R S G B

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JUNE, 1960

BULLETIN

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VOL. 35, NO. 12

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Current Comment

discusses topics of the day

Technical Progress

AT the Conference of Region I I.A.R.U. Societies at present taking place in Folkestone, R.S.G.B. is presenting a number of technical papers, two of which—on RTTY and narrow band image transmission—deal with the latest communications ideas to seize the imagination of European radio amateurs. Discussions on both these subjects are further examples of the keen interest shown by amateurs in all things new. While the mind sometimes boggles at the tremendous expansion of radio, and at the speed of that expansion, the continual extension of knowledge and techniques is one of the fascinations of Amateur Radio.

Take RTTY for example. Here is a telegraphy system which enables anyone proficient with a typewriter to send and receive at more than 60 w.p.m.—a speed that even a champion c.w. operator would be unlikely to keep up for very long. But like all methods of signalling it involves its own problems for the radio amateur and that is why the Society has put the matter down for discussion at Folkestone. RTTY perhaps presents the amateur with more unfamiliar problems than most modes of operation, for some are mechanical as well as electronic. Therein lies the challenge on which Amateur Radio thrives.

This might be an opportune moment to scotch the allegations in some quarters that R.S.G.B. is " against " RTTY. The Society is of course against those high power commercial radio-teleprinter stations which consider the amateur bands fair game for their operations but so far as amateur use is concerned it is to be encouraged as yet another example of how the resourceful amateur can overcome technical difficulties.

Another new system put forward by R.S.G.B. for discussion is described in a paper on narrow band image transmission prepared at the Society's request by the British Amateur Television Club. This is a television-like method of transmitting a picture by radio using a bandwidth no greater than that required for good communications quality phone operation.

For years, amateurs have successfully transmitted high definition television of excellent quality on the u.h.f. bands but TV DX has generally meant a range of 30 or 40 miles or so. Like the rest of us, however, the amateur experimenting with television has dreamed of achieving real DX in the world wide sense, but bandwidth requirements of television have made the use of the h.f. bands impracticable. In order to reduce the bandwidth to an acceptable figure an expanded time scale is used in the narrow band image system to synthesise each complete picture. At the receiving end, the picture is reproduced on a cathode ray tube with long persistence characteristics. In this way, the picture information is stored long enough for the picture to be completed. As members who saw the demonstrations at the R.S.G.B. Radio Hobbies Exhibition last November will know, the signals can be recorded on an ordinary domestic tape recorder in the same way as other signals in the audio frequency range. The system, though complex, clearly offers an exciting new field for amateur investigation.

Another R.S.G.B. paper at the Conference is a draft specification for amateur communications receivers of the type necessary to cope with conditions now existing on the h.f. amateur bands. It is perhaps surprising to remember that the receivers in present use in the vast majority of amateur stations were designed as much as 20 or 30 years ago. Such old faithfuls as the HRO and AR88 were designed long before s.s.b. was even in use by more than a handful of amateurs and at a time when there were far fewer amateurs on the air and QRM was not the problem it is today. It also is sad to have to record that many receivers built since those days have failed to take much notice of the changed conditions on the bands.

The R.S.G.B. proposals being discussed this week at Folkestone are therefore timely, as the agreed specification which comes out of the Conference will give a considered lead to both amateurs and manufacturers. With the advent of the Common Market and the Outer Seven trade areas, the ideas should prove particularly helpful to manufacturers.

In line with the lead being offered at Folkestone, the R.S.G.B. BULLETIN will next month commence publication of an important new series of articles on receivers. With the home construction of receivers once more engaging the attention of amateurs these articles should arouse considerable interest amongst all members.

J. A. R.

National Field Day

N.F.D. is over and apart from sending in the entries, the labours of this most popular of events are ended for another year. But not for members of the Contests Committee.

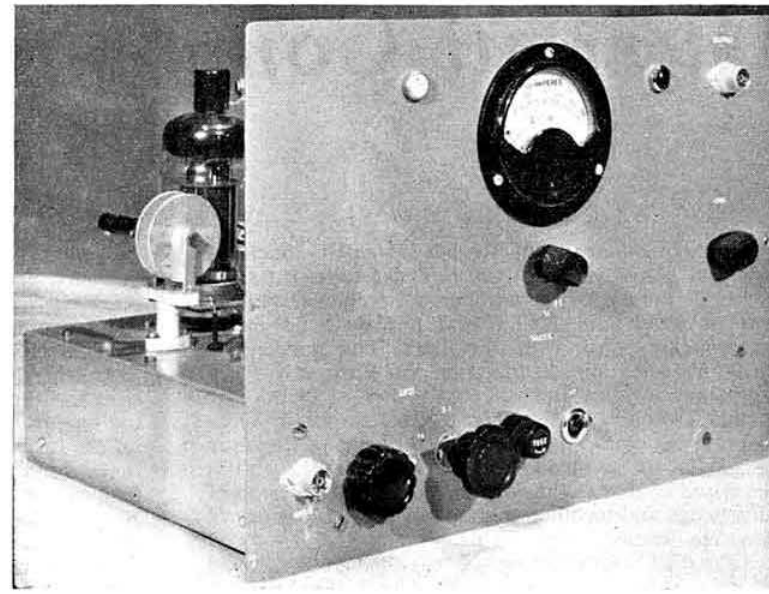
Few realize the immense amount of work put into the organization of the Society's contests programme. Preparations have to be made many months ahead—indeed some of next year's events have already engaged the Committee's attention.

Now, in the midst of the programme, come the entries for N.F.D. In the next few days a big pile of log sheets will accumulate in Headquarters and soon the arduous task of checking will commence. Besides meeting almost every week for the next two months or so, many hours will be put in by band checking groups in their own homes.

Spare a thought, then, these long summer evenings, for the members of the Contests Committee!

The TT21 Linear Amplifier

By R. F. STEVENS (G2BVN) *



A front view of the TT21 Linear. From left to right, input co-ax socket, grid circuit tuning, grid bandswitch, h.t. fuse and relay switch. Below the meter, the anode circuit tuning control with the link capacitor C3 to the right. The grid current indicator is to the left of the meter with the heater circuit pilot lamp on the other side. Output is taken from the co-ax socket at the upper right.

WHEN the unit to be described was being built the writer had little experience of single sideband techniques, and bearing in mind the possible need for modifications following experience of this mode of transmission, the requirements were that: (i) the design should be as simple as possible; (ii) alterations to the circuitry could be made readily and (iii) the components to be used should preferably be those already to hand.

After a period of testing and some months of use on the air it was found that no drastic modifications were necessary and the amplifier at present stands in its original form except that the type 807 valves originally used have been replaced by a pair of G.E.C. TT21. By virtue of its compact construction this type has shorter cathode leads than the 807 and the advantage of a screened base. No parasitics or instability have been encountered.

* 51 Pettits Lane, Romford, Essex.

Circuit

A parallel tuned high C input arrangement (Fig. 1) is used with link windings on the coils. One switch position covers

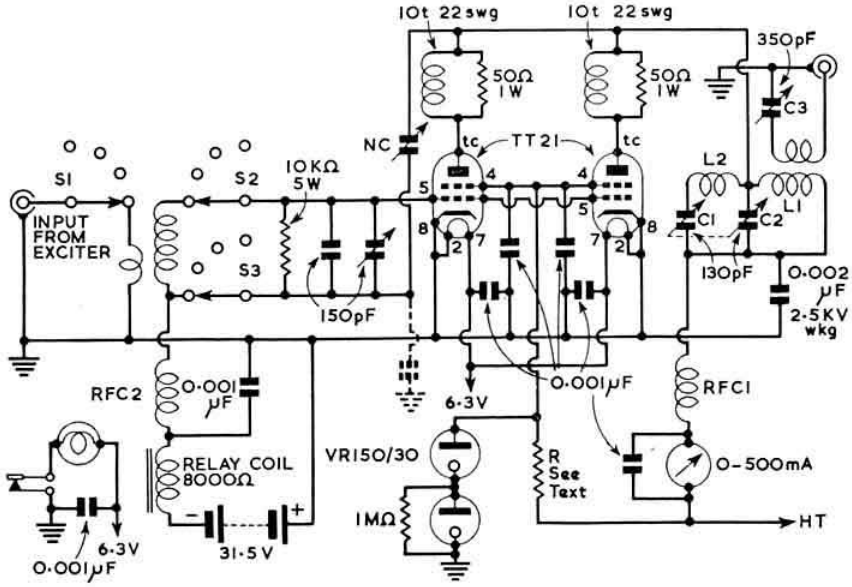


Fig. 1. Circuit of the TT21 Linear Amplifier. Details of the input coils (see text) are: 28 and 21 Mc/s —4 turns 22 s.w.g., link winding 2 turns 30 s.w.g.; 14 Mc/s—7 t. 22 s.w.g. and 3 t. 30 s.w.g.; 7 Mc/s— 11 t. 22 s.w.g. and 4 t. 30 s.w.g.; 3·5 Mc/s—30 t. 30 s.w.g. and 8 t. 30 s.w.g. (All close wound.) All 0·001μF fixed capacitors are disc ceramic type, 500 volt working. The value of the screen voltage dropping resistor R will depend upon the h.t. voltage; 20K ohms is suggested for a voltage of 800. S1, S2, S3, comprise a single pole, four-way, three-bank, ceramic switch. NC is an Eddystone neutralizing capacitor type 756 with a maximum capacity of 8 pF.

28 and 21 Mc/s with separate inductances for the remaining bands. The coils employed were of an obsolete Raymart type suitably modified but winding on other formers should not present any difficulty, particularly if a grid dip oscillator is available.

The anode circuit is unconventional in that a multi-band tuning unit is employed instead of the more common pi-network. The original information on this tuner was supplied by Norm Turnbull (VK3AXX).

The grid circuit is damped by a 10K ohm non-inductive resistor while bias is supplied by batteries which will last practically their shelf life. A sensitive relay with a coil resistance of 8000 ohms is wired in series with the lead from the battery and is used to light a 6·3 volt pilot bulb to indicate the flow of grid current. A regulated screen supply of 300 volts is derived from two VR150/30 valves mounted on the chassis of the amplifier. The circuit of the complete amplifier is shown in Fig. 1

The Eddystone neutralizing capacitor (NC) forms one arm of a bridge neutralizing circuit, the remaining arms being made up as follows: (i) the anode to control grid capacitance; (ii) the

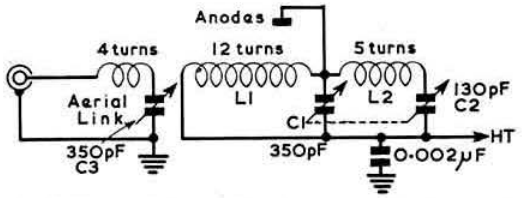


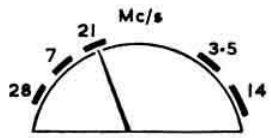
Fig. 2. Circuit of the multi-band tuner used in the output.

control grid to cathode capacitance and (iii) the self capacitance of the r.f. choke plus the stray capacitance of the associated wiring which appears in parallel with it. This is shown on the diagram in dashed lines.

Multi-band Tuner

It will be seen from Fig. 2 that if L1 is replaced by an r.f. choke, C1, C2 and L2 form a standard split-stator tank circuit. The inductance is adjusted so that the range 14 to 30 Mc/s is covered with some overlap at either end. If the r.f. choke is now removed and the coil L1 substituted (at the same time shorting out L2) the circuit is that of the usual single ended type with C1 and C2 in parallel and is adjusted to cover 3500 to 7150 kc/s. In practice, L1 and L2 are in

Fig. 3. Sequence in which the bands are tuned. Coverage of 14 Mc/s will occur at maximum capacity.



circuit at all times. Both sections of the capacitor C1 and C2 are in series on the high frequency bands and in parallel on the low frequency bands, thus providing adequate L/C ratios for linear operation.

To cover both ranges without switching, L2 acts as a long lead in the range 3500 to 7150 kc/s, whilst L1 has the same effect as an r.f. choke on the range 14 to 30 Mc/s. The sequence in which the bands are tuned is shown in Fig. 3.

Coils L1 and L2 are wound on the same 2 in. diameter former at 8 turns to the inch. L1 should be wound first followed by L2 and adjusted with a grid dip oscillator for coverage on the higher frequency range. A fixed capacitor of about 30 pF capacity should be connected in the circuit to replace the valve and stray capacities.

When the adjustment of L2 is completed alterations may be made to L1; such changes will not be reflected in L2, but

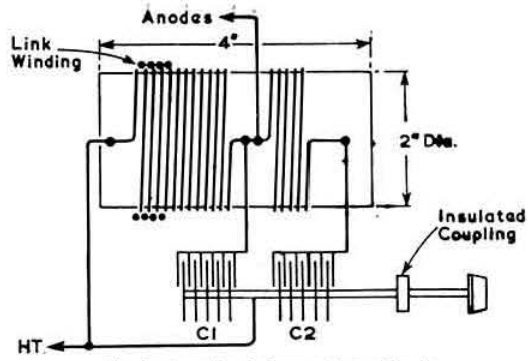


Fig. 4. Details of the multi-band coil.

the reverse does not hold. The coils should be adjusted so that 30 Mc/s and 7 Mc/s or 14 Mc/s and 3·5 Mc/s do not appear at the same dial setting. Very slight alterations to L1 and L2 will achieve the desired result. The link winding, which should be effectively insulated, is designed for working into a 72 ohm feeder and will need to be increased if a line of higher impedance is used. A variable capacitor of 350 pF in series with the link gives adequate control of the loading. The physical details of the multi-band coils are given in Fig. 4.

The split-stator capacitor should have a maximum capacity of about 130 pF per section and a reasonably low minimum capacity, with plate spacing suitable for the voltage to be used. The single section capacitors from the TA12 transmitter are very suitable after modification by removing the three centre stator plates. It should be noted that the frame of the capacitor is connected to h.t. positive, making it necessary to use insulated feet and a good insulated coupling on the shaft.

Power Supply

The anode voltage may be in the range 800 to 1000 and is obtained from an external unit via a multi-way screened cable. The maximum indicated current drawn at a voltage of 900 is 300 mA.

The h.t. supply is controlled by a toggle switch mounted on the front panel of the amplifier and connected in the earth return of a relay located in the power supply case. With this switch in the "off" position there should be no lethal voltage on the supply cable or in the amplifier unit itself. In addition to switching the h.t. supply an additional pair of contacts on the relay is used to operate a warning light on the power supply panel.

It is not necessary, and indeed inadvisable, to use more than a single section filter in the h.t. supply line, but the output capacitance should be at least 32 μF to assist in maintaining good dynamic regulation. The rectifiers may be a pair of the 866A mercury vapour type or, if these are not available, the 5R4GY is suitable.

The heater current drawn by a pair of TT21 valves is 3·2 amps, and it is essential that the voltage measured at the heater pins should be 6·3.

Construction

In common with all gear used for r.f. generation or amplification the unit should be completely enclosed, with adequate provision for ventilation. The chassis measures 12 in. × 8 in. × 2 in. but there is nothing vital in these dimensions which were selected to fit a case already available. Input and output is by coaxial cable, and all power leads are filtered and by-passed, with a large proportion of the wiring run in screened cable.

