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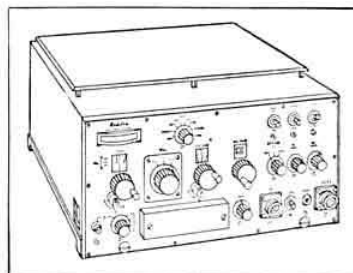
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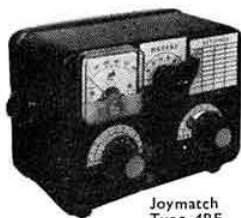
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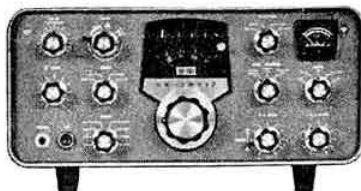
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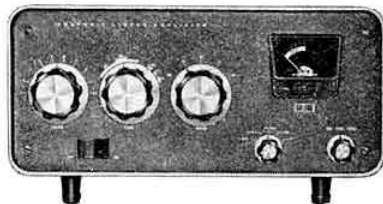
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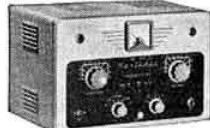
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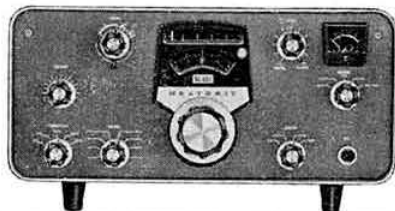
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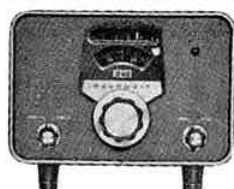
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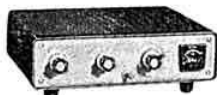
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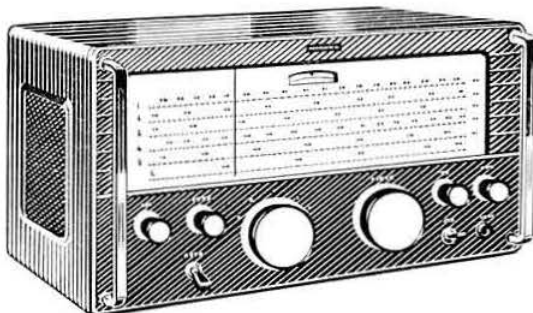
Amateur communications receivers



EA12

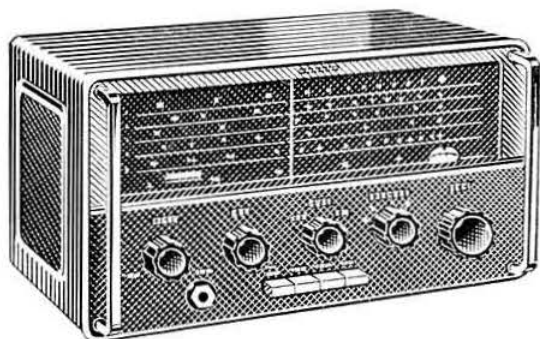
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RADIO COMMUNICATION JANUARY, 1968

J. B. LOWE

51 Wellington Street, Matlock, Derbyshire DE4 3GS

Matlock 2817 (2430 evenings)

Happy New Year

Sorry, lads, no pretty pictures this month as I've got to make room for a whole load of stuff I want to flog. First of all, a word on devaluation—I'm afraid it is bound to increase prices on the vast majority of the stuff I flog. Sorry and all that, but it can't be helped. Incidentally, as anyone with a slide rule can tell you, a devaluation of 14% does not mean that the import price goes up 14%. No sirree! It goes up darn nearly 17%! If you don't believe me, figure it out!

Still, there's one good thing about devaluation—it gives British industry a better chance. Let's hope to goodness they take it and stop messing about. Damn it, after all I am reasonably patriotic—I don't like having my shelves full of imported gear—I'd much rather sell British. If Management smarten up and Labour does a little work, the whole world would be selling British. Then you'd all be stinking rich like Bill Lowe.

Who does this Bill Lowe think he is? He can talk! The only work he ever does is carry a suitcase of cheques to the bank!

Enough of this nonsense—I have my own troubles—John is threatening to go on strike 'cos his screwdriver's too heavy. He'll be wanting extra pay for working 12 hours a day 7 days a week next! Fortunately he thinks overtime means drinking after hours.

NEW STUFF:

You know darn well that I have a very wide selection of new stuff. Rx's, Tx's, test gear and bits and bobs, so I won't waste space pushing it. I would, however, like to mention the new Sommerkamp equipment:

FR-500: A new Rx similar in design to the FR-100-B, but with the following additional features: (1) Top band. (2) 500 cycle mechanical filter. (3) Notch filter.

FL-500: A new Tx, again similar in design to the FL-200-B, but featuring 500W p.e.p.

FT-500: The new transceiver with 500W p.e.p.

By the time you read this I should have had deliveries of the RX (probably sold 'em all, too!) and the Tx and transceiver should be on their way. I'm not going to go hog wild on advertising—you know the reputation of Sommerkamp, so all I'll say is—if you're smart, you'll get on the waiting list right now.

SECONDHAND:

RX'S: HA350—£60.0.0.; 940—£90.0.0.; SX110—£40.0.0.; AR88D—£30.0.0.; EA12—£120.0.0.; 75A2—£120.0.0.; HRO—£27.10.0.; APR4—£50.0.0.; AR77E—£30.0.0.; EC10—£38.0.0.; HR22—£80.0.0.; KT340—£20.0.0.; 640—£20.0.0.; SX101A—£80.0.0.; HT32—£80.0.0.; R388—£110.0.0.; SP600—£85.0.0.

TX'S: DX40U—£20.0.0.; Matching VFO—£5.0.0.; LG50—£25.0.0.; LG300 r.f. section—£20.0.0.; Top-2-7—£18.0.0.; Viceroy 3—£90.0.0.; Labgear topbender—£18.0.0.; DX100 and SB10—£60.0.0.; Geloso Miniphase with VFO and p.s.u.—£40.0.0.; B2Spy Tx/Rx—£12.0.0.; KW600 linear—£70.0.0.; Panda Cub £25.0.0.

SUNDRIES:

10 metre walkie-talkies on 28.5 mc/s £12.10.0. per pair post free; Shure 401A mikes—£5.10.0.; Dartronic's scope—£20.0.0.; Codar mobile p.s.u.—£8.0.0.; Codar preselector—£5.0.0.; BC453 "Q fiver"—£5.0.0.; R.F. output meters—£2.10.0. (the meter alone is worth this!); 339 'scope—£15.0.0.; Power Units 234A for 1132 or 1392 sets. Ideal bench supply giving 300V dc or 250V ac and 6-3V a.c. Absolute gift 30/- carriage paid; RF Units 24B. These are the popular things for a 20, 15 and 10 converter. 7 mc/s out 20/- carriage paid; Tuning unit-4218 containing coil formers, ceramic trimmers and no less than 3 rotary inductors (priceless!) for 30/- carriage paid.

COMPONENTS:

NEW: Tubular trimmers either 2-5pF or 3-15pF 1/- each 10/- a doz; Feedthroughs 1000pF screw type 1/- each, 10/- a doz; Disc ceramics .001, 3/6 a doz; .01 5/- doz; Standard coax sockets 1/- each; Standard coax plugs 1/4 each; PL259 plugs 5/- each; Alligator clips 6d. each; Plugs (Octal, B7G, B9A) 2/6 each; 2pF and 3pF ceramics, 3d. each, 2/6 doz; Electrolytics—brand spanking new can types, complete with mounting clips, 10mF 350V, 1/8; 20mF 350V 2/3; 20mF 450V 2/9; 100mF 350V 5/6; 100-100mF 350V 6/8; 100mF 450V 7/2; 40-40mF 500V 7/3; 100mF 500V 7/9; 100-100mF 450V 13/2; Silicon rectifiers—Current manufacture, NOT surplus, NOT seconds. You can rely on these. SE-05 1000piv 500mA, 4/6; 1S1066 1000piv 750mA, 8/-.

New Surplus: Resistors, most values from 2d. each. I can make up a batch of 100 useful values for 10/-. Capacitors from 2pF to 150mF from 2d. each. Again I can make up a very useful lot of 200 for 25/-. Mica trimmers 1000pF 1/-, 2800pF 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.

TRANSFORMERS—All new:

Pri.	Sec.
Tapped 110, 120, 200-250	325-0-325 200mA 5V at 3A, 30/-
Tapped 180-250	300-0-300 150mA 6.3 at 6A, 2.5-0-2.5 at 3A, 30/-
Tapped 105-250	250-0-250 120mA, 0-4-5 at 2.5A, 0-4-6.3 at 5A, 30/-
Tapped 180-250	300-0-300 50mA 2-0-2 at 2.5A, 6.3 at 1.5A, 20/-
240	250-0-250, 5V, 6.3V, 20/-
220	0-1860 at 4mA (5KV insulation), 20/-
Tapped 105-250	325-0-325 at 10mA, 6.3 at 6A, 6.3 at 3A, 15/-
Tapped 200-250	5KV-0-5KV at 120mA, £10.0.0.
Tapped 220-250	400-0-400 at 400mA, 80-0-80 at 10mA, 63-0-63 at 6A, £6.10.0.
Autotransformers	0-110-150-190-230 at 1.6KVA £3.10.0.

SPECIAL OFFER: In order to clear up stocks of stuff which I can't advertise (because I haven't many of each and if I did advertise, they'd soon go and I'd spend the rest of the month returning cheques P.O.'s etc., with a letter of apology!) I can send you a very sound junk box if you'll send me £1.0.0. A mixed bunch of resistors, capacitors, trimmers, pots etc., carriage paid, which I guarantee to be good value. I can promise that they won't be the usual horrible surplus. Usually these bargain offers involve chucking 90% of it away, but in this case you'll only chuck 89% away! Seriously—a good buy.

Service Department: Sorry, lads, we're full up for the present.

Postage: Except where items are marked "carriage paid", postage is extra. Please remember the days of the penny black are over and something weighing 2lbs. 1oz costs 4/6. Don't be frightened of sending too much. I'll return any excess.

A s.a.e. will get you my latest blurb.

H.P. certainly. The Credit Co., have such long faces as they count their devalued millions. 'Tis heart-breaking, Jim lad!

73, The Bandit,
VE8DP/G3UBO

Welcome RADIO COMMUNICATION . . .

Farewell RSGB BULLETIN

A new year, a new title. And, inevitably, the first reaction of many members will be: Why has this step been taken? Is this some deep-seated plot to squeeze out Amateur Radio, in favour of those professionally concerned with radio communication? Just what was wrong with RSGB BULLETIN?

A change of title of a long-established journal is never undertaken lightly. Indeed, only once before in over 40 years of the journal's history has this been necessary—and that was the relatively minor change from the original "*T & R Bulletin*" (a name marking the inauguration of our journal by the old Transmit and Relay Section in 1925) to a quarter of a century of RSGB BULLETIN.

First, it must be emphasised that the change of name does not imply any change in direction. "For the Advancement of Amateur Radio" remains the paramount aim of the RSGB—and of its journal. *Radio Communication* has absolutely no intention of becoming a periodical of interest primarily to professional radio communication engineers—though, of course, it is hoped that many of these, in their *alter ego* as amateurs, will continue to find the journal of interest.

But, as many institutions and societies have discovered before now, there are serious disadvantages to publishing a journal under a title that means nothing to the uninitiated. The former *IEE Journal* has for some years blossomed under the title *Electronics and Power*. Similarly the IERE renamed their journal *The Radio and Electronic Engineer*. Many other examples could be quoted.

It is not easy to rename a journal to everybody's satisfaction. Many of the more obvious, and possibly more appropriate, names are already bespoken by commercial publishers and overseas societies.

Radio Communication fulfils many of the requirements. It is reasonably short. It conveys immediately the field covered. It does not overlap existing periodicals. It will fall conveniently into place under "radio" in all those reference books in which it is important, particularly from an advertising viewpoint, that a journal should be readily identified. It reflects unashamedly the important role that our hobby has played in the development of new radio communication techniques.

So there is no intention to change the aim—only, it is hoped, to make possible an even better coverage of those subjects of interest to RSGB members.

And to do this—in the future, as in the past—the Society depends upon its members to make possible the production of a first-rate journal: by contributing good technical and topical articles; by keeping the regular contributors informed of noteworthy activities; and by letting advertisers know where their announcements were seen.

Some may regret that *Radio Communication* does not readily lend itself to any diminutive name. It may well be that many members will continue to refer (we hope affectionately) to the "Bull."

For above all, there must be no change in the close ties which have always linked the Society's journal and the members.

Farewell RSGB Bulletin . . .

Welcome RADIO COMMUNICATION

A Field Effect Transistor Voltmeter

By M. ALLENDEN, G3LTZ*

YOU can equate this meter to the old familiar valve voltmeter; it's got all the advantages that an 11 megohm input impedance can give, without the disadvantage of mains power supplies and consequent lack of mobility.

Circuit Description

A glance at Fig. 1 shows that the FETs have merely replaced the valves in a conventional circuit. Operation is on the basis of a balanced pair of amplifiers, the gates of which are biased by tapping the power supply to earth (chassis) and connecting TR2 gate to chassis. TR1 gate is similarly (d.c.) referred to chassis via the attenuator chain, and by adjusting the ZERO control, the voltage across the two 4.7k source resistors can be trimmed so that the meter reads zero with no input. Any voltage applied to TR1 upsets the balance, and the differential voltages on the sources cause the meter to deflect. The sensitivity of the meter is controlled by two series calibration resistors (RV1, RV2), one for a.c., the other for d.c. In practice, the input resistance attenuator chain always allows a direct input of 0.5 volt, and full scale deflection can be set by adjusting RV1 and RV2. The a.c./d.c. switch and calibration resistors are arranged so that an input via the a.c. probe reads the r.m.s. value.

As battery voltage falls, the sensitivity of the circuit can vary, and so it was therefore considered essential that a reference source be added. This was conveniently done by introducing a Zener diode (in fact the emitter/base junction of a 2N706); its actual voltage does not matter, so long as it is a known quantity. A quick prod onto the CAL point and the d.c. cal. pot (RV1) can be adjusted to compensate for any changes.

* 10 Carshalton Road, Swindon, Wilts. This article originally appeared in *Wiltshire Hams*, the Swindon and District Amateur Radio Club's magazine.

Calibration

The instrument is simply calibrated on d.c. by applying a known voltage to the input via the d.c. probe on any of the ranges and adjusting the D.C. CAL. (RV1) until the meter reads the known voltage being applied. The author used a digital voltmeter to check the calibration voltages, but reasonable approximations can be obtained by using known Zener diodes or new dry batteries. All ranges should be checked to ensure correct correlation. The use of 1 per cent resistors (high stability carbon) will give an accuracy such that the meter itself will be the limiting factor. On the prototype no error could be detected on any range.

Using the a.c. probe, inject a known a.c. voltage (such as 6.3V from a heater line) and adjust A.C. CAL. RV2 until the meter reads the voltage being injected. RV2 is in series with the D.C. CAL. (RV1) and is small compared with RV1; this arrangement allows RV1 to be used as the main compensating calibration (to combat battery ageing) while not materially affecting the a.c. calibration.

Probes

The d.c. and a.c. probes are made from ball point pen cases (see Fig. 2). The d.c. probe consists of a 1 megohm carbon resistor installed as near to the point as possible, then 24 in. of small diameter screened lead is used to connect to the meter. The a.c. probe is constructed with a 3000 pF ceramic capacitor, a high p.i.v. diode, and a 1 megohm resistor. The ratings of the capacitor (C2) and diode (CR1), are important, for if it is intended to use the meter on the 1000V a.c. range, the capacitor working voltage and peak inverse voltage of the diode must be of a similar rating. Diodes can be used in series to establish the rating, or use of the meter restricted to the value obtainable.

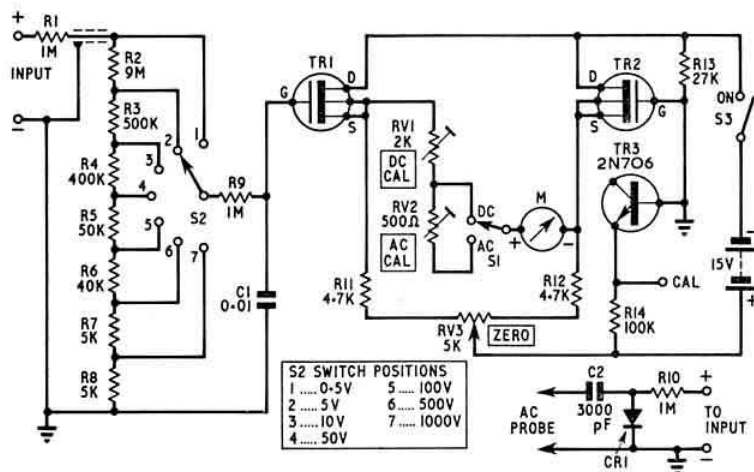
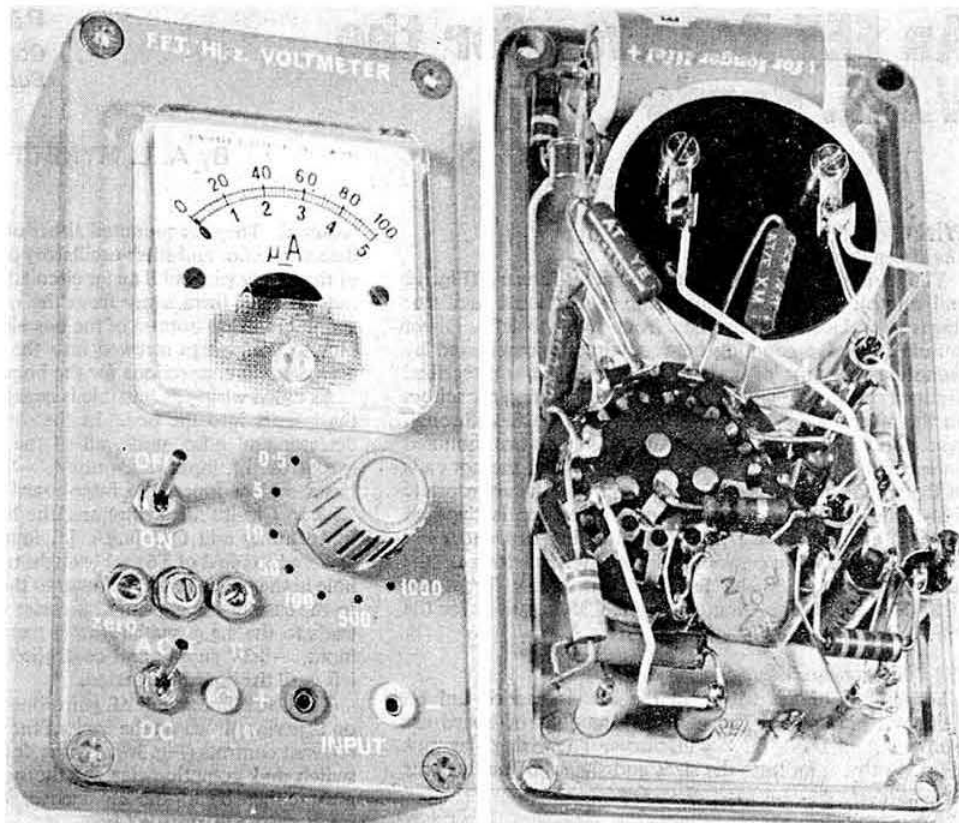


Fig. 1. Circuit diagram of the FET voltmeter. R1 is a $\frac{1}{2}$ watt carbon resistor, R2-R8 are 1 per cent high stability, and R9-R14 are $\frac{1}{2}$ watt carbon. C1 is a 50V disc ceramic, and C2 is 1000V wkg. CR1 is a 1000 p.i.v. silicon diode, or two lower voltage types in series. TR1, 2 are metal oxide silicon p-type FETs, and TR3 is a 2N706 used as a Zener diode.

G3LTZ's FET voltmeter, illustrating the compactness which can be achieved by using miniature components and controls. On the panel, the Cal. 6.0V terminal is a socket-type feed-through terminal. The rear view shows the two FETs centre-right, and the 2N706 top left.



The 3000 pF value for C2 can be exceeded of course, but anything much less than 3000 pF will give low output on 50 Hz.

FETs

The FETs used were of unknown origin but were *p*-channel metal-oxide silicon types and differed from the more usual types in that the bias applied to the gate was negative as was the drain potential (enhancement mode). There is no reason why other types cannot be used, such as the 2N3819, provided the correct polarity and biasing are used; this means either reversing the battery polarity (and also the Zener diode if you do) and/or transposing R13 and R14.

Construction

To be useful, it was decided that it had to be portable, and

therefore the unit was built in the smallest Eddystone diecast box. The meter, of Japanese manufacture, just fitted nicely and left enough room for the rest of the components and the battery. The a.c./d.c. switch and the ON/OFF switch were of a miniature toggle variety, but miniature slide switches could also be used. The CAL controls and ZERO were miniature wirewound trimmer pots, but here again other types could be used. The photographs give a clear idea of the layout, but it is in no sense critical and several versions have been built by club members using entirely different configurations, and meters from 2 in. to 6 in. have been used.

Other Ranges

The ranges chosen for the original were such that by using a small meter, most voltages could be read well on scale.

(Continued on page 19)

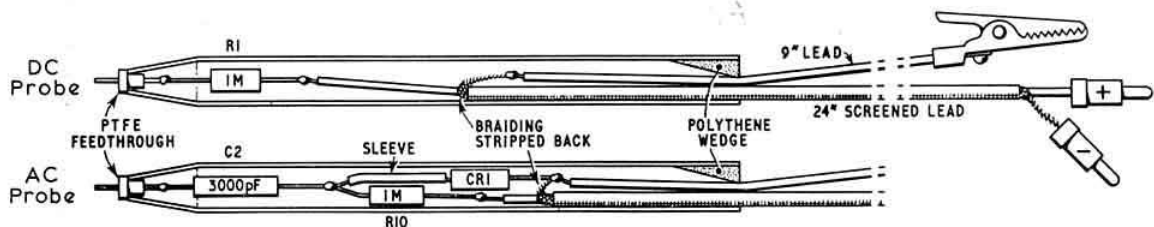


Fig. 2. Construction of the a.c. and d.c. probes.

An FET Receiver for the V.H.F. Bands

PART 2

Continued from *RSGB Bulletin* December 1967

By A. L. MYNETT, B.Sc., G3HBW *

Wiring

The Tuner Portion

The wiring on the tuner plate is straight-forward (Fig. 12 and photo). The i.f. amplifier, mixer and local oscillator stages are placed in sequence from right to left. Direct mutual inductive coupling between circuits is achieved by mounting the pairs of coils to be coupled at a prescribed distance apart. The ten connections to the tuning capacitors on the reverse side of the plate are made via feed-through insulators. The Mullard concentric trimmers are mounted on earthed tags screwed down on to the plate, the hot ends of the trimmers being connected directly to the appropriate feed-throughs unless a series-damping resistor is required (C12, C16, C23 and C27). Fixed trimming capacitors are supported by the concentric trimmers. When wiring up the tuning capacitors to the feed-throughs, don't forget the 3000pF oscillator padding capacitor, C35, required for the 0.7 MHz tuning range.

The Die-Cast Box Wiring

Almost all of the wiring in the box is carried out on Lektrokit pin-board. The necessary sections of board are cut from standard $4\frac{1}{2}$ in. \times 4 in. pieces. The wiring diagrams (Figs. 13 to 16) indicate the sizes and shapes of the sections

required. They are mounted either on screens (i.f. amplifier, detector, b.f.o. and filter-oscillator) or else on the side-walls of the box (a.g.c. and S meter circuits), using 6BA screws and nuts to hold them away from the metal surface. They are supported at the bottom of the box also by soldering suitable pins to solder-tags screwed into the box. The latter serve also as earth connections for the board.

As much wiring as possible is completed prior to inserting the boards into the box. In the case of the i.f. amplifier, detector and b.f.o. units, all of the wiring may be put in except the i.f. input, a.f. output, -8.2V supply, controlled bases and emitters, the inter-board i.f. lead (collector of TR7 to Cleveite filter ring) and the leads to C57, C58, C69 (b.f.o. tune) and C72 (a.g.c. i.f. input). A lead should be soldered to pin 4 of T6 and brought up through a convenient hole in the board for attachment to the tuning capacitor C69. In the case of the a.g.c. and S meter unit, attachment of the leads to the a.g.c. switch, the S meter pots., the a.g.c. i.f. input, -8.2V supply and controlled bases leads should be left until the board is inserted.

The noise limiter and r.f. gain control circuits are wired up on tagstrips placed on the back of the front panel close to the relevant controls (Fig. 18). If it is desired to use a combined switch and potentiometer for the noise limiter, the switch must either be of the changeover or the "anticlockwise

*10 Prior Grove, Chesham, Bucks.

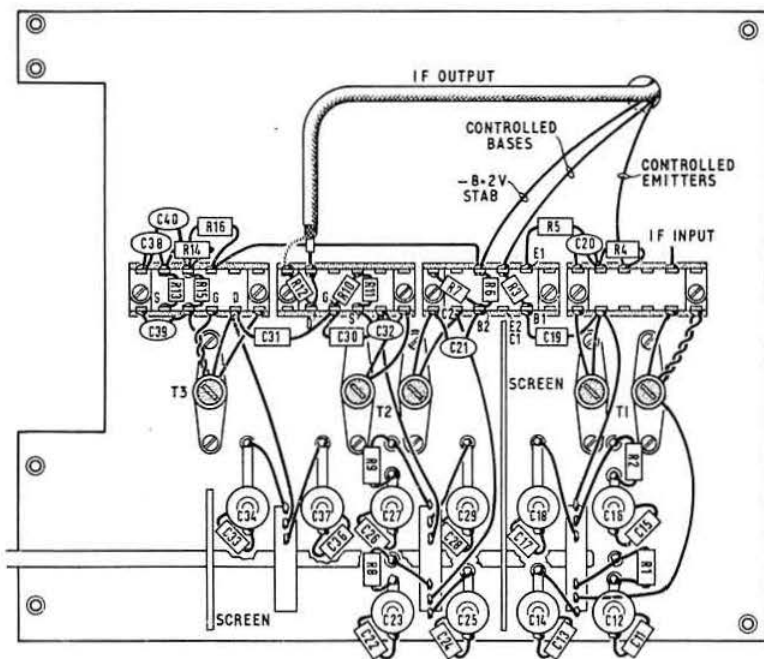
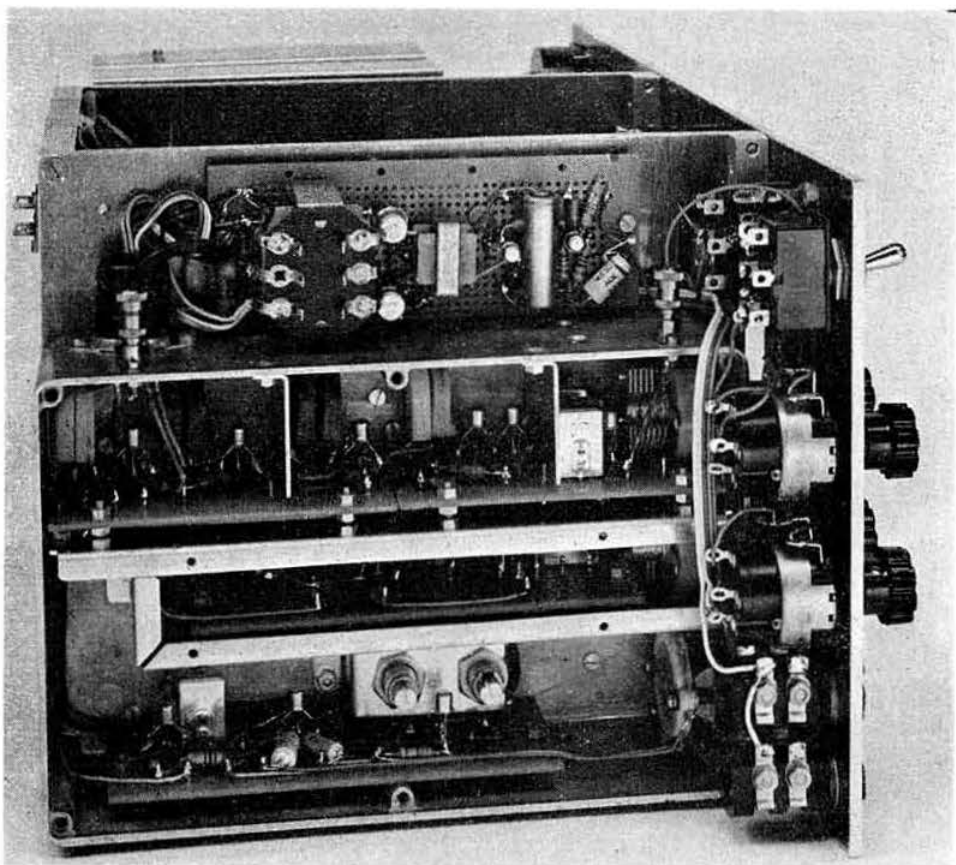


Fig. 12. Wiring diagram of the tuner.



-on" variety. The component specified is of the former type but might be difficult to obtain. If such a component cannot be located, it will be necessary to use a separate switch to control the noise limiter. In this case, it is probably easier to use the switch marked "Panel Lights On" for the noise limiter, placing the other switch elsewhere, perhaps on the other side of the panel.

The a.f. amplifier board wiring requires little comment (Fig. 17). C89 (500 μ F, 15V) is an optional component which is useful if either the receiver is to be run from dry batteries, which may sometimes present a high source impedance, or else from accumulators in conjunction with h.t. inverters for a transmitter, in which case C89 will help to prevent serious "inverter whine" on transmit. If required, C89 may be accommodated on the a.f. board at the power supply and stabilizer end. Alternative patterns of driver and a.f. output transformers are mentioned in the components list. In fact, almost any driver and output transformer combination designed to give 0.5 to 1.5W output into a suitable impedance will serve.

No details are given in circuit diagram form of the wiring to the converters and converter selector switch. Obviously one pole of the switch will be used to select the i.f. outputs from the converters while another pole switches the -12V input to them. The i.f. leads should of course be screened. Co-axial cables may be run to a row of suitable sockets near the

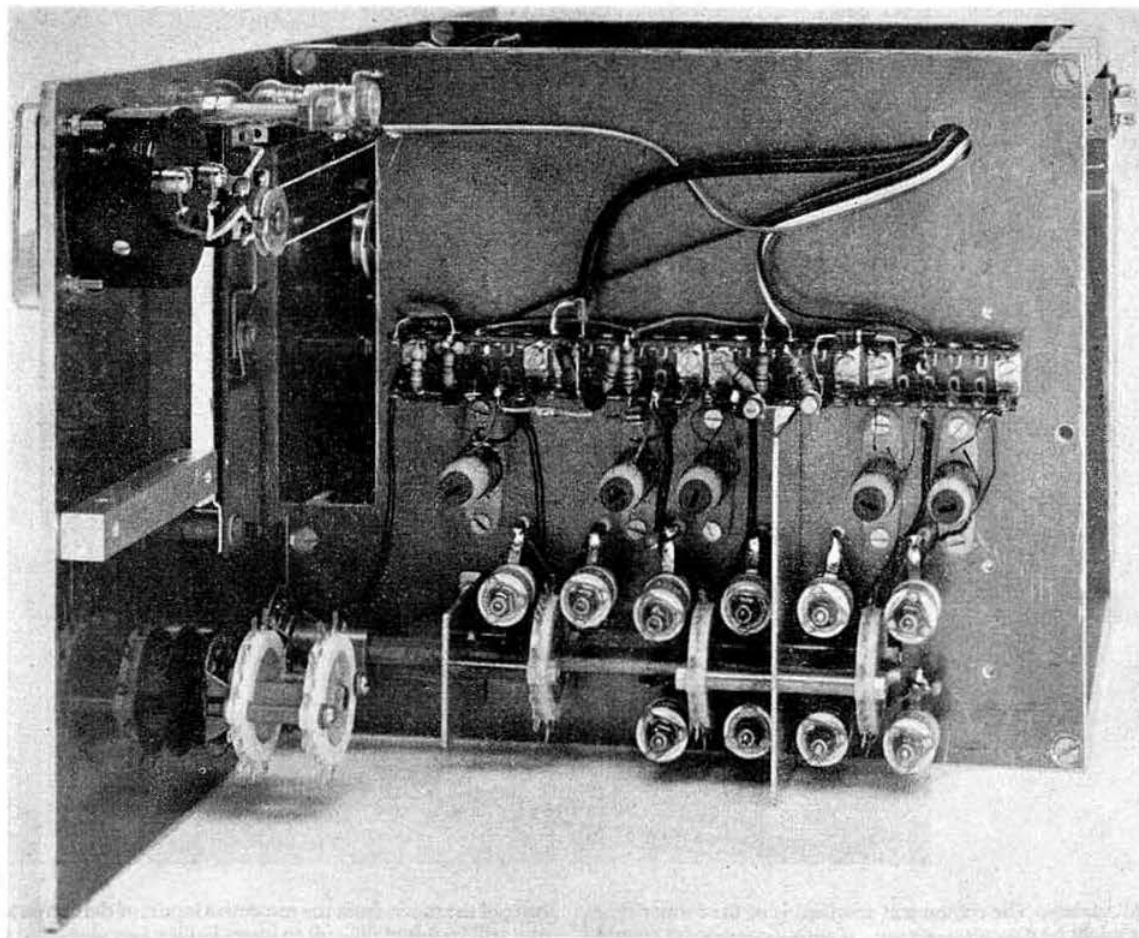
back of the tuner, from the respective inputs of the converters as it will be found difficult to insert Belling Lee plugs into the converters' input sockets. An i.f. input lead may be run to a rear socket from a spare position on the converter selector switch, to take the i.f. output of an external converter, but this can result in i.f. interference being produced on other ranges.

The input arrangements for the tuner have deliberately been kept rather vague so that they may be organized to suit personal requirements.

Tuning-Up and Initial Adjustments

Firstly, adjust the pre-set R57 until the d.c. voltage on the "Controlled Bases" line is between 2.0 and 2.4V, as measured with a high-resistance meter to the -8.2V rail. This sets the i.f. stages' bias level correctly. Then, with C62 set at half-mesh, the core of T5 should be adjusted until noise or signals are heard through the i.f. amplifier. Next tune the primary of the detector transformer T4 into the centre of the i.f. passband. Moving C62 in either direction away from the half-mesh position should result in the i.f. bandwidth being reduced, ultimately to zero. The b.f.o. centre frequency may now be set, adjusting the core of T6.

Peaking of the tunable-i.f. circuits should commence with adjustment of the local oscillator frequency over the 2.0 MHz range. Successively adjust the core of T3 at the l.f. end and



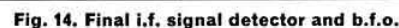
the trimmer C34 at the h.f. end until the oscillator frequency is 2.555 MHz (2.100 MHz signal frequency) at "058" on the logging scale and also 4.355 MHz (3.900 MHz signal frequency) at "455" on the logging scale. The core settings of T1 and T2 may then be adjusted at the l.f. end (2.1 MHz signal) and the trimmers C12, C16, C23 and C27 at the h.f. end (3.90 MHz signal) until the circuits track properly. The photograph gives a rather poor indication of the scale linearity that will be achieved on the main tuning range, with the capacitor law chosen, as the dial calibration was undertaken in a hurry for an imminent contest and was later found not to be very accurate (after the contest!).

When the main 2.0 MHz range is operating correctly, switch to the 0.7 MHz bandspread range and adjust C37 until the 2.00 MHz dial calibrations on the two ranges coincide. Then, at 2.90 MHz peak the trimmers C14, C18, C25 and C29 on signals or noise. The tuner should now track accurately on both ranges. If not, it will probably be found that one or other of the trimmers is fully out or fully in. If so, adjustment of the fixed trimmers will obviously effect a cure. However, provided the tuner is built as described, all circuits should tune easily within the range of the adjust-

ments. If this does not happen, a fault of some kind should be suspected, possibly shorted turns in a coil or else wrongly marked fixed capacitor values. It is very easy to damage some patterns of polystyrene capacitor inadvertently with a soldering iron and complete failure of a particular tuned circuit to resonate may be due to this cause. As soon as the tuner itself is operating correctly, the a.g.c. i.f. amplifier may be aligned. Tune in a signal, switch on the a.g.c. and turn up the r.f. gain control until the S-meter shows an on-scale reading. This may require adjustment of the S-meter bridge balance potentiometer R64 and the sensitivity potentiometer R62. With the broadest obtainable i.f. passband, tune-in the test signal exactly and then set the core of T7 to give the maximum S-meter reading. The S-meter itself may now be set up to give the sort of indications desired by the user!

Operation

The receiver should not present any real operational problems. It may take a little while to become familiar with the unusual behaviour of the variable-bandwidth i.f. filter. It is possible, as already mentioned, to tune away from the



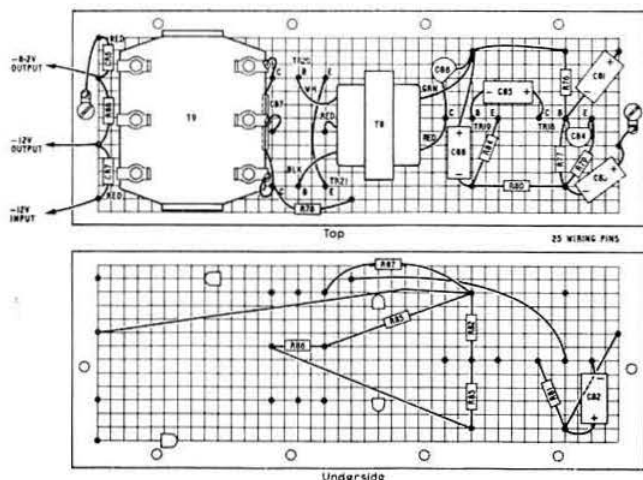


Fig. 17. Wiring diagram of the a.f. amplifier and power supply.

"completely overlapped" condition of the i.f. passbands in either direction. Whichever direction is chosen will determine which passband edge remains relatively stationary as the bandwidth is reduced. The b.f.o., if in use, must obviously be placed on the correct side of the i.f. passband to make proper use of the filter. It should in fact be put outside the passband, on the "stationary edge" side of it.

The ratio of maximum to minimum usable effective bandwidths for this filter is about 5 to 1 (4.5 to 0.9 kHz). The shape factors of the filter elements fix this ratio essentially. Using vacuum-mounted crystals in half-lattice arrangements

at 100 and 130 kHz, the writer has achieved an effective bandwidth ratio of about 16 (2.5 kHz to 150 Hz).

Some difficulty may be experienced with the "fast-attack, slow-decay" a.g.c. circuits in the presence of strong noise pulses or when receiving very heavily-modulated signals. These effects are worst when the a.g.c. is switched to "fast." It is difficult to improve matters without introducing considerable extra complexity into the a.g.c. circuit and it is best, under these noisy conditions, either to switch the a.g.c. to "slow" or else to dispense with it entirely.

If unduly bad strong-signal effects are experienced with the receiving set-up described here, it will almost certainly be found that the mixer-stage in the converter is being over-driven by the local oscillator, which can happen with improper setting-up. The drive level to the mixer in the tuner has been arranged to be a good compromise between noise and strong-signal performance over the band, within the tolerances of the circuitry and devices used and it is very unlikely that this mixer will be over-driven.

Substitution of Devices in the Receiver

The mixer and local oscillator stages of the receiver use the Texas 2N3819 *n*-channel junction FET, for reasons already explained. It is difficult at the moment to find suitable substitutes for this transistor although other and more expensive FETs (*n*-channel) in the same range, e.g. TIS34, 2N3823 may be used if they happen to be available.

Almost all of the other active devices in the receiver are Mullard BC108s. There are 17 of them in all! The BC108 is an inexpensive, *n-p-n* silicon planar transistor, in a TO18 case, with an average f_t of about 200 Mc/s and h_{fe} in the range 125 to 500 at 2mA collector current and also with low feedback capacitance. These latter two characteristics are particularly required for the i.f. stages, especially those with rather heavy inverse feedback. It was decided to specify the BC108 for most of the other positions in the receiver as well because of its low cost, ready availability, and just for standardization's sake. It is even suitable for the low-level a.f. stages, being officially an a.f. transistor!

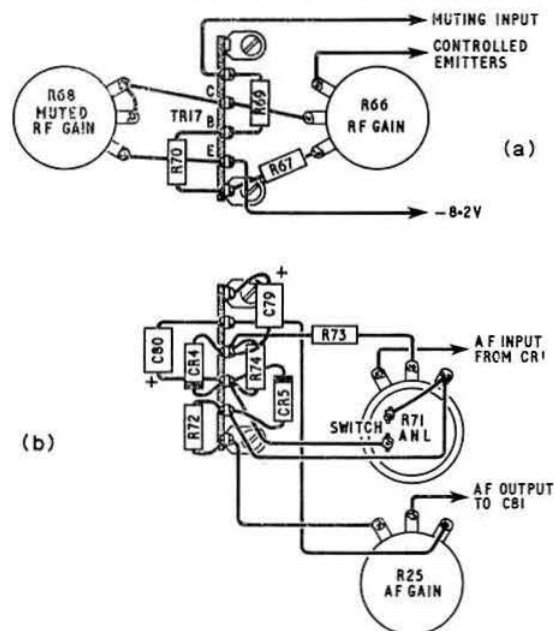


Fig. 18. The component layout on the front panel tagstrips.

Suitable devices for TR1, 2, 5, 6, 7, 8, 9, 10, 12, and 14 require to be *n-p-n* silicon planars with current gains of at least 100 at 1mA and feedback capacitances below 3pF. The other transistors in the same series as the BC108 may be used, i.e. BC107 and BC109. However, the high breakdown-voltage of the BC107 is not really required (although these were actually the types used in the prototype, because of ready availability) and the BC109 shows rather excessively high current gains, even for these applications. The plastic-encapsulated 2N2926 is suitable if the higher-gain varieties are chosen (yellow and green coding) and also the Texas BC182L. However, these plastic-encapsulated bipolar transistors have a different lead arrangement from the TO18 types which will probably dictate a redeployment of wiring pins.

Almost any silicon *n-p-n* planar device can be used to fill the other BC108 positions (TR11, 13, 15, 16, 17, 18 and 19) with the same reservations as before about the plastic types (2N2926 and BC182L). It is difficult to replace the BFY50s by anything else because of the exceptional linearity of their transfer characteristic, which eases the design of the a.f. amplifier.

