



# R S G B

APRIL, 1962

VOL. 37, No. 10

# BULLETIN

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

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**Volume 37 No. 10**

**April 1962**

**2/6 Monthly**

# R.S.G.B. BULLETIN

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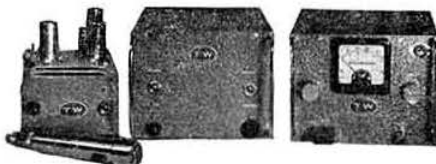
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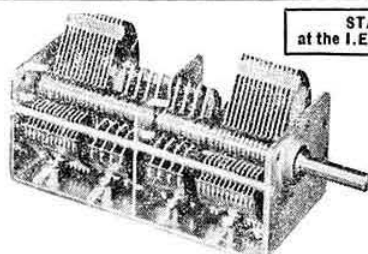
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3A5 10 6	6C16 9 0	619G 7 0	12P7GT 11 6	30P11 19 6	CV31 11 0	EC73 8 6	EF98 12 6	KT68 6 6	PCF95 17 0	U403 17 0	W76 6 6
317 12 6	6C14 24 0	61A 5 0	12S2A 7 6	30P13 12 6	DAX 32 10 6	EC74 25 2	EF98 12 6	KT68 6 6	PCF96 12 6	U404 8 6	W81M 0 0
316 5 0	6D6 6 6	615GT 6 0	12S7 8 6	33A158M1	DAF91 6 0	EC75 8 6	EF98 8 6	KT68 6 6	PCF97 7 6	U801 30 7	X61(c) 12 6
8Q1 7 6	6E5 12 6	620L2 10 0	12S7 7 0	300 30 0	DAF96 15 0	EC76 28 10	EF98 12 6	KT68 6 6	PCF98 8 0	U812 18 1	X65 12 6
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3V4 7 6	6F13 11 6	7C6 8 0	12S17 8 6	35W4 7 6	DF97 9 0	EC83 7 6	EF98 12 6	KT68 6 6	PCF99 7 6	U812 18 1	X66 12 6
5F4GT 17 6	6H6 9 0	7H7 8 0	12S17 8 6	35Z3 19 1	DF97 5 0	EC84 9 0	EF98 12 6	KT68 6 6	PCF99 7 6	U812 18 1	X66 12 6
5F4G 6 6	6J5 5 0	7S7 9 6	12S17 8 6	35Z4GT 6 0	DF97 7 6	EC85 8 6	EF98 12 6	KT68 6 6	PCF99 7 6	U812 18 1	X66 12 6
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5Z3 20 5	6K7G 5 0	8192 3 6	19A95 10 6	40 10 0	DK92 8 0	EC92 10 6	EF98 12 6	KT68 6 6	PCF99 7 6	U812 18 1	X66 12 6
5Z4G 8 0	6K8G 6 6	918W 6 6	19H11 10 0	53KU 20 5	DL33 8 6	EC93 10 6	EF98 12 6	KT68 6 6	PCF99 7 6	U812 18 1	X66 12 6
6A7 10 6	6K25 20 5	9192 4 0	20H1 15 8	72 4 6	DL66 12 6	EC94 10 6	EF98 12 6	KT68 6 6	PCF99 7 6	U812 18 1	X66 12 6
6A8 9 0	6L129 16 4	10C1 13 0	20F2 27 2	78 6 6	DL68 15 0	EC95 10 6	EF98 12 6	KT68 6 6	PCF99 7 6	U812 18 1	X66 12 6

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DX-40U



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MA-12



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7210	20	40	€0	70*	80	90	7300*	04.4	10	30	40	50	60*	70	75*	50	7420*	40	50	70	80	90			
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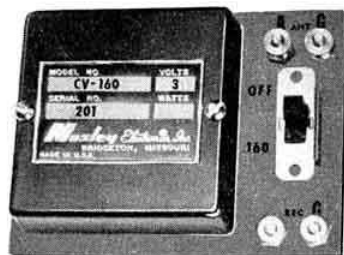
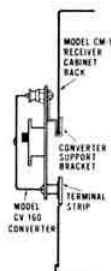
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# Current Comment

*discusses topics of the day*



## *Value for Money*

**S**HORTLY after the Society was founded nearly 50 years ago the annual subscription was fixed at 21s. plus an entrance fee of 10s. 6d. Today, the annual subscription for Home Corporate members is 30s. and for Overseas Corporate members 28s. Is it to be wondered at that some members have expressed the opinion, forcibly at times, that the Society has not made the progress that would have been possible if subscription rates had kept pace with economic change?

When money was circulating freely just after the last war the Society's assets stood at £15,000 but unfortunately very few members stopped to think how that high figure had been attained. It came about almost entirely as the result of the profits which accrued from the phenomenal sales of the pre-war edition of the *Amateur Radio Handbook* and to the economies in administration which were effected during the first four years of the war when the Society was operated from the North London home of the General Secretary with a staff of two!

In 1947 when subscription rates should have been increased to more realistic figures there were some who feared the reaction to change that would come from those members who had not appreciated that *normal* day-to-day income was far below *normal* day-to-day expenditure; in other words they concluded that members would be opposed to an increase in view of the size of the Society's post-war assets. A few years later after those assets had been seriously depleted, following a recession in membership, the efforts of the Council to rectify the position by recommending a modest increase in subscription rates were at first frustrated, but eventually wisdom prevailed, with the result that in November 1953 the Council were given power to increase Home Corporate subscription rates to 30s. a year. In point of fact, as many members will recollect, the Council did no more than increase the then London rate of 21s. by 6s. 6d. and the then Provincial rate of 15s. by 12s. 6d. to produce a uniform standard rate for Home Corporate members of 27s. 6d.

Four years later, in July 1957, the Council, still striving hard to balance income against ever-increasing costs, decided to increase the Home Corporate subscription rate to 30s. a year.

In December of the same year the membership was asked to approve an amendment to the Articles of Association which would fix the amount to be paid by

Corporate members at 50s. per year and by Associate members at 25s. per year or such lesser sums as the Council may decide from time to time.

The resolution was carried by an overwhelming majority but the Council took no advantage of the new powers given to them except to increase the subscription rate to be paid by Overseas Corporate members from 21s. to 28s. with effect from April 1, 1959.

And now the time has come for the Council to ask Corporate members to pay a little more for the privilege of belonging to the Society. The increases of 5s. a year in the case of Home members and 7s. a year in the case of Overseas members, are so small that their effect on individuals will scarcely be noticed but in the aggregate it will enable the Council to do something they have been asked to do at every O.R.M. for years—namely to increase the size of the Society's Journal.

It is never wise to make comparisons but just for the record members are reminded that the current subscription rates charged for certain other radio publications sent through the post are as follows:

<i>Wireless World</i>	..	40s.
<i>The Short Wave Magazine</i>	..	36s.
<i>The Radio Constructor</i>	..	29s.
<i>Practical Wireless</i>	..	29s.

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It may not be generally appreciated that in order to produce a 64 page BULLETIN—compared with the normal 48 page issue—the Society will be faced with an increased printing bill of at least £2,400 a year. Another item of expense that seems trivial to the individual is the cost of posting the BULLETIN. The Society has been spending £2,100 a year on postages. A single copy of a 64 page issue will cost 1d. more to post (4d. up to 5d), which means that the postage bill will go up by approximately £480 a year.

How are the extra 16 pages to be filled? It is the intention of the Council and the wish of the Technical Committee that a high proportion of the extra space shall be devoted to technical articles. The Society has for the past 15 years purchased the copyright of all such articles at the rate of £2 2s. per 1,000 words. As from July 1962, higher rates, depending upon the standard of the individual contributions, will be paid. The financial effect of this change may amount to as much

*(Continued on page 501)*



# Impedance Matching in the S.S.B. Demodulator

## *A High-gain Transistorized Audio Stage for the Sideband Receiver*

By G. B. HORSFALL (G3GKG)\*

WITH the renewed interest in receiver construction that has been sparked off by the growing popularity of the s.s.b. mode, attention should be drawn to one particular point which is usually overlooked. This concerns the impedance matching involved in the part of the receiver between the final i.f. stage and the first audio amplifier when some form of diode demodulator is used. The balanced demodulator using two germanium diodes is deservedly popular for s.s.b. reception and it is generally appreciated that this circuit requires low impedance sources for signal and carrier inputs. This is achieved in practice by the use of either a step down ratio between the windings of the i.f. transformers feeding the demodulator or by a capacitive tap on the normal secondary winding. Audio output from the demodulator is developed across a resistance of the order 1-5 K ohms and is fed directly to the grid input of the first audio amplifier. In an arrangement of this sort the voltage step down between the final i.f. amplifier and the demodulator (in one very popular design it is 10 : 1) represents a total loss of up to 90 per cent of the signal from the i.f. amplifier. This in turn leads to one of two expedients being adopted to obtain adequate drive to the output stage. Either (a) more stages of audio amplification are used with the attendant problems of hum or (b) more gain is required in the i.f. section of the receiver calling for three stages instead of two. The latter is usually chosen, the demodulator is over driven and the inherent advantage of this type of demodulator—its low intermodulation distortion—is lost.

### The A.M. Detector

At this point we come to another problem in the design of the complete receiver and it is worthwhile to digress for a while to discuss it. This is the inclusion of a conventional envelope detector for the reception of a.m. and here the recent convert to s.s.b. is probably on firmer ground. He knows that this type of detector, whether it is the diode (either thermionic or semiconductor) or the infinite impedance type, is very inefficient at low signal levels and probably remembers from his R.A.E. preparation that a signal of several volts is the level where optimum performance is obtained. The balanced diode s.s.b. demodulator on the other hand calls for a ratio of about 10 : 1 between the carrier and signal inputs to ensure linearity and, as the usual OA79 diodes will become overheated and suffer from drift of balance if the carrier input exceeds about 1-1.5 volts, this limits the signal input to the order of 0-1 volt. It is evident that the expedient of switching between one type of detector and the other, in the same part of the circuit, leads to an intolerable compromise in either one or both modes of operation.

Assuming the output stage is to be designed around a high slope beam tetrode requiring a voltage swing of about 5-10 volts at the input grid, it is clear that the a.m. detector only requires a gain of about 10 from the audio frequency amplifier, whereas the s.s.b. detector requires more like

500-1000. If the optimum performance is to be obtained from both types of demodulator, the s.s.b. type should come one stage earlier in the receiver than the a.m. type, i.e. in the one case only two stages of i.f. amplification would be required and in the other three, plus of course the necessary adjustment to the audio gain. Another aspect which is usually ignored in amateur receivers is that, in the type of receiver under discussion, two or three half-lattice crystal filters, with an overall 6db passband of around 2.5 kc/s, are included in the i.f. amplifier. This selectivity is invariably fixed and is completely unsuitable for even communications quality when followed by an a.m. detector.

A frequency response with an upper limit of 1250 c/s does not make for maximum intelligibility of speech, as anyone who has ever heard it will testify. The only way this combination of selectivity and a.m. detection can be used is by tuning the receiver so that only the carrier and one sideband are received when the power of the other sideband is, of course, lost and the same result, or better, could be obtained by using the s.s.b. detector to obtain "exalted carrier" reception. In order to make the inclusion of an a.m. detector a usable feature, arrangements would have to be included to alter the selectivity when using this mode—not an easy thing where two or more crystal filters are involved. In commercially made receivers of this kind alternative filters are usually selected by the a.m./s.s.b./c.w. switch—a costly system for the amateur to emulate.

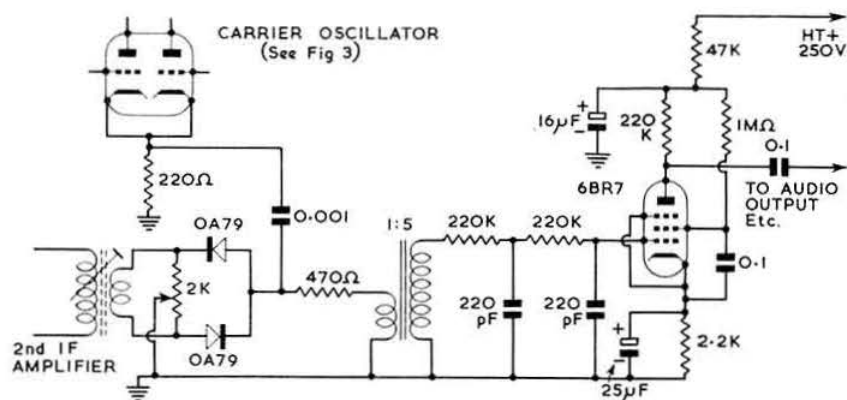
The foregoing discussion makes it clear that to obtain the best possible performance from a receiver on either a.m. or s.s.b. calls for a much more elaborate system than has hitherto been described in an amateur design. The writer's object in developing receivers of this sort is, and has been for the last five or six years, to obtain the optimum performance from a single sideband receiver. A.m. detectors were included in early developments as alternatives to the main s.s.b. type but were seldom, if ever, used and were soon dropped from the designs because the complications outlined were not felt to be justified. Since then no trouble has ever been experienced in receiving a.m. signals in the sideband mode, except in cases of severe, incidental frequency modulation. The majority of amateurs now building or about to build this type of receiver are interested primarily in s.s.b. reception and, unless they are prepared to complicate the design on the lines suggested, would be well advised to concentrate on a no-compromise arrangement for obtaining optimum performance on s.s.b.

### Circuit Arrangement for S.S.B.

Returning now to the original problem of impedance matching in the balanced demodulator for s.s.b. the requirements can be summarised. The required input signals, at low impedance, are a maximum of 100 mV from the i.f. amplifier and one volt from the carrier insertion oscillator. The audio amplifier should have an input impedance of the order of 1 K ohms and a gain of 500-1000.

In the writer's present receiver, which incidentally is not the one described in the August 1959 BULLETIN but a later

\* 183 Chester Road, Macclesfield, Cheshire.



**Fig. 1. Circuit of the original demodulator with valve amplifier.**

model built about 18 months ago, the required i.f. signal level is easily obtained from two stages using 6BA6's. Three half-lattice filters are incorporated and the cathode bias resistors are not bypassed. The carrier insertion is obtained from one of two oscillators used for sideband switching as shown later in Fig. 3. In this arrangement only the h.t. line to the oscillator is switched thus enabling the switch to be remote from the oscillator itself. This was essential in the present design which uses one single calibration scale (with an effective length of 5 ft.) for all bands and calls for an auxiliary wafer on the bandchange switch to reverse the sideband switch on some bands.

In the writer's arrangement of the balanced diode demodulator (Fig. 1) the i.f. signal is balanced out by the 2 K ohms potentiometer and the carrier is removed by a simple RC filter in the line to the a.f. amplifier. The required balanced input from the i.f. amplifier is obtained from a 5 : 1 step down i.f. transformer with a close-coupled, untuned secondary winding. The audio amplifier originally consisted of a 6BR7 stage with a gain of about 130 preceded by a 5 : 1 step up transformer, giving an overall gain of 500 when the following output and a.g.c. amplifier stages were connected.

A drawback with this arrangement was that the small transformer used, as well as having a rather poor frequency response, was remarkably prone to hum pickup, even considering the relatively high gain of the subsequent amplifier. Although a separate power pack is used with the receiver a noticeable hum was induced if this was placed within about 2 ft. of the receiver! Obviously a well-screened transformer could have been obtained but the present solution is rather more elegant.

### Transistorized A.F. Stage

The required impedance transformation was an obvious pointer to the use of a transistor amplifier as this would also remove the problem of hum pickup. Initially a conventional circuit preceding the a.f. stage was envisaged but a little development (with fingers firmly crossed) evolved the circuit of Fig. 2. This remarkable circuit has an input impedance of the order 1 K ohms, a high output impedance and a voltage gain, with an OC200 silicon transistor, of about 1200. With the filtering resistors in the input as in Fig. 3 and the slight loading imposed by the following stages this is reduced to between 900 and 1000. An OC71 germanium transistor exhibits slightly more gain but requires 470 K ohms for R1 and R2 in place of the 150 K ohms resistors shown. With these values and the higher leakage current the operating point of the transistor is markedly temperature dependent, whereas the arrangement with the OC200 is not.

The high voltage gain is obtained because the normal

current gain of the transistor works into a much higher than normal load impedance and, as far as can be seen, the transistor is quite safe. The normal collector-emitter voltage is 13 volts against the rated maximum 25 and the collector current is 0.9 mA. Thermal runaway cannot occur, partly because of the d.c. feedback occurring via R1 and R2 but essentially because the current through the transistor cannot possibly exceed 1 mA because of the 220 K ohms resistor R3. The only certain way the transistor could suffer would be a short circuit between base and emitter causing the collector current to drop to its leakage value with a consequent drastic increase in the collector voltage.

Accidental shorts between the other parts of the circuit could of course be disastrous but the above is the only practically possible event and could occur due to a failure of C1.

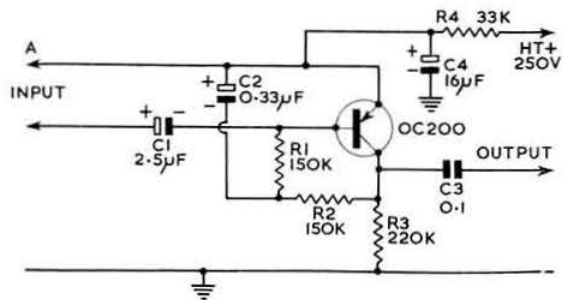
For this reason the demodulator circuit was rearranged so that point A is the "earthy" part of the circuit and this reduces the voltage across C1 to about 0.1 volt. In the original, tantalum electrolytics, which have less leakage than conventional types and are much more reliable although more expensive, were used for C1 and C2 and the whole circuit within the dotted line in Fig. 3 was potted in Araldite epoxy resin to guard against accidental short circuits. The decoupling components R4 and C4 serve, in addition to their usual function, to suppress the surge in collector voltage which would otherwise occur when the h.t. is switched on. It is obvious that the use of an  $n-p-n$  transistor in place of the  $p-n-p$  OC200 would enable the circuit to be inverted so that point A would in fact be the earth line and the circuit would be more foolproof in respect of short circuits.

The frequency response of the amplifier shown in Fig. 2 is substantially flat from 40 c/s to 10 kc/s and 6db down at 20 c/s and 14 kc/s. With the h.f. filtering incorporated in the input the response is about 3db down at 4 kc/s. The maximum output before distortion becomes noticeable is 25 volts p. to p. but in the writer's receiver the a.g.c. action holds the input virtually steady at a level corresponding to an output swing of 8 volts, more than adequate to drive the N78 output stage.

On the question of cost, even with tantalum electrolytics, it compares favourably with its valve counterpart incorporating a well-screened step-up transformer having a similar frequency response.

## Other Applications

An amplifier of this type with its low input impedance, high



**Fig. 2. The transistorized a.f. amplifier.**

gain and freedom from hum and microphony has obvious applications apart from that outlined. The one that springs to mind most readily is a pre-amplifier for use with a moving coil microphone or low impedance tape recorder head. So far this has not been tried.

Other applications of the basic idea which have occurred to the writer include the use of an h.f. transistor if a better frequency response is required. A similar circuit incorporating one of the modern transistor types having a current gain up to 200 at normal collector currents (e.g. 2N541) or with lower current gain at very low collector current, enabling a much higher collector load to be used (e.g. 2N1247), should exhibit gain figures bordering on the fantastic. The high prices of the above types of transistor have so far precluded their use and an approach likely to be more useful would be to employ a transistor of the OC203 type at a collector voltage of about 50 volts to obtain the necessary high impedance to increase the gain. There is obviously lots of scope for the experimenter who does not mind the occasional catastrophic accident with costly transistors so long as it is in the good of the cause.

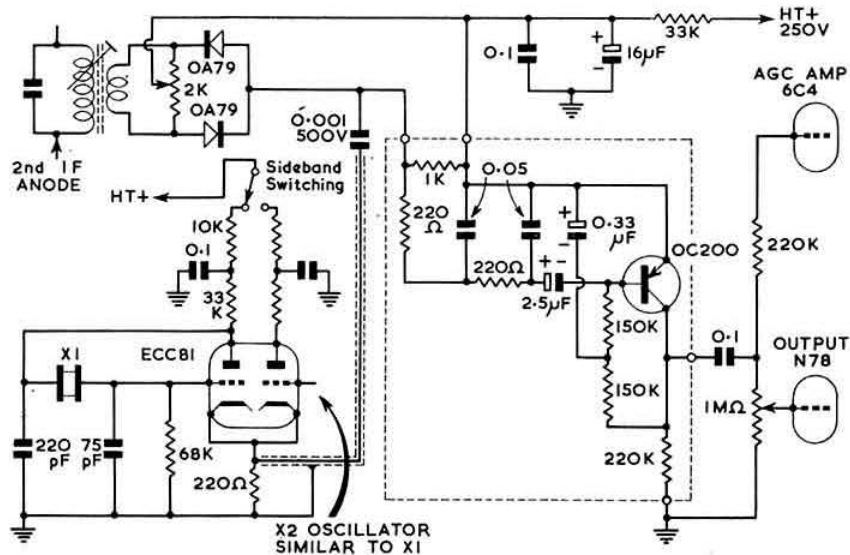
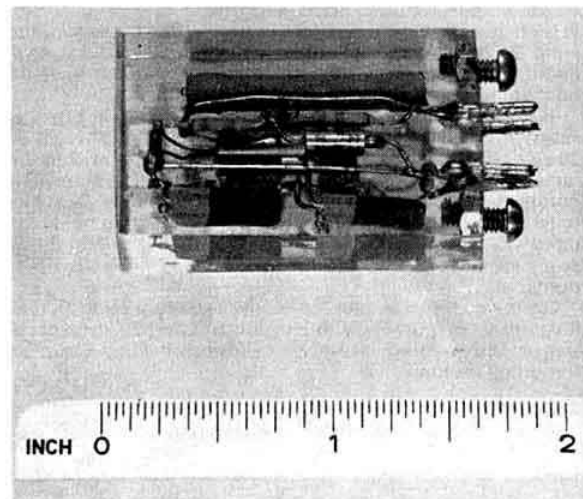


Fig. 3. Final arrangement of demodulator and audio stages.



The potted assembly ready for mounting.

#### Surrey Senior Scout Meet

THE Post Office has issued the call-sign GB3SSS for an Amateur Radio station to be operated from the Surrey Senior Scout Meet, to be held at Buckland, Surrey, on June 8-11, 1962.

The arrangements for the station are being made by R. G. Flavell (G3LTP), 141 Clyfford Road, Ruislip, Middlesex, who would welcome assistance with the operating from other licensed amateurs.

## CONTESTS DIARY

- April 15 - D/F Qualifying Event (London) (see page 454, March 1962)
- April 28-29 - V.E.R.O.N. PACC (c.w.) (for details see page 486)
- April 29 - D/F Qualifying Event (Birmingham) (for details, see page 505)
- May 5-6 - V.E.R.O.N. PACC (Telephony)
- May 5-6 - U.S.S.R. DX Contest (see page 442, Match 1962)
- May 6 - 144 Mc/s Field Day\* (for details see page 505)
- May 12-13 - OZ-CCA Contest (c.w.) (for details see page 487)
- May 13 - D/F Qualifying Event (Oxford) (for details, see page 505)
- May 19-20 - OZ-CCA Contest (telephony)
- May 27 - D/F Qualifying Event
- June 1-4 - CHC/HTH Party
- June 2-3 - National Field Day. (see page 359, January 1962)
- June 16-17 - 70 Mc/s Contest.
- June 24 - D/F Qualifying Event (Newbury). 1250 Mc/s Tests.
- July 7-8 - V.H.F. National Field Day. (For rules, see page 504)
- July 15 - D/F Qualifying Event (Wirral).
- August 10-11 - European Fox-Hunting Championships (Ankara, Yugoslavia)
- September 1-2 - Region 1 I.A.R.U. V.H.F. Contest.
- September 9 - D/F National Final.
- September 16 - Low Power Field Day.
- October 7 - R.A.E.N. Rally.
- October 20-21 - Second 420 Mc/s Contest.
- October 27-28 - R.S.G.B. 7 Mc/s DX Contest (Phone).
- November 3-4 - R.S.G.B. 7 Mc/s DX Contest (c.w.)
- November 10-11 - Second 1.8 Mc/s Contest.
- December 1-2 - R.S.G.B. 21/28 Mc/s Telephony Contests.

\*To coincide with I.A.R.U. Region 1 V.H.F. Contest dates.

#### QRA Locator Maps

COPIES of the British Isles QRA Locator Maps are now available from Headquarters, price 2/6 post paid.



# Transistor Circuit Design Made Easy

## PART I

By M. C. HATELY, B.Sc.(Eng.), A.C.G.I., A.M.I.E.E.  
(G3HAT)\*

**O**FTEN amateurs neglect using transistors where they would seem to be of real advantage. Their robustness, efficient power conversion and small size, make them ideal for microphone pre-amplifiers, loudspeaker amplifiers, modulators for mobile equipment and so on. Perhaps the main reason they are not used by more amateurs is that the published data seems difficult to understand, or perhaps because the text books on transistors seem to be packed with long algebraic expressions. It is hoped that this series will dispel these mysteries and enable readers to use transistors freely in home-built equipment.

This article and two articles to follow will deal with the design of audio amplifiers of several useful types. In the

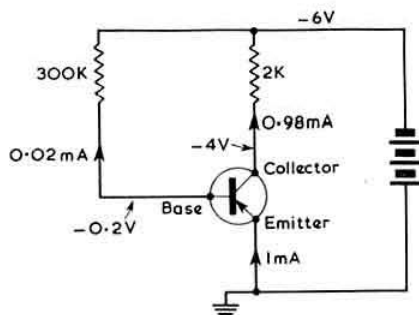


Fig. 1. Simplified circuit arrangement.

present article a method will be described for designing a voltage amplifier of any desired gain: in the second, current amplifiers and push-pull amplifiers will be shown: in the third, some power amplifiers will be designed and there will be some general hints on testing and fault finding. All

\* 87 Warden Avenue, South Harrow, Middlesex.

† Nearly all transistors used at present are *p-n-p* types which need the collector negative with reference to emitter. *N-p-n* transistors are the reverse of this but they are rarely encountered at the present time.

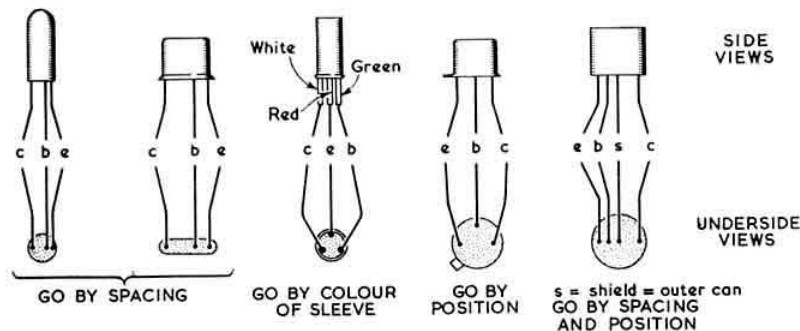


Fig. 2. Base connections of small transistors.

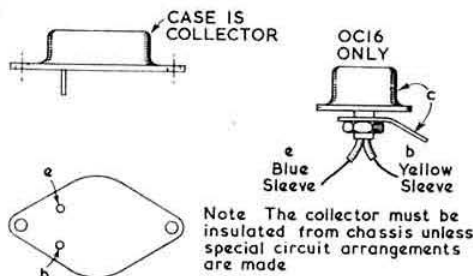


Fig. 3. Base connections of power transistors.

this will be done using down-to-earth, step-by-step methods with a minimum of calculation and fuss. There will be short appendices to each article to show the mathematically minded how the formulae are obtained. Readers who have bought surplus transistors about which they know nothing but the base connections, will find that it will be possible to use them in most of these designs.

First of all, so that everyone is thinking the same way, an explanation of a few fundamentals is necessary. What is the transistor anyway?

Primarily it is a *current* amplifier. Most transistors use a *negative* voltage supply†. The signals are put *in* at the *base* and arrive amplified at the *collector*. The emitter is usually decoupled to earth.

With these facts in mind, it is useful to study the circuit in Fig. 1. This shows the symbol for a normal transistor and typical currents and voltages. Notice particularly that the emitter carries both of the other currents, and that the base current is only 1/49 of the collector current. Here is the property of the transistor that is so useful. A tiny current in the base circuit causes many times that current to flow in the collector circuit. To extend the principle to a.c. conditions, a tiny *change* of base current will cause a very much multiplied *change* of collector current. The relation between collector current and base current is called the  $\beta$  (beta) of the transistor, i.e. the current gain of the transistor. In this case  $\beta = 49$ .