All by-pass capacitors are earthed at the nearest point on

(*Continued on page 547*)

An Improved Low Noise Crystal-Controlled Converter for 144 Mc/s

By GEORGE R. JESSOP, A.M.Brit.I.R.E., Assoc.I.E.E. (G6JP)*

IN the May 1958 issue of the R.S.G.B. BULLETIN a low-noise converter for 144 Mc/s operation was described in which the A.1714/CV408 valve was used as the neutralized input stage of a cascode pair. Since that time, an improved valve, the A.2599, has become available. This is a grounded cathode version of the well-tried grounded-grid valve type A.2521 and has a quoted noise factor at 45 Mc/s of 1·3db compared with 1·9db for the A.1714. These two valves, the A.2599 and A.2521, are probably the best pair of standard base valves available anywhere in the world for very high and ultra high frequency r.f. amplifier service.

A new 144 Mc/s converter using these types has been built and is described in the present article. The information given is not intended to be a complete constructional description but with the layout drawings provided there should be no difficulty in making a copy.

Circuit

The circuit arrangement is quite orthodox and is shown in Fig 1.

V1 (type A.2599) is the neutralized input stage, the valve being connected in a capacity bridge which is much simpler to neutralize than the more common inductive configuration. The input to V2 (type A.2521), the grounded-grid second valve of the cascode pair, is tapped down the anode circuit of the first stage, an arrangement which gives better performance compared with that in which the second stage is driven directly from the anode of the first valve.

V3 (type B.719/ECC85) is a double triode with an internal screen separating the two systems. The first section is employed as the mixer, while the second is used as a cathode follower to feed the main receiver.

The fourth valve, V4 (type B.719/ECC85) is a crystal-controlled oscillator-multiplier using either a 6 or 10 Mc/s crystal, the anode of the first triode being tuned to 30 Mc/s and the second to 120 Mc/s. The oscillator-multiplier is screened from the mixer to the grid of which it is connected through a 2·5 pF capacitor positioned in a clearance hole in the interstage screen.

Construction

The general arrangements above and below chassis are given in Fig. 2. The diagrams are drawn to scale so that they may be used for setting out the various components and locating the interstage screening. These screens are made from 18 s.w.g. aluminium sheet suitably bent; their overall height above the chassis plate is 2in.

All the components including the screening are attached to the lid of a cast alloy box, and the layout should be similar to that shown in the diagrams. If it is not, small adjustments to some of the inductances may be necessary.

With the arrangement shown, no instability has been encountered since neutralizing the input stage although the converter has been in use for nearly two years. During this time the input valve has shown no sign of damage in spite of no special precautions being taken against r.f. from the transmitter (40 watts input). The aerial changeover relay

* 32 North View, Pinner, Middlesex.

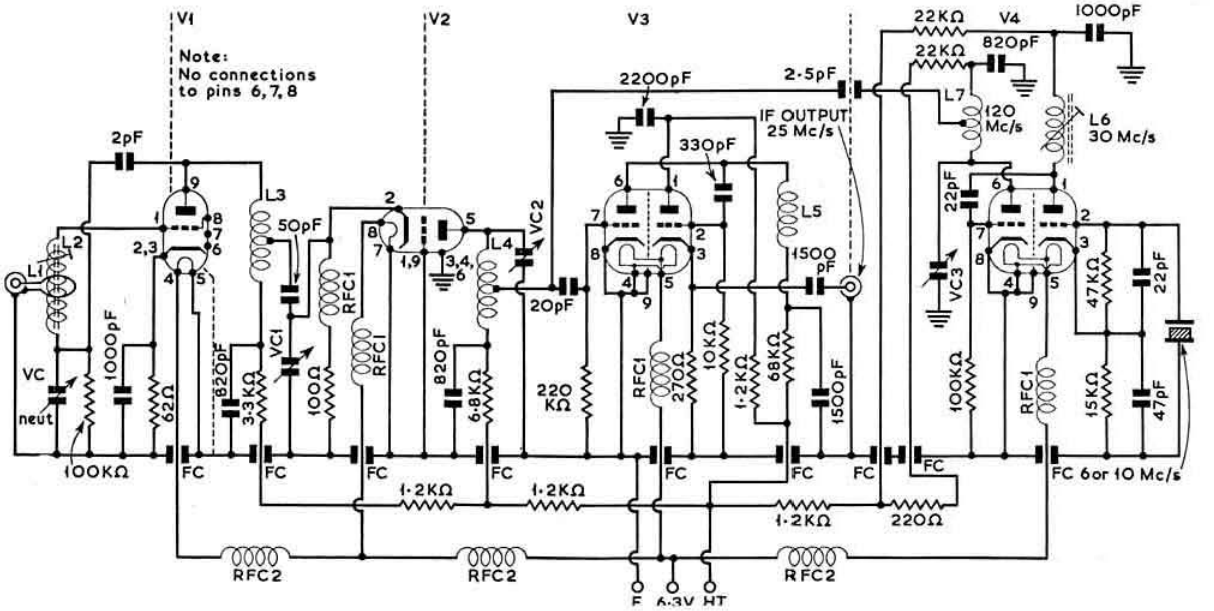


Fig. 1. Circuit diagram of the improved low-noise crystal-controlled converter for 144 Mc/s described by G6JP. The feed-through capacitors marked FC are 4700 pF. VC, VC1, VC2, VC3, are 3-9 pF adjustable capacitors (T.C.C. type CC195N); V1, A.2599 (G.E.C.); V2, A.2521 (G.E.C.); V3, B.719/ECC85 (G.E.C.). The h.t. voltage should be 150.

is in fact an open type fitted into a screening box. In the transmit position, h.t. is merely removed from the converter. However, for use with higher power transmitters it may be necessary to employ more elaborate means to protect the valve.

Inductances

The coils and r.f. chokes should be wound as follows.

L1 (aerial coupling): 1 turn of sleeved 20 s.w.g., ½ in. internal diameter, close wound.

L2 (input coil): 6½ turns 16 s.w.g. spaced one wire diameter, on ⅜ in. diameter former, resonated by half dust core similar to that used in L5.

L3 (V1 anode coil): 4¾ turns 16 s.w.g. spaced 1½ wire diameters, ⅜ in. internal diameter.

L4 (V2 anode coil): 3¾ turns 18 s.w.g. spaced 2 wire diameters, ⅜ in. internal diameter.

L5 (i.f. coil): 30 turns 26 s.w.g. close wound on $\frac{5}{16}$ in. Aladdin former type PP5938 with iron dust core.

L6 (30 Mc/s oscillator coil): 16½ turns 18 s.w.g. close wound on $\frac{13}{32}$ in. Aladdin former with iron dust core.

L7 (120 Mc/s oscillator-multiplier coil): 4½ turns 18 s.w.g. ⅜ in. internal diameter, ⅛ in. between turns.

RFC1: 26 in. (one-third of a wavelength) 26 s.w.g. enamelled, close wound on ½ watt resistor.

RFC2: 26 in. (one-third of a wavelength) 18 s.w.g. p.v.c. sleeved close wound, ¼ in. inside diameter.

Adjustment

With the various tuned circuits specified it is unlikely that

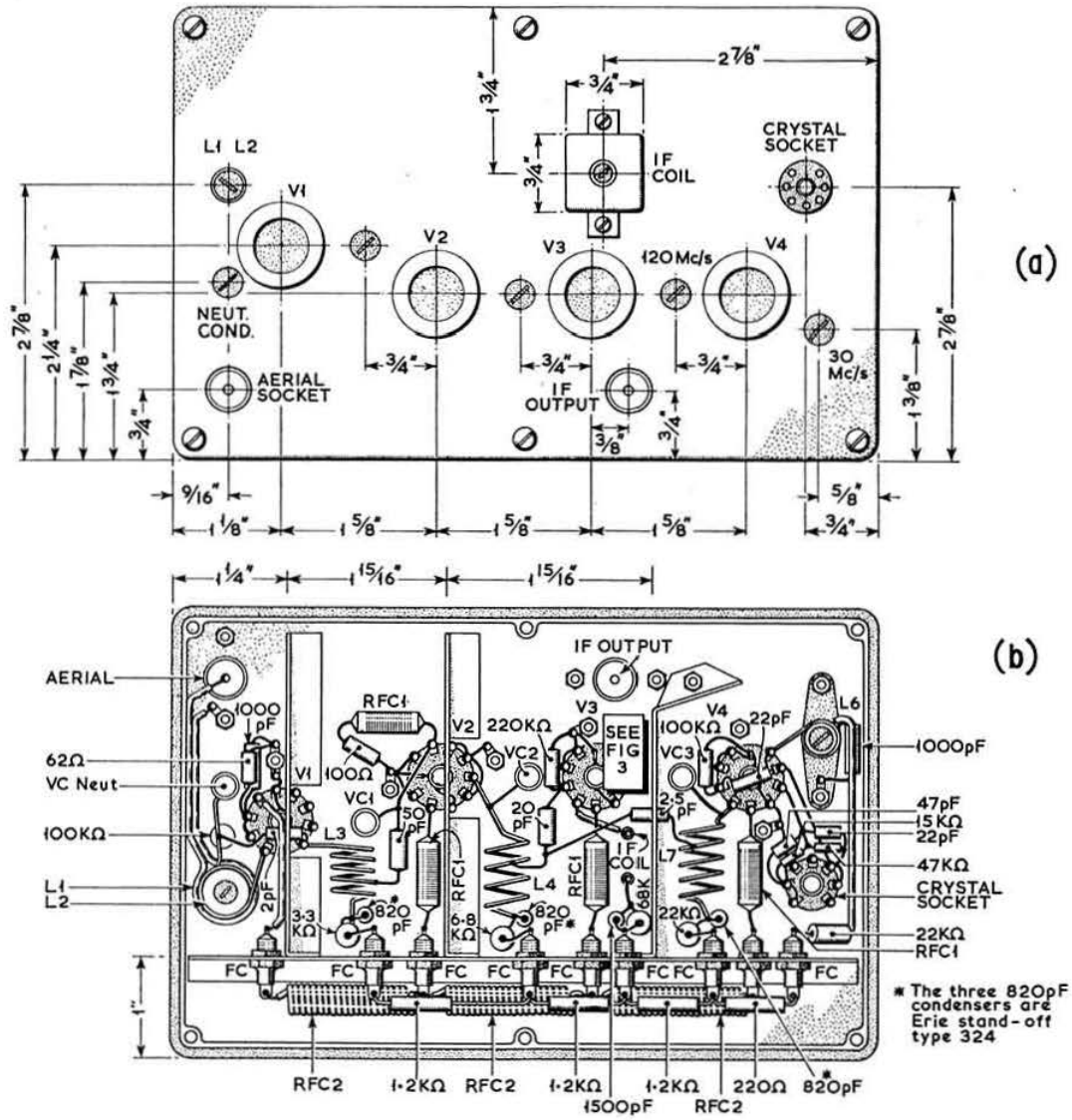


Fig. 2 (a). Above chassis layout showing the positions of the valves, i.f. coil, crystal, input and output sockets. (b) Component positions on the inside of the chassis plate.

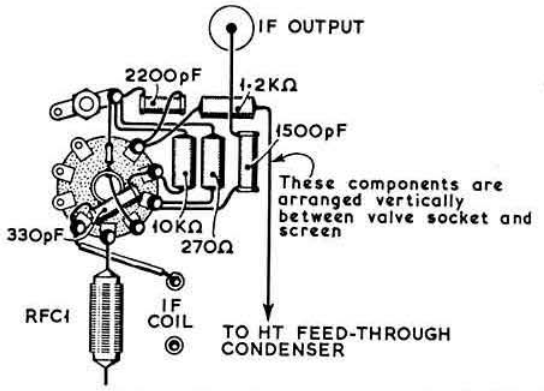


Fig. 3. Detail of the position of components associated with the second triode (cathode follower) section of V3. Most of these parts are mounted vertically one above another and cannot be clearly shown in Fig. 2 (b).

there will be any difficulty in finding the correct oscillator and multiplier frequencies. The 144 Mc/s circuits can be readily tuned up initially with the aid of a grid dip oscillator or a strong local signal. With the value of bias resistor specified for V1 the anode resistor should be adjusted so that not more than 16 mA is drawn by this valve.

Adjustment of the tuned circuits to obtain the best noise factor may next be carried using a noise generator such as that described in a previous article[1]. Although a valve type is suggested, there is of course no objection to the use of a silicon crystal noise source[2] provided it is remembered that the noise output will vary from day to day. It is however quite suitable for comparative tests. General details on the use of noise generators have been adequately described in the BULLETIN in the past[3].

Neutralizing the input stage is quite straightforward. As will be seen from the layout diagrams the variable neutralizing capacitor is adjusted from above the chassis. This component is a 3-9 pF concentric trimmer and neutralization occurs with the screw a little more than half in (about 5 to 5·5 pF).

The writer's converter has a noise factor 0·5 to 0·6db better than that of the converter described in May 1958. The measurements were made with the same noise generator.

References

[1] "A Low Noise Crystal-Controlled Converter for 144 Mc/s," G. R. Jessop (G6JP), R.S.G.B. BULLETIN, May 1958.

[2] "A Simple Noise Generator," J. A. Rouse (G2AHL), R.S.G.B. BULLETIN, December 1953.

[3] "Measurement of Noise Factor in Receivers," J. W. Mathews (G6LL) and W. H. Allen (G2UJ), R.S.G.B. BULLETIN, September 1952.

Interference Characteristics and Performance of Radio Receiving Equipment

THIS revised publication—the work of one of the British Standards Institution's many committees of experts—brings up-to-date the first (1940) edition of B.S.905, *Interference characteristics and performance of radio receiving equipment for aural and visual reproduction (excluding receivers for motor cycles and marine equipment)*. It specifies requirements which should be complied with in the design of sound radio and television receivers in order to reduce (*a*) interference caused by them and (*b*) their susceptibility to interference other than that picked up by the aerial/earth installation. It deals also with anti-interference and communal aerial systems. Methods of test for determining compliance with the various requirements of the standard are specified in detail.

The Foreword to the standard carries a recommendation on the choice of intermediate frequencies for television receivers (vision i.f. : 34·65 Mc/s; sound i.f. 38·15 Mc/s, with the oscillator frequency higher than the signal frequency), f.m. sound broadcast receivers (10·7 Mc/s with the oscillator frequency lower than the signal frequency) and combined television and f.m. sound broadcast receivers (sound i.f. : 10·7 Mc/s with the oscillator frequency lower than the signal frequency, or 38·15 Mc/s with the oscillator frequency higher than the signal frequency).

Copies of the Standard may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London, W.1, price 12s. 6d., plus postage.

Ham Hospitality in South Africa

R.S.G.B. Members visiting Durban are invited to contact C. D. Petersen (ZS5LU), 25 Ramsay Avenue, Toll Gate, Durban. (Telephone No. 882317 or, during business hours, 21703).

