up in the usual way but with the standing current reduced to *just zero* with no drive. However, this does put the honest operator at something of a disadvantage, as with the PA valve running with *no* grid current one gets about five watts out for a DC input of ten watts. One could wish the Post Office would amend the power-input limitations for use with CW/SSB transmitters so



An inside view of the K.W. "Vespa" transmitter, showing general construction. It is completely self-contained, and runs 220 watts p.e.p., AM/CW/SSB.

that in such cases one could load up to a specified RF output regardless of the standing current in the PA—which would preserve the perfect signal such a rig can generate when driven without grid current.

Power Supplies

One of the noticeable differences between the Mark I and Mark II Vespas is the power-supply—the latter is three pounds heavier at 18 lb. than the earlier one. However, a weight of 18 pounds is not much, when compared with the weight of the PSU for an AM rig of similar power—typically about 50 lbs.—and leads one to consider the actual power taken from the mains. Here the comparison is indeed startling—the AM rig soaks up 600 watts while the Vespa Mk. II takes only 250 watts at full modulation. As for the Mark I under test, a mere 180 watts mains load sufficed.

Specification and Handbook

The transmitter not being new, some deviation from the K.W. specifications might have been expected but in fact when tested on the bench it met all the requirements of the specification, and indeed handsomely bettered it in some respects. The figures against which the Tx was measured were those laid down in the handbook, and the methods of making them were taken, where applicable, likewise. But in all cases the accuracy was checked against other laboratory test gear and different methods, with similar results. The handbook is about the best your reviewer has seen from a British manufacturer in the Amateur Radio field, and while the pages are duplicated—which is only sensible in this sort of context—there is no doubt that there is enough information for anyone, with all the setting-up procedures and tables of voltages and resistances, also drawings of

the interconnections to the receiver, aerial, and linear amplifier (if one is used).

Setting it Up

And talking of connections, it is a pleasure to note that here is a manufacturer who realises that most well-equipped stations do have a receiver. The Vespa provides the connections for switching the aerial over to the receiver, and contacts to mute it when transmitting—and, thank Heaven, has so arranged things that none of the plugs can be cross-mated.

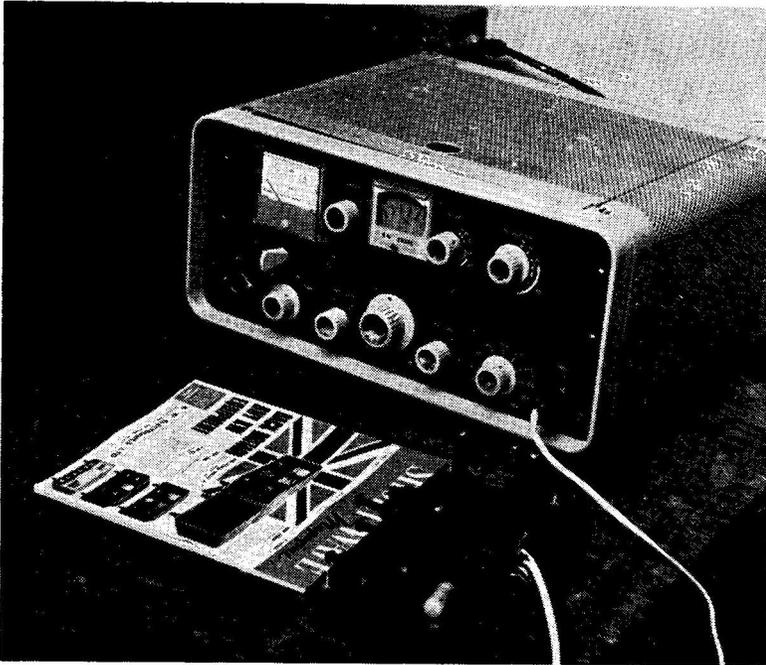
Performance

On the air, the expected improvement in range of QSO's was experienced, as compared with the old AM rig. Netting was a trifle more complicated in that the netting switch has to be thrown and some carrier inserted, but this was more than cancelled out by the fact that this enables one to set the netting to a level appropriate to the incoming signal. The stability was impressive, as was the dial calibration accuracy on all bands. As with most transmitters of this type, sustained operation at full stick into a dummy load is not possible due to the method of use of the PA valve, but it can be said that after prolonged periods of operating no deterioration in output was noted, nor was the transmitter excessively hot; the power-pack indeed ran quite cool.

Criticisms

No equipment is perfect, but fewer comments than usual can be levelled at the Vespa under this heading. The front panel layout is fine for the SSB operator, but one could wish, for CW operating, that the key-type switch for change-over could be above the meter rather than below.

As for the circuits, there is little that can be levelled



General appearance of the K.W. "Vespa," with a size comparison.

at them; ALC would be a desirable addition, as it would to any transmitter, and those who prefer a Vox will miss this facility, although it is quite possible to build a suitable outboard unit to do the job.

The power supply is an admirable piece of work, and is intended to be fixed under the operating table out of sight. This being the case, a fibre cover is acceptable, and does not tear one's trousers when bumped against—but your reviewer would admit he would much prefer a metal case to the unit!

Service

A word should be said about this. When the transmitter was purchased, the writer was given the name of a contact at the Works where the service department is located. As indicated earlier, occasion arose to use this contact. No words were wasted in platitudes but plenty of information was immediately forthcoming to solve the problems, both verbally over the telephone, and in the way of a follow-up letter with circuits in the post the same day. One was left with the feeling of someone extremely capable and interested in the reputation of his firm's products.

Conclusions

Knock-about use on the bands has given much pleasure and demonstrated that the Vespa transmitter fully lives up to the expectations inspired by its specification; appearance and finish are good, as is the circuit design and layout. This review has been written around a piece of second-hand equipment treated as though it were straight off the line; and on this basis one can reasonably say the transmitter would represent a very good buy indeed as new equipment, and is a credit to its designer's ability when looked at as a second-hand

item. Finally, as no one was aware that the writer was intending to review the transmitter for *SHORT WAVE MAGAZINE* till after it had been safely stowed away in the car for the journey home, confidence may safely be placed in the statement that this rig is no better than any other of its type.

The criticisms, such as they are, are minor when set against the ability to operate the HF bands with freedom from TVI in most locations, and to have a station set-up which is not an eyesore.



"... Am a really keen CW operator ..."

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

THE month under review has been notable mainly for the changes in the Wx, and the resulting spasms of—for once in a way—static, rather than man-made noise. Thus concentrated interest has been taken in one of the “noise-blanker” circuits, which seems to have far more effect on the various varieties of static-crash than the more conventional arrangements. Since the effect of more selectivity in the receiver IF system is to slow up the fast rise of the noise pulses, the ploy seems to be to extract the noise signal ahead of the selectivity producing stages, and then use it to shut off the receiver gain, leaving “holes of silence” rather than just flattening the peak of the noise, as the more usual limiters do. Such a circuit is shown in the 1968 *ARRL Handbook*, and certainly seems to give better results than the usual noise-control arrangements, both in CW and SSB reception. A very useful practical treatment of the subject, by G3JZK (now GM3JZK) appeared in the August 1962 issue of *SHORT WAVE MAGAZINE*.

And, talking of receivers, the majority of us lesser mortals are still using receivers of what one may call the “classical superhet” design, involving a tunable first local oscillator. After once again losing some choice DX as a result of the old Rx drifting frequency while muted, and back the other way when switched on again, one wonders if there is *any* way of muting receivers which will prevent them wandering.

In quite another context, it will not surprise readers of this piece to hear that the W's also go in for chasing counties, and your scribe was rather amused to note a recent exercise by WAØKXJ and 'NYK, when they operated from the junction of Adair, Madison, Guthrie and Dallas counties; a photograph appears in June *CQ* showing the rig with one corner in each of the four counties! On the mainland of the U.S. there are 3,030 counties, corresponding roughly in size and

administration to our own County system. It would be quite a feat to get QSL's from even half of them!

The Bands

Possibly one of the greatest pleasures of DX-chasing is the unexpectedness of propagation conditions at times, with real DX turning up oddly or on an apparently dead band. On the other hand it sometimes has its annoyances, as when one finds the best DX on Twenty is only there when civilised folk should be sleeping, instead of appearing on the lower frequencies, habitués of which do not sleep anyway! At that point perhaps it is as well to give a whirl to the Top Band news.

W1BB sends a copy of his ever-welcome *DX Bulletin* covering Top

Band activities. He finally landed his own 100th country on 160 metres—yes, one hundred on Top Band—by way of a contact with CE3CZ (DL9KRA in his “other hat”), albeit three of them do not count, as they were worked before Hitler's War. This is *quite* an achievement—it seems not so many years ago that a term for the improbable was “as likely as a Top Band WAC”—which went out of fashion when the late G6GM first knocked it on the head. Since then the phrase has become “as likely as a Top Band DXCC”—but how can we describe the impossible now?

Still on the tack of “the improbable,” W1BB is interested in collecting authentic reports of *real* 160-metre DX which took place in *daylight*—one often hears of some-

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

Station	Countries	28 mc	21 mc	14 mc	7 mc	3.5 mc	1.8 mc
W6AM	345	131	140	345	116	54	7
G2DC	335	169	307	327	163	108	20
G3DO	334	188	231	327	90	83	9
G3NOF	310	155	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	141	82	42	77	83	49	9
G3VDL	132	46	96	96	45	22	—
G3IDG	121	72	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.

ALL-BAND ZONES AND PREFIXES TABLE

Starting date: January 1, 1968

Station	Zones	Prefixes
G3LZQ	40	240
G3SED	24	110
G3AAQ/M	23	213
G3PQF	22	163
G3IDG	20	74
G3WJS	15	171
G3VPS	15	158
G3WPO	12	92

one else who has done it, but you never seem to meet the people. W1BB is on a serious quest for information on such anomalous propagation, and information should be sent to him direct, *QTHR*.

Also from W1BB, a few snippets: First, that DL9KRA has plans to work from FO8 on Top Band, dates and details still to be announced. Secondly, thoughts are being turned, thanks to a suggestion by G3SED, towards the idea of Europe-to-JA tests this coming Winter season, rather on the lines of the trans-Atlantics. Those interested should contact JA3AA, *QTHR*, as soon as possible. Thirdly, UA0JW was reported worked by JA1PVK during March, and it is said that "many JA's had QSO's." Whether this UA0JW was the real McCoy is not at the moment known, but no doubt the QSL will settle the matter—and it is an interesting point that if W1BB himself had worked these three—UA0, JA and FO8—he would have the requisite 100 countries for a post-war DXCC on 160 metres.

ZC4GM passes on the word that the famous ZC4RB will, by the time this piece is in print, be back in the U.K. and resuming in due course his activities as G3VIR. As ZC4RB, he put up a masterly performance in the firmament of Top Band DX activity.

A note from G3TTN on the G3SVK, with others, DX-pedition to the isles of Sark, Alderney, Guernsey and Jersey gives the relevant dates: July 28 to 31, *Sark*; August 1 to 4, *Alderney*; 5th and 6th, *Guernsey*; and August 7-9, in *Jersey*. The calls to look out for

are GC3TTN, GC3LDH, GC3KNZ and GC3SVK, on all bands, but with Top Band coming up every evening. Transmitters are to include a Vespa and a KW-2000A.

Talking of this expedition, GM3UVL (Bearden, Dunbartonshire) says he is waiting for the *Sark* activity with baited hook, and hopes he can batter his way through QRM which is 400 miles closer to the target.

GB2IS on Top Band pleased G3PQF (Farnborough) but your poor old scribe displeased him by not hearing G3PQF when G3KFE was working locals—to which the writer can only reply "Snap!" Dave passes on a rumour that G3LGN intends to do something in Cumberland later on in the season.

G13GRD (Enniskillen, Co. Fermanagh) would like the Top Band clan to know that he has acquired a 160-metre transmitter, with which he intends to remove County Fermanagh from the list of rare ones. Operating times will be, in the main, between midnight and 0100 clock. Letters to G13GRD, 8 Station Road, Kest, Enniskillen, Co. Fermanagh.

Back in 1951, some Top Band operators and SWL's may remember HA4SA, who gave out many a QSL for a country (Hungary) now apparently on the inactive 160m. list. G3IDG (Basingstoke) says that this same HA4SA is still active today, albeit he signs WA1FHU now! G3IDG also reminds us that SWL Allen, mentioned last time round from VK, is a real old-timer in the SWL game and the winner of various receiving contests.

G3IGW (Halifax) has a brief note in this time to say that while the HF-band types may feel things have not been as good as expected this season, the converse has been the case for Top Band, which has not deteriorated as much as one would have thought—5Z4LE is still getting DHJ, although recent skeds with G3IGW drew a blank.

Pleasant to hear from G3XGD (Sheffield) who is rapidly becoming addicted to key-bashing, because his modulator chose the right moment "to go on the blink," as the saying is. He is most pleased with contacts with G3WRQ for Hereford, and G13LV/P for Fermanagh.

The weekend August 23-26 is

slated for the Addiscombe Club to spend a weekend in Rutland signing GB2ARC/P on CW and AM, the bands being 160m. and the VHF's. All contacts will be QSL'd. Operators will be G3VLJ, G3VKI, G3XJO and G8BJG.

A combination of summer doldrums and the "monsoon season" in the Isle of Sheppey, a lawn mower and a growth of young wild life in the garden pond have between them kept the G2HKU activity down to a low level, albeit Ted worked G13SGR for Londonderry (as new one), G13WSS, G13AOB, GM3OXX and GB2IS in the Scillies (for which the cards should be sent to G3VNR), also PA0PPN, all on the 160m. key; he heard GW3PPF/P (in Montgomery), GM3FSV, GM3BGW and GM3UQL/P, although the latter did not come up at any of the sked times.

G3VLX (Sidcup) also remarks that he heard virtually nothing of the GM3UQL expedition, though several stations were there and calling at the sked times. In partnership with G3XMD, daylight QSO's were made with Cornwall and Merioneth, with PA0PN heard mid-morning working G3WPO; the latter was called, as he was 56 on Phone, but he went QRT.

Which is a good way of bringing G3WPO (Burgess Hill) into the discussion; Tony has been mainly active on Top Band, but at the time of writing was tasting the delights of Twenty as a result of acquiring a KW Vespa.