This most important parameter,  $\beta$ , is in some literature also called  $\alpha'$  (alpha dashed) or  $\alpha'$  or  $h_{fe}$ . Notice also the approximate voltages of the base and collector electrodes relative to emitter. In all distortionless circuits the base will be about 0.15 to 0.3V negative of emitter and the collector will be about 3V or more negative of the emitter. (In a.c. work the collector must never approach emitter voltage at any instant or there will be distortion.)

Base connections of most small transistors are shown in Fig. 2. Base connections of power transistors are usually as shown in Fig. 3.

All the disadvantages of the heater circuit of the thermionic valve are absent. There is no delay after switching on, no heater current running to waste and heating up the whole equipment, and there is no hum. There are, however, some attendant disadvantages.

Unfortunately the  $\beta$  changes as the transistor gets warm, and secondly the input terminal (the base) draws a little current, but these troubles are easily overcome by appropriate design.

### Data—What to Look for

If information on available transis-

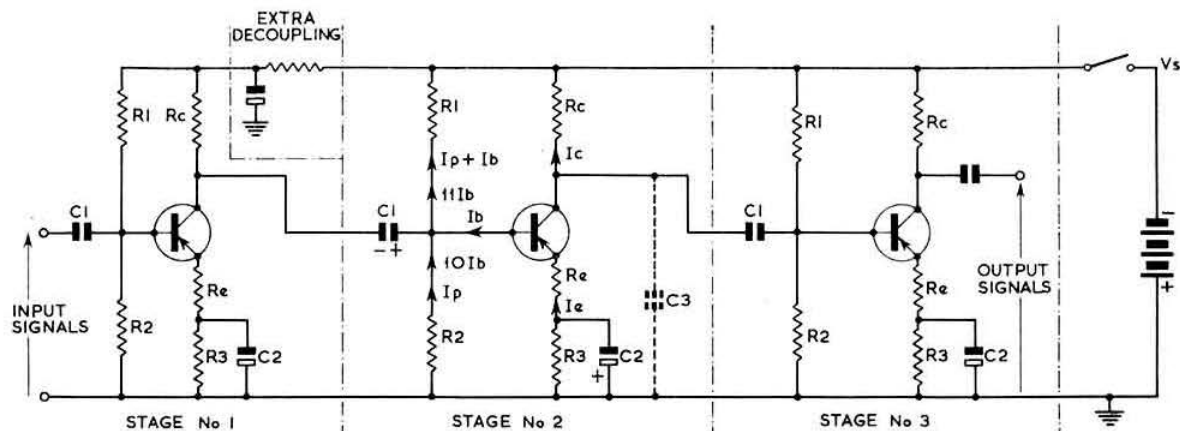


Fig. 4. The general schematic circuit of a voltage amplifier.

tors is obtainable, it is important to know what to look for.

Firstly, see that the collector voltage rating is good enough for the negative h.t. supply—most are suitable for  $-15V$  peak. Others are made up to  $-50V$  or more. Secondly, see that the collector wattage is reasonable. Most audio transistors will stand 50 milliwatts in their collector; intermediate power,  $\frac{1}{2}$  to 1 watt; and power, up to 12 watts (when bolted to a metal cooling fin, or "heat sink"). Thirdly, check that the collector current carrying capacity is adequate. Usually this is more than adequate in all the applications to be discussed. Fourthly, look up the  $\beta$  (or  $\alpha'$  or  $\alpha''$  or  $h_{fe}$ ). In the circuits to be considered we shall not be restricted by  $\beta$  as long as it is about 20 or more, but the more that is known the better. Most general purpose transistors have  $\beta$  about 40 but they vary among specimens of any one type.

### Voltage Amplifier Design

Fig. 4 shows a three-stage amplifier. One complete stage lies between dotted lines. Moving step by step, starting from a design requirement, a simplified procedure is as follows:

- Decide the amplification (or gain) that is required overall.
- Break this up into stages of equal gain, and not more than 14 per stage (up to 30 if it is certain the transistors have a  $\beta$  of 100 or more). Remember this is not simply division but finding a root, e.g. 1,000 is produced by three stages of 10 gain or two stages of 31.7.
- Decide on a voltage of supply ( $V_s$ ). This depends on

what is available in a reasonable sized battery and should not be greater than the maximum collector voltage the transistor will stand (say 9V if in doubt).

(iv) Decide on an economical current drain and use this for the collector current  $I_c$ . (Do not use less than  $300 \mu A$  with germanium transistors. One milliamp is ideal.)

(v) Calculate the base current  $I_b$ , which will be necessary to cause this  $I_c$  to flow.  $I_b = I_c / \beta$

If  $\beta$  is unknown, assume it is 30.  
Thus a typical value for  $I_b$  is  $1 \text{ mA} / 30 = 33 \mu A$ .

(vi) Drain 10 times this base current down R2 and R1. (So Fig. 4 shows  $10 I_b$  through R2 and  $11 I_b$  through R1.) Call it potentiometer current,  $I_p$ , then  $I_p = 10 I_b$ .

(vii) Make the emitter voltage,  $V_e$ , equal to one-third  $V$  supply so  $V_e = V_s / 3$

(viii) By Ohm's law calculate value of  $(R_e + R_3)$   
 $R_e + R_3 = V_e / I_e$  approximately.

(ix) Choose  $R_e$  so that the voltage across  $R_e$  is also one-third  $V$  supply. By Ohm's law  $R_e = V_s / 3 I_e$ . Use the nearest value higher.

(x) Calculate  $R_e$  from the following relationship:  
Voltage gain of stage =  $R_c / R_e$  or  $R_e = R_c / \text{gain}$   
(Notice that it is not necessary to know  $\beta$  for this.) Use the nearest standard value lower.

(xi) Find  $R_3$  from step (viii) by subtraction. Use nearest standard value.

(xii) Calculate R2 from fact that the voltage at the base is

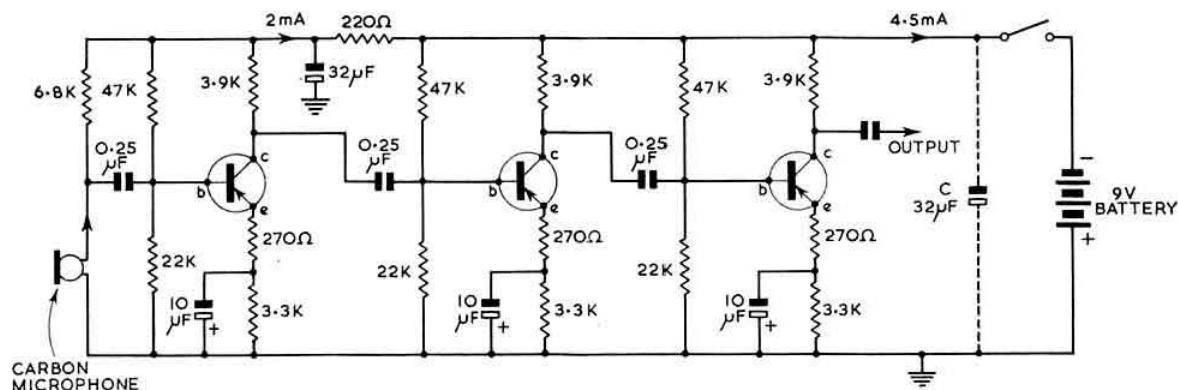


Fig. 5. Full circuit of the worked example (voltage amplifier. Gain = 2000).

approximately  $V_e$  so by Ohm's Law  $R_2 = V_e/I_p$ . Use nearest standard value higher.

(xiii) Calculate  $R_1$  from Ohm's Law

$$R_1 \approx (V_s - V_e)/I_p$$

Use nearest standard value higher.

Make  $C_2$  at least  $10 \mu F$  (which need only have a working voltage of  $V_e$  or more but beware polarity).

Make  $C_1 = 0.25 \mu F$

Put decoupling in the h.t. supply between every pair of stages. The resistors should drop only 0.5V or so (due to the total current to all the stages ahead) and the capacitors should be about twice the capacity of  $C_2$  or larger if the space can be afforded. The polarity of electrolytic capacitors must be carefully observed.

### Worked Example

A carbon microphone can give 1 mV but 2V is needed for a modulator input.

(i) A gain of 2,000 is therefore required. Supposing GET103 transistors are available, the following information is required from the data sheet.

$$V_{e \text{ max}} = -30V$$

$$W_{e \text{ max}} = 200 \text{ mW}$$

$$I_{e \text{ peak max}} = 1 \text{ amp.}$$

$$\beta = 60 \text{ (average)}$$

(ii) Three stages with an overall gain of 2,000 is 12.6 per stage.

(iii) Working from  $-9V$ .

(iv) Decide average current:  $800 \mu A$ .

(v) Therefore base current  $= 800/\beta = 800/60 = 13.3 \mu A$ .

(vi)  $I_p = 133 \mu A$ .

(vii)  $V_e = 9/3 = 3V$ .

(viii)  $R_e + R_3 = 3V/800 \mu A = 3.75K \text{ ohms}$ .

(ix)  $R_e = 3V/800 \mu A = 3.75K \text{ ohms}$  (use nearest higher value:  $3.9K \text{ ohms}$ ).

(x)  $R_e = 3.9K/12.6 = 310 \text{ ohms}$  (use  $270 \text{ ohms}$ ).

(xi)  $R_3 = 3.75K - 270 = 3.48K \text{ ohms}$  (use  $3.3K \text{ ohms}$ ).

(xii)  $R_2 = 3V/133 \mu A = 22.6K \text{ ohms}$  (use  $22K \text{ ohms}$ ).

(xiii)  $R_1 = (9 - 3V)/133 \mu A = 6V/133 \mu A = 45K \text{ ohms}$  (use  $47K \text{ ohms}$ ).

Circuit is then as shown in Fig. 5.

### Footnotes

1.  $C$  may be added to overcome high internal resistance which develops in batteries. Value of  $C = 25 \mu F$  or more.

2. A carbon microphone is ideally used with transistor circuits because the usual transformer may be omitted and microphone current can be bled from the transistor supply voltage. When used a foot or so from the mouth a carbon microphone is capable of fairly good quality.

3. If it is desired to design the frequency response of the amplifiers, a method is given at the end of the appendix.

### Appendix

Step (iv).  $I_c$  should be 10 times  $I_{co}$  (the collector leakage current) or 10 times  $\beta I_{eo}$  (the base leakage current). Use at least  $300 \mu A$  for germanium transistors or  $30 \mu A$  for silicon transistors.

Step (viii). Accurately,  $R_e + R_3 = V_e/I_e$

But  $I_e = I_c + I_b$

$$= I_c + I_c/\beta$$

$$= I_c(1 + 1/\beta) \text{ as } \beta \text{ usually } 30 \text{ or so}$$

$$= I_c(1 + 1/30)$$

$$\approx I_c$$

So  $R_e + R_3 \approx V_e/I_c$

Step (x). Voltage gain =  $\frac{\text{Voltage out}}{\text{Voltage in}}$

Referring to small changes of current and voltage only:

$$\text{Voltage out } v_o = R_e i_e$$

$$= R_e \beta i_b$$

$$\text{Voltage in } v_i = R_e i_e$$

$$= R_e(i_b + i_c)$$

$$= R_e(i_b + \beta i_b)$$

$$= R_e i_b(1 + \beta)$$

since the base to emitter voltage hardly changes, nearly all the signal appears on the emitter in this circuit.

So  $v_o/v_i = R_e \beta i_b / R_e i_b(\beta + 1)$  But  $\beta$  is much greater than 1

Or  $v_o/v_i \approx R_e/R_e$

So voltage gain  $\approx R_e/R_e$

The output impedance  $Z_o$  at the collector is approximately

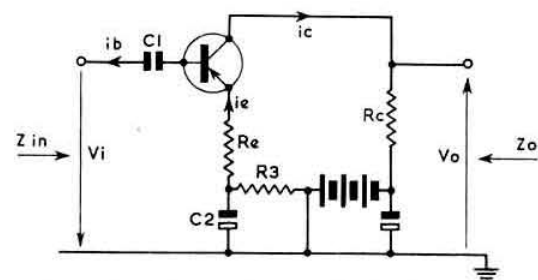


Fig. 6. Theoretical small signal circuit of one stage.

$R_e$  since the collector is a current source of resistance about  $50K \text{ ohms}$ .

The input impedance  $Z_{in}$  at base is

$$Z_{in} = v_i/i_b$$

$$= i_e R_e / i_b$$

$$= (\beta + 1) i_b R_e / i_b$$

$$= (\beta + 1) R_e$$

So  $Z_{in} \approx \beta R_e$

provided  $R_e$  is greater than  $50 \text{ ohms}$  for a small audio transistor or  $5 \text{ ohms}$  for a power transistor. Here the base input resistance of the transistor is neglected. It is usually  $60 \text{ ohms}$  or more and adds to the calculated input resistance.

### Frequency Response

(a) Low Frequency End. Controlled by  $C_1$  and  $C_2$ . It is usually best to make  $C_2$  too large and control the l.f. end response by  $C_1$ . See Figs. 6 and 7.

The rule is 3db at frequency ( $f$ ) per stage where

$$C_1 = 1/2\pi f \beta R_e \text{ Farad}$$

(or 1db per stage at twice this frequency) so if there are three stages it is 9db down at this frequency.

$C_2$  must be much greater than  $C_1 = 1/2\pi f R_e \text{ Farad}$ .

$C_1$  may be electrolytic with negative side to collector and positive to base.

(b) High Frequency End. Most ordinary transistors lose their  $\beta$  about 15 to 20 kc/s—but if required to fall off before this frequency add a capacitor  $C_3$  as shown dotted in Fig. 4. Each stage so treated will be 3db down at a frequency ( $f_h$ ) where

$$C_3 = 1/2\pi f_h \beta R_e$$

or 1db per stage so treated at a half this frequency.

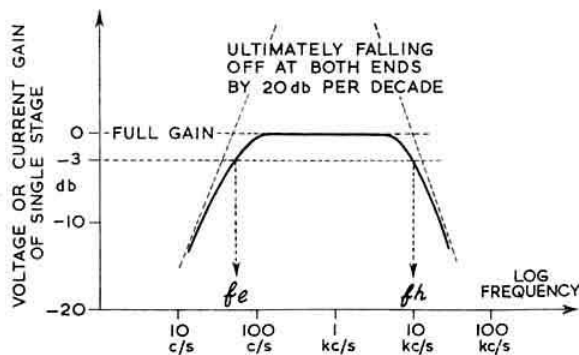


Fig. 7. Band edge considerations.

# TECHNICAL TOPICS By PAT HAWKER (G3VA)

*Non-linear Resistors*

*Electrolytic Capacitor Hints*

*Zero-bias Modulators*

*Valves for U.H.F.*

*Carbon/Crystal Microphone Input Circuit*

*New Form of S.S.B. Generation • QRM Eliminator • Noise Limiters*

LAWS, it is said, are made to be broken. And certainly, in recent years, Ohm's Law has had to suffer many indignities. Once again, those ubiquitous semiconductors are largely to blame. Several types of special resistors, using various oxides and silicon carbide and having non-linear characteristics, are coming into increasing use, and can be expected to be found more and more frequently in amateur equipment. With these devices, doubling the voltage applied across them does not necessarily result in a doubling of the current; it may be much more or much less.

Resistors having a very large negative temperature coefficient, known as thermistors (or by such trade names as Brimistors or Varite thermistors) have been available for many years, but their many uses have not always been appreciated by amateurs. The resistance of these components drops sharply with increasing temperature; for example a thermistor may have a resistance of 6000 ohms at 25° C, 2000 ohms at 55° C, and only about 500 ohms at 100° C. The increase in temperature can come from an external source, or more generally due to the energy dissipated within the component.

Thermistors are widely used in a.c./d.c. equipment having series-connected valve heater chains in order to reduce the switching-on surge, and also for such purposes as the protection of dial lamps and television picture height stabilization. But they also have many lesser known applications of more direct interest to amateurs: for the protection of rectifier valves from capacitor surges; for providing a time delay for the application of h.t. voltage to receiver valves when a directly heated rectifier is used; for providing a degree of voltage stabilization (akin to that provided by a "swinging choke") in h.t. supplies; or for such purposes as stabilizing the output from an audio generator (use of such an arrangement was noted in a recent design in *Electron*, the Dutch amateur journal). It is also possible to use thermistors in various safety or protection circuits—for example to provide automatic warning against fan failure with forced-air-cooled valves.

An important application of thermistors in transistor equipment is to provide temperature stabilization of class B amplifiers in order to reduce the risk of thermal runaway. The thermistor is placed across part of the base bias network so that it tends to stabilize the operating current over a reasonably wide range of temperature variation.

It is worth noting that thermistors are often intended to run at fairly high temperatures and should be mounted away from heat sensitive tuned circuits, etc.

Thermistors, of the types described above, rapidly decrease in resistance with rising temperature or with increased power dissipation. But elements are also available—for instance the S.T.C. "Silistors"—which have an appreciable positive temperature coefficient, though the slope is not as pronounced as with the negative coefficient devices.

These positive coefficient resistors are useful for a number of applications: one—suggested by S.T.C. in their *Application Report MK145*—is to prevent thermal runaway in transistor d.c. converters of the type used by many mobile operators. The Silistor is placed in thermal contact with the transistors and arranged so that if a fault occurs (for example an overload could stop the transistors oscillating) additional protection is given against thermal runaway.

Recently there has been a rapid increase in the use of

non-linear or "voltage-dependent" resistors (VDR) which are able to form an "overflow" to prevent the building up of high peak voltages. Whereas the resistance of a conventional resistor remains reasonably constant despite variations in the voltage applied across it, with the VDR the resistance falls rapidly when voltages beyond a certain value are applied. These special resistors are finding many applications for protection and stabilization circuits in valve and transistor television receivers, and would seem to have other uses of potential interest to amateurs: for example they can be used for the suppression of sparks across relay contacts; to expand the sensitivity of a meter across a particular part of its range; or to protect transistors against excessive induced voltages.

Clearly, Amateur Radio designers will need to keep all these relatively inexpensive devices in mind when up against problems of stabilization, regulation, and the protection of costly components.

## Electrolytic Capacitor Hints

Silistors and VDRs may be little known; the electrolytic capacitor, on the other hand, is an old and trusted (or mistrusted) friend. For despite all the improvements over the years, it still has the unenviable reputation of being the least reliable of all the commonly used components. But some at least of the failures are due to the fact that few of us bother to study its peculiarities.

Two forms of electrolytic capacitor failure are met with: the electrolyte may "dry out," resulting in the loss of capacitance (the problem in the design of this component is to seal moisture in rather than out); or a dielectric breakdown may occur, often as a result of increasing leakage current. Both of these forms of failure are materially affected by high ambient temperatures. For some types of electrolytics it has been estimated that for every 10° C rise in operating temperature, the life expectancy must be reduced by 50 per cent!

High temperatures promote the drying out of the electrolyte. Above a fairly sharply defined critical temperature (which varies with the type and design of the component), they also cause a rapid increase in the d.c. leakage current; this in turn generates more internal heat and thus even more leakage—all the elements of a vicious spiral leading to a dud capacitor. It is thus highly advisable to keep electrolytics as cool as possible by means of adequate ventilation, and by not placing them too close to hot-running rectifier or output valves. Whereas the old "wet" capacitors had to be mounted upright, there is no restriction on the mounting position of modern types, so long as ventilation is not affected.

Unlike other capacitors, all electrolytics pass appreciable leakage current. A guide to the leakage current in microamperes to be expected in a capacitor in good condition is given by  $0.15 \times C$  (in  $\mu F$ )  $\times$  Voltage (for plain-foil types) or  $0.05 \times C \times V$  (for etched foil types). Say, roughly, 1 mA for a 16  $\mu F$  capacitor at 450 volts; this will tend to increase as the condition of the component deteriorates.

It should be clearly recognized that electrolytics deteriorate fairly rapidly when not in use, and after being out of service for about a year (or less in some climates) require to be "reformed" before putting back into use. This applies to new as well as old capacitors. After being "on the shelf,"



there will be very high leakage currents during the first few minutes following the application of a voltage, gradually dropping over half an hour or so to the normal value (if the component has been out of use too long, the leakage may remain high and the capacitor must be discarded). The usual method of reforming is to connect a 10,000 ohm resistor or 15 watt electric bulb in series with the capacitor and to connect it across a supply a few volts above its normal working voltage until the leakage has dropped to a safe figure.

Because leakage current is always likely to vary slightly between different capacitors, it is advisable when connecting electrolytics in series (to increase the voltage rating) to connect across each unit an equalizing resistor; this avoids unequal voltage distribution.

With almost all other types of capacitors, it is possible to increase reliability greatly by using very generously rated components: for example a 450 volt rating when the peak voltage is only 250 volts. However, this dodge is of little or no use when dealing with electrolytics. When one of these capacitors is operated well below its rated voltage, deformation of the oxide film results and it is then no longer safe to use the capacitor at its full rated voltage without reforming—furthermore the capacitance is likely to decrease on low voltages. The component seems to adapt itself to the lower voltage without any great increase in reliability.

In practice, the average electrolytic tends to have a capacitance above its rated value; the usual manufacturer's tolerance is - 20 per cent to + 50 per cent or, for low voltage types, to + 100 per cent.

The etched type of capacitor has much greater capacitance per unit volume than plain foil types, but may offer greater impedance to r.f. signals. With all types, it is advisable to connect a conventional r.f. decoupling capacitor in parallel across the electrolytic whenever there is any question of r.f. decoupling being needed. Although the circuit may function perfectly with a new electrolytic, the series resistance to r.f. will tend to increase with age. Even with ideal operating conditions, the life of an electrolytic capacitor may be cut short if any form of corrosion occurs within the casing—this however is largely a matter of the care taken in manufacture.

But fortunately, despite these forebodings, electrolytics often give yeoman service over many years without any special precautions being taken.

### Zero Bias Modulators

Much favoured for many years have been modulators using a pair of 807s in the class B zero bias arrangement. Factors in this long-standing popularity are the economy of components and the elimination of a bias supply. The usual circuit consists of connecting the signal input directly to the screen grids and, via resistors of about 22 K ohms, to the signal grids (see *Amateur Radio Handbook*, page 274). This arrangement, however, is not well suited for use with modern high perveance tetrodes. In *QST* (February, 1962) W2YM shows how the system can be adapted to modern valves such as those used in the line output stages of television receivers ("sweep tubes"). The modification consists basically of simply removing the signal input connection from the signal grids and connecting these to earth; however, W2YM also shows how a double-triode can be used advantageously as a cathode-follower driver stage: see Fig. 1. W2YM provides circuits of two complete modulators using this arrangement: a straightforward 50-watt unit with a 6AN8 triode-pentode speech amplifier; and a de luxe version with speech clipping and compression.

### Gigacycle Valves

A few years ago it seemed as though only the specialized valves such as the disc-seal types would ever be much good around 1000 Mc/s or—where as well get used to the term—1 Gc/s. Then came the 6AF4A which functions as a

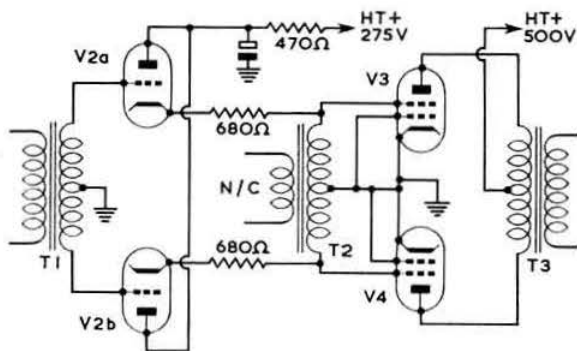


Fig. 1. W2YM's driver/modulator using high perveance valves in class B zero bias. V2 6CG7, V3, V4, 6GJ5 or 6GW6, T1 interstage a.f. transformer ratio 1:3 (primary to total secondary), T2 push-pull a.f. output transformer (speech coil winding not used), T3 modulation transformer.

u.h.f. oscillator in this region. Now, with the prospect of u.h.f. television in the offing, the EC88 series has arrived. This is a frame grid valve manufactured by fairly conventional mass production techniques for use in grounded-grid circuits up to frequencies greater than 1 Gc/s. The electrode structure (Fig. 2), designed to provide the lowest possible inter-electrode capacitances, is rather like a normal valve cut in two; in some respects it resembles disc-seal construction. In order to reduce the inductive effects of the grid connection, the grid is brought out to no less than five of the B9A pins. The Mullard *New Product Information* booklet on this valve includes a circuit for a crystal controlled 470 Mc/s front-end unit using two EC88 r.f. amplifiers and an EC88 mixer. The local oscillator chain comprises two E88CC double triodes. Details are also given for a 1 Gc/s r.f. amplifier with quarter-wave trough line. Both these designs could probably be adapted for amateur u.h.f. applications. A 70cm converter using a PC88 (similar to the EC88 except for its heater rating), E88CC, 6AK5 and 6J6 is described by DL0SZ in *DL-QTC* (March, 1962).

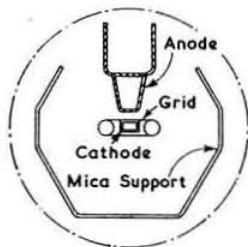


Fig. 2. Horizontal cross-section of the Mullard EC88 electrode structure.

Another B9A-based valve specially designed for u.h.f. amplification is the low-noise G.E.C. type A2521 with a listed noise factor of 9.5db at 900 Mc/s.

Also of potential interest to u.h.f. enthusiasts is the fairly recent R.C.A. twin-power pentode type 6939 on a B9A base. This valve, which has built-in neutralization, can deliver 6 watts at 500 Mc/s or about 2.2 watts when operated as a frequency-tripler. Further details are given in *R.C.A. Application Note AN-192*. Since this note was originally penned, the March *QST* has arrived with a design for a 5 watt, 70cm transmitter using two of these valves at the end of a 6EA8, 6AQ5, 7558 144 Mc/s chain.

A u.h.f. grid-dipper covering about 300-600 Mc/s with a 6J6 oscillator is described by W8TCO in the February *QST*.

**Carbon/Crystal Microphone Input Circuit**  
Mobile operators and others who use carbon microphones mostly know the trick of connecting the microphone in the

### Carbon/Crystal Microphone Input Circuit

Mobile operators and others who use carbon microphones mostly know the trick of connecting the microphone in the

cathode circuit of the valve. The stage is then a grounded-grid amplifier without need of an impedance matching transformer or separate microphone battery. A snag with this system is that the change of microphone resistance is sometimes sufficient to introduce distortion by excessive variation of the operating point of the valve. In *Electronics World* (February, 1962), K8ERV gives a circuit which takes the microphone out of the bias circuit but retains all the advantages: see Fig. 3. This circuit also provides an additional input connection for use with high-impedance microphones. Should it be required to adjust the gain of the stage to equalize the output of the two types of microphone an additional resistor can be shunted across R4 (to lower the gain from the carbon microphone) or alternatively between H.T. + and the junction of R2/R4 (to increase carbon microphone current and hence gain). R2, R3 and C2 will be the normal component values for the particular value used.

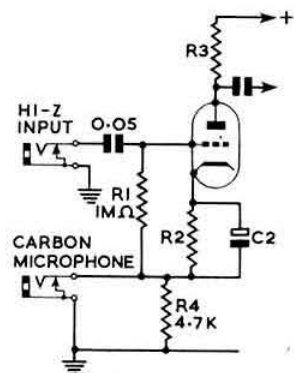


Fig. 3. K8ERV's input circuit for carbon or high impedance microphones.

### New Form of S.S.B. Generation

At the Physical Society Exhibition in 1961, A.E.I. showed a new system of s.s.b. generation which they have under development (Pat. App. No. 41574/60). This uses quadrature modulation but requires one instead of two multiplier-modulators and only a relatively simple filter. At the 1962 Exhibition, further information was given by the firm on the single Hall-effect vector multiplier (Pat. App. No. 44605/60) which replaces the two balanced modulators and which forms an essential part of the new system. It is claimed that whereas the conventional s.s.b. system depends upon the cancellation of the unwanted sideband after it has been produced (at the same level as the wanted sideband) by both modulators, the new system produces (ideally) only the required sideband. It is also claimed that it simplifies the problem of the high stability required in the balanced modulators and phase shift networks. We have no circuit details of the system and do not know whether it will ever prove useful for amateur operation, but it seems worth reporting.