There may be some difficulty experienced in obtaining the TO-02C Clevite Filters for 500 kHz, although the 455 kHz

units are readily available. It is not known whether Brush-Clevite will supply the devices themselves at the moment, but investigations are under way.

Results Obtained with the Receiver

The receiver has proved quite satisfactory in use, particularly for contests and Field Days. The maximum i.f. bandwidth obtainable is rather on the small side, however, for obtaining a true assessment of speech quality on local stations. The noise figure of the tuner is better than 10dB over the entire tuning range and this is adequate to realise all of the sensitivity capabilities of the converters themselves. There are no noticeable beats to be heard, although initially, harmonics of the b.f.o. and filter oscillator did somehow manage to find their way into the tuner portion. At night, a small amount of i.f. interference may be experienced, especially around 4 MHz, unless a metal cover is placed over the receiver.

In conclusion, the author would like to thank Mr Balfour of Brush-Clevite Co. Ltd., for permission to use the trans-filter equivalent circuit.

An error last month: R78 should be taken to the base of TR19, not TR18.

An FET Voltmeter

(Continued from page 13)

The resistors with the ranges chosen work out to easily obtained values, but to design for different ranges the chain can still be kept to 10 megohms overall, with the tapping points altered. For example: input chain of 10 M ohm and 0.5V for f.s.d. means a total value of resistors from chassis end of input chain

$$= \frac{10 \text{ M ohm}}{\text{Ratio of required range to 0.5V}}$$

Taking the 500V range, the ratio of 500V to 0.5V = 1000:1

$$\therefore \text{Resistance of lower leg of chain} = \frac{10 \text{ M ohms}}{1000} = 10 \text{ k ohms}$$

$$\text{Resistance of upper leg of chain} = 10 \text{ M ohms} - 10 \text{ k ohms} = 9.99 \text{ M ohms}$$

Conclusion

It has proved to be a most useful tool, simple to build, and for me, at any rate, it supersedes the valve voltmeter.

INSTALLATION OF PRESIDENT 1968

Mr. J. C. Graham, G3TR, will be installed as the thirty-fourth President of the Society during the course of a General Meeting and Social Evening on

FRIDAY, 12 JANUARY, 1968

at the Kingsley Hotel, Bloomsbury Way, London, WC1, commencing at 7 p.m.

Admission will be by ticket, available on request (with s.a.e.) from Headquarters. Tickets are restricted to two per member.

LONDON LECTURE MEETING

THE DEVELOPMENT OF A U.H.F. TELEVISION SERVICE

To be given by R. C. Hills, B.Sc. (Eng.), C. Eng., MIEE, MIERE, G3HRH.

See page 72

GB2RS NEWS BULLETIN SCHEDULE

RSGB News Bulletins are transmitted on Sundays in accordance with the following schedule:

Frequency	Time	Location of Station
3600 kHz	9.30 a.m.	South East England
	10 a.m.	Severn Area
	10.15 a.m.	Belfast
	10.30 a.m.	North Midlands
	11 a.m.	North West England
145-10 MHz	11.30 a.m.	South West Scotland
	12 noon	North East Scotland
	9.30 a.m.	Beaming north from London
145-8 MHz	10.00 a.m.	Beaming west from London
	10.00 a.m.	Beaming north west from Aberdeen
	10.15 a.m.	Beaming south from Belfast
145-30 MHz	10.30 a.m.	Beaming south west from Aberdeen
	10.30 a.m.	Beaming north west from Sutton Coldfield
	11.00 a.m.	Beaming south west from Sutton Coldfield
145-50 MHz	11.30 a.m.	Beaming north from Leeds
	12 noon	Beaming east from Leeds

News items for inclusion in the bulletins should reach Headquarters not later than first post on the Thursday preceding transmission. Reports from affiliated societies and from non-affiliated societies in process of formation will be welcome.



EQUIPMENT REVIEW

P. SIMPSON G3GGK and B. ARMSTRONG G3EDD

THE HEATHKIT MONITOR SCOPE SB-610E

ONE of the ancillary equipments available in the Heathkit SB range is the monitor oscilloscope SB-610E. Manufactured by the Heath Company USA, it is marketed in the UK by Daystrom Ltd., Gloucester. The price is now £41 14s. as a kit or £51 14s. assembled.

The unit is designed to monitor r.f. envelopes from a.m., s.s.b. or c.w. transmitters, i.f. waveforms in receivers for a variety of intermediate frequencies, or RTTY tones.

General Description

The circuit is simple and full use is made of multi-electrode valves including the 6BN8 double diode triode, the 6C10 triple triode and the 6J11 double tetrode. The latter valve generates the two audio frequencies, 1500 and 1950 Hz. The kit allows for the vertical amplifier to be wired in slightly different ways to cover 1 to 150 kHz, 455-2475 kHz or 3 to 6 MHz. The horizontal deflection amplifier (1/3 6C10) may be switched to an external socket, internally detected r.f. or the internal sweep generator. A switchable clamping circuit is included so that when in operation but with no r.f. input the spot is deflected off the screen to avoid screen burn.

The front panel controls consist of FOCUS, INTENSITY, VERTICAL SHIFT, HORIZONTAL SHIFT, VERTICAL GAIN, HORI-

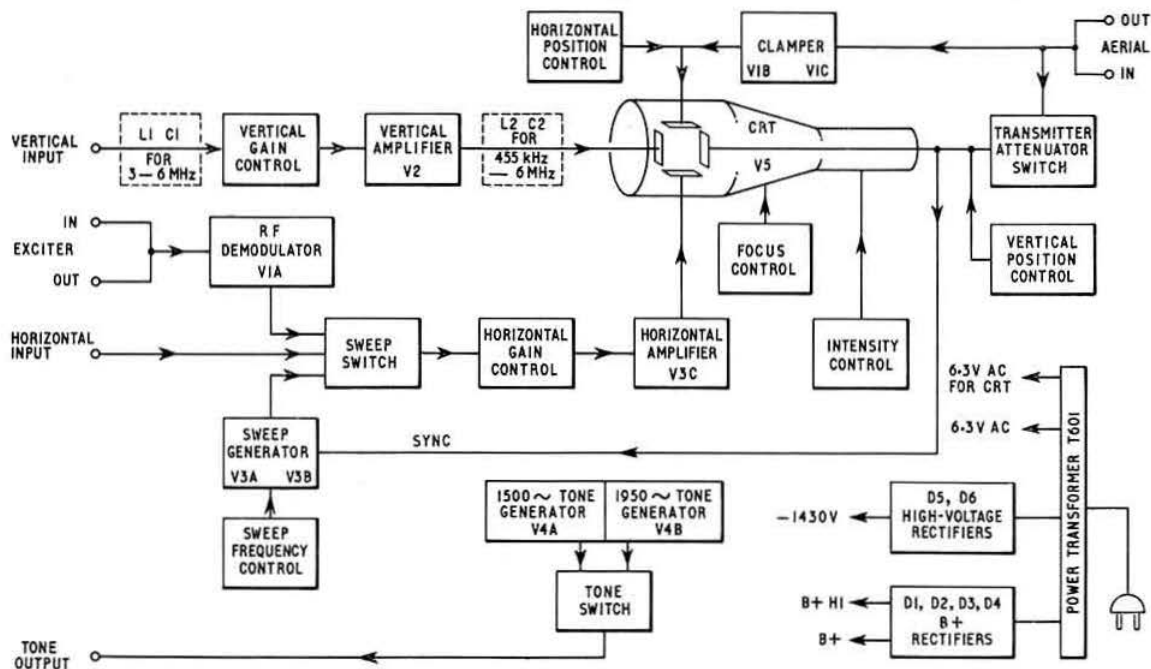
ZONTAL GAIN, SWEEP SOURCE (internal, external a.f., or internally demodulated r.f.), TONE GENERATOR (off, 1500 Hz or 1500 plus 1950 Hz), SWEEP FREQUENCY, CLAMP IN/OUT and the ON/OFF switch. A 2 in. x 2 in. graticule is provided over the face of the 3 in. diameter 3RP1 cathode ray tube. The rear panel contains two phono sockets for exciter in and out; two UHF series SO239 sockets for aerial in and out; three phono sockets for tone output, vertical input, and horizontal input; and a transmitter attenuator to adjust the amount of r.f. pick up from the aerial in/out sockets.

Aluminium metalwork is used throughout and the case is painted in two-tone green to match the rest of the SB series.

The internal power supply provides -1430 volts from a selenium rectifier full wave voltage doubler. Silicon diodes in a voltage doubler circuit are used for +600V d.c. and the same circuit also provides +290V d.c.

Transmitter Monitoring

The transmitter output is fed to a dummy load or aerial via co-axial aerial terminals; the c.r.t. then shows the r.f. envelope. For p.e.p. or linearity checks the two tone generator is fed into the transmitter mic. input. An interest-



A block diagram of the Heathkit monitor scope SB-610E

ing application is that the linearity of a linear amplifier can be checked by connecting the output of the exciter via the monitor. R.f. from the exciter is detected and applied as the horizontal time base and the linear r.f. is used for the vertical deflection. The shape of the resulting trapezoid is an indication of the linearity.

Receiver Monitoring

The receiver output is normally taken from the grid of the last i.f. stage and is applied to the vertical input socket of the monitor. Care has to be taken in the interpretation of the envelopes displayed since the receiver a.g.c. and selectivity can considerably modify the envelope of the transmitted signal. The manufacturers have since pointed out that it has been found preferable in some cases to connect via the anode of the last i.f. amplifier. This is to take advantage of the gain to obtain maximum display of small signals.

RTTY Monitoring

By feeding mark and space outputs from the terminal equipment into horizontal and vertical inputs respectively a cross can be displayed. Once the amplitudes have been properly set up on a known good terminal output, the patterns produced by a received signal can be interpreted.

Construction

The particular SB-610 under review was purchased as a kit by a commercial organization and made up by a professional wirer in her spare time. About 15 hours were spent in the construction with no snags or "oddies" encountered. The unit did not work on switch-on but this was a human error and not the fault of the Heathkit Manual which, if properly followed, appears foolproof.

Tests

Sweep frequency: 11 Hz to 128 Hz.

Horizontal amplifier: 3dB at < 20 Hz and 25 kHz

Maximum sensitivity 830 mV per in. deflection.

Audio oscillators:

Maximum 50 mV 1526 Hz 8.5 per cent distortion

Maximum 50 mV 1970 Hz 12.5 per cent distortion

Vertical amplifier

Maximum sensitivity 133mV per in. deflection at 14 MHz

R.f. power sensitivity: 40 watts p.e.p. for 1 in. deflection.

In Use

The monitor was easy to use and proved to be a most useful piece of test gear. When first using the monitor it tends to be treated as a "gimmick" but it soon becomes an essential. After a short period of use the e.h.t. rectifiers failed and were replaced with similar types which gave no further trouble.

The Assembly Manual

This 55 page book is an excellent document which is easy to follow and contains a wealth of information apart from that concerned with assembly. The only odd thing is that there is no direct cross reference between part numbers in the parts list and component references in the excellent circuit diagram.

Manufacturer's Specification

Vertical Amplifier

Input Resistance 100 k ohms.

Sensitivity

Optional frequency inputs		Nominal input voltage (r.m.s.) per in. of vertical deflection
Untuned	10 Hz to 400 Hz	2.0V
	400 Hz to 10,000 Hz (RTTY)	1.0V
	10 kHz to 455 kHz	500mV
	455 kHz	70 mV
Tuned	1600 to 1680 kHz	200 mV
	2075 kHz	200 mV
	2215 kHz	200 mV
	2475 kHz	200 mV
	3000 kHz	400 mV
	3055 kHz	400 mV
	3395 kHz	500 mV
	5000 to 6000 kHz	600 mV

Horizontal Amplifier

Frequency Response \pm 3dB from 3 Hz to 15 kHz

Sensitivity 800 mV per in. deflection.

Input resistance 1 megohm

Sweep Generator

Recurrent type Sawtooth produced by internal sweep generator

Frequency 15 to 200 Hz (variable)

(amended to 10 to 125 Hz)

Tone oscillators

Frequencies Approximately 1500 Hz and 1950 Hz

Output voltage 50 mV (nominal)

General

Frequency coverage 160m through to 6m (50-75 ohm coaxial input)

Signal Power Limits (at rear co-axial connector) 15 watts to 1 kW

Valve and diode complement 1—3RP1 CRT, medium persistence, green trace

1—6BN8 Clamper, low level r.f. detector

1—6C10 Sweep Generator, horizontal amplifier

1—6J11 Twin phase-shift tone generator

1—6EW6 Vertical amplifier

1—Germanium diode, sync. rectifier

4—Silicon diodes, B + rectifiers

2—Selenium diodes, high voltage rectifiers

Front Panel Controls

Sweep

Sweep frequency—pull for clamp

Tone at generator

Horizontal gain

Horizontal position

Vertical gain

Vertical position

Focus

Intensity—a.c. off

Rear Panel Control

Transmitter attenuator,

Attenuates to 24dB at approximately

8dB per step.

Power Supply

Transformer operated, fused at 1/2A

Power requirements 115 or 230V* a.c. 50.60 Hz 35 watts

Dimensions 6 in. high \times 10 in. wide \times 11 1/2 in. deep

(including knobs).

Net Weight 9 lb. 10 oz.

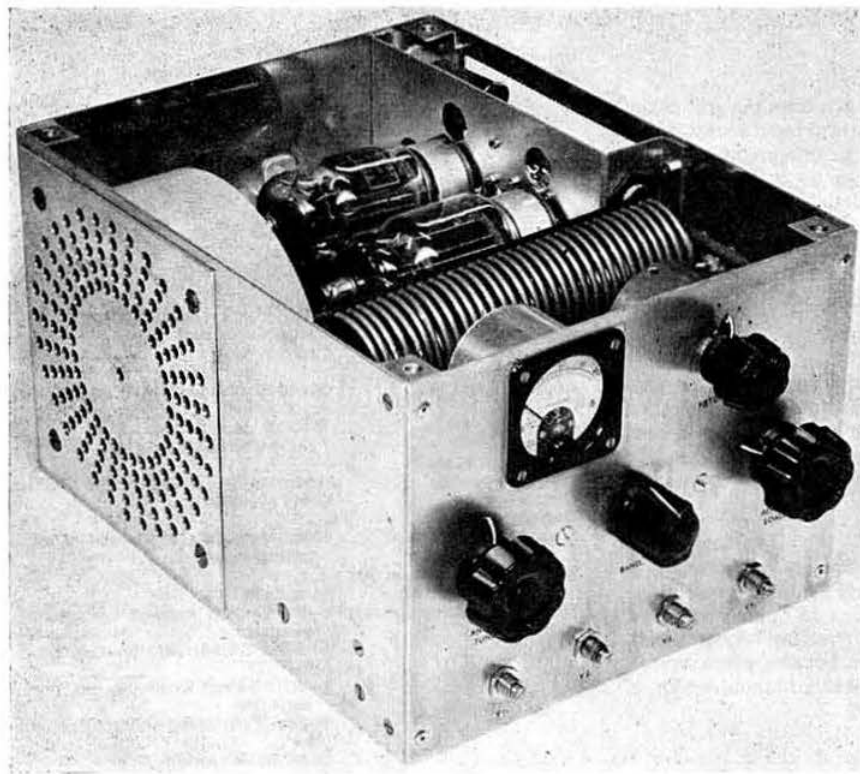
* Export Model.

Conclusions

For the s.s.b. operator particularly, a visual monitor should be an essential piece of station equipment. Judging from many stations heard on the air, few have means of judging the quality of the signal they are transmitting. The SB610 provides the means and is certainly not expensive for what it does.

A 400 watt TT21 Linear Amplifier

By G. R. JESSOP, G6JP*



THIS linear amplifier is designed to cover the normal h.f. bands 3.5-30 MHz at up to the full power permitted by the Amateur (Sound) Licence A. It is fundamentally similar to the amplifier described in the May 1964, issue of the RSGB BULLETIN, but in this case four TT21 valves are used in parallel to reach the power output level. As can be seen from the test results given in the table and in Fig. 6, 400 watts can be obtained on each band, with the exception of 10m where, due to the increased circuit losses, there is a significant drop in output.

The Linear Circuit

The circuit in Fig. 1, is straightforward with a conventional parallel feed pi-anode output circuit and a passive grid input to the four valves in parallel; it has not been found necessary to resort to tapping the valves down the circuit with a double or split anode tuning capacitor. In the lowest frequency position the band switch brings into operation an additional 500 pF fixed capacitor in parallel with the aerial loading capacitor. Each valve is provided with a separate grid bias control so that it can be adjusted to the correct

standing cathode current, using a single meter with a five position switch. The fifth position is used to indicate the r.f. output which is essential if the pi-coupler is to be correctly adjusted. The r.f. indicator circuit is connected across the output using a capacitive potential divider.

The screen of each valve is fed from a stable 300V supply and decoupled with a ferrite bead and three 0.01 μ F disc ceramic capacitors in parallel to the cathode which, in turn, is decoupled to chassis by three similar capacitors. Across the cathode bypass capacitors is connected a meter shunt in series with a 22 ohm resistor.

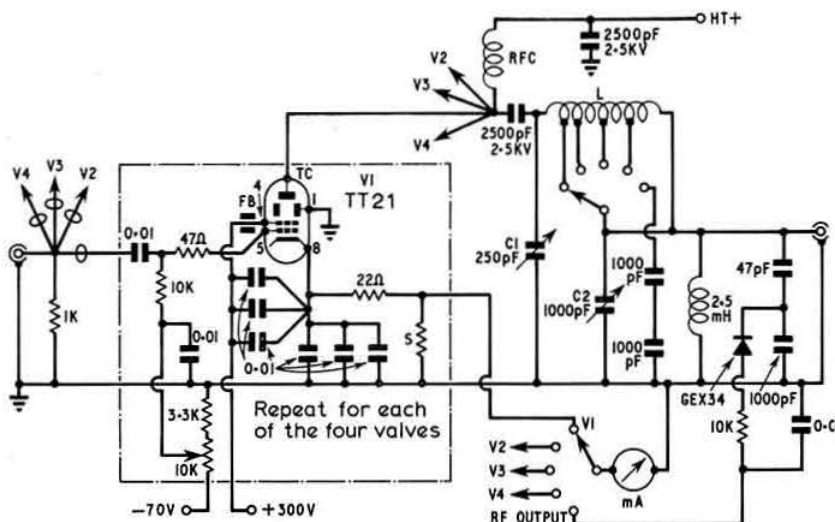
Construction

In Fig. 1 only one valve is shown, the connections to each of the four being the same. These are mounted in a square formation on the sub-chassis (see Fig. 5) with valve sockets at 2 $\frac{3}{4}$ in. centres; this spacing is less than the recommended figure quoted in the valve data but is permissible owing to the use of forced air cooling.

In order to provide the required air flow around the valves the sub-chassis must be perforated in the area of the sockets. Holes of $\frac{1}{2}$ in. to $\frac{3}{4}$ in. diam., are ideal, although for ease of construction a larger number of smaller holes could be

* 32 North View, Eastcote, Pinner, Middlesex.

Fig. 1. The TT21 400 watt linear circuit. Components relating to each individual valve are enclosed in a dotted border; repeat for each. FB represents ferrite beads. RFC is a 4 in. winding of 24 s.w.g wire, 1 in. diam. S, 200mA shunt. Details of L are given in Fig. 4.



adopted. The fan used in the prototype is larger than is necessary and so a 3½ in. diam. type would be quite suitable, thus allowing a somewhat smaller cabinet to be employed.

The overall dimensions of the amplifier cabinet are 9 in. wide, 7 in. high and 11½ in. deep. It is a simple box containing a sub-chassis on which the four 6TT21 valves are mounted, illustrated in Fig. 3. The underside of the sub-chassis contains all input and decoupling wiring. There is a small screen covering the four bias potentiometers. As can be seen from the general view the cooling fan is mounted on the left hand side of the cabinet and the valve sub-chassis opposite. The ventilated cover over the sub-chassis is removable to allow access to the valve sockets for wiring and maintenance.

One of the most important points to remember in constructing a multi-valve amplifier is avoiding, as far as possible, multiple earths. In this design the common earth point for the valve is the chassis centre between the valves. Cathode leads are taken to four insulated tags and the meter shunts

(zig-zag wires) are connected from these to the common earth point, a four-way solder tag.

Each valve has an equal short length of coaxial feed from the input to its grid, the resistor across the input to the amplifier being positioned at the top right corner of the side view photograph. As can be seen from the general view the meter and the meter switch are screened, and so are the leads between the meter and the switch and the connection points on the underside of the valve sub-chassis. The h.t. lead, which for convenience passes under the valve sub-chassis, is also screened by copper tube.

The general arrangement of the anode circuit components

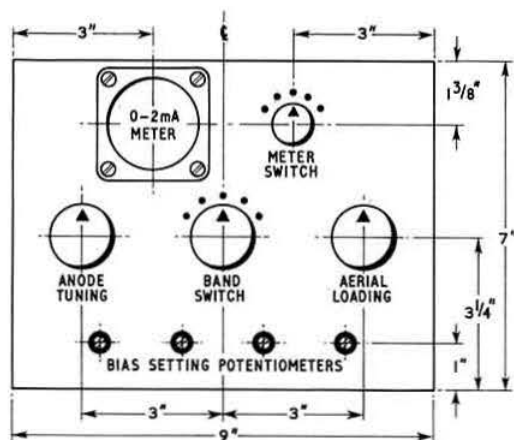


Fig. 2. Drilling plan for the front panel.

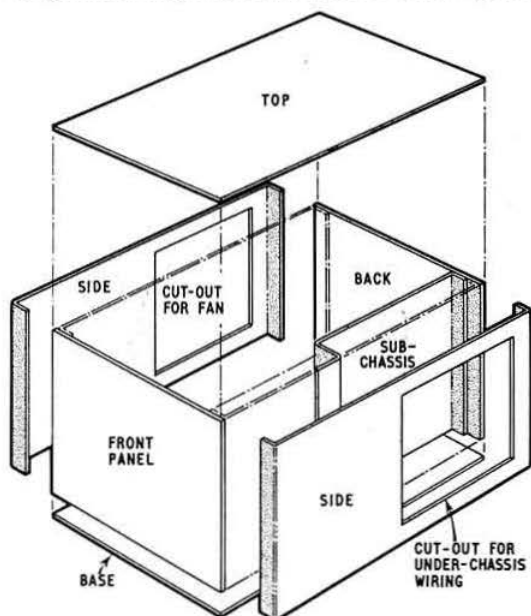
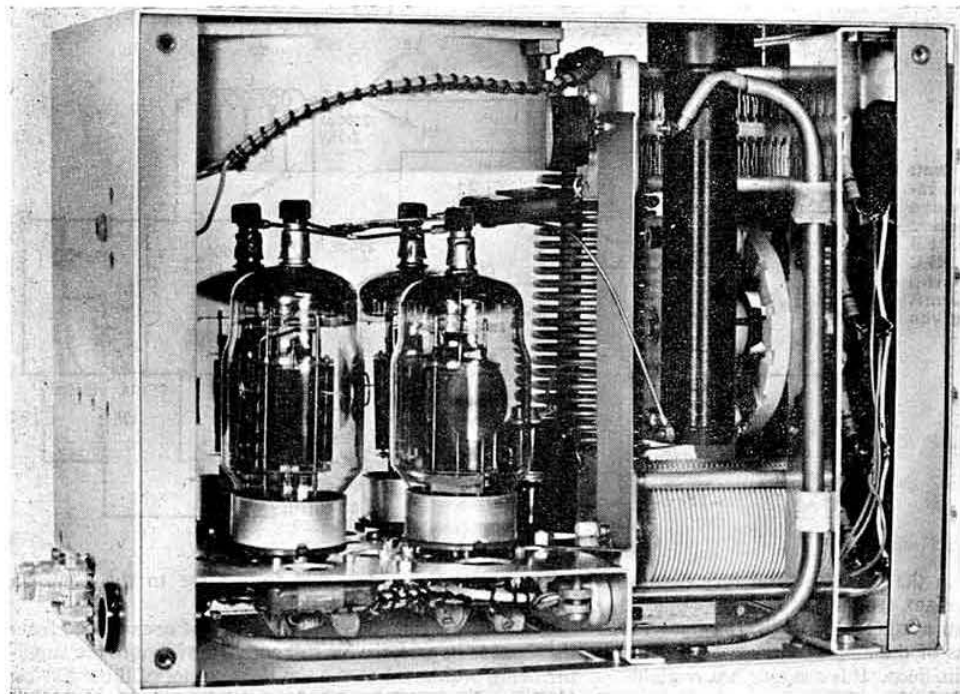
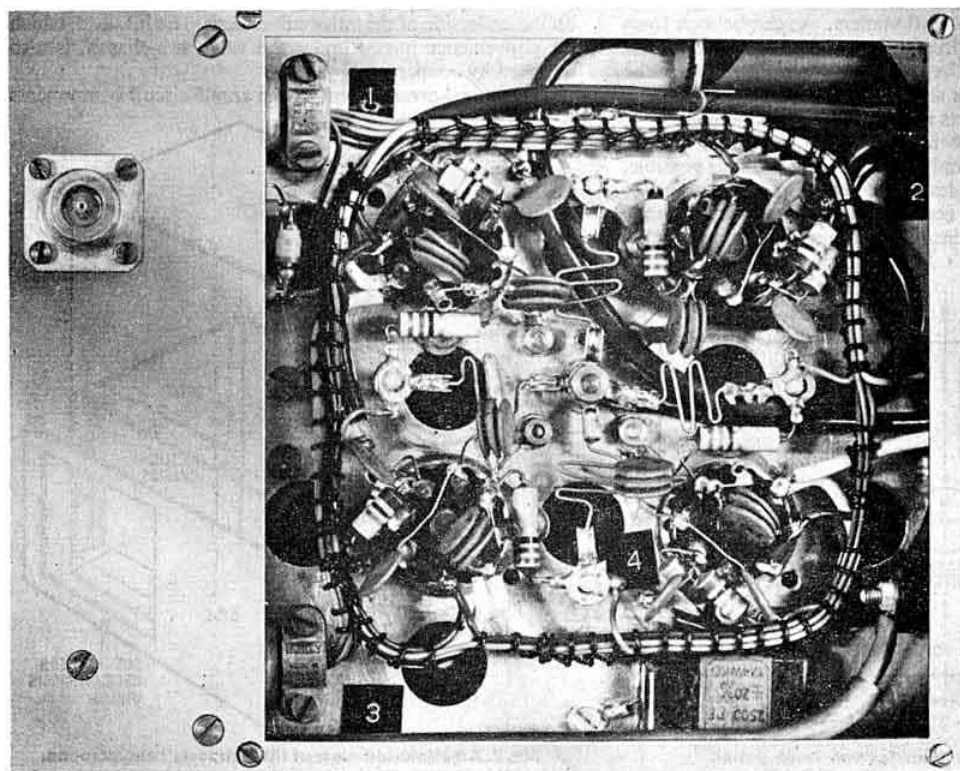


Fig. 3. An exploded view of the "chassis" and screens.



The underside view of the TT21 linear.



The valveholder wiring below the sub-chassis. The yig-yog wires to the centre tag are meter shunts.

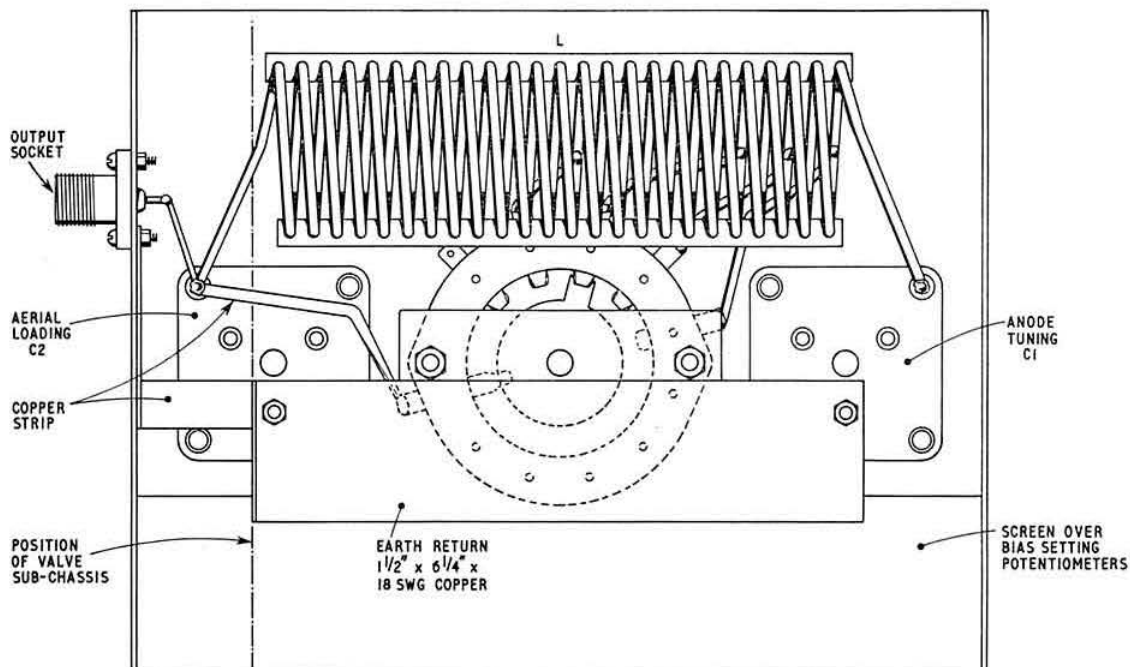


Fig. 4. The complete pi-net assembly, showing the best method of positioning the components. The inductor, L, consists of 33 turns of $\frac{1}{8}$ in. diam. copper wire, $1\frac{1}{2}$ in. overall diam., $6\frac{1}{2}$ in. long tapped at $\frac{1}{2}$, $2\frac{1}{2}$, $4\frac{1}{2}$ and $11\frac{1}{2}$ turns.

is shown in Fig. 4. The large slab earth connection which runs horizontally between the valves and the r.f. choke is essential to keep the anode tuning capacitor properly at earth potential; it can be clearly seen in the photograph (underside view).

The bandchange switch is a large pattern, and it is essential that the rotor is ceramic insulated, for during the testing of the prototype, the switch used had a p.t.f.e. insulator which

unfortunately melted. The reason appeared to be that the contacts were too hot with heavy circulating currents which are involved in an amplifier of this power.

Performance

The performance of the amplifier is shown in Fig. 6. It will be noticed that there is a larger percentage power fall

(Continued on page 27)

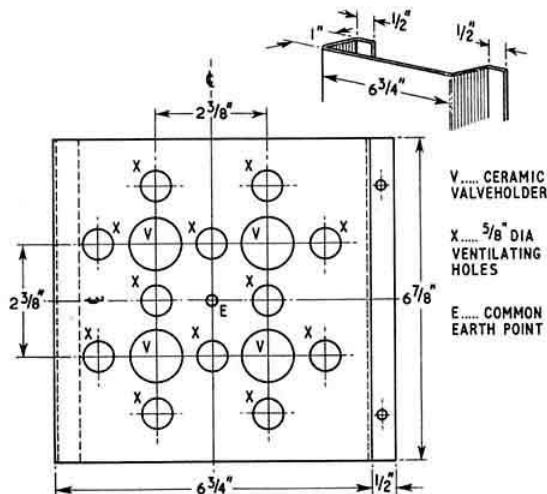


Fig. 5. Constructional details of valveholder sub-chassis.

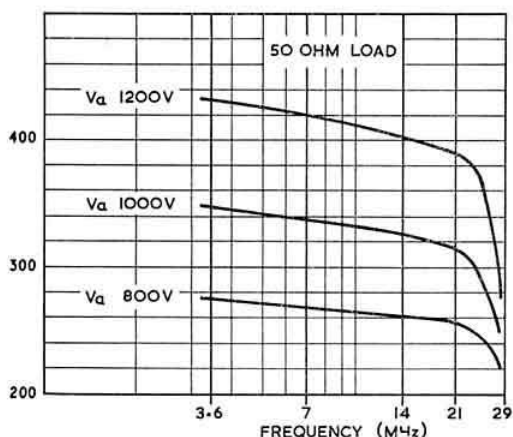
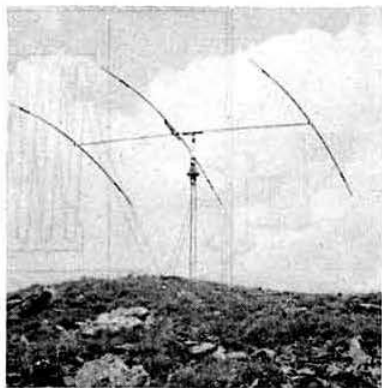


Fig. 6. The amplifier's performance over its intended frequency range.

DX-Pedition to Andorra

By J. R. HAWKE, G3VNV*



WE applied for the licence in January, 1967, so, when it arrived in mid-July, we were ready to start collecting together some equipment.

This was fairly easy, although the FT100B lent by Lowe Electronics could not be collected until the morning of the day we left. The transport had been a problem for a long time, but at the last minute an old school-friend, Duncan Hare, turned up with a Land Rover, on condition that he could come. This was agreed and on Wednesday, 16 August, this monster left Wells, Norfolk, with Mike G3ULF and John G3VNV aboard.

At Dover, 200 miles after starting, the speedo read 75,872 miles, and the oil pressure gauge read its customary pressure of 15 pounds p.s.i. But just to be sure we checked the oil—nothing, not even enough to splash on to the dipstick: we were using at least $\frac{1}{2}$ gallon to every 200 miles. We were not unduly worried at this point, we just put a gallon of the cheapest into the sump and drove on to the boat. We expected to be out of Calais by 7 a.m., but our equipment held us back. The 'Rover was unloaded three times to show the equipment to the Customs officials, and they finally let us go after Mike's bank had arranged a guarantee of £392 that we would bring the gear back with us. Thus, by 6 p.m. we were on the road again, the start of our 740 miles French tour.

Two days later, we reached Andorra, having nursed the Land Rover the last 60 miles because a vast hole had developed in the radiator.

"Where should we camp?" was the next question, answered by us all staring toward "Radio Sud," which was 8,300 feet above sea level. PX1JQ was there, and he told us we could camp anywhere, so we erected the tent near the radio station, five yards from the edge of a 200 ft. cliff. When this was discovered, after about five minutes, we moved to the opposite side of the pass into a sheltered hollow with very useful hillocks each side for the aerials.

Next day we bought some butane for the generator from Andorra la Vella, put up the V-4-6 and put the Sommerkamp on the air. Later the KW600 was added to this, and the next day the Mosley TA33 went up. Stations flowed in constantly until Wednesday, the 23rd when, at 6.30 p.m., we were hit by a hail storm. The tent started to leak like a sieve, and lightning was playing around the aerials, so we bundled all our clothing and sleeping-bags into the 'Rover, drove to the

other side of the valley, and requested the use of one of "Radio Sud's" rooms—the best night's sleep we had.

In the morning we returned to the camp site to clear up the mess, only to find that in the centre of the hollow was a puddle which extended halfway along the tent. Mike removed the rig from the tent while Duncan and John baled out the puddle with an old RAF kitbag, which turned out to be an extremely good bucket. The puddle never fully disappeared, but after a while we got used to operating with wet feet!

The rest of the trip was relatively uneventful. We survived another hailstorm without visiting "Radio Sud," and left two days earlier than expected as another storm was threatening. The return trip was completed in two days, and by 11 p.m. on the 1 September we were in Dartford returning the KW600.

In the 75 hours for which we operated 1020 QSOs were made, 473 of which were W/VE. Fifty countries were also worked, all except one on twenty metres. Of the three bands used, twenty was the best, although 100 QSOs were made on fifteen and one CR6IS, on ten. Forty and Eighty were useless



The laden Land Rover EVG 689 awaiting Customs clearance.
(Photo by G3VNV)

* "Aingale," The Buttlands, Wells-next-the-Sea, Norfolk.



Baling following the storm.

(Photo by G3VNV)

owing to QRM from "Radio Sud," and neither of the aerials tuned 160.

We three all enjoyed ourselves immensely, and it is a pity that all the little incidents cannot be related, but there is not enough space for this. We should like to thank all who helped with the expedition, especially the following:

Lowe Electronics, for the FT100B; KW Electronics, for the KW 600 linear; Mosley Electronics, for the TA33 and V-4-6;



The camp site, 8,200 ft. a.s.l., higher than most surrounding hills and only a little lower than that supporting "Radio Sud" half a mile away. The TA33 jnr. can be seen to the left of the photo, the V-4-6 vertical is a few yards out of view to the right.

(Photo by G3VNV)

J-Beam Aerials, for the poles; Sutton Electronics, for last minute help with connectors; WA9HJM and G2MI (the RSGB QSL Bureau), for handling the cards; Crane Freuhauf, Ltd., for printing the cards; "Radio Sud," for resistors, solder and a room; D. H. Gregory, for correcting the script and Mrs Baldwin, for typing it!

A 400 watt TT21 Linear Amplifier

(Continued from page 25)

off at 1200V than at 1000 or 800 volts, the reason for which is difficult to establish, but appears to reside in circuit losses

as a whole because the valve is known to give its full power output at 30 MHz in a single band test circuit.

The actual operating conditions are set out in Table 1 with figures quoted for zero grid current conditions, to facilitate adjustment. All power measurements were made at an output impedance of 50 ohms, although the output tuning capacitor will cover higher impedance.

TABLE 1

f, MHz	3.6			7			14			21			29			Units
Anode voltage V_a	800	1000	1200	800	1000	1200	800	1000	1200	800	1000	1200	800	1000	1200	V
Screen voltage V_{g2}	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	V
Grid voltage V_{g1}	-70	-70	-70	-70	-70	-70	-70	-70	-70	-70	-70	-70	-70	-70	-70	V
Cathode Current $I_{k(o)}$ each valve	45	36	30	45	36	30	45	36	30	45	36	30	45	36	30	mA
Cathode Current $I_{k(max sig)}$ each valve	146	146	143	146	143	144	145	143	144	143	141	142	148	145	144	mA
Anode Current $I_a (max sig)$ 4 valves	540	544	530	540	535	540	536	530	538	530	525	530	545	540	540	mA
Screen Current $I_{g2} (max sig)$ 4 valves	44	41	40	44	38	37	45	40	39	42	39	38	45	41	36	mA
Power Input P_{in} 4 valves	432	544	636	432	535	648	429	530	646	424	525	636	436	540	648	W
Power Output* P_L 4 valves	280	355	430	265	330	420	260	320	400	255	315	390	220	250	275	W
Power Loss† $P_{in}-P_L$ 4 valves	152	189	206	167	205	228	169	210	246	169	210	246	216	290	373	W
Power Loss† $P_{in}-P_L$ per valve	38	47	52	42	51	57	42	53	62	42	53	62	54	73	93	W

* Measurement made into a 50 ohm load.

† This includes circuit losses.

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TECHNICAL TOPICS

By PAT HAWKER, G3VA

SOMETIMES, one feels that the rate of technical innovation in radio communication must surely slow down—but then along comes the next series of "breakthroughs." Fortunately, new techniques seldom mean that existing ones are immediately outdated. This is just as well since few of us could face the prospect of changing equipment every time something new comes along.

A noteworthy feature of recent months has been the continued progress being made in h.f. techniques; this part of the radio spectrum seems almost to be back in the forefront of communications technology. Indeed the past few weeks have been particularly prolific in ideas in the h.f. receiver field, although not all of them seem likely to affect our equipments immediately.

Up-converter parametric front ends, frequency presentation on cold-cathode numerical indicators, spreading use of variable ratio divider frequency synthesizers, new realizations of Wadley loop principles, and a novel simplified method of achieving exalted carrier reception are among the many subjects which have been noted either in actual equipments or in the journals.

Thus this may be rather more of a "think" than a "soldering iron" *TT*, but what are only "ideas" at the moment may well form the circuits of the near future.

Paramp Up-Converters

One of the most intriguing ideas—but unfortunately the one about which we can unearth least solidly practical information—is that of using varactor diodes as parametric up-converters in the front-ends of h.f. receivers. Put simply, an up-converter may be regarded simply as the "in-way" of describing a mixer of the form $f_{\text{signal}} + f_{\text{osc}}$ output, rather than the more usual $f_{\text{osc}} - f_{\text{signal}}$. Thus, with an up-converter the "i.f." must always be higher than the

incoming signal frequency (a situation also found in "single-span" receivers advocated in the 'thirties), a factor which can be a great help in reducing various forms of spurious responses, including "image."

With a varactor diode up-converter, the local oscillator is more correctly termed the "pump" oscillator—and the gain of this type of mixer increases with a high ratio of pump/signal frequency. For this reason, it may be worth pushing the incoming signal well up into v.h.f., though one has the problem of providing efficient v.h.f. filters and then of bringing the "i.f." down again to a more manageable frequency.

Frankly, the idea of using a varactor up-converter in an h.f. receiver had not, until recently, occurred to us. Then suddenly it became obvious that a good deal of work has in fact been going on in this area. For instance, at a recent conference on radio receivers, a member of ASWE outlined a possible future m.f./h.f. receiver for use on ships in close proximity to a number of transmitters.

This is shown in Fig. 1, from which it will be noted that an incoming signal on 10.1 MHz would be lifted up to 80 MHz by means of a 69.9 MHz signal derived from a frequency synthesizer. The synopsis of this paper did not specifically mention the use of a paramp up-converter, but clearly this is the type of arrangement in which one could be used.

Then in the American military communications journal *Signal* (September, 1967) an outline was given of a new range of commercial/military h.f. receivers currently under development by Avco Electronics, all of which, it is claimed, use paramp up-converters in conjunction with full or partial frequency synthesis. This article did not go deeply into the design of these front ends but it did list some specific advantages claimed for the use of paramp up-converters. The first "i.f." is in the region of 120 to 180 MHz.