Technical Topics

By Pat Hawker (G3VA)

H.F. and V.H.F. Transistors – Adjustable Peak Limiter – R.F. Hazards? – Rectifier Ratings – Word Method of Learning Morse – Transistorized Morse Oscillator – 100/10 kc/s Frequency Standard – The Birdcage

IT seems no time at all since the junction transistor was regarded as an exclusively low-frequency device. Now one can seldom pick up a magazine without reading of 28, 50 and 144 Mc/s transistorized walkie-talkies, v.h.f. a.m./f.m. receivers and even fully transistorized television sets: such terms as "drift," "alloy-diffusion" and "mesa" trip lightly from the tongues of those who would blind us with science. But with world transistor production running at about 200 million units annually, the amateur cannot afford to fall behind in knowing the way around these new types of transistors.

Owing primarily to the appreciable transit-time taken by the positive "holes" in crossing the base region of the earlier alloyed junction transistors in their passage from emitter to collector, these transistors were unsuitable for h.f. applications. By skilful reduction of dimensions, however, it has for several years been possible to produce r.f. transistors with good performance up to several megacycles; modern types often have an "alpha cut-off" rating of 10 to 12 Mc/s.

This expression "alpha cut-off" ($f\alpha$) is of great importance for r.f. transistors and can mislead the unwary. It is *not*, as often thought, the upper limit at which the transistor will function; it is simply the frequency at which the transistor, if used in a common-base circuit (see Fig. 1), would have a gain 3db down (i.e., 0·7) on its low-frequency performance. While in practice this means that a transistor can be effectively used up to about this frequency as a self-oscillating mixer, regenerative detector or variable oscillator, for other functions the upper frequency limit may be very different. For example, as a fixed-frequency oscillator it can normally be used up to at least 1·25 times the alpha cut-off frequency, while as a mixer—if used with a separate oscillator—it should be quite satisfactory at twice alpha cut-off. On the other hand, for r.f. amplification in the usual common-emitter configuration, it is normal commercial practice to regard the upper limit as only about one-quarter alpha cut-off. For many amateur applications, the addition of some positive feedback—for example by the omission of neutralization—will allow useful gains well above the "one-quarter" figure. Then again, the "spread" of transistor characteristics is still very much greater than with valves and different specimens of the same nominal type may well show an alpha cut-off variation as much as three or four times! Probably the only certain way of determining whether a transistor will function at a given high-frequency is to try it and see.

To overcome the frequency limitations of alloyed junctions, various new forms of construction have been developed. The user need not be especially concerned about the exact details since in practice the final product is operated in much the same way as earlier types; the same order of potentials is applied in the same basic circuits, and the same precautions against heat and excessive voltages must be taken. We have already mentioned the "surface barrier" transistor several times in *Technical Topics*: it differs from the alloyed junction type mainly in the method of forming the junctions, and is commonly effective up to about 50 Mc/s. Surface barrier transistors are manufactured in the U.K. by Semiconductors Ltd.

Also now available at fairly reasonable prices are transistors using the "drift" and "alloy diffusion" techniques. To the layman the term "drift" is yet another misleading word, being generally associated with leisurely movement. In physics however it has the rather contrary meaning: a charged particle which "drifts" moves faster than one having random motion. A drift transistor is thus one with what may be called a built-in accelerator to speed up the movement of the charge carriers across the base region. A further cutting down of transit time can be achieved by using an alloy diffusion technique during manufacture which makes possible base regions only a few microns thick. By combining these techniques the poor little positive holes are really hurried across the base region—the result is transistors of use up into the v.h.f. region. There are now quite

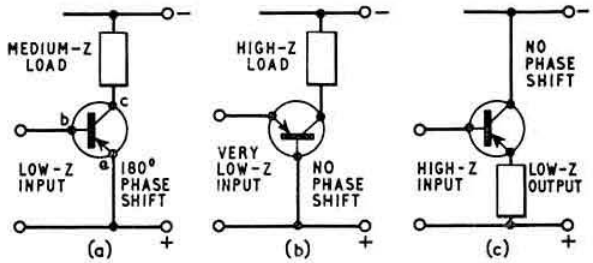


Fig. 1. The three basic transistor amplifier configurations. (a) Common emitter is most widely used for amplification. (b) Common base will operate at the highest frequency and is often used in oscillator circuits. (c) Common collector is useful for preamplifiers and other impedance transformation applications.

a number of transistors being made in the U.K. using one or both of these ideas: examples are the new Mullard OC170 (suitable as a mixer-oscillator throughout the h.f. range and costing 35/-), the Newmarket Transistors V15/20R (alpha cut-off between 20 and 75 Mc/s) and several by Ediswan-Mazda (including the XA131 which can act as an r.f. amplifier up to 100 Mc/s).

Even higher frequencies are possible with the "mesa" transistor: this uses a double-diffusion technique with diffused layers of both *n* and *p* material, though this fact may mean less to the amateur than its ability to operate up to several hundred megacycles. Mesa transistors are not yet easy to come by (or cheap) although Texas Instruments have announced several as available in production quantities: for example, the 2G102 which can be used as an r.f. amplifier up to 200 Mc/s and the 2G110 which as a power amplifier is said to provide 150 mW output at 100 Mc/s.

If you want to go much higher, then there are always the amazing tunnel diodes coming along with good performance at 4000 Mc/s. In the States, tunnel diode prices, which a few months ago were at diamond-studded levels, are already falling to around $10.

Circuit Round-up

Because most of the items this month do not require illustration, the opportunity has been taken to include

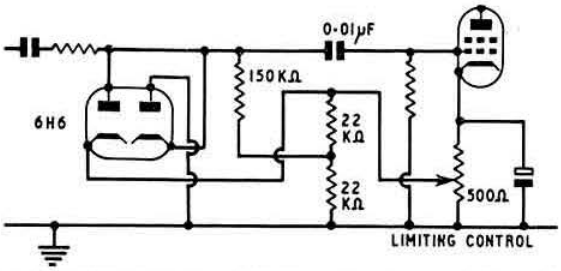


Fig. 2. VK7GC's ingenious adaptation of the shunt peak clipper for noise limiting in the output stage of a receiver. Positive peak clipping is provided by the left-hand diode, while the right-hand diode provides adjustable negative peak clipping determined by the setting of the limiting control. Values of additional components only are indicated. (Source: Amateur Radio, August 1959.)

several useful circuit diagrams (Figs. 2-5) which have come to our notice recently and which do not require lengthy explanation.

R.F. Radiation Hazards

Considerable interest has been developing over possible risks entailed in working close to powerful radio and radar transmitters. Two recent articles—"Are Radar radiations dangerous?" *British Communications and Electronics* (May, 1960) and "R.F.—Is it dangerous?" *Electronics World* (April, 1960)—survey what is at present known. It has been found, for instance, that a 200 watt transmitter can cause the death of a monkey, from excessive internal temperature, in only five minutes. For humans, it is now believed that radiation levels on frequencies between roughly 200 and 1000 Mc/s should not exceed about 0·01 watts per sq. cm. This figure may, at first sight, seem very low but fortunately, because of the operation of the inverse square law, the field of even quite high power transmitters soon falls below this figure (although for the new super power radar stations distances of up to two miles have been quoted). The danger area for a radar transmitter can be calculated from the formula $R = [(P_w \times G_æ)/(4\pi \times L)]^{\frac{1}{2}}$ where R is the safe distance in centimetres, P_w is the output power in watts, $G_æ$ is the aerial gain factor, and L is the safe radiation level.

Amateurs may well be wondering whether there is any risk of ill effects from their v.h.f. rigs. In most stations this idea can be dismissed; radiation levels in the shack are very low because of anti-TVI screening and the use of non-radiating transmission lines. Assuming a transmitter with an output of 100 watts and a 10db gain array, the danger area would seem from the above formula (which is probably not strictly applicable at short distances since a dipole element is not a point source) to work out to something under

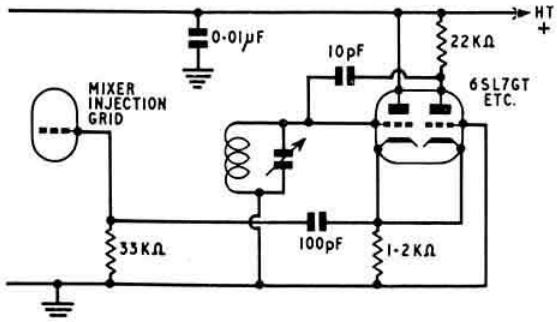


Fig. 3. The use of a cathode-coupled oscillator in a broad band mobile converter provides a stable oscillator with a simple two-terminal coil construction. (Source: CQ, April 1960.)

3 ft. in the forward direction of the array. Possibly, however, this point should be considered when actually working on v.h.f. transmitters or aerials, or where an indoor beam is used, particularly as some of the harmful effects of r.f. have not yet been fully investigated. Luckily there appears to be no question of small doses having cumulative effects, such as those of radioactive materials and X-rays.

Rectifier Ratings

The growing interest in silicon rectifiers makes it important that the amateur designer should be quite clear on what is meant by "peak inverse voltage" and how this is profoundly affected by the action of the reservoir smoothing capacitor. Without such a capacitor, the peak inverse voltage across a rectifier is simply that of the peak supply voltage, or in other words $\sqrt{2} \times E_{ac}$. But when the reservoir capacitor is connected in circuit, the p.i.v. is approximately equal to the peak d.c. output plus the peak supply voltage ($2\sqrt{2} \times E_{ac}$, or about 2·8 times the r.m.s. supply voltage).

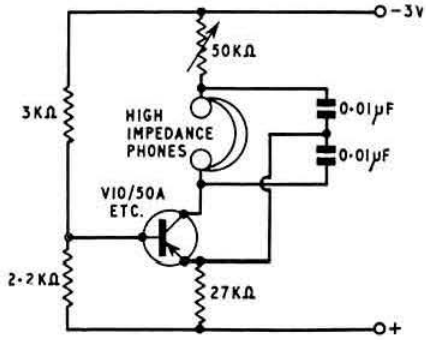


Fig. 4. Transistor Morse oscillator. (Source: T. D. Tower's lecture to the Society, October 1959.)

This explains why, for example, it is necessary to use two of the new S.T.C. silicon rectifiers (type FST1/4), which have a p.i.v. of 400 volts, connected in series for a 200 to 250 volts supply.

"Word Method" of Learning Morse

Mention recently (*Technical Topics*, January 1960) of a new system of Morse instruction brought forth an interesting letter from Mr. W. L. Hill (formerly G5WI), now living in California. He sent details of a new gramophone code course which has been developed by W6TTB who is blind. This course is believed to be unique in that, instead of starting at very slow speeds and gradually working up, the entire course is conducted with the letter formation equivalent to a minimum of 13 w.p.m., in order to eliminate the notorious 8-10 w.p.m. "hump." The training is entirely by word of mouth—there being no visual aids (which '5WI believes can confuse the learner)—combined with very accurate code sending. At first single letters are given, then easy words and so to more complex words and figures. The final sixth side of the three records is purely code practice with no speech. The three records play for some 2½ hours or could be speeded up for high-speed practice. W6TTB markets these discs under the label Epsilon Records, Redwood City, California at $10 the album. Perhaps we should add that ex-G5WI has no financial connection with this venture (nor unfortunately has G3VA) but feels strongly that this system represents a real advance in Morse teaching methods and would like to see the course taken up in the United Kingdom.

Also Noted

G4ZU describes his happily-named "Birdcage" aerial in *CQ*, April, 1960. Strong claims are made for this interesting new array, including a 10db gain, a relatively simple mechanical structure (in effect two X's one above the other with

the ends joined with wire) and only a limited space needed for erection and rotation. One-wavelength loop elements of the quad type are used as radiator and reflector and in appearance it is not unlike the traditional Bellini-Tosi d.f. aerial except that each loop, which may be square or circular, does not cross but is bent back in the form of two stacked V-dipoles. Single and multi-band versions using the same loops are described. Now it only remains for someone to come up with a modern radio-goniometer which would make it unnecessary to rotate the aerial! . . . U.S. amateur authorizations rose from 188,600 in 1958 to nearly 203,000 in 1959. The Citizens Radio Service increased by some 27,800 to 70,000. . . . An interesting valve development in the States is a low-noise pentode (6FG5) using a " shadow grid " to reduce partition noise, while maintaining the high gain of a pentode. After the control grid, the electron flow is concentrated by an electrostatic field into streams which pass accurately between the mesh of the screen grid without striking it. . . . An Australian amateur was recently reported for causing TVI in a " fringe area "—the nearest television station was 700 miles away!

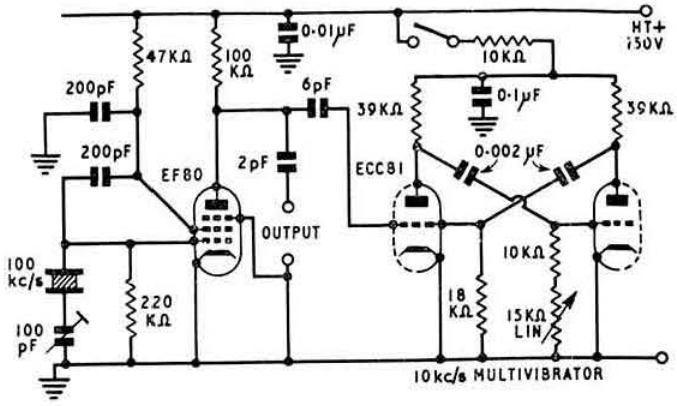


Fig. 5. A useful frequency standard designed by DJ3JV using miniature valves. It provides calibration markers every 100 or 10 kc/s provided the 10 kc/s multivibrator is correctly adjusted. The 100 pF trimmer should be adjusted on the long wave Light Programme transmission. (Source: DL-QTC, March 1960.)

New Equipment

THE ELECTRONIC DEVICES EL-BUGS

SINCE the original transistorized electronic key manufactured by Electronic Devices (Cheltenham) Ltd. was reviewed in the R.S.G.B. BULLETIN for May 1959, the firm has expanded the range and four units are now available. Type 1 is an improved version of the original key and is fitted with a netting switch and variable speed control. Type 2 is basically a Type 1 key with the addition of a switchable fixed frequency tone monitor which feeds a miniature built-in loudspeaker. Type 3 incorporates a variable frequency monitor with a built-in loudspeaker and controls for varying the mark/space ratio. Type 4 is similar to the Type 3 except that the internal loudspeaker is omitted and provision made for monitoring through headphones. A separate pair of leads can be fitted with the requisite jack plug and inserted into the receiver phone jack, the headphones then being inserted into a socket fitted to the key. Incoming signals are audible through the phones and when the key is operated a keyed tone is superimposed.

In addition to the electronic keys, two types of transistorized audio frequency oscillators are available and are suitable for Morse code training; if a source of rectified r.f. were substituted for the internal battery, these units could be used for monitoring c.w. transmissions.

All the keys are housed in steel cases, finished in silver grey hammertone, and measure 3¾ in. by 2¼ in. by 5½ in. Fitted with internal 4·5 volt dry batteries from which there is only a small drain when keying, the units are equally suitable for use at a home station or during portable operation such as N.F.D.