### QRM/N Eliminators

Many are the devices which have been heralded as the final answer to QRM and QRN. But somehow our old

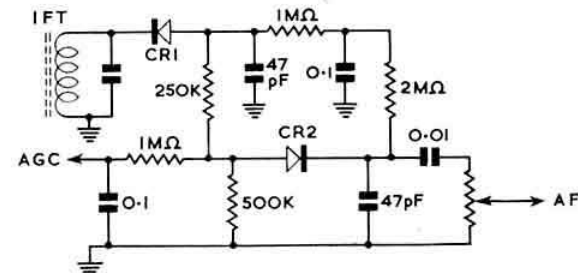


Fig. 4. ON4JM says of this noise limiter "to try it is to adopt it." CR1 (detector) OA85, CR2 (limiter) OA85.

enemies have a habit of remaining at least partially immune from these radio antibiotics.

One of the medicines for the c.w. operator which turns up from time to time in varying degrees of complexity is the idea of using the receiver's a.f. output only to trigger off a sharply tuned a.f. oscillator which remains unresponsive to interfering signals and to static. A modern form of this system is described in *Electronics World* (March, 1962) using a 12AT7 as a Wien bridge oscillator at about 740 c/s and a 12AT7 Schmitt trigger with a crystal diode clamp, with a further half of a 12AT7 as an audio amplifier.

This type of unit can undoubtedly do much to improve reception under certain conditions; but it has always appeared something of a disadvantage that one is listening not to the actual incoming signals but only to the locally generated audio tone. There seems much less personal link with the operator at the other end—and it can result in undesired RST599 reports on all sorts of signals.

The more ordinary noise limiter, applied to the a.f. signal, can often be useful to the operator. Fig. 4 shows a simple design for "un antiparite" by ON4JM (*QSO*, January, 1962) using crystal diodes as detector and noise limiter.

Somewhat more complex is the circuit (Fig. 5) which forms the basis of a Collins patent (2961532) as published recently—but without component values—in *Radio-Electronics*. The two limiter diodes short out positive or negative peaks greater than those required. The potential at P2 is proportional to the instantaneous a.f. wave coming from the crystal rectifier. R1, R2 are chosen to make P1 proportional to the a.f. peak, and P2 proportional to the

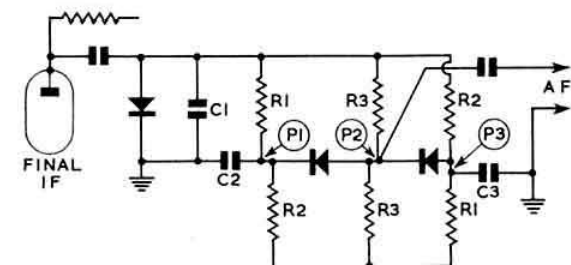


Fig. 5. Basic arrangement of a noise limiter circuit developed for Collins Radio.

second a.f. peak. This makes P1 more positive than P2 and P2 more positive than P3, permitting the diodes to short out the excessive peaks. Since C2 and C3 are relatively large, the potential at points P1 and P3 cannot follow rapid changes in signal as P2 can. Thus, if the instantaneous audio voltage should become greater than a fixed value—for example because of a noise pulse—P2 becomes momentarily more positive than P1. The second diode conducts and shorts the pulse through C2 to earth. Similarly should the negative peak exceed a fixed value, the third diode will short it through C3.

### Mobile Transceiver

Since Collins marketed their KWM-1 and 2, the appeal of a compact bandswitched s.s.b. transceiver for mobile or fixed use has undoubtedly grown. No one would pretend that the home construction of such rigs is to be undertaken lightly. But W8WFH and W8DLD have taken the plunge and provide, in a two-part article in *G.E. Ham News* (November-December, 1961 and January-February, 1962), constructional details of a 23 valve rig for 3.5–30 Mc/s delivering 5 watts p.e.p. output. Because of its affinity to the KWM designs, it is named the LWM-3.

# THE MONTH ON THE AIR

A CHRONICLE OF EVENTS ON THE HF AMATEUR BANDS

By R. F. STEVENS (G2BYN)\*

**D**URING the period under review conditions on the h.f. bands have shown a distinct improvement indicating that the seasonal variation is overriding the gradual reduction in the sunspot number. The prediction of the smoothed monthly sunspot numbers from the Zurich Observatory range from 37 for the current month dropping to 31 in August compared with a number of 55 for December, 1961. The numbers represent a mean of the readings obtained daily during the monthly period and during the latter there may be considerable variation in the day to day figures. During February, 1962, provisional numbers of 20, 26 and 28 were observed on the 17th, 18th and 19th respectively, whilst the 23rd, 24th and 25th produced numbers of 108, 124 and 103. The lowest number during February was 7, noted on the 12th/13th.

In terms of expected propagation on the amateur bands the following alterations in the maximum usable frequencies are anticipated: (i) a decrease on the New York path from 21 to 16 Mc/s, the peak occurring at 18.00, (ii) a decrease on the path to Fiji from 18 to 15 Mc/s, the best time being between 10.00 and 14.00, (iii) a decrease on the short path to Melbourne from 22 to 17 Mc/s with the peak at 08.00, and (iv) the Cape Town path shows little alteration in m.u.f. but the most favourable period will probably be shorter, extending from 14.00 to 16.00, when contacts on 28 Mc/s should be possible on good days.

With the current interest in Top Band working the comments by G6BQ on his experience with aerials on this band will be of considerable interest. Before 1939 G6BQ was a consistent high scorer in Top Band contests using a quarter wave "L" aerial but had very little luck with W/VE DX. In 1949, and using the same transmitter, but with a half-wave dipole having the centre high above earth many North American QSOs were made with frequent reports of RST579. Arrangements were then made so that instant switching was possible between a centre-fed Zepp and a Marconi aerial working against earth, and a large number of comparative reports produced the following results:

Range	Marconi	Zepp
Local ..	One "S" point better than Zepp	
100-300 miles		Two "S" points better than the Marconi
Central Europe	Neither shows a consistent advantage	
Trans-Atlantic stations ..	from VE-S1	S4
	from W1BB—could not detect signals	S5

It is now thought that the best angle of radiation for 1.8 Mc/s DX is very high, possibly, 60 degrees or more. This would account for the late peak time of around 06.00, for at this hour the E layer at the U.S.A. is thin enough to pass a high angle ray.

\* Please send all reports to R.S.G.B. Headquarters to arrive not later than April 21.

## News from Overseas

From 5N2JKO comes the following news of Nigerian stations: 5N2AMS has left Minna and will be in Kaduna for a short time, following which he goes on leave in mid-April and will probably settle for a location in Northern Nigeria when he returns. All mail should be addressed c/o 5N2JKO. 5N2RSB and 5N2SMW go to the U.K. on leave in May and return in the autumn. 5N2RDG will not be returning to Nigeria after his present tour ends in December—he is hoping for a Caribbean posting. 5N2JRG is travelling round the country and in his absence 5N2EBL ensures that the KWM-2 remains serviceable. Both 5N2LKZ and 5N2JKO took part in the B.E.R.U. Contest with the former seeming to have won the local honours. The 5N2 Awards are being issued at the rate of one every two days with 31 countries having received at least one certificate.

Writing from Gan, G3JJH hopes that the R.A.F. club station will become more active in the near future, but at the present time G3JJH is the only licensed operator. There are a large number of outstanding QSLs but these will be despatched as soon as possible. The times of operating are from 11.00 to 14.00 and 15.00 to fadeout, usually about 18.00 on 21 Mc/s, and contacts with the U.K. are particularly welcome. Mail for VS9MB should continue to go to R.A.F., Gan, B.F.P.O. 180, London.

Stan Crabtree, 5A4TC, the manager of the Libyan (5A) QSL Bureau, mentions that at the present time he holds large numbers of cards for 5A3CAD who is now back in the U.K. and sought after QSLs are probably being held up, although large numbers of outgoing cards have been handled by W2CTN. In drawing attention to the correct address of the 5A QSL Bureau (given in QTH Corner)



The shack of G3JFF/MM on board H.M.S. Cook. The same gear is used when G3JFF operates as VR1M and VR2EA.



5A4TC mentions that he is fairly active on 14, 21 and 28 Mc/s after a change of QTH.

Jerry Connolly, ex-ZD2KHK/NC and G3KHK, is now on duty with the United Nations at Government House situate in the neutral zone between Jordan and Israel, and has received permission to use the call ZC6UNJ. In view of the status of this small piece of territory it is hoped that call will acquire an added interest. G3KHK will be in Jerusalem until the end of the year and the location offers plenty of scope for good aerial systems. It is hoped to operate on s.s.b. but lacking a portable rig such as a KWM-1 the situation is not too hopeful. The address is P.O. Box 490, Government House, Jerusalem, Israel.

G3PAG, the QSL Manager for VP8GQ (South Orkneys) now has the situation well in hand and, with the exception of the period December 16 to February 22 the logs for which are in the post, all contacts will have been acknowledged. Some initial delay was caused by a printer's error which necessitated the return of the QSLs. Logs are at present passed with the help of G3KXQ, and G2BVN also has a weekly sked with VP8GQ who reports disappointing conditions on 1.8 Mc/s during the B.E.R.U. Contest. On 3.5 Mc/s G5WP was worked and G3FXB and G2DC were heard and called with no reply. Generally conditions on the latter band have not been good during recent weeks, due partly to the increase in the static level in the Antarctic regions.

G2FDF is now on duty at a location some 80 miles s.e. of Fairbanks, Alaska, and is active on 7, 14 and 21 Mc/s from the local M.A.R.S. station under the call KL7DTS. The rig consists of a Pacemaker transmitter with a 75S-2 receiver, the aerials consisting of a TA33 beam, a vertical for 7 and 14 and a dipole for 3.5 Mc/s. G2FDF is particularly on the look-out for U.K. contacts. QSLs may be sent to W. F. Limehouse, P.O. Box 310, R.C.A. B.M.E.W.S. Project, Clear, Alaska.

#### DXpeditions

The EI trip this year will take place from 16.00 on June 9 until 12.00 on June 12, the station being located at Kilronan on the island of Inishmore. The call-sign, EI0AB, will be the same as that used last year and whilst not a separate country will be of interest to prefix hunters. The leader of the trip will be EI3B and operation is planned on c.w., a.m. and s.s.b. on all bands from 3.5 to 28 Mc/s. In addition there will be a station on 144 Mc/s. Cards will be answered direct if an I.R.C. is enclosed, otherwise through the bureaux. EI6X comments that only 50 per cent of the stations worked last year sent QSLs.

Unfortunately UA3CR and UC2AA were not able to get to Franz Josef Land during the Sideband Contest owing to extremely bad weather conditions which made flying impossible. Whilst awaiting transport many contacts were made from Dickson Island under the club call UA0KAR, which provided a large number of stations with a first Zone 18 s.s.b. QSO.

The HB9TL transmitter should be in operation from FM7WQ by the time this is being read. The trouble at the previous stop was caused by a o/c bias resistor causing the defection of an amplifier valve. The next planned stop after Martinique is Guadeloupe.

The world wide trip planned by W4BPD is scheduled to commence this month with activity from VQ9 and VQ7. QSLs should go to W4ECI. It is disconcerting to see in the advance notices of this trip that operators who contribute to the expenses of the trip will receive information which will enable them to make contact with W4BPD with the least difficulty at the various stopping places. This, and other facts, which have come to the notice of the writer, lead one to the conclusion that operating ability is now at a discount, whilst the possession of a large bank balance is assuming increasing importance in the world of Amateur Radio.

VQ9HB plans operation from the Aldabras for a period of about 14 days during the earlier part of April. Operation will be mainly on c.w.

Details of activity from Timor (CR10) have again been current, and CR10JS has been worked on c.w., but the status of this station is not known at the time of writing. First information said that a Portuguese naval officer would be on the island for a period of one month and would operate c.w. on 14 and 21 Mc/s with a power of 60 watts, using frequencies multiplied up from crystals of 7029 and 7039 kc/s. VK8OW is also thought to be visiting CR10 taking along a KWM-1.

G3LIG and G3FUN will be visiting Scotland from April 24 to May 1 and will operate from Golspie in Sutherland on c.w. 1.8 Mc/s operation will be nightly from 20.00 to 23.00.

The Wirral Amateur Radio Society will be operating from Westmorland during the week-end April 27 to April 29, using the call G3NWR on a.m. and c.w. in the 1.8 Mc/s band. Operators are asked to call off the operating frequency.

Bhutan will be represented on 7, 14 and 21 Mc/s a.m. and c.w. by a party consisting of VU2US, VU2PS, VU2ED and VU2BK who will be there for a week in the middle of this month, the exact date not being known at the time of writing. The call will be VU2US/AC5 and QSLs should go to VU2BK.

#### Contests

The P.A.C.C. contest organized by V.E.R.O.N., the Dutch national society, will take place during the following periods: c.w.—12.00 on April 28 to 20.00 on April 29; telephony—12.00 on May 5 to 20.00 on May 6. All bands between 3.5 and 28 Mc/s may be used but cross-band contacts are not valid. Stations will exchange a 6 (5 on telephony) digit number consisting of RST(RS) and the serial number of the contact

#### QTH Corner

<b>BY1PK</b>	Box 427, Peking.
<b>E8BDO</b>	Box/Tenerife, Canary Islands.
<b>EP2BK</b>	R. M. Snyder, Box 224, Abadan, Iran.
<b>FK8AX</b>	H. Lesueur, B.P. 541, Noumea, New Caledonia.
<b>FM7WD</b>	Capt. J. Germain, B.P. 12 Bis, Fort de France, Martinique.
<b>FP8DD</b>	via W4ZODA.
<b>H2P</b>	via K0RDP.
<b>W6YCW/KJ6</b>	A.P.O. 105, Box 100, Postmaster, San Francisco, U.S.A.
<b>KM6CE</b>	Midway, Navy 3030, Box 23, c/o FPO, San Francisco, U.S.A.
<b>KP4BEA</b>	Box 2029, San Juan, Puerto Rico.
<b>KV4CM</b>	via W0GEK.
<b>LX1AB</b>	W. Berger, 15 rue de la Scierie, Bettenbourg, Luxembourg.
<b>UP2CG</b>	G. Misiunas, P.O. Box 46, Vilnius, Lithuanian S.S.R., U.S.S.R.
<b>SP8CK</b>	E. Kawozyński, ul Wschodnia 13m18, Lublin, Poland.
<b>SV0WT</b>	Box 606, Iraklion Air Station, Iraklion, Crete.
<b>TU2AK</b>	A. Rouault, P.O. Box 1813, Abidjan, Ivory Coast Rep.
<b>VE8MZ</b>	via K0RDP.
<b>VPIWS</b>	via K8ONV.
<b>VP2DX</b>	via W8VDJ.
<b>VP2GAA</b>	via W4OPM.
<b>VP2SH</b>	R. L. Nelson, Dept. of Agriculture, St. Vincent.
<b>VP5MJ</b>	via K0TYO.
<b>VP8GE</b>	M. Meade, Met. Office, Ballygorman, Lifford, Co. Donegal, Eire.
<b>VQ1DR</b>	via W2TSD.
<b>XZ QSL Bureau</b>	B.A.R.T.S., P.O. Box 800, Rangoon, Burma.
<b>ZD9AD</b>	via Box 3449, Johannesburg, S. Africa.
<b>ZS6PC/8</b>	Box 9321, Johannesburg.
<b>5A QSL Bureau</b>	P.O. Box 372, Tripoli, Libya.
<b>5A3TQ</b>	Box 263, Benghazi, Libya.
<b>5H3GC</b>	N. Jackson, Box 111, Mbeya, Tanganyika.
<b>5N2FEL</b>	F. E. Ledger, Ex-Lands Nigeria Ltd., P.O. Barakin Ladi, Nigeria.
<b>5T5AD</b>	A. Duffau, B.P. 100, Nouakchott, Mauritania.
<b>6O1MT</b>	Box 397, Mogadiscio, Somalia Rep.

R.S.G.B. QSL Bureau: G2MI, Bromley, Kent.



starting with 001. PA/PI stations will in addition give two letters indicating their province. Each completed QSO counts 3 points; 2 points are earned upon receiving the number correctly and 1 point on receiving acknowledgment of the transmitted number. For stations outside the Netherlands the provinces give 1 point per band for the multiplier and thus the maximum obtainable multiplier is 55 (11 provinces on 5 bands). The final score is the sum of all worked provinces on all bands. Certificates will go to the highest scoring stations in each country on c.w. and telephony. The log information required is: (i) Date and time (G.M.T.); (ii) Call-sign of station worked; (iii) Province worked; (iv) Multiplier claimed; (v) Transmitted number; (vi) Received number; (vii) Points. Logs must be postmarked not later than June 15, 1962, and sent to P. v. d. Berg, PA0VB, Keizerstraat 54, Gouda, Netherlands. Each log must be accompanied by a signed statement that the participant has observed the contest rules and the regulations for amateurs in the operator's country. G2BVN has a small number of copies of the complete rules which may be obtained by sending a s.a.e.

The 11th E.D.R. OZ-CCA Contest will take place during the following periods: c.w.—12.00 on May 12 to 24.00 on May 13; telephony—12.00 on May 19 to 24.00 on May 20. Operators will try to work as many amateur stations in all continents as possible under the rules and during the contest periods. All bands between 3.5 and 28 Mc/s may be used and the contest call is "CQ AW." Cross-band working is not allowed. Contestants will exchange six figure numbers (five on telephony) consisting of the RST (RS) report plus the serial number of the QSO starting with 001. Each contestant earns 1 point for a correctly received report and 2 points for a correctly received QSO number, a total of 3 points for each contact. Contacts with OX, OY and OZ stations count double. Each country worked counts as a multiplier and the final multiplier is the sum of all countries worked on each band. Each of the W/K-VE-PY-LU-VK and ZL licensing areas counts as a separate country for this contest. The final score consists of the total points multiplied by the sum of the multipliers. The same station may be worked on different bands. Certificates will be awarded to the leading scorer in each participating country in the c.w. and telephony sections. If one I.R.C. is forwarded with the log a complete list of results will be sent to the contestant. The log form must contain the following details: (i) Contestant's name, call and QTH with details of equipment used; (ii) A signed declaration that the competition rules and the radio regulations of the contestant's country have been observed; (iii) Column headings: (a) Date and Time (G.M.T.); (b) Station worked; (c) Country; (d) Worked records of new countries for each band, e.g., 3.5, 7, 14, 21 and 28 Mc/s; (e) Number sent; (f) Number received; (g) Points. The logs must be postmarked not later than June 15, 1962 and should be sent to E.D.R. Contest Committee, P.O. Box 335, Aalborg, Denmark.

Contacts made in the OZ-CCA Contest may count towards the OZ-CCA Award without the necessity for producing QSLs provided the contacts are approved by the E.D.R. Traffic Department.

Participation in the CQ Magazine 160m Contest was at a high level. This was the first occasion that this contest had been run on a world wide basis and certificates will be awarded to the leading scorer in each country.

Conditions in the CQ W.W. S.S.B. Contest were favourable and many high scores have been reported. Several stations were heard giving serial numbers between 500 and 600, which should indicate consecutive contacts.

In connection with the U.S.S.R. Contest on May 5/6, G3YY has drawn attention to the fact that awards will be made on both an all-band and single band basis, the latter referring to 3.5 and 7 Mc/s only. Also, there is a condition



The handsome certificate issued by CQ Magazine to the leading entrant in each country in the CQ 160 metre Contest.

that each contestant must show in his log a minimum of 12 hours of continuous operating time, but the log must be presented for the whole of the operating time. Page 442 of M.O.T.A. for March, 1962 contains a summary of the rules of this contest which should be read in conjunction with the above.

#### The B.E.R.U. Contest 1962

The B.E.R.U. week-end was blessed with conditions rather above those experienced recently and several most interesting openings were seized upon by dozens of the old B.E.R.U. addicts and hundreds of the newer calls.

The two, or at the most three, kc/s on 3.5 Mc/s not cluttered with idling commercials produced good signals from upwards of a dozen ZLs apart from VP8GQ and VES. Public enemy No. 1, the wide band jammer on 7 Mc/s aided by the seemingly never ending sequence of RSEM contests, reduced that band to the verge of utter uselessness but when a few spare cycles could be tracked down the S7 signals from VK, ZL and VP8GQ proved again the DX potential of the band. 14 Mc/s, the Old Faithful, showed up with fewer short-skip openings and lived up to its reputation. The excellent evening opening to VE7 was crowned by the S8 appearance of VR2EA, and ZD9AD surprisingly put that volcanic prefix in one or two logs. VS4RS, VS9MB, and VQ8BM had the U.K. wolf pack in full cry on 21 Mc/s but ZL was disappointing and VK signals seemed restricted to the more prominent DX exponents from down under.

VEs expectedly provided the bulk of the contacts on all bands excepting 28 Mc/s but on the latter band it was interesting to hear, but only while beaming south, snatches of a VE2 in contact with 5N2JKO.

Not surprisingly, African participation was below previous years but, as ever with B.E.R.U., the compensating appearance of some unhopd-for prefix provided that spice which puts this contest in a class of its own.

From the reports of claimed scores it seems that the probable winner will come from the triumvirate of ZC4IP, ZB1HC or VK5NO, all having points totals in the region of 3300 to 3400. The leading U.K. exponents appeared to be G3FXB, G4CP and G2DC but it is unlikely that a U.K. station will provide the eventual winner. 5N2LKZ and 5N2JKO were both very active but no hint of their totals has yet filtered through. The participation from Canada was on a high level, VE2YU claiming 2890 points with VE2NV, VE2YA and VE2NI all well above the 2000 mark. The number of Montreal stations entering was an all time high, according to a report from VE2YU. VP8GQ assesses his

probable total as being 2000+; this would have no doubt been considerably higher had VP8GQ concentrated on seeking bonus points rather than providing a large number of U.K. stations with a South Orkneys contact.

#### Awards

The 5A Award is obtainable on production of a certified list showing contacts with five 5A stations in two districts, e.g., Tripoli and Benghazi, telephony or c.w. after January 1, 1961. The list should be sent to the custodian, 5A3BC, together with eight I.R.C. or a postal order for 4/-.

The WFEDXP Award is obtainable on production of QSLs showing QSOs with three Far East DXploiters. QSLs, together with 10 I.R.C., should be sent to JA1BYM, Junzo Yokokawa, 1-862 Asagaya, Suginami, Tokyo, Japan. Members are: JAs 1BK, 1EL, 1GV, 1YL, 1BDF, 1BLC, 1BRK, 1BWA, 1BYM, 2JW, 2XW, 2AEY, 3EK, 3TC, 4AS, 5FQ, 6ACZ, 6CY, 7JU, 8BY, 0CE, 0AEQ. (The information on this and the 5A Award comes from G8PL.)

The R.E.F., the French national society, have created a new award known as the DTA Diploma (Dipolme des Terres Australes Francaises). The French Austral Lands comprise: Kerguelen (FB8XX); St. Paul and New Amsterdam (FB8ZZ). Crozet group (FB8WW) and Adeline Land (FB8YY). It is necessary to produce QSLs showing contacts after April 1, 1946, with three of the above territories. Contacts with all four territories qualify for a certificate of excellence. The diploma is available on a mixed mode basis or for c.w. or telephony only. QSLs together with five I.R.C., should be sent to the D.T.A. Manager: A. Jacob (F3FA), Avenue Victor-Hugo 33, Pavillons-sous-Bois, Seine, France.

Claims for the Worked All Zones award issued by CQ Magazine should be sent to the DX Editor, W2DEC. Claims for the WPX awards may be sent to F9IL, from whom the special forms are available. A leaflet dealing with the Worked 100, etc., Sideband awards may be obtained from G2BVN, to whom claims from U.K. stations may be sent.

#### DX Briefs

The latest Finnish calls are consisting of three letters following the district number, e.g., OH2BCA. It is believed that some of the operators hold the equivalent of a novice licence.

VS6EN, who is ex-G3JZI, is looking for U.K. contacts around 14,080 kc/s at 17.00. VS6EN is a member of the Royal Navy Amateur Radio Society. (Tks G3DAF.)

The bulletin of the South Trinidad A.R.S. contains a note that amongst recent visitors was G2YL, for whom a barbecue was held at the home of VP4NC.

ST2AR is anxiously awaiting permission to renew operating, and mentions that the former holder of ST2AC is back in the Sudan, so that further activity can be expected in due course. ST2AR was subsequently reported as working in the second half of the A.R.R.L. DX contest.

XT2Z was active during the CQ Sideband contest and QSLs should go, as before, to K4TWF. 9G1DP is the licensee of XT2Z.

AP2AD is the only s.s.b. station now on the air from West Pakistan, the QTH being Lahore. AP2AD has been well heard in the U.K. on 14,300 around 13.00.

The U.S. stations located on the floating icebergs, e.g. KL7FLC, etc. will, it is understood, have the same status as Maritime Mobile stations, and their QSLs will not count for the WAZ award.

5T5AB and 5T5AD are active from Nouakchott in Mauritania, the former on 21 Mc/s a.m. and the latter on a.m. and 14 Mc/s c.w. Both stations give the same QTH for QSL, and this will be found in QTH Corner.

VQ1DR, who has been operating from Zanzibar, is aggrieved by reports circulating amongst U.S. stations that

he has no official licence, and a photostat copy of the latter has been sent to the A.R.R.L. for information. VQ1DR will shortly be on his travels again operating under the call W2GLM/MM. QSLs should go to W2TSD.

#### Band Reports

It would appear that the season for DX on 1.8 Mc/s has just about closed, although with the erratic conditions now being experienced anything may happen. The results from the CQ 160m Contest were rather below those expected owing partly to the QRM from U.K. stations taking part in the R.S.G.B. Top Band contest. Amongst the North American stations heard on February 24/25 were: W1BB, W1ME, W1PPN, W2FYT, W2GGL, W2IU, K2DGT, W3EIV, W4KFC, W4YHD, W9YT, W9PNE and VO1FB, and, in addition, B.R.S.20317 (Bromley) reports EP2BK (23.10 to midnight); EL4A (23.00); ZC4PB (00.05); VP8GQ calling CQ on 1801 kc/s at 06.30; W0VEH/VP9; HR3HH and FP8BX badly QRM'd by U.K. stations. On March 4, 18 DX stations were heard by our reporter but these were exclusively North American. Amongst the U.K. stations heard and worked by W1PPN were: G3CHN; G3FPQ ('phone); G3IGW; G3KQX; G3MBN; G3OIT; G3PQA; G3PU; GM3IAA and GD3UB. W0VXO/9 reports hearing ZL3RB at RST449 on March 4.

W1BB comments in his 160m DX Bulletin that the 1961-62 season has not been as good as some expected nor as bad as it could have been. Of interest is the number of DX stations worked by W1BB, which reads as follows: 1954-55, 19; 1955-56, 26; 1956-57, 20; 1958-59, 4; 1959-60, 5; 1960-61, 11; 1961-62, 27. These figures seem to indicate a regular cycle correlating with sunspot activity. ZL1AH (ex-G3AH) reports hearing W1BB at RST339 calling CQ (08.09), but HClAGI encountered poor conditions with heavy static. HR3HH reported hearing G3PU, his first G, but unfortunately no QSO resulted. This last season has produced a number of "firsts," and it is anticipated that the winter of 1962-63 will produce further milestones in Top Band working.

Latest information on the IQSY project is that no plans have been made for amateur participation in propagation research, but that the question is now being examined. If it is thought that amateurs can provide useful ionospheric data then the idea will be developed.

The 3.5 Mc/s band has not produced anything truly outstanding but conditions have been sufficiently good to provide worthwhile contacts at most times during the last month. B.E.R.U. provoked c.w. activity and B.R.S.20317 logged MP4BBE, VP8GQ, VP9BO, ZL2PM, ZL3FZ, ZL4BO, ZL4IE, and 5N2LKZ. Also logged were EP2BK (03.00), TI2LA, TF5TP, and Ws. On s.s.b. MP4BBW (Awali) worked a number of European stations including HB9TL, GD6IA, OY7ML, OH5NQ, OX3AI and UC2AA, with, in addition, VE3BQL/SU, UL7JA, HZ1AB and 5A3TQ. Pending the erection of a vertical for 3.5 and 7 Mc/s MP4BBW is using the feeder to his 144 Mc/s beam loaded up as a random length of wire. 5N2JKO (Zaria) heard Canadian and U.K. stations during the B.E.R.U. Contest with W/Ks at other times. The static level is building up as the rainy season has now started.