Another chap to change his gear is G3VPS, who has now got a KW-2000 in the shack. This has modified his operating habits no end; the 99% CW approach has gone overboard, and he says there are not enough hours in the day at Hailsham now.

That suggestion from G8HX, to use a standard calling frequency for CW when the band is not active (as is done on 1910 kc for Phone) finds an echo in the letter from GW3VPL (Porthcawl), who suggests a CW spot around 1820 kc. Steve has been a bit inactive due to the calls on his time of "the examiners" but has found that when the QRN is fairly low, W1BB on 160m. is almost at winter-time strength.

Reverting to the point about activity from Cumberland, G3WQQ



The G3UID/G3WUW GW-expedition party stopped at Stow-on-the-Wold on their way to Brecon. G3XCK is in the stocks and G3WUW is second from right, with G3UID on the left. During the expedition—which took place over Easter—call-signs used were GW3UID/P on 160m. and GW3WUW/P on two metres. On the right is the expedition location, about 14 miles south-east of Brecon, at 1800ft. a.s.l.

(Brighton) remarks that the only station he has ever worked from that county was on Forty; when said station was asked why he did not try Top Band the answer was “To keep away from people like you who want a QSL!”

A change of QTH is noted by G3WUD, who now is in Bramhall, Cheshire. His activity has been low as yet, due to the settling-in business, but the machinery has been fired up on Top Band, where it worked the TV set—which was *not* part of the plan. An inverted-Vee aerial is on the stocks when time becomes easier to spare, and then Robert will be going places once more.

Bute and Londonderry for new counties gladdened the heart of G13WSS (Co. Down), who rises in the Tables as a result.

Interesting DX-Pedition

Until August 31, G3UOL will be taking a trip to Greece for a holiday, and he will be operating /P most of the time, both out and return, using calls ON8IT, G3UOL/LX, FØJA and YU7LCT, together with an OE one (not as yet to hand). QSL's should go to the home QTH of G3UOL in Coventry. The transmitter runs 15 watts, CC on 14047 and 14075 kc, while the Rx side is a transistor job.

The other LF bands get hardly a mention, other than in passing com-

ments here and there; as far as your scribe is concerned, he has to agree that Forty seems to be much below par, with virtually nothing worthwhile at times when one is normally awake. Some of the commercial signals have the most fearsome drift, which one is sure could just not be achieved without special drift-producing circuitry! And as for the notes: As this is being written, the receiver is set to the LF end of the 40m. band in the “SSB selectivity” position, and there are no less than four signals in the pass-band that would justify T2 reports—but all four were being given T9!

Here and There

First, the phoneys—a tribe on the increase. “HC8CV” is not known by VE3GCO, who is quoted as his QSL manager; and we hear also that VE3GCO is not doing the cards for a “5X5HH” either. Another dud is the “MP4TCE” who is around on Forty; the real one does not use that band, and does not operate CW much either—which is a pity, as the phoney “MP4TCE” is not a bad CW operator!

Reverting to the W9WNV business, a rumour reaches us that Don has now taken up medical practice in Gillett, Wisconsin. It is understood that a settlement has been reached with ARRL, and that the latter will

accept Blenheim Reef and Geysler, while Nelson Island will count for Chagos credit. SWL reports for all W9WNV cards 1965—1968 will be dealt with by VE3GCO; cards for the three mentioned operations will be disposed of on the SWL side when the cards come to hand, as a shipment of blank cards would appear to have gone astray.

Nice to hear again from W6AM (Long Beach, California) one of the world's leading DX operators, with an entry for the Table—and a sobering thought to notice from the date on the envelope that it landed a darn sight quicker than some of the U.K. mail has been doing of late! Don sent in two cards, one of his own, and a VK9DC card, which indicates that W6AM is doing the QSL chore for the latter.

From G3NOF (Yeovil) comes news that K7HNT is looking for the present whereabouts of a certain Don Wilson, who was signing DL2VK from Berlin back in 1957; if anyone has any knowledge, it would be appreciated if it were passed to G3NOF (*QTHR*) for onward transmission to K7HNT.

Harking back to that paragraph on p.230, June issue, anent the unknown benefactor who has been helping the juniors with anonymous parcels of components, G3XFF (Felixstowe) writes to say that he was a recipient, and mighty handy

that parcel was, too. G3XFF wants to make sure that whoever sent the parcel is aware of his thanks for a most opportune gift.

9V1OG says that he would like to receive any reports on his transmissions, and would QSL genuine SWL reports direct. As he is having—or seeming to have—a certain amount of difficulty in getting out the reports should be brief and to the point. The band where the problem lies is 21 mc, on which 9V1OG uses a Sommerkamp receiver and transmitter to a home-built beam at 150 feet. If his signals are RS-33, then he would like to know, and such reports are just as good for QSL's as the 59 ones. Summing it up, look out for 9V1OG, 21 mc SSB, between 1500 and 1800z, and if you find him, send an *honest* report to 34D Far East Mansions, Kim Yam Road, Singapore.

Members of the R.M.A. Sandhurst will be operating GM5PM/P from Clackmannanshire over August 8-16, chasing the DX in the mornings, working the LF bands in the afternoons, using SSB in both cases, and for a change coming up on Top Band CW in the evenings. All contacts will be QSL'd *via* Bureaux.

The HF Bands

Here we will start by looking at Ten, which is as "iffy" as one would expect at this time of year; G3NOF remarks on the ZD8's around 1700, and the short skip conditions prevailing. He made SSB contacts with ZD8CC, ZD8JW, ZS's and 9Q5HU.

As far as G2DC (Ringwood) was concerned, Ten did not justify wasting a lot of his time, and the only three QSO's he records as being outside Europe were with CR7IZ, DZ9GO and ZS1XR.

Where's the DX? asks G3PQF, of 28 mc conditions—his total crop comprised an OZ and OK5PRAGA, the latter at the World Stamp Exhibition in Prague. Incidentally, Dave prognosticates a situation where there could be more ex-PMG's about than licensed amateurs in U.K.!

G3IDG has a feeling, shared by many, that conditions have "gone off" all round of late months; certainly, there have been times when not a signal was to be heard on any band from Eighty to Ten, CW or

SSB—a situation alarming enough to cause worrying thoughts about receiver and aerial/earth system.

G3AAQ has, as usual, been doing most of his operating /M, and as he is now commuting 100 miles a day, he has plenty of opportunity! However, a move to Rugby from Kidderminster is in prospect, and for a time this will probably result in even less operation with the home rig. The weekend of June 22/23 was so bad that Jake had a session indoors with his Joystick, and at that time he heard ZE3JJ under the all-European QRM, although the ZE got away.

Fifteen Metres

People say this has been a poor band, and then offer contacts to demonstrate otherwise! G3AAQ/M found UJ8AB, UH8BO, JA1NCZ, W6WX, KV4CI and VE7AC; also 9H1BA/P, 9J8AA/P and the VS6 field day station, although there is a slight element of doubt as to whether the last-mentioned one was completed, due to the inevitable QRM. Later in the period, Jake connected with CR6AL, EA6BD and ZE4JS. Showing his gear to some non-amateur friends, he casually switched on, and forthwith raised WA7IXE /MM, on a big tanker just nosing into Kuwait—which must have impressed them mightily.

G2DC feels 21 mc to have been the best of the bunch this month, and seems to have spent much of his time on it. Not much was doing before about noon, with the Far East prominent in the afternoons, and to him there was nothing new in CE3ZK, CR7IZ, CR7LU, CM1AR, EA6AR, LU7FAL, MP4BGU, MP4MBC, TJ1AJ, UF6FN, VK3AZY, VS6AA, VP7JH, VP7JX, Halley Bay (who said G2DC was his first G QSO for a couple of months), VU2OLK, ZD8JW and 9F3FMA.

The degree of short-skip is commented on by G3NOF; Don found the band open till midnight or later to North and South America, although he only made one actual contact, with TJ1AQ.

Turning now to the note from G3VDL (Chalfont St. Giles) we find activity somewhat down, due to the calls of the garden and in particular the lawnmower. However, a few wet weekend hours spent on the

TOP BAND COUNTRIES LADDER

Station	Confirmed	Worked
<i>Phone and CW</i>		
G2NJ	98	98
GM3UVL	94	96
G2HKU	79	84
G3WPO	69	66
G8HX	68	83
G3WQQ	64	77
G3WDW	62	83
G3VMQ	55	73
G3IDG	55	61
G3WSS	47	67
G3VLX	46	75
G3UGF	36	76
G3WJS	21	56
G3XGD	9	37
G3SVK/A	?	78
<i>Phone only</i>		
G2NJ	96	96
G3WPO	41	48
G3VMQ	38	54
G3UGF	36	73
G3PQF	25	60

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

21 mc band yielded CW contacts with KX6EN, TJ1AJ, CT3AS, CR6GO and KV4AM. A couple of notable QSO's were with a WNØ for his first contact outside U.S.A., immediately followed by a WA7 to whom G3VDL was his first G.

As usual, GM3JDR (Golspie) stuck to 21 mc, and on SSB worked CR6GM, CR6II, CX7BW, PY7MB, MP4BGU, GB2IS, ON6AF/F, SVØWN, 9G1KM and JA1-Ø. The CW mode produced a longer list, including CE2BC, CE3ZK, CX1FB, CX1JM, CX4AAK, CX4JK, CT3AS, HL9KO, HK5MU, HM5BZ, HP1XR/MM, JA's, K4PHY/YV5, LU's, PY's, MP4BEU, ON6AF/F, TT8AN, UAØKKB, UH8AE, U18IZ, VP9FW/P, VU2OLK, W's, YVØX, ZE3JJ, ZS6GG, 5A1TW, 3V8AH, 5Z4LE, 8P6CA, 9J2MX and LZØWYF.

[over

Reporting the HF Bands

G3VPS with his new KW-2000A spent only a brief time on 21 mc, where he worked two new countries in PY and (surprise, surprise!) I1.

No contacts on 21 mc were recorded by G2HKU, but Ted did look the band over and heard VU2OLK, 9H1AV, and OD5EJ.

Grouse and Gripe

A couple of "procedural" ones, of which the first is from G3AAQ. Jake is a trifle niggled at the characters who seem to believe that VA means, "I have finished my first Final—there will probably be at least six more after this!" They certainly *are* on the increase.

From G3IDG a complaint about the earlier part of the contact. On CW, he points out that R, OK, FB, or "solid" means just that. It is annoying beyond all belief when one gets "R" from a station immediately followed by a request for a repeat on name, QTH, RST and the rest. One can tolerate it on the part of the Novices, who cannot be expected to know it all—although they should have been told about this before they got a ticket—but to have it coming from an old-timer who ought to know better, *and a G at that*, is a bit much. If one points out the error, they either go all hot and red-eyed or else suddenly get "local QRM," even though they have given you S8 or so!

G2HKU comments on the numbers of times a G/SSB contact has disappeared under a DL, calling CQ in German, who proceeds to work another DL—and then complains about U.K. QRM. This is noticeably a problem with DL's.

Twenty Metres

The first letter from G3WPO mentions that it was composed in between his contacts on Twenty, at 0210z. A DX-40 and V-dipole accounted for all South American countries, apart from FY7 and VP3, in one night's working, so the set-up and location must be

"giving" as well as can reasonably be expected.

G3AAQ/M has nothing startling to offer other than 4L1A, who appears in other lists as well, but the gotaways included KV4AA, YV5BXS and HK5MO.

That 4L1A character has worried G13WSS, who swapped only reports with him; the writer has no more information, and has not heard 4L1A, but suspects that, like the other 4L calls, it emanates from the USSR and is quite OK.

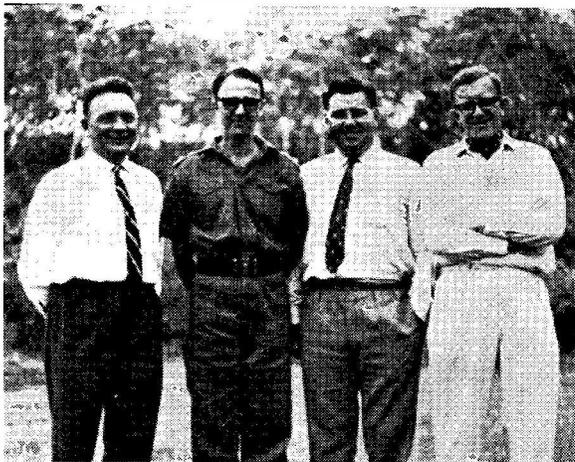
Twenty on the Isle of Sheppey means G2HKU, and Ted mentions only two contacts, 9H1R and ZL2KP; the regular sked with the latter has been called off for the moment, as for the time being the ZL's are very noticeable by their absence on the band at 0700. Heard by G2HKU were HV3SJ, on several

mornings using SSB, and TA3AR at the CW end.

In contrast to the absence of the early-morning Pacific stuff, also mentioned by G3NOF, was the presence of strong W6 and W7 signals as late as 0900, again in the afternoons at 1600, and workable at 1800z. Contacts were made by G3NOF with CR6IV, EP2JP, ET3REL, HS1WB, HS3DR, JA3KMC/MM, K7YWZ, MP4TCE, OA4XN, PX1JI, TA2BK, TG9GF, TJ1AL, TU2AK, TU2BJ, TU2BQ, VP2MF, VU2DKZ, VU2ED, W6's and W7's, 4S7PB, 5Z4KO, 5Z4LJ and 6W8DV; VR6TC was often heard but seems to reserve his energies for the W6 stations.

An interesting encounter for G2DC was with EA2CR/T, who was on with what Jack described in his letter as a "QRP 1-watt transistor transmitter" with which he was maintaining a steady S6 throughout the QSO, in spite of plenty of QRM. Other contacts, apart from the usual JA, VK, and W gang, included EA6BH, CO2FA, K7BTN/KL7 (on Barter Island) and VR1L.