Keys of Types 2 and 4 have been tested over a considerable period and the only criticisms worthy of mention are that (i) nearly all of the range obtainable with the speed control is compressed into half of the sweep of the potentiometer, and (ii) the output of the monitor in the Type 4 key appears to be of relatively low impedance and the volume delivered into a pair of high impedance (4,000 ohms) headphones is barely sufficient.

The keys tested were of excellent finish and construction and can be recommended. The prices range from £5/15/- to £11/10/- and full details can be obtained from the manufacturer: Electronic Devices (Cheltenham) Ltd., of Wellington Road, Cheltenham, Glos.—R. F. S.

Radio Frequency Radiation

THE Postmaster General, the Rt. Hon. Reginald Bevins, M.P., has announced that the inter-departmental committee on possible hazards to health from intense radio frequency radiation has now made its Report. The committee recommends safety precautions to be taken at radio transmitting stations and other establishments where such radiation is generated. The recommendations are to be put on sale soon by Her Majesty's Stationery Office.

This matter first came to public notice in 1958, when the Secretary of State for Air and the Postmaster General were asked in the House of Commons about possible hazards from stations using " forward-scatter." The replies emphasized that there was no danger to the public from any existing stations of this type.

The radiation in question is similar to that sometimes used for industrial and medical heating. It must not be confused with ionizing radiation such as is given off by radio-active substances.

" Break-in Operation with the Geloso Signal Shifter "

DURING editorial preparation of the article " Break-in Operation with the Geloso Signal Shifter," published in the March issue of the BULLETIN, an error was introduced in lines 19-22 of the paragraph headed " Keying Circuit " on page 405. The sentence should read, " In this way the oscillator *starts* functioning a fraction of a second before the buffer, obviating any possible chirp."

"A Versatile Grid Dip Oscillator "

MEMBERS who experience difficulty in obtaining the cores and formers specified for L1, L2 and L3 in the article published in the April 1960 issue of the R.S.G.B. BULLETIN may like to know that these items are available from stock from Salford Electrical Instruments Ltd., Components Group, Times Mill, Heywood, Lancashire.

" Radio Amateurs' Notebook "

THE *Voice of America* Radio Amateurs' Notebook programme is now broadcast on Sundays between 21.15 and 21.30 G.M.T. (3980, 6185, 9520, 9620, 15,205 and 21,505 kc/s) and between 22.15 and 22.30 G.M.T. (173, 1196, 3980, 6185, 9520, 9620 and 11,875 kc/s).

Noise Factor

BY R. A. STEVENS, M.Sc.(Eng.), A.M.I.E.E. (GW3GQM)*

NOISE produced within an r.f. amplifier is responsible for a reduction in signal-to-noise ratio and is especially apparent at very high frequencies. Noise factor is a measure of this effect and a simple explanation is given in this article.

Below about 20 Mc/s atmospheric noise is usually high and sets a limit to the weakest readable signals. As the frequency increases above about 30 Mc/s the amplifier valve noise tends to rise rapidly. For these two reasons valve noise sets the limit at v.h.f. for weak signal reception. As an example, consider an r.f. amplifier having a signal input of 1 microwatt and a noise input of 0·1 microwatt, then the signal-to-noise ratio is 10 : 1. If the equivalent noise power of the amplifier is 1 microwatt referred to its input, then the total noise input is 1·1 microwatt, and the signal-to-noise ratio is 1 : 1·1 at the output of the amplifier, as both signal and noise are amplified equally.

Sources of Noise

Assuming that there are no bad connections and that noise from the power supplies is negligible, the main sources of noise in an amplifier are thermal agitation noise in resistances and shot noise in valves. The first of these is produced in all resistances whatever their nature including the radiation resistance of an aerial. When electrons pass through a conductor they collide with the atoms of the conductor material so that there are slight fluctuations in the flow, which appear as a noise voltage across the resistance of the conductor. When the temperature of a body rises, the atoms

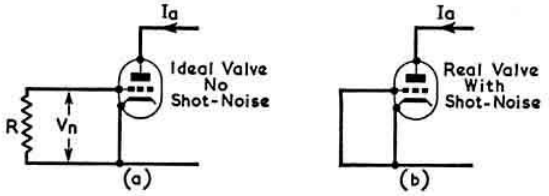


Fig. 1. If the noise component of I_a in (a) and (b) is the same then R is the equivalent noise resistance of the valve.

in it vibrate more rapidly leading to more collisions, hence the noise voltage rises with temperature.

Shot noise is due to the fact that current flowing in a valve arrives at the anode as an electron stream and every time an electron arrives at the anode a tiny noise pulse is produced; as vast numbers are involved, a noise voltage is generated. Shot noise is usually described in terms of the equivalent noise resistance. If a resistor is connected between grid and cathode of an ideal valve (Fig. 1a), having no shot noise, the noise voltage set up across the resistor by thermal agitation will cause the anode current to vary. If the value of the resistor is so chosen that this variation is the same as that produced by shot effect in a real valve, then its resistance is the equivalent noise resistance r_n of the valve.

Shot noise depends very much on valve design and valve type: it is least for diodes and increases for triodes and still more for tetrodes due to the splitting up of the electron stream (partition noise), although by careful design the noise can be reduced. For example, in tetrodes if the screen grid wires are placed in the shadow of the control grid wires, the screen-grid current is reduced and a big improvement results.

Performance of First Stage

The performance of the first stage is of vital importance in the design of a low noise amplifier. This is illustrated in Fig. 2. The first stage in this amplifier generates noise that is equivalent to 1 μV at its input. As the voltage gain is ten the noise output would be 10 μV in the absence of signals. With a 10 μV signal the signal output would be 100 μV. If the aerial noise were 1 μV it would be amplified to 10 μV at the output of the first stage so that the total noise at this point would be given by:

$$V = \sqrt{10^2 + 10^2}\ \mu V$$
$$= 14{\cdot}14\ \mu V \qquad \text{(See Appendix)}$$

Hence the signal-to-noise voltage ratio at this point is 100 : 14·14 or 7 : 1 instead of 10 : 1 at the input.

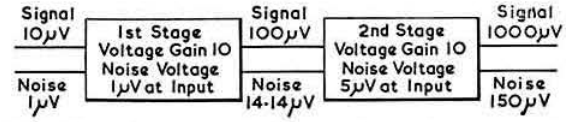


Fig. 2. The performance of the first stage in a receiver is vital as the diagram shows.

The signal output of the second stage is 1000 μV and its noise output is:

$$V = \sqrt{(141{\cdot}4)^2 + (50)^2}\ \mu V$$
$$= 150\ \mu V$$

The signal-to-noise voltage ratio at this point then is 1000: 150 or 6·67 : 1, showing that the second stage, even though it generates five times the noise of the first, has little effect on the overall signal-to-noise ratio. If other values are tried it will be seen that this is true provided that the first stage has low noise and reasonable gain. It is thus the first stage that is of prime importance in the design of a low noise amplifier.

Noise Factor

Noise factor is a measure of the way in which the signal-to-noise ratio in an amplifier is degraded by the noise generated within the amplifier itself.

As stated previously a receiving aerial possesses radiation resistance and will therefore give rise to thermal agitation noise. In the case of a receiver designed for an 80 ohm impedance input, this would be the thermal agitation noise in a resistance of 80 ohms which could be of the order of 1 μV. Even if the receiver were perfect and generated no noise, and there were no atmospheric noise, a limit to the weakest signal readable would be set by this thermal agitation noise in the aerial.

Assuming that the noise actually picked up by the aerial is small compared with its thermal agitation noise, which is a reasonable assumption at v.h.f., the signal-to-noise ratio at the receiver input is given by

$$\frac{\text{Signal power at receiver input}}{\text{Aerial thermal agitation noise at receiver input}}$$
$$= \frac{\text{Signal power at receiver input}}{\text{Thermal agitation noise power in design input resistance}}$$

Noise factor can be defined as the number of times the signal-to-noise power ratio at the input is better than the signal-to-noise power ratio at the output of an amplifier. That is:

$$F = \frac{\text{Signal-to-noise power ratio at input}}{\text{Signal-to-noise power ratio at output}}$$

Or in decibels $\quad K_n = 10 \log_{10} F$ db.

That is if F is 2, K_n is 3db; if F is 10, K_n is 10db; if F is 20, K_n is 13db, and so on either from logarithm tables or decibel conversion tables.

Another definition which can be shown to be equivalent to the one above (see Appendix) is: F is the number of times the input signal power must be greater than the

*65 Dan-y-Graig, Whitchurch, Cardiff.

input noise power for the signal-to-noise power ratio at the amplifier output to be 1 : 1. It will be noticed that amplifier output and not receiver output is specified. The reason for this is that the second detector is usually a square-law device, at least for small signals, so that its output is not directly proportional to its input.

Giving one or two examples: If an amplifier has no internal noise the noise factor is 1 or 0db; if the noise factor is 5 (7db) it means that the signal-to-noise power ratio at the input must be five times greater for a given signal-to-noise ratio at the output than in an amplifier with no internal noise; that is the signal must be increased by 7db.

In the example quoted earlier on, $F = \frac{10/1}{1/1 \cdot 1} = 11$ or 10·8db.

Effects of Frequency

As the frequency rises noise factor also rises; for example, at 30 Mc/s the noise factor of an amplifier using an EF54 pentode would be about 3 (4·8db), while at 145 Mc/s it would be about 10 (10db). That is for the same signal-to-noise ratio at the two frequencies, the signal power, and therefore either the transmitter power or the aerial gain must be increased $\frac{10}{3} = 3{\cdot}3$ times (or $10 - 4{\cdot}8 = 5{\cdot}2$db) which is an expensive proposition especially at v.h.f.

Even the most carefully designed tetrodes and pentodes do not improve very much on these figures and they are not therefore used at v.h.f. This leads to the use of the triode as an r.f. amplifier at such frequencies. A well-designed triode r.f. amplifier at 145 Mc/s will have a noise factor approaching 3 or better than 5db. This figure is obtainable using any of the three possible arrangements, namely, grounded grid, neutralized grounded cathode or the cascode connection. At 420 Mc/s a grounded grid amplifier can be made having a noise factor of the order of 4 (6db). At this and still higher frequencies it is common practice to dispense with r.f. amplifiers and use crystal-diode mixers which have very low noise factors, but it must be borne in mind that there is no gain with this type of mixer, hence the noise of the first i.f. amplifier stage is important. If the i.f. is higher than about 50 Mc/s it is necessary to use a low noise triode as the first i.f. amplifier, especially if the bandwidth is wide.

Appendix

Thermal Agitation

Thermal agitation noise voltage is given by:

$$V^2 = 4KBTR$$

Where K is Boltzman's constant, $1{\cdot}38 \times 10^{-23}$,
B is the bandwidth in c/s,
T is the absolute temperature, $T = (273 + t)$ where t is °C.,
R is the resistance in ohms.

For an 80 ohm resistance at 17°C. (62·6°F.) or 290° absolute and a bandwidth of 8 kc/s the voltage is about 1 μV.

Addition of Noise Voltages

When a voltage V is developed across a resistance R the power developed is given by $P = \frac{V^2}{R}$. Hence if the input noise to an amplifier is V_1 and the noise generated by the amplifier itself is V_2, referred to its input, the total noise power is $P = \frac{V_1^2}{R} + \frac{V_2^2}{R}$ where R is the input resistance. If the total effective voltage is V, then the total power P is $\frac{V^2}{R}$

therefore $$\frac{V^2}{R} = \frac{V_1^2}{R} + \frac{V_2^2}{R}$$

from which $$V = \sqrt{V_1^2 + V_2^2}$$

Noise Factor

By definition noise factor

$$F = \frac{\text{Signal-to-noise power ratio at input}}{\text{Signal-to-noise power ratio at output}}$$

If the signal input power is S_i the signal output is AS_i where A is the power amplification. If the noise power input is N_i and the amplifier noise power is N_a, referred to the input, the noise power output is $A(N_i + N_a)$.

Then the input signal-to-noise ratio is $\frac{S_i}{N_i}$ . . . (1)

And the output signal-to-noise ratio is

$$\frac{A\,S_i}{A\,(N_i + N_a)} = \frac{S_i}{(N_i + N_a)} \quad \ldots (2)$$

Therefore $$F = \frac{S_i}{N_i} \Big/ \frac{S_i}{N_i + N_a}$$

$$= \frac{N_i + N_a}{N_i} = 1 + \frac{N_a}{N_i} \quad \ldots (3)$$

If the input signal power is this number of times the input noise power the output signal-to-noise ratio becomes:

$$\frac{N_i \dfrac{N_i + N_a}{N_i}}{N_i + N_a} = \frac{N_i}{N_i} = 1$$

which agrees with the second definition given in the text.

A third alternative follows. If the signal input is increased F times to FS_i the output signal-to-noise ratio becomes, from (2) and (3),

$$\frac{S_i \dfrac{N_i + N_a}{N_i}}{N_i + N_a} = \frac{S_i}{N_i}$$

which is the input signal-to-noise ratio before the signal increase. It follows then that the noise factor is the number of times by which the signal power must be increased for the signal-to-noise ratio at the output of the amplifier to be the same as it would be without any amplifier noise.

References

Moxon, L.A. "Recent Advances in Radio Receivers," Cambridge, 1949.

Moxon, L. A. "Noise Factor," *Wireless World*, December, 1946, January 1947.

"Measurement of Noise Factor," *QST*, August 1949, p. 20.

Williams and Gore, "Design and Performance of a New Low-Noise Triode for use up to 1000 Mc/s," *Proc. I.E.E.*, Part B, January 1959.

The European Band Plan

The Plan, which is voluntary and supported by all I.A.R.U. Societies in Europe, is as follows:

Frequency Band	Type of Emission
3500— 3600 kc/s	Telegraphy only
3600— 3800 kc/s	Telephony only
7000— 7050 kc/s	Telegraphy only
7050— 7150 kc/s†	Telegraphy and Telephony
14000—14100 kc/s	Telegraphy only
14100—14350 kc/s	Telegraphy and Telephony
21000—21150 kc/s	Telegraphy only
21150—21450 kc/s	Telegraphy and Telephony
28000—28200 kc/s	Telegraphy only
28200—30000 kc/s	Telegraphy and Telephony

†7100—7150 kc/s shared with broadcasting which has priority

Mobile Column

By JOHN A. ROUSE (G2AHL/M)*

THERE are now so many mobile rallies that comprehensive reports on all of them are no longer possible. However, a few words may not be out of place.

This year, the season opened with the Amateur Radio Mobile Society's rally at Overstone Solarium, near Northampton, on April 10. Despite cold and windy weather about 50 mobiles attended, by no means a poor attendance in view of conditions.

There was brilliant sunshine all day for the North Midlands Mobile Rally at Trentham Gardens, near Stoke-on-Trent, on April 24 and this probably contributed to the record attendance—in the region of 1,500. Certainly far more "signed in" than ever before and although considerably greater indoor space was available, it seemed more crowded than ever. This event is now one of the highlights of the Amateur Radio year: an amalgam of mobile meeting and hamfest, it seems to have something for everyone and this coupled with the excellent facilities available attracts visitors from considerable distances.