The 7 Mc/s band has obviously contained some very good DX signals if only they could be heard through the racket created by the jammer. B.R.S.20317 reports that the first North American signal heard was W2KQT at 21.15 whilst K4BUR at 09.40 was the latecomer. Signals from the West Coast were audible between 01.00 and 08.00, the first usually K6EVR, the strongest K6BWX and the latest WA6NNJ. Also heard were VE7ZM and VE7BAX/W7. Morning DX has been rather disappointing but B.E.R.U. produced VP3MC, VP6RG, VP9BO, VP8GQ, MP4BBE and 5N2LKZ. ST2AR was heard at 01.20 with VR2DK

providing weak signals at 08.30. During the afternoons conditions were often good and on one occasion W6GTI and W6YMD were logged by our reporter at 15.00. Around 15.30 VK5CI and VK5ZC were heard with EP2BB coming in a little earlier. In addition there have been the usual UI8, UM8, UL7 and UJ8 signals with UA0BU, UA0WC and UA0LJ coming from farther afield. 5N2JKO reports that in Nigeria conditions are getting worse on this band, with a very high static level in the afternoons and evenings, although the early mornings produce QSOs with North America.

G8PO (Fareham) remarks on the good conditions prevailing on the VK/ZL path after 07.00, reports usually being of the order of S7/8 on 7 Mc/s compared with S4 on 3-7 Mc/s. A QSO with W3PHL which commenced at 08.30 with S9+ signals both ways on s.s.b. (7250 and 7090 kc/s) was held until 11.15 when the level had dropped to S6. W3PHL uses d.s.b. and a Vee beam. In a multi-way QSO with VK between 07.40 and 08.30 the following stations participated: VK2APP, VK2BL, VK3AC, VK3JK, VK3IY, VK3OZ, VK3XM and VK5XB. The average signals from the Australian stations were S5/6, with VK3OZ outstanding at S7/8 using a long wire aerial. Reports to G8PO averaged S7/9 using the latter's "guy wire array." On c.w. G3HDA (Stratford-on-Avon) worked FP8BX (00.15), KV4CI (22.18), LAILI/P (10.20), VP8GQ (02.20), and VP9BO (02.30).

14 Mc/s is capable of producing interesting signals at almost any hour of the day or night and the early mornings are once again providing the opportunities of working into the Pacific, KH6, KM6, KG6 and KB6 all having been reported. The evening periods have no less provided considerable DX activity, and on some days signals have been arriving simultaneously from widely separated areas of the world. The log extracts listed below give a good cross section of what has been worked on this band.

G3HDA: AP5B (18.15), CR10JS ('040, 07.10), FG7XF (19.54), FK8AZ (08.51), FY7YI (20.42), KM6CE (20.04), KR6KV (12.15), KV4AA (19.50), PJ3AH (20.10), TI2PZ (22.04), UA1KED—Franz Josef Land—('040, 08.25), UA0KYA—Zone 23—('030, 08.23), UH8BI (16.00), VP2VJ (19.15), VP3MC (10.06), VP5MJ (20.20), VP9EP (20.05), VR2EA (07.20), VS9OC (08.05), ZP5OG (21.05), 5H3GC (06.35), 5N2JKO (07.02), 6W8BQ (19.14), 9M2UF (16.34). Heard were: AC4AK (16.20), AC4NC (18.12), BY1PK (12.51), HM4AQ (08.20), ZK1AR (08.00) and SU7AC (20.20). G3HDA comments that BY1PK was calling CQ on the same frequency as JT1KAA, UA1KED and UA0KYA, and for once the latter three had no reply to their calls. BY1PK peaked to RST589 but did not work any stations in Western Europe.

G8PL (London, N.W.3) offers the following list of those heard and worked. 06.00 to 07.00 BY1PK, EP2AF, HZ1AB, OA4FM, SU1M, TF8AJ, UD6AX, UL7s, UJ8KAA, UI8s, UM8s, UA9s, UA0s AQ, BN, KCC, KKB, KYA, TN, ZC4PB, YK1AK, 4X4JU and 5A3BC. 07.00 to 08.00 CR10JS, HK3LX, JA8AH, KL7DTS, UF6KAF, UI8AT, UA0s EW, KKB, KQB, KUV, KSB, SB, SH, SK, TT, VKs, VS9OC, 5N2s and 4X4s. 08.00 to 09.00 JA2JW, KL7s, LAILG/P (Jan Mayen), TF3AB, UA0s AG, BN, KSB, LU, VKs and ZK1AR. 5N2JKO hears useful openings to the Pacific around 07.00 and 21.00. 5N2JKO heard his first ZL station for two years on 14 Mc/s c.w. but unfortunately could not raise him. This contrasts sharply with conditions in the U.K. where there is usually a good morning opening to New Zealand on 14 Mc/s. G2FFO (Burnley) managed two very good catches in VP2LD ('050, 11.50) and VR4CV ('050, 11.30), and queries 9A1FQ giving his QTH as San Martino! From Cyprus, ZC4CS writes of poor conditions experienced on the bands and of QSOs with VO2NA, VK5NQ, VK2GW, VQ8BM, and VE8RX in the N.W. Territories. Most of the European prefixes have been heard and worked but the Pacific

stations are still not in evidence at Cyprus. During B.E.R.U. G3AAE, G3FXB and G3FPK were worked on 28, 21 and 14 Mc/s all within a short period. Nearer home, G3AAE (Loughton) worked CP5EZ (22.30), FK8AZ (09.27), VP2VJ (20.40), VP3MC (10.32), VP5MJ (19.56), VP8GQ (18.57), VR2DK (09.10), ZS7M (18.15), and unusual HK0AA ('010, 20.30) on San Andres.

The devotees of sideband have managed to unearth a considerable quantity of DX and it seems that a definite pattern is emerging from c.w. and s.s.b. operation. Most of the stations in the American sphere in the Pacific (and other parts of the world) prefer sideband operation and contacts on other modes are infrequent. However in the other islands such as VR1, 2 and 4, VK9, VQ8 and other parts of the Commonwealth c.w. operation is the mode most used. MP4BBW has, as usual, missed very little of the DX that has presented itself as the following list will show: AP2AD (13.48), CE3RC (11.48), CR7CI (12.36), CR9AH (14.10), DUIGF (14.09), EA8BA (12.50), HH2P (14.34), HSIW (12.29), JA1NG (14.12), KG1FR (14.47), K6CQV/KS6 (06.57), LX1DE (12.58), OA4J (12.07), OX3BZ (13.16), TU2AK (18.01), UA2AW (14.25), UD6BI (13.31), VK3AHJ/VK9 (12.14) in New Guinea, VK9BM (13.51) in Papua, VP2DA (12.58), a swift QSLer, VP2GAC (12.52), VQ2AT (17.35), VQ5FS (09.23), XE1ZE (14.10), XW8AS (11.32), ZE2KL (17.29), 5H3FQ (18.40), 9G1CY (17.02), 9M2CR (14.29), and 9Q5AF (12.37).

21 Mc/s continues to provide many interesting contacts and G3AAE records the following: c.w. HM1AP (09.14), VP3MC (11.23), VQ8BM (08.10), VS4RS (11.00), and ZS7M (16.30). A.m. produced OX3KM (15.50), VP2LS (11.40), VS4RS (13.20), 5R8AA (13.15) and 9Q4BD (09.15) in Kamina. 5N2JKO comments that there is often a late morning opening to Europe with the afternoons generally good to the East. VS4RS has been an outstanding signal on many afternoons when working Africa and Europe. On c.w. G3HDA worked MP4BBE, VP8GQ, VS9AAC, VS9MB, and 5N2s. G2FUU accounted for, amongst others, MP4BDC, HK3LX, OX3KM, VP2LS, YS1JM, VS9ARC, YV2CT together with several Nigerian stations and the more usual U.S.A. and Near East contacts. Our listener reporters have noted most of the activity mentioned above together with the more usual stations heard on the band. Logs have been received from A.2498 (Easington), A.1622 (York), B.R.S. 24643 and A.2340 (Plymouth). The latter received a.m. signals from CP10A (19.25), CO8ES (19.31), FG7XN (19.35), HP1AP (19.22), H18DGH (20.12), KG4BC (13.00), VK9RO (10.35), VE8YG (19.03) Baffin Island, VP4LG (11.30), VS4RS (13.06), ZS6PC/8 (17.20) and XW8AL (11.16).

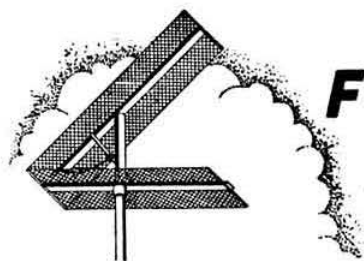
Even the 28 Mc/s band has shown distinct signs of life on several occasions and G3AAE reports a good opening to Africa on March 25. G3CCX (Rustington) also mentions a good day on March 19, when he says 28 Mc/s was wide open in a way similar to 1947. Several 59+ QSOs were made with South Africa and South America. 5N2JKO writes that this band has shown the most pronounced improvement during the last four weeks. From Nigeria openings to the Near East, North America, and Central America have been noted, with the only blank period being around sunset at 18.00. 5N2JKO worked EP2BE (13.40), TI2HK (17.10), K4PDI/VP9 (14.50), XE1CCW (15.10) and YN6HH (17.40), all on a.m.

\* \* \*

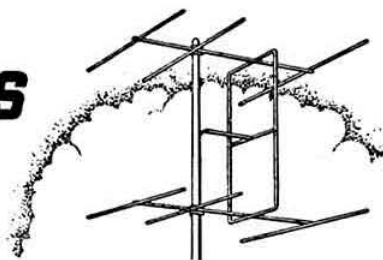
Correspondents are thanked for their letters and reports and their co-operation is much appreciated. Acknowledgments are made to DX (W4KVX), the *West Gulf DX Bulletin* and the *DX press*.

Please send letters and reports for the next issue to arrive at R.S.G.B. Headquarters not later than April 20.





# FOUR METRES DOWN



By F. G. LAMBETH (G2AIW)\*

AS most members will know, the QRA Locator is now an essential part of the report in any official I.A.R.U. Region 1 V.H.F. Contest. This being so, it is opportune to explain how the QRA Locator for a fixed station (or even more important, a portable location) can be determined.

The Society has produced a QRA Locator map of the British Isles (price 2/6 from Headquarters) from which it is a fairly simple task to determine the code for any QTH. First fix the location in the correct square of the map. As the large rectangles are based on exact latitude and longitude lines (west of Greenwich is the beginning of "Z," east is the beginning of "A," for example, whilst 51° N. is "L," 52° N. is "M," etc.) it is a simple matter to transfer a

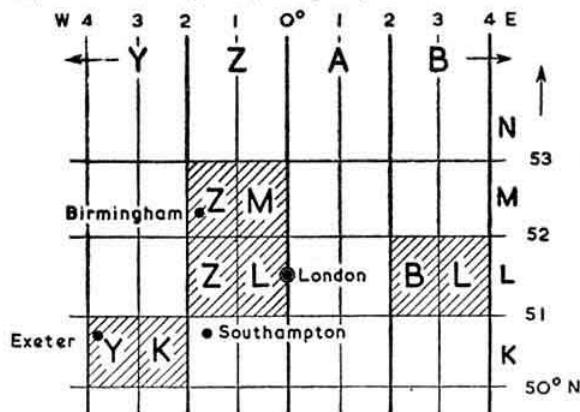


Fig. 1. The QRA Locator System applied to part of a map of Southern England.

known location from a detailed map on to the QRA Locator map. Once a location is coded, it will not change.

The method of coding the squares is: Top letter first, then side letter, followed immediately by the side figure and then the top figure. The squares are simply numbered from 1 to 80, starting at the top left-hand corner; provided this is remembered there should be no difficulty in working out the correct code for any given site. For guidance, a sample location based on London is shown in Fig. 1, while Fig. 2 is an illustration of the "end letter" which gives an even more exact coding. When this letter is used it goes on to the end of the location code so that a sample could read "AL76E." This is however not absolutely necessary and the two letters and figures are usually enough. Remember, if continental stations are worked in future I.A.R.U. Contests QRA Locators will have to be exchanged.

## Eighth International V.H.F./U.H.F. Convention

Arrangements for the annual V.H.F./U.H.F. Convention to be held in London on May 19 are now well advanced. Among the speakers will be Dr. T. R. Kaiser of Sheffield

University whose subject will be "Ionospheric Effects at V.H.F.," Mr. M. Davenport of The General Electric Co. Ltd. who will talk about "Adler Tubes for 70cm" and Mr. H. Gibson (B.R.S.1224), also of G.E.C., who will describe the GB3GEC Beacon Station. Mr. T. Withers (G3HGE) of Withers Electronics will give a talk on "Electronic Equipment."

It is hoped to provide a trophy for award in connection with the exhibition of v.h.f./u.h.f. equipment at the Convention. It is intended that the trophy should be awarded for the best piece of equipment, in the opinion of the judges, which has not won a prize at the Convention in previous years. All those attending are urged to bring items for display.

Details of the Convention programme are given in the accompanying display announcement. Tickets are available now from G2AIW.

## Two Metres News and Views

G5MR (Hythe, Kent) is not heard as frequently these days, due to professional engagements, but still manages to keep his Sunday morning schedule with F8GH. Rumour has it that G3EMU (Canterbury) is delving into the technicalities of photography, whilst G3LCK comes up when the opportunity permits. The Ashford Group (G8RK, G8BJ and G3IIZ) make spasmodic appearances. Nothing has been heard in recent months of the Hastings Group (G3KMP and G3BDQ) and a few people have been wondering when they will be putting in an appearance again. G3EDD, G3DGI and G3PSA are a good representative Cambridge group with strong signals often heard in the south-east. G3NAE (Bournemouth) is putting out an excellent s.s.b. signal at the bottom end of the band, while G3BSU on n.b.f.m. is also a regular and powerful signal. Other good signals often heard in the south-east are G5NF, G3MPS and G2AXI. The schedule between G3LOK and G3CO (Wrotham) seems to be going successfully as also is that long standing Essex one between G3FIJ, G3ANB and G4AC. A newcomer to the band, G3NPF, is finding lots of interest, and in about 10 weeks of operation from Southend-on-Sea has worked 76 stations with 20 watts input and a four-over-four indoor aerial.

G2JF (Wye) worked 98 British stations and 28 continental stations during the 144 Mc/s Open Contest, the station being operated by G8RK, G3LZZ (a student at Wye College and a newcomer from Yorkshire) and G2JF himself. Schedules between G2JF, PA0KT and DL2XM are being successfully maintained through all sorts of propagational conditions. Outstanding long distance signals often heard during the last few weeks in the south-east are G2XK (Harrogate), G3ILD (Darlington) and G6GN (Bristol).

During the 144 Mc/s Open Contest it was very evident that the

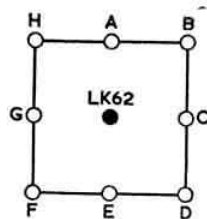


Fig. 2.

\* R.S.G.B. V.H.F. Manager, 21 Bridge Way, Whitton, Twickenham, Middlesex.



continental entrants have definitely adopted the new QRA Locator system, which after all is so simple to apply and should save all those long drawn out exercises in phonetics. There was the odd "out of Zone" operation in the Contest. One station heard was a recent newcomer.

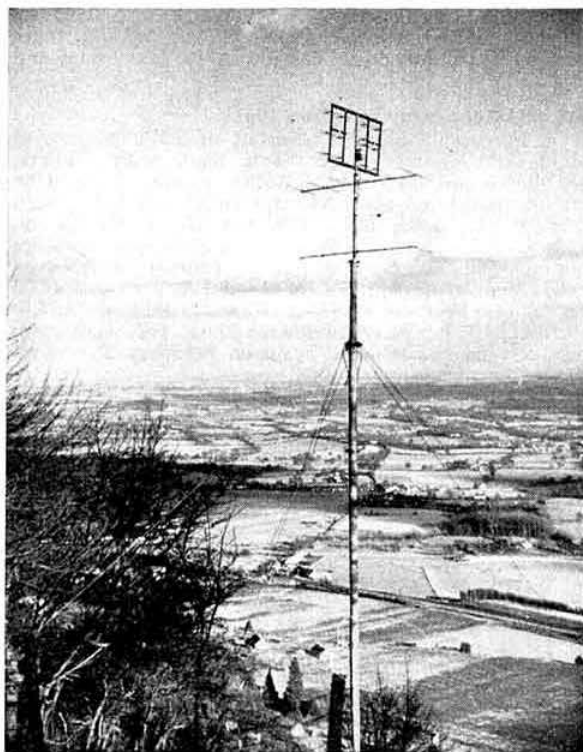
**F3XY** (St. Remy de la Vanne) is looking for G QSOs and is on the air practically every day from 20.00-22.00 G.M.T. The frequency used is approximately 144.730 Mc/s, power input about 80 watts. When conditions are good operation also takes place between 18.00-19.00 G.M.T.

**CTICO** (Lisbon) is also waiting patiently for a QSO with the U.K. and hopes that an opportunity will occur this summer. His situation is about 350 ft. above sea level, the aerial is some 90 ft. above ground and 20 ft. above the roof, with a clearance towards the British Isles.

**A.1795** (Weymouth) has heard stations in GC, GW and F, to say nothing of 14 counties in England, since December 4. All this has been done with a 6BQ7A cascode converter into a CR100 and a five element Yagi aerial.

**G3LLJ/A** was on Mow Cop (Cheshire), 1,000 ft. above sea level for the 144 Mc/s Open Contest, and says that conditions were really trying to be poor! Any station from over 100 miles was indeed rare DX—exceptions to this were G5MA, G3GHI and G5TN who were heard consistently at R5. The farthest north was G3JYP (Westmorland) but nothing was heard of GI, EI, GD or GM. The Mow Cop site has been obtained on a permanent basis and will be used as often as possible during the summer. A point for county chasers is that the site includes both Staffordshire and Cheshire. G3LLJ says "what happened in the Contest between 01.00 and 08.30 I don't know. Temperature was checked at 00.55 only to find that the mercury had left the scale of the thermometer and this meant that the radiator of the Jeep had frozen solid (anti-freeze as well) so that a long time was spent thawing out (a) the Jeep and (b) G3LLJ/A."

**G3MTI** (Great Malvern) has had a very bleak and empty four months using only a dipole and with the /M vehicle laid up. The home station again has the six-over-six aloft, although the power is not increased yet, with a 24 element



The aerial system at **G3MTI**, Great Malvern. The 6-over-6 array for 144 Mc/s has a 24-element 430 Mc/s stack above it.

stack for 70cm above it. The array is at 950 ft. above sea level with the shack 100 ft. down the hill.

**GM3LTJ** (Aberdeen) is now operative on 145.8 Mc/s. Weeks of listening on the band have produced nothing more imposing than a consistent 59+ signal from a local navigation beacon outside the amateur band. The aerial in use is a four element Yagi, beaming towards Dundee. The transmitter is a modified SCR522 running 20 watts. Some amateur QSOs would be greatly appreciated.

**ON4TQ** (Antwerp) had two meteor scatter QSOs recently as follows: Geminids (December 1961), with OK2LG; and Quadrants (January) with OK2WCG.

**EI2W** (Dublin) found conditions good on February 20, and worked G3LZB, G6PC, G5IG, G3KYU and G3OAF—all new ones except G5IG. For the other four it was also their first EI contact.

**GB2IC** will be the call-sign of a station working on several bands, one of which will be 2m, from the Isles of Scilly during the second fortnight in June. The station will be operated by members of City and Guilds College Radio Society, South Kensington, S.W.7. **G3OZF**, who supplied this information, says that he is willing to arrange skeds with anyone interested.

In order to conform with the British Isles Two Metre Band Plan, the South East of England **GB2RS** News Bulletin transmission will be on 145.1 Mc/s, on and after Easter Sunday, April 22, 1962.

Members will be sorry to hear that **G5YV** lost his aerials in the recent gales, resulting in an inability to transmit the News Bulletin for a time.

**G5CP/M**, but presumably static portable at the actual time, was on the Cat and Fiddle (Cheshire), near Buxton, on March 25 and worked G3JZN/P (at sea level at Fleet-

## EIGHTH INTERNATIONAL V.H.F.-U.H.F. CONVENTION

Saturday, May 19, 1962

Kingsley Hotel, Bloomsbury Way,  
London, W.C.1

### Programme:

Convention and Exhibition of V.h.f./U.h.f. Equipment opens ... ..	10 a.m.
Lectures and Technical Discussions commence ... ..	2 p.m.
Convention Dinner ... ..	7 p.m.
Presentation of Awards and Prizes ... ..	9 p.m.
Convention closes ... ..	10.30 p.m.

Tickets may be obtained by post from F. G. Lambeth (G2AIW), 21 Bridge Way, Whiston, Twickenham, Middlesex, at the following prices: Convention only—3/6; Convention and Dinner—24/6. Bookings for the Dinner cannot be guaranteed if received later than Wednesday, May 16, 1962.

Tube Stations: Holborn and Tottenham Court Road.

Organized jointly by the R.S.G.B. V.H.F. Committee and the London U.H.F. Group.

wood), G3EWZ (Chester), G2FCV (Warrington), G3KWQ (Wigan), G3BNL (Keyworth, Notts) and G3ASC (near Oswestry). Not a bad haul considering the heavy snow and fog!

#### Auroral Report for February 1962

On February 4 SM6PU observed auroral conditions at 12.30 G.M.T. and contacts were made with LA4YG, SM5CAY, SM5DIA and SM6BQ around 17.45-20.00. Stations heard included LA4RD, OH0RJ, and SMs '3BEI, '5LZ, '5BIU, '6NQ, '6PF, '7ZN and '7BLO. On the 7th, 12th, 13th, 14th and 15th there were distinct signs of aurora but no signals were heard on 2m. On February 16, however, QSOs were made with DL1RX and LA9T around 16.00 G.M.T. On February 26, SM4CDO was heard from 18.24 to 19.10 G.M.T. but no contacts were made. This small opening persisted and returned again on February 27, but no further 2m signals were logged.

#### SCOTTISH V.H.F. CONVENTION

Braboch Hotel, Paisley

APRIL 28, 1962

Lectures—Demonstrations—Dinner—Raffle

*Tickets may be obtained, price 21/- each, from L. F. Benzie (GM3DDE), 83 Hillview Road, Corstorphine, Edinburgh 12 and from W. B. Miller (GM3PMB), 13 Alder Road, Glasgow, S.3. The R.S.G.B. Council and V.H.F. Committee will be represented by F. G. Lambeth (G2AIW).*

#### Seventy Centimetre News

G3LTF (Galleywood) says there has been nothing very spectacular recently but activity on 70cm is really increasing. On March 17, conditions were fairly good with G2CIW (S9), G2FNW (S8) and many London stations to be heard. There were about a dozen stations at least audible at Galleywood. G3LTF has built a TV converter (420 Mc/s) using a very high Q mixer circuit with a 3½ in. diameter cavity which works well and on which some good pictures have been taken from local stations. G3LTF also mentions that his present frequency is 432.980 Mc/s and asks that publicity be given for it as it does not seem to be tuned very many times by searching stations. Incidentally conditions on 70cm recently have sometimes been very good, but comparison has sometimes revealed that they have at the same time been only slightly above normal on 2m. Most stations in East Anglia find that this is a fairly common occurrence. G3LTF sends an interesting list of high power stations in South Germany, Austria, and Czechoslovakia, which may appear in someone's lists when the band opens again in earnest:

	Mc/s		Mc/s
DJ1KC (Munich)	433-100	DL1LS (Heidelberg)	433-844
DJ3ENA (Feldberg)	432-525	DL3SPA (Erlangen)	432-325
DJ3QC (Erlangen)	432-950	DL6SW (Stuttgart)	432-482
DJ4KH (Nuremberg)	432-545	DL9MW (Munich)	432-900
DJ4UC (Waldhaubing)	432-553	DL9JU (Munich)	433-333
DJ4TV (Munich)	433-820	DL9YZ (Munich)	433-368
DJ5LY (Munich)	432-902	DL9FX (Munich)	433-800
DJ5LZ (Munich)	433-179	DM2ADJ (Possneck)	432-050
DJ7GK (Munich)	433-220	OE2BM (Salzburg)	432-435
DLOSZ (Munich)	432-008	OE2JG (Salzburg)*	432-450
DL1CK (Munich)	433-049	OE5HE (Gmunden)	433-120
DL1EY (Erlangen)	433-150	OK1VR/P (Snezka)	432-000
DL1EI (Munich)	433-420	OK1EH (Boi ni Tachan)	433-600

\* Portable QTH 1400m above sea level at Gaisberg, nr. Salzburg.

# GB3VHF

BEACON STATION OF THE  
RADIO SOCIETY OF GREAT BRITAIN

This is to acknowledge with thanks your report on reception of this station on 19

#### TECHNICAL DETAILS

TX: Plessey PT15C. Power Output: 50 watts  
Aerial: 5 el. Yagi Direction: due North  
E.R.P.: 200 watts Aerial Ht.: 180 ft. a.g.l.  
Frequency: 144.5 Mc/s  
Location: B.B.C. VHF Transmitting Station  
Wrotham Hill, Kent  
Site Ht.: 725 ft. a.s.l. N.G.R. TQ594604

WROTHAM,  
KENT

Chairman, V.H.F. Committee

The card used to confirm reports of reception of GB3VHF.

G3MTI (Great Malvern) has a 24 element 70cm stack on top of his 2m aerial, with the h.t.—less tripler mounted on the stack framework.

#### Four Metre News

G13HXV (Belfast), in a letter to G5CP, reports that he is active on 4m and listens and calls on sked each Sunday from noon to approximately 12.20. His rig comprises a modified SCR522 running 25-30 watts to a QVQ03-20A in the p.a. Phone and c.w. are used on 70-29 Mc/s. The aerial is a three element Yagi at 25 ft., rotated manually. One or two other G1 stations are expected on the band soon, the main period for activity being between 22.00 and midnight most evenings. G13HXV's Monday evening sked with GM3EGW is almost always successful over a 150 mile path.

G3HWR reports that G5FK is operational on Wednesdays from 18.00-12.00 clock time on 70-32 Mc/s. Recent activity on the band has been reasonable.

#### "Four Metres and Down" Certificates

G13OFT and G3OBD/P are additions to the "144 Mc/s Transmitter" category of the "Four Metres and Down" Awards. It is regretted that they were omitted from the list published last month due to circumstances beyond the immediate control of the V.H.F. Committee. Incidentally, congratulations to G13OFT on being the first Northern Ireland operator to qualify.

Some claims for these awards are being received without check lists for the QSL cards submitted. This complicates an already difficult process and slows down the return of the cards to the claimant.

#### Before V.H.F. was Invented

During the 144 Mc/s C.W. Contest on January 28 G5UM (near Hertford) was in contact with G6TS of Bournemouth. In due course, the QSL from G6TS turned up, with the following comment written on the back "Many thanks for my first QSO as G6TS, but my last with you was at 00.52 G.M.T. on January 29, 1931, in Top Band contest when I was EI7C!"

Elapsed time: 31 years minus one day!

#### R.S.G.B. V.H.F. BEACON STATION GB3VHF

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

Date	Time	Error
March 6, 1962	12.00 G.M.T.	2,180 c/s high
March 13, 1962	11.40 G.M.T.	2,000 c/s high
March 20, 1962	12.25 G.M.T.	1,890 c/s high
March 27, 1962	11.10 G.M.T.	1,620 c/s high

The station is in operation from 06.30-23.59 G.M.T. daily, but may be on for the full 24 hours for test purposes from time to time.

# Using Oscar Predictions

By R. G. FLAVELL (G3LTP)\*

NOW that most amateurs who are interested have discovered the extent to which they can participate in future amateur satellite projects, the publication of details of a track diagram together with other useful information may assist operators who intend following *Oscar II* to make the most of the predictions which will again be a feature of the R.S.G.B. News Bulletins. As is well known, such predictions are prepared at the D.S.I.R. Radio Research Station at Datchet, near Slough, and much of the information on which this article is based has come from that source.