One was the "compression" of the four octaves or so

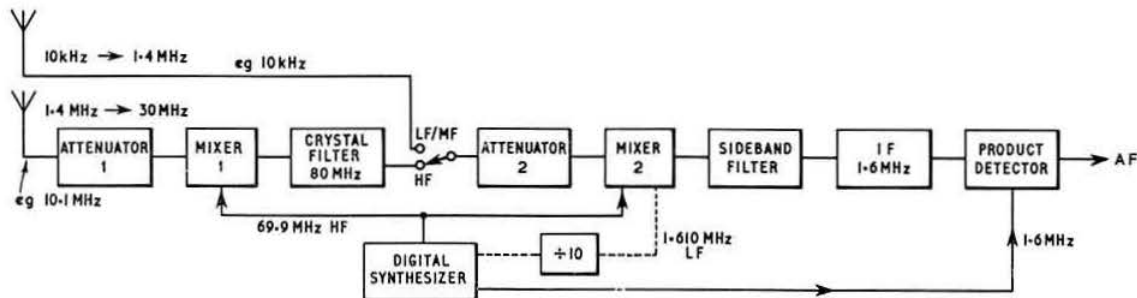


Fig. 1. Outline of a possible future shipborne receiver with attenuators used on surface ships to improve intermodulation product performance and using an "up-converter" form of first mixer.

PARAMP UP-CONVERTERS FOR H.F. ?—MOS FETs FOR LOWER CROSS-MODULATION FORWARD A.G.C. ON FETs—P.A. PROTECTION CLAMPING CIRCUIT—NEW H.F. RECEIVER DESIGNS—SIMPLIFIED EXALTED CARRIER RECEPTION FOR A.M. SIGNALS—COLLECTOR-BEND TRANSISTOR DETECTORS—MORE ON WHISPERING GALLERY MODE—LOOP AND ACTIVE MINIATURE RECEIVING AERIALS—CONSTANT CURRENT DIODES—28 MHz KEYED OSCILLATOR.

represented by the span 2 to 32 MHz into a small part of an octave at v.h.f.—this would be useful in the design of the synthesizer and also in providing extremely rapid tuning of the receiver, presumably for such military communications techniques as rapid frequency hopping. This feature would have little attraction to the amateur, except in so far as it might facilitate the design of a synthesizer.

But the second advantage listed in the article was that of a very large signal handling capacity (i.e., large front-end dynamic range) which, it is said, results from the high linearity of the process; this enables good performance to be achieved on weak signals in the presence of very strong signals on nearby frequencies (an important requirement for good amateur receivers).

And a third advantage listed is "simplicity" which, it is said, results in "small size, low cost and high reliability." The paramp up-converters, it would seem, are used in conjunction with varactor "electronic" tuning (see later).

The very high "i.f." (which can I suppose be translated as idler frequency as well as intermediate frequency) suggests that it should be possible to reduce to a minimum the need for front-end signal-frequency selectivity; and this would be helped by the linearity and extremely low-noise characteristics of the paramp.

The details given on the Avco designs indicate that varactor variable capacitance diodes are also used for electronic tuning, partly to improve frequency switching times and to eliminate mechanical gearing, and make possible smaller size, high reliability and to lower cost. Diodes are also used for switching in and out the various filters, aerials, demodulators.

One of the designs is for a small pocket h.f. receiver for s.s.b., c.w. and a.m. reception measuring 1 1/4 in. x 3 in. x 5 in. and covering 0.5 to 30 MHz.

The *Signal* article certainly aroused curiosity, and some judicious enquiries among professional receiver designers convinced us that quite a number of designers in the UK have been looking into the question of using paramp up-converters for h.f. receivers. Unfortunately, nobody was prepared to quote any firm reference to this technique for h.f. receivers, suggesting that most of the literature is in the form of private company reports. So far, searching the journals has failed to unearth any practical description of typical circuitry.

For the moment, this is probably just an idea that needs to be tucked away in the subconscious—but one has a feeling that it may prove an important innovation in the not too distant future, when good v.h.f. bandpass filters become available at reasonable cost. The Racal Wadley-loop receivers have, of course, used a first i.f. in the region of 40 MHz very successfully for a number of years.

Cross-modulation and Semiconductors

While it could be possible that the linear paramp up-

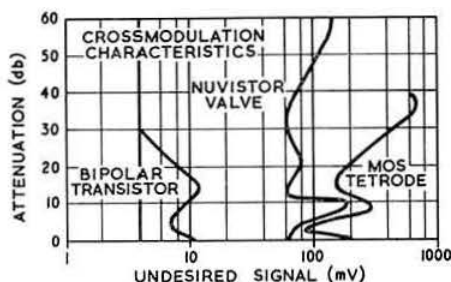


Fig. 2. Comparison of a.g.c. characteristics of a dual-gate MOS FET (tetrode) with those of Nuvistor valves and typical bipolar transistors.

converter may prove to have the widest dynamic range of any semiconductor front-end, in the absence of firm knowledge on this type of approach, one must look to the devices and circuits about which information is more readily available. And the evidence points strongly in the direction of the new dual-gate MOS FETs (77, November, 1967). Fig. 2 is an interesting comparison of the cross-modulation performance of bipolar transistors, Nuvistor valves, and dual-gate FETs as given in a letter in *Electronic Communicator* (July/August, 1967); this emphasized the value of the tetrode (dual-gate) MOS FET not only at maximum gain, but throughout the full range of a.g.c.

The question of cross-modulation effects in single-gate and dual-gate MOS FETs is covered in some depth in a recent RCA Application Note (No. AN-3435 from Radio Corporation of America, Electronic Components and Devices, Harrison, NJ, USA). This compares the performance of the 3N128 single-gate with the 3N140 dual-gate device, which, as mentioned in November, is available at a very reasonable cost in the UK.

This application note claims that calculations show that typically for an r.f. amplifier, the cross-modulation performance of the 3N140 should be at least two to four times better than that of most popular transistors. The single-gate 3N128 also provides this order of improvement at full gain but falls away to be roughly equivalent to the bipolar units at high attenuation. On the other hand, the 3N140 maintains its superiority throughout its full attenuation range, as indicated in Fig. 2.

There is, however, one point that must be stressed: the actual performance achieved depends upon the way the devices are operated, for instance whether forward or reverse a.g.c. is used, bandwidth of the input circuits (for instance whether tuned or in the form of a broadband filter), degree of negative feedback provided by the a.g.c. loops, and the like. A receiver is not necessarily a bad one because

it uses bipolar transistors—or good with dual-gate MOS FETs. But it certainly seems that, other things being equal, it should be possible to achieve significantly better results with these tetrode MOS FETs.

In *TT* (May, 1967), some notes were given on the use of reverse or forward a.g.c. with bipolar transistors. It is worth pointing out that a similar choice is open with FETs, as was made clear in a recent article in *Electronic Design*.

Varying the d.c. drain current to alter gain—similar to the system used with vari-mu valves—is a form of reverse a.g.c.

But another method is to adjust the bias circuitry so that increases in drain current reduce the FET impedances and lowers circuit gain; this is known as forward a.g.c.

The *Electronic Design* article suggests that forward a.g.c. usually results in a larger range of gain control than is possible with reverse a.g.c., but that selectivity tends to be sacrificed due to the increased loading effect on the tuned circuits. Also pointed out is that although the initial gain is a little lower with common-gate configuration, this arrangement tends to result in better a.g.c. performance.

The cascode arrangement, using either two separate devices or a dual-gate unit, is claimed to combine both high gain and good a.g.c. performance. Thus, on the whole, it looks as though the optimum choice at present for a gain controlled r.f. stage is that of two JUGFETs or MOSFETs in cascode, or a single dual gate MOSFET.

One point not mentioned in the November *TT* when describing the new RCA range including the 3N140 is that these devices are sold with a small spring clip short-circuiting the leads and intended to be removed after the device is wired into circuit—thus largely overcoming the handling problems which have been described in earlier *TT*.

P.A. Protection Circuit

It is becoming widely recognized that transmitters using high-cost transistors in the p.a. need built-in protection from any sudden removal of the load, violent mis-match, etc. But it is often forgotten that protective circuits may also be useful in valved transmitters when there is no fixed bias supply.

A note from E. Harlord, G3VPF gives information on a useful-looking circuit he uses to protect the QQV03-20A in his 70 MHz portable transmitter. He writes: "This is a development of the relay clamp circuit where a relay is worked directly by the grid current of the p.a. This eliminates the normal clamp valve but has two disadvantages: (1) a high cost and delicate relay which pulls in on 1-2 mA; (2) a form of oscillation can occur when working near the pull-in current (i.e. drive increases, relay closes, p.a. comes on, drive drops, relay falls out, drive increases... and so on)."

In the G3VPF arrangement two transistors are used in a bistable arrangement with a built-in backlock to eliminate the oscillation. This circuit is shown in Fig. 3. Any *p-n-p* silicon transistors can be used, provided that TR1 has fairly high gain (3 over 50) and TR2 is capable of handling the current through the relay (20 mA in the G3VPF original). The circuit closes at 1.5 mA, and opens at 1 mA, but these parameters will vary, depending on the V_{BE} of TR1.

New commercial H.F. Receiver Techniques

At a recent exhibition and symposium, Racal introduced, *inter alia*, a new version of their fully transistorized Wadley-loop range (RA217, RA1217, etc.). This is the RA1218 which

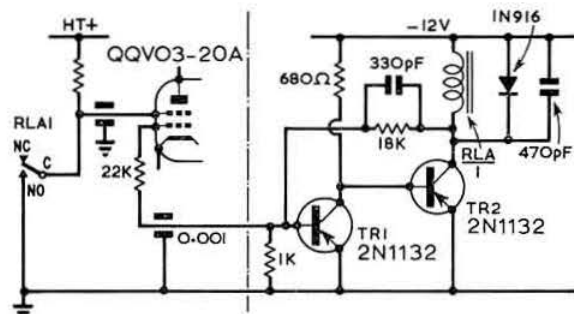


Fig. 3. Clamp protection circuit for p.a. stage to remove screen voltage in absence of drive, as used by G3VPF.

features a built-in in-line digital presentation of the frequency to which the set is tuned, not on any form of mechanical dial, but instead on a row of cold-cathode numerical indicator tubes (the type of indicator often known as Nixie tubes).

This technique is also being used in the new GEC model RC410 high-stability receiver which has the further distinction of being the first general purpose h.f. receiver to use full frequency synthesis for the local oscillator (receivers such as the HRO500 and Plessey PR155 have used partial synthesis). The synthesis, of the variable ratio divider type (Fig. 4), is controlled by an ingenious mechanical gearing of the synthesizer "switches" in conjunction with servo-motor control of the r.f. tuning circuits so that one can have the impression of a normal continuously tuned receiver, but with the stability of a modern frequency synthesizer.

This receiver was briefly mentioned in *TT* (July, 1966) but has, in fact, only just gone into full production. Among its many interesting features is the use of two fully-tuned r.f. stages each comprising a cascode-type junction FET stage, followed by a balanced, push-pull mixer using bipolar transistors.

Since the cost of this set is in the region of £1150 it is clearly not aimed at amateurs, but its novel features are of general interest. I must admit though, that when I tried one recently, I felt that the unusual tuning arrangements, despite the simulation of conventional tuning, would take a little getting used to. The set certainly represents a major advance in stability for a search or scanning receiver, with its overall stability better than five parts in ten-million. In other words,

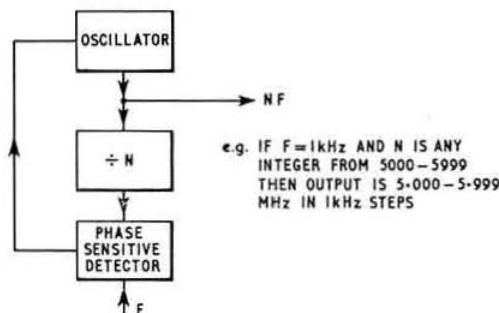
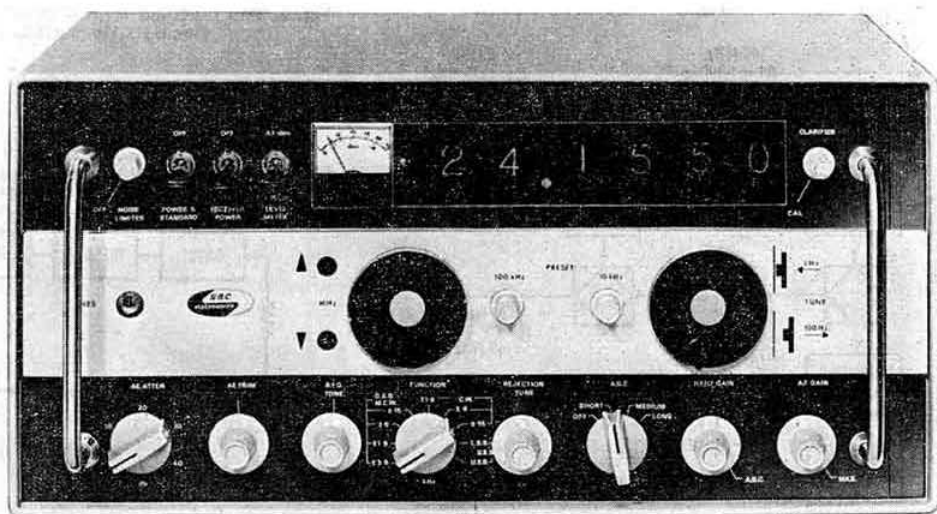


Fig. 4. Block outline of the variable ratio divider form of frequency synthesis—but despite the simplicity of this diagram the practical realization requires a good deal of digital circuitry.

This new GEC h.f. receiver, the RC 410.R, possesses a full frequency synthesiser and servo-control to track the r.f. circuits.



A new Racal receiver with an improved read-out system of cold-cathode display tubes. This is the RA 1218.



even at its limit (for on many frequencies it is better than one part in ten-million), one could put the set to say 30-0000 MHz and it will stay there to within better than 5 Hz!

A full description of this interesting design appears in *GEC Journal* Vol. 34, No. 3, 1967 and there are some brief notes in *Electronics Weekly* (6 December). Basically it is a double superhet with 1.6 MHz first i.f. and 100 kHz second i.f. Undoubtedly it is a serious attempt to produce a receiver suitable for both "search" type applications and at the same time for the high stability requirements of point-to-point service.

The in-line frequency presentation of the RC410 and RA1218 (the system is also used in the Plessey PR155 series as an add-on unit) is an extremely attractive feature. It not only allows extremely accurate re-setting to any given frequency, but also shows exactly any subsequent drift off this frequency; it avoids the well-known problems of mechanical gearing and backlash of even the best mechanical systems.

However, since it requires a fairly elaborate frequency "counter," there would not seem to be any very cheap way in which such facilities could be duplicated in an amateur-built set.

Another new design, soon to go into production, is the

Racal RA919. This has a modified, multi-loop form of the Wadley principle to form modular units and would seem to make it possible to extend, if required, the Wadley technique up to the v.h.f. and u.h.f. bands. Briefly, a series of Wadley loops are interconnected so that there is in effect one loop for setting 1 MHz intervals, and another for 100 kHz intervals, by means of a series of bandpass intermediate frequencies each exactly one-tenth of the previous one: Fig. 5. All the features of drift cancellation, which made the original RA17 receiver such a step forward in the 'fifties, are retained. A prototype of this fully-transistorized receiver on show at the exhibition certainly gave good performance on the amateur bands—and one gathers that the RA919 should be marketed at appreciably lower cost than the RA217.

Homodyne Reception of A.M. Signals

Some extremely interesting ideas have been put forward recently by Dr R. C. V. Macario of University College of Swansea on the possibility of using various homodyne and "single-span" techniques in order to improve the performance on m.f. and h.f. of domestic radio receivers. He believes that exalted carrier or synchronous detection would result in improved quality due to the better linearity of the detector

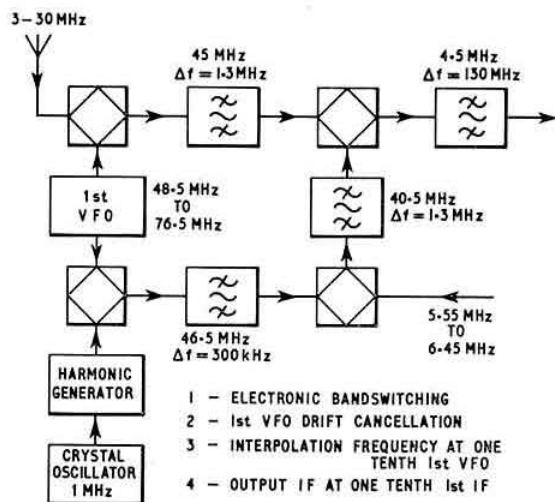
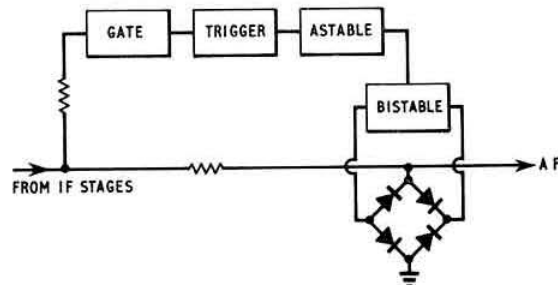


Fig. 5. The modified form of Wadley loop used in the new Racal RA919 modular receiver.

Fig. 6. One form of the digital technique for exalted carrier reception developed by Dr. Macario.



and reduction of distortion due to selective fading. An article outlining his views appeared in *Electronics Weekly* (15 November, 1967), and there have also been references recently in *Wireless World* and *Electronics*.

One specific idea which seems to be of interest also to those requiring better a.m. reception for communications is the realization of exalted carrier reception (which he shows to be analogous to homodyne reception) without the complications of the original system put forward in 1945 by Crosby (*Proc IRE*, September 1945) or the synchronous detector of Costas (*Proc IRE*, December 1956) referred to in a recent *TT*. He has developed a proposal made by F. G. Apthorpe (*Electronic Engineering*, July 1947) in the hey day of the Tucker Synchrodyne, using a few standard SICs to form an ingenious self-following coherent carrier generator: one approach is shown in Fig. 6.

Briefly, he generates a local coherent carrier from the action of a zero-crossing detector at the end of the i.f. strip. He points out that, if a station can be received at all, the carrier is discernible at the detector, and that with a.m., whatever the modulation, the carrier continues to cross zero regularly at twice the carrier frequency.

Thus by means of this signal and a Schmitt trigger, or

other form of fixed threshold trigger, it is possible to obtain a square wave signal at the carrier frequency which can be added to the incoming signal. The additional circuitry thus comprises a gate, trigger, astable and bistable arrangement which can be realized using standard commercial SICs. Although this basic outline has been given in a number of sources, the actual circuit details still seem to be in course of development. In the full receiver (outlined in Fig. 7) it would seem that a balanced mixer with a single or dual gate FET in the first frequency conversion is used to prevent breakthrough of the first oscillator and its harmonics to the second mixer; also possible is the use of FETs to provide broadband matching to an internal "active" aerial comprising a pair of parallel plates (see later).

This type of approach, with i.f. stages, is rather different from the type of simple homodyne receiver described in *TT* (March 1967) where, since only s.s.b./c.w. reception is involved, there is no requirement for a locally generated carrier accurate in both frequency and phase to an incoming carrier.

Results already achieved mention a "significant speech clarification"; the absence of the synchrodyne type of tuning whistle; and none of the problems of any phase locking

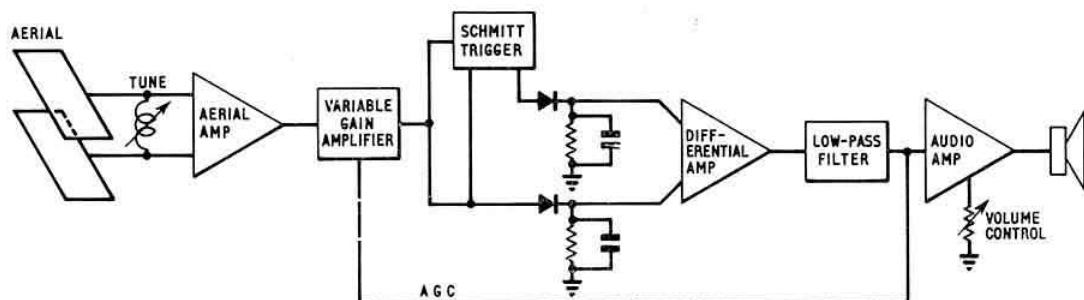


Fig. 7. Broad outline of domestic broadcast receiver using "single-span" and homodyne exalted carrier techniques.

on to the wrong signal. Altogether the work at Swansea could well produce one of the first new approaches to a.m. and broadcast reception for a long time.

Transistor Detectors

One reason why some people are looking again at the various forms of coherent demodulation is the poor efficiency of envelope detection at low signal inputs. Crystal diodes in particular may require a swing of about five volts for good efficiency. A much simpler approach, described by K3IGP in *QST* (October, 1967) is the collector-bend transistor detector which provides some gain, and is claimed to work quite well at low signal input. Fig. 8 (a) shows the K3IGP design, while Fig. 8 (b) is a collector-bend detector circuit taken from the circuit diagram of a small broadcast transistor receiver.

Whispering Gallery Mode

The notes in the November *TT* on the possible potential value of entrapment-mode propagation paths, where signals are trapped between F and E or F1 and F2 layers, and thus do not suffer from ground reflection attenuation, attracted interest rather less from amateurs on their own account, than from those representing major rival users of the h.f. spectrum! There is still some controversy on the practical value of such non-classical modes for working regularly over long distances, and not everyone accepts that these earth-detached paths can be achieved by extreme low-angle radiation, or that the Russian broadcasters are exploiting such techniques. Nevertheless, nobody seems willing to dismiss this type of propagation altogether. This uncertainty could give amateurs a real opportunity to come up with something new.

Layer entrapment modes are briefly mentioned by Dr Bruno Beckman, the head of the West German Ionospheric Warning Centre in an interesting article "Can Hams make contacts above the classical MUF?" in the latest *Interadio* ("4U1ITU calling") No. 4, 1966-67. In this, he describes no less than eleven propagation modes in which h.f. and v.h.f. signals can be transmitted over medium and long distances at frequencies above the m.u.f., and points out that at least ten of these can be (and of course often are) exploited by amateurs. The entrapment modes are indicated as suitable for distances of up to 20,000 km (E and F layers) or 40,000 km (between F layers). He confirms the point made in our November notes about the very low attenuation of entrapped signals saying "It is known that signals having travelled several times around the earth show field strength losses of the order of only 6dB per circuit around the earth," i.e. about one S-point!

Loop and SIA Receiving Aerials

Some of the possibilities offered by low-loss transmitting loops were described in *TT* (November, 1967). A new wide-band, directional receiving array with good front-to-back ratio, based on a series of small (one-metre diameter) loops a few feet above ground has been developed by the Canadian firm EMI-Cossor Electronics (*Electronics Weekly*, 29 November, 1967) as an alternative to log periodics or rhombics, and capable of being erected very quickly at an unprepared site.

This particular form of array, with its special wideband

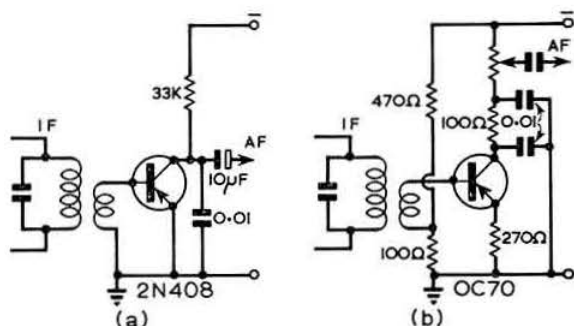


Fig. 8. Transistor collector-bend envelope detectors for a.m. (a) Circuit suggested by K3IGP; (b) typical arrangement used in transistor portable receiver. Volume control 20 kohms (log).

preamplifiers located immediately beneath each of eight pairs of balanced loops is perhaps not of immediate concern to amateurs. But a point of general interest is made strongly in the manufacturer's notes on this aerial: that an aerial may be inefficient for h.f. transmission but is not necessarily unsuitable for reception. This arises from the absence of a need in receiving aerials for efficient free space coupling.

At frequencies below about 30 MHz where atmospheric and galactic noise is the limiting factor, it is possible to use an aerial for receiving purposes which is electrically small and which thus has a poor free space coupling efficiency. It is this fact which also opens the way for the use of active subminiature integrated aerials (*TT*, September, 1967).

In *Electronics* (12 June, 1967), it is noted that the problem

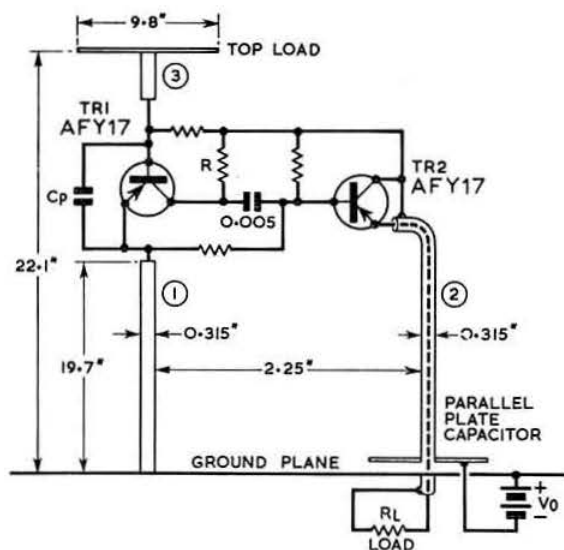


Fig. 9. One of the subminiature integrated aerials developed by Professor Meinke. This is a wideband omnidirectional aerial for use between 3 and 30 MHz. One transistor provides amplification, the second for matching. C_p prevents oscillation. The parallel plate capacitor provides an a.c. ground. Some component values not shown in the original diagram (*Electronics*, 12 June, 1967).

with electrically short aerials (less than $\frac{1}{2}\lambda$) arises from the difficulty in drawing maximum power from such an aerial without dissipating too much of it in the matching circuit. Such aerials usually act like a large capacitive reactance; this reactance can be tuned out with an inductance, but the problem of low loss broadband matching remains. This is where Professor H. Meinke's active devices come into the picture, as they can provide a wideband match without the use of tuning coils or transformers.

Fig. 9 shows one of his designs, in the form of a wideband 3-30 MHz omni-directional system only some 22 in. in height. As indicated in earlier *TT*, there is a good deal of controversy about these SIA systems, and there is no guarantee that the arrangement of Fig. 9 will live up to expectations.

Another compact "plate" aerial, taken from the paper on homodyne broadcast receivers by Dr Macario already referred to, is shown in Fig. 10. This uses two parallel

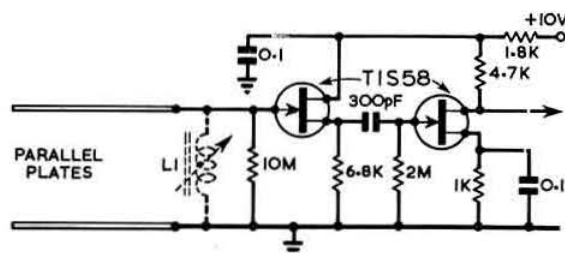


Fig. 10. One form of parallel plate capacitor proposed for the exalted carrier receiver of Fig. 7.

copper laminated plates fitted in the upper and lower portions of the receiver cabinet; a tunable coil is placed across the plates and matching and amplification then achieved by means of two TIS58 field effect transistors.

Constant-current Diodes

A recent component which has never previously been mentioned in *TT* is the "constant-current" diode, or field effect current regulator. This diode is rather like the reverse of a Zener diode, passing a small but almost constant current when quite a wide range of voltage is applied across it. The diodes, described in *Electronics World* (October, 1967) seem to have some useful looking applications, as noise or spike limiters, for biasing differential amplifiers, or in conjunction with a Zener to provide pre-regulation making for better voltage regulation and temperature performance.

At present, diodes intended specifically for this purpose

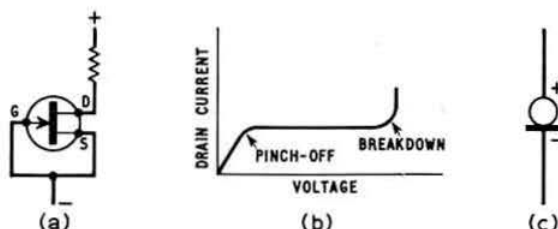


Fig. 11. Constant current diode. (a) equivalent FET; (b) typical characteristics; (c) symbol.

are marketed by Motorola and Silconix (e.g. Motorola 1N5313) but tend to be costly. However the *Electronics World* article points out that these devices consist basically of a junction field effect transistor with gate and source short-circuited: see Fig. 11. The special diodes are thus FETs chosen for low pinch-off and high breakdown voltage, but where only a limited control is required normal FETs could be used.

Here and There

A 28 MHz keyed Seiler-type transistor oscillator by DJ1ZB was spotted recently in *Funkschau* (No. 18, 1967) claimed as producing a chirp free signal: see Fig. 12. The transistors shown are of *p-n-p* type, but DJ1ZB gives *n-p-n* alternatives as 2N3932 for the oscillator, BC108 for the keyer. Output is about 30 to 50 mV.

In "Hints and Kinks" (*QST*, October 1967), WA8QYK points out that v.h.f. parasitics can be a problem in remodelled h.f. receivers using EF183 (6EH7) high-slope frame-grid valves as r.f. amplifiers. He suggests that these can often be tamed with the technique traditionally used in transmitter stages: 5 turns of 18 s.w.g. wire on a 50-ohm $\frac{1}{2}$ -watt resistor installed right at the anode terminal of the valve socket.

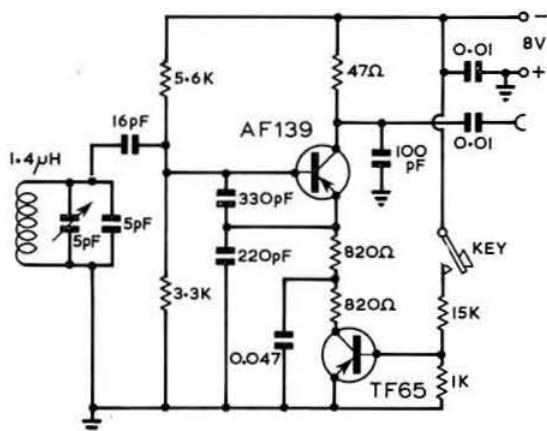


Fig. 12. Keyed 28 kHz oscillator by DJ1ZB.

RAE Course

Leeds, Yorks. West Park Secondary School, Spen Lane, Leeds. Wednesdays, 7-9 p.m. Commencing 29 January, Morse classes will be run on Monday evenings between 7-9 p.m.

Please

When writing to Headquarters regarding your membership details, change of address or renewal of subscriptions, please enclose your *Radio Communication* wrapper or state the month when your subscription falls due. This can be ascertained from the figures printed below the address on the wrapper. We recommend that you retain Postal Order counterfoils for at least three months to alleviate problems resulting from any loss of mail.

The Georef System

By W. BLANCHARD, G3JKV*

AS will have been obvious to close scrutineers of the correspondence columns of the "RSGB BULLETIN" there has lately been some discussion therein of the merits or otherwise of the QRA grid locator systems. This has resulted in a new system called GEOREF being put forward, which the RSGB has now decided to publicize, there being a proposal that it should eventually supersede QRA as the grid for amateur radio purposes. To this end, it is specially requested that v.h.f. operators in particular read this article, which describes GEOREF in detail, and make their comments known.

The basic concept of having a grid locator system is an excellent one which is not now seriously disputed, and therefore the pros. and cons. of grid systems generally will not be discussed here.

The QRA system was introduced in Germany as long ago as 1959, and has since been recommended for general adoption by member Societies of IARU Region 1. Unfortunately it has turned out in practice to have serious disadvantages which have hindered its widespread adoption. Briefly these are

(i) Complication—it is almost impossible to derive mathematically, and therefore requires the use of maps overprinted with its grid, which are not easily obtainable, because they must be specially prepared and printed.

(ii) Inaccuracy.

(iii) It is needlessly difficult to understand.

(iv) There are basic technical defects in its construction.

To overcome these difficulties while still retaining QRA is impossible, and it has now been proposed that the alternative GEOREF system should be adopted.

GEOREF is basically a NATO military system which has been in use since 1950 and has proved very satisfactory, being currently used for all position reporting within NATO, except for reports to civil authorities which use their own grids (e.g., police). It was introduced with the objectives of providing a simple, fast, unambiguous, world-wide method of defining position not suffering from the limitations of local grids which ignore curvature of the Earth (e.g. National Grid) and consequently a fair amount of research went into its design. No modifications to it have since proven necessary, showing its basic soundness, and it is highly unlikely that any amateur-designed system could better it.

The only world-wide grid in common use before GEOREF was latitude and longitude, which is excellent for surveying and similar work, but suffers from the disadvantages of unwieldiness, and ambiguities near the Equator or Greenwich meridian. However, any world-wide grid system must be based on it in order to avoid distortion, and GEOREF therefore is based directly on latitude or longitude without fractional sub-divisions (which is what makes QRA so clumsy).

There are three prime rules which must be remembered when dealing with GEOREF. They are:

(i) All lettering and numbering is from bottom left to top right of whatever square is being considered.

(ii) The letters I and O are never used.

(iii) Eastings are always given first, followed by northings.

The basic grid divides the world into 24 longitudinal zones (i.e. north/south) each 15° wide. Starting at the 180° meridian, and going eastwards (Rule iii) they are lettered A-Z (no I or O—Rule ii). It is further divided into 12 latitudinal (i.e. east/west zones, also each 15° wide. Starting at the South Pole, and going Northwards (Rule iii again) they are lettered A to M (once again excluding I—Rule ii). These are the basic divisions, giving 288 quadrangles of 15° sides each denoted by a unique letter combination (see Fig. 1). Most of the UK, for example, lies in the quadrangle MK, and most of Continental Europe in NK.

The accuracy of this is obviously very low, and in Amateur Radio practice, the country prefix in the call-sign would give better accuracy. For this reason it is not considered that these first two letters would normally be used in amateur practice.

Each 15° quadrangle, however, is then sub-divided into 225 one-degree quadrangles, lettering being used from A-Q (I and O still omitted—Rule ii) in both directions, the eastwards letter being given first (Rule iii). See Fig. 2. Thus Salisbury, Wilts, is in the quadrangle PG, and its full reference so far would be MKPG.

From now on, the usual minutes of latitude and longitude are used, with the sole difference that they are re-numbered so that the numbers always go in accordance with Rule iii (see Fig. 3). In the Northern Hemisphere, this means that minutes of latitude are not altered, since they go northwards anyway, and east of Greenwich there is similarly no alteration in minutes of longitude. Our European friends therefore are let off lightly, but those of us living West of Greenwich must alter minutes of longitude so that they agree with Rule iii. For example, 51° 04' N 01° 48' E comes out as 4804 (in full: NKBG 4804) but 51° 04' N 01° 48' W is 1204 (in full: MKPG 1204). This gives position to about $\frac{1}{3}$ statute mile (3520 feet) and can be further refined if thought necessary by adding further numbers representing tenths of minutes. For instance : 51° 04' 20" N 01° 47' 37" W is, in full, MKPG 124043; an accuracy of about 350 ft.

As stated earlier, there is little point in adopting the first two letters for our purposes, so that a GEOREF grid reference to an accuracy of about $\frac{1}{3}$ mile (statute) would be given by two letters and four numbers (PG 1204) or to an accuracy of 350 ft., two letters and six numbers (PG 124043). The system is obviously easily capable of giving any necessary degree of either accuracy or freedom from ambiguity.

Because the system is widely used already, it is quite easy to obtain maps already overprinted with the appropriate letters. A full-colour aeronautical map of Europe to a scale of 1 : 1,000,000 with GEOREF lettering included as well as towns, railways, roads etc., can be bought in UK for 12s. and at any map agent in Europe dealing in aeronautical charts. If this is thought to be too expensive (and you can always use the map for planning continental motoring tours!) any amateur can easily make up his own GEOREF map by

*Hilldean, Furnace Wood, East Grinstead, Sussex.

simply lettering up any old map of suitable scale he has lying about. There is no need to draw accurate lines and make precise sub-divisions as with QRA—they are already there! (Unless you happen to have one of the very few maps without latitude and longitude on it.) You can in any case work out GEOREF locators without ever looking at a map, provided you have the initial latitude and longitude. This is done like this:

1. Call North and East positive, South and West negative.
 2. Add or subtract (depending on 1), North or South to 90° East or West to 180° .
 3. Ignore minutes, divide degrees so obtained by 15.
 4. Add 1 to answer, and also add 1 to any remainder.
 5. Work out corresponding letters of alphabet for these two numbers, omitting I and O.
 6. Assemble locator, giving Eastings first, then Northings.
- Example: What is GEOREF for $51^\circ 08' \text{ N } 00^\circ 59' \text{ W}$?
1. $51^\circ 08'$ is positive, $00^\circ 59'$ negative.
 2. $90 + 51^\circ 08' = 141^\circ 08'$ (Northing).
 3. $180 - 00^\circ 59' = 179^\circ 01'$ (Easting).
 4. $141^\circ \div 15 = 9$ times and 6 over.
 5. $179^\circ \div 15 = 11$ times and 14 over.

Any comments or suggestions regarding GEOREF, QRA locators or grid systems in general should be addressed for the attention of the Society's V.H.F. Committee, c/o RSGB Headquarters. The QRA locator system is an agreed standard adopted by the International Amateur Radio Union, Region 1, and thus the possibility of a unilateral change by the UK cannot be considered seriously. Therefore, if a new system is felt to be advantageous, a water-tight case must be prepared by the RSGB for recommendation to IARU.

5. $10 = K$ $7 = G$ (these are Northings).

12 = M 15 = Q (Eastings).

6. MKQG plus minutes 0103.

This method is applicable anywhere in the world, but if the first two letters are dropped, the calculation becomes (from stage 3 above onwards):

3. $141^\circ \div 15 = 9$ times and 6 over.

$179^\circ \div 15 = 11$ times and 14 over.

4. $6 + 1 = 7$.

$14 + 1 = 15$.

5. $7 = G$.

$15 = Q$.

6. QG plus 0103.

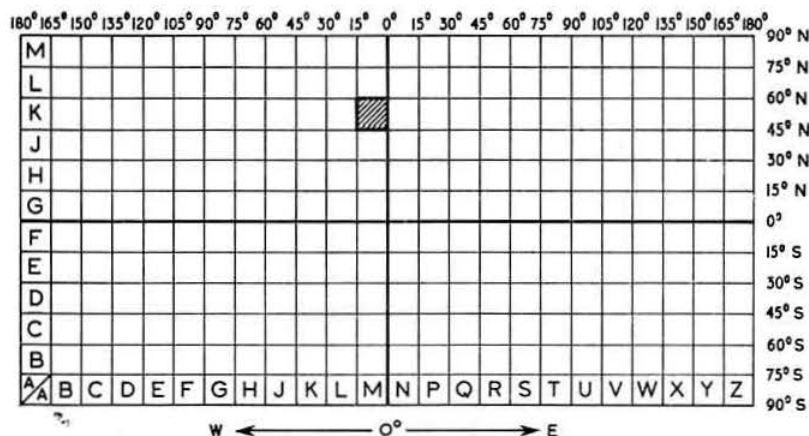


Fig. 1.

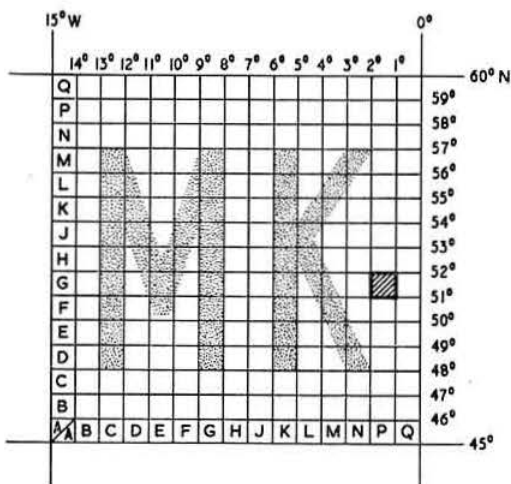


Fig. 2.

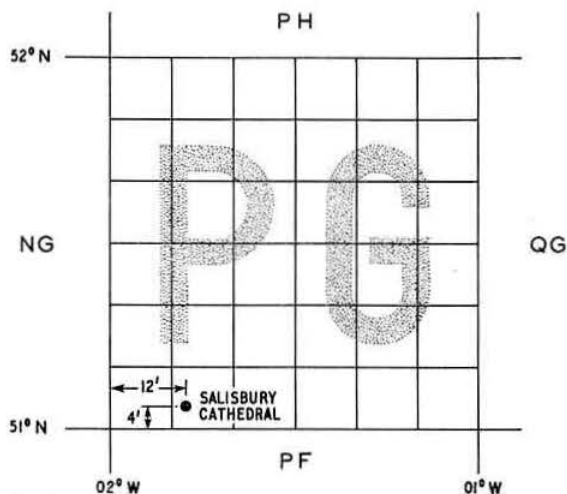


Fig. 3.

Figs. 1, 2 and 3 depict the three stages of providing a Georef locator for Salisbury Cathedral, which is shown to be MKPG 1204.

This Concerns You

By the time this issue appears, all members will have received a letter drawing attention to the need for the membership—rather than the bank—to shoulder the responsibility of financing the development of our new Headquarters. The recent rise in Bank Rate means that additional interest is payable: *this increase can be avoided* if members take up the remaining Debentures or make an outright donation to the Headquarters Fund. If you are a Debenture holder, your interest is safe, even if the Bank Rate falls. The Society would rather pay interest to the members than *half as much again* to the Bank.

The £25 Debenture unit is the minimum feasible amount; below that figure the cost of clerical work involved becomes too high for the Society to bear in relation to the sum involved. If you cannot spare this amount have you considered making a *gift* to your Society? Forego a few packets of cigarettes or a night at the "local" and you have saved the basis of a worthwhile contribution. Ask the XYL to organize a coffee party; have a "whip round" or a raffle or a club night—or even get the members to participate in a "sponsored walk"! There is no limit to the ingenuity by which money can be raised for this worthy cause—your Headquarters for your Society. Make this your New Year Resolution—do it now!

If only the British Isles are to be considered, as for the QRA calculation below, the conversion becomes very simple indeed.

For all stations: 50°N = F, 51°N = G, 52°N = H, etc.
Stations East of Greenwich: 00° = A, 01° = B.

Stations West of Greenwich: First subtract longitude from 180°, then: 179° = Q, 178° = P, 177° = N, etc.

Examples (the same positions are used in the QRA conversion set out below):

1. 52° 18' 52" N, 02° 31' 15" W.
52° = H. 180° - 02° 31' 15" = 177° 28' 45".
177° = N.
Latitude rounded off to nearest minute is 19'.
Longitude rounded off to nearest minute is 29'.