More than 100 mobiles journeyed to Montpellier Gardens for the Cheltenham Mobile Rally on May 8. Once again,

G3IER operating the 144 Mc/s talk-in station at the Cheltenham Mobile Rally on May 8.

G6NW/M won the mobile contest in the Cotswolds with G3LOV/M second and G5PP/M third. The Rally is considered to have been the best of the series so far.

A cliff top site overlooking Pegwell Bay was the venue for the Thanet Mobile Rally, also held on May 8. About 40 cars attended the event and talk-in facilities were provided on Top Band and 2m.

Fifty-three Top Band and eight 2m mobiles visited the Atomic Energy Research Establishment on May 15 for the Harwell Mobile Rally and Hamfest, the total attendance being more than 260 people. The major item on the programme was a conducted tour of parts of the site for those who had applied early enough. After an introductory talk in the Cockroft Hall Lecture Theatre, visitors saw BEPO (British Experimental Pile), a graphite-moderated pile used for a wide variety of nuclear experiments, and for the production each year of several million pounds worth of radio-isotopes for medical and industrial use. Visitors were shown how radio-active substances are handled behind lead-glass windows, as well as the effects of irradiation in preserving food and other materials. This rally was the first organized

* *Deputy Editor, R.S.G.B. Bulletin.*

AMATEUR RADIO MOBILE SOCIETY RALLY

Transmitting Site of R.A.F. Croughton at Barford St. John, near Banbury

(By permission of Lt.-Col. Fred W. Harshfield, U.S.A.F., and the Air Ministry.)

Sunday, June 19, 1960

RALLY STATIONS

Top Band—G3NMS/P H.F. Bands—G8KW/A (s.s.b.)
Two Metres—G3HTC/P

Visits to the Transmitter Hall of the U.S.A.F. Station. Picnic meals should be taken as only light drinks will be available. Covered accommodation in case of rain. There is a speed limit of 20 m.p.h. on the base.

(Barford St. John is within the area bounded by the A41/A423 Banbury to Deddington road, the A361 on the west side and the B4031 on the south side. Follow the A.A. signs.)

Organized by the Amateur Radio Mobile Society.

LONGLEAT MOBILE RALLY

Longleat House, near Warminster, Wiltshire

(Between Frome and Warminster on the A362 road.)

Sunday, June 26, 1960

RALLY STATIONS

1900 kc/s—G3CHW/A 145·3 Mc/s—G3FKO/A will be on the air from 10 a.m.

Grounds open from 10 a.m. to 6 p.m. Admission to Rally 1/-. Full catering facilities without prior booking.

Organized by the City and County of Bristol R.S.G.B. Group.

HARLOW MOBILE RALLY

Village Hall, Magdalen Laver, near Harlow, Essex

Sunday, July 3, 1960

RALLY STATIONS

1·8 Mc/s—G3ERN/P 144 Mc/s—G3JMA/P

Organized by Harlow and District Radio Society.

SOUTH SHIELDS MOBILE RALLY

Bents Park Recreation Ground, South Foreshore, South Shields, Co. Durham

Sunday, July 10, 1960

RALLY STATION

G3KZZ/A on 1980 kc/s

Reserved car park open from 11 a.m. to 6 p.m. Refreshments available on the Rally site or at the nearby beach. Further details from R. Ray (G3NCL), 16 Holystone Avenue, Gosforth, Newcastle 3.

Organized by the South Shields and District Amateur Radio Society.

SOUTHERN COUNTIES MOBILE RALLY

Beaulieu Abbey, near Lymington, Hampshire

Sunday, July 17, 1960

RALLY STATIONS

1980 kc/s—G3IVP/A 144·14 Mc/s—G2HIF/A will be on the air from 10.30 a.m. to 8 p.m.

Lunches (6/6) and teas (3/6) in the Domus Restaurant must be booked in advance with R. Bassett (B.R.S.16075), 42 Norham Avenue, Shirley, Southampton, not later than July 9, 1960. Applications should be accompanied by s.a.e.

Organized by the Southampton R.S.G.B. Group and Bournemouth and District Amateur Radio Society.

by the A.E.R.E. Harwell Amateur Radio Society and it is to be hoped that is the first of many.

The third Northern Mobile Rally at Harewood House, near Harrogate, attracted more than 150 mobiles; according to the *Yorkshire Post*, G3LDJ/M's scooter-mounted station created the most interest.

Future Rallies

After a brief respite over the Whitsun and N.F.D. week-ends, the ardent rally-goer has plenty to occupy his attention in the coming weeks. On June 19, the Amateur Radio Mobile Society is holding a rally at the U.S.A.F. station at Barford St. John. Cameras will be allowed on the base but not in the transmitter hall where, it is understood, a great deal of the latest s.s.b. equipment will be on show. On the programme are technical and non-technical competitions, a demonstration baseball game and raffles.

The Longleat Rally the following Sunday, June 26, needs no introduction but in amplification of the details in the box it may be mentioned that there will again be displays of Morris Dancing by the English Folk Dance and Song Society (Wiltshire Group), a grand *free* draw and prizes and certificates for (i) the mobile operator travelling the greatest distance *to and from home* on the day of the rally, (ii) the longest distance mobile-to-mobile contacts on 2m and 16m, (iii) the mobile recording the highest field strength at the control station from a selected site in the grounds and (iv) the winning mobile in the concours d'elegance. Lord Bath will present the awards personally at 4.30 p.m.

The South Shields Rally on July 10 will again provide a meeting place for mobile enthusiasts and their families in the north-east of England. As at Longleat, prizes will be awarded to the visitor travelling the longest distance to and from home on the day of the Rally and the longest distance mobile-to-control contact. There will also be a mobile equipment competition.

The organizers of the Southern Counties Rally on July 17 are fortunate in having found a venue with a difference: the Montagu Vintage Car Museum at Beaulieu Abbey should prove a great attraction. Other items on the programme include a mobile treasure hunt, boat trips on the river and lunches and teas at special rates for those who book in advance.

G.D.O. for Mobile Work

Adjusting mobile aerials to frequency is facilitated by the use of a grid dip oscillator but most of these instruments require an a.c. mains supply for power. The circuit of a very simple device found in an issue of *Radio and Television News* of some years ago, is shown in Fig. 1. It uses a 12BH7 valve and requires only 12 volts from the car battery for satisfactory operation.

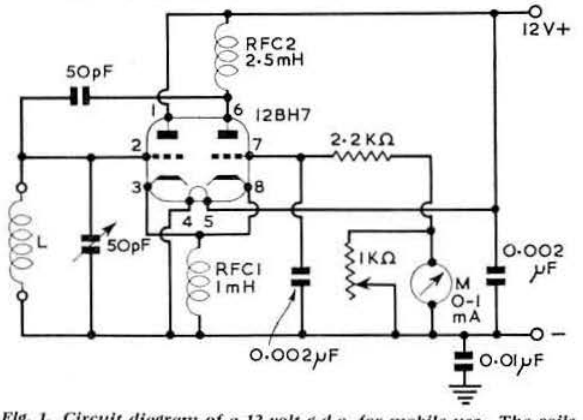


Fig. 1. Circuit diagram of a 12 volt g.d.o. for mobile use. The coils should be wound on 1 in. dia. formers as follows: 1.8-3 Mc/s, 80 turns 30 s.w.g.; 3-6 Mc/s, 40 turns 28 s.w.g.; 10-18 Mc/s, 12 turns 20 sw.g.; 18-32 Mc/s, 5 turns 18 s.w.g.

Items for inclusion in *Mobile Column* are most welcome, and should be sent to R.S.G.B. Headquarters.

Among those who attended the Northern Mobile Rally at Harewood House, near Harrogate, on May 22, 1960, were (left to right) K. Sutton, G3FWL, J. R. Petty, G4JW (Regional Representative), H. T. Littlewood, G2XY, P. H. Wade, G2BPJ (Zonal Representative) and J. Spivey, G2HHV. (Photo by G2BPJ).

The TT21 Linear Amplifier (Continued from page 537)

the chassis and the cathode leads are short and made from coaxial cable braid.

The grid coils and tuning capacitor are located beneath the chassis thus providing screening and short leads, with the larger multi-band tank components above the chassis adjacent to the anode top connections of the TT21 valves.

Testing

After completion of construction the usual continuity and resistance checks should be made, followed by voltage and current checks with the unit running on reduced h.t. voltage and feeding a non-inductive dummy load. Subsequently a visual inspection of the linearity may be made by the 45 degree line method, utilizing demodulators connected to the input and output of the amplifier in the method described by J. W. Govier (W8QNW) in *CQ* for March 1958. The more usual waveform or trapezoid pattern checks could, of course, be used.

The TT21 valves should operate in class AB1 and any attempt to drive them too hard will result in unacceptable distortion. With miniature batteries of 22·5 volts and 9 volts in series the standing anode current was 75mA in the writer's amplifier. Reference should be made to page 349 of the R.S.G.B. BULLETIN for February 1960 where the method of determining maximum licensed input is described.

After some experience with the amplifier described it is felt that a built-in monitoring device would have been useful, and any future unit of this type will probably incorporate an Etel 1CP1 1 in. diameter tube which seems ideal for this purpose.

Results

Used in conjunction with a filter exciter using a type N709 (6BQ5) in the final class A amplifier, the writer has had two-way s.s.b. contacts on the 14 Mc/s band with nearly 50 countries. Reports on the transmission have always been pleasing. Although but a recent convert to the "language" of Donald Duck and Mickey Mouse it is confidently asserted that all those who choose to dispense with their carriers will not regret the step.

Auroral Research at the Hillhead Experimental Station

A feature of the recent North of Scotland O.R.M. and Hamfest was a visit to the Auroral Research Station on the Moray Firth. In this article culled from official sources some interesting information is given about the work of the station. Among the engineers currently on duty at the station are at least three with U.S. amateur calls.

A radio-telescope has been installed at Hillhead Experimental Station, Aberdeenshire, in order to study the effects of the aurora on the propagation of radio waves. The method uses a radio transmitter to bounce echoes back from the aurora, so that a study of the reflected signals yields information relating to the properties of the echo regions. The work is basic research designed to increase our understanding of the nature of the aurora, and contribute to knowledge of the ionosphere. Investigations of these phenomena are in progress at many centres but the site in Northern Scotland is particularly suitable for a study of radio reflections from the aurora because it is so close to the region of maximum auroral occurrence. In addition the geometry of the earth's magnetic field is favourable.

The Hillhead radio telescope was designed, engineered, and installed by Stanford Research Institute of California. The equipment at Hillhead is operated by a small team of engineers from the Institute's Communications and Propagation Laboratory. Scientists from the Royal Radar Establishment, Ministry of Aviation, collaborate in the experiments.

Description of the Equipment

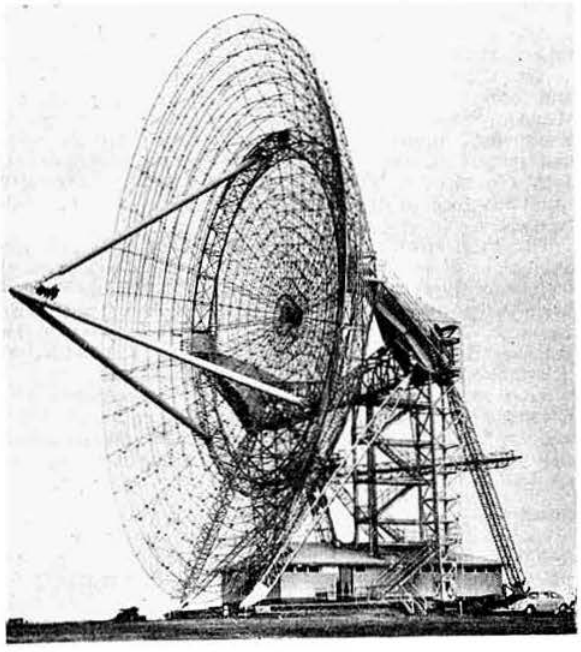
The radar aerial is a 142 ft. parabolic reflector supported on an altitude-azimuth type mount. It is unique in that the entire radar electronics complement is installed in a cabin mounted on the hexagonal undercarriage of the rotating structure. The assembly rotates about a centre hub but the weight is carried by six double-wheeled trucks rolling around a track which consists of a flat ¾ in. thick steel plate supported on a concrete foundation anchored to the bed-rock beneath.

The front surface of the parabolic reflector, or dish, which forms the reflecting screen, is made of light aluminium mesh in order to reduce the wind pressure. The dish is supported by two 4 in. shafts mounted in self-aligning bearings which allow the beam to scan in elevation from the horizon to the zenith.

The structure can be continuously rotated in azimuth at speeds up to 1° per second. The maximum speed of elevation movement is also about 1° per second. The normally accurate positioning of the beam progressively deteriorates when the wind speed rises above 20 m.p.h. In extreme wind conditions the structure is clamped to its foundation by means of six tie-rods, in order to prevent overturning. The strength rating is such that the structure will withstand a wind speed of 100 m.p.h.

The aerial structure weighs approximately 200 tons and contains over five miles of aluminium tubing. More than a third of an acre of aluminium mesh covers the face of the dish. The total cost of the structure, including erection, amounts to $250,000.

The cost of the equipment is being borne by the Institute, which receives financial support for this project from United States Government funds. The Ministry of Aviation is co-operating in the programme and provides some technical assistance and facilities.



A view of the aerial system at the Hillhead Experimental Station, Aberdeenshire. The array has a gain of 43db.

Stanford Research Institute

Stanford Research Institute, Palo Alto, California, provides a scientific research and fact-finding service to business, industry, government and the general public. Most of its research is carried out on a contract basis.

The professional and technical staff includes several hundred engineers, economists, chemists, physicists, and other specialized personnel. In addition to the full-time staff, consultants are available as needs arise for other skills or experience.

Amateur Radio at the National Boat Rally

DURING the period of the National Boat Rally and Exhibition, August 9-12, 1960, the Stoke-on-Trent Amateur Radio Society will be operating GB3SOT on 1·8, 3·5 and 7 Mc/s from the exhibition hall. Boats from all over the country will be making their way to the Rally by canal. Members are also installing mobile gear on board various craft.

The Hon. Secretary of the Society, V. J. Reynolds (G3COY), 90 Princes Road, Hartshill, Stoke-on-Trent, will be pleased to hear from Rally visitors who will be operating /M en route, as it may be necessary to open the control station 2-3 days in advance.

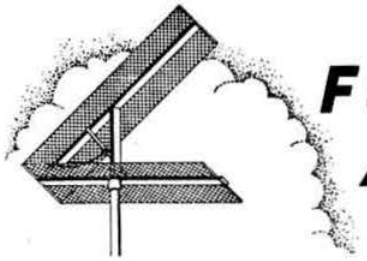
All contacts will be confirmed with special QSL cards.

NEXT MONTH...