Seems as if G3VPS gave the 20m. band a fair old going-over, and the



Left to right: 9M2XX, VS5MH, VS5RCS/9M2NF and VS6AA, taken on the occasion of the VS5RCS operation from the exotic territory of Brunei, in the South China Sea (Zone 28), over the Whitsun holiday period May 30 to June 3. Though Dennis Bowden, 9M2NF, Maurice Caplan, VS6AA and Jack Cooper, 9M2XX had only that short time, they made 3,350 contacts (1174 on CW and 2176 SSB) on 15-20m., in 105 countries. But a major disappointment was the paucity of G's, only 140 being worked in the two modes, against more than 1,000 W's. One of their difficulties was the layer of UA9/UA0/OH/SM stations, who could only be worked off in order to clear the frequency for G's. In other words, there was an almost insurmountable barrier against working into the U.K.—but they did try!

pickings included four new countries in the shape of PJ3CL, MP4TCE, HK and 6Y5, plus the hordes of W, VE, LU, and YV. Quite an initiation, and a pity that the work stuff had to get in the way!

This and That

That paragraph about a Top Band WAC is called into doubt by G3IDG. But the paragraph in the latest *ARRL Handbook* seems to leave no room for doubt. After all, it is they who issue these awards.

GM3UVL wants information on tunable HF-band converters, and how to build good VFO's at above the 20 mc fundamental. The latter query is easily dealt with—*don't*—although there is a rather nice FET VFO in the 1968 *ARRL Handbook* which could meet the bill.

Contests

Not much of any interest on this front apart from the WAE CW



Roy Graan, O. Kyrkogatan 14-B, Umea, Sweden runs a KW-2000 with a 14-AVQ vertical aerial. He is 40 years of age, works CW mainly, and is a keen contest operator.

TOP BAND LADDER

(G3V-- and G3W-- stations only)

Station	Countries	Countries
G3VMW	96	20
G3VGR	94	16
G3VYF	88	19
G3VTY	86	13
G3WDW	83	9
GW3VPL	82	17
G3VLT	80	16
G3WQQ	77	15
G3WUD	75	14
G3VLX	75	10
G3VMQ	73	16
G3WPO	69	17
GI3WSS	67	9
G3VMK	63	17
G3VES	63	16
G3VOK	61	15
G3VSL	60	11
G3WJS	56	11
GW3WWN	54	7
G3WDG	52	8
G3VPS	45	13
G3VWC	34	7

event, on August 10-11, and the CW affair called the All-Asia which comes off over the weekend August 24-25. Exchange RST plus your age, except YL's who exchange RST plus 00 (!). Asians count the non-Asian countries for the multiplier, while the others take the Asian countries for *their* multiplier. QSO's count one point per contact; for a single-band entry, multiply total QSO points by the countries multiplier; for a multi-band entry multiply total QSO points by the sum total of countries worked multiplier from all bands. (Sounds Greek to us!) Entries, to arrive before November 30, go to JARL, Contest Committee, PO Box 377, Tokyo Central, Japan.

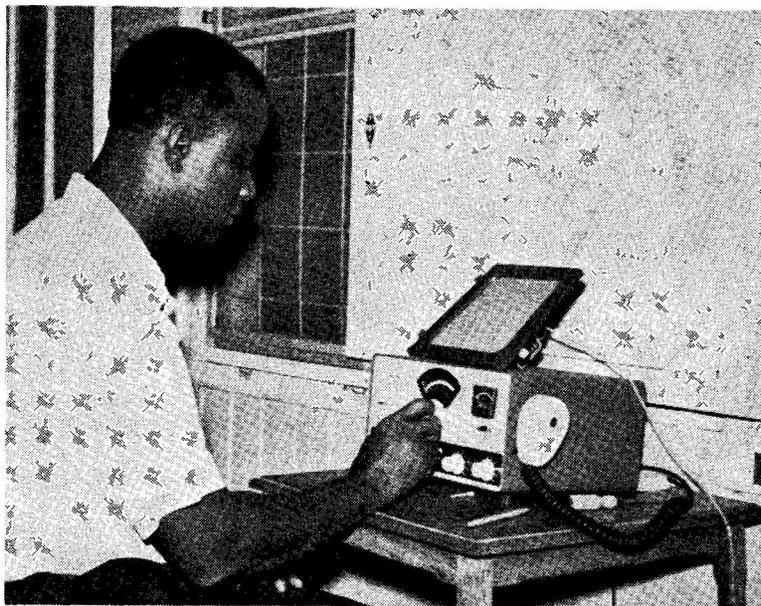
And, of course, we must not

forget the *CQ WW DX* Contest, over the last weekend in October (*Phone*) and the last weekend in November (*CW*). Rules, official log forms and summary sheets, are available from *CQ*, World Wide DX Contest, 14 Vanderver Avenue, Port Washington, L.I., N.Y., 11050, U.S.A. Now is the time to send a large s.a.e., plus some IRC's for the data, rather than a couple of days before battle is joined.

And that, gentle folk, is that, once again. News, views, DX and general chat, as always, is welcome for next month's piece, the deadline for which is first post, August 12, addressed as ever to CDXN, SHORT WAVE MAGAZINE, BUCKINGHAM. 73 *es DX*.

ZD3D is owned and operated by Cecil Wiltshire, of Bathurst, and the rig is a small HF-band transceiver. He is one of the seven licensed amateurs in the Gambia.

Picture by G3BID



MARCONI RADAR EQUIPMENT FOR RUSSIA

A Marconi/Thomson "Secar" secondary radar system is being installed at Vnokovo Airport—the air traffic control centre for the Moscow area—for evaluation and test. The system is designed to extract information from an aircraft in flight to supplement the normal radar position-finding function. This is achieved by transmitting a number of interrogation signals to the aircraft from a ground station. These signals are received in the aircraft by a transponder which will automatically transmit an appropriate reply in the form of a digital code. Four interrogation modes are available and each mode corresponds to a definite question; "Who are you?", "What is your height?", etc. The system is automatic, in that the aircrew take no part in the transfer of information once the airborne transponder has been switched on to give the appropriate replies. (Readers who, during Hitler's war, had experience of I.F.F. equipment—"Identification Friend from Foe"—will recognise the genesis of the idea, though of course "Secar" is a good deal more sophisticated.)

Secondary radar is a valuable adjunct to the normal primary radar system. Height finding primary radars are not sufficiently accurate for air traffic control, and at the present time, the only way in which the controller can obtain this vital information is by asking for it from the pilot on the radio telephone. With Secar, the height is derived automatically from the aircraft altimeter.

AMATEUR RADIO IN FRENCH-SPEAKING AFRICA

We were glad to see (from the March issue of *QTC*, Newsletter of the Radio Society of East Africa) that the association of African countries comprising former French territory have agreed to encourage the develop-

ment of Amateur Radio in their member-countries. These are mainly in West Africa, and French is still their common language. This is a significant step forward, and owes much to the pioneering work of various keen and far-sighted individuals, who have been able to show that the encouragement of Amateur Radio would be a great help in the technological progress of emergent countries.

OBITUARY

We very much regret to have to record the passing of the following radio amateurs:

—G3MEF, Thomas Wylie, M.I.R.E., of Barnstaple, North Devon, on June 10, at the age of 68. An old-timer with 50 years' experience professionally and in Amateur Radio, he held the calls VE3WI/VE3WY during the period 1927-'56. He was featured in our "Other Man's Station" series in the September 1964 issue of *SHORT WAVE MAGAZINE*.

—G3ZC, Hugh Cockrem, of Stoke-in-Teignhead, near Torquay, South Devon, on July 6, at the age of 61. He was a one-time sea going radio officer and later was on the engineering staff at Rugby Radio, GBR. He remained a keen CW operator and was a valued member of the Torbay Amateur Radio Society.

Our sympathies are offered to the family, relations and friends of G3MEF and G3ZC.

VHF BANDS

A. H. DORMER, G3DAH

THERE is little room for doubt about the improvement in conditions during the last month. On *Two*, the openings extended from Norway to Spain and from Ireland to Czechoslovakia. On *70 Cm.*, similar conditions were experienced, albeit with a somewhat more restricted range, and on *Four Metres*, the sporadic-E development gave ample opportunity to work the ZB2 stations—which at times were coming in at S9+ for hours on end.

Let's go back to the beginning: On June 10/11 the trailing edge of a weak front brought a lift to the east with PAØ and DL at good strength most of the day and night. Once again, the two-metre German beacon station on the Danish border, DLØPR, was a good indicator that conditions were right for contacts in that direction. Reception was at S7 from early on June 9 and continued right through till June 12, when signals dropped to about S3. As reported previously, this station is beaming north for polar reflection checks and yet is regularly receivable in the south-east at good strength. It would be of interest to know whether it is heard in the north of this country, and in GW?

Although the East/West path remained good for the next week, the level of activity dropped consider-

ably, which was rather a pity as there was some very choice DX to be had. Outstanding signal from GW was G3NUE/P on CW, who was on a quick trip round Carmarthen, Cardigan and Pembroke; his signals were of the order of S7/8 in Herne Bay and, as always, of impeccable quality. G3NEO/P was very active from Devon and was RST-599 on the night of June 14. GI3GXP (Co. Down), and GI5AJ from the same country were also good signals here, but did not appear to be getting many takers. G3GZJ (Redruth Cornwall) has been consistently good on CW and has also been putting out a potent Phone signal on Two.

As reported on p.300 last time, the night of June 15 produced the first phase of a good opening to Scandinavia, although contacts were very largely limited to the north of England. LA4FE (Bergen) was heard in the south, but was using NBFM and was a very difficult signal to copy. A careful search was made for the Norwegian beacons but none was heard and it was subsequently learned that they are temporarily out of commission, although LA4FE said that he expected the Bergen beacon to be in operation again shortly. SM and OZ were also worked from the north. By the night of June 16, the opening had reached the South Coast and there were reports of good reception of the two Norwegian stations, LA4FE and LA9OD, both in Bergen. The former, who runs 150 watts, was particularly strong with signals well over the S9 mark for hours on end. LA9OD, who has a slightly inferior site and rather less power, was S7 during the same period. LA4FE was saying, around midnight, that he had worked 43 G's during the evening. Nothing was heard from SM or OZ at this time nor were any stations heard calling them. Checks to the east and south produced no results with the exception of F9FT who, with his 64-element array and high power, comes in pretty well any time he beams this way. To the West, it was interesting to note that GB3CTC was at S3 for long periods, better than usual therefore.

The Norwegian stations were still audible on June 17 during the early evening, but by 2200z were

almost unreadable, and activity in general had dropped to a very low level once more. Although an auroral warning was out for the period, nothing appeared to transpire, and indeed there was very little traffic for the next few days.

* * *

On June 24, the two-metre SSB Contest got off to a good start with the North/South path better than East/West. Stations from Yorkshire and Lancashire were of generally good strength in the South, with G3OZP (Tynemouth) audible at S5 most of the time. There was a small amount of PAØ activity with PAØACG and PAØIJ putting in good signals over most of the country, but no ON or DL contacts were reported. The need to do something about the QRM on the SSB calling-frequency when conditions are reasonable was again very apparent, and although there was some spread about 145.41 mc, the mutual interference was fierce at times. Fifty-one callsigns were recorded at G3DAH, something rather less than half of the known stations using this mode on Two.

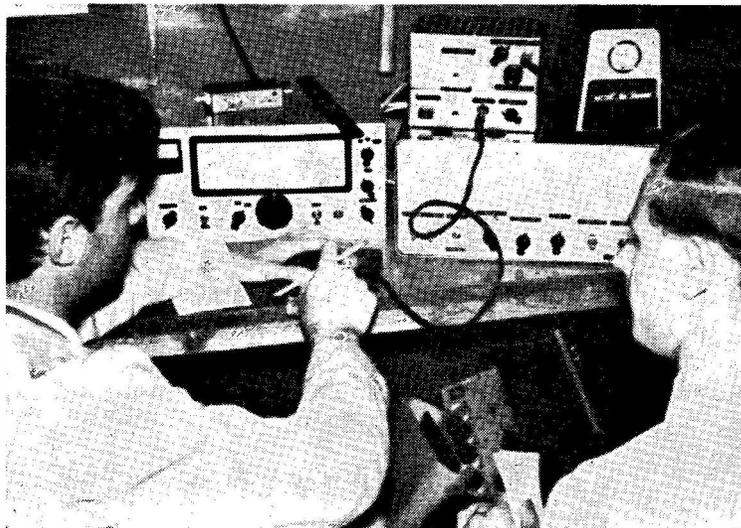
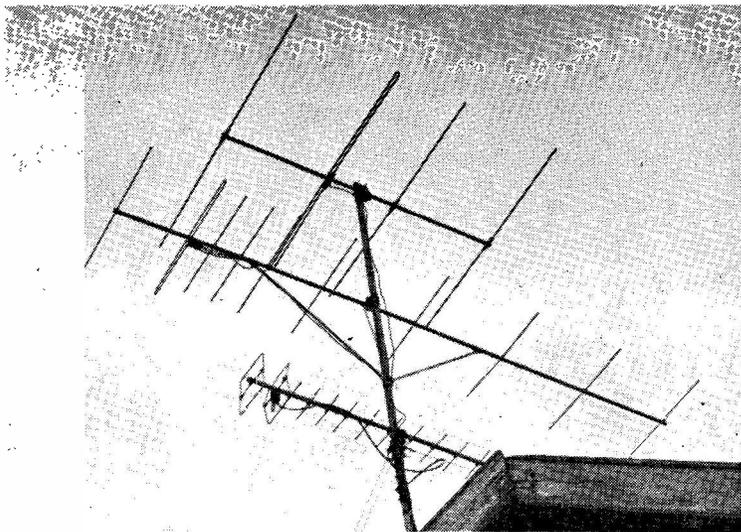
June 29 saw the first day of the G3UQL/G3VAG operations from GM, and although reception of their signals from Roxburgh was reported by G3LAS (Hertford Heath, Herts) there is no evidence of any contacts further south. It appears also that there has been some snag with the gear as it was reported by G3FIJ (Colchester, Essex) that the CW frequency has been changed from the original 144.054 to 144.096 /144.012 mc.

This day also saw the start of a very good extended tropo. opening to the south of France. Stations well south of Paris were coming in at remarkable strength from 8 p.m. onwards, and by 11 p.m. contacts were made with the Pyrenees, F6ACL in Pau (ZD59g) being one of the best with that old regular F9NL (AD71b) at 5 and 9+ for hours on end. An outstanding achievement was that of G8BJR (Charing, Kent) who worked EA2HX at 5 and 9 both ways; he first heard the San Sebastian station just after 2300z following a contact with F2FI/M, who was then 20 km. north of the Spanish border, gave him a

call, and there he was! Peter runs 100 watts to a T.1131 transmitter with a rather unusual antenna, consisting as it does of a six-over-six slot-fed in phase with the tenement Yagi about three feet below it. The receiver is a TW2 converter into a home-brew superhet and the site is 320 feet a.s.l. Did any other G8 get this one?