Georef is therefore NH 2919.

2. 51° 18' 42" N, 00° 21' 14" E.
51° = G, 00° = A.
Georef = AG 2119.

The accuracy of both these positions is about 3525 feet.

This easy mathematical process, compared with the extremely complicated method necessary for QRA, is the reason for another advantage of GEOREF, the ease with which it can be computed. This is perhaps of little interest to the average amateur, but where a large number of locators must be processed (in contests, for example, or for statistical analysis) it could become of the greatest importance.

Enough has now been said to enable amateurs to judge for themselves whether or not GEOREF is a better system than QRA for Amateur Radio. If you feel that QRA is better, then say so, but be prepared to give your reasons! If you think that GEOREF should supplant QRA, the Society would like to know that too! Or, if you feel that you have an even better system than either, let it be known. Let us not have yet another system being put forward in five or ten years' time!

If this system is used in reverse, the latitude and longitude obtained will be those of the south-east corner of the smallest rectangle for stations west of Greenwich, and those of the south-west corner for stations east of Greenwich.

APPENDIX

Calculation of QRA Locator from Latitude and Longitude.

This involves the selection of the largest number which will leave a positive remainder when subtracted from the latitude or longitude or from the result of a previous subtraction. The numbers (in degrees, minutes and seconds) are given below. Latitude and longitude may be obtained from the scale at the side of the Ordnance Survey Map.

For stations West of the Greenwich Meridian

First Letter (Longitude)	Number (Longitude)	(Latitude)	Last Letter
0° W = Z	0° W = 10	0° 0' N = 70	4° W & 5° 0' N = A
1° W = Y	12° W = 09	7° 30' N = 60	0° W & 5° 0' N = B
2° W = X	24° W = 03	15° 0' N = 50	0° W & 2° 30' N = C
3° W = W	36° W = 07	22° 30' N = 40	0° W & 0' 0' N = D
4° W = V	48° W = 06	30° 0' N = 30	4° W & 0' 0' N = E
5° W = U	1° 0' W = 05	37° 30' N = 20	8° W & 0' 0' N = F
6° W = T	1° 12' W = 04	45° 0' N = 10	8° W & 2° 30' N = G
7° W = S	1° 24' W = 03	52° 30' N = 0	8° W & 5° 0' N = H
8° W = R	1° 36' W = 02		4° W & 2° 30' N = J
9° W = Q	1° 48' W = 01		
10° W = P			
11° W = O			
12° W = N			
13° W = M			
14° W = L			
15° W = K			
16° W = J			
17° W = I			
18° W = H			
19° W = G			
20° W = F			
21° W = E			
22° W = D			
23° W = C			
24° W = B			
25° W = A			

Add the results of Lat. and Long. to obtain the number of the Locator

Example	2° 31' 15" W	52° 18' 52" N	
Subtract	2°	52°	giving first letters YM
Remainder	31' 15" W	18' 52" N	
Subtract	24'	15'	giving 08 + 50 = 58
Remainder	7' 15"	3' 52"	
Subtract	4'	2' 30"	giving last letter J
			The Locator is YM58J

For stations East of the Greenwich Meridian

First Letter (Longitude)	Number (Longitude)	(Latitude)	Last Letter
0° E = A	0° E = 01	0° 0' N = 70	4° E & 5° 0' N = A
1° E = B	12° E = 02	7° 30' N = 60	8° E & 5° 0' N = B
2° E = C	24° E = 03	15° 0' N = 50	8° E & 2° 30' N = C
3° E = D	36° E = 04	22° 30' N = 40	8° E & 0' 0' N = D
4° E = E	48° E = 05	30° 0' N = 30	4° E & 0' 0' N = E
5° E = F	1° 0' E = 06	37° 30' N = 20	0° E & 0' 0' N = F
6° E = G	1° 12' E = 07	45° 0' N = 10	0° E & 2° 30' N = G
7° E = H	1° 24' E = 08	52° 30' N = 0	0° E & 5° 0' N = H
8° E = I	1° 36' E = 09		4° E & 2° 30' N = J
9° E = J	1° 48' E = 10		
10° E = K			
11° E = L			
12° E = M			
13° E = N			
14° E = O			
15° E = P			
16° E = Q			
17° E = R			
18° E = S			
19° E = T			
20° E = U			
21° E = V			
22° E = W			
23° E = X			
24° E = Y			
25° E = Z			

Add the results of Lat. and Long. to obtain the number of the Locator

Example	0° 21' 14" E	51° 18' 42" N	
Subtract	0°	51°	giving first letters AL
Remainder	21' 14"	18' 42"	
Subtract	12'	15'	giving 02 + 50 = 52
Remainder	9' 14"	3' 42"	
Subtract	8'	2' 30"	giving last letter C
			The QRA Locator is AL52C

GJJKY

THE MONTH ON THE AIR

By JOHN ALLAWAY, G3FKM*

THIS first issue of *MOTA* in the New Year is being written in the latter part of November, well before the Christmas season has got under way. The writer's current feeling is that he would very much like to become a sought after DX call himself if only it were possible to move easily from the UK where life seems to be rapidly losing a lot of its joys! However, 1968 is upon us, and is likely to bring considerable cheer for those of us interested in long distance communication on the higher frequency amateur bands. The sunspot cycle is still on the upgrade and the spring season promises to bring magnificent conditions for DX contacts. Your scribe would like to take this opportunity to wish all readers a very happy and successful New Year.

As will be seen later, the controversy over W9WNV is still raging. It is impossible to judge the rights and wrongs of the entire business in the absence of knowledge of all the facts from both sides. The only comment which can be fairly made is that a situation like this must never be allowed to develop again. One cannot help feeling that the whole unpleasant business could have been avoided had attempts to right the alleged wrongs been made much sooner. The new rules for DXpeditions should obviate all doubts concerning future operations, but to do so they must be applied to all expeditions without fear or favour.

Apologies are offered to readers for the lack of information in this issue of *MOTA*. This is of course due to the abnormally early deadline caused by the Christmas holiday season.

News from Overseas

Those of us who value the world's wild life will be relieved to hear that the proposed base on Aldabra Is. is not to be constructed. News of the Royal Signals amateur station VQ9JW which has been there since 15 August is given in the October issue of *Mercury*. This says that regular contact between Aldabra and G4RS has been kept, starting with a twice weekly evening schedule which has now become a daily (Monday to Friday) afternoon affair. VQ9JW is putting a good signal into the UK each afternoon on 10 and 15m and is also very active on 20m. As the winter progresses it is John's intention to become active on 80 and 160m (he has already of course been reported on 40m). According to *Mercury* John is willing to arrange skeds on all bands and may be reached by contacting G4RS, or other Royal Signals ARC members at Blandford. These include G3's DSS, EKL, IBB, NJM, VYZ, and WGN.

The call-sign of the RAF Masirah Amateur Radio Society has been changed from the well known VS9OC to MP4MBC.

* 10 Knightlow Road, Birmingham, 17. Please send items for the February issue to arrive by 17 January, for the March issue by 14 February, and for April by 13 March.

A letter from Ted Ross, GM3LWS draws attention to the fact that a station using the callsign ZC4FB has been active on the h.f. bands recently. He wishes to point out that his last connection with this call was in 1964 and that the present user is a pirate. ZC4FB was issued to Ted originally and re-issued to an RAF Sergeant in 1961/2, but has not been in use officially since 1963.

Ian Wollen, well known as 4S7IW a few years ago, reports that he will be leaving for Bahrain soon and that he hopes to be on the air with an MP4B call very soon afterwards. He says that there seems to be considerably more s.s.b. activity from Ceylon than there was when he was there, 4S7's BR, LM, NE, PB, SW and WP all being reported currently using that mode. Soma, 4S7YL, and her husband 4S7WA are at present at Male in the Maldives Is. on a three month stay.

Following the previous discussion concerning communications with the VP8 amateurs, G3NMH has obtained the following details from Robin, VP8IU. It appears that they may send 100 words per month to next of kin free; these messages go by radio to Port Stanley where they are typed out onto an air letter form. They are then sent by sea mail to Montevideo and posted air mail to the UK. To get one of these off and receive a reply takes about 3 months. Ordinary letter telegrams take 2-3 days and cost £1 0s. 8d. for 22 words—they are radioed to Dorchester where they are posted to their destination in the UK. Greetings letter telegrams receive the same processing and cost 9s. 6d. for 11 words. VP8IU says that his base has had about four ships visiting during the last year, Steve, VP8JD on Signy Is. has had two, and VP8DJ at Halley Bay has only seen one! Again it is emphasized that there are means by which life and death messages can get through, but there is absolutely no contact possible such as a telephone call at Christmas.

Top Band News

Top Band county chasers will be interested to learn that Ed, G3WKJ, intends to operate GM3WKJ/P and /M from various sites in East, West and Northern Scotland during the first week in January. Operation will be around 1850-1890 kHz between 19.00 and 22.00, and the number of counties visited will depend on the state of the weather. Ed will keep a sked with G3WKV each evening.

As previously mentioned Herb, W0VXO, is hoping to make an expedition to Central America and the Caribbean area early in the new year. He may be reached at 515 Olive Street, Hannibal, Mo., USA. According to W1BB, 6W8CW's 160m activity resulted in contacts with six Gs and 20 Ws between 5 and 7 November. Stew also says that Chas, W2EQS, considers that 1875 to 1880 kHz would be a good

part of the band to use for Transatlantic contacts, and suggests that someone tries it!

Readers who are familiar with the fine signal from VO1FB will be interested to know that Joe is moving house and will be taking his three 45 ft. steel towers with him. However, at his new home he will have a dipole for the band, not a long wire as at his old location.

During his second visit to Easter Is. DL9KRA managed to contact a number of W stations. The first CE0 /W QSO was during his first trip when he contacted W2EQS on 20 September. It is believed that Jan will be making a number of other brief appearances on the band from exotic locations in the future.

A reminder that the CQ 160 WW DX Contest will be taking place over the weekend of 27/28 January (see Contest section).

GM3SVK, who has now left the Shetlands, reports that VE8ML in Northern Canada has been copying DHJ at RST559 on a rather poor aerial. From this it would appear that there is a possibility of a VE8/G QSO at some time in the future.

Awards

The Potomac Basin Award is given by the Catoctin Radio Club for working counties within the Potomax river basin. The requirements are as follows for stations outside the USA: Class A award, 12 counties in Virginia, five in Maryland, five in West Virginia and four in Pennsylvania. Class B 6, 2, 3, and 2 counties respectively, and Class C 4, 1, 1, and 1 counties. The charge is three IRCs and a certified list of QSLs is accepted. Applications should be sent to W4GYP, Route 1, Box 380, Leesburg, Va., 22075, USA. The eligible counties in each state are as follows: *Virginia*—Arlington, Augusta, Clarke, Fairfax, Fauquier, Frederick, Highland, King George, Loudoun, Northumberland, Page, Prince William, Rockingham, Shenandoah, Stafford, Warren and Westmoreland. *Maryland*—Alleghany, Carroll, Charles, Frederick, Garrett, Montgomery, Prince Georges, St. Mary's and Washington. *West Virginia*—Berkley, Grant, Hampshire, Hardy, Jefferson, Mineral, Morgan, and Pendleton. *Pennsylvania*—Adams, Bedford, Franklyn, Fulton and Somerset. Washington D.C. may be used once in place of any other county.

The Worked All Europe Award is one of the more difficult and worthwhile certificates available to licensed amateurs. It is issued in three classes for contacts since 1 June, 1946, and each European country on the WAE list counts for one point on each of the six bands 1.8 to 28 Mc/s. For a Class 3 award QSLs from 40 countries totalling 100 points are needed. The Class 2 award requires 150 points from 50 countries, and the Class 1 award requires 175 points and 55 countries. A country may only count four times for points, but if the same station is worked on five bands this counts for 5 points. Each WAE country may also be contacted on one v.h.f. band and counts for two points. The official WAE list consists of the European countries in the DXCC list plus LA (Bear Island), GM (Shetlands), UN (Karelia), and IT (Sicily). Applications must be made on the official forms issued by DARC which may be obtained from DARC DX Bureau, Igor Falster, 85 Nurnberg, Tillystrasse 44, Germany, in exchange for an IRC. Note that for this award all contacts must have been on one mode, either phone or c.w. and reports recorded must be Q3 S3 or RST 338 or better.



A regular contributor to MOTA, Hans, SM2BYD, finds plenty of DX on the band at his location in Northern Sweden.

A note from Frank, G16TK, draws our attention to the fact that applications for the W.A.GI Award should now be sent to Frank A. Robb, G16TK, 125 Downshire Road, Holywood, Co. Down, Northern Ireland. This certificate is obtained by producing evidence of at least two contacts with stations in each of the counties of Antrim, Armagh, Derry and Down and two in either Fermanagh or Tyrone. Stations outside Europe need only one QSL from each of the listed counties. Applications should consist of QSLs plus 5s. Contacts may be on any band or mode, but must have been since 1 January, 1959.

GM2HCZ reports that having applied for the Budapest Award (classes II and III) enclosing eight IRCs last May, he has just received a reply indicating that more IRCs are required. The letter said "I have received your application for BP Award II and III. You sent only two IRC for request. BP, A. II count eight IRC, and III same eight IRC. Please send the missing 14 IRC." Ed wonders whether any one else has experienced the same treatment?

Readers attention is drawn to the "5N2 Award" issued by the Nigerian Amateur Radio Society. This can be obtained by contacting five 5N2 stations provided that more than one band is represented. It is issued in three classes—Phone, C.W. and Mixed, and is also available to listeners. Applications should consist of a certified copy of the appropriate log entries (or list of the five QSLs in the case of SWLs) and five IRCs, and should be sent to the Awards Manager, NARS, PO Box 2873, Lagos, Nigeria. The certificate will then be forwarded by air mail. Only 5N2 contacts count (not ZD2) and in the case of contacts with stations who have held two calls (e.g. 5N2JKO/5N2AAF) both contacts may be counted.

DXCC News

A copy of an open letter from Don Miller, W9WNV, to the Directors of the ARRL has been received. Briefly this letter protests at the fact that at the date of its writing credit was not being given for QSLs submitted for VQ8CBB and VQ8CBR contacts. It says that since the new ARRL policy concerning expeditions came into force over 20 other operations have taken place and no cards from them have been rejected. All documents proving the validity of Don's operations since the new ruling came into force have been submitted to ARRL but he believes that in the case of the other

expeditions no documents have been sent in, or indeed requested. (It is now reported that credits *are* being given for the Rodrigues and St. Brandon contacts). Don points out that under certain circumstances (e.g., if any more deletions were to take place, or if his agreement with ARRL were broken) he said that he would take legal action against ARRL. His Attorney has now been instructed to go ahead with this action unless the last three deleted countries are reinstated (these would appear to be PY0, St. Peter and Paul Rocks, VQ9AA/C Chagos, and VK2ADY/0 Heard Is.) and an assurance given that no more deletions would take place from those already accepted or from future operations *unless* DXCC rules are violated. He is not prepared to submit any more documents to prove the validity of present or future operations until the 20 or more which ARRL have at present are returned to him and until some evidence is seen that the same procedures apply to all other DXpeditions.

QRP News

G6XN reports interesting contacts with W/VE on 21 and 28 Mc/s during the CQ Phone contest whilst operating his 2N3553 transmitter from Old Winchester Hill using dipoles 20 ft. above the ground. About 12 stations were contacted with 1 watt p.e.p. output, and reports of up to S9 were received! Using the quad at his home station VK2NN was worked on a number of occasions on both bands with a few hundred milliwatts output and G6XN was S6 in Australia. Les points out that his location during a contact with VK3IP which he effected during a spell of poor conditions favoured very low angle radiation. This supports the observations made in Technical Topics (November BULLETIN, page 736).

It would be extremely interesting to see just what can be done in the direction of very low power DX working in the spring when the h.f. bands are really open. Your scribe would be very grateful for reports of unusual low power contacts.

Contests

Results of the 1967 CQ Magazine 160m Contest have now been received. Conditions were, as expected, not as good as in the previous few years, but not as poor as might have been feared considering the state of sunspot activity. In all, stations in at least 32 countries were known to have taken part, and the highest score ever in the history of the contest was made by HI8XAL who scored 55,986 points. Scores of UK stations were as follows:

GM3IGW/A 24,310 points	G3FVA/A 5,269 points
G3KMI 12,478 "	G2DC 5,209 "
G5RP 11,611 "	G3JVJ 4,494 "
G6LD/A 10,912 "	G3PVA 3,330 "
G8NF 7,980 "	G3GHN 2,184 "
GM3KMR 6,710 "	G3TIF 1,125 "
GW3CW 6,097 "	GD3HQR 68 "
GM3OXX 5,786 "	GC3LFJ 5 "

Congratulations to all those who won certificates (those in heavy type) and especially to GM3IGW/A who managed to have 216 contacts with a total of 61 countries. The 1968 WW 160 DX Contest will take place between 00.00 27 January and 15.00 28 January. (Note that this is 3 hours longer than on previous occasions). Stations taking part exchange report and serial number of QSO (starting from 001). Contacts with stations in one's own country count 2 points, in other countries 5 points, and with W/VE/VO 10 points.

The points total is multiplied by the total number of countries plus US states and Canadian provinces worked to arrive at a final score. Certificates will be awarded to top stations in each country, state and province. Log sheets may be obtained from CQ 160 Contest, 14 Vanderventer Avenue, Port Washington, L.I., N.Y., U.S.A. 11050, and they should be sent to that address no later than 29 February.

The Arkansas QSO Party takes place between 22.00 6 January and 04.00 8 January. Each QSO with an Arkansas station counts 5 points, and final score is multiplied by the number of counties worked (maximum 75). Stations may be worked once on each band and mode. Frequencies to be watched are 3525, 7025, 14,025, 21,025, 28,025, 14,325, 21,425 and 28,650 kHz. Those scoring more than 100 points should send their logs to: Sam Housley, Route 4, Harrison, Ark., USA 72601, before 30 January. The Louisiana QSO Party runs from 18.00 27 January to 22.00 28 January. Rules as for the Arkansas affair. Frequencies 3600, 7075, 14,075, 14,300, 21,400, 28,100 and 28,700 kHz. Entries to be sent to Lafayette ARC, 308 Karen Drive, Lafayette, La., USA 70501, before 29 February. Please note that each QSO is worth 1 point only in this contest.

DXpeditions

At the time of writing no definite information was available about the future movements of Don Miller, W9WNV. He was much in evidence during the weekend of the CQ WW DX Contest (c.w. section) signing 5R8BA from Madagascar.

The proposed trip to Qatar by OD5BZ and MP4BEU which was to have taken place late in November has had to be postponed. It is possible that this may now take place in January.

Although strictly not a DXpedition the recent activity by PY0AQB has been causing a great deal of interest and speculation. Abilio was with a party constructing a lighthouse on Atol das Rocas which, according to the writer's atlas is situated slightly West of Fernando de Noronha in a position 3° 55' S. 33° 55' W. This seems to be less than 100 miles from Fernando de Noronha and more than 400 miles from St. Peter and Paul Rocks. Unless there is some difference in administration between the former and Atol das Rocas it is difficult to envisage PY0AQB counting as St. Peter and Paul Rocks for DXCC purposes.

DOTM in its latest news release mentions the fact that 9J2BK has returned to Zambia following his stay in South Africa, and is now active on 21 and 28 MHz s.s.b. Another item of interest concerns VP8IE (S. Georgia) who is now said to favour 14,187 kHz for his s.s.b. transmissions. The writer is confident that all those who have taken advantage of W2GKH's kind help through DOTM would like to join him in congratulating Stu on his election to Director of the Aerotron company. Stu's handling of his DX "charges" has always been a model of correctness and above reproach in every way and those interested in DX have a great deal to be thankful to Stu for.

According to the Florida DX Bulletin W4DQS says that there is a possibility of some activity from Malpelo Is. (HK0) by HK3RQ and others. No further information is available at present.

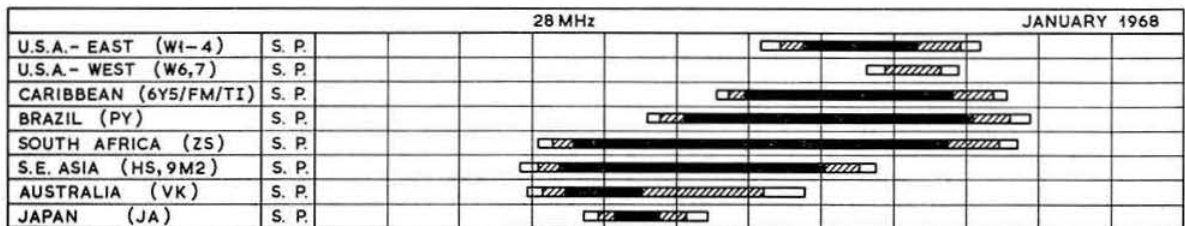
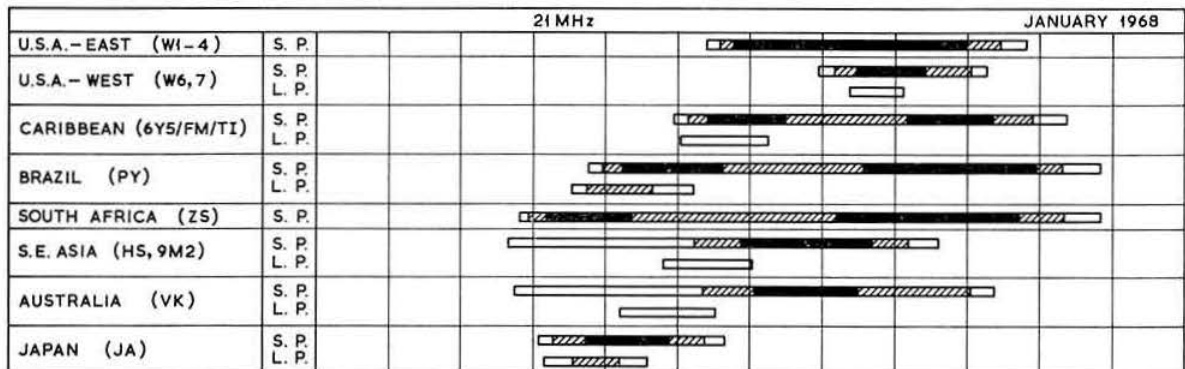
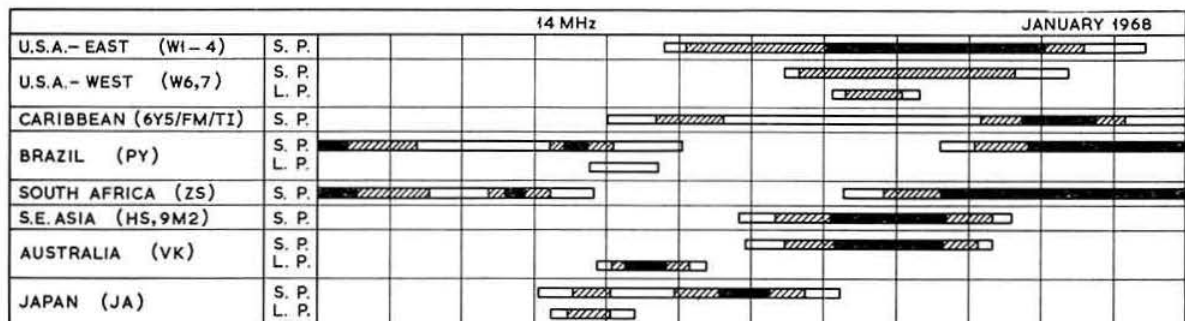
DX Briefs

It is reported that TA1AM will be leaving Turkey during January, TA2BK has been active on s.s.b. as well as on c.w.

Propagation Predictions

In January conditions will differ little from those of the previous month. Towards the end of the month the h.f. bands should remain open a little longer in the evenings. Otherwise the forecast given in the December issue will still hold good for all the bands mentioned.

The provisional sunspot number for November 1967 was 97.8 with the greatest solar activity occurring during the second half of the month with a daily number of 134 being recorded on 18 November. The predicted smoothed sunspot numbers for March, April and May 1968 are 108, 109 and 110 respectively.



TIME (G.M.T.)

OO 02 04 06 08 10 12 14 16 18 20 22 24

1-5 DAYS 6-20 DAYS

OPENINGS ON MORE THAN 20 DAYS IN THE MONTH

and together with TAIIV was very active during the CQ WW DX Contest.

VK0CR was scheduled to close down on 17 December, leaving Macquarie Is. without amateur representation. Another VK0 heard recently was VK0GP who is located at Wilkes Base, Antarctica.

An unconfirmed report says that Nauru will be activated in the near future. The island receives its independence in January 1968, and VK9DR and/or VK9RJ are tipped by some sources to be possible visitors. The change in political status may of course result in a change of prefix.

A station using the call-sign CE0PG and claiming to be

on the island of Navarino (55° S, 67° 30' W) has been contacted on 14 MHz. This island appears to be part of the group at the extreme southern end of Chile and lies just north of Cape Horn. Further information on this one is awaited with interest.

Those who contacted ZE1S during the CQ WW DX Contest will be interested to know that this was a special station set up by the Mashonaland Branch members of the Radio Society of Rhodesia in Ruwa Park. They were using a Viking Ranger and Vee Beam. The team included such well known calls as ZE1AE, ZE2's JD and KV, ZE3's JJ and JO, ZE4's JD and JS, and ZE5JJ.

1967 Countries Table

	1.8	3.5	7	14	21	28	Total
	MHz	MHz	MHz	MHz	MHz	MHz	MHz
GM3SVK	20	25	60	103	130	66	454
G3IAR	10	56	57	164	125	81	493
G8JM	1	—	12	196	136	104	449
G8DI	—	25	33	102	81	30	276
9VILK	1	5	22	98	62	46	234
G3KSH	3	22	48	53	47	39	212
7Q7LZ	—	—	7	91	80	49	227
G3PQF	3	27	44	38	26	58	196
G8VGC	1	19	27	50	72	70	239
SM2BYD	—	31	61	—	85	—	177
G3ING	7	13	21	32	26	26	125
G3TBC	4	10	20	25	34	3	96
G3VOK	14	36	6	38	1	7	102
G3OVJ	1	1	22	21	16	20	81
G3VWC	5	5	22	21	26	5	84
G3VJG	1	3	13	22	28	72	139
G3VJG	16	19	12	23	6	21	97
9J2BC	—	—	2	29	16	43	89
A4886	10	35	54	241	127	81	548
BRS25429	5	53	74	174	136	124	566
A4566	9	42	39	165	138	107	500
A3942	13	51	59	127	100	79	429
BRS28198	1	42	42	133	71	59	348
BRS27806	3	23	40	116	121	103	406
A5105	2	27	38	110	65	42	284
A5004	4	54	29	112	41	48	288
A5273	5	48	42	93	71	52	311
A4038	7	12	16	114	190	132	471
A5135	3	26	41	87	78	30	265
A5126	4	21	30	73	69	30	227
A4182	3	29	25	69	56	48	230
A4552/VK	—	1	2	80	10	2	96
A5153	2	17	12	57	31	8	127
A5610	7	17	14	52	1	7	98
A5459	1	4	9	54	36	4	103

This month's table is in the order of 7 plus 14 MHz totals.

QTH Corner

AP2AD	Ahmed Ebrahim, Sr. Telecomms. Engineer, SUI Northern Gas Pipe- lines, PO Box 94, Lyallpur, W. Pakistan.
AP5HQ	via W4RLN, W. E. Waldrup, 1942 Foxhall Road, McLean, Va., USA.
CR4BJ	PO Box 83, Sao Vicente, Cape Verde Is.
EL8D	via SM3BNV, Bengt Eurenus, Galoppstigen 2-F, Ostersund, Sweden.
FP8DK	via K7GHZ, D. E. Simonsen, 3213 "R" Street, Vancouver, Wash., USA.
HL9KI	William Baxter, Box 22, APO, San Francisco, Cal., USA 96259.
MP4BFJ	via K1SLG, Virginia Taylor, High Street, Upton, Mass., USA.
MP4QBW	via W4SPX, Paul Swartz, RFD 5-Box 131, Orlando, Fla., USA.
OX4AA	via K8REG, Vincent Varnas, 4329 Renwood Drive, Dayton 29, Ohio, USA.
PY6AQB	PO Box 1043, Recife, Brazil.
TJ1AG	Martial Prunier, PO Box 20, Bafoussam, Cameroon.
TJ1AI	Jean Grenier, BP 1129, Douala, Cameroon.
TJ1AJ	Gustave Bernard, BP 5370, Douala, Cameroon.
VP2MU	via YASME Foundation, PO Box 2025, Castro Valley, Calif. USA 94546.
VP2MU	via VE2YU, 267 Belle Riviere St., Ste. Rose de Laval, Quebec, Canada.
VQ9JW	via G3ONU (New address) D. A. Barry, 67 Harcourt Rd., Bushey, Wat- ford, Herts.
VQ9V	via VQ9HB, V. C. Harvey-Brain, Bel Eau, Mahe, Seychelles.
VR2CC	via VE6AKV, 7612 23rd Street S.E., Calgary, Alberta, Canada.
VS6DO	via W2RDD, J. Cronn, 419 Maple St., West Hempstead, NY, USA.
VU2MWP	via K9MRC, Harry Smith, RFD 1, Westpoint, Ind., USA.
XW8BJ	(Europe only) Bertrand Deshayes, 13 rue de Bellevue, Paris 19, France.
ZD7DI	PO Box 8, St. Helena, or via RSGB.
ZF1ES	PO Box 293, Grand Cayman, BWI.
ex-ZK1AR	via W4ZKI, PO Box 463, Miami, Fla., USA 33157.
ZK2AU	via WB6EKT, Eugene Field, 1672 Winton Way, Atwater, Calif., USA.
4W1KV	via HB9KV, Ernst Salvetti, Schermenweg 127, Ostermundigen, Be., Switzerland.
SH3KJ	via W7VRO, Dick Moen, 2935 Plymouth Drive, Bellingham, Wash., USA.
SV1KG	via YASME (see TY2KG).
	RSGB QSL Bureau, G2MI, Bromley, Kent.

SV0WFF reports three stations currently active from Crete—SV0WL, who is usually to be found on 14 or 21 MHz, SV0WN, who is usually on 21 MHz, and himself. SV0WFF operates on 14, 21 and 28 MHz with 2kW p.e.p. of s.s.b. There is also a fairly inactive club station on the island.

Tom Christian, VR6TC, was due back in Pitcairn on 22 November, following his trip to the US. He was expected

to resume his Monday evening skeds with W5OLG on 27 November. Tom has been a good signal in Europe during these sked periods, and anyone desiring a VR6 contact should listen around 21065 kHz at 20.00-21.00 on Monday evenings. W5OLG acts as a control station, and prior arrangement with him is absolutely essential. Blind calling on the frequency will not result in a contact!

Harvey Brain, VQ9HB, has been heard using the call-sign VQ9V, although operating from his home QTH. The precise significance of this special call is unknown, but it is rumoured that he is to make a trip to Farquhar Is. in the near future.

There are now three resident amateurs in Togo—5V4AP, 5V4EG, and 5V4EW. According to *DXpress* they are active around 14,150 kHz at 17.00 and again between 20.00 and 22.00. 5V4EG may be reached at Box 33, Atakpame, Togo. Iris and Lloyd Colvin met with considerable success during their stay in Togo and were heard using the 5V1KG call. From there they moved on to Dahomey (TY2KG), and were then scheduled to continue to Nigeria and then fly to Bangkok, Saigon, and San Francisco. They were hoping to get on the air from Vietnam with an XV5 call.

Band Reports

As mentioned in the opening paragraphs of this issue of *MOTA* there has been very little time since the last issue was written, and the number of reports has suffered accordingly! Many thanks are extended to the following who noticed the early deadline and took appropriate action: G2BOZ, G2LB, GW3AX, G3DO, G3FPK, G3HCT, G3HDA, G3OIT, GM3SVK, G3VJG, G3VOK, G4MJ, SM2BYD, A5459, A5610, A5643, and A5737.

Conditions on the whole have shown the deterioration expected to take place during the mid-winter period, this seemed to apply especially during the weekend of the CQ WW DX Contest, nearly all participants expressing disappointment with the state of the bands at that time. Your scribe finds it difficult to understand why this most interesting contest is held every year after the peak autumn conditions on the h.f. bands have been passed. A suitable analogy would be the holding of a 160m DX contest in mid-summer!

A number of interesting stations have been worked on 160m, amongst them being OE2JG, OF3NY, HB8NL, VO1FB (05.15), PZ1AH (05.15), KIPBW, W1BB/I, K3EKO, and W3MSK (all 04.00-05.30), ZC4RB (22.00 S5/6) and ZB2AP.

On 80m CN8AW (21.00), CR6NK (00.39), EL3C (22.45), F9VN/FC (23.08), OX3CJ (07.00), PJ3CC (07.58), TA2BK (00.39), TF3TP (22.00), UL7KAA (22.10), VS6DO (22.30), VEs and Ws (06.00, 22.00), ZB2's AP, BC (21.30), ZD8J (02.30), 4L3A (03.01), 5A2TR (00.45), 9H1AM (21.30) and 9M2NF (22.00) have caused a certain amount of QRM to be generated!

The 40m band has been in its usual state with a mixture of broadcast and amateur signals to be sifted for the very occasional DX call-sign. Amongst those worth reporting were CR6IS (19.50), CX8CZ (23.57), PJ3CC (04.20), PZ1CQ (04.10), TAI4V (01.03), TGOAA (01.35), VP2SM (20.45), VP6AO (21.00), VQ9JW (20.35), W7SFA (03.21), ZD8J (22.40), 3C8BB (06.10), and 5R8BA (23.38).

As usual 20m has been carrying the majority of the long distance signals, but has been fading out during the early evening on a number of occasions. CE0AE (09.58), DU1FH (08.20), FP8CT (11.00), HZ1AB (15.50), JX3XK (15.30),

KG6SA (07.45), KX6DB (09.58), MP4MBC (17.00), PY0AQB (18.40), TG0AA (11.42), TY2KG (06.54), UA0YD (Zone 23, 07.22), VQ9B (17.02), YJ8BW (07.35), ZD9BE (19.32), 3V8BZ (16.45), 5V1KG (18.17), 9X5SA (20.45), and 9Y4VT (19.45) provided some interest.

Some of the better DX on 15m was EA9AQ (16.15), ET3FMA (15.50), HB0AG (12.40), KR6CL (09.00), MP4BJF (On a.m. asking for QSLs via K1SLG, 08.07), TJ1QQ (07.30), TU2CC (07.37), VK9BS (10.38), VP2MU (17.40), VP8JB (19.08), VQ9JW (15.00), YJ8BW (10.04), ZE1S (15.42), ZL4BO (09.15), 5H3KJ (06.52), 6Y5JB (11.43), and 9L1GQ (09.05).

Finally, 10m produced CX8CZ (18.08), ET3FMA (09.50), FL8FP (10.45), KG6SB (10.40), OA4BF (12.20), PJ3CC (18.12), VK8UG (09.32), VP2SY (16.10), VU2JM (ex-G3OYY, 12.00), ZD7DI (12.00), ZE1S (08.50), ZS3LU (12.00), ZS9L (15.55), 3V8BZ (14.43), 4J7B (08.30), 5R8BA (14.45), 9I3DT (08.50) and 9N1MM.

Gratitude is expressed to all contributors, and special thanks are extended to the following: The Florida DX Report (W4BRB), CQ DX (ARI), On the Air (ON4AD), DX'press (PA0FX), NARS News (5N2AAF), the L.I.DX.A. Bulletin (WB2EPG), The DX'er (W6PHF), DX News Sheet (Geoff Watts), the Ex-G Radio Club Bulletin (W3HQO), QUAX (SM4DXL), the DX'ers Magazine (W4PBD), the West Gulf DX Bulletin (WA5LES), QTC Newsletter (RSEA),



Robert Perry Junior, grandson of Stew, W1BB, is already taking an interest in Top Band. He will have a very long way to go to equal his grandfather's performances on 160m. (W1BB Print)

and QUA (ZE1BW). Please send all items for the February issue to reach G3FKM no later than 17 January, for the March issue by 14 February, and for the April issue by 13 March.

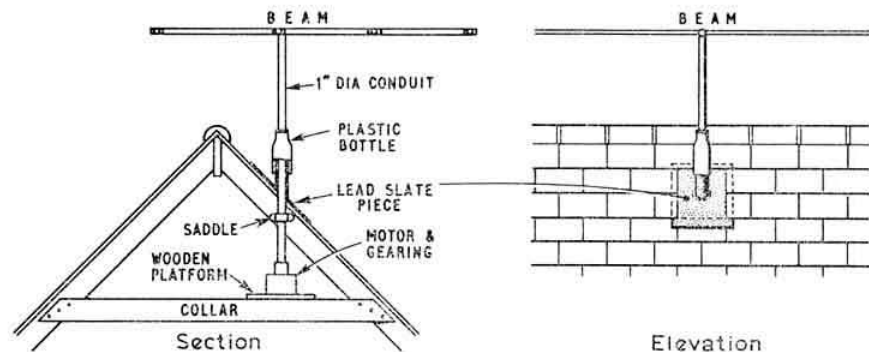
A Roof-Top Beam Rotator

A SCOTTISH member, GM3MXN, has sent us details of an installation for a single 4m four element beam which he has found to be particularly reliable during the two and a half years it has been sitting on his roof. The system is quite clear from the drawings shown below, but a few words of explanation have been provided.

One of the over-riding features is the fact that the whole rotating mechanism can be mounted, quite simply, in the loft of a house, well away from exposure to the inclement British weather. GM3MXN mounted his motor horizontally on a small timber platform, and incorporated a right angle drive, containing a thrust bearing, to couple the motor to the aerial mast. The mast, a length of 1 in. diam. conduit tubing, is kept vertical by a suitable bush/clamp fixed to a roof spar, and projects through the roof an appropriate distance to clear any obstructions when the aerial is rotated.

At the point where the mast protrudes through the roof, a tile was removed and replaced with a special lead slate to which was attached a 9 in. length of lead tubing. This assembly was in fact, produced by a local plumber who was simply instructed with a set of dimensions and angles. When in position, the gap between the two tubes was weatherproofed with a polythene bottle, modified by sawing off the bottom, thus acting as an effective cover. The "neck" of the bottle, trimmed or reamed as necessary, is secured to the 1 in. conduit with a Jubilee clip.

Given a strong roof, and a reasonable aerial elevation, this assembly can withstand strong winds, and proves less unsightly (to non-amateurs, of course) than a grounded scaffolding pole reaching up about 30 ft., even if anchored to a house wall. The method of coupling to a motorized drive is straightforward, and above all, the costs can be low.



FOUR METRES AND DOWN

By JACK HUM, G5UM*

A Grand Opening to Close With

WITH Christmas slicing a sizeable segment from this journal's production cycle, the present offering of "Four Metres and Down" must of necessity be proofed out to the printers rather earlier than is usual; which means that some of the news generated by That Opening at the end of November may not reach the typewriter. Even so, plenty has.

What alerted v.h.f. men to the imminence of The Opening of the Year was the steady rise in barometric pressure on the evening of Thursday, 16 November, confirmed by what the television and newspaper weather charts displayed in the shape of an enormous oval shaped "high" starting somewhere along the Welsh Marches and extending eastwards out into the North Sea. Typical November weather accompanied the phenomenon; no wind, almost no visibility (in some areas at any rate), and night temperatures changing freakishly within 24 hours, from frost to mid-forties.

The opening lasted for exactly a week, and the laryngitis rate rose sharply at the end of it. Either that, or sheer surfeit, caused many to go missing after four or five days of it. They weren't away for long; "... it's like a magnet" one of them was heard to say as he finished a 200 mile contact on 70 cm.

Although the isobar contours of the big "high" changed little during The Week of the Opening, marked directivity of signal paths was evident. There was a clearly defined "Scandinavian period," followed by a "West Germany period" and a subsequent swing of the axis southward to France, when Bordeaux could be worked on 70cm (QRB 500 miles plus) yet the 432MHz Dortmund beacon, DJ2LF (curious call-sign!), declined from RST588 into nothingness.

Counting our Continental friends, there must have been a thousand (or two?) operators in action during The Week, and to report what they did in detail would be both repetitious and—by now—untopical seeing that it all happened a month and a half ago. Yet we could not help being struck by the coincidence that brought by the same mail-delivery a couple of letters which seemed effectively to sum up the propagation situation at that time, and also to show the appeal of v.h.f./u.h.f. to members of vastly different age groups.

One of them was from Colin Baker of Brookmans Park, aged 14 and A5032: "In 8½ hours' listening on 18 November I logged 61 Continental stations, of which 23 were PA Zeroes, 20 DJ/DL, 16 ON4 and ON5 and two Fs."

The other was from Gerald Jeapes of Cambridge, who was active in Amateur Radio before Colin's father was born (and Colin's father is G8AIF, and his brother G8ANS). We have never heard G2XV claim to have spanned the era "from spark to 70cm," but if he did it would be true. Now retired, he pursues u.h.f. with the fervour of—well, A5032! And the

Grand Opening of November enabled him to achieve his ambition to work 50 counties on the 432MHz band. It was GW2HIY of Anglesey who helped to hoist G2XV to the half-hundred. Says Gerald: "It has been a tough grind but I was determined to reach 50 before I got 'too old'..."

Miniwatt Section

Tempting though it must have been to many operators during the extended tropo opening to pile on the power in order to break through the wall of QRM, many enjoyed the special pleasure of seeing what could be worked with really low inputs. There is nothing like a big opening to help evaluate a truly QRP rig.

From Northampton, G3PBV using his all-transistor transmitter (one watt input to a 2N3866) worked two PA0 and an F1 on 145MHz. A useful comparison check was provided by G3USB of Cambridge who reported the miniwatt signal as 19dB down on the 100 watt transmitter customarily used at G3PBV.

Farther south, G8ACE at his hemmed-in site at Hatfield found that 1.2 watts to the final transistor stage of his pocket sized transmitter would cover 100 miles with no difficulties, tropo-assisted. His near neighbour at Brookmans Park, G8ANS, had an even smaller rig, power wise, on 432MHz; from his 280 ft. location he gave G6GN of Bristol, 105 miles away, a readable signal from a transistor transmitter giving one milliwatt out, feeding an 18-element Parabeam. Earlier tests from the G8ANS place of work in central London had shown that from the summit of the tower block of City University this micropower sender was consistently capable of working G8AWO 20 miles away at Welwyn Garden City. To persuade its signal over a 100 mile tropo path was, thought Trevor, quite as satisfying as working five countries and 15 counties on 70cm with "the big rig" of 26 watts input.