## Preparing the Track Diagram

The main component is a base map, and this, in a form suitable for *Oscar's* polar orbit, is shown in Fig. 1. It is part of a polar projection of the Northern Hemisphere and the spacing of the parallels of latitude is such that bearings may be estimated fairly accurately in the neighbourhood of the British Isles. Members who take satellite tracking seriously may find it an advantage to paste or copy the map on to a card to give it longer life.

A transparent strip, two to three inches wide and slightly longer than the chart, with a reference line drawn down the centre will also be required. This should be mounted over Fig. 1 so as to swing radially from the cross marking the North Pole, so that at all times the reference line will run north and south along a meridian. Tracing paper can be used, but thin Perspex (which can be marked with a China-graph pencil) is better.

\* 141 Clifford Road, Ruislip, Middlesex.

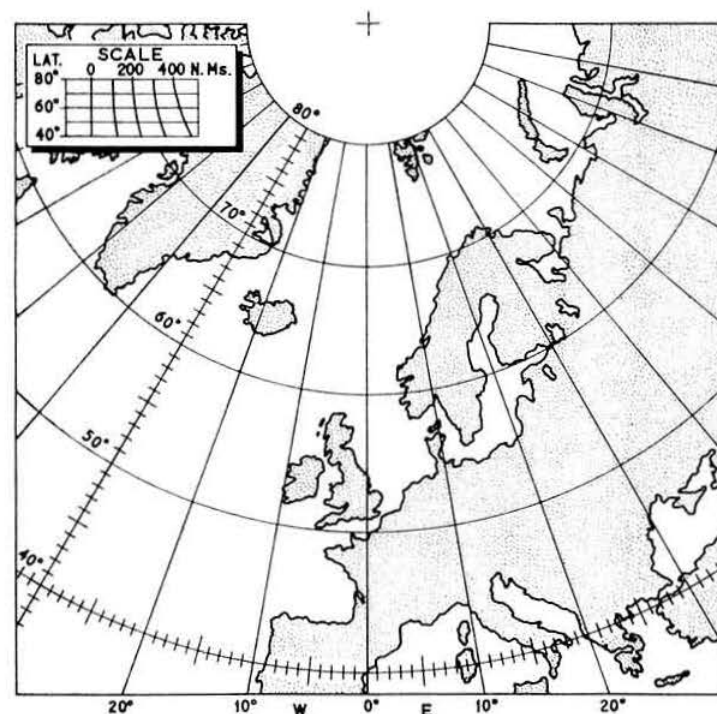


Fig. 1. Track diagram base map.

When details of *Oscar's* track are broadcast, they will be in the form of a series of latitudes and longitudes defining its position at minute intervals before and after a hypothetical pass through the point 50° N. latitude, 0° longitude. By aligning the strip so that the reference line lies along the Greenwich meridian (0° long.), the predictions and their corresponding minute numbers may be marked directly on to it, using the co-ordinates of the map in Fig. 1. Rule

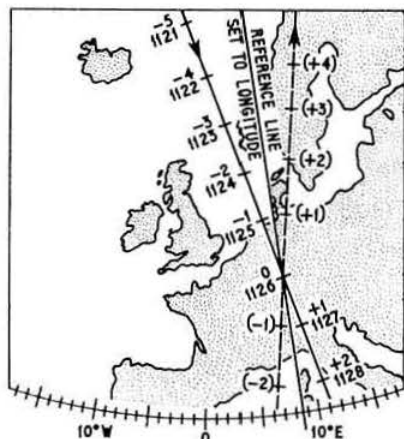


Fig. 2. Oscar I track diagram set for Revolution 41, Southbound. Note the reference line set to the longitude (8.5° E.) and the times inserted along the southbound track. For the following revolution the reference line would have to be moved westward by the angle referred to as "separation of tracks."

in the two intersecting lines through the points and distinguish them with a pair of arrow-heads pointing from negative to positive numbers. These are the tracks of northbound and southbound revolutions for use with the prediction figures.

## Using the Diagram

For any particular revolution, the prediction will indicate the longitude at which the orbit crosses 50° N., and this is taken care of very simply by moving the strip until the reference line lies along that longitude, using the graduated arc for interpolation. This set, time 0 on the strip is the time quoted in the prediction, +1 is the minute after, and so on, using whichever track is appropriate. Knowing your own location on the map, estimation of the bearing or distance at any time is then a simple matter.

To give an idea of what things look like at this stage, Fig. 2 shows the way the track diagram for *Oscar I* appeared when set for Revolution 41, Southbound, crossing 50° N., 8.5° E. at 11.26 G.M.T. on December 15, 1961.

## Details Broadcast by GB2RS

As well as the predictions themselves, it will be obvious that on the first Sunday after launch GB2RS will have to broadcast a great deal of additional information which will take too long to repeat each week. If the blank Table accompanying this article is completed at the time it will ensure that nothing of importance is missed or mislaid. Notice particularly that track details will be given for even minutes only, so as to reduce the transmission time as much as possible, but that the intermediate minutes are easily inserted after plotting.

The height of the satellite will depend on whether it is travelling north or south and will change both with latitude and time. GB2RS will give representative figures each week which should be adequate for most amateurs, but if more detailed information should be required it will be available. With height and distance (notice that both are expressed in nautical miles), Fig. 3 may be used to determine angle of elevation above the horizon.

Experience has shown that usually two passes are audible in the British Isles, and, very occasionally, three in succession. The time and longitude corresponding to the revolution before or after the one predicted are found by applying the "period" and "separation of tracks" figures which will be made known when *Oscar II* is launched. The rule to remember is that successive tracks lie progressively more to the west, and do not forget that all times will be given in G.M.T.

### Allowing for Departures from Prediction

Up to now it has been presumed that *Oscar* is playing the game and sticking to its time-table. Because the early predictions may be based on very little data it is quite possible that an increasing error may be found in the timings and a day-to-day correction will have to be applied to find the correct setting for the track diagram. Figures for inclusion in the Sunday news bulletin have to meet a Thursday morning deadline and as this may involve extrapolating

what happens in the first few revolutions so as to be able to cover the next 160 or so, this is perhaps not surprising.

It is a simple matter to maintain a graph of error against revolution number, using your own (or other people's!) observations, and this, with a change of sign, will show the amount of correction to allow in respect of a later pass. The time at which the satellite passes due east or west is a convenient point to check, and the track diagram will show how this compares with the 50° time for the operator's latitude.

From the error, a new value for the longitude may be found using the simple approximation

$$\frac{\text{minutes early on prediction}}{4} = \frac{\text{number of degrees further east}}{1}$$

$$\frac{\text{minutes late on prediction}}{4} = \frac{\text{number of degrees further west}}{1}$$

In the example of Fig. 2, if *Oscar I* had reached 50° N. four minutes early, at 11.22, then the new longitude would have been 9.5° E. This, of course, just allows for the amount that the earth has turned in the time involved, but this is quite close enough for our purpose.

If a significant error accumulates during the week, the next set of predictions will be corrected to allow for it, and this will mean a fresh start on the correction graph. However, as this will be a step in the right direction it will be obvious what has been done, and should not cause any concern.

*Continued on page 496*

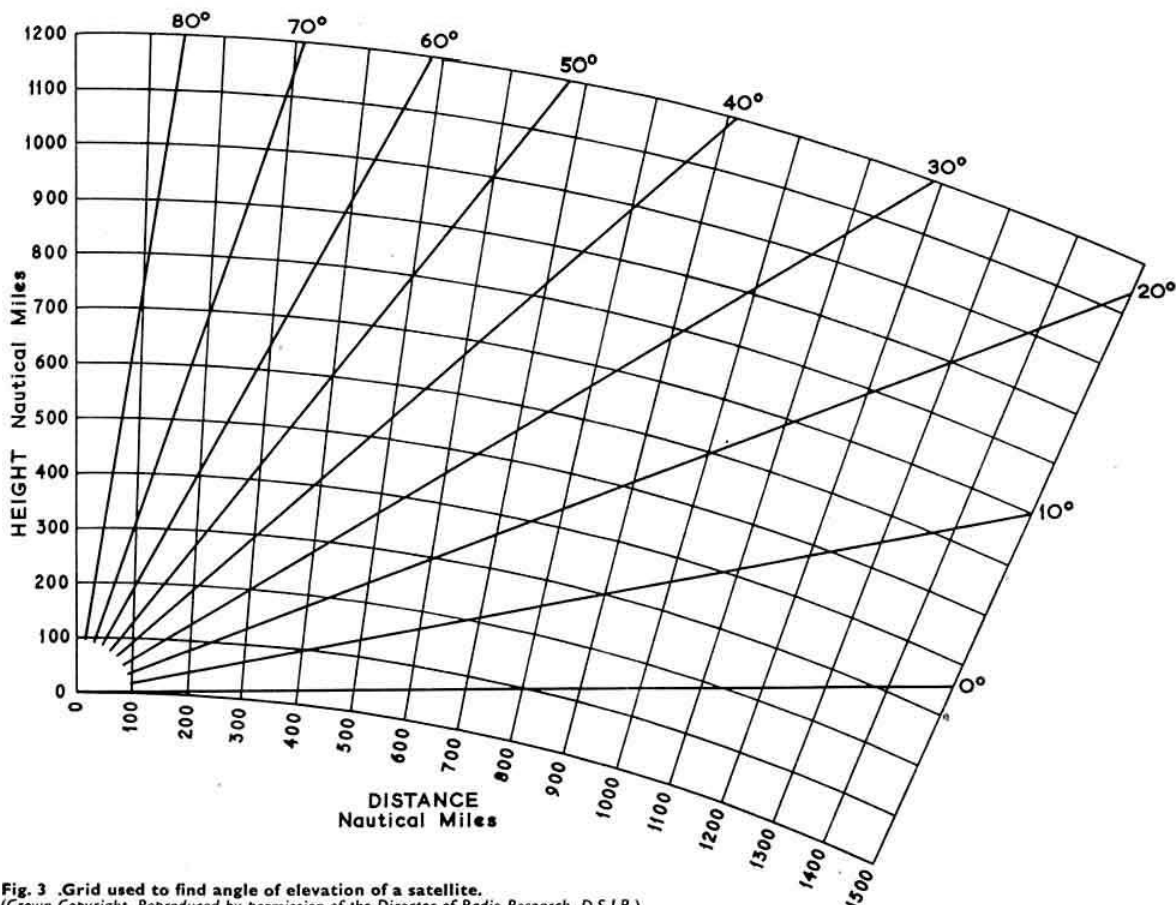


Fig. 3 Grid used to find angle of elevation of a satellite.  
(Crown Copyright. Reproduced by permission of the Director of Radio Research, D.S.I.R.)



# Mobile Column

By C. R. PLANT (G5CP)\*

ONE of the major problems associated with a mobile installation is the suppression of unwanted noises produced by the car itself. Complete elimination of all electrically produced interference is not usually possible, although the combination of an itemized attack on the equipment giving trouble and the inclusion of an effective noise suppressor in the receiver will in most cases bring the level of interference down to a workable level.

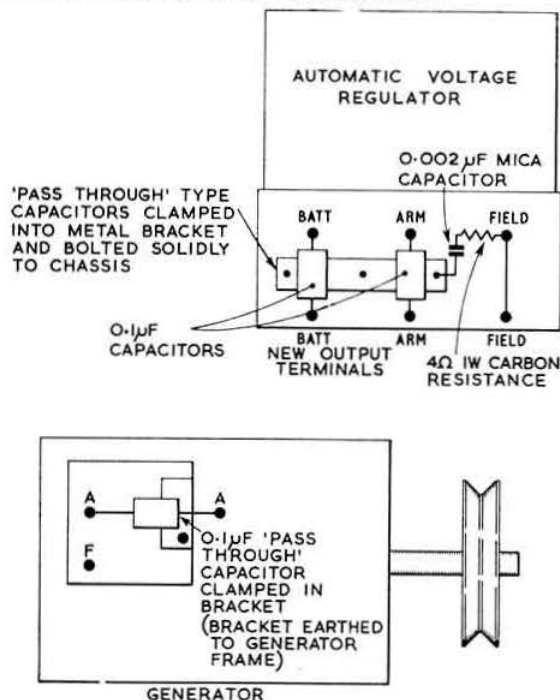


Fig. 1. Methods of suppressing electrical noise generated by a car.

The main causes of these unwanted noises may be divided into three sections: (a) ignition; (b) generation; (c) noises from ancillary equipment. Ignition interference is readily recognized because of the "machine-gun" type of noise it produces, which varies in speed as the engine speed is varied. In most cases, the insertion of a 10 K ohms resistor into all the spark plug leads at a point adjacent to the plugs will reduce the interference; in severe cases it may be necessary also to fit a similar resistor in the h.t. line close to the distributor. One sparkplug manufacturer at least markets a plug with a suppressor incorporated in the plug itself and many mobile operators have used these with satisfactory results. In the unlikely event of trouble still remaining probably the best recommendation is for the whole of the h.t. wiring to be renewed, using screened cable with the screening solidly earthed to the car frame, similar to that installed in aircraft.

Under category (b) the interference is only heard when the car engine is running at a sufficiently high speed to permit generation to take place. It is a simple matter to confirm this by starting up the engine and listening carefully as the

accelerator is slowly depressed until the ammeter or "tell-tale" light shows that current is flowing in the l.t. circuit. If the noise starts in time with the current flow it is obvious that the generator is the source of the trouble. The standard treatment is to fit a 0.1  $\mu$ F "pass through" type capacitor to the generator output terminal; in addition it will often prove an advantage also to fit similar capacitors to the outgoing connections of the automatic voltage regulator to the armature and battery, but not to the field terminal. The field terminal must only have a 0.002  $\mu$ F capacitor with a 4 ohm carbon resistor connected between it and the chassis or damage to the regulator may result.

Items in section (c) which may cause trouble include (i) static noise from tyres; (ii) sparking from small motors driving windscreen wipers, contacts on petrol pumps, etc.; (iii) noises from electrically operated instruments located on the panel. The simple way to deal with item (i) is to remember to renew the tyres when the time comes with carbon impregnated ones which allow the static charges to slowly leak away and so eliminate the interference. In the case of items (ii) and (iii) it is only necessary to fit 0.1  $\mu$ F pass-through capacitors in the leads adjacent to the equipment concerned. If any prospective mobile operator is awed by the list of possible troubles which may be encountered, the writer hastens to reassure him that, in his experience with two very different types of car, the noise suppression problems were confined to the ignition and generator systems only and the steps outlined were completely successful in clearing up the trouble.

## Mobile Rallies

Reference to the Mobile Rally schedule shows that many interesting events have been arranged for the forthcoming season. It is believed that there are still one or two clubs that have not yet forwarded information about their arrangements but at the time of going to press the list contains a complete summary of events notified. Secretaries or organizers are invited to report briefly after each event so that publicity may be given in the succeeding *Mobile Column*. Photographs will be welcome and should be printed in black and white on glossy paper, preferably half-plate size.

It seems a pity that two Kentish societies have arranged their rallies for the same day, because both may suffer a loss in attendance figures—no doubt the respective secretaries will see that this does not happen again. The Thanet Radio Society venue is a cliff-top site overlooking Pegwell Bay, an ideal spot for a family outing. Refreshments are available at the site or a local hotel; the talk-in stations will be G3DOE/A on 1.8 Mc/s and G3BAC/A on 144 Mc/s.

The West Kent Amateur Radio Society's South Eastern Counties Rally is at Dunorlan Park, Tunbridge Wells, on May 6, commencing at 11 a.m. There is a boating lake and the park is a popular spot for family parties; the talk-in stations will be G2UJ/P on 1.917 Mc/s and G4IB/P on 144 Mc/s.

The Medway Hamfest and Mobile Rally will be held at Elliott's Canteen, Rochester Airport, on May 20, commencing at 2.30 p.m., and will be a joint effort between M.A.R.T.S. and Elliott's Radio Society. Admission is by tea ticket, price 4s. adults, 2s. juniors. Tickets may be obtained at the door but the Secretary requests that application be sent in advance to G6NU, 42 Richmond Road, Gillingham, Kent, so that adequate catering arrangements can be made. At all the Kentish rallies mentioned there will be the usual raffles and competitions so a good time should be had by all!

## R.S.G.B. National Mobile Rally

On May 13 a rally arranged by the Grantham & District Radio Club and the Stamford R.S.G.B. Group, and sponsored by the Council of the R.S.G.B. and the R.S.G.B. Mobile Committee, will be held at Belton House, Grantham,

\* "Lynton," 12 Nottingham Drive, Wingerworth, Chesterfield, Derbyshire.

## MOBILE RALLIES 1962

April 29	North Midlands Mobile Rally, Trentham Gardens, Staffs.
May 6	Thanet Radio Society Mobile Rally, Ramsgate, Kent.
May 6	South Eastern Counties Mobile Rally, Dunorlan Park, Tunbridge Wells, Kent.
May 13	R.S.G.B. National Mobile Rally organized by Grantham and District Radio Club and Stamford R.S.G.B. Group Mobile Rally, and supported by the R.S.G.B. Mobile Committee, Belton House, Grantham, Lincs.
May 20	M.A.R.T.S. Hamfest and Mobile Rally, Rochester Airport, Kent.
June 10	R.S.G.B. National Mobile Rally, U.S.A.F. Station, Wethersfield, Essex.
June 17	Longleat Mobile Rally, Longleat House, nr. Warminster, Wilts.
June 24	A.R.M.S. Rally and A.G.M., U.S. Air Force Base, Barford St. John, Oxon.
June 24	East Yorkshire Coast Mobile Rally, Spa Royal Hall, Bridlington, Yorks.
July 8	South Shields and District Mobile Rally, Bent's Park Recreation Ground, South Shields, Co. Durham.
July 14	Southern Counties Mobile Rally, Southampton Common.
July 15	Harlow Mobile Rally.
July 15	Chiltern Amateur Radio Club Mobile Rally, West Wycombe Park, Bucks.
August 19	Derby Radio Societies Mobile Rally, Rykneld School, Derby.
Sept. 16	Lincoln Hamfest and Mobile Rally, North Kesteven Grammar School, North Hykeham, Lincoln.
Sept. 16	R.S.G.B. National Mobile Rally, Woburn Abbey, Beds.
Sept. 22	Region 9 Mobile Rally at Weston-super-Mare.

Lincs. Belton House is one of the stately homes of Britain, a 17th century mansion situated amid beautiful parklands an ideal place to take the family for an outing. The entrance is on the Grantham-Lincoln road (A607) just north of Grantham. Talk-in stations on Top Band and 144 Mc/s will give final directions whilst two fixed stations will work the distant mobiles. A special price of 2s. for adults, 1s. for children, will cover admission to the grounds and entrance to the house. Catering facilities are available. G5CP hopes to have the pleasure of meeting many old friends at this Rally.

The general coverage rally stations from 10.00-14.00 B.S.T. will be G2HOP on 145.62 Mc/s and G3OWR on 1910 kc/s. Visiting mobiles are asked to call these stations when within 30 miles of Belton House. GB3RS on 1970 kc/s and 145.44 Mc/s will take control at the 5-10 miles range. GB3RS will be active from 12.00 B.S.T. until the rally finishes.

### Special Mobile Rally Frequency Suggested

A suggestion has been made that it might be a good idea to arrange for a specific frequency on Top Band to be used by talk-in stations at Mobile Rallies and members' comments on this will be appreciated.

### Operating News

G2DHV (Sidcup, Kent) is one of the most active and successful of the mobile fraternity. His installation consists of a Hamobile Mk. II with either a halo or Yagi aerial array. His contacts include many G and GW stations and he has

also worked F3LP and F8MX, all whilst mobile. Using the same equipment as a fixed station, two-way contacts on 144 Mc/s have been established with DL, ON and PA, certainly splendid results. G2DHV will be out and about during the summer operating on 144-25 and 144-7 Mc/s.

G5ZT (Plymouth, Devon) has written to report that he made his W.A.C./Mobile on March 7 by working EP2AT on 14 Mc/s. Congratulations! It would be interesting if a list could be compiled of /M operators who have worked all Continents—please send a postcard stating the stations worked, frequency, and dates so that such a list may be produced. G6IF (High Wycombe, Bucks.) writes to say he worked OK1ADX on Top Band using c.w. sitting in the car outside his house, and wonders whether this is a record?

### International Lake Constance Meeting

LEAFLETS giving details of the Hamfest to be held in the Council Building, Constance, on June 23, 1962, may be obtained from Headquarters. The meeting is being organized by Ortsverband Konstanz des D.A.R.C., Mittelweg 12, Konstanz/Bodensee 3, Germany.

### Using Oscar Predictions

(Continued from page 494)

Even when everything has been allowed for, bearings at low elevations may be influenced by propagation effects, topography, and such things as the direction of the local gas-works, so do not expect all the bearings taken to fit the diagram from horizon to horizon! There is no need to be discouraged by this; the Oscar Association will sift the wheat from the chaff, and will welcome all the observations you make.

On the other hand, in spite of their professional interest in satellites, please do not send reports to the Radio Research Station unless they are asked for. The proper address for them in this country is the U.K. Co-ordinator, W. H. Allen (G2UJ), 24 Arundel Road, Tunbridge Wells, Kent.

G2AOX will be making a daily check on the predictions for D.S.I.R. and, as he is frequently to be heard on the 2 metre band, he will again be found a useful source of the latest information.

Finally, the writer would like to thank the Director of Radio Research, D.S.I.R., for permission to prepare this article. He would also like to acknowledge the assistance of the prediction staff at Datchet, who have at all times shown great interest in amateur satellite projects.

Into orbit.....G.M.T. ....1962

Frequencies .....

Period.....mins. Separation of tracks.....deg.

### TRACK DETAILS

Time	Northbound		Southbound	
	Lat.	Long.	Lat.	Long.
-4				
-2				
0				
+2				
+4				

# RTTY

*A Quarterly Review of Amateur Radio Teleprinting News and Views*

By ARTHUR C. GEE (G2UK)\*

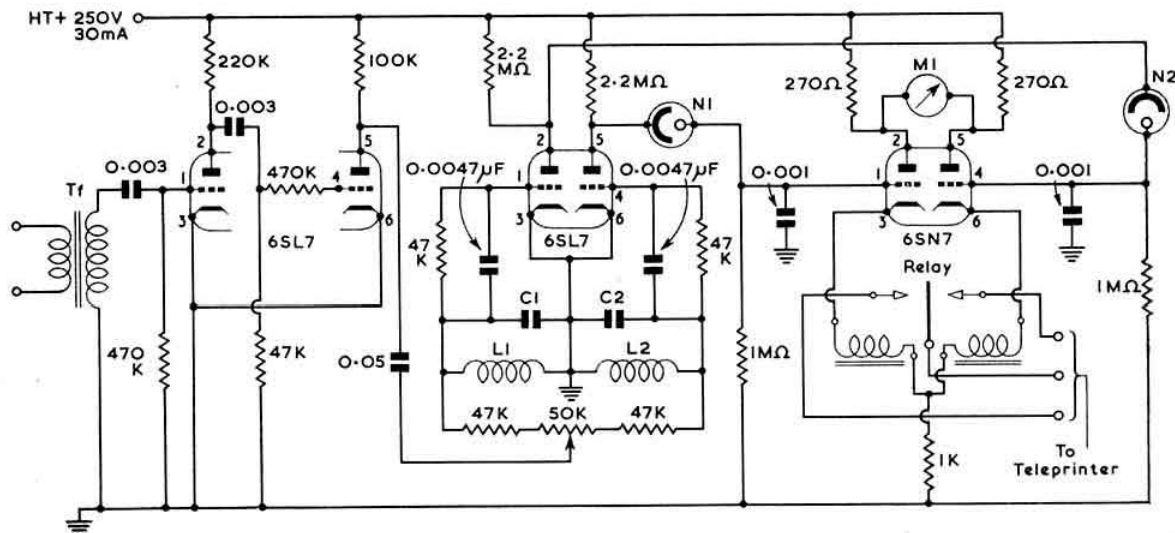
**I**N the previous RTTY contribution (January 1962) we saw how the RTTY code was transmitted and received, appearing at the receiver output as two audio tones which then have to be converted into d.c. pulses to actuate the teleprinter receiving mechanism. The device employed to achieve this result is called the "Terminal Unit." It can take a variety of forms, but the purpose of this series of articles being to show how easy RTTY can be, rather than to endeavour to "blind the reader with science," we shall

to get started and he can then graduate to more elaborate and refined T.U.'s as he acquires experience.

The only other technical aspect of starting on RTTY still to be considered is the generation of the f.s.k. signal at the transmitter end and this will be dealt with next time.

## News and Activity

The Dutch Radio Society, V.E.R.O.N., is to put out a weekly news bulletin in RTTY, on 3625 kc/s English.



**Fig. 1. Receiving converter for f.s.k. signals, based on a circuit design by W2PAT.**

briefly describe the most simple type of T.U. which will carry out this function—a type which is well within the constructional ability of the rawest tyro. The basic circuit is shown in Fig. 1, being that of a typical audio filter type of T.U. in which two audio filters separate the tones and pass them on for rectification, the resulting direct current being fed to a high speed relay, which in turn keys an external power source for actuating the electromagnets in the teleprinter receiving mechanism.

The only part of this circuit which needs any comment is the audio filter section. By custom, the receiver is tuned so that the audio tones are of 2125 and 2975 c/s and the two filters have to be tuned to these frequencies respectively. Some experimenting was needed in the early days of RTTY in this country to find locally available components suitable for making up these filters, but a variety of suitable chokes for L1 and L2 were soon found. The writer's first T.U. used Murphy V.200 series TV line amplitude chokes. The experimentally minded will have no difficulty in finding other similar suitable components. Those who wish for more information will find it well covered in the BARTG *RTTY Manual* referred to in the previous article. Such a simple unit as this will enable the budding RTTY enthusiasts

from its Headquarters station PA0AA. G2UK has already had some RTTY QSO's with this station and very fine copy should be obtained in this country from the news bulletin transmissions once they start. It is hoped to have details next time but it is expected the transmissions will be on Sundays after the present c.w. and phone transmissions. This will make V.E.R.O.N. the first national radio society in the world to put out a RTTY news bulletin for amateurs and hearty congratulations are due to the organizers of this service; Piet van Weerlee (PA0YZ) deserving most of the credit. From Hans Horn (DL1GP) it is learnt that one of the German RTTY groups also hopes to put out a regular news bulletin shortly. "In fact," he says, "the existing News Bulletin 'Deutschlandrundpruch' may get its material via RTTY!"

Activity in this country is increasing steadily. On 80 metres, G2FUD, G3LLV, G2DSF and G6CW are all new calls worked since these notes appeared last and they are all putting out nice signals. G3GGR and G3LAY keep nightly RTTY skeds on 2 metres in the Birmingham area. Scotland is now represented by GM3BST, GM8FM, GM3ENJ, GM3IQL, GM4QV and GM3DDE. GM8FM and GM3IQL are on the h.f. bands and the others on 2 metres. PA0FB, G2RF, G2UK, G3CQE, G3HKT and G3NPF are also as active as usual on 80 metres. By all

(Continued on page 499)

\* Hon. Secretary, British Amateur Radio Teleprinting Group, "East Keal," Romany Road, Oulton Broad, Lowestoft, Suffolk.

# Single Sideband

By G. R. B. THORNLEY (G2DAF) \*

WHEN the present series of articles dealing with linear power amplifiers commenced in September 1961, it was the intention of the writer to complete the discussion of the theoretical considerations in full, before going on to describe the practical and constructional applications. However, as a result of a suggestion from the Editor that *Single Sideband* was becoming a little too theoretical the design considerations were temporarily abandoned to give the constructional details of the parallel 6146 amplifier described last month.

It is known that many members have built low power transmitters from published designs and are now engaged in building a higher power amplifier using valves they have available or can purchase on the surplus market. There are a large number of valve types suitable for linear amplifier use and in many cases manufacturers' figures for single sideband service are not available. It is therefore necessary for the operator to work out the valve operating conditions from first principles. This is particularly important in regard to the value of  $R_L$  and the values of  $L$  and  $C$  in the tank circuit. The amplifier can only give its rated power output without distortion if it is working into the correct anode load corresponding to the dynamic operating conditions and the load line that has been selected. It is therefore obvious that a basic knowledge of the theoretical considerations is just as important as a knowledge of the valve pin connections.

## Finding the Value of the Anode Load

One "rule of thumb" formula that can be used to find the value of anode load ( $R_L$ ) where the makers' figure for single tone anode current is known, is  $V_a/2 \times I_a$ , where  $V_a$  is the d.c. supply voltage and  $I_a$  is the maximum signal anode current in amps. This formula cannot be more than an approximation because it does not differentiate between the different classes of working. The correct load for class AB1 is not the same as the load for class AB2 or class B working.