June 30 was still producing good DX to the south in the morning with EA2HX and EA2AB both audible and plenty of F's right down to the Spanish border again, although activity was somewhat lower than the day before. However, by the evening, the opening had moved round and the F's were all subject to considerable QSB—but DL, SM and OZ were all at very good strength and were stable signals. No SM5's were heard, but SM7AGP (*GP36h*) and SM6CQU (*GR63d*) were outstanding signals on CW. OZ9OR (*FP59d*) was the best of the Danish signals recorded here. An unusual contact was with DMØSOP in Rostock (*GO71a*) who, in reply to a comment that there were not many DMØ/3 to be heard, stated that his call letters signified "Sea of Peace" since he was located on the Baltic—oh, well!

The Scandinavian opening continued throughout the day and the evening of June 30, although nothing was heard from LA during this time. Once again the DLØPR beacon was audible at up to S9 while the opening lasted. GW's were heard working DJ3DL just before dark, with DJ9EH/P also a very good signal. PAØFAS was working G's on CW; he has a very good note and is a fine operator. It was interesting to hear John Danks, G5DS (Surbiton, Surrey) on the key again. He must have been one of the first London stations on Two, some twenty years ago; he now has SSB on that band and can be heard latish most nights up on 145·410 mc. Once again the SSB channel was very congested. Some of the stations heard never did get a look in with the DX. With the onset of darkness there was a pronounced increase in QSB on all DX paths, but conditions to the east and north-east continued good until after midnight. G3LTF (Galleywood, Essex) was still knocking off DJ/DL and SM quite late



Above, the aerial array put up for the GC expedition to Jersey over June 10-21. From top to bottom, with call signs used on each band: For 4 metres, GC3OHH; two metres, GC3OUF; and for 70 centimetres, GC3PLX. The lower picture shows G3OUF (left)—who we have known for many years as a keen expeditior to the Channel Islands—with G3OHH, one of our leading 4-metre operators. The gear shown was as used on all three bands worked.

and finished up with DM2BLI and four other DM's.

A very undesirable characteristic of this opening, and others, was the number of Phone stations operating in the low 100 kc of the band (and they were not all G8/3's using their 432 mc xtals) and neither were they operating in their correct zones. This really is a thoughtless and

selfish practice and has nothing to commend it. If the DX EU's are on Phone, they will tune the Phone portion of the band anyway; they are all well aware of our band plan, so spare a thought for the chap in South Devon trying to work his first DL.

A check was made on the two-metre band at 6 a.m. on the morning

of July 1 as, after the previous evening, conditions should have been good, and indeed they were, but apart from various beacons coming in at good strength, there was not an amateur signal to be heard. In earlier years, under conditions similar to those of the previous few days, early morning, up to about 8 a.m., has been found to be a *better* time for DX than the early evening hours—rather as one might expect, since there has been more time for cooling of the upper atmosphere and the development of good tropospheric conditions. The practice of a few years ago, of running skeds at breakfast time just before going off to work, seems to have declined almost to vanishing point these days.

Also worthy of mention in connection with this opening was the procedure adopted by some stations giving beam heading and QTH while calling CQ. G3VKC (Bushey Heath) was one operator heard using this technique to good advantage.

The evening of July 1 exhibited similar opportunities for Scandinavian DX as the previous day with SM and OZ predominating, although some DJ/DL were also worked.

Thereafter, the rot started to set in again and the bands returned to very nearly normal. The North/South path was reasonably good on July 4 with G3THX (Skegness, Lincs.), and G3JFO and G3GJY of Yorkshire among the stronger signals.

* * *

The RSGB Summer 144 mc (Open) Contest over the weekend July 6-7 produced a gratifying level of activity, although propagation was almost entirely tropospheric with few contacts over 200 miles. The best DX-axis appeared to be to the East, with PAØ and DL predominating, although a few DM's were worked and two OK1's heard. Little was heard of the French stations south of Paris.

Operating techniques appeared to be good with the usual exception of certain portables, who again were grossly overmodulated! One station signed alternately "tuning up the band" and "tuning down the band"

without any indication of the starting datum—it certainly wasn't from the band edge! The G8/3's were very much in evidence and their appearance for the first time in this contest contributed greatly to the higher activity level. GW3NUE/P, operating from Brecon, was again an outstanding signal and finished up the contest with some 240 contacts, the best score heard to date. Don't quite know how Geoff does it, because his power is not all that high—but he chooses his site very carefully and of course his operating techniques are above reproach.

A particularly interesting signal was that of G8AZU/P, from Leith Hill, Dorking, Surrey, who was only running 800 milliwatts to a transistor rig (see p.287 July issue)—but he managed 80 QSO's by the end of the contest; all being well, Robin plans to operate the same rig from the top of Snowdon during the August event, so it will be worth keeping an ear open for him from there.

It was reported that during July 6-7 OE6AP would be operating during the contest from Kitzsteinhorn near Salzburg on SSB/AM/CW looking particularly for GM and EI; as far as can be ascertained, nothing was heard of him in the South. Can any GM or EI advise of reception there?

Remarkable Record

On the Saturday night of this unofficial contest, G2JF (Ashford, Kent) completed his 4000th QSO with different stations on two metres. His total contacts on the band then numbered 53,407—of which there were 1646 G; 638 F; 600 PAØ; 519 DJ/DL; 220 ON; and 119 OZ—all worked within the fifteen years that he has been active on Two Metres—and Jim is still going strong. He has two outstanding "Firsts" to his credit, with EA and PX, and has now worked no less than 24 countries. These totals must surely be unequalled in Europe, and heartiest congratulations go to him.

Conditions during the 432 mc Contest on June 23 were poor-to-average, with activity much the same. The shorter length contest seemed popular, possibly because of the difficulty of making contacts anyway, but a contributory factor must

surely be the migration of many G8/3 stations to the two-metre band, where they appear to have taken up permanent residence. At the risk of boring repetition, the acres of silence on 70 centimetres these days is most disquieting, in the light of the demands for sections of that band by other services. Good 70-cm. scores seem to have been achieved by G8ARL/P, operating from Newbury, Berks, who was giving 068 towards the end; by G8AYB/P at Dunstable, Beds.; and by G3VXK/P at Swindon, Wilts., giving reports in the fifties and forties respectively.

There were several good 4-metre sporadic-E openings to ZB2 during the period, and ZB2BO has now had 95 QSO's with 57 different stations in 20 counties and four countries—but he still needs many QSL's! GW3LQE was one that got away, but beacon GB3GM was heard between 1849-1857z on June 23, for a new world reception record on this band, of some 1,500 miles; signals peaked to RST-579 at best. Operations from ZB2VHF have brought that station's total up to no less than 180+S worked in 40 counties and seven countries—it would have been eight if the GD who was alerted by G13HCG had been able to come on. However, on June 14, ZB2VHF worked GM3EGW on SSB, for a new world record on 4-metre Phone, with G13HCG a very useful addition.

Sporadic-E propagation also accounted for the reception of the Thurso beacon GB3GM by G3PLX and G3JVL in Hants., and G3JHM in Sussex—this was on July 8, and is the first reporting of a GM station on 4m. *via* spor-E.

During this same period, GM3JAZ /P in the *Orkneys* was heard by G3JVL and G3JHM, and was worked by G3TCT in Surrey.

So there have been great doings on the 4-metre band during the period—and the plums have gone to those who were watching conditions and keeping on the *qui vive*. And to them, congratulations!

* * *

Pressure charts for the month show only small variations about 1015 millibars with an abrupt rise to 1022 millibars on June 29.

Modulation—The Last Word

G3COJ (High Wycombe, Bucks) and G3BLP (Caterham, Surrey) both draw attention to the fact that if the asymmetrical modulation system advocated last month is not used, then the best answer is to go for high level mod. with speech clipping and filtering. With the audio adjusted to give 100% modulation on speech peaks, the average depth will only be some 20% or so, and, in certain quarters the tendency will then be to turn up the wick with the consequent production of splatter—*highly* undesirable. The filter, which should have a cut-off at about 3 kc, can be constructed by padding out the primary and secondary of the mod. transformer with suitable capacitors to resonate with the leakage inductance, but ideally, this simple low-pass filter should be followed by a further section. The inductance could well be wound on a TV line output transformer ferrite, and a good design will produce an attenuation of some 25 dB or so. G3BLP suggests that the apparent lack of modulation on VHF is tied up with steadily decreasing external noise with frequency, as the receiver noise factor becomes more important with increasing frequency. Whatever the answer, one thing is certain, there is more high blood pressure caused by a local overmodulating than by almost any other deviation from the righteous path of good operating, so Please Don't Do It!

Beacon News

GB3CTC, the Redruth, Cornwall beacon, reported back in operation again last month, now transmits on 144-130 mc with the same keying cycle as heretofore. Out thanks to G3CZZ for bringing back on the air a most useful indicator for conditions to the South West.

The new French beacon, of which mention was made in the last issue, is now regularly received here and over a large area of the South. Details are as follows:—Frequency—144-073 mc; Locator—YI23, Lannion, in the Brest peninsular alongside the satellite tracking station; Antenna Bearing—100° true, nine-over-nine element Yagi at 50 feet above ground; Power—40 watts; Keying—FSK; Cycle—25 second dash, one second dot, 25 second dash and then callsign F3THF.

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	39	5	43	13	10	1	111
G3DAH	17	2	44	13	10	1	87
G8BBB	—	—	35	9	25	5	74
G3COJ	5	3	33	7	18	3	69
G8AAZ	—	—	30	6	16	1	53
G3AHB	—	—	24	5	7	2	38
EI6AS	5	6	20	4	—	—	35
G8BJK	—	—	26	6	—	—	32
G3XFW	—	—	5	2	11	2	20
G8AYN	—	—	13	1	5	1	20

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.

GB3GM, located at Dounreay, 10 miles West of Thurso, is now operating under control of GM3SFH, and transmits on 145-995 mc and 70-305 mc. For HF band operators there is also radiation on 29-005 mc. The two-metre transmissions are beamed north by a six-over-six slot and are continuous. The four-metre signal is beamed south from a three-element Yagi and the cycle starts on the hour with silence for five minutes, operation for five minutes, and so on. Ultimately, the two and four metre transmissions will be switched to give five-minute periods to the north and then to the south. Reports of reception will be welcomed by GM3SFH at 17, Rockwell Crescent, Thurso, Caithness. No need to wait for an Aurora!

Australis Oscar

Sad news for the sponsors of this package. The vehicle was launched according to programme on June 13, but because of priority loads, in the end there was no room available for the *Oscar*. It is now unlikely that the satellite will get aloft until December, 1968. A great deal of time and effort have been expended on this project, all apparently to no avail.

News Items

G3LTF is off to the States again for a few weeks during which time he hopes to be able to clew up some further E-M-E tests on 1296 mc, for August. OK2WCG of Brno is now building for E-M-E and should be ready for that time, as of course, should our own G3CCH.

The highlight of the expedition to Jersey by G3OUF, G3OHH and G3PLX was certainly the QSO with ZB2VHF on the afternoon of Sunday, June 9. Reports were RST-599 both ways for a first G/ZB2 on four metres. The sporadic-E opening which gave rise to this contact was of very short duration, lasting only about *fifteen minutes*, so it meant some pretty slick operating at both ends to get this non-scheduled contact. Congratulations to G3OHH and ZB2VHF. About 50 QSO's were made on two and four metres, but only two on 70 cm., but conditions were reported to be only fair during the whole of the trip there.

G8BBB (Littleport, Cambs.) is now very active on Two with AM, SSB and CW but is looking for 70 cm. skeds at any time. Preferred direction is north and frequency 433-020 mc on SSB or AM, with inputs of 300 watts p.e.p. and 150 watts respectively.

Andorra!

Success for the Andorra expedition! G3RIK, operating as PX1RI, raised G3NKL (Southport, Lancs.) for a G/PX "First" on 4 metres—this was at 1829z on June 22. Other G's worked were G3EKP, G3GVM, G3PMJ, G3VNO/M—and on June 23, PX1RI also made it with G3WBQ and G3VPK. Those known to have heard PX1RI on 4m. include G3JVL, G3VEL and G3COJ.

It is rather surprising that so little was heard of PX1RI on two metres although conditions should have been all right for the distance since the French stations in the Pyrenees were coming through at that time. G3COJ checked with F9LL at La Rochelle who confirmed that nothing had been heard of PX1RI in that area on Two. However, Brian did reasonably well that evening with some dozen or so F's worked on AM or SSB, though EA2HX and EA5II were two that got away.

The GM expedition by G3UQL and G3VAG seems to have run into trouble. Stations were called on sked for the first two nights of operations, but after that the weather changed and very high winds and torrential rain beat them. Water got into the petrol supply for the generator and resulted in a complete shut-down and that, combined with the impossibility of erecting the beam or a tent for the gear, had resulted in no operation up to and including July 6—although they were obviously going to do their very best to get on the air again as soon as a favourable opportunity presented itself. The only stations heard by the expedition to date have been a few local GM's and the Dundee beacon, GB3ANG. Hard luck!

Alan Williams, GM3KSU (Edinburgh) is looking for skeds on four metres. Most of the local activity seems to be on Two, even in this difficult terrain, but given a little co-ordination it is felt that Four should prove a productive band, and anyone interested in invited to write to him at 35 Howard Place, Edinburgh Place, Edinburgh 3. (Tel: 031-556 6138).

News of the VHF Groups: The Leicester Group will have a visit to the BBC TV transmitting station at Sutton Coldfield, and therefore

to G3BA, on August 15. The party will be limited to about forty souls and will travel by coach there and back. Anyone wishing to join them may obtain further details from G5UM, QTHR.

The South-East UHF/VHF Group had another successful meeting on June 21 at Kent University, Canterbury, when the speaker was Arnold Mynett, G3HBW, who had chosen as his subject "Transistors at VHF/UHF." He gave a lucid explanation of the operation and application of these devices, illustrated by a display of his own multi-band equipment. Those who were at the Twickenham Convention may remember seeing his transceiver, and may also recall that it won him an award. The Group is now QRT until October 18, when Charlie Newton, G2FKZ, will be going to Wye College to talk about radio aurorae and allied subjects.