All the above were with solid-state and n.b.f.m. What can be done with valves and a.m. in the low power field was demonstrated by G8AUF with his QVQ02-6 midget and its quarter-watt out. It produced a report of S9-plus-10 from G3FAN some 160 miles to the south on the Isle of Wight. Well, lots of other people were getting this sort of report during the extended tropo conditions then prevailing, the point being that G8AUF is sited deep in a Derbyshire valley where u.h.f. ordinarily should not get out at all, and indeed doesn't; G8AUF considers himself fortunate in working outside his own county in normal circumstances. To work I.O.W. was a surprise, to say the least.

And so to that positively QRO rig at GW8AHI in Prestatyn—all 4 watts of it! And don't think because he has a GW prefix that he enjoys any advantage from the Welsh terrain: few GW men do, and for most of them the Cambrians represent a topographical impedance that *can't* be matched.

* Houghton-on-the-Hill, Leicester, LE79JJ. Send reports for the February issue by 15 January, and for the March issue by 10 February.

His low power input makes all the more creditable the regular contact which Bill at GW8AHI manages to sustain with G8AXC of Scarborough. Using two 14-element Yagis at almost zero feet a.s.l., he, of course, found the tropo a help with this coast to coast schedule, but even without it the 4-watter succeeds in covering the 135 miles path, Pennines and all. The signal differential tropo to non-tropo is S9 to S2.

Tapes and Traces

It was not only TV weather maps and the rise displayed by the domestic barometer that warned members of an imminent opening during November: the RSGB beacons told the tale as well. They serve as electronic barometers to distant listeners.

Observation of beacon signal behaviour some hundreds of miles away can throw up a wealth of data about v.h.f. propagation, though it is made a little difficult when the notoriously unreliable human ear attempts to record variations around S9 plus. So it is useful to be able to put a machine into service to do the job for you. Many members seized the opportunity of the November opening to tape-record much of what they heard, especially such rarities (to us) as DL0PR on "Two" and DJ2LF on 70cm, two continental beacons that certainly indicated to us across the water to the westward how conditions were developing.

Something of decided scientific value was produced during the opening by G2HCJ of Rainhill near Liverpool. Noting that "the signal from GB3VHF was as strong as I have ever heard it," he proceeded to take a pen recording of it from midnight on 21/22 November through to 19.00 GMT on 24 November. From the resultant 6 ft. strip of barograph paper we have endeavoured to produce a condensed version as shown in the sketch on this page, the verticals grossly exaggerated, inevitably. The G2HCJ original will go to the Scientific Studies Committee.

Down in Sussex, Ron Ham, BRS15744, once again compared his weather barograph with the emergence of 2m and 70cm DX. "Once again, there was a steady build up of pressure, and the bands opened at the drop off point."

Ron has a big project in train for satellite and solar observation where once again recording facilities are going to be important. Four 6-element Yagis cut to 137 MHz backed by a 10 by 6 ft. reflector made from $\frac{1}{2}$ -in. mesh will be put in the path of the sun to supply information to three receivers

on 137 MHz, 27 MHz and 20 kHz, their outputs feeding a Triplex pen recorder.

Ron puts something else on record: his thanks to J-Beams for the help they have given him with the aerial design problems, and to Evershed and Vignoles for their willingness in supplying charts, ink and spare pens for surplus pen recorders. "Without the sympathy of such firms these private ventures would be impossible," he says.

* * *

Back to beacons and their value in denoting conditions, here is something to ponder: at the start of the opening on the Saturday afternoon, F9FT was receiving GB3VHF at RS59 plus (off the back of its beam of course). On the following Thursday at lunch time, when everybody agrees the tropo was in decline, he logged GB3GW at RS55 (it beams at right angles to him), and GB3GI at RS33 along a path distance of 1010 km, and the first known Continental reception of the Northern Ireland beacon. *At the same time GB3VHF had dropped to RS54.*

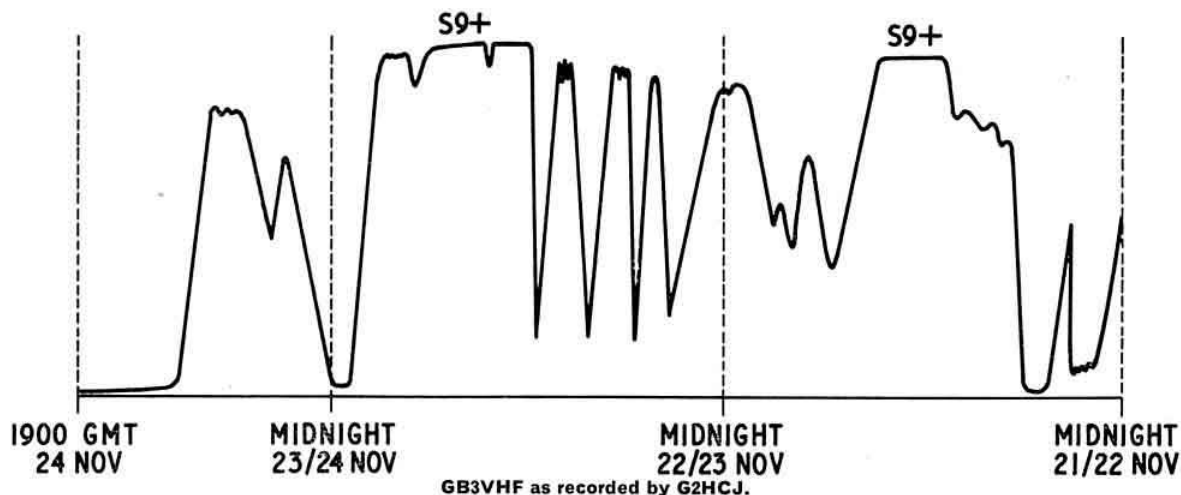
The receiver at F9FT (he is at Reims) has an FET 2N3829 into a TIS34 feeding a TIS34 mixer, and eight 8-element Yagis stacked at a height of no less than 120 ft. A separate receiving set-up disposes of a 27-element long Yagi again at 120 ft., with an AF239 masthead amplifier.

During the opening F9FT enjoyed such success as to deserve a section to himself. So over now to—

Report from Reims

First intimations to F9FT that "Two" was about to break on 18 November were the sound of "John Fox" working East Germany and G3UUT of York pounding through at RST589. So many contacts with the UK followed that Marc in his report to "Four Metres and Down" lists only those beyond 500 km range, and there were 25 of them. Best contacts were with G15AJ and G13NSM, both on c.w. and both in excess of 900km, leaving some mystification as to why no GMs were heard: "I think it could have been possible to make a QSO with Scotland. Conditions seemed to be quite suitable," writes F9FT.

Fully versatile, F9FT runs c.w. or a.m. (70 watts) or s.s.b. (150 watts) as required. His versatility extends to 70cm, and here he was rewarded as on "Two" with plenty of contacts well into England. The 9 watter at G8AUE up in





Rather belated, but these are the cards confirming contacts with G3MCS which won him the first RSGB 1296 Mc/s Four Metres and Down Award.

the Derbyshire hills gave him an S9 plus 10dB signal in Reims, at 590 km, the best worked on 432 MHz.

On 70cm the power level at F9FT is 40 watts r.f. out of a carefully under-run 4X150A. The aerial: 120 elements of stacked Yagis at 125 ft.

One disappointment: it was hoped to establish the first F-to-GW contact on 70cm, and GW8ASA was specially looked for with this in mind. Next opening, perhaps?

In case members may wish to correspond with F9FT with a view to setting up links on 2m or 70cm, we give his QTH, which is: 134 Boulevard Dauphinot, 51 Reims. His name: Marc Tonna.

Rest of the Tropo News

To many in the UK, F9FT "sounds like a beacon." To many on the Continent "John Fox" sounds the same: to G2JF a large arc of nearer Europe is "local" to him from his famous site 15 miles back from the Channel. November's extended tropo pushed this arc still farther out—to Warsaw, no less, where SP5AD was worked for his best contact on "Two" in the period 17-22 November inclusive. This period produced a total of 248 contacts in 14 countries of which 145 represented stations Jim had not worked before, to bring his total of different stations worked on "Two" to the staggering number of 3583. This is no meaningless statistic: it gives a measure of the v.h.f. occupancy in western and central Europe.

Sad though it is that Continentals cannot be worked on "Four," the band has its own special attraction to some hundreds of operators; and it also has its own "beacon like" stations of which G3OHH atop Mow Cop can be heard by most of the people most of the time. From one CQ put out during the tropo week Roger worked a chain of sixteen stations on a southerly beam heading, some of them using indoor dipoles and heard by him for the first time. He used the opportunity to put over a little propaganda in favour of using better aerials!

Another top-notch on "Four" is G3VPK of Chelmsford, Willie McLintock, a native of Co. Down with a special interest in working G1. As the tropo situation developed and large numbers of Midlands and Northern England stations were worked, the breakthrough to G1 could not be long delayed, and surely enough on "tropo Sunday" two were worked and two more heard.

Just as on "Two" and 70cm, the following Wednesday produced top propagation, in conformity with the falling barometric pressure phenomenon, and G13HCG and G13TLT were worked at around the S7 level, but G13HNM and GM2FNF on the Isle of Arran were gotaways.

Willie confirms the importance of having the c.w. as well as the phone facility available. Many of his 300-mile-plus contacts would not have been achieved without a Morse key in the house.

It is worth adding that G3VPK, always such a prominent signal on "Four," uses only 10 watts input and a 4-element aerial at 20 ft.

"I Want to Start on 'Two': How Do I Go About it?"

Stan Henton, G5VU, writes:

"I had the opportunity to meet G6FI at the RSGB Exhibition (I met him there last year also). He was telling me that, since he'd retired, he had 'gone v.h.f.' and was getting much fun out of it.

"Having recently retired myself, I have been thinking about having a go on 2m—just to keep me out of mischief! However, I live in a very low lying part of Nottingham and I've always assumed that it would be hopeless from the v.h.f. point of view. Yet having taken delivery of a G3JXX converter I am quite surprised at what I have received so far. Using only a dipole in the shack (the small spare bedroom) I have pulled in East and West Midlands stations in some numbers as well as G3MED on sideband down in Surrey. The beacon GB3VHF is there whenever I tune to its frequency on the Eddystone EA12 but strength varies from barely audible to a good S5 to S6.

"All this suggest that 2m would be well worthwhile at this QTH, and I am now in a position to ask a few questions:

"First of all, the aerial, probably in the roof space in the first instance. Slot or Yagi, and of what type?

"Next, the transmitter: the transverter seems to be fashionable, though I don't feel inclined to find £100 or more for a commercial job, and to build one would take a very long time. So I'm looking for something simpler and cheaper, as a first step. I am attracted to a TW2, but is ten watts sufficient?

"I am anxious to produce a little more local QRM on the 145 MHz band and would be most interested to know what readers of 'Four Metres and Down' would recommend."

* * *

Everybody who reads this page must at some time or another have asked himself the same questions which G5VU

now puts in the above letter—those very basic questions which, positively answered, can be the means of opening up an entirely new world to members who have not as yet essayed the “very highs.”

What answers, then, would you give to G5VU if he put these questions to you personally? Let “Four Metres and Down” have them, for there must be hundreds of members who require no more than a few words of advice from the converted to become themselves convinced.

Exotica

Spain has been worked occasionally on 2m from the UK but is still a rare country to most. Five EA stations along the north coast are regularly operative between 144.01 and 144.44 MHz and would be worth watching for given a good southerly lift to the band.

Far more remote is Algeria; yet several 7X stations operate “Two.” But they rate contacts with the south of France as good DX, requiring favourable conditions. So what hopes have we in the UK? Yet you never know. . . .

In Poland SP2DX has received special permission to use 50-54 MHz, valid to the end of 1968. Transatlantic contacts might be a possibility (the Americans have this band), and were indeed made in great numbers when we had it back in the high sunspot period of the late ‘Forties.

(The above extracted from the G2AIW IARU V.H.F. Newsletter).

OSCAR—and Envelopes

Such is the interest in Orbital Satellites Carrying Amateur Radio (in short, *OSCAR*) that Bill Browning, G2AOX, the UK *OSCAR* Co-ordinator, has already been asked to send out something like 160 sets of the advance information about them. To be strictly accurate, he has been asked for rather more than 160, but only the 160 will get it: the rest failed to send him stamped addressed envelopes, so their applications are being filed *pro tem*. “Those who have written without an s.a.e. will get their copy of the information when they send me one” says Bill.

An idea of the accumulating interest in the project (and of the admin load on G2AOX) may be gauged from the fact that he is getting on average two requests a day for *OSCAR*-info.

As for the two imminent *OSCAR* packages, latest news just before Christmas when this page went to press was that *Australis* is checked out ready to fire, though its place in the queue of hardware awaiting space-rocket space means that it may not get into orbit until February or March.

With *EURO-OSCAR* the technical troubles which cropped up have, G2AOX believes, now been resolved, and the device could well be on its way to the Californian blast-off site by the time these words appear.

* * *

As will be known, the Australian-built *WRESAT* satellite (intended for upper atmosphere investigations and nothing to do with the amateur-band *Australis*) went spacewards about six weeks ago. It should have transmitted on 136.35 MHz for the following ten days. Did anyone manage to track it?

Contest News

Almost upon us—it will be played off next Monday—is the second 2m sideband contest, a quickly-organized,

V.H.F./U.H.F. BEACON STATIONS

Call-sign	Location	Nominal Frequency	Emis- sion	Aerial Direction
GB3ANG	Craigowl Hill, Dundee*	145-985 MHz	A1	
GB3CTC	Redruth, Cornwall*	144-10 MHz	A1	North-East
GB3GI	Strabane, N.I.	145-990 MHz	A1	N/SE
GB3GW	Swansea	144-250 MHz	A1	E.N.E.
GB3GM	Thurso*	145-995 MHz	A1	S
GB3GM	Thurso*	70-305 MHz	A1	N/S
GB3GM	Thurso*	29-005 MHz	A1	N/S
GB3GEC	W.London*	434-00 MHz		North
GB3VHF	Wrotham, Kent	144-50 MHz	F1	North-West

* Not operational.

RSGB V.H.F. BEACON STATION GB3VHF

The frequency of the Society's v.h.f. beacon transmitter at Wrotham, Kent, when measured by the BBC Frequency Checking Station, was as follows (nominal frequency 144.50 Mc/s):

Date	Time	Error
30 November ...	10.45 GMT	140 Hz high
6 December ...	10.24 GMT	90 Hz high
13 December ...	12.08 GMT	138 Hz high
19 December ...	16.25 GMT	200 Hz high

slightly modified version of the highly popular first-ever of last August, won by G3BA. The small number of entries belied the level of activity: almost fifty s.s.b. men were on at the time. Rules for this month's are on another page.

This contest has the special value of demonstrating, from several sites well distributed over the country, something of the long-path capability of s.s.b. at v.h.f. There is a school of thought which holds that the only *raison d'être* for side-band at v.h.f. is its long-path capability, and that its use for local and medium distance contacts is both anti-social and incapable of realising the good audio quality characteristic of a.m. on the very highs. This wouldn't worry most side-band operators; few cannot provide a.m. or c.w. at the turn of a switch. Anyway, it's a debating point.

* * *

Later in the month there will be a further opportunity to test the carrying power of “Two” when the annual telegraphy contest comes round (Sunday, 28 January). Experience during the telegraphy Cumulatives showed that you *must* have facilities to operate in the c.w. segment of 144.0 to 144.1 MHz if you are to do any good. If you haven't yet got a crystal for it (assuming you are not by now v.f.o.) you may be able to persuade one of this journal's advertisers to supply you with one in time for 28 January. Special-order frequencies can be had at low cost these days—but as always, avoid 144.00 and 144.09 MHz (see licence).

Further to c.w. operation, there was a very good turnout for the 4m telegraphy event at the beginning of last month, even though the extended tropo conditions, which might have been expected to enhance occupancy, had long since evaporated. It was borne in on us that 4m band-planned itself during this event: a preponderance of operators occupied the bottom 100 kHz.

Earlier, the extended tropo *did* influence the 2m leg of the Cumulative Contest on 18 November. The ninety minutes of what was probably the heaviest occupancy ever experienced in the bottom 100 kHz of the band provided a splendid conclusion to the first half of this Winter's series.

Of the Cumulatives in general, 70cm as well as “Two,” all who participated will surely agree with G2XV when he says: “I must register my appreciation of the Cumulative.

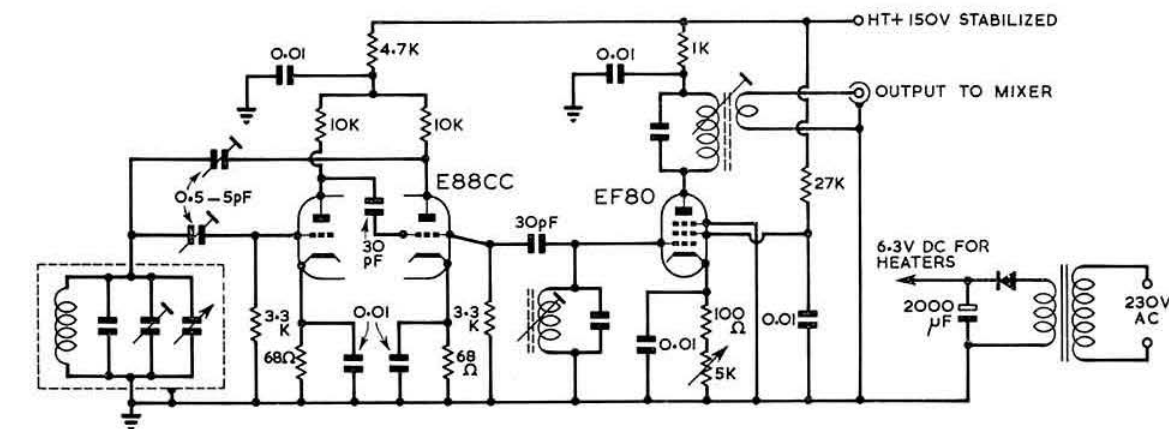


Fig. 1. The v.f.o. used in the mixer-exciter at G8AEX. A d.c. supply for the v.f.o. heaters is furnished by means of the rectifier-and-capacitor circuit shown inset. Output can be taken from the second anode of the E88CC if preferred.

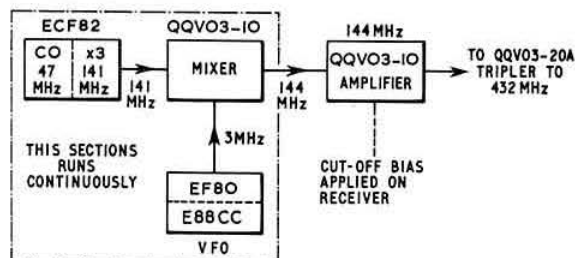


Fig. 2. Block diagram to show how a Franklin v.f.o. and a crystal chain can provide outputs to be mixed in a QQV03-10 to give a 144 MHz product. See accompanying note by G8AEX.

Contests. I think they are a fine idea, and give the home station man a chance. . . .

Ready for the second leg of the 1967-68 Cumulatives? Rules are in this issue.

Finally, V.H.F. National Field Day for 1967: statisticians could delve a wealth of information from the detailed tables given on pages 810 to 812 last month, a task of some magnitude for the V.H.F. Contests Committee—and we hope they weren't denied too many tropocontacts through their devotion to duty. To compare '67 with '66 is to observe development all round: 16 entries on 23cm, two more than in 1966, fifty-one on 70cm, which was 14 more than in 1966, while "Two" at fifty-five shows an increase of five. On 4m there were 50 entries both years. And of course 1967 was significant for the first V.H.F. NFD activity on 13cm.

Tech Corner

From G8AEX (Mike Pittam of Wolverton, Bucks):

During the big opening on 70cm in November several people showed an interest in the v.f.o. exciter used at G8AEX and remarked on its stability. Details are given below.

The heart of the exciter is a Franklin oscillator with a buffer amplifier stage as shown in Fig. 1. Over the years a goodly number of v.f.o.s have been built for various purposes and none has been found better than the Franklin. Its output, which is of course very low, is mixed in a QQV03-10 with the output from a crystal oscillator chain as shown in the block diagram at Fig. 2. The sum frequency emerges as 144 MHz at a level sufficient to drive another QQV03-10 as a buffer amplifier.

Choice of the two input frequencies to feed to the mixer is at the discretion of the constructor. A suggested combination is 3 MHz from the Franklin and 141 MHz from the crystal chain as shown in Fig. 2. At higher frequencies the Franklin output tends to fall off, though some constructors may find this acceptable, so long as the mixing efficiency of the QQV03-10 is not impaired.

To maintain a good waveform and keep the harmonic content low quite small values of gridleak are essential. Several published circuits showing values of about one megohm have, I think, been copied from pre-war battery valve designs and I imagine never tested.

The 0.5 to 5pF coupling capacitors are miniature air spaced trimmers and are mounted in a screening box with the inductor, main tuning capacitor and its trimmer. The coil is wound on a ceramic former and the tuning capacitor is of the double bearing type.

The whole unit is built on double-sided printed circuit board. There is a close fitting screen across the EF80 amplifier.

Cut-off bias is applied to the QQV03-10 amplifier on "receive," but to enable frequency checks to be made a net switch is included in the bias line to allow this valve to draw 5mA of anode current and to provide an S7 harmonic on 70 cm.

In a Mark 2 version of this mixer-v.f.o. it is hoped to mix to 70cm direct, though an additional stagger-tuned amplifier will be necessary.

From G6FI (Fred Ingleton of Staines, Middlesex):

Since the 2m transistor converter called the "Quick-starter" appeared in the RSGB BULLETIN for April, 1966, I have built two versions in experimental lashup form and

derived a lot of interest from the behaviour of transistors at v.h.f. while doing so.

It might be worth putting on record that the converter will perform quite well with only three transistors instead of the four originally specified, thus permitting a further reduction in size. I removed the second multiplier stage and ended up with the circuit shown at Fig. 3, just a crystal oscillator times four from a 35 MHz crystal putting 140 MHz straight into the mixer as shown. The output from the AF186 r.f. stage goes to the mixer emitter. Because it brought in a certain amount of i.f. breakthrough I by-passed the mixer emitter resistor—though care must clearly be taken in doing this not to throw away all of what the r.f. stage is providing!

Skeds Wanted

By G8ANS with any 70cm operators interested to help in tests to evaluate minipower u.h.f. transmitters. Send details of preferred days and times to Trevor Baker, 12 Westland Drive, Brookmans Park, Herts.

By G3VPK with any 4m stations at a range of 250/300 miles from Essex. Write Willie McLintock, Longwood Chase, Little Baddow, Chelmsford.

Skeds Operative

By G8ARM, South London, 433.08 MHz, with G6FK, Wolverhampton, 433.15 MHz, at 20.50 GMT, and with G8AUE, Derbyshire, 433.15 MHz, at 21.30 GMT every Monday night.

By G8AUE, Derbyshire, with G8AWO, Welwyn Garden City, at 20.00 GMT every Monday night.

By G3VPK, Chelmsford, 70.16 MHz, with G13HNM, Bangor, Co. Down, 70.15 MHz, on telegraphy every Saturday at 21.00 GMT.

Xtal Xchange

G3IDG, F. Allan Herridge, 96 George Street, Basingstoke, Hants., offers 8025 (144.25) and 8050 (144.9) both FT243, and wants anything between 8000-8005.55 kHz (FT243 or 10X).

Here and There

Rare Radnor will be easier to work now that GW3LJP has a new QTH 250 ft. higher than the old one half a mile away. The aerials are at 950 ft. a.s.l. Address is Rock House, Cross Gates, Radnor.

"Have ordered a commercial s.s.b. rig to get going on the 'Donald Duck racket' on the DX bands, but rest assured, I shall not forsake the v.h.f./u.h.f. bands, where I hope to maintain the pleasant relationships with the many friends made over the years"—G2XV, now retired.

"If c.w. activity on 'Four' doesn't increase I shall soon be forced to get a modulator!"—G5NU.

Did anyone hear the Malta beacon 9H1MB during the Ursids meteor shower 20-23 December or the Geminids a week before? This *might* have been an opportunity to break down the UK-to-Malta path on "Four."

New Belgian V.H.F. Manager is ON4ZN of Antwerp. He says: "I hope to serve our community as good as ON4TQ did" ... "Tommy Queen" was Belgium's V.H.F. Manager for six years.

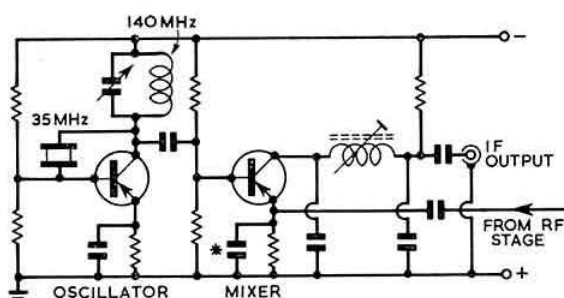


Fig. 3. How G6FI reduced the "Quickstarter" 2m converter to a three transistor configuration.

"There is no doubt that the issue over the past year or so of the F1-two-letter prefixes together with the DK1 and 2, and the DC6's, has done for 2m what the G8-three-letter have done for 70cm"—G2JF.

"... many, many grumbles about interference to the sacred monster from Saturday 18 November to Thursday the 23rd. One nearby radio dealer was being driven mad by complaints about the QRM on the TV"—BRS15744.

"... starting work in Exeter. We have managed to get the QTH we were after in the village of Hennock on the edge of Dartmoor about 600 ft. a.s.l., and looks quite a good v.h.f. QTH!"—G3PBV, late of Northampton.

"... typographical error in Tech Corner for December re preferred frequencies for wideband equipment for 13 cm ... should read 'Using a 36 MHz i.f. strip, which is standard TV practice, a broad band receiver can be constructed with a L/O on 2340 MHz, the second channel of which is on 2304 MHz, that is etc. ...'—G3RPE.

LATE NEWS: from Don Hayter, G3JHM, some items for the proposed "Ratifications" panel. Details next time.

From A. Morgan, Secretary of the Swansea University College Radio Society which runs the GB3GW 2m beacon:

"The long awaited event has at last happened ... the first report from France! Enclosed is photocopy of QSL from F9FT in Reims. Previous longest reported path was to G3DAH in Herne Bay who gave us RST 429 on 4 May last. We have, however, had very few reports and would welcome more to give a better idea of the service area.

Can You Help?

● The Cheltenham Amateur Radio Society, St. Mark's and Hesters Way, Community Association, Brooklyn Road, Cheltenham, Glos., which is trying to obtain a copy of the circuit or handbook for the BC348 receiver?

● M. F. Docker, G3OOW, 60 Lyndon Road, Rubery, Worcestershire, who requires information on the DF-1 aircraft radio DF equipment, and also on radio receiver type CRV46123?

See What You've Got For Your Money

BY SYLVIA MARGOLIS,

RSGB PUBLIC RELATIONS OFFICER

NOT only because you elected the Council and the Council appointed me, are you, the members, entitled to a direct report on the progress of your Public Relations Programme. To the surprise and gratification of everybody involved, the members themselves have taken an active part in the scheme and ensured its success. They send in press cuttings and describe local efforts to project the image of amateur radio.

For example, G3NKE, Bill Locke, writes regularly to report on how the Cornish Radio Amateur Club handles public relations. He is on the RSGB Speakers' Panel and speaks often to non-radio audiences in his area. The Cornish Club has some original ideas. They contacted the local Ministry of Labour Youth Employment Officers, who visit students leaving school. This arouses interest in electronics as a career and in Amateur Radio as a hobby which will help that career. These are splendid RSGB members who don't grumble about what is being done wrong in London and don't whine about how little London is doing for them, but get down to the job of conducting Amateur Radio with enterprise and verve in their own district.

G8ASO, Brian Jones, sent a sheaf of newspaper reports about Amateur Radio activity by the Worcester Amateur Radio Club, all carefully annotated and of inestimable value to the Society.

On our Speakers' Panel we have 22 volunteers, covering most of the country. We need representation, still, in the Durham and Dorset areas and no names at all have been offered from Wales! But the more speakers we have in all districts, the easier it will be, so offers of help are still needed. We circulated a Brief for the guidance of speakers and most of them liked it. G3DTB, Rex Sawyer, didn't like it at all, and said so, but then he is a most accomplished and experienced speaker on Amateur Radio and can be relied on to deliver goods of a high standard whenever he represents RSGB to the public. I must emphasize that the Brief contains only suggestions to guide speakers.

We circulated nation-wide organizations about the Speakers' Panel, including Rotary Clubs, Round Tables and youth clubs. The National Association of Youth Clubs publicised the information in their Newsletters, with a circulation of 250,000 and several enquiries have resulted.

We are to be honoured on 3 January, 1968, when I shall be Guest Speaker at a meeting of the Rotary Club of London, at the Café Royal. The occasion is particularly rewarding, because the New Year meeting of this distinguished body includes wives and families of the members. The audience should exceed 200. I hope to be accompanied on this significant mission by one of the officers of the society.

Twice in 1967 the Society was represented on BBC. On 10 August a 12-minute item in "Woman's Hour" gave an outstanding picture of Amateur Radio, in the way we like to hear it imaged. I must thank the radio amateurs who

collaborated in this project, particularly Angus McKenzie, G3OSS, Nell Corry, G2YL, and Peter Balestrini, G3BPT. Unfortunately the BBC misled us about the date of this broadcast, so many members missed it, but tapes are available for those who are interested. Soon afterwards I was asked to participate, at one hour's notice, in an item in "The World At One" about Amateur Radio pirates.

Defence—this is the most difficult aspect of the job. One of the greatest obstacles to keeping our name clear of mud is the use of the word "ham." Newspapers can attribute all kinds of wickedness to a nebulous body of villains whom they call "hams" and I am very sorry but there is *nothing* we can do about it, in law. Would it be possible, I wonder, for us to register the name "Radio Amateur" somewhere, and to be scrupulous in our avoidance of the word "ham" ourselves, so that, at least, the moment rogue editors libelled "Radio Amateurs," we could clamp down on them? What do the lawyers among you think?

The problem cropped up when ITV produced a short play which maligned radio amateurs to an extent, about which I was alerted by G3VNQ, Malcolm Pritchard. ITV's lawyer said that anybody who twiddles the knobs on a radio receiver can call himself a "ham." The same situation arose, in a more serious way, when a reputable journal alleged that radio amateurs were responsible for interfering with long-distance aircraft communication! Until we rationalise our title, there is little we can do about these characters, except try to reform them with kindness and good example.

We achieved this with one suburban paper, which published a report about a "ham's" interfering with ambulance services. I was informed about this by the Honorary Secretary of the Amateur Radio Mobile Society, G3FPK, Norman Fitch. We both wrote officially to the Editor, who is being most co-operative and allowing me a feature, not just a letter, to repudiate the accusation. We have plans to take more positive action in this matter of our image in the popular papers. Meanwhile you can be sure that, provided the members themselves keep careful watch on local affairs and assist by notifying me without delay of incidents, I shall act faithfully every time and do whatever can be done to put the matter right. Unceasing vigilance from all of us will produce the test case we need one day.

A good platform for Amateur Radio can always be mounted when the hobby is on show in public. We had a fine opportunity to exploit this when the Caravan Club of Gt. Britain celebrated its Diamond Jubilee in May with a caravan rally at Royal Sandringham, attended by 12,000 people. RSGB collaborated with the Caravan Club to install a demonstration s.s.b. station at Sandringham, the first time Amateur Radio has ever operated from Royal property. The call-sign was GB2CC, equipment was loaned by KW Electronics Ltd. and the station operated for 36 hours of the rally, providing a source of entertainment which the Caravan Club appreciated. 300 contacts were made,

Two Modesty Blaise strips, featuring Amateur Radio, which appeared in the Evening Standard. Reproduced by permission of Peter O'Donnell and the London Evening Standard.



including a log of quite rare DX, attracted by the unusual QTH.

One aspect of the Public Relations venture which was sure to be successful was the "Welcome to London Programme." I must thank all the operators, who went to great personal trouble and expense to welcome and assist visiting amateurs. During the tourist season in 1967, particularly when I was in the USA, enquiries were coming in from overseas visitors at the rate of three a week, and the operators were working at full pressure. We seem to have pleased most of the guests and all the operators enjoyed the season. This project received lots of publicity and has gone down as an unchallenged British "first" in International Amateur Radio.

The RSGB Dinner Club is not really an official function of the Public Relations Programme, except where it serves to welcome overseas visitors, of whom a surprising number manage to be in London for the quarterly meetings. This is very pleasing, as we knew from the start that a weakness of the three-monthly plan, as opposed to the monthly schedule of the old Luncheon Club, was that it did not offer overseas and provincial visitors a firm, regular date on which to plan trips to London. But it is accepted that more frequent meetings, at today's prices, would be impractical and, with the more leisurely atmosphere which the evening meeting induces, a three-monthly date seems to give quite a festive atmosphere to the Dinners. I handle the Dinner Club correspondence, to ease the pressure on Headquarters, but I must thank Mrs. Maisie Jardine, for her help with the administration. We were glad to see the Council well represented at the last event. The next Dinner is on 26 January.

Peter O'Donnell, author of the Modesty Blaise stories, is

so pleased with the impact of the recent Amateur Radio incidents in the London Evening Standard strip cartoon, that he is incorporating the amateur radio theme into the next Modesty Blaise book. We have already worked with Mr. O'Donnell on the details of the Amateur Radio section of the book and promise that the story will be as exciting as its predecessors. We, in turn, were pleased at the faultless way he used Amateur Radio in the Evening Standard. Considering the enormous sales the Modesty Blaise books enjoy, in hard cover and paperback, we can look forward to some valuable publicity when the new book appears.

What has surprised me more than anything is the way members have reacted to the public relations idea. What responsible criticism I have received has been friendly and constructive, the idea has stirred up serious thought in other national Societies and they have been most complimentary on the occasions when it has been my honour to represent RSGB abroad, in Canada, the USA, Austria and Belgium in 1967. At the Woburn Mobile Rally, for instance, at least 20 members approached me with queries and suggestions, or just to say "carry on with the good work!" I have been asked for help in some very unexpected directions, some of them hardly connected with the original terms of reference of the job. The Council seems to like the idea and, from your letters and kind wishes, so do you, the members. And, from the RSGB Council, I have received the most gratifying collaboration and kindness.

You will want to know what all this has cost you. In one year I have used £10 petty cash, £2 of which was given to me, "for information received," by a national newspaper. Therefore the Public Relations Programme has cost the Society £8.

News from Headquarters

Results of the 1968 Council Elections

Ordinary Members

	Votes	
E. J. Allaway, G3FKM	994	
B. Armstrong, G3EDD	1322	ELECTED
E. G. Ingram, GM6IZ	1234	ELECTED
C. Penna, G3POI	1021	
R. F. Stevens, G2BVN	1594	ELECTED
J. W. Swinnerton, G2YS	1223	ELECTED
R. G. B. Vaughan, G3FRV	991	
Total votes Accepted	2052	
Total votes Rejected	53	

Zone G Election

A. F. Hunter, GM3LTW	78	ELECTED
A. W. Smith, GM3AEL	68	

Total votes Accepted	146
Total votes Rejected	None

Ballot papers were rejected for the following reasons:

Signed on Ballot paper	1
Not signed	17
Incorrectly sealed	19
Received too late	16
	<u>53</u>

Morse Tests, Isle of Man

The GPO has arranged for candidates in the Isle of Man to take the Amateur Morse Test at the Head Post Office, Douglas. Application forms for the test are contained in the Post Office leaflet "How to become an Radio Amateur," obtainable from the Radio Services Department (Radio Branch), General Post Office, Armour House, St. Martin's-le-Grand, London, EC1.

Candidates wishing to take the test at Douglas should send the completed application forms to the Head Postmaster, Head Post Office, Douglas, marking the envelope "For the attention of Mr J. Galt."

New Managing Director for Daystrom

Daystrom Limited, Gloucester, have announced the appointment of Leonard T. Perriam, M.A., as Managing Director from 1 November, 1967. Mr Perriam joined Daystrom six years ago as Technical Sales and Service Manager of the Industrial Products Division after holding senior posts involving instrument development at Imperial Chemical Industries Limited for some 15 years. The Heathkit division at the Gloucester Factory manufactures electronic equipment in kit or ready-to-use form; and the Industrial Products Division manufactures X-ray thickness gauges and special dimensional measuring and control units, in addition to marketing equipment from Weston Instruments Inc., an associated company in the Schlumberger Group.

Pirates Fined

As a result of Post Office enquiries into the suspected unlicensed use of wireless telegraphy transmitting equipment, the following convictions have been obtained on using wireless transmitting apparatus without the appropriate licence, contrary to the provisions of Section 1 of the Wireless Telegraphy Act, 1949. At Tottenham Magistrates Court on 30 October, 1967 a Mr Howard Lawrence White, 59 Firs Park Avenue, London N2, Mr Christopher Tucker, 58 Southbury Road, Enfield, Middx., and a Mr Nigel David Hunt, 102 Fotheringham Road, Enfield, Middx. were each given a Conditional discharge and ordered to pay £1 ls. costs with forfeiture of equipment.

At Liverpool County Magistrates Court on 12 October 1967 a Mr Frank Sage of 1 Lulworth Avenue, Waterloo, Liverpool 22, was fined £20 on each of two charges and ordered to pay 20 guineas advocates costs with forfeiture of equipment.

At Barking Magistrates Court on 7 November a Mr Jonathan Edwin Rome, 48 Empress Avenue, Ilford, Essex, and a Mr John Anthony Shaw, 128 Perth Road, Ilford, Essex, were each fined £10 and ordered to pay £2 2s. costs. Mr Colin Geoffrey Hinds, 106 Queenborough Gardens, Ilford, Essex, was fined £5 and ordered to pay £2 2s. costs.

RSGB Dinner Club

The Dinner Club will meet on Friday, 26 January, 1968, at the Kingsley Hotel, Bloomsbury Way, London, WC1, at 7.30 for 8 p.m.

This is a completely informal occasion and all members are welcome. Tickets are 25s. each and reservations accompanied by a remittance should be sent to RSGB Headquarters.

Civil Service RS Changes Venue

The Civil Service Radio Society, which hitherto met at the Science Museum, South Kensington, has now found new premises at the Civil Service Recreation Centre, Moncil Street, Westminster, London SW1. Meetings will be held on the first and third Tuesdays in each month, admission to which is open to HM Civil Servants, although any visitors are always welcome. Details are available from G3KGM, 01-300 0767.

British Universities Net

A British Universities Net (BUN) has been operative for a few weeks on 40m. Skeds were originally arranged between GW3UWS and G3OUL and the Net grew from these QSOs. It is on the air on Wednesday afternoons, at 3 p.m., during term time on the nearest clear channel to 7.060 MHz. Active on the net so far are GW3UWS (Swansea), G3OUL (Liverpool), G3UCL (University College, London), G5YC (City and Guilds Technical College) and G3VZI (Staffordshire College of Technology). An invitation is extended to all university stations and technical college stations to join in and populate the Net.

Nominations for Mullard Award 1968

In accordance with Rule 5, the Council invites nominations for consideration for the Mullard Award for 1968. Such nominations should be sent in writing to the General Manager at RSGB Headquarters to arrive not later than 29 February, 1968.

The terms and conditions governing the Mullard Award, are as follows:

- (i) The Award is offered annually by Mullard Limited during the pleasure of the Directors of that Company.
- (ii) The Award will take the form of a gift in kind (preferably electronic or electrical apparatus and/or books) to the value of £25, and a plaque.
- (iii) The Award will be made to the member of the Radio Society of Great Britain resident in the United Kingdom who in the opinion of a Committee consisting of three representatives of Mullard Limited and three representatives of the Council of the Radio Society of Great Britain, has, through the medium of Amateur Radio during the preceding calendar year, rendered outstanding personal service to the community by his own endeavour or by his own example of fortitude and courage.
- (iv) The presentation of the Award will take place during the month of April each year on a date and at a place to be decided by the Committee.
- (v) In January of each year, the Radio Society of Great Britain shall, through its official journal, invite nominations for the Award. Each such nomination shall be supported by at least three Corporate Members of the Society and shall be accompanied by a brief factual account of the personal service rendered by the nominee.

Obituary

Phyllis Lonsdale, G3VXL

The sudden death of Phyllis Lonsdale, G3VXL, "Lonnie", on 16 November, 1967, came as a great shock to her many friends particularly to those members of the Surrey Radio Contact Club who had helped her in getting a transmitting licence.

"Lonnie", who was severely handicapped physically by arthritis, was resident in the British Home for Incurables in Streatham, SW London. Her interest in Amateur Radio can be traced to visits in her youth to Gerald Marcuse, G2NM, who was a near neighbour. Having expressed a wish to become a radio amateur in November 1964 she showed tremendous enthusiasm in the technical course on which she embarked. In 18 months she had passed the RAE and also by then had taught herself some Morse. Although sending and writing were very difficult she insisted on getting up to the required standard before taking the Morse test which she passed six months later.

Although she was on the air for slightly less than a year her call-sign on 4m had become very well known in the South East of England. A few days before her death she had been discussing with local amateurs the possibility of getting onto 2m and 70cm.

All who knew "Lonnie" admired her courage in spite of her disabilities and will miss her cheerful voice on the air.

R. D.

Sydney Poutney, G3MN

It is with deep regret that we report the death of Sydney Poutney, G3MN, at his home on 11 November, following a heart attack. He was aged 54.

Sydney was a member of the South Birmingham Radio Society for many years and always took an interest in the society's many activities. His many friends will be sad to lose yet another of the "Old Timers."

To his widow, Aileen, we extend our deepest sympathy.

N. L. G.

Representation

REGION 9 REPRESENTATIVE:

J. Thorn, G3PQE, Jessamine House, Chapel Allerton, Axbridge, Somerset.

REGION 15 REPRESENTATIVE:

J. Thompson, G13ILV, "Albany," Newry Road, Armagh, N. Ireland.

Area Representatives

BARNLEY & DISTRICT

P. Ackley, G3LRP, 4 Mayfield Rise, Ryhill, Wakefield, Yorks.

CARDIFF RSGB GROUP

AREA REPRESENTATIVE: T. J. Brooke, GW3GHC, 32 Elgar Crescent, Llanrumney, Cardiff, CF3 9 RU.