The recommended procedure that will give an accurate answer for the value of  $R_L$  is the formula based on the operating conditions and taking into consideration the angle of anode current flow. This is  $R_L = 2 \times (V_a - V_{a \min}) / I_a \times K$ , where  $V_a$  is the d.c. supply voltage,  $V_{a \min}$  the minimum value of anode voltage at the crest of the cycle when the anode current reaches its maximum value,  $I_a$  is the manufacturers' figure for maximum signal anode current and  $K$  is a constant whose value is dependent on the angle of anode current flow. For class B operation the angle of flow will be approximately  $180^\circ$  and  $K = 3.14$ . For class AB operation the angle of current flow will be greater than  $180^\circ$  and  $K$  will have a value that is smaller than 3.14. For  $200^\circ$  the approximate value will be 2.88.†

Zero bias triodes such as the 805, 811A and TZ40 are designed to have a low zero signal anode current and be operated in class B. Conversely, many high slope tetrode or pentode valves are capable of high power output without grid current and are normally driven in class AB1. Examples of the latter are 6146, 4-125A, 4X150 and 813.

A typical load line and the method of plotting is shown in

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† The linear amplifier can be analysed and designed as a class C amplifier in which the angle of anode current flow is slightly greater than  $180^\circ$  and the value of  $V_{a \min}$  is slightly higher than for class C operation. In the R.S.G.B. publication, *Valve Technique*, Chapter 4, the relationship  $I_a \text{ peak} / I_a$  for various angles of anode current flow is shown in detail.

Fig. 1. The instantaneous anode voltage should not be allowed to drop much below the applied screen voltage in order to avoid excessive screen current and the risk of exceeding the makers' figure for the maximum permissible screen dissipation. Normally,  $V_{a \min}$  is given a value slightly less than the recommended screen voltage for the valve. To take the popular 813 as an example, operated in class AB1, with 2,000 volts h.t. and 750 volts on the screen, the maximum signal anode current is 150 mA. Using the

formula,  $R_L = \frac{2 \times (V_a - V_{a \min})}{I_a \times K}$  and substituting the values,

this gives  $\frac{2 \times (2000 - 600)}{0.15 \times 2.88} = 2800/0.43 = 6500 \text{ ohms}$ .

## Where the Maximum Signal Anode Current is not Known

A number of valve types—designed for some other application—are available, either on the surplus market or as low cost initial equipment and are therefore attractive to the amateur for linear amplifier operation. In many cases, however, operating data for r.f. or audio use is unobtainable. In these cases it is necessary to design from first principles. The procedure can perhaps most clearly be shown by taking a specific example. An excellent valve available at low cost is the EL38, a high slope pentode developed as a television

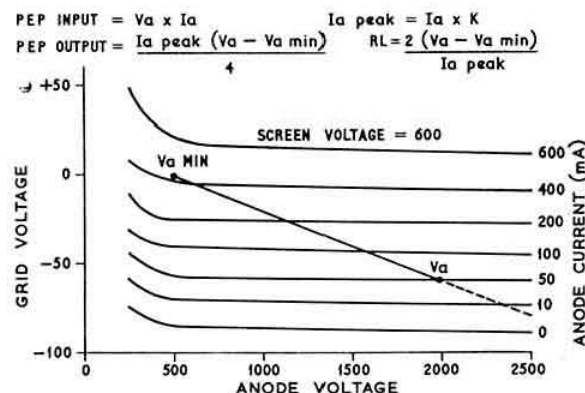


Fig. 1. Graphical determination of valve operating conditions. Typical constant current characteristics, showing how the load line is plotted.  $V_a$  is the zero signal point, showing that the resting anode current is 50 mA, the grid bias -60 volts, and the d.c. h.t. supply 2000 volts.  $V_{a \min}$  is the instantaneous value of anode voltage at a peak anode current of 450 mA ( $I_a \text{ peak}$ ). This occurs at the crest of the grid driving cycle when the r.f. voltage reaches a peak value of +60 volts; the effective bias value is then zero as shown. ( $I_a$  is the d.c. anode current meter reading at maximum signal.)

receiver line time base output valve capable of operation at high anode voltage and high peak anode current—characteristics particularly suitable for s.s.b. amplifier use.

It will be assumed that the valve is to be operated in class AB1 with an expected efficiency of 60 per cent. Inspection of the manufacturers' data for limiting values gives  $V_a$  800 volts,  $V_{a \text{ peak}}$  8 kV and  $V_{g2}$  400 volts. (Suitable values of anode and screen supplies for amateur service would be 1000 and 300 volts.) Since the 40 per cent power loss must equal the maximum rated anode dissipation of 25 watts, the total power input (100 per cent) must be  $25 \times 100/40 = 62.5$  watts.

Dividing the maximum power input by the anode voltage gives a maximum signal anode current  $I_a$  of 0.0625 amp., and  $I_a \text{ peak} = 0.0625 \times 2.88$  ( $K$  is 2.88 for class AB operation) = 0.18 amp.

Assuming that the instantaneous anode voltage is allowed



to swing down just below the value of the screen voltage ( $V_a - V_{a \min} = 800$  volts and  $R_L = 1600/0.18 = 8888$  ohms).

From the formula given in the November 1961 issue of the BULLETIN, the p.e.p. input =  $V_a \times I_a = 1000 \times 0.0625 = 62.5$  watts and the p.e.p. output =  $I_{a \text{ peak}} \times (V_a - V_{a \min})/4 = 0.18 \times 800/4 = 36.0$  watts. To check the figures the output power is subtracted from the input power,  $62.5 - 36 = 26.5$ . This is slightly more than the rated anode dissipation but is quite satisfactory for amateur sideband use. (If a greater power output than this is required it would be satisfactory to increase the h.t. supply to say 1250 volts.)

Four EL38 valves in parallel with a 1000 volts h.t. supply would make an excellent linear amplifier running at 250 watts input and a p.e.p. output of 150 watts. The correct value of  $R_L$  would be one quarter the value of one valve— $8888/4 = 2222$  ohms.

The power output obtainable from a linear amplifier at a given anode voltage is determined by the peak anode current  $I_{a \text{ peak}}$ ; this in turn is determined by the minimum anode voltage  $V_{a \min}$ . A large  $I_{a \text{ peak}}$  is required in order to obtain large output, and a small  $V_{a \min}$  in order to have a good efficiency. With  $I_{a \text{ peak}}$  and  $V_{a \min}$  determined by considerations of power output and anode efficiency, respectively, it is required that  $R_L$  have the value given by the formula  $R_L = \frac{2 \times (V_a - V_{a \min})}{I_{a \text{ peak}}}$ .

If  $R_L$  is smaller than it should be, then  $V_{a \min}$  is thereby increased and both efficiency and output power suffer. If  $R_L$  is made too large,  $V_{a \min}$  becomes very small and with triodes this causes  $I_{a \text{ peak}}$ , and therefore the output power, to decrease; with pentode and tetrode valves a virtual cathode forms if  $V_{a \min}$  is too small causing secondary emission from the anode to the screen, excessive screen current and a flattening of the anode current peaks. In the examples given  $V_{a \min}$  is determined by the operating voltage on the screen. In the case of triode valves  $V_{a \min}$  is limited to a value that is more positive than the peak r.f. grid voltage.

A summary of the operating conditions for four valves in parallel would be as follows:

#### Operating Conditions for Four EL38

D.C. anode voltage	..	1000 volts
D.C. screen voltage	..	300 volts
Zero signal d.c. anode current	..	80 mA
Max. signal d.c. anode current	..	250 mA
Effective load resistance	..	2220 ohms
D.C. grid voltage	..	value required to give 80 mA standing anode current
Maximum signal power input	..	250 watts
Maximum signal power output	..	150 watts (approximately)

The amplifier would be loaded and the drive adjusted with single tone input (audio tone or inserted carrier) to the maximum signal anode current of 250 mA. On speech the p.a. anode current meter would not be allowed to swing beyond half this value to prevent overdriving and distortion. In general the linearity of a tetrode or pentode amplifier is improved by running the zero signal anode current as high as possible without exceeding the rated anode dissipation—80 watts is a good compromise value.

#### The Tank Circuit

The  $Q$  of the anode circuit, of which the tank is a part, must be sufficient to keep the r.f. anode voltage close to a sine wave shape. Because of the greater angle of anode current flow the requirements for linear amplifier operation are less stringent than for class C operation. However, if the anode circuit  $Q$  is insufficient the r.f. waveform may be distorted resulting in low anode efficiency and also poor

attenuation of the harmonics of the output signal. Too high a value of  $Q$  results in large circulating r.f. currents and power loss. A compromise value giving a good balance between the conflicting requirements and fully sufficient for sideband working is a  $Q$  of 12.

The pi tank has the advantage of allowing the amplifier loading to be precisely adjusted while the amplifier is being driven—an invaluable feature for correct amplifier adjustment. This is the recommended type of output circuit, and once the correct value of  $R_L$  has been calculated as shown, the required  $C$  and  $L$  values can be read off directly from the tables given in the excellent and highly recommended article *Simplified Design Procedures for Pi-Network Tank Circuits* by G. C. Fox, A.M.I.E.E. (G3AEX) in the June 1961 issue of the BULLETIN.

#### Semiconductor Diode Source Book

THE *Diode Source Book* published by Cowan Publishing Corporation of New York and available from R.S.G.B. Headquarters price 18s. 6d. (postage 2s.) contains complete characteristics of more than 2,800 types. There are two lists, one a numerical tabulation and the other a tabulation of the most important design parameters. There is an additional chart listing the availability of devices from various manufacturers. The charts were prepared by the National Bureau of Standards.

The *Diode Source Book* also contains a number of feature articles by experts in their respective fields; Switching Diodes; Varactor Diodes; Microwave Mixer and Detector Diodes; Zener Diodes; Photo Diodes; Tunnel Diodes; High Power Silicon Rectifiers.

The book runs to 126 pages of large format (11" x 8½") and the Editor is Samuel L. Marshall.

FUNDAMENTALS OF SINGLE SIDEBAND. Collins Radio Company, London Road, Staines, Middlesex. Page size 8½ in. x 11 in. 259 pages. 324 illustrations and diagrams. Price 35s. 9d.

This volume contains a wealth of information on all aspects of s.s.b., dealing with the equipment necessary for the transmission and reception of this mode. There are, in addition, chapters covering aerials and propagation. For those interested in Collins equipment the details and circuitry of the 'S' line and KWM series are also given. Admirably produced, this book is a valuable addition to the existing literature on s.s.b.

#### RTTY (Continued from page 497)

accounts, DX activity is not too good at present due to the current poor ionospheric conditions.

Enquiries are frequently received about membership of the British Amateur Radio Teleprinting Group. Briefly, its purpose is to help further Amateur Radio teleprinting in this part of the world. It has a membership of about 60, the annual subscription is 10s. (no entrance fee) and the Group is affiliated to the R.S.G.B. Services include a bi-monthly *News Letter*, a Library Service including Service Manuals on T/Ps; paper and ink roller and spares supplies; T/P availability information and so on. Those interested in joining should write to G2UK.

RTTY Manuals are beginning to appear thick and fast! The B.A.R.T.G. *RTTY Manual* was referred to in the January BULLETIN and there is news of two more to be published. The American Amateur Radio magazine 73 is to produce one, written by Fred DeMotte (W4RWM) and edited by Wayne Green (W2NSD) while CQ has also just produced one by Byron H. Kretzman (W2JTP). G2UK has recently received a copy of the CQ book and it will be reviewed in the July issue.

Late News: RTTY News Bulletins are now transmitted on Sundays at 13.30 G.M.T. by PA0AA on 3625 kc/s.

ON4HW and ON4UN are both using RTTY and the first ON/G contacts were made with them by G2UK on March 11, 1962.

# Society News

## Nominations Invited for Vacant Office of Zone D Representative

MR. F. A. RUSSELL (G3BHS) having resigned from the office of Zone D Representative for business and health reasons, nominations are invited to fill the casual vacancy. Any 10 Corporate Members resident in the Zone (Regions 6, 9 and 17) may nominate any other duly qualified person resident in that Zone by delivering their nomination in writing in a single document to the Secretary, together with the written consent of such person to accept office if elected, but each such nominator shall be debarred from nominating any other person for this election.

Nomination papers must reach the Secretary by not later than 12 noon on Tuesday, May 15, 1962.

In the event of more than one duly qualified person being nominated for the vacancy a ballot will be conducted, details of which will be published in the June 1962 issue of the Society's Journal.

Zone D comprises the counties of Buckinghamshire (outside London), Gloucestershire (excluding Bristol), Oxfordshire (forming Region 6), Bristol, Cornwall, Devon, Dorset, Somerset (forming Region 9), Berkshire, Channel Islands, Hampshire, Wiltshire, Isle of Wight (forming Region 17).

## New Zone F Representative

MR. A. D. PATTERSON (G13KYP) of Belfast, Northern Ireland, has been elected, unopposed, to fill the casual vacancy on the Council occasioned by the resignation of Mr. E. G. Ingram (GM6IZ) from the office of Zone F Representative.

Mr. Patterson becomes the first member resident in Northern Ireland to serve on the Governing Body of the Society.

## The International Amateur Year Book

DUE to a change in his business activities, the publisher of the *International Amateur Radio Year Book* (Mr. P. Casling, G3MWZ) has given up his association with that publication.

The Society has been invited by Mr. Casling to take over the *Year Book* entirely free of charge and the offer has been accepted by the Council. However, due to heavy publishing commitments the Society will not be able to publish an edition during 1962 but the editorial staff have been authorized to look into the possibilities of preparing a new edition for publication during 1963. In the meantime, Mr. Casling, whose address is now 31 Fiskerton Road, Cherry Willingham, Lincoln, will handle any correspondence concerning the earlier edition.

## Subscription Rates

In order to enable the Society to publish larger issues of the R.S.G.B. BULLETIN the Council has decided that the annual subscription to be paid by Corporate Members (Home and Overseas) shall be increased as from July 1, 1962, to £1 15s. This represents an increase of 5s. in the case of Home Corporate members and 7s. (\$1.00) in the case of Overseas Corporate members.

A Banker's Order form to cover the new subscription rate will be included in each copy of the May 1962 issue of the BULLETIN. It is hoped that as many members as possible will place a standing order with their Bank.

## Headquarters Fund List No. 7

THE following is the seventh list of those who had contributed to the Headquarters Fund up to March 31, 1962.

Radio Society of East Africa, C. W. Boegal (W0CVU), D. S. Booty (G3KKQ), H. Ashton (WA2DRK), K. E. Walters (G8FW), E. R. Martin (G6MN), J. Flynn (B.R.S.7046), W. P. Lewis (G3IFV), C. H. Holt (W2ZMK), R. M. Pitaluga (VP8AH), Acton, Brentford and Chiswick Radio Club, H. A. J. Gray (B.R.S.23279), T. Knight (G2FUU), A. B. Whatman (G2BQ), C. R. Green (G3OPX), L. R. Seal (G2OC), A. Rossi (GM3JGQ), F. C. Wilson (B.R.S.14660), Grafton Radio Society, J. H. Clarke (G2AAN), P. Beresford (G3AFC), R. Morgan (G3KGC), J. Mulcahy (G3JVV), W. Bailin (G3NOZ), D. Sloan (G3ONS), A. Wennell (G2CJN), H. Lassman (G3JZX), D. MacIntyre (G3ONY), R. Howell (G3RRH), A. MacKenzie (G3OSS), B. Whitaker (B.R.S.23088), H. Brooklyn, L. Butland (G3NUD), A. Keene, T. Fricke (B.R.S.23326), W. Gough (G3NMV), H. Robertson (A.2435), A. Callegari (G3OMD), A. Yilmaz (B.R.S.24593), E. Duggin, P. Humble, R. Streatfield, G. Hutchings (G3LCA), Anon., D. W. J. Haylock (G3ADZ), H. J. M. Box (G6BQ), A. Vinnels (B.R.S.22759), B. G. Gayden (A.2302), M. Nicholson (G2MN), E. J. G. Tucker (G1SDX), G. Dorling (G3PGA), A. M. Robertson (B.R.S.17033), B. W. Garnham (B.R.S.23275), M. H. Ewen (VK9CK), H. H. Lowe (G2HPF).

Total amount contributed to date: £1,358 2s. 4d.

## Honorary Certificates Manager

At a meeting of the Council held on March 19, 1962, Mr. K. A. V. Hurrell (G3NBC), 2 Alma Cottages, Church Lane, Great Warley, Brentwood, Essex, was appointed Honorary Certificates Manager of the Society in succession to Mr. George Verrill (G3IEC).

Claims for R.S.G.B. certificates must in future be sent by registered post to R.S.G.B. Headquarters for recording and acknowledgement after which they will be passed on to Mr. Hurrell for examination. After examination Mr. Hurrell will return the cards to the claimant together with the appropriate certificate provided the claim is in order.

If a claimant requires his cards to be returned to him by registered post sufficient extra money must be sent with the claim.

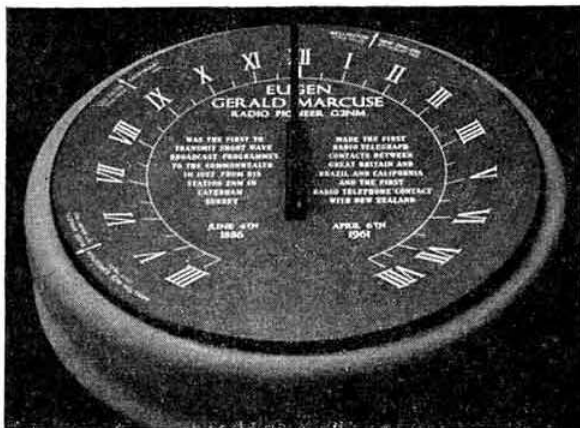
## March issue

ALL copies of the March issue of the R.S.G.B. BULLETIN were posted on Tuesday, March 20, 1962, and the



London Trio—

Major-General Eric Cole, G2EC (Immediate Past President), Phil Thorogood, G4KD (Region 7 Representative) and Eric Yeomanson, G3IIR (Zone C Representative on the Council) at the Presidential Address on February 23, 1962.



A sundial was recently placed in the churchyard of Bosham Church, West Sussex, by Mrs. Irene Marcuse in memory of her husband, the late Gerald Marcuse (G2NM). The sundial records that Gerald Marcuse was the first to transmit short-wave broadcast programmes to the British Commonwealth in 1927, from his station in Caterham, Surrey, and that he made the first radio telegraph contacts between Great Britain and Brazil and California and the first radio telephone contact with New Zealand. Gerald Marcuse who was President of the Society during 1929-30, died on April 6, 1961.

Society holds a certificate to that effect from the Letchworth, Herts, Post Office.

It is much regretted that the March issue was published late. This was due to staff illness and other difficulties outside the control of the Editor.

#### R.S.G.B. News Bulletin Service

WITH effect from Sunday, April 22, 1962, the R.S.G.B. News Bulletin on v.h.f. from the South East of England will be transmitted on 145.1 Mc/s.

#### Mobile Rally Stickers

WINDOW stickers incorporating the R.S.G.B. emblem and the words "Mobile Rally" are available from Headquarters, price 5s. per 100, plus 1s. postage and packing.

#### Receipts

RECEIPTS for subscriptions paid by cheque, bankers' order or postal order are not now issued unless specially requested. Receipts are drawn, however, and kept on file at Headquarters for six months.

### Silent Keys

F. N. EVANS (G2KL)

Members of all the Medway Clubs, as well as many other amateurs, will be sorry to learn of the death after a long illness of Mr. Fred Evans (G2KL) of Brampton, Gillingham, Kent.

To his widow and family heartfelt sympathies are extended. W.E.N.

J. S. JOHNSON (G3KB)

The passing on February 28, 1962, at the age of 54 years of Mr. J. S. Johnson (G3KB) of Clayton, near Bradford, Yorkshire, has deprived the Amateur Radio movement of yet another old timer. Joe had been ill for some time but kept active by means of a Top Band transmitter by the side of his bed.

Always ready to help the newcomer, his death will be mourned by all who knew him. Members of the Northern Heights Amateur Radio Society sent a floral tribute to his funeral.

Sympathies are extended to Mrs. Johnson and her family in their bereavement. G2SU

#### Current Comment

(Continued from page 475)

as £500 a year. Additionally, expenditure on blocks and on draughtsman's fees will also go up when the time comes for more diagrams to be prepared and—dare we mention it—there must inevitably be an increase in staff. At the moment the main administrative work of the Society is being carried out by a staff of six which is the same number the Society employed seven years ago when the membership was about 8,000. Today it is well past the 11,000 mark.

An increase in subscription rates should produce an enhanced income of about £2,500 which will certainly not cover additional BULLETIN production costs but it is hoped that larger issues will attract more advertising and more members.

At 35s. a year membership of the R.S.G.B. will continue to represent the best value for money in Amateur Radio circles. J. C.

#### London Lecture Meeting

NEARLY 100 members attended the meeting in the Faraday Room of the Institution of Electrical Engineers, London, on March 30, 1962, when members of the London U.H.F. Group presented a V.H.F. Symposium. Mr. G. M. C. Stone (G3FZL) lectured on "Nuovistor Pre-amplifiers," Mr. F. A. Griffiths (G3MED) on "S.S.B. on Two Metres," Mr. Norman Ross (G3LAR) on "Applications of Varactor Diodes" and Mr. John Gazeley (B.R.S. 20533) on "V.H.F. Transistor Receivers." The Symposium was arranged by Mr. A. J. Worrall (G3IWA), Hon. Secretary of the Group.

The Chair was taken by the President, Mr. E. G. Ingram (GM6IZ), who had the support of the Executive Vice-President, Mr. Norman Caws (G3BVG). A vote of thanks to the speakers was proposed by Council Member R. C. Hills (G3HRH), Chairman of the Society's V.H.F. Committee.

#### "Integrated Single Sideband Transceivers"

THE author of the article *Integrated Single Sideband Transceivers* has drawn attention to two errors in the March issue of the BULLETIN. In Fig. 2 on page 431, the lower end of the 270 ohm resistor should be connected to the junction of CR3 and CR4 and not to earth. In line 8 of the right-hand column on page 433, the stage referred to should be the *first* i.f. stage.

#### Civil Air Transport Appointment

MR. G. R. SCOTT-FARNIE (G5FI), Managing Director of International Aeradio Ltd., has been appointed Chairman of the National Joint Council for Civil Air Transport.

#### RADIO CROSSWORD

Solution to the puzzle on page 437 of the March issue

T	A	B	L	E	T	O	P	P	E	R
R	O	W	L	U						
A	C	I	D	E	M	I	T	T	E	D
N	G	N	E	Y						
S	E	L	E	C	T	O	R	C	S	
M	E	Y	S	H	O	C	K			
I	M	A	G	E	S	O	E			
T	D	C	O	M	M	U	N	A	L	
E	H	O	B							
W	A	R	W	O	R	K	O	M	I	T
R	E	E	A							
T	H	I	S	E	D	I	T	I	O	N

# Council Proceedings

*Résumé of the Minutes of the Proceedings at a Meeting of the Council of the Radio Society of Great Britain, held at New Ruskin House, Little Russell Street, London, W.C.1, on Thursday, February 22, 1962, at 6 p.m.*

**Present:** The President (Mr. E. G. Ingram in the Chair), Major General E. S. Cole, Messrs. N. Caws, C. H. L. Edwards, R. C. Hills, A. O. Milne, L. E. Newnham, F. K. Parker, R. F. Stevens, G. M. C. Stone, J. W. Swinnerton, P. H. Wade, A. C. Williams, E. W. Yeomanson (Members of the Council) and John Clarricoats (General Secretary).

**Apology:** An apology for absence was submitted on behalf of Mr. F. A. Russell.

## Membership

**Resolved** (i) to elect 87 Corporate members and 34 Associates; (ii) to grant Corporate membership to 10 Associates who had applied for transfer; (iii) to grant Life Membership to Mr. T. Jones (G3JTY) (elected 1952).

## Applications for Affiliation

**Resolved** to grant affiliation to the Eccles and District Radio Club and Lymington and District Amateur Radio Society.

## Newly Licensed Amateurs

It was reported that 87 out of the 149 persons licensed since the 1962 edition of the *Call Book* closed for press in October 1961 were now members of the R.S.G.B.

**Resolved** to send a letter to all newly licensed amateurs who are not members inviting them to join the Society.

## Society Films

**Resolved** to set up a small ad hoc Committee consisting of Messrs. C. H. L. Edwards, J. W. Mathews, W. A. Scarr and the General Secretary to examine and report upon the Society's historic films and to report upon a proposal that the Society should produce a film dealing with the history of the Society as a Golden Jubilee project.

## Radio Show, Earls Court

**Resolved** to accept an offer made by Radio Industry Exhibitions Ltd. to allocate space to the Society at the Radio Show, Earls Court 1962 on payment of a nominal rent, the Society to be responsible for all costs relating to the erection of the stand and other services.

## Radio Hobbies Exhibition

**Resolved** (i) to inform Mr. P. A. Thorogood that the Council authorizes him to organize on behalf of the Society an Exhibition at Seymour Hall during the period October 31-November 3, 1962; (ii) to request the Exhibition Committee to give consideration to the question of a new name

for the Exhibition; (iii) to consider at the April 1962 meeting of the Council the question of an opener for the Exhibition.

## I.A.R.U. Region 1 Conference 1963

**Resolved** to invite the Society's Technical Committee to produce technical papers for consideration at the I.A.R.U. Region 1 Conference 1963 on the assumption that a Technical Committee will be in session.

## Reports of Committees

The Minutes of meetings of the following Committees were submitted as Reports:

R.A.E.N. Committee	September 2, 1961
Golden Jubilee Committee	December 16, 1961
Technical Committee	February 8 and 15, 1962
Mobile Committee	February 9, 1962

**Resolved** to receive the Reports and to accept the various recommendations contained therein. A recommendation of the Technical Committee that the rate paid for the purchase of the copyright of *BULLETIN* technical articles shall be increased to a maximum of £5 5s. per 1000 words as from the July 1962 issue was carried by a majority vote. The recommendation had been made by the Technical Committee to enable the Society to offer a better inducement to members to contribute high quality material to the *BULLETIN* and also to assist the editorial staff to build up a stock of articles in preparation for the publication of larger issues of the *BULLETIN*.

The other recommendations dealt with arrangements for celebrating the Golden Jubilee of the Society and with National Mobile Rallies.

It was also agreed to authorize the V.H.F. Committee to finalise plans for the V.H.F. Convention to be held in London on May 19, 1962.

## I.A.R.U. Region 1 Bulletin

It was reported that a new issue of the *I.A.R.U. Region 1 Bulletin* had recently been published and that copies had been sent to each member of the Council. The issue had been prepared by Major Per-Anders Kinnman (SM5ZD) and Mr. Alfred Schädlich (DL1XJ), members of the I.A.R.U. Region 1 Executive Committee.

## Obsolete Publications

It was reported that several hundred copies of the sixth edition of *A Guide to Amateur Radio* (published in 1957) and the 1960 edition of the *R.S.G.B. Amateur Radio Call Book* had been sent to T.R.s and A.S.R.s as the result of the invitation published in the February 1962 issue of the *BULLETIN*.

*The meeting terminated at 10.20 p.m.*

## Representation

THE following are additional to the list of Town Representatives published in the December 1961 issue.

### REGION 4—LINCOLNSHIRE

#### STAMFORD AND DISTRICT

D. PAGE (G3KWC), 57 Queen Street, Stamford.

### REGION 7—LONDON SOUTH-WEST

#### DORKING AND LEATHERHEAD

W. J. WALSH (G3HJZ), 4 Meadowbrook Road, Dorking, Surrey.

### REGION 14—STIRLINGSHIRE

#### FALKIRK AND STIRLING

S. HINCKS (GM3JUH), Roman Bar Buildings, Camelon, Falkirk.

## Affiliated Societies' Representatives

THE following are additional to the list of Affiliated Societies' Representatives published in the December 1961 issue.