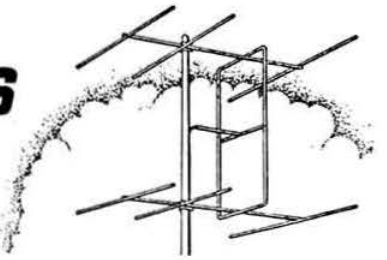
The first of an important new series of articles entitled

COMMUNICATION RECEIVER DESIGN CONSIDERATIONS

...in the BULLETIN



FOUR METRES AND DOWN



Sixth International V.H.F./U.H.F. Convention — First 144 Mc/s Phone Contact via the Aurora — New 70 Mc/s Record

By F. G. LAMBETH (G2AIW) *

THE Sixth International V.H.F./U.H.F. Convention, held in London on May 21, 1960, attracted an attendance of about 120 for the lecture session in the afternoon and 89 for the Convention Dinner.

The morning was devoted to the informal discussions and " ragchews " which have become a traditional feature of these annual meetings of v.h.f. and u.h.f. enthusiasts.

Dr. Roger Jennison (ex-G2AJV), head of Satellite Instrumentation and Space Research at the Jodrell Bank Observatory, Manchester University, gave an excellent lecture on radio astronomy and satellite matters, illustrated with a number of coloured slides. In the course of a racy talk on microwave gear, Mr. Ken Drummond of Mullard Ltd. showed many pieces of " ironmongery " of the type used at these wave-lengths and gave a number of demonstrations. Mr. Drummond also exhibited several valves suitable for use at s.h.f.

At the Dinner in the evening, the Chair was taken by the Society's President, Mr. W. R. Metcalfe (G3DQ), now happily recovered from his recent long illness. The toast of the R.S.G.B. was admirably proposed by Mr. Austin Forsyth, O.B.E., G6FO, editor of *Short Wave Magazine*, to which the President responded. A toast to the visitors, proposed by Mr. R. C. Hills, G3HRH (Chairman of the V.H.F. Committee), was replied to by Dr. J. A. Saxton, Deputy Director of the Radio Research Station, Slough. Among the visitors were Mr. W. A. Kirkpatrick of the Post Office, F3SK, F8MX and PA0LQ, while members who travelled long distances to attend included GM3DIQ, GW3MFY and GW8SU. Mr. Norman Caws, G3BVG, replied to the toast of the London U.H.F. Group proposed by G2AIW.

At the conclusion of the after-dinner speeches Dr. Saxton announced the names of the prizewinners in the exhibition of home-built equipment. First prize went to Sven Weber (B.R.S.19317) for his 420 Mc/s receiver; others to receive prizes being G3HBW, G3GHI and G3HWR. A popular feature of the exhibition was a demonstration of noise factor measurement by G3HBW.

The Convention ended with a distribution of the many gifts generously donated by the radio industry and press.

S.s.b. via the Aurora

G3CCH (Scunthorpe, Lincs.) reports that during the aurora on May 8 a single sideband QSO was made with G3ILD (Darlington, Yorks.). Signals were S8 to S9 for most of the time with both beams pointed north-east. Recordings of the contact were made at both stations and show a peculiar lack of bass giving the effect of a " ghostly " voice. The recordings were played back at the Convention on May 21. G3MED remarks that the QSO is the first two-way phone QSO in this country via the aurora—certainly if such a QSO has occurred before it was not reported. Speech transmitted in this way is quite easily readable if delivered slowly but at normal speeds it is a bit difficult to understand.

New Four Metre World Record

At 11.36 G.M.T. on May 25, 1960, G5MR (Hythe, Kent) worked CN8MG in Casablanca on phone to set up a new world record for 4m. G5MR's signals were RS58 in Casablanca while CN8MG was received at RS59. It will be remembered that the previous record was set up by G5KW and FA9VN on June 22, 1958.

This fresh evidence of the potentialities of 4m DX is particularly encouraging coming as it does so near to the 70 Mc/s Contest to be held on June 19.

Auroral Report

What a month for aurora! We are experiencing increased auroral propagation, and more stations are now participating. SM6PU was ill during the month and this misfortune enabled Olaf to monitor the bands more often; he reports that auroral disturbances occurred on 23 days in the month and that QSOs were possible on 144 Mc/s on no less than 11 days.

It has been established for some time that a disturbance on the sun can last for more than one revolution, and this can guide us in trying to predict auroral disturbances. If the disturbance is on the solar equator it takes 27 days to make a complete revolution but due to the gaseous nature of the sun, any disturbances towards the poles of the sun take somewhat longer to return. A cycle of 27 to 29 days has frequently shown itself in auroral recurrences.

G3HBW draws attention to a 29-day cycle which has just occurred. The first appearance was made on February 2, 1960, when several G-GI-GM QSOs were made. Twenty-nine days later, SM6PU heard OH signals via aurora but no contact was made. The next recurrence was the extensive opening of March 31/April 1 but the possibility that this was caused by a fresh solar outburst cannot be overlooked. Then after a further 29 days came the second impressive opening on April 30. In Sweden, SM6PU observed a good opening on April 10 and this was followed up 28 days later by the disturbances which took place on May 8 during the 144 Mc/s tests.

* *V.H.F. Manager, 21 Bridge Way, Whitton, Twickenham, Middlesex.*

A detailed report had been promised covering the opening on April 1, but most of the information did find its way into last month's *Four Metres and Down*. In the U.K., no second phase of this opening has been reported but on the continent the band opened up again at 19.30 G.M.T. and auroral conditions persisted until 23.00. SM6PU had contacts with SM3AKW, SM7ANE, SP5PRG, OZ9BR, OZ9A and LA3AA as well as hearing a number of DJ/DM/DL stations.

Here in the U.K. we had to wait until April 30 before further auroral QSOs were made, though disturbances affecting other bands were recorded on April 5, 7, 25 and 28. The only detailed report from the continent is from SM6PU who heard SM stations on April 3, 4, 5 and 25 without contact, and who enjoyed auroral QSOs on other days as follows: April 7 with SM3AKW; April 10 with SM3SV, SM4KW, SM5AAS, SM5IP, SM7YO, LA4VC, LA9T; April 16 with LA4RD LA9T, SM6CJI; April 24 with eight SMs; April 28 with DL1RX, DL6QS, DJ1EY, LA9T and many more SMs.

This brings us up to April 30 when several stations experienced their first taste of aurora. A.1491, who had missed out on earlier major openings, was at last in the running, and his most interesting and comprehensive report records 37 stations logged in seven countries. He logged F9EA and F8KF as the only Frenchmen heard and though they were being called by GM stations, it does not seem as if the F boys realised that an aurora was in progress. G3JR, using low power, worked GI5AJ for his first auroral QSO ever, and heard several GMs and continentals, of which HB9RG was by far the loudest. G3EHY, too, had never worked by aurora before. He noticed "unreadable" signals on 70 Mc/s, made a quick QSY to 144 Mc/s and raised GM, GI, DL and PA0 in record time. In all he heard eleven countries. G5MR, who was reported last month as having been in QSO with GM3FMD on April 1, did finally work his first GM during this opening by raising GM3EGW. G3HBW had a number of QSOs as reported in last month's summary, and has since heard that his signals reached OK2VCG, but alas! no QSO took place. SM6PU, who never misses an opening, contacted nine DJ/DM/DL stations, a PA0 and a batch of SMs, but HB9RG did not reach into SM. The HB9 was frequently logged calling LA however. The German stations were working into HB9, OZ, OK, PA0 and SM, but very few G stations were heard in DL. DJ1KC, however, logged G2XV. In Sweden the first phase of this opening lasted from 13.00 to 16.51 G.M.T., and in England from 14.10 to 18.15. A short second phase was noted by both G3EHY and by G2BDQ at 19.20 when GI5AJ was heard still calling CQ aurora. In Sweden the second phase continued until 21.30 but was not intense, only a QSO with DM2ADJ being made.

This completes the April summary but another successful opening on May 8 should be mentioned. Only reports from G2BDQ/P, G3GZJ/P and G3HBW have so far been received, and from these it has been gleaned that the disturbance began at 14.55 and lasted until at least 16.45 G.M.T. G2BDQ/P (Northumberland) heard OK, ON, OZ, SM, G, GI, GM, GW and DJ/DM/DL, working DL6QS. G3GZJ/P (South Downs) worked GI3KYP/P and heard G, GM, DL and SM. G3HBW had QSOs with GM3DIQ, GM3FYR/A and GI5AJ and heard DJ/DL, OZ and F. During this opening G3ILD and G3CCH carried out the s.s.b. QSO mentioned earlier, using the auroral curtain as reflecting medium. Will any European s.s.b. station please look for G3ILD and G3CCH during future aurorae!

There has been so much to report this month that full justice has not been done to all the excellent reports received by G4LX or kindly relayed to him. Space prevents a full list of those stations logged during the various openings, but it is now certain that not many auroral openings are likely to escape notice with a hundred or more observers now eagerly scanning the bands.

Two Metre News

G5CP (Chesterfield) is again mobile on 144 Mc/s and will be active all summer on 145·65 Mc/s using a Hamobile with a halo aerial or a five-element Yagi when signing /P. Whilst in Somerset recently, G3CHW, GW5AB, G5KK, G6GN and G6DW were worked and a personal QSO made with the latter. The location for the last two weeks of August will be Caernarvonshire.

During a meteor scatter sked on April 19 **G3CCH** was heard by **OH1NL**, who was also heard by G3CCH but no QSO was completed. There will be further tests in the near future. G3CCH would like to hear from other stations on the continent interested in m.s. skeds.

A.1491 (Palmers Green) found the month his most exciting since starting on 2m. The aurora hoodoo has been vanquished, A.1491 sitting in on two of them since last mentioning the subject. The station score is now 560 stations heard in nine countries and 44 counties. Activity is increasing but more people might with profit come on before 8 p.m. April 21 was good with Yorkshire and North Midlands stations coming through well including G3BNL, a new Notts. station on 145·29 Mc/s. G3CCH was a remarkable signal at 589. April 24 and May 5 brought the odd DX signal, with QSB, but best conditions were reserved for the first 144 Mc/s Field Day on May 8. The early risers were rewarded with excellent conditions to the south and south-east. Many ON and PA stations were in evidence and A.1491 was particularly happy with just two new ones—F8GH and ON4ZN/P. The list of new stations heard includes G3GKM (a club station in Central London) and G3NZF (Sunbury) around 145·3 Mc/s G5YH (Chiswick) has returned to the band. G2ANS, G2LW and G3MNR have been heard while mobile.

G3FZL has received a report from OK2VCG concerning the meteor scatter sked on May 5/7 (Aquarids shower) and the great aurora of April 30. Between 22.00/24.00 G.M.T. on May 5/6 and 21.00/23.00 on May 7, G3FZL's signals were heard. G3FZL received only two pings (one each on 5th and 6th) and nothing on the 7th. It is proposed to continue the tests during future showers, probably during the Arietids on June 8. During the aurora of April 30 OK2VCG worked only SM7BJ and DJ3FX but heard many stations, including G3HBW (59A!) and G3EHY (46A), both called without success. Also heard were SM7ZN, SM7AWN, LA8MC, PA0QHB, DL7FU, DL1PS, DJ3NGA, DL9ARA, DL1LS, DJ2XW and DL7HM. OK2VCG is particularly looking for G station during auroral openings. His frequency is 144.41 Mc/s.

On May 8 G3FZL was out with G3GZJ/P on the South Downs near Lewes. The aurora was very good and lasted from 15.20/16.45 G.M.T. The strongest station was GM3DIQ who was called without success. Local Gs had a pronounced auroral hiss and G3HBW was received very well via aurora. G3HBW predicted that the next auroral opening could occur on May 29 if the pattern observed in the past is repeated.

G3LTF (Danbury, Essex) found April 20 and 21 quite interesting with PA and ON well received on the 20th. Interesting s.s.b./a.m. QSOs were made with G3MED and G3CCH on the 21st and G3JGJ heard (229). On April 27, G2FO (Stockton) was worked for the first Durham station. On April 30 the tail end of the great aurora was experienced. GW2HIY was worked at 20.09; GI3GXP (18.30), GI5AJ (19.30) and G2NY were heard. A signal on 145·264 Mc/s, presumably Dresden TV was heard with auroral note until 19.45 G.M.T. GI3GXP was later worked via tropo (22.30) whilst G3LTF was waiting in vain for the aurora to reappear. Solar noise checks are still going on.

On May 2/4 the noise was somewhat above normal but decaying. May 5 saw the next liveliness and PA0EZ (Nijmegen) was worked. Things seemed to build up (May 6/7) for a good Field Day weekend, when a few PA and ON stations were worked, also was DL6WU/P (QRA Locator EW21) on whose signals there was a lovely meteor ping! A good time was had on the 8th, although only two auroral QSOs were made (GW3HYH/P and GM3DIQ). Also heard were GI3AJ, GM3LAV/P (who was called incessantly), GI3KYP/P and GM2FXN. G3ILD, heard on s.s.b. was a readable signal in spite of the aurora. GC2FZC was logged (57 phone) and called without success on May 8. The portable transmitter runs 25 watts to a QQV03/20 to a 7-over-7 slot aerial.

G5ZT (Plymouth) is back on 2m after about 10 years absence and asks that the boys put their beams on Plymouth from time to time. Operating times are 11.30, 12.45 and 17.30 G.M.T. daily; frequency at present is 144·25 Mc/s. Equipment includes 20 watts to an 832, 8-over-8 aerial and a c.c. converter. G5ZT says that after a week's listening he finds that a G calling CQ2 *never* gives his QTH and those in QSO usually go over so quickly that one cannot get their call-signs. A little thought and care would help!

B.R.S.21476 (Penarth) has improved results by installing a new aerial. However, the number of stations heard during Field Day was disappointing compared with last year. This '21476 puts down to the counter-attraction of the Cheltenham Mobile Rally—well you can't have it both ways!

G3MED (Northwich) went out with G3HYH to North Wales as GW3HYH/P during the Field Day but they did not do very well, although they made 50/60 contacts. However, stations further south than Birmingham could not be heard. GW3HYH/P (c.w.) had an interesting contact with G3ILD (s.s.b.).

G2XV (Cambridge) was in on the aurora on May 8 from 15.00/16.30 G.M.T. when DL, F, GW, GM, ON and PA stations were logged at good strengths at the portable site at Linton, Cambs. Unfortunately the little portable rig (6 watts to a pair of 6C4s) could not raise any of them—G2XV wished he had been at home!

GM3LAV (Edinburgh 8) enjoyed the aurora of April 30 and worked G2CIW, G3EHY, G3GWL, G6ZP and DL1PS between 15.15/17.00 G.M.T. However, after 17.30 the band opened again and G3CCH, G3IKV and G5ML were worked. Stations were heard in G, GI, DL, F and SM. During the Field Day GM3LAV was operating /M from Carter Bar, 11 miles south of Jedburgh, assisted by GM3FGJ and GM3UM. Sixteen GMs were worked on phone during the morning and early afternoon; G3CCH was heard but could not be raised. At 15.00 they decided to move to Lander, which is their usual contest site, but on reaching Jedburgh GM3FSD told them of the aurora. They lost no time in returning to Carter Bar and worked G3DIV/P, G3JZG and G2HCJ/M. Others heard were G3IVD, GM3GUI, GW3HYH and ON4DH.