Affiliated Societies

The following are amendments to the published lists of Affiliated Society Secretaries.

BEDFORD AND DISTRICT AMATEUR RADIO CLUB

Ken Whitbread, 78 Pipit Rise, Bedford.

CANNOCK CHASE AMATEUR RADIO SOCIETY

G. Preece, G3RSX, Bridgtown Social Club, 170 Walsall Road, Bridgtown, Cannock, Staffs.

SALTASH AND DISTRICT AMATEUR RADIO CLUB

J. A. Ennis, 19 Coombe Road, Saltash, Cornwall.

ST. OVEN'S SCOUTS RADIO CLUB

Honorary Secretary: J. Hewlett, Group Scout Leader, 18th Jersey, St. Owen, Scout Group, Les Landes School House, St. Owen, Jersey.

LEYLAND HUNDRED AMATEUR RADIO GROUP:

Honorary Secretary: G. Wild, G3RFN, 16 Grange Road, Leyland, Lancs.

BASINGSTOKE AMATEUR RADIO CLUB:

Honorary Secretary: H. O. Sachse, 74 Loggon Road, Basingstoke.

BRUNEL UNIVERSITY STUDENTS' UNION ARS

Honorary Secretary: J. I. Wilson, G3WEH, Brunel University Students' Union, Woodlands Avenue, Acton, London, W3.

CHILTERN AMATEUR RADIO CLUB

Honorary Secretary: M. J. Pemberton, A5126, 205 Bowerdean Road, High Wycombe, Bucks.

HEMEL HEMPSTEAD & DISTRICT AMATEUR RADIO SOCIETY

Honorary Secretary: Alexander Lex-Arnold, 13 Little Road, Adeyfield, Hemel Hempstead, Herts.

UNIVERSITY OF SALFORD, ELECTRONICS SOCIETY

Honorary Secretary: C. G. Partridge, G8AUU, University of Salford Union, Salford 5, Lancs.

MASIRAH ISLAND AMATEUR RADIO CLUB

Cpl. D. Roberts.

RAF Masirah, BFPO 65.

MAGNUS GRAMMAR SCHOOL RADIO SOCIETY

R. V. Gelsthorpe, G3UVT.

Magnus Grammar School, Earp Avenue, Newark, Notts.

1968 Call Book Correction

G3IDG, F. A. Herridge, 96 George Street, Basingstoke, Hants.

Society Affairs

A brief Report on the November 1967 Meeting of the Council

THE Meeting was held on Monday, 6 November, 1967, and was attended by The President (Mr A. D. Patterson in the Chair), Messrs B. Armstrong, N. Caws, J. Etherington, J. C. Graham, E. C. Ingram, H. E. McNally, L. E. Newnam, J. F. Shepherd, R. F. Stevens, G. M. C. Stone, J. W. Swinnerton, G. Twist, E. W. Yeomanson, (Members of the Council), D. W. Robinson (General Manager), C. P. Pope (Secretary), and T. R. Preece (Assistant Editor).

An apology for absence was submitted on behalf of Mr F. Parker.

Membership

The Council elected 119 new members (79 Corporate and 40 Associate) and accepted three applications for transfer from Associate to Corporate Grade.

The subscriptions of three members were waived on the grounds of blindness or disability.

The application of Mr A. J. Shepherd, G3RKK, for Life Membership was accepted.

Braaten Trophy 1967

Council accepted a Recommendation that this Trophy should be awarded to Mr C. R. Perks, G4CP.

Milne Trophy 1967

Council accepted a Recommendation that this Trophy should be awarded to Mr D. G. Gibson, G13OQR.

National Field Day

Council noted correspondence relating to the questionnaire in connection with this event and received verbal reports from the President and the Chairman of the H.F. Contests Committee, Mr J. C. Graham, G3TR.

Lambda Investment Company

The Honorary Treasurer reported on the progress of the issue of the Debentures and reviewed the financial situation in connection with the new Headquarters.

Region 1 Executive Committee Meeting

A Report on this was given by Mr R. F. Stevens, G2BVN and a full written report will appear in the January 1968 issue of the *Region 1 Bulletin*. Mr Stevens had received an invitation to visit the Central Research Establishment of the German Post Office and reported on his visit.

Log Books

Council received a report on the range of Log Books now published or sold by the Society and accepted a Recommendation that these should be reprinted in a revised form.

Mauritius Amateur Radio Society

Council accepted a Recommendation that copies of certain Society publications should be sent to this newly formed National Society.

Minutes of Committees

The Minutes of the following Committee Meetings were received as Reports:

Exhibition (22.9.67), this was concerned with the final arrangements for the 1967 RSGB Exhibition.

Scientific Studies (2.10.67), which dealt with the setting up of the former Lerwick beacon station at a new site near Thurso; considered future work in the field of propagation research and the evaluation of material collected from observers.

V.H.F. Contests (3.10.67), the meeting approved the Calendar for 1968, considered the use of grid locator systems, considered rules for future v.h.f. contests and made recommendations for awards in connection with the Third 432 MHz (Open) Contest 1967.

Mobile (5.10.67), when matters arising from the Mobile Rallies held at Gilwell Park and Woburn Abbey were considered.

H. F. Contests (12.10.67), which dealt with correspondence concerning N.F.D. and contest logs suitable for all international contests, accepted offers for the checking of entries for the 80m Field Day, the 21/28 MHz Contest and the 7 MHz Contest. A revision of the Rules for the A.F.S. Contest on 13/14 January was agreed.

Finance and Staff (14.10.67), at which staff problems were discussed together with the many matters connected with the new Headquarters. A recommendation was made to Council that Mr C. P. Pope should be appointed Secretary of the Society.

GPO Liaison and TVI (17.10.67), which dealt with matters suitable for the Agenda of the next meeting with the GPO and problems connected with suitable equipment for use in cases of TVI. A number of TVI cases were considered and it was agreed that the setting up of local TVI groups was essential.

V.H.F. Contests (17.10.67), rules for 1968 contests were reviewed together with General Rules for 1968 and recommendations were made to Council for awards in connection with V.H.F./NFD 1967.

Education (21.10.67), which made final arrangements for the production and custody of the tape/slide lecture and discussed the Committee's display at the RSGB Exhibition. Arrangements for the supervision of the RAE on 5 December were reported.

The Council was in session for 4½ hours.

Amateur Radio Licences

The following are the total number of Amateur Radio Transmitting Licences in force on 30 November, 1967.

Amateur (Sound) Licence "A"	12,597
Amateur (Sound) Licence "B"	693
Amateur (Sound Mobile) Licence "A"	2,396
Amateur (Sound Mobile) Licence "B"	22
Amateur (Television) Licence	176

There were also 12,016 Model Radio Control Licences in force.

Radio Amateur Emergency Network

By S. W. LAW, G3PAZ *

ADDRESSES:

Honorary Registrations Secretary:
Mr R. A. Ledgerton, G2ABC
1 Latchingon Gardens,
Woodford Bridge, Essex.

Honorary Secretary, RAEN Committee:
Mr E. R. L. Bassett, BR516075
57 Upper St. Helens Road,
Hedge End, Southampton, SO3 4LG.

WHEN you read this, the New Year will be upon us. Resolutions will have been made (and many already broken!) for this or that, according to our personal consciences and/or tastes or the pressures gently brought to bear in the family circle. Far be it from this column to add to this burden of the soul, and if we have erred in this respect in the past we proffer a small apology—not too abject, however, because it is our humble duty to stir rather than soothe our members. So when we give you a hearty New Year greeting, may we please (without indulging in too many clichés) imply gently that we should learn from past experience and keep ourselves both adaptable to progress and ready for the unexpected. Remember, it *will* happen—sometime.

Re-shuffle

The Surrey Group, under their CC G3VK, have had a little re-arrangement in personnel. The post of AC, Practice and Training has been re-entitled Controller, P and T and is now held by G6SC (who has already some smart rods in pickle, we hear). The previous holder of the post, under the original title, G3MFB now becomes Assistant County Controller (and also performs the onerous duty of Group Treasurer). The title was agreed by the RAEN Committee, and this Group will no longer use the title "Assistant Controller." Thus, for example, G3JXA is now Controller, Technical Development. Other titles change in accordance with this policy.

Torrey Canyon

We hear that the CC for Cornwall, G2AYQ has received an official letter of thanks from the Newquay Urban District Council expressing thanks for the willing assistance which was so readily forthcoming *at a moment's notice*. Do we need to press the point?

Water, Water

After the reports of the terrible floods in Italy some time ago, it was sobering to read of the disastrous effects of those in Lisbon, Portugal at the end of November last year. In this country we rarely experience anything of this magnitude, but this must not lead to complacency on our part. Fortunately the authorities concerned are, in the main, well aware of the hazards at certain danger points but even they can be overwhelmed by freak conditions. RAEN interest in some counties is rightly centred on such local conditions, and in this connection we are pleased to note the interest in the

Severn area. This river and its estuary is not only well known for its collection of wildfowl and the recently completed bridge into Wales, but is notorious for the periodic phenomenon known as the "Severn Bore." The title may appeal to the "wags" as a source of humour, but there is nothing funny about an alarming wall of water travelling at a terrifying speed up a gradually narrowing estuary. Under certain weather conditions this can be really dangerous, and stringent precautions must be taken at these times. Needless to say, those who are RAEN-minded in the area are well aware of the situation and take this into consideration in their programme.

Go-Go?

There still appears to be a certain amount of controversy over the best way to pass a message correctly first time (that is to say, without time-wasting repeats). To pass a complete message in one fell swoop can mean that the other station may either miss a portion in QRM or fail to write fast enough—pencils *have* been known to break, and the spare which should be available *may* be out of reach! The technique of passing just a few words and then breaking carrier means that the other station needs only to interject the word "Go" for the sender to understand that the portion already transmitted has been correctly received and recorded. Should the message be intended for several stations, the "Go" should be preceded by each station's call-sign, the sending station waiting until all have acknowledged before proceeding with the message.

Fiery Chariot

Two things distinguish Man from the beasts; the use of fire and the invention of the wheel. These two were soon combined to give us the gifts of power and transport. Steam locomotives (and the amazingly fast steam cars) changed our world. Yet because of our infinite capacity for absorbing change, the fear of fire is far from our minds when we travel. The steam car was more feared for its speed (it was banned from Brooklands!) than for the risk of fire. Today we drive around with several gallons of highly volatile fluid behind our seats and an electrical system of often dubious quality virtually in our laps—do we carry a fire extinguisher? Possibly one car in every 500 might! We saw a car alight recently, and it was lucky that a passing bus driver pulled up and used his extinguisher or the situation could have been very nasty. Science has invented and industry produced some excellent appliances at quite reasonable prices, and it seems a sensible precaution to have one accessible on one's car. Think about it in the New Year.

* 11 Chisholm Road, Croydon, Surrey, CRO 6UQ.

BERU Contest

Rules for the Thirty First Event, 9-10 March, 1968

RADIO amateurs throughout the British Commonwealth are invited to take part in the Thirty First BERU Contest to be held on 9-10 March, 1968. The Contests Committee is again arranging to secure the maximum amount of overseas publicity but invites the assistance of members in bringing the dates and rules to the notice of operators throughout the Commonwealth.

1. Sections. The contest is divided into two sections: (a) High Power—maximum licensed power; (b) Low Power—maximum input 25 watts.

2. Duration. The contest (both sections) will start at 00.01 GMT on Saturday, 9 March and end at 23.59 GMT on Sunday, 10 March, 1968.

3. Eligible Entrants. The contest is open to all fully paid-up corporate members of the RSGB resident within the United Kingdom and to all amateurs licensed to operate within the British Commonwealth and British Mandated Territories. All entrants agree to be bound by the rules of the contest.

4. Operator. Only the entrant will be permitted to operate his station for the duration of the contest.

5. Entries. Entries should be set out, as shown in the example, on ONE SIDE ONLY of foolscap or International A4 paper. **Entries must be postmarked not later than 1 April, 1968,** and must be addressed to the Contests Committee, Radio Society of Great Britain, 26 Little Russell Street, London, WC1, England. Log sheets are available from RSGB Headquarters on request.

BERU CONTEST, 9-10 MARCH, 1968

Claimed Score.....

Section: (High or Low Power).....

Name Call-sign

Address

Transmitter (D.c. input to any stage of the transmitter should not exceed 25 watts in the Low Power Section)

Receiver Aerial(s)

DECLARATION: I declare that this station was operated strictly in accordance with the rules and spirit of the contest, and I agree that the decision of the Council of the RSGB shall be final in all cases of dispute. I certify that the maximum input to the final stage of the transmitter was watts.

Date Signed

Failure to sign the declaration may involve disqualification of the entry.

SAMPLE LOG SHEET

Date	Time GMT	Call-sign of station worked	I sent him	He sent me	Band MHz	Bonus Points	Points Claimed
9	0005	G4XXX	569001	559002	14	20	5
9	0009	VK2ZZZ	579002	569004	14	20	5
10	0012	GM4YYY	569113	579112	14	—	5
10	0730	GW4ZZZ	589154	589164	21	20	5
Total (Bonus Points + Points Claimed) 60 + 20 = 80							

6. Bands. Operation is restricted to the following bands: 3.5, 7, 14, 21 and 28 MHz. Transmission must be of type A1 (pure c.w.) only, and frequent tone reports of T8 or less may result in disqualification.

7. Licence Conditions and Power Input. Entrants must operate within the terms of their licences.

8. Contacts. Contacts may be made with any station using a British Commonwealth call-sign except within the entrant's own

call area. British Isles stations may not work each other for points. Contacts with unlicensed stations will not count for points. The decision as to whether or not a contact is valid will rest with the RSGB Contest Committee. Only one contact on each band with a specific station will count for points. **Duplicate contacts should be logged, but no points claimed.**

9. Scoring. Each completed contact will score 5 points. In addition a bonus of 20 points may be claimed for the first contact with each new Commonwealth call area (as defined in the Appendix) on each band. All British Isles stations (G, GB, GC, GD, GI, GM and GW) count as only one call area.

10. Contest Exchanges. Contest numbers must be exchanged and acknowledged before a contact may count for points. The contest number of six figures shall be made up of the RST report and three figures starting with 001 for the first contact and increasing by one for each successive contact, e.g., 559001 for the first and 439002 for the second contact, and so on.

11. Awards. At the discretion of the Council, the BERU Senior Rose Bowl or miniature will be awarded to the winner of the High Power Section, and the Colonel Thomas Rose Bowl will be awarded to the leading British Isles station in the High Power Section. The winner of the Low Power Section will be awarded the Junior Rose Bowl or miniature.

Certificates will be awarded to the first three entrants in each section. In addition a certificate will be awarded to the leading entrant in each call area regardless of the number of entrants in his call area provided that his score exceeds 1500 points in the High Power Section or 750 points in the Low Power section. A certificate will be awarded to the runner-up in each call area in which there are ten or more entrants, provided his score exceeds 1500 points in the High Power Section or 750 points in the Lower Power Section.

Rules for the BERU Contest Receiving Section, 1968

The rules for the Receiving Section of the BERU Contest 1968 are as follows:

1. Eligible Entrants. The contest is open to all fully-paid-up members of the RSGB resident within the United Kingdom and to all short wave listeners resident within the British Commonwealth and British Mandated Territories. All entrants agree to be bound by these rules. Only the entrant may operate his receiving station for the duration of the contest. Holders of amateur transmitting licences are not eligible to take part.

2. Duration. The contest will commence at 00.01 GMT on Saturday, 9 March, 1968, and end at 23.59 on Sunday, 10 March, 1968. The BERU Contest for transmitting amateurs will take place during the same period.

3. Entries. (a) To count for points, a station outside the entrant's own call area must be heard in a contest contact and the following details logged in columns headed as follows: (i) Date/Time (GMT) (ii) Call-sign of Station heard; (iii) Report and Serial Number sent by Station heard; (iv) Call-sign of the Station being worked; (v) Band in MHz; (vi) Bonus Points claimed; (vii) Points claimed. CQ or Test calls will not count for points.

(b) Entries must be set out on ONE SIDE ONLY of foolscap or International A4 paper. Entries must be postmarked not later than **8 April, 1968** and must be addressed to the Contests Committee, Radio Society of Great Britain, 28 Little Russell Street, London, W.C.1. Log sheets are available from RSGB Headquarters on request.

(c) All entries must contain the following declaration:
I declare that this receiving station was operated strictly in accordance with the rules and spirit of the contest and I agree that the decision of the Council of the RSGB shall be final in all cases of dispute. I do not hold an amateur transmitting licence.

Date Signed

4. Scoring. Each complete log entry will score 5 points. In addition, a bonus of 20 points may be claimed for the first station heard in each new Commonwealth call area on each band. The British Isles (G, GB, GC, GD, GI, GM and GW) count as one call area only as indicated in the Appendix to the rules of the Transmitting Section. A station may be logged only once on each band for the purpose of scoring. Where both stations in a contact are heard, they should be logged separately; points may be claimed for both entries.

5. Awards. At the discretion of the Council, the Receiving Rose Bowl or miniature will be awarded to the winner and a certificate of merit to the runner-up in each of the IARU continents.

General Rules for RSGB H.F. Contests 1968

The following rules apply to all RSGB H.F. Contests except where modified in individual events and are to be read in conjunction with the details for each contest published in *Radio Communication*. All entries will be acknowledged by Headquarters within seven days of receipt but it is the responsibility of the entrant to refer to Headquarters if an acknowledgment is not received.

1. Entrants must operate in accordance with the terms of their licences.

2. Unlicensed Stations.

Contacts with unlicensed stations will not count for points.

3. Contacts.

Only one contact on each band may be claimed with a specific station, whether fixed, portable, mobile or alternative address. Mobile stations are stations installed in motor vehicles or vessels on inland waterways and so equipped that they are capable of operation in motion without any alteration. Duplicate contacts must be logged and clearly marked as duplicates without claim for points. Cross-band contacts may not be claimed. Proof of contact may be required.

4. Entries must be clearly written or typed ON ONE SIDE ONLY of RSGB contest log forms or on foolscap or quarto paper and must be set out in the form prescribed in the published details for the contest concerned. The **cover sheet** of an entry must be made out as in the specimen form.

5. Entries.

All entries become the property of the Radio Society of Great Britain. In the event of any dispute the ruling of the Council of the RSGB shall be final.

6. Multi-operator Stations.

Unless otherwise stated, single operator entries only will be accepted. A single operator station is one manned by an individual operator who receives no assistance in operating, log keeping or checking, etc. from other persons during the contest periods. A multi-operator station is one which does not conform to this definition. In those contests where multiple operator entries are allowed, such entries will only be accepted provided that:

- The call-sign of the operator concerned is indicated for each contact.
- The declaration is signed by only one operator who will be regarded as the entrant.
- The names and call-signs of all operators are listed on the cover sheet.

Contest _____ Date _____ Claimed Score _____

Section (if any) _____ Call-sign _____

Name _____

Home Address _____

Address of station in Portable Location _____
(if other than home address above)

QTH as transmitted _____

National Grid Six Figure Reference, QRA Locator, County Code Letters
or other co-ordinates (see contest details)

Transmitter(s) _____ Input Power _____

Receiver(s) _____

Aerial(s) _____

DECLARATION

I declare that this station was operated strictly in accordance with the rules and spirit of the contest, and I agree that the decision of the Council of the RSGB shall be final in all cases of dispute. I certify that the maximum input to the final stage of the transmitter was _____ watt(s).

Date _____ Signed _____
Failure to complete the cover sheet or sign the declaration may involve disqualification of the entry.

7. Portable stations must operate from the same site for the duration of a contest and may not be located in a permanent building. Power must not be derived directly from public or private supply mains. No apparatus may be erected on the site prior to the day of the event.

8. The details relating to specific contests published in *Radio Communication* shall be regarded together with these general rules as the rules of the contest.

9. The use of GB call-signs is not permitted.

Commonwealth Call Areas

The following call areas are recognized for the purposes of scoring in the BERU contest:—

AC3 (Sikkim)	VK9 (Admiralty Island)
AP (West Pakistan)	VK9 (Christmas Island)
AP (East Pakistan)	VK9 (Cocos Island)
G, GB, GC, GD, GI, GM, GW as one call area	VK9 (Norfolk Island)
MP4 (Bahrain)	VK9 (Nauru)
MP4 (Muscat and Oman)	VK9 (New Guinea and Bismark Island)
MP4 (Qatar)	VK9 (Papua)
MP4 (Trucial Oman)	VO
VE1	VP1
VE2	VP2 (Angilla)
VE3	VP2
VE4	VP2 (Antigua and Barbuda)
VE5	VP2 (British Virgin Islands)
VE6	VP2 (Dominica)
VE7	VP2 (Granada and Dependencies)
VE8	VP2 (Montserrat)
VK0 (Australian Antarctica)	VP2 (St. Kitts and Nevis)
VK0 (Heard Island)	VP2 (St. Lucia)
VK0 (Macquarie Islands)	VP2 (St. Vincent and Dependencies)
VK1	VP3
VK2	VP4
VK2 (Lord Howe Island)	VP5 (Turks and Caicos Islands)
VK3	VP6
VK4	VP7
VK4 (Willis Island)	VP8 (Falkland Islands)
VK5	VP8 (Grahamland)
VK6	VP8 (Sandwich Islands)
VK7	VP8 (South Georgia)
VK8	VP8 (South Orkney Islands)

VP8 (South Shetland Islands)	ZK1 (Cook Islands)
VP9	ZK1 (Manihiki Island)
VQ1	ZK2
VQ7 (Aldabra Island)	ZL1
VQ8 (Chagos)	ZL1 (Kermadec Island)
VQ8 (Agalega)	ZL2
VQ8 (Rodrigues)	ZL3
VQ3 (St. Brandon)	ZL3 (Chatham Island)
VQ8 (Mauritius)	ZL4
VQ9	ZL4 (Auckland and Campbell Islands)
VR1 (Gilbert and Ellice Islands)	ZL5 (NZ Antarctica)
VR1 (British Phoenix Islands)	ZM7 (Tokelau)
VR2	ZS3
VR3 (Christmas Island)	ZS8
VR3 (Fanning Island)	ZS9
VR4	4S7
VR5	5H3
VR6	5N2
VS5	3W1
VS6	5X5
VS9 (Maldives Islands)	5Z4
VS9 (Kamran Island)	9Y5
VU2	7Q7
VU4 (Laccadive Islands)	8P (The Gambia)
VU5 (Andaman and Nicobar Islands)	8R (Guyana)
ZB2	9G1
ZC4 (SB4)	9H1
ZD5	9J2
ZD7	9K2
ZD8	9L1
ZD9 (Gough Island)	9M2
ZD9 (Tristan da Cunha)	9M6
ZE	9M8
ZF1 (Cayman Island)	9V1

General Rules for V.H.F./U.H.F. Contests, 1968

In order to reduce the space taken up in *Radio Communication* by v.h.f. and u.h.f. Contest rules it has been decided to adopt a new type of presentation. All the rules for a particular contest will be selected from the rules reproduced below (e.g., see rules in this issue for the First 144 MHz (S.S.B.) Contest, the second 144 MHz (Open C.W.) Contest and First 70 MHz (Open) Contest). Most v.h.f. and u.h.f. contest rules are repetitive (anyway) and thus it is true to say that writing out the rules in full for each similar contest is a waste of space, which no doubt readers would prefer to see occupied by original material. It will of course mean that entrants will have to always refer back to these rules which will be somewhat inconvenient, but loose leaf copies of these rules will be available on request from the Secretary, V.H.F. Contests Committee at RSGB HQ.

The rules have also undergone considerable changes, the most notable being to the scoring system. Distance has been retained as the basic guide to overall "good" v.h.f. operating. A factor depending on the number of stations contacted has also been introduced. Precise distance measurement is OUT. Instead contacts made between certain limits will score a certain number of points, as shown in the table with Rule 4. There is a built in advantage to those who make long distance contacts, while those who make a large number of contacts (over a certain distance) will have a high station multiplier. Fig. 1 shows the radius system based on a station in Birmingham. For fixed stations it will only be necessary to draw circles of stated radius on a map once, and then for any contest once the station worked has been positioned (either by QRA or QTH) the score can be read straight off without making any measurement. Those who operate portable may prefer to draw the scoring circles on a perspex sheet, so that any location can be used as a centre.

Note that there are no restrictions on who may enter these contests. Entries from the continent are always welcome. Note also that the only restriction on power is that contained in Rule 11. There are many factors which spell good contest performance; power, site and aerial gain being just three, but a poor site can be offset by good aeriels and high power. To achieve a perfectly fair and simple scoring system is the aim, one which as yet has not been attained. The Committee hopes that these new rules represent a step in the right direction. Suggestions are always welcome and of great assistance to the committee in assessing trends. Such suggestions should be written on the reverse side of cover sheets.

1. Date and Time (see individual contest details).

2. All entries must be sent to the adjudicator at the address given in the particular contest rules.

3. Awards.

3a. In each section of the contest there will be an award to the highest scoring station. An award will be made to the runner up if there are 10 or more entries in the section.

3b. An award will be made to the highest scoring station and the runner-up.

4. Scoring system

Contacts made between the distances shown below will score as indicated.

Miles	km	Points
00-31.25	0-50	1
31.25-62.5	50-100	2
62.5-93.75	100-150	3
93.75-125	150-200	4
125-187.5	200-300	6
187.5-250	300-400	10
250-312.5	400-500	14
312.5-375	500-600	18
375-437.5	600-700	22
437.5-500	700-800	26
500-625	800-1000	34
Over 625	Over 1000	44

Contacts on borders score low. When the total distance score for the contest has been found, it is multiplied by the station multiplier which is the number of contacts made of 50km (i.e. two or more points) plus half the number of contacts at 50 km or less (1 point).

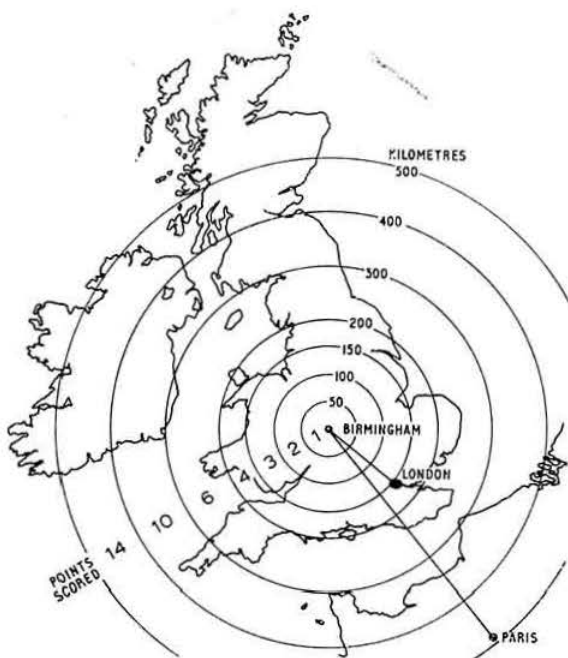


Fig. 1. This specimen map shows the radius scoring system in use centred on a station in Birmingham. The contact with the station in London scores 4 points while that with the one in Paris 14 points.

Location

5a. Entrants may not change their location during the contest.

5b. Entrants may change their location during the contest on one occasion, provided that only the highest scoring contact with a given station is claimed in the event of a repeat contact. Repeat contacts must be clearly marked as repeats.

6a. Crossband contacts will not count for points.

6b. Crossband contacts to another v.h.f. or u.h.f. band, where one station is transmitting on the band named in the title of the contest will count for half points. Only one crossband contact may be made with a given station. Crossband contacts must be clearly marked as crossband contacts.

Sections

7a. There will be three sections as follows:

- Section A—Single operator, fixed stations.
- Section B—Club, /A and multi-operator fixed stations.
- Section C—Portable stations.

7b. Portable stations only.

7c. Single operator, fixed stations only.

Modes

8a. Contacts may be made on all permitted modes except A (m.c.w.).

8b. Contacts may be made on A1 (c.w.) and F1 (f.s.k.) only.

8c. Contacts may be made on A3j (s.s.b.) only (see rule 10b).

8d. For modes to be used, see Rule 1.

9a. The **contest exchange** shall consist of the following:

- (i) RS or RST report followed by serial number.
- (ii) Location information—QRA or QTH, may be sent.

9b. The **contest exchange** shall consist of the following:

- (i) RS or RST report followed by serial number.
- (ii) Location information—QRA and QTH must be sent.

Repeat Contacts

10a. Only one scoring contact with a given station may be made, or only one crossband contact. If a station that has moved location is contacted for a second time only the higher scoring contact may be claimed. Such repeat contacts must be clearly marked as repeat contacts.

10b. Repeat contacts will be allowed on the following basis. The contest will be divided into four periods each of a half hour duration (i.e., period 1—first half hour, period 2—second half hour, etc.). A given station may only be contacted once during each period, but stations worked transmitting any other mode apart from A3j (s.s.b.) may only be contacted once during the contest.

10c. One contact may be made with a given station during each activity period.

11. Entrants must operate in accordance with their licence.

12. Contacts with **unlicensed stations** will not count for points.

RSGB V.H.F./U.H.F. Contest Cover Sheet

Name Call-sign Claimed Score

Home Station Address

Portable or A Location

Location as transmitted during contest

QRA locator sent during contest

Height of contest location above sea level ft.

Name of Group

Total number of contacts Station Multiplier

Longest distance QSO Station Distance km

Comments on conditions during contest

Map used for scoring

Transmitter Receiver

Aerial Height of aerial above ground ft.

PLEASE MAKE ALL COMMENTS ON RULES OF THIS CONTEST ON REVERSE SIDE OF THIS COVER SHEET DECLARATION.

I declare that this station was operated in accordance with the rules and spirit of this contest, and I agree that the decision of the Council of RSGB shall be final in cases of dispute. I certify that the maximum power to any r.f. stage of the transmitter was watts.

Date Signed

Failure to sign the declaration may involve disqualification of the entry.

FOR ENTRANT'S USE.

I require more RSGB Contest Log Sheets and enclose a large s.a.e. YES/NO

I require more V.H.F./U.H.F. Cover Sheets and enclose a large s.a.e. YES/NO

Please confirm that my entry has been received. I enclose a stamped addressed postcard. YES/NO.

13. **Logs** should be made out on RSGB Contest Log sheets and tabulated in columns as follows:

- (i) Date and Time (Time in GMT until the introduction of British Standard Time.)
- (ii) Call-sign of station worked.
- (iii) My report on his signals and serial number sent.
- (iv) His report on my signals and serial number received.
- (v) QRA received, and/or (vi)
- (vi) QTH received.
- (vii) Call-sign of operator, multi-operator stations only.
- (viii) Points claimed.

14. **Proof of contact** may be required.

15. All **entries** become the property of the RSGB and will not be returned. (Entrants must keep their own log records in accordance with licence requirements.)

16. Contacts made via **EME reflection**, man made **satellites** (active or passive) or any **relaying device** will not count for points.

17. The ruling of the Council of RSGB shall be final in all cases of dispute.

Entries

- 18. (i) Must be postmarked not later than 15 days following the contest.
- (ii) The cover sheet must be made out and the declaration signed.

19. Portable Stations

- (i) May not be located in a permanent fixed building or use public supply mains. Power for all equipment may only be derived from an on site portable generator or accumulator.
- (ii) No equipment or aerials may be installed or erected on the portable site prior to 24 hours from the start of the contest. This does not apply to the storage of equipment.

20. **Fixed Stations** must operate from the address given on the operator's licence. Any form of power supplies may be used.

21. **A Stations** are stations located at an alternative address, or at a location not named on the operator's licence, other than a Portable site.

22. **Club Stations** must operate from the address on their licence unless they operate portable, in which case they are classed as portable stations for the contest.

23. **Single Operator Stations** may only be operated by the licensee, receiving no other assistance.

24. **Multi-operator Stations** are those operated by more than one operator or one operator receiving assistance.

25. **Site (i.e., Portable Site)** is defined as a circle drawn with a radius of 1 km from the operating position during the contest (see Rule 19ii).

26. **QRA** is the standard 5 bit location fixing system.

27. **QTH** must be a distance in km and a bearing from a town which is identifiable on the Ordnance Survey ten mile map.

28. **Serial Numbers** must start at 001 and advance by one for each contact.

Rules for Cumulative Activity Contests, Winter 1968

144 MHz Contest

1. **Time** from 19.00 to 20.30 GMT.

Dates: 20 January, A3-A3j, 3 February, A1-F1, 17 February, A3-A3j, 9 March, A1-F1, 23 March, A3-A3j, 6 April, A1-F1.

2. All logs should be sent to the adjudicator at V.H.F. Contests Committee, "Summerleigh," Beltinge Road, Herne Bay, Kent.

In addition the following General Rules will apply: 3b, 4, 5a, 6a, 7c, 8d, 9b, 10c, 11 to 18, 20 and 26 to 28.

432 MHz Contest

1. **Time** from 20.30 to 22.00 GMT.

Dates: 20 January, 3 February, 17 February, 9 March, 23 March, 6 April.

2. All **Logs** should be sent to the adjudicator at: V.H.F. Contests Committee, 60 Merlin Grove, Beckenham, Kent.

In addition the following General Rules will apply: 3b, 4, 5a, 6a, 7c, 8a, 9b, 10c, 11 to 18, 20 and 26 to 28.

CONTEST NEWS

Third 432 MHz (Open) Contest 1967

A total of 43 entries were received for this contest held on 14-15 October. The response to section A was 20 logs, section B five and section C 18. Two listeners' logs were received; from BRS 28005 and A5032, and check logs from G2WS and PA0PJV.

Poor conditions strong winds and rain storms prevailed throughout the contest. G3HBW writes, "Perched on a cliff top 800 ft. above the English Channel is not the best place to be in a south westerly gale with horizontal rain (or was it lead shot?). Contacts were very few and far between, but for some mysterious reason, the contest was still found to be enjoyable." This was typical of the comments received.

Several comments were received about hopelessly inaccurate QRA locators such as YM50D which should have been ZM50D—an error of a mere 115 km. It would appear that several stations could not even take the trouble to check that the geographical location they were using appeared on the 10 miles to the inch map.

Several comments were again received about stations not operating in the band plan, and suggest that it be made compulsory for contests. Operating at the bottom of the band to catch stations tuning low to high only encourages others to follow causing mutual QRM on the DX. As the band plan is not mandatory this could not be enforced and would be difficult to check.

The best contact of the contest was between G8AAY in Poole and G8AWN/P in York, a distance of 370 km.

Congratulations go to G3NNG/P as the overall winner, who will receive a miniature cup. G3MAR/P will receive a certificate as runner up in section C, and G8AKE will receive a certificate of merit as leading station in section A and G8AAY will receive a certificate as runner up. With only five entries for section B a certificate of merit will only be made to the leading station, G3PMH/A. The award and certificates are, of course, subject to approval by Council.

SECTION A

Posn	Call-sign	Points	QTH	Receiver	Power Input	Watts	Aerial	Posn	Call-sign	Points	QTH	Receiver	Power Input	Watts	Aerial
1	G8AKE	7072	Melton Mowbray	BF180	150	2 × 14 ele.		3	G8AMU/A	1912	Redhill	BF180	25	24 ele	
2	G8AAY	4052	Poole	A2521	28	2 × 18 ele Bl. SQ.		4	G3UCU	1705	City of London	2N3819	8	14 ele	
3	G3BNL	3890	Nottingham	AF239	40	—		G8AHM disqualified (operators not listed).							
4	G8AKT	3878	Biggleswade	AF139	28	24 ele									
5	G8AWW	3207	Leicester	AF139	—	4 × 6 ele									
6	G8AUE	3176	Derbyshire	AF239	9	Parabeam									
7	G2RD	2968	Caterham	AF139	30	6/6									
8	G8ARM	2644	Greenwich	BF180	20	2 × Parabeams									
9	G8COJ	2635	High Wycombe	TIXM101	100	14 ele		1	G3NNG	7268	Wantage	2N4416	12	2 × 8/8	
10	G8ANS	2605	Herts.	2N3478	26	Parabeam		2	G3MAR	6571	Rubery	TIS34	25	2 × 14 ele	
11	G2XV	2463	Cambridge	AF186	100	40 ele stack		3	G8ABQ	6493	Worcester Beacon	AF139	18	Parabeam	
12	G8AUO	2301	Harrow	BF180	38	8/8		4	G8ACP	6469	Leighton Buzzard	Transistor	30	14 ele	
13	G8AOD	1716	E. Grinstead	EC88	12	10 ele		5	G8AIE	5317	Ivinghoe Beacon	BF180	60	8/8	
14	G5UM	1375	Leicester	AF139	15	14 ele		6	G8AYB	4917	Dunstable Downs	AF139	18	18 ele	
15	ON4HN	1235	Zomergem	AF239	125 A3	64 ele stack		7	G8AWN	4709	Carroby Hill	2N3819	25	2 × Parabeam	
					250 A1			8	G8AKQ	3877	Chefftenham & High Wycombe	GM0290	10	8/8	
16	G8ARD	948	Somerset	AF139	38	Parabeam		9	GW8ANY	3609	Montgomery	BF151	15	8/8	
17	G8AUM	895	Herts.	BF180	5	Parabeam		10	G8ART	3376	New Barnet	BF180	25	32 ele stack	
18	G8ATI	863	Bexleyheath	BF180	6	Parabeam		11	G3EFX	3344	Ventnor I.O.W.	2N2398	20	2 × 8/8	
19	G8BAV	726	Derby	AF239	20	Parabeam		12	G8ATK	2778	Reading	GM0290	10	8/8	
20	G3JKY	718	Beckenham	GM0290	12	Corner Refl.		13	G8AHE	2268	Broadway	GM0290	8	14 ele	

SECTION B

1	G3PMH/A	7171	Barkway	GM0290	150	8/8
2	G3WXI/A	4347	Sheffield	GM0290	75	14 ele

Second 1296 MHz Contest 1967

A disappointing entry was submitted for this contest held on 7 and 8 October, with a total of seven entries (compared with 18 for the May event). A check log was received from G2WS, and a listener's log from BRS26234/P is also acknowledged.

Section A produced five entries and sections B and C each produced one. Judging from the logs received this represents a false impression of the activity that took place with well over 20 different stations listed. It is hoped that next time more stations will send in logs even if only one or two contacts are made.

Congratulations go to G3NNG/P as the overall winner who made 16 contacts, 11 of which were both ways. G3MCS was runner-up

and made 16 contacts also, 14 of which were both ways.

The best contact of the contest was between G3MCS and G3OXD/A on c.w., a distance of 124 km. The best phone contact was between G3NNG/P and G8AL at 5 and 7 both ways, a distance of 105 km. G3NNG/P reports that a great deal of time was spent with six other stations without success and favours the half points for one way contacts. BRS26234/P is to be congratulated on receiving a total of nine stations using a 2N3570 transistor in the r.f. stage feeding a transistor converter followed by an EC10 receiver.

G3NNG/P will receive a certificate of merit as leading station, and G3MCS will receive a certificate as runner up.

SECTION A

Posn	Call-sign	Points	QTH	Receiver	Power Input	Watts	Aerial
1	G3MCS	793	Aylesbury	K6AXN	30	3 ft. dish	
2	G2RD	622	Caterham	Diode-Mixer	30	3 ft. dish	
3	G8AGM	310	High Wycombe	TIXM101—K6AXN	30	4 ft. dish	
4	G8AOD	220	E. Grinstead	K6AXN	9	8/8	
5	G3BNL	200	Nottingham	K6AXN	50	3 ft. dish	

SECTION B

1	G3OXD/A	478	Rowley	K6AXN	15	Trough
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SECTION C

1	G3NNG/P	1096	Wantage	IN416 Diode Mixer	12	3 ft. dish
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80 Metre Field Day 1967

The 80 Metre Field Day 1967, held on Sunday, 10 September, has been won by Neil Graham, GW3OAY, who was assisted by Clive Whelan, GW3NJW. In second place was Stanley Andrews, G3OGY whose co-operator was G3DBY.

GW3OAY/P ran 10 watts to a Codar AT5 transmitter with a Codar T28 receiver and a half wave dipole at 30 ft. G3OGY/P had a TT11 p.a. running at 10 watts, a BC348 receiver, and a dipole. The lowest powered station by far was G3JKY/P who ran 0.75 watts. Activity was a little down on last year, and once again there were a number of portable stations active who did not send in logs.

"All gear carried on bicycle (as usual)!" (G3JKY). "A very enjoyable contest which deserves much greater support." (G3BZM). "We found the weekend a good proving ground for NFD." (G3VCP). "Must construct a v.f.o. for next year!" (G3CWL). A number of entrants felt that an additional band should be included to offset the slow scoring rate towards the end of the contest. Alternatively the event could be shortened. The H.F. Contests Committee welcomes comments on these suggestions, and wishes to thank those competitors who sent in comments with their logs.

Awards

Subject to Council approval, the Houston-Fergus Trophy will be awarded to GW3OAY, and a Certificate of Merit to G3OGY.

Position	Call-sign	Score	QSOs	Position	Call-sign	Score	QSOs
1	GW3OAY	353	54	6	G3VCP	262	37
2	G3OGY	308	56	7	G3IGU	246	37
3	G3BZM	290	49	8	G3WQP	245	47
4	G2SIA	287	49	9	G3JHF	226	35
5	G3CWL	270	35	10	G3JKY	189	29

Disallowed: G3WTP (No declaration. Claimed score, 168).
Check logs from G3BY and G3IDG are gratefully acknowledged.

DF National Final

The 1967 DF National Final was organized jointly by the Rugby and Stratford-upon-Avon clubs.

It took place on 15 October in an area south west of Gloucester which included the Wye Valley, and the Forest of Dean. Starting from near the Speech House in the centre of the Forest of Dean, the competitors had to locate two transmitters, G3RPJ/P, and G3BXP/P.

G3RPJ/P was located in the Wye Valley area and competitors were faced with two problems in locating this transmitter. The first was bearing inaccuracy due to the high hills and deep river valley, the second was to decide on which side of the river the transmitter was located. The transmitter was in fact hidden in Bargain Wood, on the far side of the river from the start. This was on a steep hillside overlooking the Vale of Llandovery. Some of the teams found a way to drive along forest tracks to within a few yards of the well concealed transmitter. Others arrived rather wet and muddy, having found a narrow, muddy footpath from the village of Cleddon about half a mile away.