### BURNHAM ON SEA AMATEUR RADIO CLUB

M. J. I. LILLINGTON (G3JFY), 19 St. Mary's Road, Burnham-on-Sea, Somerset.

### GRIMSBY AMATEUR RADIO SOCIETY

H. O. GILLATT (G3LOP), 102 Station Road, Healing, Grimsby, Lincs.

### MANCHESTER AND DISTRICT AMATEUR RADIO SOCIETY (G3HOX)

A. B. LANGFIELD (G3IOA), 2 Rowland Street, Moston, Manchester 10.

### NORWICH AND DISTRICT RADIO CLUB

O. F. SIMKIN (G3AYJ), 15 Hillside Road, Thorpe-next-Norwich, Norfolk, NOR 48T.

### SOUTH DORSET RADIO SOCIETY

C. E. BIGGS (G2TZ), 54 Prince of Wales Road, Dorchester, Dorset.

### TORBAY AMATEUR RADIO SOCIETY

B. E. SYMONS (G3LKJ), 23 Westhill Avenue, Plainmoor, Torquay, Devon.

### YORK AMATEUR RADIO SOCIETY (G3HWW)

G. F. NOTTINGHAM (G3DTA), 23 Abbotsway, York.

## Affiliated Societies

THE following are additions to the list of Affiliated Societies published in the August 1961 issue.

DUDLEY AMATEUR RADIO CLUB—c/o D. H. W. Pratt (G3MHS), 23 Kent Street, Upper Gornal, Dudley, Worcs.

ECCLES AND DISTRICT RADIO CLUB—c/o A. W. Ward, B.Sc., 5 Newstead Road, Davyhulme, Manchester.

## GB2RS SCHEDULE

R.S.G.B. News Bulletins are transmitted on Sundays in accordance with the following schedule:

Frequency	Time	Location of Station
3600 kc/s	9.30 a.m.	South East England
	10 a.m.	Severn Area
	10.30 a.m.	North Midlands
	11 a.m.	North East England
	11.30 a.m.	South West Scotland
	12.00	North East Scotland
145.55 Mc/s	11.15 a.m.	Beaming south-east from Leeds
	11.30 a.m.	Beaming south-west from Leeds
	11.45 a.m.	Beaming north from Leeds
145.1 Mc/s	12 noon	Beaming north from South East England
	12.15 p.m.	Beaming west from South East England

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.



# R.S.G.B. 21/28 Mc/s Telephony Contest 1961

## 5A3TY Overall Leader - G3FXB Leading British Isles Entrant

THE Sixth R.S.G.B. Telephony Contest held on December 2-3, 1961, turned out to be very disappointing for most competitors. From the U.K. point of view, 21 Mc/s was open only to the Eastern Mediterranean and North Africa on both days while 28 Mc/s contacts were rather few and far between. Many stations reported no 28 Mc/s openings at all on the Sunday. As a result of the very poor conditions, which had been anticipated to a certain degree, it was no wonder that the number of entries fell very heavily. The total of logs received from U.K. entrants was 33—12 fewer than last year—and from overseas a mere 27 logs arrived compared with 62 last year and 107 the year before.

The Receiving Section, however, was well supported by home listeners. There were 55 entries compared with 39 in 1960 and from overseas eight entries, one fewer than the previous year. The results of the Receiving Section will be published next month.

Brian Bush (5A3TY) romped home an easy winner, with a score of 3869 points from 300 contacts, and A. Talby (CN8MT) who scored 2478 points from 196 contacts was second. Third place was taken by D. H. Parr (ZB1HC), having a total of 2365 points from 171 scoring contacts while M. Dransfield (5N2JKO) was fourth with 2087 points from 138 contacts.

The Whitworth Trophy, for the leading British Isles entrant, was won by A. J. Slater (G3FXB) by the narrow margin of 14 points from A. E. White (G3HCU). The winner scored 1959 points from 120 scoring contacts, 68 of which carried bonus points while the runner-up made 1945 points from 121 contacts with 67 earning bonus points. In third place, more than 200 points below, was C. M. Nairn (G3GHE) while N. I. Bower (G5HZ) was fourth.

Comments from contestants can be summed up in a very few words: it was an enjoyable contest but conditions, on the whole, were awful.

The Contests Committee found that the standard of log-keeping was very good but several overseas competitors ran into trouble with the scoring. One station claimed over

16,000 points but when the multiplier he had used was removed his score came down to a more realistic figure. The main trouble for the overseas stations was the last sentence in Rule 8 which stated "a further 50 bonus points will be scored for each additional ten stations worked in each of the above categories irrespective of band." Several stations ignored the phrase "in each of the above categories" and claimed 50 points extra for every 10 Gs worked. Others ignored the word "additional" and claimed the bonus on the 10th contact, instead of the 11th, in each category.

Check logs from VQ2MS, VQ3PBD, ZC4AB, ZE7JD and ZE7JK are gratefully acknowledged.

### Bulletin Contributors

MEMBERS who are willing to contribute articles to the Society's Journal are reminded that some notes are available to help them prepare manuscripts in a form that will assist in securing uniformity of presentation, simplify the work of the Society's printers and draughtsmen and help ensure that their instructions are easily understood.

A copy of *Hints to Contributors* can be obtained on application to the Editor.

All contributions to the Society's Journal including those for the *Regional and Club* and *Forthcoming Events* features should be typed with double-spacing between lines using one side of the paper only. Information for the R.S.G.B. BULLETIN should not be included on the same sheet of paper as material for news bulletins.

Photographs should be clear and sharply focused. Prints should preferably be glossy and should contain information of general interest to members. Captions should be written on a separate sheet of paper.

### Enquiries Regarding Bulletin Articles

MEMBERS who write to the authors of BULLETIN articles are asked to enclose stamped addressed envelopes if they require replies.

### Results—R.S.G.B. 21/28 Mc/s Telephony Contest 1961

Call-sign	Points	PLACINGS		Call-sign	Points	PLACINGS		Call-sign	Points	PLACINGS	
		Home Position	Over-seas Position			Home Position	Over-seas Position			Home Position	Over-seas Position
5A3TY*	3869		1	G2HJU	945	11		G3KSH	415	24	
CN8MT*	2478		2	G3MWG	930	12		EA6AR†	340		
ZB1HC*	2365		3	G2KO	880	13		G2AJB	325	25	
5N2JKO*	2087		4	G3OQU	790	14		G3KWH	300	26	
G3FXB	1959	1		G3MA	769	15		CN8DM†	275		
VQ2WR*	1954		5	GM3OCV*	765	16		EA3LA*	255		20
G3HCU	1945	2		SV0WZ*	760		14	GW2HFR*	250	27	
G3GHE	1730	3		G3NFV	735	17		G3KHT	210	28	
5N2RSB	1684		6	G3VW	699	18		GM3OGJ	200	29	
G5HZ	1670	4		G3OIB	694	19		VQ2JG	180		21
G3KFT	1655	5		G3NEO	674	20		ZSSPG*	124		22
VP6WR†	1645			MP4BDC*	635		15	I1ZIE	65		23
I1ZLW	1550		7	GM3NPR	630	21		VK2AKV*	65		25
UB5FG*	1350		8	VO1FB*	610		16	W1QCO*	59		26
ZD6RM*	1305		9	GM3NFR	555	22		VE2AFC*	55		
G3JAF	1200	6		YV3BW*	555		17				
VE3BQL/SU*	1185		10	ZS6AJH*	555						
G3NAC	1185	7		CT1QF	550		19				
LZ1UF*	1155		11	G3FPK	460	23					
CT1YE*	1130		12								
G2DC	1059	8									
G3LHJ	980	9									
EP2AT*	960		13								
G2JB	955	10									

Multi-Operator Section			
4X4IL*	1503		1
GB2SM*	1245		
GM3BCD*	1064	1	
G3OGT	935	3	
G3CIO	755	4	

\* Certificate winners  
 † Invalid—no declaration  
 ‡ Invalid—Incomplete

# Rules for the R.S.G.B. 7 Mc/s DX Contest 1962

RADIO amateurs throughout the world are invited to take part in the first R.S.G.B. 7 Mc/s DX Contest to be held on October 27-28 and November 3-4, 1962.

## Rules

1. **Duration:** The two sections of the contest will take place in each case between 06.00 G.M.T. on the Saturday and 24.00 G.M.T. on the Sunday as follows:

**Phone:** October 27-28, 1962. **C.W.:** November 3-4, 1962.

2. **Eligible Entrants:** The contest is open to licensed amateurs in all parts of the world.

3. **Licence Conditions:** Entrants must operate in accordance with the terms of their licences.

4. **Contacts:** Contacts must be made in that portion of the 7 Mc/s band for which the entrant is licensed. In the Phone Section, stations must not operate below 7050 kc/s. Contacts with unlicensed stations will not count for points. Proof of contact may be required. Only one contact may be made with a specific station, whether fixed, portable, mobile or alternative address in each section. Duplicate contacts must be logged and clearly marked as duplicate without claim for points.

5. **Contest Exchanges:** An exchange of RST (or RS) reports followed by a three figure serial number starting with 001 for the first contact and increasing by one for each successive contact and for each separate section (for example, 58002, etc.) must be made before points can be claimed.

6. **Operators:** Only the entrant will be permitted to operate his station for the duration of the contest.

7. **Entries:** Entries must (a) be clearly typed or written on one side only of foolscap paper; (b) log sheets must be ruled in columns headed (in this order) "Date/Time (G.M.T.)", "Call-sign of station worked", "My report on his signals and serial number sent", "His report on my signals and serial number received", "Band", "Leave Blank", "Bonus Points", "Points Claimed"; (c) be addressed to the **Contests Committee, Radio Society of Great Britain, New Ruskin House, Little Russell Street, London, W.C.1., England**, the name of the contest being clearly shown on the top left hand corner of the envelope which must be postmarked not later than **November 19, 1962**. Log sheets are available from R.S.G.B. Headquarters.

8. **Scoring:** British Isles stations may not work each other for points.

Overseas stations may only claim points for contacts with British Isles stations (G, GB, GC, GD, GI, GM and GW). Scoring will be as follows:

**British Isles Stations:** Each completed contact will score 5 points. In addition, a bonus of 20 points may be claimed for the first contact with each new country. For the purposes of scoring, the official R.S.G.B. countries list will apply, with the exception that VE, VK, W/K, ZL and ZS call areas will each count as a separate country.

**Overseas Stations:** Each completed contact with a British Isles station will score 5 points. In addition, a bonus of 50 points may be claimed for the first contact with each British Isles country—numeral prefix, i.e. G2, G3, G4, G5, G6, G8, GB, GC2, GC3, GC4, GC5, GC6, GC8, GD2, GD3, GD4, GD5, GD6, GD8, GI2, GI3, GI4, GI5, GI6, GI8, GM2, GM3, GM4, GM5, GM6, GM8, GW2, GW3, GW4, GW5, GW6, GW8. A further 50 bonus points will be scored for each additional ten stations worked in each of the above categories.

9. **Awards:** Certificates of merit will be awarded to the overall leaders and runners-up in each section and the leading station in each of the other five British Isles country-prefix zones. Certificates will also be awarded to the leading station in each overseas country, VE, VK, W/K, ZL and ZS call areas counting separately as in Rule 8.

## SAMPLE COVER SHEET

<b>R.S.G.B. 7 Mc/s DX Contest 1962</b>	<b>Claimed Score</b> .....
<b>Section</b> .....	<b>Call-sign</b> .....
<b>Name</b> .....	
<b>Address</b> .....	
<b>Transmitter</b> .....	<b>Power Input</b> ..... watts
<b>Receiver</b> .....	<b>Aerial(s)</b> .....

**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 R.S.G.B. 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.

The closing date for posting entries is November 19, 1962.

## Rules for the V.H.F. National Field Day 1962

ALL R.S.G.B. Groups, Affiliated Societies and clubs are invited to take part in the first V.H.F. National Field Day to be held on July 7-8, 1962. This year's event will be restricted to operation in the 144 Mc/s band but in 1963 all v.h.f. and u.h.f. bands will be employed.

No applications to enter are necessary but supplies of R.S.G.B. contest log sheets are available from Headquarters on receipt of a large stamped addressed envelope.

**When:** 18.00 G.M.T. on July 7 to 18.00 G.M.T. on July 8, 1962.

**Eligible Entrants:** Any group of members within the British Isles, which for the purposes of the contest comprise the prefix zones G, GC, GD, GI, GM and GW, may enter. The group may be a local R.S.G.B. group, a club, or an Affiliated Society.

**Operators:** Operators of portable stations competing in the contest must each hold a current British Isles (G.P.O.) Amateur (Sound) Licence, and must be fully paid-up Corporate Members of the R.S.G.B. at the time of the contest.

**Operators' Signatures:** Contacts made by an operator whose personal signature does not appear on the cover sheet of the appropriate log(s) may be disallowed.

**Power Supplies:** Power for any part of the station shall not be derived from supply mains.

**Tents:** Stations must be operated from tents.

**Contacts:** May be made on either A1, A3, A3a or F3 in the 144-146 Mc/s band with an input not exceeding 25 watts to any stage in the transmitter.

**Scoring:** Points will be scored on the basis of one point per mile for contacts with fixed stations and two points per mile for contacts with other portables or mobiles.

**Contest Exchanges:** RST or RS reports followed by the contact number

and location (e.g. RST559001 SNE Luton). This location must be identifiable on the 10 mile to the inch Ordnance Survey Map.

**Logs:** (a) Must be tabulated in columns headed (in this order) "Date/Time (G.M.T.)", "Call-sign of the station contacted", "Our report on his signals and serial number sent", "His report on our signals and serial number received", "Location of station contacted as received", "Distance", "Points claimed".

(b) The cover sheet must be made out in accordance with R.S.G.B. Contest Rule 5, and the declaration signed. The National Grid Full Six Figure Reference and the location of the station as transmitted must be given.

(c) Entries must be postmarked not later than Monday, July 23, 1962.

**Awards:** At the discretion of the Council certificates of merit will be awarded to the group or club obtaining the highest number of points, and to the runners-up.

The General Rules for R.S.G.B. Contests published in the January 1962 issue of the BULLETIN apply to the contest.

## NATIONAL FIELD DAY 1962 FINAL DATE FOR ENTRY

Members responsible for stations participating in this year's N.F.D., to be held on June 2-3, are reminded that details of call-signs and frequencies to be used, together with the name of the group, club or affiliated society concerned, must reach the Contests Committee at R.S.G.B. Headquarters not later than Tuesday, May 1, 1962. The information should be set out as shown in Rule 6.

The rules for N.F.D. 1962 were published on page 359 of the January 1962 issue of the R.S.G.B. BULLETIN.

# CONTEST NEWS

RESULTS — REPORTS — RULES



## 144 Mc/s C.W. Contest 1962

THE popularity of this contest increases annually, this year's event attracting 48 entries and four check logs. From the entries received it is known that at least 190 stations participated.

Conditions during the contest were above average for the time of year and many excellent QSOs were made. Tom Douglas (G3BA), who was the winner of the High Power Section, had 58 contacts in 35 counties and five countries. The runner-up in this Section was Johnny Stace (G3CCH) with 71 contacts in 30 counties and three countries.

The Low Power Section was won very easily by C. L. Desborough (G3NNG) with 60 contacts in 30 counties and three countries from Harry Gratton (G6GN) who had 54 contacts in 27 counties and three countries.

Several of the entries had to be re-scored owing to misreading of the rules. In most cases the entrants had read county instead of country and consequently had claimed an excessive number of bonus points. It is thought that the bonus system encouraged many stations to submit an entry.

Check logs are gratefully acknowledged from G2UJ, G3HBW, G3PNA and G2FZC.

### HIGH POWER SECTION

Posn.	Call-sign	Points	Posn.	Call-sign	Points
1	G3BA	1520	15	GW2HIY	775
2	G3CCH	1472	16	G3JYP	770
3	G3LTF	1395	17	G3EDD	760
4	G2CIW	1318	18	G3BW	715
5	G3IEQ	1268	19	G5UF	710
6	G5DF	1230	20	G5DS	700
7	G3LRP	1203	21	G3INU	638
8	G3ILD	1170	22	G3HWR	635
9	G2XV	1140	23	G2BHN	625
10	G5MA	1120	24	G3LTN	590
11	GW3MFY	1105	25	G5CP/A	575
12	G3BNL	1063	26	G5ZT	560
13	G3NNK	870	27	G3NUE/A	143
*	G2JF	820			

\* Multi-operator entry.

### LOW POWER SECTION

Posn.	Call-sign	Points	Posn.	Call-sign	Points
1	G3NNG	1364	12	G3FD	623
2	G6GN	1193	13	G3HRH	610
3	G3PFM/P	1176	14	G6TS	495
4	G3BRE	960	15	G6UJ	453
5	G3BOC	860	16	G2BLA	425
6	G2MR	850	17	G3ICO	415
7	G8KL	830	18	G2WS	360
8	G3IAS	780	19	G3JR	325
9	G3PLS	775	20	G2DHY	205
10	G5UM	745	21	G3GRA	135
11	G2OI	678			

## First 144 Mc/s Field Day 1962

R.S.G.B. members throughout Europe are again invited to take part in this contest, the details of which are as shown below. Contestants are recommended to operate in accordance with the British Isles Two Metre Band Plan.

When: 10.00 G.M.T. to 19.00 G.M.T. on Sunday, May 6, 1962.

Eligible Entrants: All fully paid-up members of the R.S.G.B. resident in Europe. Multi-operator entries will be accepted provided only one call-sign is used.

Power Supplies: Power for any part of the station shall not be derived from supply mains.

Contacts: May be made on either A1, A3, A3a or F3 with an input not exceeding 25 watts to any stage in the transmitter.

Scoring: Points will be scored on the basis of one point per mile for contacts with fixed stations and two points per mile for contacts with other portables or mobiles.

Contest Exchanges: RST or RS reports followed by the contact number and location (e.g. RST59001 SNE Luton). This location must be identifiable on the 10 mile to the inch Ordnance Survey Map.

Logs: (a) Must be tabulated in columns headed (in this order) "Date/Time (G.M.T.)", "Call-sign of station contacted", "My report on his signals and serial number sent", "His report on my signals and serial numbers received", "Location of station contacted as received", "Distance", "Points claimed."

(b) The cover sheet must be made out in accordance with R.S.G.B. Contests Rule 5 and the declaration signed. The QTH as sent and National Grid Reference (full six figure grid reference) must be recorded on the cover sheet for entries from G, GD, GM, and GW. In all other cases, entrants must show latitude and longitude.

(c) Entries must be postmarked not later than Tuesday, May 22, 1962.

Awards: At the discretion of the Council a miniature cup will be awarded to the winner and certificates of merit to the runner-up and to the non-transmitting member submitting the best check log in the opinion of the Contests Committee.

The General Rules for R.S.G.B. Contests published on page 361 of the January 1962 issue of the BULLETIN apply to the contest.

## First 420 Mc/s Open Contest 1962

MEMBERS taking part in this contest are recommended to operate in accordance with the British Isles Seventy Centimetre Band Plan.

When: 18.00 G.M.T. on Saturday to 18.00 G.M.T. on Sunday, May 26-27, 1962.

Station Locations: Stations may be operated from more than one site but the National Grid Full Six Figure reference must be recorded in the log for each location in the case of entries from G, GD, GM and GW. In all other cases, entrants must show latitude and longitude.

Eligible Entrants: All fully paid-up members of the R.S.G.B. resident in Europe. Multiple-operator entries will be accepted provided only one call-sign is used.

Contacts: May be made on either A1, A3, A3a or F3.

Scoring: Points will be scored on the basis of one point per mile.

Contest Exchanges: RST (RS) reports followed by the contact number and location (e.g. RST59001 SNE Wigan). This location must be identifiable on the 10 mile to the inch Ordnance Survey Map.

Logs: (a) Must be tabulated in columns headed (in this order) "Date/Time (G.M.T.)", "Call-sign of station contacted", "My report on his signals and serial number sent", "His report on my signals and serial numbers received", "Location of station contacted as received", "Points claimed."

(b) The cover sheet must be made out in accordance with R.S.G.B. Contests Rule 5 and the declaration signed. The location of the station as transmitted must be given on the cover sheet.

(c) Entries must be postmarked not later than Tuesday, June 12, 1962.

Awards: At the discretion of the Council, a miniature cup will be awarded to the winner and certificates of merit to the runner-up and to the non-transmitting member submitting the best check log in the opinion of the Contests Committee.

The General Rules for R.S.G.B. Contests published on page 361 of the January 1962 issue of the BULLETIN apply to this contest.

This contest coincides with the I.A.R.U. Region I V.H.F. Contest.

## D/F Qualifying Events

DETAILS of forthcoming qualifying events are as follows:

### SLADE

Sunday, April 29, 1962

Organizer: T. J. Hayward (G3HHD), 2 Derwent Close, Streetly, Sutton Coldfield, Warwickshire.

Frequencies and call-signs: To be announced at the start.

Map: Ordnance Survey Map, Popular Edition Sheet No 120.

Assembly Point: N.G.R. 038152.

Assembly Time: 13.00 B.S.T.

Entries and Tea: Intending competitors should notify the Organizer in advance stating the number in their party requiring high tea which will be held at Lichfield.

### OXFORD

Sunday, May 13, 1962

Organizer: P. G. Tandy (G2DU), 4 Harbord Road, Oxford.

Frequencies: 1875 kc/s—G2DU/P.

1915 kc/s—G8PX/P.

Map: Ordnance Survey, New Popular Edition Sheet 158.

Assembly Point: The Flowing Well Public House, Sunningwell, Berks (N.G.R. 497006).

Assembly Time: 13.00 B.S.T.

Entries and Tea: Intending competitors should notify the Organizer as soon as possible, stating the number in their party requiring tea, which will be at the Eastgate High Street, Oxford (N.G.R. 518063).

# R.A.E.N. Rally 1961

THE Rally held on October 8, 1961, appeared more popular than ever and this fact, together with certain queries which had to be referred to the R.A.E.N. Committee before any placings could be made, has resulted in a rather long delay in publishing the results.

In general, the messages were passed with few errors and there seems every indication that message handling is becoming easier to all concerned. The rules, however, were badly interpreted. The score to be claimed was for the best two of the three periods. Many operators however happily added up their total score and submitted this—hence the reduced scores recorded for many entrants. One member clung to his test phrase with great tenacity and refused to be parted from it throughout the event! There were the usual few entries without the signed declaration. It should be noted that the Rally is divided into three sections and it is not possible to enter a combined score for fixed, portable and receiver entries. Failure to observe this point has resulted in a few entrants appearing in both the fixed and portable sections with a consequent reduced total score.

In general, the Rally was enjoyed by all participants although it is significant that most of the activity took place in the Midlands and North with few stations appearing from the Southern Counties. Only one log was received for 144 Mc/s and none at all for 28 Mc/s, the principal activity being confined to the 1.8 and 3.5 Mc/s bands.

Certain of the rules will be referred to the R.A.E.N. Committee for possible revision before the next Rally in the hope that there will be less likelihood of misunderstanding in future.

Comment should be made that the winner of the fixed station section, C. D. Hyde (G3OFU), is paralysed and could not enter the c.w. section. It was incidentally his first event of this nature. P. Odell (G3MUM), who came fourth, is also paralysed.

Check logs from G3IGG, G3LLM and G6NM/A are acknowledged with thanks.

## RESULTS—R.A.E.N. RALLY 1961

### Transmitting Section (Fixed Stations)

Position	Call-sign	Points	Position	Call-sign	Points
1	G3OFU	66	19	G3NOD	26
2	G3ELZ	62		G3GYV	26
3	G3OJI	58		G4XC*	26
4	G3MUM	56	21	G3LWQ	25
5	G3MWW	55	22	G3NIF	24
	G3LUG	55	23	G3EHX	23
	G3LCS*	55	24	G3HRK	22
7	G3CKC	45		G2AO	22
8	G3HTI	44	26	G3JGO	20
9	G2TG	40		G3NVG	17
	G3NNZ	40	27	G3NTV	17
11	G3BEJ	39		G3OHX	17
	G3ERB*	38	30	G3OEP	16
	G3GFU*	38	31	G3AVE	15
	G3NCE	35	32	G3OOA	14
12	G3KPU	35	33	G3BGL	11
	G3JEY	34	34	G3NZ	10
	G3LNN	34		G6ZG	10
16	G3NNX	31	36	G3LHJ	8
17	G3CHN	30	37	G3OWW	7
18	G3NHU	28	38	G3NKF	2

### (Mobile or Portable)

Position	Call-sign	Points	Position	Call-sign	Points
1	G3ISV/P	61	6	G2AVC/M	12
2	G3NJP/P/M	59	7	G3LHJ/P	9
3	G3HRK/P/M	23	8	G3CKC/M	6
4	G3EFA/M	20	9	G3OWW/P	3
5	G3OWW/M	18	10	G3LGN/M	2

### Receiving Section

Posn.	Name	Pts.	Posn.	Name	[Pts.]
1	F. W. Nash (B.R.S.6671)	417	7	M. Granville	75
2	R. H. Crowley (A.1960)	255	8	C. Woodcock (A.2511)	72
3	R. Western (A.2461)	93	9	G. Clark	69
4	B. Tinton (A.2380)	90	10	P. J. Wright (A.2586)	63
5	D. A. Hall (A.2289)	81	11	D. Hansford	42
	S. Clements (B.R.S.7323)	81			

\* Invalid—no declaration or declaration unsigned.

## For Your Bookshelf and Shack R.S.G.B. PUBLICATIONS

The Amateur Radio Handbook (Third Edition)	Price 34/- (by post 36/6)
Communication Receivers	Price 2/6 (by post 3/-)
A Guide to Amateur Radio (Ninth Edition)	Price 3/6 (by post 4/-)
Radio Amateurs' Examination Manual	Price 5/- (by post 5/6)
R.S.G.B. Amateur Radio Call Book (1962 Edition)	Price 4/6 (by post 5/-)
Service Valve Equivalents (Second Edition)	Price 2/- (by post 2/6)
The Morse Code for Radio Amateurs (Second Edition)	Price 1/6 (by post 1/9)

## AMERICAN PUBLICATIONS

Orders for the following American publications which are usually available from stock can only be accepted from residents in the United Kingdom and British Commonwealth.

Radio Amateur's Handbook, 1962 (A.R.R.L.)	38/6
CQ Sideband Handbook (Cowan)	25/6
Mobile Manual for Radio Amateurs (A.R.R.L.)	25/-
CQ Mobile Handbook (Cowan)	24/6
Antenna Book, 9th Edition (A.R.R.L.)	19/6
CQ Anthology (Cowan)	16/6
Single Sideband for the Amateur (A.R.R.L.)	14/6
Hints and Kinks, Volume 6 (A.R.R.L.)	10/6
Course in Radio Fundamentals (A.R.R.L.)	10/6
How to Become a Radio Amateur (A.R.R.L.)	5/-
Learning the Radiotelegraph Code (A.R.R.L.)	5/-
QST (A.R.R.L.) Published monthly	(p.a.) 43/6
CQ (Cowan) Published monthly	(p.a.) 44/-
73 Magazine (A.R.P.Co.) Published monthly	(p.a.) 30/-

Prices for American publications are subject to alteration without notice.

## R.S.G.B. MEMBERS ONLY

Society Tie (all silk)	16/6
Blazer Badge	7/-
Car Badge (R.S.G.B. or R.A.E.N. Emblem)	7/6
Car Badge (R.S.G.B. Emblem with call-sign) (5 characters)†	11/6
Car Badge (De Luxe type with call-sign)†	18/6
(Postage on overseas orders 5/6 extra)	
Call-sign Lapel Badges (5 characters)†	6/-
Pennants (R.S.G.B.) 12" long for car	8/9
Headed Notepaper (R.S.G.B.) per 100 sheets (Large) 9/- (Small) 6/6	

† Delivery 6-8 weeks.

## MISCELLANEOUS ITEMS

Paper Covered Log Book (Webbs)	6/-
Mobile Log Book (Martin)	9/-
Reference Manual of Transistor Circuits (Mullard)	14/6
Short Wave Receivers for the Beginner (Data Publications)	6/-
Wireless World Valve Data (Iliffe)	6/6
Panel-Signs, Sets 1, 2, 3 and 4 (Data) per set	4/-
International Radio Amateur Year Book, 1961/2 Edition (Cassling)	4/-
Radio Amateur Operator's Handbook (Data Publications)	4/-
Guide to Broadcasting Stations (Iliffe)	4/-
Countries List	6d.

All prices include postage unless otherwise stated.