G3JFY will be mobile on the Continent at the end of July and beginning of August, probably up to the 14th. He has the calls F0GY/M and G3JFY/DL/M allotted for operations from the car, and also OE7ZVJ for Austria.

Dave Sugden, G8BHL (London), is planning a trip to some of the rarer counties in England and Wales and asks for skeds which can be arranged with him at 40 Berkeley Road, London, W.8. Times are August 26 to September 6 and operation will be on two metres, using a Twomobile and a four-element Yagi, from 1900 local each evening for as long as the batteries hold up.

That active organiser of social events G6FK, has got his team working on another dinner at the Park Hall Hotel, Wolverhampton. On this occasion, the Midlands UHF/VHF Group will be addressed by G3BNL, who is to talk on 23 and 13 centimetre equipment. Tickets, at 30s. a throw (but numbers limited), may be obtained from J. R. Hartley, G8AEV, 30a Salop Street, Bridgnorth, Shropshire. A full scale convention is promised for next year.

G8ASW (Ellesmere Port, Cheshire) has been on holiday in Herne Bay and has had an opportunity to compare operating 70 cm. from the south with his own QTH. He finds activity levels very low, and in spite

of a diligent search with a detailed map and a barometric altimeter, was unable to find a really good site. However, he managed to raise G8AUE (Derby) and several local stations, but his best DX was worked from sea level when he contacted, without prior arrangement, GW8ACG/P at that Rosemor site at 1000 feet a.s.l. from whence he can be heard every Thursday night. G8ASW is himself active /P every Monday evening from Moel Fammue, 1820 feet up in the air in Flintshire, and this should make an attractive target for the Activity Night operators. G8ASW runs 38 watts through a step-recovery varactor diode into a J-Beam Parabeam strapped on to the side of the car.

Fred Lambeth, G2AIW, hon. sec. of the IARU Region 1 Working Group, advises that the only VHF Contest fully sponsored by them is that in September each year. In spite of the wide range of activity in member-countries during the July 6/7 contest, this was considered to be a local affair organised by local Societies, and no entries should therefore be sent from this country to the IARU. As a matter of interest, the September Contest this year will be adjudicated by PZK, the Polish Society. Our turn comes in 1972. Incidentally, Fred is putting out a very pleasant NBFM signal on Two with a one-watt rig. He was RS-55 in Herne Bay.

G8BML (Keighley, Yorks) is now active on Two, but finds contacts hard to come by. He is rock-bound on 144.138 mc at present and runs 10 watts to a two-element beam. How about turning the beams his way from time to time?

Contests

August 3-4 for the sixth 144 mc (Open) Contest and August 4 for the Region 1 (U.K.) VHF Contest, rules for which can be obtained from G2CUZ, QTHR. This is particularly interesting as operation is planned from Westmorland, a rare one on Two any day.

Deadline

Deadline for the next issue is **Saturday, August 10**. Addressed "VHF Bands," SHORT WAVE MAGAZINE, BUCKINGHAM. Cheers for now, and 73 de G3DAH.

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for September Issue: August 9)

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

ONE makes every month a resolution to shoot the next Club Secretary who sends in his news late and then complains bitterly that his group has been left out of this piece—but every month it happens again! Seriously, though, it has to be realised that there are quite a few processes involved in converting your notes into a paragraph in the *Magazine*, and the sequence of events is such that there is not a minute to spare; a late entry can only be taken in by burning a mighty lot of midnight oil. The deadlines are given well ahead for the incoming mail to this piece and there is really no reason why there should be a late entry—but if there is, it is normally held over, and some notes appear the following month, unless it is of earth-shattering importance.

On a rather similar tack, it should be realised that the pulling power of a paragraph in "Clubs" is to a large extent dependent on the information. A reader is mildly irritated if he reads of a past event which he would have liked to attend but missed, whereas his appetite is whetted by details of the programme for the coming month. Such a little thing makes the difference between gaining a new member and not so profiting. What it boils down to is that the deadline for this piece in the next issue, is the deadline for a note on your group's September programme, if it is to give you the maximum benefit.

Club Reports

Our first stop this time round is **Norfolk** who have a magazine *Challenge* to which many people look forward; and it was sad therefore to read in the current issue that the hon. editor was "reading the riot act" in the search for more contributions to keep the pot boiling. We hope he succeeds in keeping it going. As for meetings, these are held each Monday evening at the Brickmakers Arms, Sprowston Road, Norwich.

Reigate are at the George and Dragon, Cromwell Road, Redhill on August 7, when members are invited to bring items of equipment for showing to the assembled troops; either commercial or home-brewed.

The recent combined Barbecue and D/F event run by the **Chippenham** lads suffered somewhat from the weather, but luckily there was a pub nearby to which an adjournment could be made, and the evening still managed to go with a swing. Another D/F event is slated for August 14, and on the 27th, G3UUU will tell them how to set about amateur TV reception.

Chippenham High School, Hardenhuish Lane, Chippenham is the venue.

Alternate Tuesdays is the story at **Farnborough**, who have Hq. at the Railway Enthusiasts' Club, 310 Farnborough Road; on August 13 G8AYF discusses TVI in the form of a question-and-answer session, and on the 27th, G3NVM, the hon. sec., is down to talk about Marine Radio. Meetings kick off at seven-thirty here.

There is just time to pass on the word that the **Salop** lads will be putting on a show at the Garden Fete at R.A.F. Shawbury on July 27—the day after we come out—where all bands Top to Ten will be used, signing G3SRT/A. No formal meetings are down for August, but informal evenings at The Old Post Office Hotel in Milk Street, Shrewsbury each Thursday. September 12 will see them all in action again at the Church Stretton Traction Engine Rally with a station—which should provide a focal point for the many amateurs who have a love for steam engines.

Up in the North are **Bury and Rossendale**, who are sad at the passing of member G3WGR, who was one of those who stay in the background but are never missing when the work came to be done in the Club. August 13 is the date when Ernie Wigzel of the Stockport group is to come along to the George Hotel, Market Street, Bury, to give a lecture on "Budget Stereo."

Those aerial rigging parties at **Fareham** Hq. seem to have paid off—and things have been improved by a kind soul who built a wire fence adjacent to the building which has been smartly converted into a counterpoise! Nothing formal is planned for the coming month, but informals each Sunday evening at seven-thirty at the Portchester Community Centre, a couple of hundred yards west of Portchester crossroads on the A.27.

There is always a full programme at **Northern Heights** whose hon. sec. has just settled the programme for the coming year. August 11 sees them taking part in a Scavenger Hunt with the local car club, while the 14th is set aside for a stand at Bingley Agricultural Show, with a ragchew at Hq. the same evening. The demonstration station activity repeats on August 24 at Warly Charity Gala; on the 25th there is a trip to Humber Radio, at which time it is proposed to book some of the G8/3's members up for Morse Tests so they can become, in Northern Heights parlance, "proper full-blown amateurs!" The month is rounded off by G8CB Selling Surplus Equipment. Hq. is at the Sportsmen Inn, Ogden.

GB3SFS is traditionally the call of the station the **South Shields** chaps put on at South Shields Flower Show, and so it is this time, the dates being August 9-11, and the venue Bents Park in South Shields. All bands will be used, 1.8 to 28 mc, with AM and SSB gear.

Five meetings are in prospect for **Coventry**; G3TXR lectures on August 2, taking "VHF Thinking" as his theme, while on the 9th the club rig is to be aired, as it also is on the 23rd. August 16 is a bit of a novelty—a Junk Quiz, described as a "what is it? bring-and-buy sale." The last meeting of the month, on August 30, will be set aside for the preparations to be completed for a demonstration station that is to be put on for the Scouts. "Home" for the Coventry group is at City of Coventry Scout Hq., 121 St. Nicholas Street, Coventry, where old and new members are always welcome.

The publicity activities of the **Leicester** group have been so successful that the meeting-room bulges at the seams when they are in occupation; this is the result of a policy of going out and finding the prospective new members. More on this lively gang can be found out by contacting the hon. sec. at the address in the Panel on p.376.

* * *

Hereford are in the throes of negotiations for a new Hq., but until this is completed will continue to use the old place at Trinity Hall, Whitecross Road; the next time they foregather will be August 2, when there will be an introduction to the Autumn programme, and some Slow Morse practice.

Like so many other groups, **Shefford** go "out of business" for a short period each summer; this time it is for the first two weeks of August, things being resumed on August 22 with a Fox Hunt—G2AUA and G2DPQ are the lads to be run to earth in this one, while the August 29 date is left to G3VML, who will discuss Test Meter Design.

Tuesdays at the Sherwood Community Association, Woodthorpe House, Mansfield Road, Nottingham, is right for the Amateur Radio Club of **Nottingham**. However, the August 27 and September 3 dates are off as the Hq. is closed for that fortnight. For details of the activities, contact the hon. sec.—see Panel.

Harking back to the question of publicity, **Bangor** point out that they have sixteen entrants for the coming R.A.E. course, and a club membership of fifty, thanks mainly to some good local publicity. The BBC were asked to send someone to the Bangor NFD station. Flashes at 5.55, the recording in full at 6.25 would have been enough, but on top of that the local paper gave them nearly half a page. These lads get together on the first Friday in each month, at Silverstream Unionist Hall,

Belfast Road, Bangor, Co. Down, where they welcome visitors and prospective members.

Cornish next, and here all the stops are being pulled out to prepare for the Rally, which occurs before we reach the bookstalls; so we are not certain of the details for the meeting in August, save that it will be held on the first Thursday in the SWEB Clubroom, Pool, Camborne.

A Stereo Demonstration by Heathkit is the attraction laid on for the August meeting of the **Verulam** group, who are at the Cavalier Hall, St. Albans; in addition an informal is now organised for the first Wednesday in each month at Salisbury Hall. The hon. sec. is the man for further details, at the address shown in the Panel. They have been very sorry to lose Brian Grist, G3GJX, to "the jungles of Surrey." He has been a hard worker for Verulam for a long time, as we well know.

Not so very far from St. Albans is **Dunstable Downs** where recently a very successful group was started. Now the only shortage has been rectified by the acquisition of improved Hq. at Chews School, right in the heart of Dunstable, where they get together every Friday evening for a programme of interest to everyone.

Like a phoenix, rising for the ashes, what was known as the Auchenharvie group has (because the old Hq. was demolished) changed its name and become **Ardeer** Recreation Club Radio Section, which has given them a stake in the new place; judging by the leaflet sent along by the hon. sec., they have just about everything they could want. For details, drop a line to him at the Panel address.

The Model Engineers Hq., Stoke Park, Guildford, is also the home of the **Guildford** radio chaps, who meet every alternate Friday, commencing with the day this piece reaches the readers. We have not got details of the August programme, but if it is as good as the July one referred to in their *Newsletter*, it should be well worth joining.

* * *

Observant readers may have noticed that it is some time since **WAMRAC** was mentioned in this piece, and concluded they had gone into hibernation; not so, but hon. sec. G3NJB has had so many problems to resolve that there just has not been enough time to keep in touch. However, it is a credit to the Wamrac organisation that they have come through such a difficult year comparatively unscathed.

Sutton and Cheam have all-outdoor activities for August, with an organised party to the Woburn Rally, and on August 25 their own affair. For all the details it is necessary to contact the hon. sec. at the address in the Panel.

Otley have their own place, where there is room for a shack, and separately somewhere to serve the refreshments, plus another room set aside for audio work. They get together every Tuesday evening, and all the details can be obtained by getting in touch with the hon. secretary.

Every Monday, the **Wolverhampton** lads converge on Neachells Cottage, Tettenhall, Wolverhampton, where they have their Hq. Each session starts with a spell of Morse practice; then on alternate weeks the rest of the evening is taken up by some organised activity, the

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: August 9, September 6 and October 4 for the issues dated September, October and November respectively. Pse don't be late!

intervening weeks being informals. For all the current gen. a contact with the hon. sec. is indicated—see Panel.

R.A.I.B.C. caters, as we have so often said, for the invalid and blind; they have a Club net on Tuesdays at 10.0 a.m., another on Wednesday afternoons at two, and the Cheshire Homes crew can be heard at 2.0 p.m. each Thursday afternoon, all around the 3.7 mc region.

Surrey get together each month at the Blue Anchor, South Croydon, and their committee are busy thinking up new activities to amuse the chaps. For all the latest details, give the hon. sec. a ring.

A new home for the **Wirral** group, who have taken over the old Civil Defence Hq. in the grounds of Nocturnum Lodge, Upton Road, Birkenhead. They still retain the first and third Wednesday of the month for meetings, so that August 7 is set down for G3VQT to lecture on RTTY, and a fortnight later on the 21st there is to be a Film Show.

We have part of the story for **Medway** this time, that the lecture for August 19 is to be about Computers, and that it is to be given by G3KAF, but the venue is not mentioned; so for the latter it will be necessary to contact the hon. sec.—see Panel.

The passing of the AGM has meant a few changes at **North Kent**, and that we have not the full detail on the the August doings which we usually get; but we can say that alternate Thursdays is the form, at the Congre-

gational Church Hall, adjacent to the Clock Tower, Bexleyheath.

Cray Valley also gather on alternate Thursdays, which in their case means August 1 at the Congregational Church Hall, Court Road, Eltham, S.E.9, when G3LNT will talk about "Solid State Mobile for 160." August 15 is the Natter Nite, which is at All Saints Church Hall, Bercta Road, New Eltham, S.E.9.

* * *

How to rope 'em in is the problem faced by many groups; and so it had to come that a group would decide to run a membership drive as an activity. The credit goes to **Acton, Brentford and Chiswick**, who are going to discuss the plans they have laid at the session on August 20, which will of course be at 66 High Road as usual. Visitors always welcomed.

Purley are a lively lot and include several "poets" as contributors to *Splatter* as well as band reports, news of the locals and the future programme. They get together at the Railwaymen's Hall, 58 Whytecliffe Road, on the first and third—but *never* fifth—Fridays in each month; the first meeting is in the small hall and the second in the large one. Thus on August 2 there is Natter night, and August 16 is a Constructional Contest with prizes to be taken away.