G5MA (Great Bookham, Surrey) says he has missed all the aurora openings and has " only " worked GI3GXP on phone and GW3LJP (Radnor) on c.w. **G5MR** (Hythe, Kent) says conditions were excellent for the Field Day on May 8 and up to midday Sunday the band was full of stations. Among many worked was F9CQ/M between Rouen and Paris. Two high scores were ON4ZN/P and ON4HU. A good QSO was enjoyed with Pierre Plion (R.E.F. V.H.F. Manager) operating his alternative station F2DE. F9SH (Mouvaux, Nord) was worked for the first time

G2HCJ/M was out with G3IWJ at a site six miles south-west of Sheffield for the Field Day on May 8 and found early excitement when PA0s including PA0CML were strong but not worked. In the afternoon, at about 16.15, the aurora began and many Gs and continentals were heard. DL6WU/P, GM3LAV/M and GM3BDA were worked. After this, southern Gs came through but not as well as hoped, best DX being G3LTF/P (near Danbury) and G5MA. Later the PA0s came through again and several were worked. The North-West V.H.F. Group (G3MAX/P) were out in force, with some of the mobiles also operating with their own calls (G3KCB/M and G3AOS/M for example). G3MAZ is expected on 2m s.s.b. soon. G2HCJ and G3IWJ heard the s.s.b. phone contact between G3CCH and G3ILD, reported earlier; in fact, nearly everyone appears to have heard it!

GM2CHN (Glasgow) reports some good east/west contacts around 21.30 G.M.T. On May 8 much interest was aroused by the appearance of GM3LAV/P and GM3FSD/P at sites in Roxburghshire. Reception in Glasgow was patchy; they were inaudible at some stations and S7 a mile away. The aurora on that day was noted and proved very interesting for those able to work in it. **GM3GUO** has a 2m version of the G4ZU " Bird Cage " aerial undergoing tests and GM2CHN has a 70cm model almost completed which looks incredibly tiny! The news that GM3DIQ contemplates mobile and portable operation during most of July from the Isle of Arran in the County of Bute should make the inveterate county chasers prick up their ears. A selection of open sites with good elevation and a fine water path southward over the Irish Sea should help.

G3KQP (Lancing) has been receiving quite a strong picture from French TV transmitters on Channel 2, almost spot frequency with Brighton TV. Using an ordinary B.B.C. TV receiver, pictures can be resolved after the British station has closed down. There is no sound, however.

G3JGJ (Moretonhampstead) has been on 2m almost evening since January (18.00/19.00 approximately) but the sked with G3LTF has only produced results occasionally although no contacts have been made. That with GC2FZC has produced nothing at all for about six weeks! G3HBW was heard on c.w. on April 30, the first London station heard this year! Stations in Devon and Dorset have been worked and heard from time to time. GW5BI was also heard recently.

G3JR (Barnes) has at last " clicked " on aurora. He had thought that QRP was useless in this connection but on April 30 he worked GI5AJ (55A both ways), hearing several GMs, DLs, PA0s and HB9RG. Altogether 11 countries were heard on this occasion. HB9RG was the strongest signal. **G3DIV** (Polegate) caught the aurora of April 1. Having noted on TV service calls that auroral interference was fairly intense, a quick check was made on 2m at about 4 p.m. and the band was very quiet. A last check before switching off brought GM3BDA with a good 58A signal, calling a DM. After a couple of CQ calls, GM3FMD (Ayr) came back at 16.45 for the first-ever GM and first auroral QSO on 2m. Another CQ raised PA0FB (55A). The band was back to normal at 17.00. Gs heard with auroral notes included G5MR and G5LK. At the tail end of the April 30 aurora, GM2FXN, GM3EGW, GM3DIQ and numerous Gs were heard. No QSOs were achieved on this occasion however, probably because there were too many other stations on. All the above were accomplished with the indoor 5-over-5.

The 144 Mc/s Field Day was very much enjoyed—a good choice of date both for weather and conditions—when G3DIV/P operated from Brightling Needle, 647 ft. a.s.l. PA stations came in well at the beginning and many were worked, followed by Gs and portables. Conditions tailed off in the afternoon, with G3AYT/P, G3KMT/P and G8SB/P about the best signals from the north, with G5CP/M as the best mobile from that area. The " turn-up " for the Field Day book came at 16.20 when GM3DIQ (59A), GM2FXN (Dundee), GM3LAV/M (Carter Bar), GM3KYI/P (Forfar) and GI5AJ were worked via aurora. Altogether a very satisfying experience.

OK3MH made the first OK/RB5 144 Mc/s QSO with RB5WN on March 13, 1960.

GM3DIQ has sent details of his forthcoming portable expeditions to Lamlash, Isle of Arran, Bute, on July 2/3 and from July 9/29 inclusive. Frequencies in use will be 144·5 and 145·8 Mc/s. Apart from the period of the Second 144 Mc/s Field Day, GM3DIQ intends to be on the air from 21.30 each evening for as long as activity warrants or the car battery holds up! The home station at Kilbarchan is now operational on 145·92 Mc/s most evenings from 22.00.

G3GHI hopes to be active /A from Studland, Dorset, from June 19 to July 1. He will be using a frequency in the correct zone.

GW8UH has been on 144 Mc/s fairly often but in his opinion present activity does not compare with that of two years ago. He has been out portable/mobile to Monmouthshire on Monday activity nights for the last five years and the usual 20 stations has now dwindled to seven—mostly locals! The only London area station heard in the last two months have been G3LTF and G6OX! GW8UH will be operating mobile on Mondays on 144·4 Mc/s between 19.00/22.00 G.M.T., mostly in Monmouthshire, but for the Field Day on July 3 operation will be from a site just north of Fowey, Cornwall.

GW3MFY (Bridgend) missed the first part of the aurora on April 30 but when auroral conditions recurred again briefly at 19.07 G.M.T., GW2HIY, G3HAZ and G3LTF were heard, all at 57A. The opening ended at 19.14 G.M.T. GW3MFY's frequency is now 144·35 Mc/s.

G3NBQ (Coventry) worked GM3DIQ on April 30 by aurora. At 23.35 G.M.T. the same day GI3GXP was worked by tropospheric propagation. Two new stations have been noted: G3CNG (Coventry) and G3OBZ (near Nottingham). The G3NBQ transmitter runs 75 watts input to a three-element Yagi at 15 ft.

Four Metres

The transistorized 4m converter designed by B.R.S.20533, the circuit of which is shown in Fig. 1, employs a type XA141 drift transistor as an earthed emitter r.f. amplifier, and an OC170 self-oscillating mixer (oscillation being crystal controlled by a 9550 kc/s crystal on its fifth overtone, 47·75 Mc/s) giving an i.f. of 22·55 Mc/s for 70·3 Mc/s input.

B.R.S.21476 (Penarth) feels that a great amount of credit is due to G3EHY for his efforts on 4m; he does stir up a lot of dormant enthusiasm. The big drawback in the west is TVI from both the transmitting and receiving gear, which more or less restricts GWs to Sunday mornings or after 23.00.

G5MR (Hythe, Kent) has noted evidence of sporadic *E* propagation on several days recently but so far no amateur signals have been heard. F8GH told G5MR that during the v.h.f. contest on May 7/8 he heard FA9VN for a few minutes. French stations continue to come in well at Hythe by tropospheric propagation.

G4LX reports that he and G2BDQ are now operating on 70·2 Mc/s. G5YV has been heard in Newcastle (449) but no QSO has yet been made.

Seventy Centimetres

G2XV (Cambridge) has had several interesting QSOs on this band and there seems to be increasing activity and interest. A few new stations are appearing, including G3NOX and G3OAT.

G5MR (Hythe, Kent) has been carrying out tests with G2JF and G3KMP who have converters in action—G5MR's signals were comfortably received by both, and QSOs are expected when the two stations get their transmitters working.

G3EMU (Canterbury) has a tripler in operation and has been well heard by G2JF.

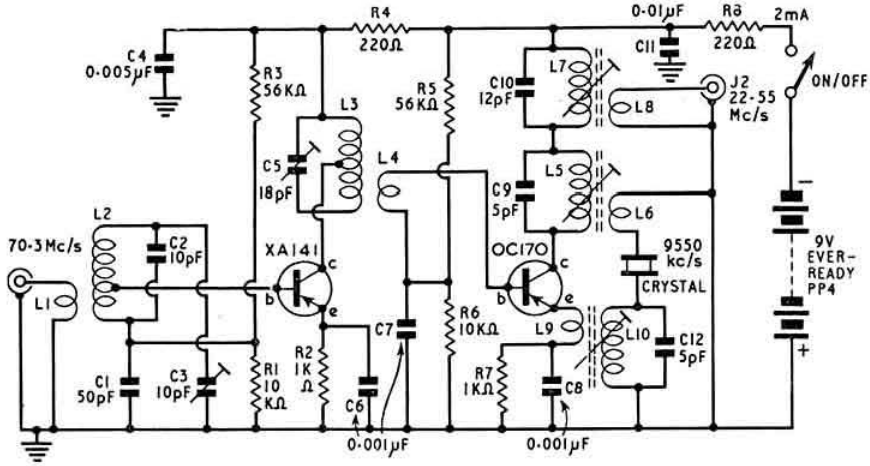


Fig. 1. Circuit diagram of a transistorized 4m converter designed by B.R.S.20533. The coils are wound as follows: L1, 2 turn link into L2; L2, 9 turns 18 s.w.g. ⅛ in. dia. ¼ in. long, tapped 1½ turns from earth; L3, 9 turns 18 s.w.g. ⅛ in. dia. ¼ in. long, centre tapped; L4, 1 turn link into L3; L5, 15 turns 30 s.w.g. ¼ in. dia., close wound; L6, 2 turns at "cold" end of L5, brass core; L7, 15 turns 30 s.w.g. ¼ in. dia., close wound; L8, 2 turns at "cold" end of L7, dust iron core; L9, 2 turn link at "cold" end of L10, brass core; L10, 10 turns 30 s.w.g. ¼ in. former. There is ¼ in. separation between L5 and L6 and between L7 and L8. The tuned circuits C9/L5 and C12/L10 resonate at 47·75 Mc/s.

Worked and Heard on V.H.F.

Two Metres

A.1491 (Palmers Green).
Heard Tropo: F3LP, 8GH, G2JF, 2UJ, 3NR, 3APY/P, 3AYT/P, 3BGL, 3BNL, 3CCH, 3DIV, 3EHY, 3EJO, 3EMU, 3FAN, 3HKT/P, 3KEF/P, 3KMP, 3MAR/P, 3MEV, 3MNQ, 3NNG/A, 3NRO, 5DF, 5GJ, 5HZ, 5YV, ON4ZN/P.
Aurora: F9EA, G2JF, 2CIW, 2HCJ/M, 3CCH, 3DVK, 3EGK, 3EHY, 3FCY, 3GWL, 3HAZ, 3ILD, 3KFD, 3KHA, 3LRP, 3MAR/P, 3NRO, 5BM, 5MR, 6XX, GI3KYP/P (5m Newcastle), 5AJ, GM3BDA, 3DIQ, 3EGW, 3FMD, 3GUI, 3HLH/A, 3KYI/P (near Dundee), 3LAV, 3LAV/M (13m Jedburgh), GW3HYH/P (Conway), 3LJP, ON4GN, 4HU, PA0CML, 0QC.

B.R.S.21476 (Penarth).
Heard: G2FQP, 2HDR, 2HIF/P, 2JM, 3CHW, 3EHY, 3EXW, 3GYQ, 3FIH, 3ION/P, 3KHA, 3MAR/P, 4GR, 5CP/M, 5DW, 5KK, 6GN, 6GN/P, GW3ATM, 3HAW, 3MFY, 3NWR/P, 4CG, 5BI, 5AB, 8NP, 8SU, 8UH, 8UH/M, G3ENY (70·31 Mc/s).

V.H.F. QSY

Members who wish to acquire or dispose of crystals in connection with the British Isles Two Metre Zone Plan announced in March 1959 are invited to send details to "V.H.F. QSY," R.S.G.B. *Bulletin*.

Crystals Offered
By G5ZT, Burnbank, Goosewell Hill, Eggbuckland, Plymouth. 12,050 and 12,083 kc/s (B7G type).

Crystals Required
By G5ZT, as above. 12 Mc/s crystals suitable for Zone A (12,000 to 12,008 Mc/s).

The Earth seen from 20,000 miles in Space

TV-type pictures transmitted by American satellite

This is the first crude picture obtained from the Explorer VI earth satellite launched on August 7, 1959. It shows a sun-lighted area of the central Pacific and its cloud cover. The picture was made when the satellite was about 17,000 miles above the surface of the earth on August 14.

The lined areas at the left represent a cloud-cover map, prepared from meteorology charts which have been superimposed on a globe to show the lighted areas which the Explorer VI television scanner "saw" on August 14. As explained in the text, the scanning device resembles a television camera.

MAN'S first view of the earth, as seen from outer space, has been provided by a crude picture relayed from *Explorer VI*, the American "paddlewheel" satellite launched in August, 1959.

Though the picture is little more than a crescent-shaped series of white blurred lines, it has demonstrated the feasibility of using television for interplanetary exploration by unmanned satellites and rockets.

The picture, which covers a broad area of the central Pacific, was made from signals received from the satellite by the tracking station at South Point, Hawaii. At the time of transmission *Explorer VI* was about 17,000 miles above the surface of the earth and was crossing Mexico. The area photographed was therefore more than 20,000 miles from the satellite.

During the 40-minute signal transmission from which the picture was made, the central part of the Pacific was lighted, while the North American continent was dark and the Asian land masses were over the satellite's horizon.

In the image scientists can discern cloud banks in the large white areas at the upper and lower parts of the crescent. The white area near the horizon in the equatorial region is probably sunlight reflected from the atmosphere or ocean.

An extremely small video bandwidth, 1·5 cycles per second, was employed to transmit the picture to earth. This contrasts with the four million cycles per second used for television programmes. The difference is that complete television pictures are transmitted in one-thirtieth of a second, whereas the earth image received from *Explorer VI* required 40 minutes for transmission.

The scanning device which took the picture resembles a television camera, but weighs only 2 lb. It consists of a tube containing a mirror that receives and focuses light and dark impressions, and an electronic counter which computes and records the impressions before they are converted into radio signals.

The satellite's payload is spinning about 2½ times a second to give it stability. Once per revolution the camera unit records the light or dark impressions that it sees in the form of a coded electrical impulse. The impulse can be reduced to a single dot; a row of dots forms a line and eventually the lines form an image.

The photographs used to illustrate this article are reproduced by courtesy of the United States Information Service.

Prelude to Convention

Animal, Vegetable or Mineral

Scientific Research in Cambridge

By " CANTABRIGIAN "

THE ancients subdivided matter into four groups: " earth, fire, air and water," but the only simple division that can still be made in this complicated world is " animal, vegetable and mineral." Although the words themselves change, research into matter in its many forms continues to exercise the minds of men and women in Cambridge.