## R.S.G.B. PUBLICATIONS

28 Little Russell Street, London, W.C.1.



# Forthcoming Events

Details for inclusion in this feature should be sent to the appropriate Regional Representatives by the 18th of the month preceding publication. T.R.s and club secretaries are reminded that the information submitted must include the date, time and venue of the meeting and, whenever possible, details of the lecture or other event being arranged. Regional Representatives are requested to set out the copy preferably typed double spaced, in the style used below. Standing instructions for more than three months ahead cannot be accepted.

## DATES FOR YOUR DIARY

**May 20.**—Hunstanton "Bucket and Spade" Party with mobile DF contest.  
**September 2.**—G6UT's Ham Party.  
**September 8.**—B.A.T.C. Amateur Television Convention, Conway Hall, London, W.C.1.  
**September 22.**—Region 9 Mobile Rally at Weston-super-Mare.  
**September 23.**—Surrey Radio Contact Club 144 Mc/s D/F Hunt.  
**September 23.**—Region 9 O.R.M. at Weston-super-Mare.  
**October 20-21.**—Jamboree-on-the-Air.  
**October 31-November 3.**—R.S.G.B. Exhibition, Seymour Hall, London.  
**December 15.**—Annual General Meeting, Overseas House, London S.W.1.  
 Details of Mobile Rallies are given in *Mobile Column*.

## REGION 1

**Ainsdale (A.R.S.).**—Wednesdays, 8 p.m., 37 Hawthorne Grove, Southport.  
**Blackburn.**—Fridays, 8 p.m., West View Hotel, Revd Road.  
**Blackpool (B. & F.A.R.S.).**—Tuesdays, 8 p.m., Squires Gate Holiday Camp.  
**Bury (B.R.S.).**—May 8 (Film Show), 8 p.m., Knowsley Hotel, Kay Gardens.  
**Chester.**—Tuesdays, 8 p.m., Y.M.C.A.  
**Liverpool (L. & D.A.R.S.).**—Tuesdays, 8 p.m., Gladstone Mission Hall, Cuzens Drive, Stoneycroft.  
**Macclesfield.**—April 17, May 1, 15, 29, 42 Jordan-gate.  
**Manchester (M. & D.A.R.S.).**—Wednesdays, 7.30 p.m., King George VI Club, North Road, Moston, Manchester, 10. (S.M.R.C.).—Fridays, 7.30 p.m., Fallowfield Bowling and Lawn Tennis Club, 81 Wellington Road, Fallowfield, Manchester, 14.  
**Morecambe.**—May 2, 125 Regent Road.  
**Preston (P.A.R.S.).**—April 24—No Meeting. May 8 (Night on the Air), May 22 ("DX Working with Indoor Aerials" by G2HFC), 7.30 p.m., St. Paul's School, Pole Street, Preston.  
**Southport (S.R.S.).**—Thursdays, 8 p.m., The Esplanade.  
**Stockport (S.R.S.).**—April 25, May 9, 23, 8 p.m., The Blossoms Hotel, Buxton Road.  
**Wirral (W.A.R.S.).**—April 18, May 2, 16, 7.45 p.m., 15 Balls Road, Cloughton, Birkenhead.

## REGION 2

**Barnsley.**—April 27 ("V.F.O./C.O. Mixers," by W. Lee, G6LZ), May 11 ("Transistors in the Amateur Station," by J. A. Ward, G4JJ), 7.30 p.m., King George Hotel, Peel Street.  
**Bradford.**—April 25 ("N.F.D. Arrangements"), 66 Little Horton Lane. May 8—visit to Automatic Telephone Exchange, Manchester Road.  
**Halifax (Northern Heights).**—May 2—visit to Leeds and Bradford Airport, Yeaman. May 16 ("Converters for 2 and 4m," by G3OGV), 7.30 p.m. Sportsman Inn, Oden.  
**York (Y.A.R.S.).**—April 19 ("Activity Night"), April 26 ("Plans for N.F.D."), Club Rooms, Fetter Lane, York.

## REGION 3

**Birmingham (M.A.R.S.).**—April 17 ("Space Instrumentation," by E. C. Mackenzie of Birmingham University), 7.45 p.m., Midland Institute, Paradise Street, Birmingham. (Slade.)  
 —April 27, May 11, 7.45 p.m., The Church House, High Street, Erdington. (South.)  
 —April 19 (Film Show), May 17 ("S.S.B." by George Brown, G5BJ), 7.30 p.m., The Friend's Institute, 220 Moseley Road, Birmingham 12.  
**Coventry.**—April 18 ("Microminiaturization," by J. P. Pitts), 7.30 p.m., Main Lecture Room,

Training Centre, G.E.C. Telephone Works, Stoke, Coventry. (C.A.R.S.).—Mondays, 7.30 p.m., R.A.F.A. Club, Holyhead Road, Coventry.  
**Cannock Chase (A.R.S.).**—May 3, 7.30 p.m., White Lion Hotel, Bridgtown.  
**Stourbridge.**—May 1 (Films and N.F.D. Discussion), 7.45 p.m., Library, Foley College, Stourbridge.  
**Sutton Coldfield.**—April 26 (Club Station Activities), 7.30 p.m., Conservative Committee Room, 92 The Parade, Sutton Coldfield.  
**Wolverhampton.**—April 30 8 p.m., Neachells Cottage, Stockwell End, Tettenhall.

## REGION 4

**Chesterfield (C. & D.A.R.S.).**—Wednesdays, 7.15 p.m., Chesterfield Technical College.  
**Derby (D. & A.R.S.).**—April 18 (D/F League Fixture), April 25 (Open Evening), April 29 (Exhibition at Trentham), May 2 (Surplus Sale), May 9 (Experimenters' Night), May 16 (D/F League Fixture), May 23 ("Receivers" by F. K. Parker, G3FUR), 7.30 p.m., Room No. 4, 119 Green Lane, Derby. (D.S.W. Exp. Soc.).—Fridays, 7.30 p.m. Sundays, 10.30 a.m., Nunsfield House, Boulton Lane, Alvaston, Derby.  
**Grantham (G. & D.A.R.S.).**—Mondays, 7.30 p.m., Club Rooms (rear of Manners Arms Hotel), London Road, Grantham.  
**Grimby (G. & D.A.R.S.).**—April 26, May 10, 24, 8 p.m., R.A.F.A. Headquarters, Abbey Drive West, Grimby.  
**Leicester (L.R.S.).**—Mondays, 7.30 p.m., Club Rooms, Old Hall Farm, Braunstone Lane, Leicester.  
**Lincoln (L.S.W.C.).**—Fortnightly, Wednesdays, 7.30 p.m., Lincoln Technical College, Cathedral Street, Lincoln.  
**Melton Mowbray (M.M.A.R.S.).**—April 26 ("Audio Equipment" by A. Brown, G3QWR), May 24 (S.S.B. Discussion opened by K. Pugh, G3HES), 7.30 p.m., St. John's Ambulance Hall, Asfordby Hill, Melton Mowbray.  
**Nottingham (A.R.C.N.).**—Tuesdays (R.A.E. Classes), Thursdays (Lectures), 7.15 p.m., Room No. 3, Sherwood Community Centre, Woodthorpe House, Mansfield Road, Nottingham.  
**Northampton (S.W.C.).**—Thursdays, 7 p.m., Allen's Pram Works, 8 Duke Street, Northampton.  
**Peterborough (P. & D.A.R.S.).**—May 4 (Aerials), June 1 (N.F.D.), 7.15 p.m., Peterborough Technical College, Eastfield Road, Peterborough.  
**Retford & Worksop (N.N.A.R.S.).**—Tuesdays (Beginners), Thursdays (Club), 7.30 p.m., Victoria Institute, Eastgate, Worksop.

## REGION 5

**Cambridge (C. & D.A.R.C.).**—April 27 ("S.W.R. and the CM-1 Receiver," by O. J. Russell, G3BHJ, of Mosley Electronics Ltd.), May 9 (Surplus Sale) 7.30 p.m., Club Headquarters, Corporation Yard, Victoria Road.  
**March (M. & D.A.R.S.).**—Tuesdays, 7.30 p.m., Club Room (rear of Police Headquarters), March.  
**Shefford (S. & D.A.R.S.).**—April 26 (N.F.D. Discussion and Junk Sale), May 3 ("Constructional Techniques," by D. Raby, G3IDR), May 10 ("A Morse Evening," by C. Pettifer), 8 p.m., Digswell House, Shefford.

## REGION 6

**Cheltenham.**—First Thursday in each month, 8 p.m., Great Western Hotel, Clarence Street.  
**Wolverton (W.D.R.C.).**—First Friday in each month, 7.30 p.m., Science and Arts Institute, Church Street, Wolverton.

## REGION 7

**Acton, Brentford and Chiswick (A.B.C.R.C.).**—April 17 (General Discussion), 7.30 p.m., A.E.U. Club, 66 High Road, Chiswick.  
**Bexleyheath (N.K.R.S.).**—April 26, 8 p.m.,

Congregational Hall, nr. Clock Tower, Bexleyheath.

**Dorking (D.D.R.S.).**—April 24 (Demonstration—Instrumentation and Digital Voltmeters by B. Bonehill, G3LHC), 8 p.m., Star and Garter, May 8, meeting at Wheatsheaf.  
**Ealing.**—Sundays, 11 a.m., A.B.C. Restaurant, Ealing Broadway, W.5.  
**East Ham.**—Tuesdays fortnightly, 8 p.m., Leigh Road, East Ham.  
**East Molesey (T.V.A.R.T.S.).**—May 2 (Ferrite Loaded Aerial by G. A. Bird, G4ZU), 8 p.m., Carnarvon Castle Hotel, Hampton Court.  
**Edgware and Hendon (E. & D.R.S.).**—Second and fourth Mondays each month, 8 p.m., John Keeble Hall, Church Close, Deans Lane, Edgware.  
**Harlow.**—Tuesdays, 7.30 p.m., rear of G3ERN (G. E. Read), High Street, Harlow.  
**Holloway (G.R.S.).**—Mondays, Tuesdays and Wednesdays (R.A.E. and Morse), 7 p.m., Fridays (Club), 7.30 p.m., Montem School, Hornsey Road, Holloway, N.7.  
**Ilford.**—Thursdays, 8 p.m., 579 High Road, Ilford (nr. Seven Kings Station).  
**Kingston.**—Lectures alternate Thursdays, Theory and Morse Classes weekly, 7.45 p.m., Y.M.C.A., Eden Street, Kingston (Morse at 2 Sunray Avenue, Tolworth).

## LONDON MEMBERS' LUNCHEON CLUB

will meet at the Bedford Corner Hotel, Bayley Street, Tottenham Court Road, at 12.30 p.m. on Friday, May 18, June 15 and July 20, 1962.  
 Telephone table reservations to HOL 7373 prior to day of luncheon. Visiting amateurs especially welcome.

**Mitcham (M. & D.R.S.).**—Lectures alternate Fridays, 8 p.m., Morse Classes, 7 p.m., "The Cannons," Madeira Road, Mitcham.  
**New Cross (C.A.R.S.).**—Fridays, 7.30 p.m., Sundays, 11.30 a.m., Wednesdays (Morse Practice), 8 p.m., 225 New Cross Road, S.E.14.  
**Norwood and South London (C.P. & D.R.C.).**—April 21 (Return Joint Quiz), 8 p.m., Windermere House Annexe, Weston Street, Crystal Palace.  
**Paddington (P. & D.A.R.S.).**—Wednesdays, 7.30 p.m., Beauchamp Lodge, 2 Warwick Crescent, W.2.  
**Romford (R. & D.R.S.).**—Tuesdays, 8.15 p.m., R.A.F.A. House, 18 Carlton Road, Romford.  
**Sutton and Cheam (S. & C.R.S.).**—Every Third Tuesday, The Harrow, High Street, Cheam.  
**Welwyn Garden City.**—May 10 (Final Preparations for N.F.D.), 8 p.m., Conference Room, Murphy Radio Ltd., Bessemer Road, Welwyn Garden City.

## REGION 8

**Crawley (C.A.R.C.).**—April 25 ("Project Oscar," by W. H. Allen, M.B.E., G2UJ), 8 p.m., West Green Centre, Crawley.  
**Tunbridge Wells (W.K.A.R.S.).**—May 6, Mobile Rally at Dunorlan Park, May 11, 7.30 p.m., Culverden House, Culverden Park Road.

## REGION 9

**Bath.**—May 14, 7.30 p.m., Committee Room, Bath Technical College, Lower Borough Walls, Bath.  
**Bideford.**—First Thursday in each month, 7.30 p.m., alternately at T. G. Ward (G7FKO), 38 Clovelly Road (phone Bideford 964) and D. H. Jones (G3FO), Rosebank, Westcombe (phone Bideford 550).  
**Bristol.**—April 27, 7.15 p.m., Carwardines Restaurant, Baldwin Street, Bristol, 1.  
**Burnham-on-Sea.**—May 8, 8 p.m., Crown Hotel, Burnham-on-Sea.

**Dorchester (S.D.R.S.).**—First Friday in each month, 7.30 p.m., alternately at the Labour Rooms, West Walks, Dorchester, and the Waverley Hotel, Westham, Weymouth. (May meeting, Dorchester).

**Exeter.**—May 1, 7.30 p.m., Y.M.C.A., St. David's Hill, Exeter.

**Falmouth (C.R. & T.C.).**—First Wednesday in each month, Y.M.C.A., Falmouth.

**Plymouth (P.R.C.).**—Tuesdays, 7.30 p.m., Virginia House Settlement, St. Andrews Cross, Plymouth.

**Torquay.**—May 12 (N.F.D. Preparations), 7.30 p.m., Y.M.C.A., The Castle, Torquay.

**Weston-super-Mare.**—First Tuesday in each month, 7.15 p.m., Technical College, Lower Church Road, Weston-super-Mare.

**Yeovil (Y.A.R.C.).**—Wednesdays, 7.30 p.m., Grove House, Preston Road, Yeovil.

#### REGION 10

**Cardiff.**—May 14 ("Final Arrangements for N.F.D."), 7.30 p.m., T.A. Centre, Park Street, Cardiff.

**Penarth.**—Last Monday in each month, 7.30 p.m., R.A.F.A. Club, Windsor Road, Penarth.

**Port Talbot.**—May 8, June 5, 7.30 p.m., 8-10 Jersey Street, Velindre, Port Talbot.

#### REGION 11

**Prestatyn (F.R.S.).**—April 30 (Film Show), 7.30 p.m., Railway Hotel, Prestatyn.

#### REGION 13

**Edinburgh (L.R.S.).**—April 26 ("U.H.F. and

V.H.F. Working," by GM3DDE), May 10 ("Commercial Test Gear," by GM3NXX), May 24 ("N.F.D. Briefing"), 7.30 p.m., Y.M.C.A., South St. Andrews Street, Edinburgh.

#### REGION 14

**Ayrshire.**—Third Sunday in each month, 7.30 p.m., Royal Hotel, Prestwick.

**Falkirk.**—First and last Thursdays in each month, 7.30 p.m., Comely Park School, Falkirk.

**Motherwell.**—Third Friday in each month, 7.30 p.m., Carlin Hall, Motherwell.

#### REGION 16

**Chelmsford.**—First Tuesday in each month, 7.30 p.m., Marconi College, Arbour Lane, Chelmsford.

## Regional and Club News

**Cambridge and District Amateur Radio Club.**—Recent events have included a demonstration of the AVO Valve Tester by A. W. Tomalin (G3PBT), short talks on "What I am using and why" by newly licensed members and an Amateur Television demonstration by G3KKD/T and G3NOX/T. On March 15, the club was "at home" to senior Scouts of Cambridge District Troop. Members of the Junior Group who meet on Wednesdays are building Top Band receivers. Details of meetings are given in *Forthcoming Events* for Region 5.

**Cornish Radio and Television Club.**—Owing to the very bad weather, only 11 members attended the meeting at Redruth in March when there was an informal discussion. The A.G.M. was due to be held on April 4. Information regarding future activities may be obtained from the *Hon. Secretary*: W. J. Gilbert, 7 Poltair Road, Penryn, Cornwall.

**Coventry.**—Work is proceeding steadily on preparations for the special Amateur Radio Station GB3COV which is to be a feature of the celebrations in connection with the consecration of Coventry Cathedral. A fund to defray the expenses involved has been opened and donations may be sent to the *Town Representative* for Coventry (South): John L. Boyce, 73 Maida Vale Crescent, Coventry.

**Crawley Amateur Radio Club.**—The Annual Dinner at the "Apple Tree," West Green, in February was most successful, with an attendance of 46. On April 25, W. H. Allen, M.B.E. (G2UJ) is to give a talk on "Project Oscar." *Hon. Secretary*: R. G. Vaughan (G3FRV), 9 Hawkins Road, Tilgate, Crawley. **Crystal Palace and District Radio Club.**—At the A.G.M. in February the following were elected: *Chairman*—David Deacon (G3BCM); *Hon. Treasurer*—Fred Lawrence (G2LW); *Hon. Secretary*—Geoff Stone (G3FZL), 10 Liphook Crescent, Forest Hill, London, S.E.23; *Committee Member*—Eric Yeomanson (G3IFR). In view of the likely change of the club meeting place to more suitable premises at Catford, the Tuesday meetings have been discontinued. Meetings will continue to be held at 8 p.m. on the third Saturday in each month at Windermere House Annexe, Westow Street, Crystal Palace, until June.

**Derby and District Amateur Radio Society.**—The Annual Dinner and Dance held on February 17 attracted an attendance of 134. T. Douglas (G3BA) proposed the toast to the Society and the R.S.G.B. Region 4 Representative, F. C. Ward (G2CVV), responded. The toast to the Guests and visitors was proposed by the *Chairman*, T. Darn (G3FGY), C.R. for Derbyshire, and A. Brown (G3OWR) of Grantham responded. The President's Trophy for the 1961 D/F Contest was presented to Messrs. J. Pell (G3PEL), K. J. Pegg (G3FSH) and F. C. Ward (G2CVV) by Founder Member A. Trevelyan Lee. W. A. Mead (G5YY), C.R. for Leicestershire, presented his Trophy to the *Chairman*, winner of the 1962 G5YY Contest. Among the visitors were Mr. F. K. Parker (G3FUR), R.S.G.B. Zonal Representative and Mrs. Parker. Details of meetings are given in *Forthcoming Events* for Region 4. *Hon. Secretary*: F. C. Ward (G2CVV), 5 Uplands Avenue, Littleover, Derby.

**East London.**—George Brown (G5BJ) recently lectured to the Group on "Single Sideband," lucidly explaining the advantages of the system and describing a simple but effective exciter unit. At the meeting on April 15 at Ilford Town Hall, Messrs. Kirkpatrick and Turner of the G.P.O. will continue their discussion entitled "The Log and the Licence." Details of future activities

may be obtained from the *District Representative*: M. McBrayne (G3KGU), 25 Purlieu Way, Theydon Bois, Essex.

**Flintshire Radio Society.**—At the February meeting, Peter F. Jones (GW3FPF) described and demonstrated his Eddystone 888 receiver and A. Mossford demonstrated his rebuilt HRO receiver. Details of activities may be obtained from the *Hon. Secretary*: H. T. Jones (GW3NQP), "Bedwyn," Queens Walk, Rhyl.

**Grafton Radio Society.**—There was an attendance of more than 70 at Montem School, Hornsey Road, Holloway, London, N.7, on March 9 when the General Secretary of the R.S.G.B. presented Radio Amateur Certificates to 25 candidates who were successful in passing the R.A.E. during 1961. All of the certificate winners had received their instruction at Montem School, from where the Grafton Radio Society operates weekly. At the conclusion of the presentations Mr. Clariccoats discussed the future of Amateur Radio making special reference to the many commercial developments now taking place at ultra and super high frequencies which may in time enable amateurs to engage in exciting new spheres of experiment.

**Harrow, Radio Society of.**—On April 27 there will be a discussion under the title "My Rig," while a Junk Sale is arranged for May 11. A comprehensive tool kit is available for members' use during evenings devoted to practical work. R.A.E. and Morse instruction classes are held every week. Further details may be obtained from the *Hon. Secretary*: A. C. Butcher, 95 Norval Road, North Wembley.

**London Members' Luncheon Club.**—There was an attendance of 30, including MP4BCR, SM4CKL and W5LYT, at the March meeting. At the informal A.G.M. following the luncheon, Stanley Vanstone (G2AYC), Clem Jardine (G5DJ) and Frank Fletcher (G2FUX) were re-elected *Chairman*, *Treasurer* and *Secretary* respectively. The statement of accounts revealed a healthy financial position. Dates of meetings are announced in *Forthcoming Events* each month and bookings may be made by telephoning G2FUX at RU1slip 2763 or R.S.G.B. Headquarters, Holborn 7373.

**Lothians Radio Society.**—Meetings continue to be held at the Y.M.C.A., South St. Andrews Street, Edinburgh, at 7.30 p.m. on the second and fourth Thursdays in each month. An excellent programme of lectures and demonstrations has been presented during the winter session. LA4EF and LA6EF, who are at the moment resident in Edinburgh, have been warmly welcomed to meetings as have a large number of schoolboys. *Hon. Secretary*: T. Simpson (GM3BCD), 118 Brail Road, Edinburgh, 10.

**Magnus Grammar School Radio Society.**—Recent events have included a visit to Kirkgate Telephone Exchange, and talks on "Broadcasting and Television in Western Germany" by H. Schirm and "Safety Standards" by D. Kitchen (G3KVP). A six week series on television is commencing shortly. *Hon. Secretary*: J. Baxter, Magnus Grammar School, Newark-on-Trent.

**Northern Heights Amateur Radio Society.**—A visit to Leeds and Bradford Airport is arranged for May 2 and to Holme TV station for May 30. On May 16 G3OGV will give a talk on converters for 2 and 4m. A course at Halifax Technical College for the R.A.E. will commence in September. *Hon. Secretary*: A. Robinson (G3MDW), Candy Cabin, Ogden, Halifax.

**Peterborough and District Amateur Radio Society.**—Members visited the G.P.O. Automatic Telephone Exchange at Peterborough for the society's March meeting. *Hon. Secretary:* D. Byrne (G3KPO), Jersey House, Eye, Peterborough.

**Portsmouth and District Radio Society.**—The Club station is active again under the call-sign G3DIT. Morse classes are held on Mondays, commencing at 8 p.m. The future programme includes talks by G3ORR, G3JZV (on transistors) and by G2TX (on Early Days). *Hon. Secretary:* T. R. Mortimer (G3JZV), 72 Whitworth Road, Copnor, Portsmouth.

**Purley and District Amateur Radio Club.**—A ragchew session is arranged for April 20 while the meeting on May 4 will be devoted to mobile matters. G3GKF/A will be the talk-in station. Members are invited to bring their own mobile or portable gear. Both meetings will be held at the Railwaymen's Hall, Whytecliffe Road, Purley. Visitors will be most welcome but are asked to note that access to the hall is by the rear entrance.

**Reigate Amateur Transmitting Society.**—A large and appreciative audience attended R. G. B. Vaughan's (G3FRV) recent talk on "Mobile Operation" with particular reference to 144 Mc/s. Special revision classes in preparation for the R.A.E. are being held. The Junior Section will meet at 2 Hazel Road, Reigate, on May 5 while at the meeting on May 19 at 7.30 p.m. G3FM will give a talk on "Crystal Grinding," followed by a final discussion on plans for N.F.D. *Hon. Secretary:* F. D. Thom (G3NKT), 12 Willow Road, Redhill.

**Rhondda Valley Radio Society.**—Despite arctic weather conditions and a local outbreak of smallpox, the Annual Dinner at the Royal Hotel was a great success. The Guest Speaker was Arthur Williams (GW5VX), R.S.G.B. Zonal Representative. Following the speeches, there was a draw for prizes and an entertainment by G. Tuckwood and Garfield Williams (GW2FOF). *Hon. Secretary:* A. Chapman, Royal Hotel, Trearlaw, Rhondda.

**South Dorset Radio Society.**—The March meeting, at which a representative of Tiger Radio Ltd. gave a lecture and demonstration, was well attended. *Hon. Secretary:* C. E. Biggs (G2TZ), 54 Prince of Wales Road, Dorchester, Dorset.

**Thames Valley Amateur Radio Transmitters' Society.**—During his talk entitled "More Workshop Practice" at the March meeting, D. Foster (G3KQR) described how to build a complete shack. On May 2, G. A. Bird (G4ZU) will talk about the

F.B.5 multiband aerial. Visitors will be most welcome. *Hon. Secretary:* Ken Rogers (G3AIU), 21 Links Road, Epsom.

**Torbay Amateur Radio Society.**—Mr. J. Robinson, Torquay Corporation Publicity Officer, was the guest of honour at the Annual Dinner at the Abbey Lawn Hotel on March 3. Following the dinner, Mrs. Robinson presented the 28 Mc/s Cup to B. Symons (G3LKJ), the Senior Construction Cup to E. Hayman (G3ABU), the Junior Construction Cup to R. Pavey, the S.W.L. Cup to R. Western and the G3LFL Rose Bowl to D. Webber (G3LHJ). Meetings are held on the second Saturday in each month at 7.30 p.m. at the Y.M.C.A., Castle Road, Torquay. The A.G.M. will be held in April while the May meeting will be devoted to a discussion of N.F.D. preparations. *Hon. Secretary:* Mrs. G. Western (G3NQD), 118 Salisbury Avenue, Torquay.

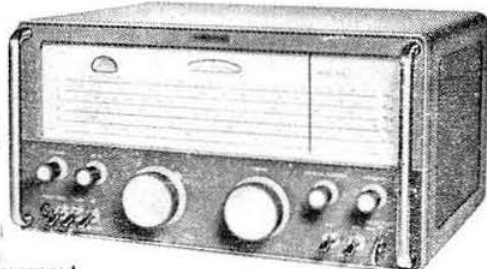
**Wirral Amateur Radio Society.**—The Annual Dinner was due to be held on March 30, and a night D/F hunt on April 13. Details of future activities are given in *Forthcoming Events*. *Hon. Secretary:* A. Seed (G3FOO), 31 Withert Avenue, Bebington, Cheshire.

**Worthing and District Amateur Radio Club.**—This year's "Bucket and Spade" Party is to be held in early July. Prospective members will be most welcome at meetings which are held at the Adult Education Centre, Union Place, Worthing, commencing at 8 p.m. The club's Hon. Treasurer now holds the call-sign G3PUR/T. *Hon. Secretary:* P. Robinson, 46 Hillview Road, Worthing, Sussex.

**York Amateur Radio Society.**—At the A.G.M. the following were elected: *Chairman*—G. F. Nottingham (G3DTA); *Hon. Secretary/Treasurer*—N. Spivey (G3GWJ), 80 Melton Avenue, Clifton, York; *Committee Members*—W. H. Hodgson, P. S. Robson (G3FYP), B. Scretion and J. Yarker (G3GJY). A society function is to be held every fortnight, the alternate meetings being "activity nights" when the club station, G3HWW, will be on the air and Morse practice given. Preparations for N.F.D. are to be discussed on April 26.

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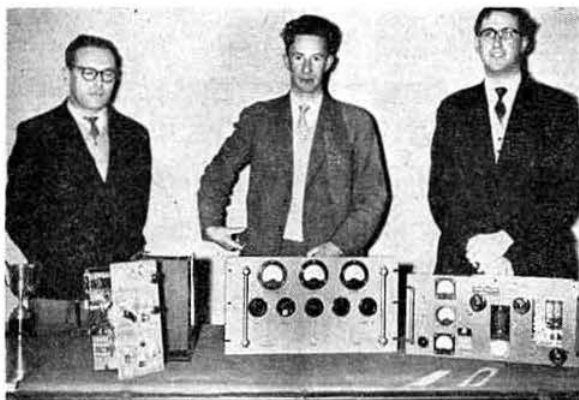


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As "Top Band" is favourite with Mobileers the 3F1F Mobile antenna is supplied complete with instructions for 160 metres. Any other coils supplied to order.

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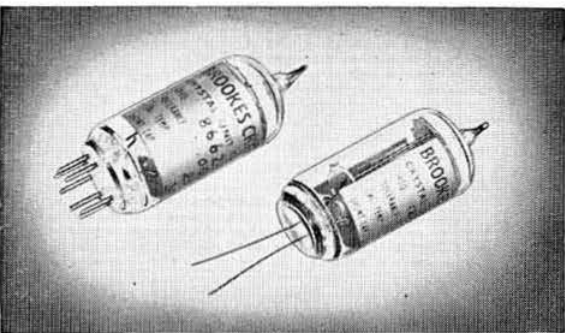
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