The Mobile element are catered for by the group



This was the turn-out for a D/F event held recently in the Salisbury area, with home-built direction finding receivers very much in evidence. Leaders in the competition were SWL Simmons, Oxford; G3NDM, Rugby; and G3WMM, Oxford. If you look carefully at this picture you will discern Stonehenge in the background. The event was organised by G2FIX and G5YN, near the centre of the group.

known as **A.R.M.S.**, by way of "Mobile News" each month; quite apart from the /M stuff, there was a piece in the edition to hand at the moment about the postal service which justifiably burnt a hole in the paper. One could not but agree, and at the same time feel that the postal people could well try and make their efficiency a bit more like that of Licensing Branch folk, who seem to deal with everything by return, no matter how complex.

The Midland Institute in Margaret Street, Birmingham, is the place where the **Midland** group are to be found on the third Tuesday in each month, unless otherwise notified. We are not quite up to date on the programme, probably because of holidays and things, but we can say this is a lively lot and will almost surely have laid on some form of entertainment for the members.

Saltash are still at Burraton Toc H Hall on alternate Fridays; for all the details of current activities, we must refer you to the hon. sec.—see Panel.

Sad to say, the Secretary of **British Rail** has had to take a rest for a few weeks, and so we are asked to ensure all correspondence goes to the assistant hon. sec. for the moment, at 29 Little Dock Lane, Honicknowle, Plymouth, Devon. **British Rail** is the organisation (in this context) that caters for the radio amateur interest in the whole of the railways organisation in the U.K., and it is connected with the International FIRAC group

which consists of members in railway service in many foreign countries.

As ever, the **Echelford News Letter** this time was of great interest, and it is typical of this lively group. For August, the date is the 29th, for an informal at Hq., The Hall, St. Martins Court, Kingston Crescent, Woodthorpe Road, Ashford, Middx., starting at 7.30. This is a place where elderly people live, and the road in is often blocked by badly parked cars, which is not looked on with much favour by emergency services vehicles trying to get through—so if you go, take care over parking, and have consideration for the local residents!

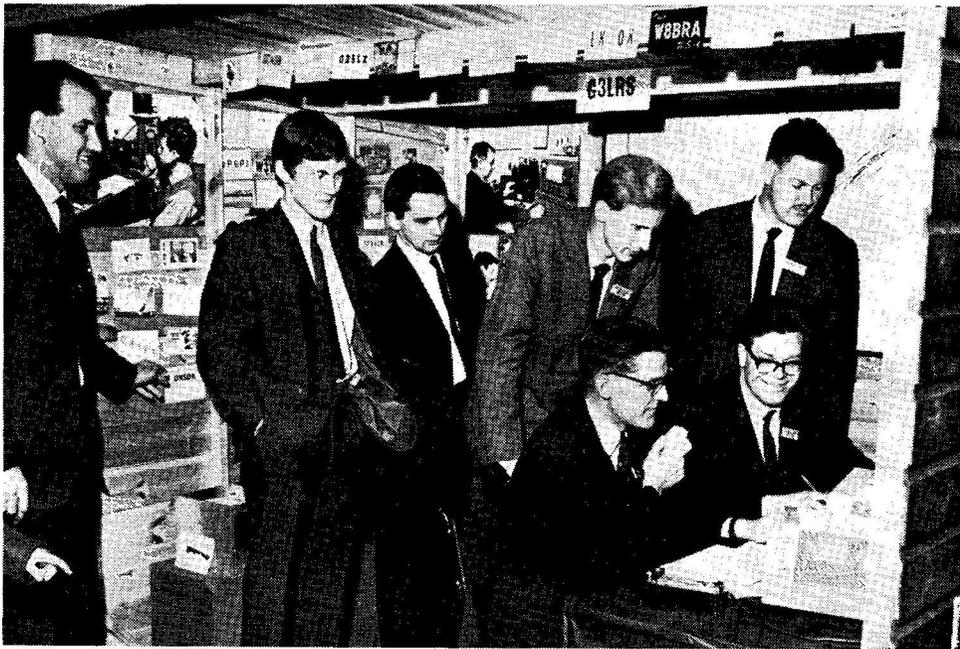
A new hon. secretary comes in for **Pudsey**, to enable the previous one to get his nose down to R.A.E., and also there has been a change of Hq., to Bramley Liberal Club, off Town Street, Bramley, where all are welcomed every Wednesday evening at 8.0 p.m. Lectures and visits are mooted for the near future, although at the moment we do not have any dates. A good crowd, this.

Similarly **Culcheth** have a change of Secretary to record; and the new incumbent has as his first task writing in to this piece to tell us that on August 9 G3SAY is talking about a transceiver for fixed, portable or mobile use on Top Band. All visitors and prospective new members are of course welcome.

Names and Addresses of Club Secretaries reporting in this issue :

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, London, W.3.
 ARDEER: E. Somerville, GM8BOM, 14 Winton Street, Ardrossan, Ayrshire.
 A.R.M.S.: N. A. S. Fitch, G3FPK, 79 Murchison Road, London, E.10. (*LEYtonstone 6700.*)
 BANGOR: J. W. Campbell, G13OLJ, 48 Abbey Drive, Bangor, Co. Down.
 BISHOPS STORTFORD: A. Stanley, G3WUR, 43 Havers Lane, Bishops Stortford (4519, *day only*).
 BRITISH RAIL: H. A. J. Gray, Eleven, Swanton Drive, East Dereham, Norfolk.
 BURY & ROSSENDALE: A. Cooper, G3VVQ, 411 Holcombe Road, Greenmount, Nr. Bury, Lancs.
 CHESHUNT: N. Invest, 93 Manor Court Road, Enfield, Middlesex.
 CHIPPENHAM: N. Cutter, G3PQG, 1 Fossey Close, Colerne, Chippenham, Wilts. (*Box 664.*)
 CORNISH: W. J. Gilbert, 7 Poltair Road, Penryn, Cornwall.
 COVENTRY: C. Jaynes, 20 Belgrave Road, Wyken, Coventry CV2-5AY.
 CRAY VALLEY: D. Buckley, G3VLX, 234 Halfway Street, Sidcup, Kent. (*01-850 6945.*)
 CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook Crescent, London, S.E.23. (*FORest Hill 6940.*)
 CULCHETH: K. Burgess, 32 Stendon Street, Leigh, Lancs.
 DUNSTABLE DOWNS: G. N. Bath, G3NMZ, 9 Chalton Heights, Chalton, Luton, Beds.
 ECHELFFORD: M. Clift, G3UNV, 45 Fordbridge Road, Ashford (59628), Middx.
 EXETER: E. G. Wheatcroft, G3HMY, 27 Lower Wear Road, Countess Wear, Exeter.
 FAREHAM: J. Rampton, G3VFI, 23 Oxford Close, Fareham, Hants.
 FARNBOROUGH: D. G. Arigho, G3NVM, 6 Frensham Close, Yateley (2174), Camberley, Surrey.
 GUILDFORD: A. Wilkes, G3SLH, Schiehallion, Hookley Lane, Elstead, Godalming, Surrey.
 HARROW: R. H. Medcraft, G3JVM, 134 Dulverton Road, Ruislip Manor, Ruislip, Middlesex.
 HEREFORD: B. Edwards, G3RJB, 5 Powys Walk, Hereford.
 LEICESTER: N. Tomlinson, G8BOA, 33 Merton Avenue, Leicester.
 MEDWAY: P. Carey, G3UXH, 29 Miskin Road, Hoo, Rochester, Kent.
 MIDLAND: C. J. Haycock, G3DJJ, 29a Wellington Road, Handsworth, Birmingham, 20.

MID-SUSSEX: E. J. Letts, G3RXJ, 87 Meadow Lane, Burgess Hill, Sussex.
 NORFOLK: M. J. Cooke, 76 Falcon Road West, Sprowston, Norwich (46093) NOR-73R.
 NORTHERN HEIGHTS: A. Robinson, Candy Cabin, Ogden, Halifax (44329).
 NORTH KENT: P. T. Baber, 64 Latham Road, Bexleyheath, Kent. (*01-303 8655.*)
 NOTTINGHAM: K. Viles, 27 Cresta Gardens, Mapperley Rise, Nottingham.
 OTLEY: M. Powell, G3NNO, 82 Forest Avenue, Starbeck, Harrogate, Yorks.
 PETERBOROUGH: D. Byrne, G3KPO, Jersey House, Eye, Peterborough.
 PUDSEY: P. Conway, G3XLV, c/o 10 Tyersal Grove, Tyersal, Bradford, 4. (*64220.*)
 PURLEY: A. Frost, G3FTQ, 62 Gonville Road, Thornton Heath, Surrey. CR4-6DB.
 R.A.I.B.C.: Mrs. F. Woolley, G3LWY, 331 Wigan Lane, Wigan, Lancs.
 REIGATE: D. Thom, G3NKS, Bankside, 58 Garlands Road, Redhill, Surrey.
 SAILOP: W. Lindsay-Smith, G3WNI, 22 Kingswood Crescent, Copthorne, Shrewsbury.
 SALTASH: J. A. Ennis, 19 Coombe Road, Saltash, Cornwall.
 SHEFFORD: M. B. Goodwin, G3WKR, 16 Roe Close, Stotfold, Hitchin, Herts.
 SILVERTHORN: G. E. Fenner, G3VMO, 80 Larkshall Crescent, Chingford, E.4. (*01-529 6613.*)
 SOUTHGATE: R. Wilkinson, G3TXA, 23 Ashridge Gardens, London, N.13. (*01-886 4592.*)
 SOUTH SHIELDS: D. Forster, G3KZZ, 41 Marlborough Street, South Shields.
 SURREY: R. Morrison, G3KGA, 33 Sefton Road, Croydon. CRO-7HS, Surrey. (*01-654 5982.*)
 SUTTON & CHEAM: J. Marriott, G8BFH, 8 Romany Gardens, Sutton, Surrey. (*FAIrlands 2745.*)
 VERULAM: J. Thomas, G3RXA, 9 Highland Drive, Hemel Hempstead (5536), Herts.
 W.A.M.R.A.C.: Rev. A. W. Shepherd, G3NGF, 52 Thanet Street, Clay Cross (2184), Chesterfield, Derbyshire.
 WIMBLEDON: K. Alexander, 23 Pepsys Road, West Wimbledon, London, S.W.20.
 WIRRAL: J. Phillips, G3PXX, 16 Collingham Green, Little Sutton, Wirral, Cheshire.
 WOLVERHAMPTON: J. P. H. Burden, G3UBX, 28 Coalway Road, Wolverhampton.



GB3LRS, the station laid on by the Leicester Radio Society for the local "Leisure '68 Exhibition," at the Granby Halls, was housed in a garden shed contrived to look like a typical amateur station. Using a KW-2000A, the GB3LRS operating team (G3UOF, G3RHZ, G3LTT, G8BOA and G3ONV, with much SWL assistance) made more than 200 contacts on the 15/80m. bands, keeping the crowds round the shack continuously interested in their live demonstration of Amateur Radio—well done, boys!

A new one comes from Peterborough, who are proposing to run a Maritime Mobile D/F contest, as a joint affair with the Stamford chaps. Bring your own boat and Top Band D/F gear! The entertainment—on September 15—will end with a barbecue on the river bank at Alwalton. On September 2 the Mobile Rally is due, for details of which consult the "Mobile Scene" piece. For August, there will no doubt be plenty of things to be done, and for the dope on these we must commend you to the hon. secretary.

Wimbledon and South London Mobile's combined efforts result always in a good newsletter. In the current issue there is a rather interesting piece on Morse Code, the Russian and Japanese variations on the theme, and various abbreviations and their derivations, contributed by G3DWW. These chaps can be found on the second and the last Friday of each month, at the St. John Ambulance Hall, 124 Kingston Road, South Wimbledon, S.W.19, starting at 2000 clock.

Bishops Stortford have Hq. at Windhill, in the British Legion Club; July saw a talk and demonstration of Printed Circuit Manufacture by G8BBO; no details are to hand of the August doings, but it is known that there is a complete programme through to the next AGM and new members and visitors will always be welcomed.

The ex-hon. sec. of Silverthorn is now resident in Zurich, where he holds the call HB9ALV; he recently revisited the Club and one can imagine a good time was had by all concerned chewing the rag. For details of this group, who have Hq. at Friday Hill House, Simmons

Lane, Chingford, contact the Secretary—see Panel.

The Newsletter of the Southgate group has plenty of reportage on Club doings and some useful incidental items—like details for an RF probe and notes on transistor Rx design. They shut down for August and the next meeting—at Parkwood Girls School, Bounds Green Road, Wood Green—will be on September 12, for a junk sale.

Cheshunt had their own annual field day on July 7, signing GB3CRC and using a KW-2000 owned and operated by G3TZZ. Here again, the next meeting is not till September 6.

Through an inadvertence on our part last month, we are asked to make it clear that Harrow always meet, weekly, at Roxeth Manor School, Eastcote Lane, South Harrow, every Friday at 8.0 p.m. The programme is fixed right through till October 4, when they visit the BBC at Crystal Palace, to see the technical side. What should be an interesting occasion will be on August 23, when the G2FKZ tape/slide lecture on the Aurora will be given. They do a lot of practical work at Harrow—it was their chairman, G2TA, who first conceived the idea of Club Projects, now adopted by many other groups up and down the country.

We are told, and we congratulate them, that the Exeter membership is now no less than 50, and many interesting talks and demonstrations have been given during the last three months. Next meeting, at the George & Dragon, Blackboy Road, is on August 6 at 7.30 p.m. Starting on September 3, they will have

permanent Hq. at St. Sidwell's Methodist Committee Room, Sidwell Street, first Tuesday each month at 7.30 p.m.—and the programme is fixed till January '69.

Crystal Palace have their next meetings on August 17 (G3IIR and G3XCB on Mobile) and September 21, when G3OOU and G3FZL will go into the matter of Receiver Measurement Techniques.

At **Mid-Sussex**, they will be closed down for August, but on the resumption in September, the intention is to have meetings fortnightly on Thursdays, at Marle Place Further Education Centre, Leylands Road, Burgess Hill. The current news letter, *Mid-Sussex Matters*, reports not only meetings and outings but also includes an account of a 4-metre expedition to the Welsh Alps (Snowdonia) by G3RXJ, with some very interesting results noted as regards propagation on 70 mc in mountainous terrain—broadly, it was found that /M contact on 4 metres could be maintained under the most surprising conditions.