G3BXP/P was hidden in a section of the Forest of Dean near the start. This part of the forest was almost rectangular in shape, covering an area roughly 2 miles by 3 miles in size surrounded by roads. The transmitter was about 1½ miles through the forest from the start, ¾ mile from the nearest road. Competitors approached this transmitter from all directions, walking from various points along the surrounding roads. Some teams even walked from the start, but only one team drove nearer than ½ mile to the transmitter. After this long trek through the forest the competitors were then faced with locating the exact site of the transmitter, which was manned by Rugby's camouflage expert, G3IKL. An almost invisible aerial of fine wire led to a small hole under the roots of a tree, and inside this hole lay both transmitter and operator. A small fallen tree over the entrance completed the cover, which was so successful that it took most teams about ½ hour to trace the aerial to the transmitter.

The winner Mike Hawkins located his second transmitter with 40 minutes to spare. Ian Butson who was the only other competitor to locate both transmitters, finally unearthed G3BXP/P, with only one minute of the contest remaining.

Families, friends and four members sat down to tea afterwards, where Mrs J. J. Grant presented the RSGB DF Trophy to Mike Hawkins, G3WMM.

Thanks are due to G3IKL, G3MDC, G3OOQ, G3RPJ, G3SFV, Mr R. Burdett, and Mr J. J. Grant, all of whom assisted in the organization of this contest.

Position	Name	Club	Time Stn. A	Time Stn. B
1	M. P. Hawkins, G3WMM	Oxford	1450	1550
2	I. R. Butson	Oxford	1629	1515
3	V. Bratton	Oxford	—	1517
4	G. T. Peck	Chiltern	1525	—
5	E. Bristow, G3WNN	Oxford	1525½	—
6	W. North	Chiltern	1529	—
7	E. L. Mollart	Oxford	1527	—
8	E. Trelogan	Oxford	1528	—
9	J. R. Vickers, G3ORI	Stratford	—	1542
10	T. Gage	Oxford	—	1549
11	P. Tyler	Oxford	—	1549½
12	B. J. Mahony, G3NDM	Rugby	—	—

First 1.8 Mc/s Contest 1968

1. **When.** 22.00 GMT on Saturday, 17 February, 1968, to 08.00 GMT on Sunday, 18 February, 1968.

2. **Eligible Entrants.** All fully paid-up members of RSGB resident in G, GC, GD, GI, GM and GW.

3. **The General Rules for RSGB Contests**, as published in the January 1968 issue of *Radio Communication*, will apply except as superseded by these rules.

4. **Contacts:** C.w. (A1) only in the 1.8-2 MHz band.

5. **Scoring.** Six points for the first 10 contacts with any one county, and three points for the eleventh and subsequent contacts with that county.

6. **Contest Exchanges:** RST report followed by the contact number starting with 001, and the county code letters given on page 63 of this issue of *Radio Communication*, e.g., for a contact from Surrey, 589001SY. All reports must be acknowledged with "R."

7. **Logs (a)** Must be tabulated in columns headed (in this order): "Date/Time GMT," "Call-sign of station worked," "My report on his signals and serial number sent," "His report on my signals and serial number received," "County code letters received," and "Points claimed." The county code letters as sent must be entered at the top of each log sheet. RSGB log sheets must be used.

(b) The Cover Sheet must be made out in accordance with General Rule 4, and the declaration signed.

(c) Entries must be postmarked not later than Monday, 4 March, 1968.

8. **Awards:** At the discretion of the Council, the Somerset Trophy will be awarded to the winning station and Certificates of Merit to the stations placed second and third. In addition, the Maitland Trophy will be awarded to the Scottish Member with the highest aggregate number of points in this contest combined with the Second 1.8 MHz Contest 1967. A Certificate of Merit will also be awarded to the non-transmitting member submitting the best check log.

Chiltern Top Band Contest

A 1.8 MHz contest will be held on 21 January, 1968, from 10.00 to 12.00 GMT, in which contestants may only use phone operation. Exchanges should consist of signal reports (RS), serial number and county. Scoring will be 1 point per contact multiplied by the number of counties worked, and 1 point per contact for all other participating stations, for contacts with chiltern stations.

Trophies will be awarded to the leading Chiltern station and Chiltern SWL, and a certificate will be awarded to the leading non-Chiltern entrant. Logs should be posted to M. J. Pemberton, 205 Bowerdean Road, High Wycombe, to arrive not later than 11 February, 1968.

Region 1 (North West) Events

You will have seen in the November BULLETIN that the Wind-scale, Cumberland Group won the North West V.H.F. Contest. The Contest, which was organized on behalf of the Region by the Ainsdale Group, was well supported. G3OHH was runner-up with G3ANY/P in third place, close on their heels. The winners of Region One Field Day this year were Chorley G3DBY/P, with G3NKL/P and G3NWR/P in second and third places respectively.

The 1968 V.H.F./U.H.F. Listeners' Championship

Several suggestions were received from contestants in the 1967 event and so with these in mind, some changes have been made in the rules. Scoring is now based on distance, as in the transmitting contests. The multiplier on 432 MHz has been reduced in view of increased transmitting activity on the band, while the 1296 MHz multiplier has been increased to encourage work on this band. Some entrants have asked whether portable operation is in order and this has been clarified.

1. Eligible Entrants. The Championship is open to all non-licensed fully paid-up Members of the RSGB. Only the entrant may operate his receiving station. Entries will be accepted from newly licensed members provided that the entrant was unlicensed at the time of his first entry in 1968 and that no transmitter is used during any period for which he submits a listener log.

2. Location of Stations. The same site need not be used for each contest in the Championship but the station may not be moved during a contest with the exception that in 1296 MHz events the station may be moved within a 10 km radius. Portable operation is permitted.

3. Duration. The Championship will run throughout 1968 on those dates and times when RSGB v.h.f. or u.h.f. contests occur. Cumulative Activity Contests will not count towards the Championship.

4. Entries. Entrants may submit logs for any or all RSGB v.h.f. and u.h.f. Contests with the exception noted above. The scores of the best six logs from each entrant will be totalled at the end of the year. Not more than four of these logs will be for v.h.f. (70 MHz and 144 MHz). For this purpose V.H.F./NFD will be treated as two separate contests, one v.h.f. and one u.h.f. Entries must be set out on one side only of foolscap paper or on RSGB Contest Log Sheets (available from RSGB HQ) and must be posted within the period allowed for the corresponding transmitting contest. Entries for the 70 MHz and 144 MHz Listeners' Contests will be automatically credited to the Championship.

5. Logs. Logs must show in columns: (a) Date/time GMT. (b) Call-sign of station heard. (c) My report on his signals. (d) Report and serial number sent by station heard. (e) Call-sign of station being worked. (f) Location given by station heard. (g) Points claimed. In the case of multi-band events, e.g. V.H.F./NFD, separate logs are required for each band and stations may be logged once on each band.

6. Scoring. Points are to be scored as shown in Rule 4 of General Rules for V.H.F./U.H.F. Contests for 1968 published in this issue, except that the station multiplier does not apply.

The score on 432 MHz will be multiplied by 2.

The score on 1296 MHz will be multiplied by 12.

7. Awards. At the discretion of the Council the Hanson Trophy will be awarded to the leader of the Championship and Certificates of Merit will be awarded to the runner-up and for particularly meritorious logs for individual events. These awards are in addition to the awards for the Listeners' Contests.

First 144 MHz (S.S.B.) Contest

During the first experimental s.s.b. contest held last year it was noticed that there was considerable QRM caused by stations operating close to the s.s.b. frequency. In order to reduce the QRM level it is suggested that s.s.b. stations operate plus or minus 50 kHz of 145-40 MHz during this contest.

1. Date and Time. 8 January, 1968, from 20.00 to 22.00 GMT.

2. All Logs should be sent to the adjudicator at the following address: V.H.F. Contests Committee, 80 Argyle Road, Ealing, London, W13.

In addition the following General Rules will apply: 3 b, 4, 5 a, 6 a, 7 c, 8 c, 9 a, 10 b, 11 to 18, 20, 23 and 26 to 28.

Second 144 MHz (Open C.W.) Contest

The simple scoring system used in the past was very popular because it did not involve any distance measurement. The new scoring system based on distance is as easy and almost as quick to use, while being fairer.

1. Date and Time. 28 January, 1968, from 10.00 to 18.00 GMT.

2. All Logs should be sent to the adjudicator at the following address: V.H.F. Contests Committee, "Summerleigh," Beltinge Road, Herne Bay, Kent.

In addition the following General Rules will apply: 3 a, 4, 5 a, 6 a, 7 a, 8 b, 9 b, 10 a and 11 to 28.

First 70 MHz (Open) Contest

1. Date and Time. 11 February, 1968 from 10.00 to 20.00 GMT.

2. All Logs should be sent to the Adjudicator at the following address: V.H.F. Contests Committee, 60 Merlin Grove, Beckenham, Kent.

In addition the following General Rules will apply: 3 a, 4, 5 a, 6 a, 7 a, 8 a, 9 b, 10 a and 11 to 28.

LETTERS TO THE EDITOR

Neither the Editor nor the Council of the Radio Society of Great Britain can accept responsibility for views expressed by correspondents. Letters for inclusion in this feature should be concise and preferably not more than 200 words in length.

Buy British

From: F. Powell, G3SEL, Yeovil, Somerset.

A point often put forward in favour of buying British is that spares are readily available.

I recently had minor faults in two pieces of equipment, one British and one was American. I wrote to both firms on the same day. Twenty one days later I not only received the spares from Hammarlund that I ordered, but several other parts as they thought that these might be required.

I have not yet had a reply from the British manufacturer.

The American firm replied and dealt through what they called "Customer Service Dept." Obviously they believe that one satisfied customer is worth a lot of advertising.

"Advanced Modulation" and Incentive Licensing

From: Richard Ebeling, K2UTC, New York, USA.

I'm writing you today in regard to the recently adopted rules changes (FCC Docket No. 15928, Incentive Licensing) here in the USA which no doubt you have read.

My reason for writing is to encourage the many a.m. operators in the United Kingdom to scout more of the 15/20m USA phone bands after 22 November, 1968, for those of us who still use a.m. (advanced modulation) since the FCC has decided to divide the American

phone band by class of licence. Generally, on 15m these days, the remaining USA a.m. operators are found below 21,300 kHz, but after effective date of Docket No. 15928, there will be lots of s.s.b. from 21,250 kHz upwards, so this should not discourage those UK chaps who still use a.m. Actually a.m. can still be used from 21,250 kHz upwards by those American amateurs who have the necessary licence to operate here as there is no designation as to type of emission. Over the last few years the use of s.s.b. has mainly occupied the upper portion of 15m, but now that class of licence determines where one may operate, this means either mode may be used anywhere and the so-called "gentlemen's agreement" has ended. If the UK chaps will tune right up to 21,450 kHz for a.m. signals if so interested, this may not mean a "Coup de Grace" to a.m.

I personally, with on-the-air contacts, will attempt to encourage those who use a.m. to tune more of the band searching for other a.m. stations as we are outnumbered on 15/20m, but needless-to-say, total 10m s.s.b. has a l-o-n-g way to go to outnumber the a.m. operators. Speaking of 10m, why do so many chaps still crowd the low end of the band when the m.u.f. reaches past 29,700 kHz, and at least 500 kHz remain relatively free from this point downwards.

RSGB 7 Mc/s DX Contest

From: R. L. Halls, 9V1LK, ex-G3E1W MP4BEX, EP21W, VS1LK, Singapore.

I know that DX is a relative term, but my interpretation of DX is working stations which are outside of the normal range of the every day working of a particular band.

Anything under at least 3000 miles on 7 Mc/s is not DX; I think most people would agree with that.

Last Sunday morning, 12 November, at 01.30 onwards, I sat by
(continued opposite)

List of United Kingdom Counties for RSGB Contests

County Code Letters	County	Code Letter of Adjacent Counties	County Code Letters	County	Code Letters of Adjacent Counties
AD	Alderney		KS	Kinross	CN, FE, PH
AG	Anglesey	CV	KT	Kent	EX, LD, SX, SY
AL	Argyllshire	AY, BU, DU, IS, PH RW			
AM	Antrim	DW, LY	LD	London (Postal District)	EX, HF, KT, MX, SY
AN	Aberdeen	AS, BF, IS, KE, PH	LE	Lancashire	CD, CH, WD, YS
AR	Armagh	DW, TE	LK	Lanark	AY, DF, DU, MN, PB, RW, SG, WN
AS	Angus	AN, KE, PH	LN	Lincoln	CE, LR, NK, NM, NR, RD YS
AY	Ayrshire	AL, BU, DF, KB, LK, RW, WG	LR	Leicester	DY, LN, NM, NR, RD, SD, WK
			LY	Londonderry	AM, TE
BD	Bedfordshire	BS, CE, HF, HN, NR	MG	Montgomery	CA, DB, MR, RN, SE
BE	Berkshire	BS, GR, HE, OX, SY, WE	MH	Monmouth	BR, GN, GR, HD
BF	Banff	AN, IS, MY	MN	Midlothian	BW, EL, LK, PB, RH, SK, WN
BR	Brecknock	CA, CR, GN, HD, MH, RN	MR	Merioneth	CA, CV, DB, MG
BS	Buckingham	BD, BE, HF, MX, NR, OX, SY	MX	Middlesex	BS, EX, HF, LD, SY
BU	Bute	AL, AY	MY	Moray	BF, IS, NN
BW	Berwick	EL, MN, ND, RH			
			ND	Northumberland	BW, CD, DH, RH
CA	Cardigan	BR, CR, MG, MR, PK, RN	NK	Norfolk	CE, LN, SF
CD	Cumberland	DF, DH, LE, ND, RH, WD	NM	Nottingham	DY, LN, LR, YS
CE	Cambridge	BD, EX, HF, HN, LN, NK, NR, SF	NN	Nairn	IS, MY
CH	Cheshire	DB, DY, FT, LE, SD, SE, YS	NR	Northants	BD, BS, CE, HN, LN, LR, OX, RD WK
CL	Cornwall	ND			
CN	Clackmannan	FE, KS, PH, SG	OX	Oxford	BE, BS, GR, NR, WK
CR	Carmarthen	BR, CA, GN, PK	OY	Orkney	
CT	Caithness	SU			
CV	Caernarvon	AG, DB, MR	PB	Peebles	DF, LK, MN, SK
			PH	Perth	AL, AN, AS, CN, DU, FE, IS, KS, SG
DB	Denbighshire	CH, CV, FT MG, MR, SE	PK	Pembroke	CA, CR
DF	Dumfries	AY, CD, KB, LK, PB, RH, SK			
DH	Durham	CD, ND, WD, YS	RD	Rutland	LN, LR, NR
DN	Devon	CL, DT, ST	RH	Roxburgh	BW, CD, DF, MN, ND, SK
DT	Dorset	DN, HE, ST, WE	RN	Radnor	BR, CA, HD, MG, SE
DU	Dunbarton	AL, LK, PH, RW, SG	RW	Renfrew	AL, AY, DU, LK
DW	Down	AM, AR	RY	Ross & Cromarty	IS, SU
DY	Derby	CH, LR, NM, SD, YS			
			SD	Stafford	CH, DY, LR, SE, WK, WR
EL	East Lothian	BW, MN	SE	Shropshire	CH, DB, FT, HD, MG, RN, SD, WR
EX	Essex	CE, HF, KT, LD, MX, SF	SF	Suffolk	CE, EX, NK
			SG	Stirling	CN, DU, LK, PH, WN
FE	Fife	CN, KS, PH	SK	Selkirk	DF, MN, PB, RH
FH	Fermanagh	TE	SL	Shetland	
FT	Flintshire	CH, DB, SE	SR	Sark	
			ST	Somerset	DN, DT, GR, WE
GN	Glamorgan	BR, CR, MH	SU	Sutherland	CT, RY
GR	Gloucester	BE, HD, MH, OX, ST, WE, WK, WR	SX	Sussex	HE, KT, SY
GY	Guernsey		SY	Surrey	BE, BS, HE, KT, LD, MX, SX
HD	Hereford	BR, GR, MH, SE, WR, RN	TE	Tyrone	AR, FH, LY
HE	Hampshire	BE, DT, SX, SY, WE			
HF	Hertford	BD, BS, CE, EX, LD, MX	WD	Westmorland	CD, DH, LE, YS
HN	Huntingdon	BD, CE, NR	WE	Wiltshire	BE, DT, GR, HE, ST
			WG	Wigtown	AY, KB
IM	Isle of Man		WK	Warwick	GR, LR, NR, OX, SD, WR
IS	Inverness	AL, AN, BF, MY, NN, PH, RY	WN	West Lothian	LK, MN, SG
			WR	Worcester	GR, HD, SD, SE, WK
JY	Jersey		YS	Yorkshire	CH, DH, DY, LE, LN, NM, WD
KB	Kirkcudbright	AY, DF, WG			
KE	Kincardine	AN, AS			

(continued)

my receiver for several hours listening to "G's" working DL, YU OZ, SM, and the other near countries, and exchanging reports of 599. These people were competing in the 7 Mc/s DX contest, yet they were not working DX.

Myself and at least two Australian stations, after trying for hours to find the chap with a selective enough receiver and ears that could hear a 579 signal, gave up and went to bed. Now I know some people will say he is just some because he couldn't work anyone, which in a way is right. However, I did take the precaution to work at least one European station ten minutes before the contest

started and received a 579 report so there was little doubt the signal was getting through.

It is my opinion that if this contest is to remain as a "DX" contest, the rules must be so modified that no points are scored for contacts of less than 3000 miles, and to accommodate the people who are within 3000 miles of UK then they can score by working stations in the Commonwealth. In this way contacts will be spread all round the world and not just in the UK. If people are prepared to make the effort overseas to make a contest a success it seems only reasonable for the "G's" to take some trouble also.

CLUB NEWS

REGULAR FEATURE

Please post contributions to your Regional Representative, whose address can be found on page 9, to arrive not later than the first of the month. For further details of club activities, contact the amateur whose call-sign appears at the end of the item.

You will have noticed by now the absence of *Clubroom* from this first issue of *Radio Communication*. Members who send in copy for inclusion should note that this feature and *Forthcoming Events* have merged. We hope the result will make more interesting reading and to this end a change in format has been evolved. As can be seen the layout is similar to previous *F-E* pages, but closer examination shows that some Societies have expanded items. It is hoped in future to publish more detailed accounts of proposed meetings rather than dwelling at length on those past. We would be glad to have constructive comment and suggestions; write to *Radio Communication*, 28 Little Russell Street, London, WC1.

REGION 1

Ainsdale (ARS).—10, 24 January, 7 February, 8 p.m., 77 Clifton Road Southport.

Allerton (Liverpool) (SRHS).—Thursdays, 8 p.m., 3rd Allerton Scout Group Headquarters, Church Road, Woolton, Liverpool.

Ashton under Lyne (AUL & DARS).—Fridays, 7.30 p.m., 6 Stamford Street, Staybridge.

Blackburn (ELARC).—4 January, 1 February, YMCA, Limbrick, Blackburn.

Blackpool (B & FARS).—Mondays, 8 p.m., Pontins Holiday Camp, Squires Gate, Morse Road, Blackpool.

Bury (B & RRS).—9 January (Club Notes), Tuesdays, 8 p.m., Sundays, 11 a.m. The Georges Hotel, Market Street, Bury.

Chester (C & DARS).—Tuesdays, 8 p.m., YMCA, Chester.

Crewe & District.—5 February, 8 p.m., 80 Albert Street.

Eccles (E & DRC).—Tuesdays, 8 p.m., Patricroft Congregational Schools, Shakespeare Crescent, Patricroft. Every Thursday (Club Top Band Net), 8.30 p.m.

Liverpool (L & DARS).—9 January (Open Meeting), 16 January (Lecture on DX Working), 23 January (Junk Sale), 30 January (Business Meeting), 8 p.m., Conservative Association Rooms, Church Road, Wavertree. The Society has recently held its annual Dinner/Dance which was a great success. Shortly, it is hoped to be visited by K5QWS and Frank Johnstone, G3IDC. G3TYE.

Liverpool (NLRC).—5, 19 January, 2 February, 8 p.m., Landsbury House, 13 Crosby Road South, Liverpool 22.

Macclesfield (M & DRS).—16, 30 January, 8 p.m., The George Hotel, Jordangate.

Manchester (M & DARS).—Wednesdays, 7.30 p.m., 203 Droylsden Road, Newton Heath, Manchester 10. Future meetings will include lectures on Aerials, Stereo f.m. Broadcast reception and Radar. by G2DCF, Bill Mackie and G3TJX respectively. On 1 November an interesting lecture was given on the subject of Budget Stereo by Ernie Quigley of Stockport RS. G3TJX.

Manchester (SMRC).—Fridays, 7.45 p.m., Rackhouse Community Centre, Daine Avenue, Northenden.

North West V.H.F. Group.—Tuesdays and on 8 January (Discussion Night), 8 p.m., Club HQ, Chapelton Street, Manchester. V.H.F. Techniques were comprehensively described by Mr F. James at a meeting on 14 November. The new secretary is Mr W. R. Parkinson, G3FNM.

Preston (ARS).—11, 25 January, 7.30 p.m., "Windsor Castle," (Private Room), St Paul's Square.

St Helens (SES).—9, 23 January, 6 February, 7.30 p.m., IVS Centre, 55 College Street.

Southport (SRS).—Wednesdays, 8 p.m. and Sundays, 2.30 p.m., The Esplanade.

(73 S.S.B. Society).—Tuesdays, 8 p.m., (All commencing with a talk on part of the RAE Syllabus), 73 Avondale Road North, Southport.

Stockport.—10, 24 January, 7 February, Royal Oak Hotel, Castle Street, Edgeley.

Warrington Culcheth (CARC).—Fridays, 7.30 p.m., The Harrow Inn, Culcheth.

Westmorland.—5, 19 January, 2 February, 7 p.m., The Allen Technical College, Sandes Avenue, Kendal.

Wirral (WARS).—17 January, 7 February, 8 p.m., Harding House, Park Road West, Cloughton, Birkenhead.

REGION 2

Barnsley (B & DARC).—12 January ("G2DAF Receiver," by G3LRP), 26 January ("Transistor Oddments" by G4JJ), 7.30 p.m., King George Hotel, Peel Street, Barnsley.

Bradford (BRS).—9 January (Have you a Radio problem? Why not ask the Committee), 17 January ("Fingerprints"—visit to Northern Heights ARS), 23 January ("RAEN, Scouting & Amateur Radio" by F. Dews, G3HPD & F. D. Walker, G3JWM), 6 February (Members' Colour Slides), 7.30 p.m., Bradford Technical College, Great Horton Road, Bradford. V.H.F. was again the subject of an interesting lecture in recent weeks. This time J. Burgess G3KKP presented a talk and demonstration and completed the evening by working a local amateur on v.h.f. G3OTO.

Halifax and District Amateur Radio Society.—For details contact Robert Millar, G3WLW, 17 Brooklands, Bradley, Huddersfield, Yorks. Among recent activities was a visit to local BBC and ITA Broadcasting stations.

Hull (H & DARS).—5 January (Annual Dinner), 7.30 p.m., Dorchester Hotel, Beverley Road, Hull. Tickets priced 22s. 6d. are available from G3AGX. 12 January ("Demonstration of J-Beam Aerials" by G3FCY), 19 January ("Talk on Test Meters—Part 4—" by G3PQY), 26 January (AGM), 8 p.m., 592 Hessle Road, Hull.

Northern Heights.—17 January ("Fingerprints," by Wakefield CID Officer), 31 January (Film Show including "Handle with Care" from Decca), 7.45 p.m., Sportsman Inn, Ogdin, Halifax.

Scarborough (SARS).—Thursdays, 7.30 p.m., rear of 3 Trinity Road, Scarborough.

South Shields (SS & DARC).—4 January (Film Show including GPO Colour film "Ship to Shore"), 27 January (Annual Dinner) 7.30 p.m., Trinity House Social Centre, Laygate, South Shields.

REGION 3

Birmingham (Bourneville).—Fridays, 8 p.m.

(MARS).—16 January (Talk and Demonstration of the Sommerkamp F Line), 7.45 p.m., The Midland Institute, Margaret Street, Birmingham 1. MARS met on 21 November when Howard Parker, G6KRU/T talked on and demonstrated Amateur Television. The demonstration was hampered, however, by high steel buildings in the proximity of the institute. G6CC.

(SBRS).—First Wednesday in the month, 8 p.m., Scout Hut, Pershore, Road.

Bromsgrove (B & DARC).—12 January ("S.S.B. Exciter"—Club Project), 8 p.m., Co-op Hall.

Cannock (CCARS).—First Thursday in the month, Bridgton Social Club, Walsall Road.

Dudley (DARC).—12, 26 January, 8 p.m., Art Gallery, Dudley.

Hereford (HARS).—First Friday in the month, 7.30 p.m., Mortimer Hall, Mortimer Road.

Nuneaton ARS.—Details from J. Roughton, 42 Severn Road, Bulkington, Nr Nuneaton, Warks.

Shrewsbury (SARS).—4 January (D/F by Mr Simmonds, Slade ARS), 11 January ("Film Show" by Mr Harris), 16 January (Club Projects, G3UDA), 25 January ("Two Metres" by J. Armstrong, G3GDA), Old Post Office Hotel, Milk Street, Shrewsbury.

Stourbridge (STARS).—9 January ("Raynet on 70 MHz," by T. Blackmore, G3FKO), The Library, Longlands School.

Sutton Coldfield (SCRS).—Second Monday and forth Wednesday in the month, 8 January (Junk Sale), 8 p.m., The Fox Inn, Sutton Coldfield. During the AGM, which incorporated a display of home constructed equipment, Tony Ferneyhough, G8AVH won the Senior Trophy with a G8ABP designed 70cm converter. G8AVH.

Leamington Spa (MWARS).—8 January (AGM), 22 January ("D/F" by AEI RS Rugby), 7 Regents Grove, Leamington Spa.

Wolverhampton (WARS).—8 January (New Year's Party, Black Horse), 15 January (Film Show), 8 p.m., Nechells Cottage, Stockwell Road, Tettenhall. Every Monday (Morse Classes), 7.15 p.m., Nechells Cottage.

REGION 4

Burton on Trent (B-o-T & DRS).—10 January ("D/F—Some second thoughts" by J. W. Morris), 7.30 p.m., Stapenhill Institute, Stapenhill, Burton on Trent.

Chesterfield (C & DRS).—3, 17, 31 January, 7.30 p.m., Newbold Observatory, Chesterfield.

Derby (D & DARS).—3 January (Surplus Sale), 10 January (Juniors' night), 13-14 January (AFS Contest), 17 January (Committee Meeting—Library), 24 January (afternoon visit to John Davis & Son, Alfreton Road, 2.30 p.m.), (evening — Sub-basement clean up), 31 January (Technical Film Show), 7 February (AGM), 7.30 p.m., Room 4, 119 Green Lane, Derby.

Grimsby (GARS).—11 January (Tape Lecture—Transmitter Design and TVI—Organize AFS), 25 January (Sale of Surplus equipment), 7.30 p.m., Grimsby Model Engineers Club Room, Fletchers Yard, Wellowgate, Grimsby.

Leicester (LRS).—Mondays, 7.30 p.m., Sundays, 10.30 a.m., Club Room, Gilroes Estate Cottage, Groby Road, Leicester.

Leicestershire V.H.F./U.H.F. Group.—18 January ("V.H.F. Aerials and other matters," by Dave Dryden, G3BKQ) 7.30 p.m., Regional College of Further Education, The Newarke, Leicester.

Loughborough (LARC).—5 January (Contest operating procedure by L. Sharrock, G3BNL and D. Watson, G3PXP), 12 January (Night on the air—R. Rawlins), 19 January (Preparations for Club Annual Dinner), 20 January (Annual Dinner—"Nandinis Restaurant, Bedford Square), 26 January (Lecture—subject to be announced), 7.30 p.m., Club Room, Bleach Yard, Wards End, Loughborough.

Melton Mowbray (MMARS).—18 January (2m and 70cm by L. J. Fisher, G4MK), 7.30 p.m., St John Ambulance Centre, Asforby Hill, Melton Mowbray.

Newark (NSWC).—Mondays, Thursdays, 7.30 p.m., Room No 3, Sherwood Community Centre, Woodthorpe House, Mansfield Road, Sherwood, Nottingham.

Peterborough (P & DARS).—Fridays, 2 February (Film Show), 7.15 p.m. Peterborough Technical College, Eastfield Road, Peterborough. Details from G3KPO.

Workshop (NNARS).—Tuesdays (RAE Class), Thursdays (Lecture night), 7.30 p.m., Club Room, 13 Gateford Road, Workshop.

REGION 5

Bedford (B & DARC).—Headquarters, "The Dolphin Inn," The Broadway, Bedford. Particulars of meetings from G3VBA.

Bishop's Stortford (BS & DARC).—Details of meetings from Andrew Marriott G3VWS, 21 Thorley Hill, Bishop's Stortford, Herts.

Cambridge (C & DARC).—5 January (Engineering a System—Jim Bucknell), 12 January (Informal), 19 January ("Take your Pick" Quiz), 26 January (Informal) 2 February (Grand Junk Sale), Fridays, 7.30 p.m., Club Headquarters, Victoria Road, Cambridge. Meetings

have settled down to a regular pattern of a formal talk, demonstration, quiz or film, alternating with a completely informal evening. On 17 November there was a helpful and informative talk on Station Planning by Peter Simpson, G3GGK. G5BQ.

Cambridge University (CUWS).—Meetings on Tuesdays at 8.15 p.m., Department of Psychology, Downing Site, Cambridge.

March (M & DARS).—Tuesdays, 7.30 p.m., at Old Police Headquarters, High Street, March, Cambridgeshire.

Royston (R & DARC).—Wednesdays 8 p.m., Manor House Social Club, Melbourn Street, Royston, Hertfordshire.

Shefford (S & DARS).—4 January (Discussion on the Causes and Cures of TVI), 11 January ("The FET Voltmeter" by G3ROL), 18 January (First NFD Planning), 25 January (AGM), 1 February ("Phase Changing" by G3TDW), Thursday Evenings, (Morse Classes), 7.45 p.m., Meetings 8 p.m., Church Hall, High Street, Shefford, Bedfordshire.

REGION 6

Cheltenham RSGB Group.—First Thursday in the month, 4 January ("Propagation and the Radio Amateur" by F. M. Smith, G8KG), 8 p.m., Great Western Hotel, Clarence Street, Cheltenham.

High Wycombe (CARC).—Last Thursday in the month, British Legion HQ, High Wycombe. 21 January (Top Band Contest, see page 61). Further details from M. J. Pemberton, 205 Bowerdean Road, High Wycombe, Bucks.

Gloucester (GRC).—Second and fourth Thursdays in the month, (Morse Practice included each evening), 7.30 p.m., Lamb Inn, Market Parade, Gloucester.

REGION 7

Acton, Brentford and Chiswick (ABCRC).—16 January (AGM), 7.30 p.m., Chiswick Trades and Social Club, 66 High Road, Chiswick.

Addiscombe (AARC).—9 and 23 January, 7.30 p.m., 158 Lower Addiscombe Road (Toc H Hall).

Ashford (Middlesex) Echelford (ARS).—11, 25 January, 7.30 p.m. St Martin's Court, Kingston Crescent, Ashford.

Bexleyheath (NKRS).—11 January (Club Station and Natter Evening), 25 January (Musical Evening), 7.30 p.m., Church Hall, Chapel Road, Bexleyheath.

Chingford RSGB Group.—5, 19 January, Royal Forest Hotel, Chingford.

Chingford (SRC).—Fridays, except first in month, 8 p.m., Friday Hill House, Simmons Lane, Chingford, E4.

Croydon (SRCC).—16 January, 7.30 p.m., Blue Anchor, South End.



Married at the Holy Redeemer Church, Sidcup on 7 October were Frank Moore, G3VST and Miss Linda Park. Best Man was Mr W. G. Covil, G3VJD.

Photo by: G3BTC

Dorking (DR & DRS).—9 January, 8 p.m., Wheatsheaf. 23 January 8 p.m., Star and Garter, Dorking.

East Ham.—First and third Tuesdays, 7.30 p.m., 12 Leigh Road, East Ham.

Ealing (E & DARS).—Tuesdays, 7.30 p.m., Northfields Community Centre, Northcroft Road, W13.

East London.—21 January ("Aerials in Difficult Situations," by D. Purchase, G3LXP), 2.30 p.m. Wanstead House, The Green, Wanstead, London, E11.

Edgware & Hendon (EDRS).—22 January, 8 p.m., 8 January (AGM), John Keble Hall, Church Close, Deans Lane, Edgware.

Gravesend (GRS).—Third Wednesday, 8 p.m., RAFTA Club, Overcliff Road.

Guildford (G & DRS).—12 January (Junk Sale), 26 January (Natter Night). 8 p.m., Guildford Engineering Society in Stoke Park.

Hampton Court (TVARTS).—First Wednesday in the month, 7.30 p.m., Cardinal Wolsey, Hampton Court. The Annual Dinner and Dance was held on Saturday, 11 November, at the Court Restaurant, Hampton Court. The principle guests were Mr and Mrs John Graham, G3TR, RSGB President elect. Earlier in the evening, A. Mears, G8SM presented on behalf of club members a Japanese picture to L. Cooper, G5LC, in appreciation of his 21 years as President of TVARTS. Each lady present received an Italian scarf, as well as competing for table prizes. Dancing was to the Leo Gray Band with Cabaret by Steve Brett of the BBC "Sunday Special" programme. Good wishes were received from Barney Patterson, G13KYP, RSGB President and Harry Wilson, President of the Irish Transmitters Society. G8SM.

Harlow (DRS).—Tuesdays and Thursdays, 7.30 p.m., Mark Hall Barn, First Avenue.

Harrow (RSH).—5 January (Annual General Meeting), 12 January (Future), Roxeth Manor School, Eastcote Lane.

Holloway (GRS).—Mondays (RAE), 7 p.m., Wednesdays (Morse) 7.30 p.m., Fridays (Club) 7.30 p.m., Monton School, Hornsey Road.

Hounslow (HDSR).—8, 22 January, 7.30 p.m., Canteen, Mogden Main Drainage Department, Mogden Works, Isleworth.

Ilford.—Thursdays, 8 p.m., 103 Heath Road, Chadwell Heath.

Kingston (K & DARS).—Second Wednesday each Month, 8 p.m., YMCA, Eden Street.

Kings Langley (HH & DARS).—First and third Friday in the month, 8 p.m., Rucklers Lane Hall, Kings Langley. Hemel Hempstead and District ARS meet on 15 December for an interesting talk by John Swinnerton, G2YS, entitled "Amateur Radio in the Thirties." Earlier it was reported that Alex Lex-Arnold managed to acquire a duplicator to assist in the production of the club's newsletter. G3UZF.

Leyton and Walthamstow.—Tuesdays, 7.30 p.m., Leyton Senior Institute, Essex Road, London, E10.

London UHF Group.—4 January (Preamplifiers), 8 p.m., White Hall Hotel, Bloomsbury Square, Holborn.

Loughton.—12, 26 January 7.30 p.m., Loughton Hall (nr. Debden Station).

Maidenhead (N & DARC).—16 January, 7.30 p.m., Victoria Hall, Cox Green, Maidenhead.

New Cross.—Wednesday and Fridays, 8 p.m., 225 New Cross Road, London, SE14.

Norwood & South London (CP & DRS).—27 January ("V.H.F. and Meteorology," by Charlie Newton, G2FKZ), CD Centre, Woodyates Road, SW12.

Paddington (P & DARS).—Wednesdays, 7.30 p.m., Beauchamp Lodge, 2a, Warwick Crescent, W2.

Purley (P & DRC).—First and Third Fridays, 8 p.m., Railwayman's Hall, Side Entrance, 58 Whytecliff Road, Purley. The continuation of the October Junk Sale was held on 17 November when the attendance of the two meetings topped 120 and over £13 10s. boosted club funds. Membership is increasing at a rate of three or four per month and prospective members are always welcome at club meetings. G3FTQ.

Reigate (RATS).—10 January (AGM), George & Dragon, Cromwell Road, Redhill. 2 February (Annual Dinner and Dance), at the Lakers Hotel. The Annual Constructional Contest, judged by members of the Crawley Club, was held in November when the G8KW

Cup—Open Class—was won by G3NKS with his transistorized transmitter for 1.8 MHz; the XYL Cup Junior Class by Clive Graham with his transistorized receiver; and the G3RCY Trophy—Hilarious Class—by G8AAZ with his pulsed, variable tone generator. G3NKS.

Romford (R & DRS).—Tuesdays, 8.15 p.m., RAFTA House, 18 Carlton Road.

Scouts (ARS).—18 January, 7.30 p.m., Baden Powell House, Queensgate, South Kensington, SW7.

Sidcup (CVRS).—4 January ("The Transmitting Licence," by S. W. Smith), 8 p.m., Congregational Church Hall, Court Road, Eltham. 18 January (Natter Night), 8 p.m., All Saints Church Hall, Bercta Road, New Eltham.

Slough (SDR Group).—First Wednesday every month, United Services Club, Wellington Street.

South London Mobile Club.—13, 27 January, 7.30 p.m., Clapham Manor Baths, SW4.

Southgate & District.—11 January, 7.30 p.m., Parkwood Girls School, (behind Wood Green Town Hall).

St. Albans (Verulam ARC).—3 January, (Informal Meeting), 17 January ("Mobile Operating up to date," by G3LXP). 7.30 p.m., Watford Road, St. Albans.

Sutton & Cheam (SCRS).—16 January, 8 p.m., The Harrow Inn, High Street, Cheam.

Welwyn (Mid Herts ARS).—11 January (G3LXP on "Mobile Operation"), 8 p.m., Welwyn Civic Centre, Welwyn.

Westminster (CSRS).—17 January (Informal Meeting), 7 February ("S.S.B. Working," by E. P. Essery, G3KFE), 6 p.m., Science Museum, South Kensington.

Wimbledon (W & DRS).—12 January, 7.30 p.m., St. George's Road, Wimbledon, SW19.

Wembley (GECARS).—Thursdays, 7 p.m. This Club is now open to non-GEC Employees by invitation. Telephone ARNold 1262 first. Sports Club, St. Augustin Avenue, North Wembley.

REGION 9

Bristol RSGB Group.—15 January ("Omni-Match," by G. Twist, G3LWH) 7.30 p.m., Becket Hall, St Thomas Street, Bristol 1. The talk on 20 November by John Clarricoats, G6CL entitled "Amateur Radio, Past, Present and Future" was given to 60 members and visitors, who remained completely silent during the evening. A tribute to the manner in which this interesting subject was presented. G3PFD.

Bristol (BARC).—Monday and Thursdays, 7.30 p.m., University Settlement, 43 Ducie Road, Barton Hill, Bristol 5.

Burnham on Sea (B-o-S ARS).—Second Tuesday in the month, 8 p.m., Crown Hotel, Oxford Street, Burnham-on-Sea.

Cornwall (CRAC).—First Thursday in each month, 7.30 p.m., Staff Recreation Hall, SWEB Headquarters, Pool, near Camborne.

Cornwall (V.H.F. Group).—Third Thursday in each month, 7.30 p.m., The Coach and Horses, Pydour Street, Truro.

Exeter.—First Tuesday in each month, 7.30 p.m., George and Dragon Inn, Blackboy Road, Exeter.

Plymouth (PRC).—Every Tuesday, 7.30 p.m., Virginia House, Bretonside, Plymouth.

Saltash (S & DARC).—Alternate Fridays, 7.30 p.m., Burraton Toc H Hall, Warraton Road, Saltash.

South Dorset (SDRS).—First Friday in each month, 7.30 p.m., Labour Rooms, West Walk, Dorchester.

Taunton.—Alternate Thursdays, 7.30 p.m., Lecture Theatre, Taunton Technical College.

Torquay (TARS).—Every Tuesday and Friday from 7.30 p.m., 27 January ("Semi-Conductors" by J. Bagwell, STC Ltd.) 7.30 p.m., Club Headquarters, Bath Lane, Rear 94, Belgrave Road, Torquay.

Wells (WARS).—Mondays, 8 p.m., EMIE (Wells) Sports and Social Club, Chamberlain Street, Wells, Somerset.

Weston-super-Mare (W-s-M ARS).—January meeting and new meeting place to be notified by G3GNS.

Yeovil (YARC).—Wednesdays, 7.30 p.m., Park Lodge, The Park, Yeovil.

REGION 10

Blackwood (ARC).—Fridays, Lectures and practical programmes, Section devoted to RAE Exam. 7.30 p.m., Blanche Cottage, off High Street, Blackwood, Mon.

Cardiff RSGB Group.—Monday, 8 January, (Talk on TVI and BCI) 7.30 p.m., TA Centre, Park Street, Cardiff.

Cardiff University College Radio Society.—This Society has recently been formed, and all interested are invited to write to the Secretary, College Radio Society, University College Students' Union, Dumphries Place, Cardiff.

Pembroke (ARC).—Last Friday of month, 7.30 p.m., Defensible Barracks, Pembroke Dock.

Pontypool (ARC).—Tuesdays, 7 p.m., Educational Settlement, Rockhill Road, Pontypool, Mon.

Port Talbot.—Details from J. E. Williams, 83 Commercial Street, Maesteg, Glam. On 12 December, GW4NZ talked on and demonstrated his KW2000A transceiver.

REGION 11

Bangor (UCNWARS).—25 January ("Sound Recording" by R. Auger, Technical Manager, Pye Records Ltd), 26 January, (Annual Dinner, details from GW8BDT), 5.30 p.m., University College of North Wales, Bangor.

REGION 12

Aberdeen (AARS).—12 January (Junk Sale), 19, 26 January, 7.30 p.m., Blenheim Lane, Aberdeen.

REGION 13

Edinburgh (LRS).—11 January, (V.H.F./U.H.F.), 25 January (Visit to Nuclear Enterprises, details from GM3PSP) Meetings normally 7.30 p.m., YMCA, 14 South St. Andrew Street, Edinburgh.

REGION 14

Ayrshire (AARG).—Information on new meeting place and dates to be given on GB2RS.

Auchenharvie (A & DARS).—4, 9, 11, 16, 18, 23, 25, 30 January, 7.30 p.m., Auchenharvie Community Centre, Stevenston.

Glasgow University (GURC).—12 January ("Radio Astronomy" by Tony Thomson), 7.30 p.m., Engineering North Building, University of Glasgow.

Lowland Royal Signals.—Tuesdays, January 7.30 p.m., 21 Jardine Street, Glasgow.