MCC Dates

Yes, it's coming round again, so get ready for the week-end November 9/10. Rules, substantially as last year, will appear in full in the October issue of **SHORT WAVE MAGAZINE**, due out on September 27. It would help us a lot if Clubs thinking of entering, *and never having taken part before*, would let us know, so that they can be included in the identification-code lists.

Deadline

For the September issue will be **August 9**, addressed: Club Secretary, **SHORT WAVE MAGAZINE**, BUCKINGHAM. This is a full and sufficient address, and the only one to use for all editorial matter. 73 to all scribes and honorary secretaries—keep up the good work.

SPECIALLY ON THE AIR

GB3NEW, August 5-10: Special station at the Royal National Eisteddfod of Wales, at Barry, Glam., operated by the Barry College of Further Education Radio Society, 0800-2000 BST daily (possibly extended depending on local conditions). Gear will include a Hallicrafters SR-400 transceiver, KW-2000A with KW-600 linear, Eddystone EA-12 receiver and a Mosley TA-33Jr. beam. All bands 10 to 160m. will be worked, CW/SSB, with simultaneous operation on more than one band. Special QSL card is being issued, via GW3VKL, *QTHR*. All contacts and (useful) SWL reports will be QSL'd, either through Bureaux, or direct for stamp.—Further information from: D. H. Adams, GW3VBP, College of Further Education, Colcot Road, Barry, Glam., South Wales.

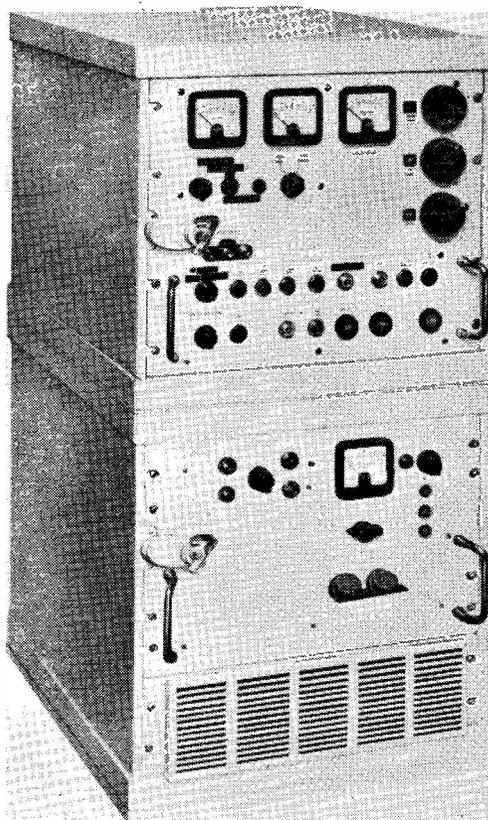
GB3EIF, August 18-September 9: Operated by the Lothians Radio Society in conjunction with the Edinburgh International Festival, from the Mountbatten Building of the Heriot-Watt

University, running SSB on the 10 to 80m. bands. Convenor: V. W. Stewart, GM3OWU, 9 Juniper Avenue, Juniper Green, Midlothian.

GB3WRA, September 7: Operating from the annual Wycombe Show, at High Wycombe, Bucks., running all bands 10-160m., AM/CW/SSB. Visiting amateurs will be specially welcome. — A. C. Butcher, G3FSN, 70 Hughenden Avenue, High Wycombe, Bucks.

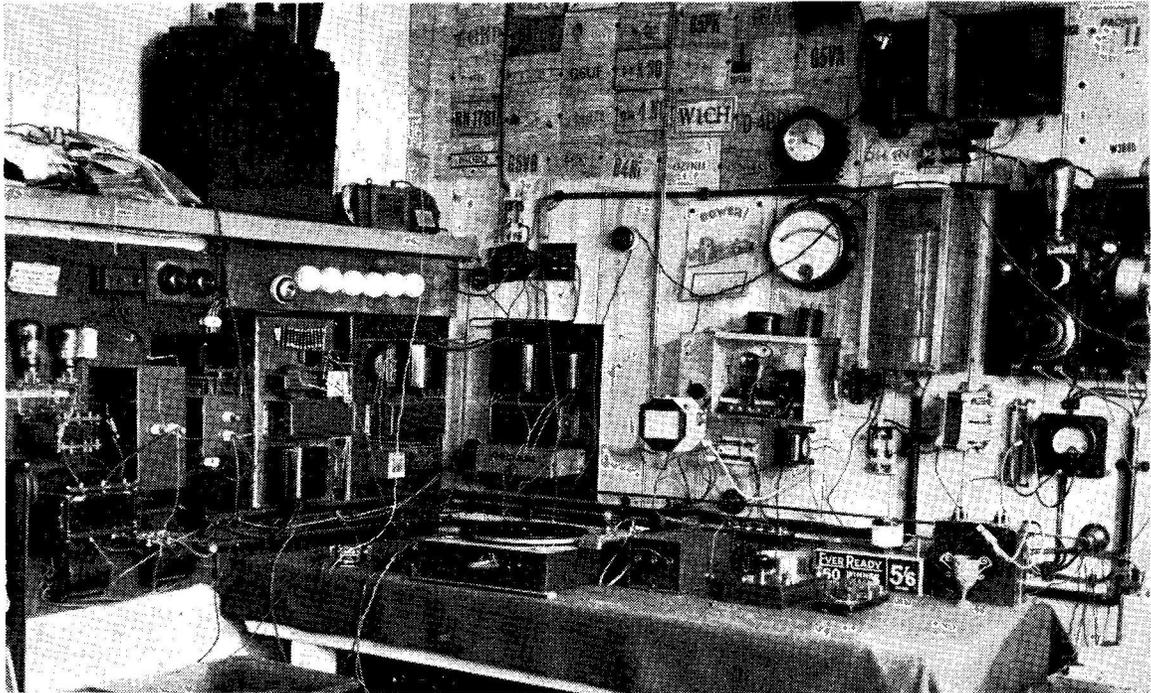
AMATEUR RADIO IN EAST AFRICA

From the March issue of *QTC*, of the Radio Society of East Africa, we get it that there are 41 licensed AT-stations in Kenya, 5Z4; three in Uganda, 5X5; and 13 in Tanzania, 5H3. Of these 57 amateurs (almost entirely European), 40 are members of the R.S.E.A.



Racal Communications, Ltd. have recently been awarded an important R.N. contract for submarine communications, valued at about £1m. This is the new Racal TA.349 kilowatt linear amplifier, in a cabinet designed for marine installation. It is for operation over the HF bands used for Naval communication.

Our regular Book Lists include all titles of general Amateur Radio interest and cover the whole field for specialised texts.



THE OTHER MAN'S STATION

G5JV-1933

A BIT unusual this time, but a picture of particular interest nevertheless because it is quite typical of an amateur station of the early 1930's—G5JV, H. W. Medcraft, then in London, N.7. He had actually started some 15 years earlier than this, in the crystal-and-spark era.

The transmitter-panel (as it used to be called) was CO-BA-PA, modulated by a 212D triode, driven from a two-stage battery amplifier, with a Marconi-Reisz microphone (a very advanced type in those days). The power packs gave 300v. and 1000v. for the Tx side, and much in the way of dry-battery voltage was used for bias, speech amplifier and receiver HT. The Rx was a 1-V-1 and covered the 40 and 160m. bands—on Forty it was usual to work half-a-dozen W's in the course of a night's session.

At G5JV, the shack was a converted coal-cellar, out of the way and keeping a nice even temperature. It will immediately be noticed that though at that time we always used to talk of "wireless"—the word "radio" was a trans-Atlantic innovation, and hardly mentioned—the station of G5JV, like many another at that period,

was characterised by the quantity of loose wiring in evidence (and some of the old-timer stations of today show the same tendency!) The QSL cards visible in the photograph include some well-known callsigns, DX and U.K.

G5JV himself went off the air altogether for about 18 years but is now back again—from Harrow Weald in Middlesex—and active on all bands, but mainly on Ten and One-Sixty. On the latter band he has been working stations last heard 30 years ago. This, for those who have been in the game long enough, is one of the more extraordinary manifestations of Amateur Radio.

The son of G5JV is also a licensed radio amateur—the photograph you see here was actually taken long before G3JVM (R. H. Medcraft, Ruislip, Middlesex) was born! But G3JVM is now well known in his own right as the busy honorary secretary of the Radio Society of Harrow, one of the most active Club groups in the country. We congratulate G5JV-G3JVM on their long family association with the *practique* of Amateur Radio.

More than 80% of licensed U.K. amateurs are regular readers of "Short Wave Magazine" — which is independent and unsubsidised and was established in 1937.

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.

DL5YY, A. F. Smyth, 2 Sqdn., R.A.F. Gatow, B.F.P.O.45.
G3XET, V. J. Riley, 4 The Island, Anthorn, Carlisle, Cumberland.
G3XFB, D. F. Jewson, 8 Johnsgate, Crestwood Park, Brewood, Staffs.
G3XGQ, P. Whitmore, 12 Holland Road, Bath, Somerset.
G3XGQ/A, P. Whitmore, High Hall, Church Road, Edgbaston, Birmingham, 15.
GW3XJA, D. J. Williams, 12 Baker Street, Blaenavon, Mon.
G3XJB, J. D. Parkinson, 7 Kemble Avenue, Northenden, Manchester 23, Lancs.
GW3XJB, J. D. Parkinson. *QSL via G3XJB.*
G3XJH, A. W. Barry, 1 Great Parks Road, Paignton, Devon.
G3XKL, C. Gill, 27 Lee Lane West, Horsforth, Leeds, Yorkshire.
G3XKO, C. Partington, 60 High Street, Ilfracombe, N. Devon.
G3XKP, S. H. W. Stephens, 65 Goonown, St. Agnes, Cornwall.
G3XKQ, D. P. Bidmead, 4 Old Falmouth Road, Truro, Cornwall.
G3XKR, S. G. Elliston, 36 St. Andrews Drive, Stanmore, Middlesex.
G3XKS, H. O. D. C. Grattan, 14 Great Central Road, Loughborough, Leics.
G3XLB, M. R. Giddings, B.Sc. (Hons.), 6 Midlothian Drive, Blundellsands, Liverpool 23, Lancs. (*Tel. Great Crosby 2661.*)
G3XLI, P. W. Holland, 61 Gallows Hill Lane, Abbots Langley, Herts. (*Tel. Kings Langley 3822.*)
G3XLR, A. S. Bunyan, 17 Sonderburg Road, Holloway, London, N.7.
G3XND, H. H. Davies, 2 Scott Road, Tilgate, Crawley, Sussex.
GM3XNE, A. F. Smyth, 31 Barrie Terrace, Ardrossan, Ayrshire.
G3XNH, J. Liming, St. Leonards, Forest Road, East Horsley, Surrey.

GW3XNI, J. Hopkins, 21 Gladstone Street, Crosskeys, Newport, Mon. NP1 7PA. (*Tel. Crosskeys 607.*)
G3XNM, 1st Barnston Scout Group, Church Hall, Barnston, Cheshire. *QSL via G3VZM.*
G3XNP, K. F. Arnold A.M.I.T.E., (*ex-G8BAY*), 21 Montayne Road, Waltham Cross, Cheshunt, Herts.
G3XNR, Amateur Radio Society, Woolwich Polytechnic, Woolwich, London, S.E.18.
G3XNT, R. Bean, 53 Arbour House, Arbour Square, Stepney, London, E.1.
G3XOB, D. C. Ellacott, 11 Stirling Road, Brislington, Bristol 4.
G3XON, S. G. Casperd, 27 Burnside Road, Gosforth, Newcastle-upon-Tyne. NE3 2DU.
G3XOQ, P. Weller, 82 Earlswood Road, Redhill, Surrey.
G3XPA, R. W. Bevan, 57 Weston Crescent, Aldridge, Walsall, Staffs.
G3XPE, M. K. Vanden-Busken, 36 Billy Lows Lane, Potters Bar, Herts. (*Tel. Potters Bar 52374.*)
GM6ADR/T, G. A. Hunter (*GM3ULP*), The Bungalow, Broomside Braes, Camp Road, Motherwell, Lanarks.
G8BJN, S. J. Taplin, 6 Pigott Street, London, E.14. (*Tel. 01-987 4121.*)
G8BJW, G. L. Marshall, 9 Eastbourne Road, Southport, Lancs. (*Tel. Southport 66735.*)
G8BLH, J. McDonald, 6 Great Meadow, Shaw, Lancs. (*Tel. Shaw 5494.*)
G8BNN, G. Kearns, 215 Mount Pleasant Avenue, St. Helens, Lancs.
G8BOV, D. F. Gorrill, 30 Ashburnham Road, Furnace Green, Crawley, Sussex.
G8BRH, J. Smith, 53 Whitehall Avenue, Kids Grove, Stoke-on-Trent, Staffs.
G8BRI, F. W. Webb, 37 Alwyne Grove, Shipton Road, York. (*Tel. York 25798.*)

CHANGE OF ADDRESS

EI2AF, D. K. Donnelly, 43 Park Drive, Ranelagh, Dublin 6.
EI8AR, Bro. John Shortall, De La Salle House, Bruff, Co. Limerick.
G3AJB, H. H. Mills, Men's Ward, St. Hilda's Hospital, Whitby, Yorkshire.
G3JTG, E. G. Gibbins, 3 Sermon Road, Teg Down, Winchester, Hants.
G3KGR, R. W. Lupton, 1 Adastral Place, Swaffham, Norfolk.
G3KZW, R. B. Ratcliffe, 3 Falkland Drive, Garswood, Wigan, Lancs. (*Tel. Ashton-in-Makerfield 76313.*)
G3MBK, D. W. Underdown, 10 Poplars Close, Hatfield, Herts.
G3NBU, P. J. S. Bendall, 89 Hexham Road, Whitley, Reading, Berks.
G3OHQ, B. Willcox, 470 Woodchurch Road, Prenton, Birkenhead, Cheshire. (*also G3OHQ/MM.*)
G3RUH, J. R. Miller, B.Sc. (Eng.), Berkeley, Tye Green, Good Easter, Chelmsford, Essex. (*Tel. Good Easter 363.*)
G3VPE, H. S. Pinchin, 61 Colebank Road, Hall Green, Birmingham 28.
GM3WFJ, R. St. J. Andrew, The Old Manse, Kirkmichael, Blairgowrie, Perthshire. (*Tel. Strath Arde 275.*)
G3WRV, A. Rowlandson, Morning Field, Little Kimble, Aylesbury, Bucks.
G3WSJ, A. Evans, 37 Shirburn Road, Egguckland, Plymouth, Devon.
G3WUD, R. M. Gilchrist, 32 Syddal Green, Bramhall, Stockport, Cheshire. (*Tel. 061-439 5570.*)
G3XAP, A. P. Ashton, 30 Ford View Road, Stowmarket, Suffolk.
G3XLU, R. W. S. Hewett, c/o Sgts' Mess, R.A.F. Changi, c/o G.P.O., Singapore 17.
G4AC, E. L. Postans, 6 Upper Moorfield Road, Woodbridge, Suffolk.