Greenock (G & DARC).—12 January ("Home-Brew Morse Oscillators, Frequency Changing and Multiplying" by J. Stirling), 26 January ("Oscilloscopes and Their Use" by A. Murray) 7.30 p.m., Art's Guild, Campbell Street, Greenock.

Motherwell (M-L RSGB Group).—19 January, (AGM), 7.30 p.m., YMCA, Brandon Street, Motherwell.

REGION 15

Bangor (B & DARS).—First Friday in the month, 5 January (EGM), Silverstream Unionist Hall, Bangor.

Belfast and District RSGB Group.—Third Wednesday in the month 8 p.m., War Memorial Building, Waring Street, Belfast.

REGION 17

Basingstoke (BARC).—Third Saturday in the month, 7 p.m., Immanuel Hall, Wote Street.

Harwell AERE (ARC).—Third Tuesday in the month, 7.30 p.m., Social Club, AERE Harwell.

Maidenhead (MDARC).—First Monday in the month (Formal), Third Tuesday in the month (Informal), 7.30 p.m., Victory Hall, Con Green.

Portsmouth (P & DRS).—Wednesday, 7.30 p.m., Room 5, Twyford Avenue Community Centre, Portsmouth.

Southampton (RSGB Group).—Second Saturday in the month, 7 p.m., Engineering Lecture Theatre, Lanchester Building, The University, Southampton.

TECHNICAL TOPICS FOR THE RADIO AMATEUR

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CONTESTS DIARY

8 January	—First 144 MHz (S.S.B.) Contest
13-14 January	—Affiliated Societies' Contest (see page 835, December 1967)
28 January	—Second 144 MHz (C.W. Open) Contest
11 February	—First 70 MHz (Open) Contest
17-18 February	—First 1.8 MHz Contest
2-3 March	—BARTG Spring RTTY Contest
2-3 March	—Third 144 MHz (Open) Contest
9-10 March	—BERU
31 March	—Low Power Contest (3.5 MHz)
20-21 April	—Second 70 MHz (Open) Contest
4-5 May	—First 1296/432 MHz (Open) Contest
19 May	—Fourth 144 MHz (Portable) Contest
8-9 June	—National Field Day
23 June	—Second 432 MHz (Portable) Contest

24 June	—Fifth 144 MHz (S.S.B.) Contest
6-7 July	—Summer Top Band Contest
21 July	—Third 70 MHz (Portable) Contest
3-4 August	—Sixth 144 MHz (Open) Contest
7-8 September	—V.H.F. National Field Day (provisional date)
14 September	—80m Field Day
5-6 October	—Third 432 MHz (Open) Contest
12-13 October	—21-28 MHz Contest
12-13 October	—Second 1296 MHz (Open) Contest
26-27 October	—7 MHz Phone Contest
7-10 November	—7 MHz C.W. Contest
11 November	—Seventh 144 MHz (S.S.B.) Contest
16-17 November	—Second 1.8 MHz Contest
1 December	—Fourth 70 MHz (C.W.) Contest

MEMBERS' ADS

These advertisements are published free of charge for the benefit of the Society's Members. The number of words is limited to 30 (not including the address). It is essential that we receive the advertisement at RSGB Headquarters by the first of the month for the following issue, typed or written on a standard post card and posted in an envelope with your last Bulletin wrapper. The address on the wrapper must, of course, agree with that in the advertisement. We cannot accept any responsibility for mistakes.

No trade announcements can be included here, but these can be submitted in the usual way for Classified Advertisements.

FOR SALE

Viceroy MkII TX with p.s.u., £75. Hallicrafter SXIII RX, £75. T. Martin, 3 Gladys Road, South Yardley, Birmingham 25.

Test Set 103A and p.s.u., Canadian 58 Set and p.s.u. Pair of 88 Sets and p.s.u.'s, Dartronic 'scope, B44 Mk II, Pye 4m base station, G & D 2m and 70cm. B. R. G. Hutchinson, G3VGH, Windward, Strensall Road, Huntingdon, York.

BIET RAE course, includes maths and Radio lessons, £5 10s. complete with postage. S.a.e. please with cash or cheque. D. C. Pickering, 25 Penybont Road, Pencoed, Nr. Bridgend, Glam.

AR88D re-aligned, no mods, manual, speaker £35. Elizabethan TX, 3-5-28 MHz with p.s.u. and 807 modulator, spare valves and p.s.u. for c.w. only £20. R. J. Stellig, G4CK, 35 Resthaven Road, Wootton, Northampton. (N'ton 61553).

Garrard 4HF semi-transcription 4 speed record deck on plinth with cover and fitted stereo head, as new, £10. Japanese micro-switch el-bug paddle, brand new and boxed, £2. D. M. Pratt, G3KEP, 30 Lyndale Road, Eldwick, Bingley, Yorkshire. (OBR486.3699).

B2 TX/RX with manual and circuit, £2. R1116/A RX, 15-2000m with heavy duty p.s.u. £5. Oscilloscope, large with full controls, perfect condition, £5. F. Griffiths, 5 Swanage Road, Small Heath, Birmingham 10.

Television, Pye 15in, ideal for TVI experiment or amateur television. BBC/ITV fair picture, buyer collects. £4 or exchange for RF40 f.s. meter plus 15s. P. Ryder, 17 Abbey Road, London, NW8. (01-624 2938).

TW 2m Communicator, mike and slightly modified for mains operation, a.c. p.s.u., included, £45 o.n.o. G3IVB, 21 Greenbanks, Melbourn, Nr. Royston, Herts.

2m p.a.—4X150A—blower, mod. transformer, cabinet etc. £15. QCC s.s.b., XTALs, 435 kHz, set of four £6. 4X150A base £3. 455 kHz i.f. amplifier complete £6. TE149 frequency meter £8. H. Rogers, G3NHR, 34 Hereford Road, Feltham, Middx.

Desperate SWL must sell Marconi CR300/1, b.f.o., XTAL calibrator, provision for S meter, external p.s.u., 15 kHz-25 MHz with new manual, first offer over £10 accepted. Buyer collects. S. Pitt, 78 Edison Avenue, Hornchurch, Essex.

R1155A RX converted for 160m, with Q Multiplier, built in p.s.u. and a.f. amp. For a.c. and d.c. operation. Buyer collects. P. Harmes, 37 Meanley Road, Manor Park, London, E12.

Canadian 52 RX with case, p.s.u. and spare valves, £9. Collaro Tape Transcription unit with manual £5. Callers only. A. Kenway, 73 Pellatt Grove, Wood Green, London, N22.

36 Set, 50W TX, 14-28 MHz, with p.s.u., two harmonic filters, dummy load, key etc., £10. Buyer collects. E. Wilders, 28 Highbury Street, Peterborough.

LM10 with partly calibrated book £7. Cowl Gill motor £7. G2DAF linear, 2 x 813, 1750V p.s.u. built in AR88 cabinet £10. New unused 14AVQ, £13. J. S. Haggart, G3JQL, 22 Alnwick Road, Newton Hall, Durham.

TV Camera tubes, little used PTW C4196, RCA 7735A, RCA 7038, EMI 9677B, £15 each or £50 for the four. P. E. Lindsley, G3UDV, 47a St Mary's Road, Ealing, London, W5.

B2 TX/RX/ p.s.u., original cases, £12 o.n.o. 1000V 350 mA p.s.u. fully smoothed, thermal switching, ex BBC, less 4-GU50, £6. Transformer 1250-0-1250V, 750mA, £4. S. A. G. Cook, G5XB, Little Orchard, Gallows Tree Common, Reading. (Kidmore End 2195).

Eddystone 888A in perfect order, £55 o.n.o. LG300 with monster homebrew modulator and p.s.u., £20 or offers. A. J. Rourke, G13JIM, 63 Kirkliston Park, Belfast, BT56ED. (653736).

R107 good condition, sensible offers to T. A. Moore, G3TAM, 20 Samuel Richardson House, North End Crescent, West Kensington, London, W14.

Marconi CR150/4 with p.s.u. and speaker, £25 o.n.o. or exchange for partly built G2DAF Mk2 TX or parts to build. Delivery/collection arranged. R. W. Limehouse, G3WTN, Abbotsleigh, 5 Argyle Road, Whitby, Yorkshire.

160m all transistor TX, 10W, 12-15V, £17. Magslip 2in, TX/RX 15s. each. Minimitter 160m mobile whip, £2, EC10 RX excellent cond. £35. C. N. Whittingham, G3DSR, 8 Corden Avenue, Mickleover, Derby, DE3 5AP.

Mobile transistor 150W p.s.u.'s 12V d.c. input. Heathkit MP1 600V & 300V out, Avel Products 600V & 300V out, perfect condition, £8 each to clear. J. Farlow, G3BXI, 49 Mountpleasant Road, Chigwell, Essex. (01-500.4546).

Valves, transformers and surplus gear, very cheap. S.a.e. for lists. Wanted. Linear. E. H. Trowell, G2HKU, "Hamlyn", Saxon Avenue, Minster, Sheppey, Kent.

Ex AM Type 3 p.s.u., metered etc., and R.f. units 24, 25, in original packing and unused, £5. F. J. Palmer, 1 Hardland Avenue, Croydon. (01-654.2029).

Pair of miniature HC-18U XTALs, marked 9731.25 kHz, STC May 1967. Offers? Wanted, KW2000 and p.s.u., also circuit diagram and any other information on National 81X RX. Details to C. J. Horrobin, G3TZW, 50 Fletcher Road, Stoke, Stoke on Trent, Staffs.

50W rack c.w./a.m. TX, 80-10m, Geloso v.f.o., 807 p.a., £12 10s. Transformer, 1000-0-1000V, 650-0-650V, choke, rectifiers, capacitors, Unused, buyer inspects and collects, £7. Heathkit s.w.r. meter £6. E. W. Hunt, G5IK, Keyhaven House, Milford on Sea, Hants.

Television. American Vanguard Camera Model 501 fully transistorized. Latest model £85 or part exchange 2000A or 2m transceiver. P. Landor, Grange House, Reigate Hill, Reigate, Surrey.

Potted mains transformer, 500-250-0-250-500V, 278mA, wt 14 lb, 25s. Potted 10H choke, 250mA, wt 8 lb, 10s. Paper capacitors in cans 8µF, 1kV 5s. each. Post extra, A. R. Williams, GM3KSU, 35 Howard Place, Edinburgh 3.

Two 52 Set RX's, one p.s.u. and 160/80m a.m./c.w. TX, £22 the lot. Wanted, handbooks and/or circuits for the B2 and TBY-8 transceivers. R. J. Basford, G3VKM, 74 Walcote Drive, West Bridgford, Nottingham, NG2 7GS.

70cm valve converter, two r.f. stages, i.f. 23-27 MHz, built-in p.s.u., £8 10s., 10X XTALS, 1926 and 1942 kHz, 6s. each. B. M. Sandall, G3LGG, 21 Dale View, Ilkeston, Derbyshire, DE7 4LD.

Cathodeon oven, 6/12V for HC6U XTALS, 15s 50 assorted moulded mica capacitors, 10s. 50 Assorted tubular paper capacitors, 8s. 6d. Miniature 10W, 2m TX with mic. £10, write for details. G. A. Jeapes, 165 Cambridge Road, Great Shelford, Cambs.

Brenell, 4 speed tape recorder, little used £25 o.n.o. will deliver 25 miles. Alos Astrasonis wire recorder, £5. Recording wire, 5s. per mile. G. F. Bloomfield, G2NR, 22 Elmwood, Welwyn Garden City, Herts.

KW Vanguard TX, 160-10m with manual, as new condition £45 or would part exchange for Heathkit Mohican GC1U RX. Cash adjustment arranged. F. W. Boulton, G3JZB, 15 Holmcroft Road, Stafford.

B & R co-ax relays, N terms, 500W, £3 plus 2s. 6d. p & p. 2m mobile, MR800, v.g.c., £4. QQVO2-6's £1. 100W 2m TX plus remote control, give away, £5. Buyers collect. G. Gibbs, G3AAZ, Coopers Close, Harmer Green, Welwyn, Herts.

Modified BC348 double superhet, £15, BC 454 2m converter attached £4. Bendix RA1B £4, CT53 9-300 MHz generator with charts £10. I-130, 100-156 MHz generator £5, Buyers collect or pay carriage. W. Blanchard, G3JKV, "Hilldean", Furnace Wood, East Grinstead, Sussex.

Attractive home built 5in oscilloscope incorporating sq. wave generator and wobulator. Perfect working order. SX 24 RX, 500kHz-42MHz, Good condition, £6 each. R. R. Birchall, 31 Coolgardie Avenue, Chigwell, Essex. (01-500. 1344).

Codar T28 mobile RX as new, Codar 12V p.s.u. and remote control unit. 3FIF whip with 160 and 80 coils, Heathkit r.f. signal generator latest mark. D. E. G. Cooke-Sanderson, G3UQZ, 175 Johnson Road, Erdington, Birmingham 23.

R209 MkII-12V-RX. Perfect, with spare valves and vibrator, £12. 30ft portable mast and whip in canvas carrying case, Unused, £2 10s. Separately excited alternator 240/1/50, 1500 r.p.m. 300W, £10. R. A. F. Farquharson, G4IK, "Woodlands", Leigh, Chard, Somerset. (Winsham 295).

U.H.F. RX R10, 420-470 MHz, Signal generators type 7, 1100-1300 MHz, type G210, 1250-1300MHz, Heterodyne wavemeter W1270, 25-131 MHz, cavity wavemeter G93, 920-1100 MHz, £1 each or offers. Heavy. Collect or carriage extra. M. Bass, G3OJE, 42 Clevedon Road, London, SE20.

Heathkit s.w.r. meter, HM1IU TW Fourmobile RX both new. Wanted, 2m TX and 2m converter, offers and exchanges to C. E. Davies, G3HNM, 52 Abbey Street, Bangor, Co. Down.

TW 2m converter, i.f. 28-30 MHz, condition as new, £10. S. Jacobs, G3SUS, 41 Queenborough Gardens, Ilford, Essex. (CRE 1697).

KW 77 RX with matching speaker, perfect working condition, £70 o.n.o. N. Jacobs, G3OGB, 41 Queenborough Gardens Ilford, Essex. (CRE 1697).

Philpotts G2DAF cabinet, drilled panel RX or TX, £4, Eddystone 898 dial boxed £3 10s, both unused. FT241 XTALS six ch. 324 four ch. 327 five ch. 329, AR88 H/B offers, M. J. Faulkner, 35 Abbey Way, Farnborough, Hants.

TW Top mobile RX, c.w. dropper resistor and Zener for 12V. Sell or exchange for 70cm or 4m converter. Mr John, 65 Hurst Street, Birmingham, 5.

National NCX-5 transceiver with matching NCX/D 230V a.c. p.s.u. in excellent condition, £185. Delivered in UK. (Terms possible). J. Moxey, G3MOE, 11 Westbury Road, Cheltenham, Glos. (0242. 24217).

HRO, five g.c. coils, 0.9-30 MHz, £20. German Sig. Gen. 300-600 kHz and 3-6 MHz plus Mod. Magnificent b.s., vernier dial, c/w transistor p.s.u. £10. Marconi VVM £8. Advance constant voltage xfmr 150W, £4. G3LCS, QTHR.

CR100 RX £12, Oscilloscope £10, 2m TX £3, Class D wavemeter, £1 10s., Testgear Sig. Gen. £1 10s. N. K. Waring, G3WQP, 33 Chestnut Street, Southport, Lancs.

Ferguson tape recorder, model 3212, four track, two speed, automatic stop, position indicator, etc. Polished wooden sides with detachable top. As new complete with remote-control mic. £17 10s. o.n.o. R. Hart, G3SHM, 2 Braddon Avenue, Urmston, Nr. Manchester, Lancs.

Eddystone 750, S meter, tilting blocks, audio filter and 100 kHz XTAL calibrator. £45. 40W a.m./c.w. TX, £15. 1000V p.s.u. and QRO p.a., single DA41 class B, zero bias and spare valves, £10. R. M. Morris, GW3HJR, Plot 4, Y Parc, Croesfaen, Pontyryclun, Glamorgan.

Superior Mobile Equipment, Elmac 160m, 10m TX a.m./c.w. with matching RX and p.s.u. one owner, £75. Wanted. Barker and Williamson sideband generator model 51SB-B to suit B & W 5100B. F. C. Soans, G2HJV, 39 Northumberland Road, Leamington Spa, Warks.

Marconi 52 RX with d.c. p.s.u. unit, in really immaculate condition, £10 10s. o.n.o. Marconi laboratory VV, £10 10s. o.n.o. 4X150 17s. 6d. Solar resistance capacity bridge and electrolytic rejuvenator, £10 10s. o.n.o. R. Chamberlain, G3VYU, 40 Elmfield Road, Peterborough.

SB10U mint condition only used on 14 MHz but tested and perfect on all other bands, £27. L.f. XTALS ch. 44, 48, 325, 327, 329, 332, 388, 389, 5s. each. F. Robathan, G2CNW, 56 Rectory Park Road, Sheldon, Birmingham 26.

6ft enclosed rack with two p.s.u., 1kV and various other units £15. Mullard AW43-88 tube 17 in, scan coils, line and field output xfmr's, new never used, £12 lot. L. Allen, G4AAH, 14 Frampton Close, Bournville, Birmingham 30.

KW Viceroy Mk4 in excellent condition £105, Also AR88D a magnificent performer with H/B £30. R. J. Harding, G3RJH, 60 Wychall Park Grove, Kings Norton, Birmingham 30.

Sphinx TX perfect order, many improvements, cabinet screened, 6146B p.a. with KW r.f.c., been driving 2 x TT21 linear FB. £55 for quick sale. J. E. Austin, G3REM, 40 Cross Keys, Bearsted, Maidstone, Kent. (Maid: 55479, business hours).

KW Vanguard MkII TX 160-10m good condition, £40 o.n.o. Will deliver 30 mile radius. D. Fowler, 9 Combe Road, Tilehurst, Reading, Berks.

RSGB Bulletin volumes. Six from 1959 to 1964 nominal price. Post 9s. Partly built converter 13in x 9in x 9in fitted four 7BA holders and stabilized p.s.u. with valves in untouched black crackle cabinet and panel £3 10s. plus 9s. postage. R. L. Castle, G6CB, 7 Caxton Road, Wimbledon, SW19.

KW Viceroy MkIIa, extra filter, consistently reported exceptional speech quality, £100. AR88D up to full spec. £35. Special quality 2.7 kHz Kokusai mechanical filter, 1.85 shape factor, new £10. Carriage extra. J. Edson, G3NYQ, 24 Wrenbeck Avenue, Otley, Yorks. (Otley 3814).

Eddystone EC10 RX as new, £38. G & D 4m TX unused £10. Part-ridge a.t.u. 300W £5. Neumann stereo pick up head, worth £40 accept £12. New. B. J. Whitty, G3HWX, "Fourways", Morris Lane, Halshall, Lancs.

AR88D—Modified but reasonable condition, £30. Buyer collects after 6 p.m. Wanted, 4m RX and 2m RX, cheap and light in good condition suitable for a.c. and car d.c. operation. W. D. Osoff, 103 Bramcote Drive, Beeston, Notts. NG9 1DU.

Mullard Resistance and Capacity Bridge, £3. Geloso 222 TX with Top Band. A first class reliable a.m. rig, £35. D. Dunn, The Poplars, Scamblesby, Louth, Lincs. (Stenigot 283 or office hours Louth 2327).

Stabilised p.s.u., 5in and 14in oscilloscope displays, wide band 30MHz i.f. amps, u.h.f. wobulators, chassis, cabinets, components. No reasonable offers refused. All prices under £4 10s. Buyers inspect and collect, evenings and weekends. I. R. Wiltshire, G8AKA, 12 Leslie Road, Winton, Bournemouth.

36 Set r.f. unit MkI, p.s.u. MkI, HAR filter No. 2 coils for 10-15-20m, no alterations, spare 807's, working, £15. Also SX18 Sky challenger separate p.s.u. working £10. Buyer collects. A. Houchin, G3GZ, 90 Shaggy Calf Lane, Slough, Bucks.

2m RX 30s 4m TX QQVO6-40 p.a. 50s, a.c. p.s.u. 30s. Buyer collects, F. Nurse, G3RBI, 10 Wenwell Close, Aston Clinton, Bucks.

160m mobile TX and RX with whip aerial, £15, Type 36 TX with p.s.u. and mod £5. Command RXs 3-6 MHz £3, 6-9 MHz, £2. W1191A wavemeter with charts and spare valves £5. N. Harrison, G3NJU, 3 Rostherne Road, Wilmslow, Cheshire. (Wilmslow 24665).

Servicing sheets, post free. 1959-64. 59 televisions, 30s, 38 u.h.f. televisions 20s, 108 battery radios 50s, 25 mains-car radios, 14s, 54 radiograms-tape-record players 28s. All £5. M. Mann, G8ABR, Flat 71, Queens Road, Tewkesbury, Glos.

For sale, R109 portable RX, 6V d.c. operation, good condition, £3 10s. inc. carriage. D. Jones, 36 Calthorpe Drive, Prestatyn, Flint.

Minimitter TX 150W, £42 10s. MR37 RX £10, Eddystone round l.s. 30s, two 8 μ F 1500V capacitors 15s. 550-0-550V 250 mA xfmr 40s. R.f. chassis, G2DAF MkII RX ready to wire offers. Collector or carriage extra. J. G. Wardhaugh, G4LA, 20 Hallgates, Hexham, Northumberland.

Codar CR45 RX complete with five coils and cabinet, £7 10s. M. Nicholls, 23 Bardon Road, Coalville, Leicester, LE6 3BE.

Eddystone S640 perfect £15, Bendix TA12 TX, 80, 40, 20m, mod and p.s.u. £6. RF27 unused, Geloso 4/11 Pi Tank, new. Eddystone type 843 4in vernier dial, similar Ex-Gov, both unused. *RSGB Bulletin* and *SWM* 1960-1966. Offers. H. White, G3NKW, 23 Edale Grove, Sale, Cheshire.

R107 RX £8, Radio Constructor, August 1961 to November 1967, any offers, various v.h.f. TX/RX for sale, inquiries to M. Watson, G3WMO, 36 Hamilton Road, Dollis Hill, London NW10. (01-452 4687).

Back issues of the Australian *EEB*, a technical experimenters magazines describing mostly transistorised equipment and theory. Send for list. R. L. Gunther, VK7RG, Botany Dept., P.O. Box 252C, GPO Hobart 7001, Tasmania.

100W table top TX, 80-40m a.m./c.w., high level modulation easily modified for all bands, made by Redifon, internal v.f.o. fitted. Complete with p.s.u. £20 o.n.o. A. McEwan, GM3WJF, 4 Teviot Road, Hawick, Rox.

Codar AT5 TX with Codar mains p.s.u. in good condition £17 10s. 100W TX, ideal for 2m. Hi fi speakers and mics etc. Ring or write P. J. Elliot, G3MFO, 17 Weighston Road, Harrow Weald, Harrow, Middlesex. (01-863. 3551).

HRO, p.s.u. and full set of band spread coils with outboard i.f.s. Collins mechanical filter and product detector, £30. TW2 TX, TW 2m transistor RX and transistor p.s.u. all perfect, offers. E. Martin, G6MN, 6 Kedleston Road, Worksop, Notts. (Worksop 2190).

RX's 1475 with p.s.u., 2-20 MHz in four bands, £10. Hallicrafter Sky Champion 500 kHz-40 MHz, £9. R209, 1-20 MHz c.w./f.m. £13. T. M. Cooper, High Ridge, Water Lane, Storrington, Sussex. (After 7 p.m. Storrington 2301).

SR600 RX, triple con, good condition, bargain at £68, Buyer collects, Hy Gain 14AVQ aerial, 19ft high, £8. Both for £75. Reason for sale—exclusive u.h.f. A. P. Legg, 12 Orchard Way, Sutton, Surrey.

Panda Cub TX, £15. Trio 9R-59 RX £18. Both in good condition, owner gone s.b.s., buyer collects. D. A. Lane, G3VOM, High Lawn, Broad Oak Park, Worsley, Nr. Manchester, Lancs.

900 ft morse tape, 20s. 6AG5, 9001, 9003, 2s. 6d. 6K7, EB34, 1s. 6d. EA50, EF50, ls. C.r.t.'s VCR 138A 40s, CV2286, CV2184 10s, Test Set 76 10s., Field telephone 7s. 6d. post extra, J. W. Thomson, G3WQM, White House, Tollerton, York.

Bulletins 1960-66, *SWM* 1954-57, 1962-66, 15s per year or £5 for *Bulletins* £6 for *SWM* or £10 the lot. C. T. Wakeman, "Broadwater House", Clifton Terrace, Southend-on-Sea, Essex.

Beautifully made linear, 2 x 813's in AB1. Built in heater and variable bias supplies, 80-10m in Imhof cabinet. Four, lettered, panel meters. £25 o.n.o. Deliver 75 miles. J. Kirk, G3UJY, Merriscourt, Churchill, Oxford. (Kingham 270).

R109 RX new 6V valves and 6V accumulator £4. Prop Pitch motor modified for 12V a.c. £3. Telescopic three section mast 6ft closed, 20ft extended £2. B. H. Douthwaite, G2AFB 25 Parkwood Avenue, Esher, Surrey. (01-398. 4490).

P.s.u. type 247, 600V 150mA, 6-3V, £3. Type 234A, 200V, 80mA 6-3V, £2 10s. HRO RX and five coils, perfect order including p.s.u. and speaker. £18. Wanted, mobile receiver. D. H. Wilkinson, 35 Street Lane, Leeds 8. (664823).

Geloso 4/105 v.f.o. mixer unit, with five XTALs, three valves, dial and escutcheon, manual, FB condition, £10. Belling "Eliminoise" aerial and RX xfmr's £1. Heathkit VJR 1 with headphones, £2. Postage extra. F. D. Cawley, G2GM, 1 Afton Lodge, Freshwater, Isle of Wight.

AR88 RX in excellent condition, £35. will deliver 50 miles. Also Miniciter unit as new, £6. S. B. Lord, G3PGN, Newfield House, Moira, Burton on Trent, Staffs. (Swadlincote 7537).

P.s.u. 100V, 250mA with spare 866A's, 813 and suitable heater xfmr. Xfmr: 6-3V 4A, two 7-5V 5A, one 7-5V 2-5A & 1-75A. Offers, prefer buyer collects. P. W. Smith, G4MU, 67 Billing Road, Northampton.

Vertical aerials Mk I, 32ft high plus 15ft whip, £3 carriage paid. Pair of G3H2P traps for W3DZZ trap-dipole £2 5s. H. Tonks, G3JFL, 11 St. Edwards Road, Bournbrook, Birmingham, 29.

Marconi television picture and waveform monitor with external regulated p.s.u. and three 931A photo-multiplier cells. Any offers? R. Piper, G3MEH, 13 Rydon's Lane, Coulsdon, Surrey, CR3 1SU.

Eagle RX 60N RX, 55kHz-30MHz, b.f.o., S meter, b.s. in mint condition. First £15 secures. M. J. Sparrow, G6KQJ/T, White Orchard, 64 Showell Lane, Penn, Wolverhampton, Staffs.

Elizabethan 100W TX, Geloso v.f.o., two 807 in parr. Two 807 in Mod. Rack mounted, £12. P.s.u.'s available. Panda tunable l.p. filter, £2. Diode tunable indicator 100 μ A meter 30s. R. G. Nash, 9 Holybrook Road, Reading, Berks.

R1475 RX 2-20 MHz, good clean condition in very good working order, complete in case, £99. Suitable p.s.u. 20s. but needs attention. G. C. Batten, "Uplands", Salisbury Road, Marlborough, Wilts.

4X150's bases, hundreds of XTALs—all frequencies and bases—Klystrons, photomultipliers etc., other gear—you name it—s.a.e. please. Wanted Withers 4m & 2m transistor converters, J. Brown, Marlborough Farm, Falmouth, Cornwall.

KW2000 with a.c. p.s.u., unmarked and in perfect working order, £145. Also 400W p.e.p. output linear with built in p.s.u. £35. J. Redford, G3SXP, 200 Doddington Road, Lincoln.

Eddystone 888A first class, not tinkered with, one owner, £70. Marconi B28 RX in good condition £15. Marconi CR300/1 bit tired £10. Couper, 90 Clarendon Court, Sidmouth Road, NW2. (Willessden 4450).

Sell or exchange xfmr's, 350-0-350V, 100mA also 360-0-360V 120mA. Brand new, shrouded, also KW mod for Vanguard or Valiant TX. Wanted 250-0-250V 150mA and 522 mod xfmr. D. V. Walters, G3MXO, 161 St. Saviours Road, Alum Rock, Birmingham 8.

Kokusai filter 3-1 kHz type new £7. BC221 with p.s.u. £15. Part built s.b.s. TX all bands £17 10s. Send for list of good components. R. Reynolds, G3IDW, Orchard Cottage, Hook, Swindon.

Philco RX, five bands 145kHz-18 MHz. 22 octal valves, variable selectivity, p.p. output, £10 10s. o.n.o. Heavy duty garage accumulator-charger, separate metered switchboard, OK for light welding. £22 10s. o.n.o. D. Byrne, G3KPO, Jersey House, Eye, Peterborough. (Eye 351).

B2 TX/RX p.s.u. FB complete station also Codar RQ10X little used. Offers to R. E. Kemp, G3VWL, 10 Pears Avenue, Grange Farm, Upper Halliford Road, Shepperton, Middx.

Standard screened coil formers, $\frac{3}{4}$ in. sq., $1\frac{1}{2}$ in. tall. Former, can, dust core and top plate 7s. per doz. $2\frac{3}{4}$ in. tall, former, can, two dust cores and top plate, 9s. per doz. Post free. R. A. Loveland, G2ARU, 22 Oaklands Park, Bishop's Stortford, Herts.

WANTED

Handbook for Cossor Oscilloscope Model 339. Purchase or loan. Fair price paid. J. Bell, G3DII, "Ashlawn", Ryland Road, Welton, Nr. Lincoln.

AR88D in first class condition, HRO with bandspread coils or any spare parts, any condition. XTALs for 80m and 40m. R. Field, 1 Haines Street, Battersea, London, SW8.

Urgently wanted for VK6KK, first i.f. fmr for CR100. F. W. Bird, G3GZE, 14 Old Bank Lane, Whinney Heights, Blackburn, Lancs. (Blackburn 58312).

Ex RAF Dinghy Kite, BC348 in good condition. P. Simpkins, G3MCL, 3 Westend Terrace, Winchester, Hants. (61334).

12V rotary converters for BP 5 TX/RX. Also unmodified TCS RX. M. Gee, 11 Whitehorse Lane, Stepney, London, E1.

Smaller fmr on Top Deck Tiger 200 TX, 100V @ 30mA, 10V @ 5mA, 5V @ 2A, 5V @ 2A = 220-240V, 6-31V 1A. S. Smith, G3LES, 20 Dunkirk Road, Southport.

Bulletin supplement, District notes, July 1945-April 1946. New members lists, June 1944-April 1946. RSGB in Wartime, 1939 circular. RSGB Bulletins, Aug. 1929-Jan 1930. July 1933 with covers. F. A. Herridge, G3IDG, 96 George Street, Basingstoke, Hampshire.

School Radio Society requires a.c. p.s.u. for 1154 TX or details of the same. Price please to, J. K. Butterworth, The Vicarage, Gildersome, Morney, Nr. Leeds, Yorks.

Manual for loan or purchase of B40 RX. M. R. Robinson, Melita, Dunton Road, Laindon, Basildon, Essex.

R107 RX in good condition with a converter for 15-10m and if possible an S meter. C. Rhodes, 10 Denton Road, Stevenage Herts.

One or more XTALs between 8-768 and 8-825 MHz. Any reasonable price paid. E. W. G. Evans, G3WCN, 33 Atherton Street, St. Helens.

Complete 70cm station, any G8 wishing to sell up complete or part, must be in good working order. J. F. Batten, 31a Whitton Road, Hounslow, Middx. (01-570. 3154).

Small battery tape recorder Japanese or similar for partially sighted young, SWL, reasonable price paid, or has anyone a set of Elizabethan-Bandbox, tape heads? A. Preston, 53 Marlowe House, Grove Street, Deptford, London SE8.

Good AR88D or HRO, manual and tools, all band TX, suit new G3, class D wavemeter, a.c. powered, AR88LF manual, SWM, March-October 1964. H. C. Pryse, G3WXT, 36 Hart Road, Byfleet, Weybridge, Surrey.

S.s.b. filter, 9MHz with carrier crystals, KVG or McCoy. R. W. Fisher, G3PWJ, 63 Swan Crescent, Oldbury, Warley, Worcs.

Class D wavemeter No. 1 for 6V operation or converted for 240V a.c. in good order. Details to, S. Casper, 27 Burnside Road, Gosforth, Newcastle upon Tyne 3.

Morse Code Tuition record for GPO Morse test. Also Class D Wavemeter No. 1 Mk II. Preferred modified for a.c. D. Benham, 77 Baldock Road, Letchworth, Herts.

Hand punch for punching Wheatstone wax paper type tape. J. M. Drudge-Coates, G2DC, "Morseden", Hightown Hill, Ringwood, Hants.

AR88D manual for purchase or loan. R. G. Martin, G3WKH, 61 Bouncers Lane, Prestbury, Cheltenham, Glos.

Back copies of QST for July, August 1966. March, May, June 1965. October 1963. Sept, Oct 1959. J. L. Meddemmen, G2CKW, 112 Farnaby Road, Bromley, Kent.

Manual for HRO 500 communications RX. A. J. Strike, G8AUX, 5 Charles Avenue, Thorpe Street, Andrews, Norwich, NOR 66T.

Complete set of Morse instruction records with books. M. Goodrum, "Kia-Mena", Chapel Street, Barford, Norwich, NOR 38X.

XTALs, 6866, 7186 and 8782.5 kHz., also LG300, Tiger TR300 or similar and good TA33 jnr beam and rotator. B. Robinson, 12 Hazel Close, Mildenhall, Suffolk.

Three band vertical aerial, and a Multi Band Trap Dipole. J. J. Forbes, 22 Portnalls Rise, Coulsdon, Surrey, CR3 3DA.

Manuals for Cossor DB Oscilloscope type 339 and Taylor Tester type 45—not 45A—Loan or purchase. A. Whitelock, G3BNM, 8 Station Cottages, Alne, York.

Mosley TA 33 jnr also 5-2 MHz XTAL. G. Roberts, G3OOR, 4 Eastburn Gardens, Pelaw, Gateshead, NE10.

Small transformer 250V in, 25V out for relay supply. Selling XTAL Mic, £1. A. Parker, G3KH, 133 Station Road, Cropston, Leicester. LE7 7HH.

P.s.u. 300V 250mA to operate 2m TX from a.c. Either commercial or home construction for blind radio amateur. A. R. Reynolds, G3VRI, Rosedene, Queen Street, Shrewsbury, Shropshire.

Urgently any amateur band b.s. coil for HRO-MX also BC221. Please state price and give details. N. Vincent, G3NVO, c/o 153 London Road, Waterlooville, Portsmouth, Hants.

Pair of TT21's in good order. G. Kaye, G3VFG, 29 Bainbridge Road, Leeds 6.

Handbook for LM13 freq. meter. Joystick aerial and TX type tuner. Full details and price first please. R. Wilson, 14 Edgumbe Park Drive, Crowthorne, Berks.

Circuit and Manual for the R209 to buy or loan. Postage will be refunded. A. J. Humphries, 14 Fosseyway Crescent, Tredington, Nr. Shipston on Stour, Warks.

Urgently needed a swinging choke, 5-25H, 250mA in good working condition, cash waiting. A. Newton, 35 Poplar Road, Rayleigh, Essex.

Two RX's required for local SWL's need not be working but must be sound. HRO, SX28, AR88, S640 or similar. Anything considered. Cash waiting. M. G. Rimmer, G3KDA, 98 The Leys, Bidford on Avon, Alcester, Warks.

Codar AT5, 160-80M TX with a.c. p.s.u. H. Pettis, G5AFO, Box 514, RAF Croughton, Brackley, Northants.

Small quantity of air system bases for 4X150's. Slightly damaged or with broken down by-pass capacitors acceptable. J. J. Thomson, GM2DRD, 70 Jeanfield Road, Forfar, Angus, Scotland.

Eddystone 770R RX in good condition. Your price paid. S. Roberts, Cottage Farm, Wessington, Derby. DE5 6BY.

Heathkit SB Series Equipment, also AVO multi meter. E. Neal, G8GP, 34 Manor Avenue, Brockley, London, SE4.

Eddystone 898. W. Tompkins, 17 Snowden Road, Wrose, Shipley, Yorks.

Exchange Bolex P3 8mm cine camera for KW600 or 1000 linear amplifier in similar good condition. G. S. Rose, G3WGF, 353 London Road, St Leonards on Sea, Sussex.

1in Vidicon tube suitable for NEV TV camera and 14 MHz b.s. coil. G. D. Davies, G2FXA, 35 Kensington Road, Stockton on Tees, Co. Durham.

Circuit and other data on Tacan RT220/ARN21 equipment. All documents returned after photocopying and expenses refunded. W. H. Flecher, G3NXT, Holmdale, Martin, Lincoln, Lincs.

Headphones—600 ohms or less, no Ex WD.RX any condition any type will pay top prices. I. McDonald, 8 Clarence Street, Paisley, Renfrewshire, Scotland.

Copies of QST issued prior to 1931, *Radio* prior to 1944 and pre-war copies of Amateur Radio Call Books. K. C. Lay, G5LY, 226 Riders Bolt, Hurlingham, Bexhill on Sea, Sussex.

XTAL Calibrator and instruction book in first class working order. H. Davis, GW3VNF, Chemist, Rhymney, Monmouthshire.

E20/25 paid for and RAI, trio 9R/59, HE30 or similar RX in good working condition. Details and price to S. Burfott, 84 Mayhill Road, Barnet, Herts.

Vanguard Mark 2 TX or similar self contained table top TX and trap vertical aerial. F. A. George, G5FG, 14 Swallow Gardens, Hatfield, Herts. (Hatfield 63051).

THE DEVELOPMENT OF A U.H.F. TELEVISION SERVICE

LONDON LECTURE MEETING 31 JANUARY, 1968

Institution of Electrical
Engineers, Savoy Place,
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Buffet tea 6 p.m. Lecture 6.30 p.m. Tickets are available
from RSGB on request.

Corrections to 1968 Call Book

The following are amendments and corrections to the 1968
edition of the RSGB *Amateur Radio Call Book*.

G3IDG, F. A. Herridge, 96 George Street, Basingstoke,
Hampshire.

G3WOE, M. A. White, 25 Green Park Avenue, Skircoat
Green, Halifax, Yorks.

G3PAI, J. Rabson, 110 Churchfield, Harlow, Essex.

GM3OXX, G. B. Burt, 1-5 Essendean Terrace, Clermiston,
Edinburgh, 4.

G3PLP, R. W. Cox, 59 Berkeley Road, Shirley, Solihull,
Warwicks.

G3UQK, F. Cummings, 25 Caldys Road, Salford, 6. Lancs.
(Old address given).

AN ILLUSTRATED LECTURE BY
R. C. HILLS, B.Sc.(Eng.), C.Eng.,
M.I.E.E., M.I.E.R.E., G3HRH
HEAD OF MAST AND AERIAL SECTION,
INDEPENDENT TELEVISION AUTHORITY

A brief introduction covering the sequence of events up to the
Government decision to authorise a television service in the
u.h.f. bands is followed by a review of some of the technical
problems associated with the engineering of the service.
Illustrated descriptions will be given of some of the trans-
mitting stations in service and under construction with
emphasis on the new designs required specifically for trans-
mission at such frequencies.

GM3NYY, Walter A. F. Davidson, 90 Octavia Terrace,
Greenock, Renfrewshire.
G3NYY, Walter A. F. Davidson, (QSL via GM3NYY).

Can You Help?

● P. Winter, 23 Connaught Road, Roath, Cardiff, who
wishes to borrow the circuit of the Geloso G210 Transmitter?

● H. L. Rowe, G3WQD, "Sunnydale," 12a Balgore
Square, Gidea Park, Romford, Essex, who requires 2m
modification details and circuit diagram of the Civil Aviation
Transmitter, Type 102?

● M. R. Robinson, Melita, Dunton Road, Laindon,
Basildon, Essex, who requires information on the B40
receiver?

PRICE REDUCTIONS AND QUANTITY DISCOUNTS

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2N3819 low noise V.H.F. FET 14/6
P346A 550 Mc/s Ft s. planar NPN 4/6
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10	6	6	finish-front panel grey s.e.
			case self colour

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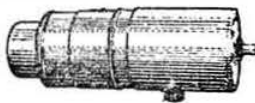
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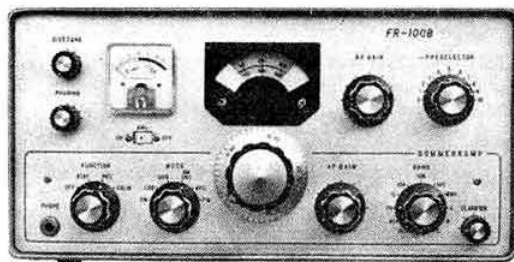
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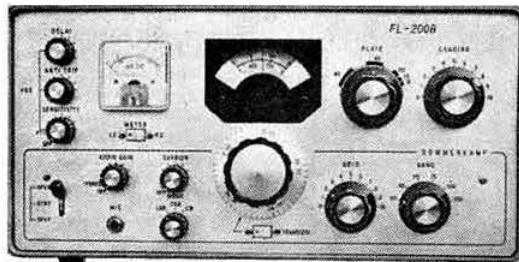
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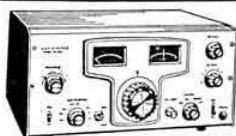
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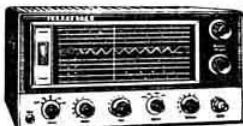
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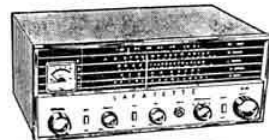
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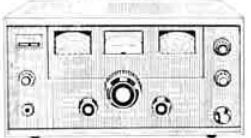
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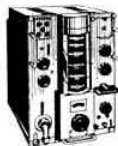
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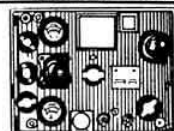
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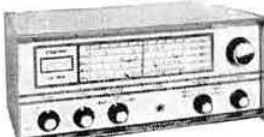
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