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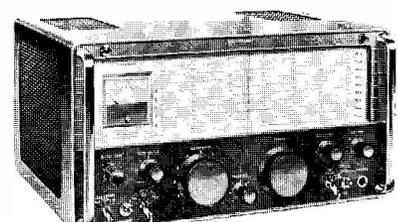
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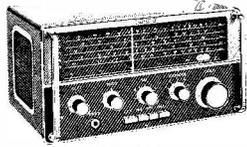


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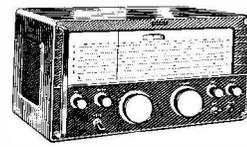
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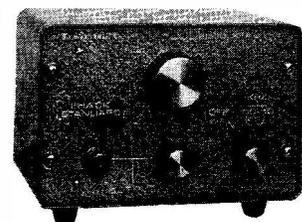
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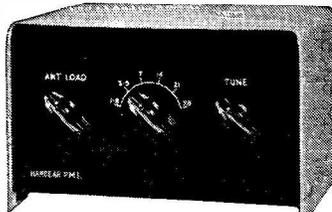
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3d. per word, minimum charge 5/-, payable with order. Add 25% for Bold Face (Heavy Type). Please write clearly, using full punctuation and recognised abbreviations. No responsibility accepted for transcription errors. Box Numbers 1/6 Extra. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, London, S.W.1.

WANTED: A CR-100 receiver. Am Selling an unused Lafayette VFO, at £8. Would consider an Exchange for a Z-Match, SWR meter or W-H-Y?—Ashton, G3XAP, 30 Ford View Road, Stowmarket, Suffolk.

FOR SALE: G2DAF-type Tx and Rx, both Mk. II version, and built to highest standards, price £45 and £50 respectively, or near offer. Suggest buyer views.—Jagger, GW3KAJ, 27 Penmaen Walk, Culverhouse Cross, Cardiff, South Wales. (Tel. Wenvoe 454.)

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SELLING: In good order, a Nova-Tech Pal D/F receiver, with leather case, circuitry and handbook, £19 or near offer, carriage paid.—Adamson, Woodend, Victoria Road, Kingsdown, Deal, Kent.

WANTED: Hammarlund HX-Fifty Tx, complete and in working order, with manual. Pse state full details with price asked.—Brook, 103 Carshalton Park Road, Carshalton, Surrey. (Tel. Wallington 6064.)

SALE: Pye 4-metre 20-watt Base Station transmitter, working well and with handbooks, £15. Codar A.T.5 Tx and mains PSU, as-new condition, £15. Also a home-built 10-watt AM transmitter for ten metres, VFO controlled, mains input, £5 only. Free delivery to any reasonable distance.—Knights, G3TQY, Ashar, Cross Road, Tadworth (3247), Surrey.

SELLING: And Everything Perfect! A Top Band Tx, similar to the Codar A.T.5, £8. Transistorised converter for Top Band, 60s. A 60-watt inverter, 12v. DC in and 300v. DC output, 60s. Halsol 160-metre whip assembly, £5. Self-powered 20-watt modulator, 60s.—Carpenter, G3TYJ, 10 Avenue Road, Frome, Somerset.

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EXCHANGE: Nikon FTN SLR Camera, F/1.4 lens, in mint condition and under guarantee, also Canon 8 x 30 Binoculars, FOR an NCX-5 or other good SSB transceiver. SALE: Marconi CR-150/6 double superhet, with PSU and manual, £45.—10 Winterslow Drive, Leigh Park, Havant, Hants.

SMALL ADVERTISEMENTS, READERS—*continues*

SALE: JJK two-metre converter, IF 1.8-3.8 mc, £9. K.W. low-pass filter for Ch.2, 75-ohm, brand new, 65s. Eddystone S-meter, suitable for S.640 or S.750 Rx, 50s. (All items post paid.) Spare units available for Minimitter Mercury Tx, write for details. (Yorkshire).—Box No. 4673, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

EXCHANGE: Marconi 390G VHF Signal Generator, coverage 16 to 150 mc, in good condition, with manual and transit case FOR good ex-Govt. communications Rx, such as B.40, CR-100, or similar, and preferably unmodified.—Chesterman, 40 Whartons Lane, Totton, Southampton.

SELLING: KW-2000 with AC/PSU, in excellent condition, £139. Delivery possible in Central Scotland or to Midlands.—Smith, GM3SNO, 5 Tarvit Avenue, Cupar, Fife, Scotland.

SALE: Taylor Model 52 Valve Tester, £10. Complete rig, suitable for mobile, fixed or portable, comprising 19 Set Tx, 81A Rx, with 12v. Mod./PSU, 2.0 to 7.0 mc and will cover 160m., £15. Command Tx's, 160m. CW and 80m. Phone, £3 each. PSU for 19 Set, £4. R.1155 receiver, converted for Top Band, with external PSU and internal speaker, £10. Valves, 813 and 8012, 20s. each. Many others, s.a.e. with enquiries. Buyers collect or carriage extra.—Nixon, G3CLP, QTHR.

WANTED: Eddystone 770R or 990R, in almost new condition. Pse state age, accessories included, all relevant details and lowest cash price. Can collect.—Box No. 4674, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

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WANTED: An R.216 receiver. For SALE: R.1475's, complete with PSU, power leads and circuitry, £12 15s. One only, HRO Rx, complete with band-spread coil packs to cover 10 to 160m., £25. Minimitter converter, covering 10 to 160m. amateur bands, IF 1.6 mc, for 230v. AC or 12v. DC operation, £14. Cash with order, money orders only (no cheques).—Gobles, 115 Dyas Road, Great Barr, Birmingham, 22A.

SALE: Marconi CR-150 Rx, coverage 2.0 to 60 mc, dual conversion, with S-meter and PSU, in good condition, price £25, buyer to collect.—Boella, 87 St. Monica Road, Sholing, Southampton (48543.)

SALE: Marconi CR-100 receiver, wired in p.v.c., with tone control and S-meter, in black cabinet, £18 or near offer.—Davies, Evergreens, Talcona, Llangefric, Anglesey, North Wales.

SALE: CR-100/B.28 Rx, with PR-30 preselector, speaker and all cables, price £20 or near offer, buyer to collect.—Hart, 10 Nursery Grove, Alwoodley, Leeds 17, Yorkshire. (Tel. 685177.)

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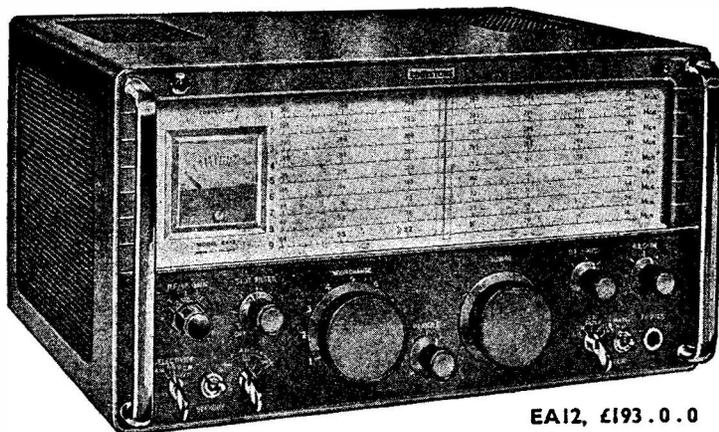
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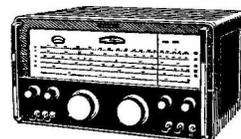


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FOR SALE: Home-built AM transmitter, 75 watts, pair 807's in PA and modulator, including full power supply, price £20, buyer to inspect and collect.—Toynnton, G3RGA, Wildhern, Old Mead Lane, Henham, Nr. Bishops Stortford, Herts. (Tel. OBS 975458).

SELLING: National NCX-5 Mk. II, serial number 882-20593, in original packing, with handbook, together with husky solid-state PSU (home-built), microphone and bug key—all in at £200. Also 4X150A valves, bases and blowers; two-metre and 70-centimetre linear PA's, converters, etc.—Ring Kirk, G3GTW, Sedgley 4664.

FOR SALE: BC-221, with mains PSU and charts, £20. R.216 receiver, with mains PSU, £30. Standard frequency receiver, £4. Receiver Type B.47, coverage 15 to 500 kc, £4. Dawe Instruments 1 per cent. L/C and R Bridge, rack mounting, £12. Avo Model 8 Mk. II test meter, £10. Airmec Model 712 VTVM, £6. All items in working order, cash and carry.—Ring Passfield, 01-674 5825 (South London).

WANTED: SSB Transceiver for 15-20m., would consider HW-32A or any, relatively cheap, all-band job.—Box No. 4677, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Heathkit RA-1 receiver, with xtal calibrator, £32 or near offer. Morse course, 37s. 6d.—Powell, G8BPK, 1 Wenwell Close, Aston Clinton (600), Aylesbury, Bucks.

SELLING: HA-350 amateur band Rx, coverage 10 to 80 metres, for AM/CW/SSB, in new condition, price £45.—Spriggs, 4 Greencroft Road, Heston, Hounslow, Middlesex. (Tel. 01-570 7890.)

OFFERING: R.C.A. AR88D, with 100 ke xtal calibrator and speaker, £20 or near. Prefer buyer inspects and collects but could deliver Southampton /Portsmouth area.—Rampton, G3VFI, 23 Oxford Close, Fareham, Hants.

SMALL ADVERTISEMENTS, READERS—continued

SALE: Ameco Tx, coverage 80 to 6 metres, 90 watts, with remote VFO, 12v. DC/PSU, AC/PSU kit, £38. HRO receiver with bandspread coil packs for 10-15-20-40-80m. plus eight general-coverage coils, including PSU and manual, £25. TU5B, TU9B units, 30s. each. LP filter, 35s. Superb Navy ATU, 60s. PSU, 1000v., 40s. Signal generator, 100-156 mc, with manual, £4. Aluminium taper whips, 8ft., 20s. each. LA-600 linear, £45. Johnson's roller-coaster coil, 25s. Pair Eagle 10-transistor walkie-talkies, on 28.5 mc. £10. Stabilised HV/PSU, 60s.—Haycock, G3VKC, 24 The Comyns, Bushey Heath, Herts. (Tel. 01-950 3387.)

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WANTED: Ferrograph Series 5 or 6 Tape Deck.—Sephton, 16 Bloemfontein Avenue, Shepherds Bush, London, W.12.

WANTED: KW-77 Mk. III or Mk. IV receiver, with matching speaker. Also Top Band Phone Tx/Rx, mobile/fixd, with PSU. K.W. Ezee-Match ATU. K.W. dummy load. BC-221 frequency meter, with PSU. All to be in good condition and working order. **FOR SALE:** BC-1147 13-valve double RF communication receiver, coverage 1.5 to 30 mc, with built-in PSU, suit SWL, £15. Elpico car radio, new, all transistor, with guarantee, £8. Hamgear Preselector /ATU, used few times, with built-in PSU, £5.—Andreang, 10 Vermont Street, Hull (45140), East Yorkshire.

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SALE: Communications Rx Type TRGDx/20C, 550 kc to 30 mc, battery powered, £12. 3FIF-type whip, with coils for 80/160m., 90s. CM.705 crystal microphone, 25s. Cascade-type two-metre converter, completed but untested, 30s. Power pack, 250v./6.3v., 30s. Copies "Short Wave Magazine," Vol. XXVI, Nos. 1, 3, 4 at 1s. 6d. each. RSGB "Bulletin," Vol. 43, Nos. 3, 7, 8, 9, 10, 1s. 6d. each. All carriage paid.—Box No. 4678, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Collins 51J-3/4 receiver and KWS-1 transmitter, or similar.—Morris, The Forge House, Church, Enstone, Oxford.

MOVING QTH, must sell or live in poverty, Heathkit DX-100U at £50, also SB-10U at £20—or as a pair, £65 including delivery.—Cammies, G3VNI, QTHR or ring Deal 3409.

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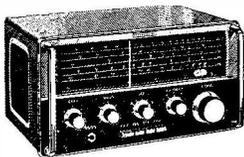
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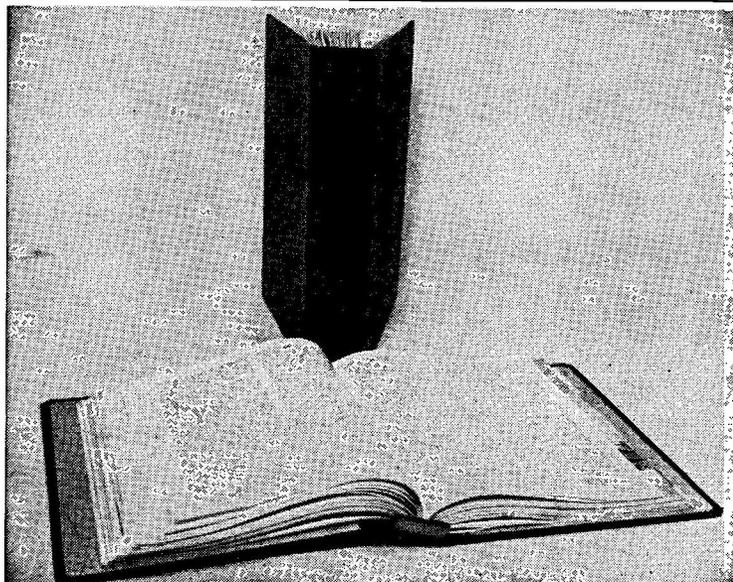
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