Most of us learned at school that Newton discovered in 1666 that white light is composed of all the colours of the rainbow; what we may not have been told was that his observations took place in his rooms in Trinity College, Cambridge. Research is not now carried on in individual colleges but in specialised laboratory blocks, many of which are located just behind the Convention Headquarters in the Examination Hall. The latter is part of the Arts School.

Each college has its own library, such as the famous Wren library at Trinity which houses amongst its treasures the only copy of the 1664 *Shakespeare Folio* to survive the Great Fire of London, and the Pepys library at Magdalene where the equally famous *Diary* is kept. The growth of printed information has caused the expansion of libraries and the present Universtiy Library, which is one of the three Copyright Libraries having the right to a copy of every book published in this country, was opened just before the war.

It is not only tradition and famous names that have brought scientists to Cambridge to do research, but the attraction of unrivalled library facilities among many other things. One of the first high-speed electronic computors, the EDSAC, is housed within a stone's-throw of what will be R.S.G.B. Convention Headquarters. Adjoining it is a tall building containing the Van den Graf High Voltage Generator used for nuclear research.

The Cavendish

The more recent developments that have taken place in the provision of research facilities can be seen in the area just behind the Examination Hall, where facing us through the archway are the older buildings of " The Cavendish " where, in 1897, the brilliant young Rutherford, working with J. J. Thomson, first "discovered " the electron—what would we do without it! To our left is the Mond laboratory, where work is in progress on such subjects as super conductivity at extremely low temperatures. At the side of the arch is the even more recent Austin wing of the Cavendish. Both of these buildings are the result of very generous gifts from industrialists. Finally the single storey " pre-fabs " which emphasise the present space limitations. It is quite obvious that this site is now full to overflowing and laboratories are now being sited further away. The Mullard Radio Observatory has therefore been built several miles from the city as has the new University Veterinary Laboratory.

This then is the pattern; first research in individual colleges usually paid for by the individual or by a patron, then by individuals in a " University " laboratory, such as by Cavendish himself, then endowments from industrialists and finally by Treasury grants to the University (*not* to the colleges). At the same time the trend has been from individual effort to the work of larger and larger teams as the apparatus has become more complicated.

The Downing Site

The Downing site houses most of the teaching laboratories from Archeology to Zoology, the main exceptions being the Departments of Engineering and Chemistry. The Engineering Laboratory dominates the southern approaches to the city, extensions to which were opened recently by H.R.H. The Prince Philip, while away to the right can be seen the upper stories of the Chemical Laboratory, opened not so long ago by H.R.H. The Princess Margaret.

There are at present about one hundred professors, as well as readers and demonstrators who are paid by the University. Many of these people carry out research in addition to teaching the undergraduates who number over 8,000. Many students return after they have graduated to carry on with some specialised problem. These research students, well over 1,000 of them, are usually financed by short period grants from Trust Funds or from the Government; as well as from the Department of Scientific and Industrial Research, grants also come from the Agricultural and Medical Research Councils and other Government departments.

One result of this concentration of facilities and workers has been the tendency for non-university organisations to house their research sections nearby. For example the Medical Research Council has the Dunn Nutritional laboratory, the Applied Psychology Research Unit and the Department of Experimental Medicine. The Agricultural Research Council has its Institute of Animal Physiology at Babraham, the Plant Breeding Institute, the Low Temperature Research Station (dealing with fundamental food problems) and the National Institute of Agricultural Botany, and a number of smaller units.

Industry has also followed this trend and among the organisations with large laboratories nearby are Spillers (flour), Ciba (synthetic glues), Tube Investments and Fison's Pest Control. The local instruments and electronic firms also have their research sections in the city.

Two inventions that have recently been in the news are the " Bacon Fuel Cell," which produces electricity from hydrogen and oxygen, and the " Draccones," the long serpentlike plastic tubes used as flexible tankers for the carriage of liquids. Both these ideas are being sponsored by the National Research Development Corporation, the first at Marshall's Airport and the second at the University Engineering Laboratory.

University " Lash-ups "

In case the impression has been given that all research is done with expensive and complicated equipment it is worth mentioning that " lash-ups " made just to demonstrate a method or principle are often kept in service for years. Such a " lash-up " on the largest scale was EDSAC 1. This was made with thousands of ex-service valves and other pieces of surplus gear and provided many people with an insight into the design and operation of high speed electronic computors.

When the Convention Lecture programme is published it will be seen to include the names of a number of prominent University research workers, all of whom will speak about those aspects of their work that can be extended to the amateur field. Most of the Convention lecturers have had practical experience in the construction of electronic equipment and many of their techniques can be applied directly by the amateur, e.g. novel methods of chassis making.

Those who plan to support the Convention need not be dismayed by an unusual title for a lecture. The organising committee can promise that every lecture will be of great interest, and that they will all be given with a knowledge of Amateur Radio. After all, many of the speakers are, or have been, amateurs themselves.

The MONTH ON THE AIR

A CHRONICLE OF EVENTS ON THE HF AMATEUR BANDS

By R. F. STEVENS (G2BVN)*

THE past month has seen the completion of the transition from winter to summer conditions. In addition to the deterioration of the h.f. bands, several ionospheric disturbances have occurred, ranging from storms lasting only a few hours to a virtual blackout for 36 hours. This state of affairs has prompted inquiries as to whether conditions during the present sunspot cycle will again permit extensive DX working on the 21 and 28 Mc/s bands. The brief answer to this question is yes, but a few supporting facts may not be out of place.

At the beginning of the present cycle, No. 19, in April 1954, the sunspot number was 3, and this rose to a maximum of 201 in March 1958. Since that date there has been a gradual decline in sunspot activity and the predicted figure for June 1960 is 120, falling to 100 in January 1961. However, these figures do not give the complete picture as the peak intensity of the present cycle was greater than ever previously recorded; in fact, 1958 provided the best year for DX working in the history of Amateur Radio. It will be seen, therefore, that although conditions on the h.f. bands are declining, DX working will be possible on 21 and 28 Mc/s for some considerable time ahead and next winter should bring reasonably reliable openings on the east-west paths.

So, pausing awhile from the erection of a rhombic for 7 Mc/s let us take a look at the past and the future in the world of DX.

News from Overseas

S/Ldr. "Jumbo" Godfrey (VR3Z), who has now returned from **Christmas Island** to take up a post at R.A.F. Brampton, reports on his DX activities. In 58 days of operating **VR3Z** made 510 contacts with 490 different stations in 50 countries and 40 States of the U.S.A. The majority of QSOs were with W/K stations and 299 were worked; of 24 European contacts only six were with G stations. The signals from North America formed a QRM barrier which was difficult to penetrate but VR3Z feels that with beam aerials it should be possible to make reasonably reliable contacts over the long path during the morning period. Unfortunately it appears that the island will again soon be without an operator for the amateur station.

From G5LR it is learnt that **PX1PA** will be active on a.m. on 7 and 14 Mc/s and from personal contact assures us that he is no pirate. Address in *QTH Corner*.

ZD2JKO lists current activity in Nigeria, and gives the following call-signs of active stations: ZD2ATU; ZD2BRG; ZD2JRO; ZD2JSC; ZD2DCP; ZD2AMS. ZD2HAH, ZD2EHW and ZD2JM should be on shortly. ZD2CKH and ZD2VPF have left Nigeria. ZD2JKO mentions that in four months he has worked 134 countries and 48 States, with Montana and North Dakota outstanding.

Due, it is believed, to postal delays, **GW3ITD/MM** was unable to obtain permission to operate from ZD9, but he is investigating the possibility of shore-based operation from ZD7 and ZD8. VS9ADL reports that a club station has been set up in Aden and may be heard operating under the call **VS9AJW**.

ZS7P, who is the only resident ZS7 using s.s.b., has been unjustly accused of being a pirate, and to confound all doubters has provided Headquarters with a photo copy of his licence. The gear in use comprises a Gonset GSB100 and a National NC300 receiver. From G3GKQ it is learnt that G3LOE has been issued with a Somaliland licence under the call **VQ6RS** and will soon be looking for U.K. contacts.

The formation of the **Ghana Amateur Radio Society** has been announced and the QSL Bureau is now operating through 9G1CW whose address is given in *QTH Corner*.

A new club station is operating from Cyprus under the call **ZC4AK** and is located at R.A.F. Akotiri. At present this is the only ZC4 station using s.s.b. QSLs should go via the R.S.G.B. Bureau.

VQ3GX will be closing down in about a month's time and Tanganyika will thereafter be without s.s.b. representation. **W2AYN/EP**, operating from Teheran, may soon make an appearance on s.s.b.

Norman Henry, **VU2RG**, is at present in the U.K. on leave until early September, and mentions that any station requiring confirmation of a QSO should write to him at 61 Moss Lane, Pinner, Middlesex.

ZS5SG writes to say that **ZD9AM** on Gough Island may often be found on the high end of 14 Mc/s on Sundays around 18.30 G.M.T. **ZS2MI** (Marion Island) is also operating with a.m. 'phone on 14,175 kc/s around 16.30 on Sundays. ZD9AC has left Tristan da Cunha and the present operator there is unlikely to take out a licence.

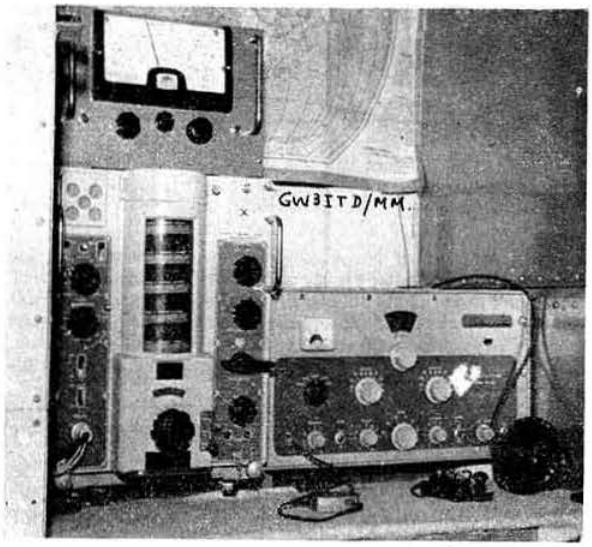
DXpeditions

OD5CT was definitely due to be operating from **ST2AR**

DXotic Showcase

Call-sign	kc/s	Mode	G.M.T.	Country
VS9OA	3,520	c.w.	22.50	Oman
EL4A	7,007	c.w.	20.37	Liberia
FF8BF	7,015	c.w.	21.42	French W. Africa
VS9OA	7,011	c.w.	22.40	Oman
DU1OR	14,078	c.w.	21.00	Phillipine Is.
FR7ZD	14,042	c.w.	17.45	Reunion Is.
HL9KT	14,014	c.w.	19.55	Korea
VP2KD	14,010	c.w.	00.15	St. Kitts
VS9OC	14,070	c.w.	23.17	Oman
7G1A	14,075	c.w.	19.52	Rep. of Guinea
9N1GW	14,065	c.w.	13.30	Nepal
DU7SV	14,310	s.s.b.	15.16	Phillipine Is.
KC4USH	14,310	s.s.b.	07.20	Antarctica
KH6KH	14,340	s.s.b.	08.30	Hawaii
KW6DB	14,307	s.s.b.	19.14	Wake Is.
TI9SB	14,298	s.s.b.	07.30	Cocos Is.
ZS7P	14,304	s.s.b.	19.50	Swaziland
CR8AC	21,150	a.m.	19.30	Goa
FK8AU	21,165	a.m.	10.25	New Caledonia
KG4AO	21,250	a.m.	22.30	Guantanamo Bay
VQ1HX	21,180	a.m.	22.35	Zanzibar
VR2BC	21,230	a.m.	09.00	Fiji
VS5PM	21,040	c.w.	17.05	Brunei
W2AYN/EP	21,150	a.m.	17.55	Iran
RJ8AAB	28,550	a.m.	13.55	Tadzhiz
VK9RO	28,210	a.m.	11.15	New Guinea
VP8EM	28,445	a.m.	18.45	Falkland Is.
YA1BW	28,310	a.m.	13.19	Afghanistan
ZS7L	28,300	a.m.	16.00	Swaziland

** Please send all reports to R.S.G.B. Headquarters to arrive not later than June 17.*



The operating position at GW3ITD/MM on board H.M.S. Puma. The transmitter is a British Heathkit DX100U while the receiving arrangements comprise a Geloso converter feeding into a Services type main receiver. The aerial is a BC610 whip cut for 28 Mc/s. GW3ITD/MM hopes to operate from a number of islands in the Atlantic and Indian Oceans in the coming months.

from the end of May for a short period. Further activity is planned from EP, VS9, ET3 and possibly JY1 and YK. Non-W/K QSLs should go to Rundy's Beirut address. A KWM-1 will be used with s.s.b. operation predominating.

AP2CR hopes that operation from **East Pakistan** will take place in about a month. Colin feels that he may obtain a licence where others have failed.

G3CWL will be operating from Monaco from July 18 under the call **3A2DA**. He will be looking for G contacts but warns that the screening to the north renders the chances only moderate. Operation will be on c.w., mainly during the mornings and late evenings.

For Top Band county chasers G3NNW will be operating /P from **Rutland** during August using c.w. only. Definite dates to follow later.

The QSLs from **VU2ANI**, now on their way to W8PQQ by sea mail, were sent in three batches, according to the date of QSO. The operating from VU2ANI was first-class but there seems to have been some confusion over the QSLs.

9G1CX plans a trip to FD8 and ZD2 during June using a KWM-1 on c.w. and s.s.b. Later visits are scheduled to cover FF4, 7G1, ZD1 and ZD3.

The first s.s.b. emanations from the Balearic Islands came under the call **EA6AR**, the operators being the licensee (Mike) and Mary, sister of W6UOU of "Argonaut" fame. QSLs come exceedingly swiftly. QTH as in *American Call Book*.

QSLs for the ZS7, ZS8 and ZS9 activity promoted by **ZS5JY** are now being distributed, and Olliver is to be complimented on an attractive card.

The sad story of the **Malpelo Island** jaunt will be widely known and one can only sympathise with the participants in encountering the extremely rough weather which prevented a landing being made.

Awards

Jack Willis, VO2NA, has taken over as Awards Manager for the **Goose Bay A.R.C.** and sends details of the W.A.G. (Worked All Goose) Award. Applicants outside the U.S.A. and Canada must have contacted three members of the G.B.A.R.C. since January 1, 1958. A list showing stations worked, date, time and frequency together with three I.R.C. should be sent to VO2NA. Commonwealth reply coupons may be used where applicable.

The attention of all "wallpaper hunters" is drawn to the latest edition of the *Directory of Certificates* published by W3RPG. Copies may be ordered through G3IEC, or obtained direct from the publisher, price $2.50 post paid.

Contests

The Japan Amateur Radio League announces that the **First Asian DX Contest** will commence at 10.00 G.M.T. on August 27 and end at 16.00 on August 28, and annually thereafter during the last weekend in August. C.w. only, will be used. Full particulars can be obtained from the J.A.R.L., P.O. Box 377, Tokyo Central.

The telephony section of the All Austria contest will take place on June 18.

Congratulations are offered to **G3FPQ** on his mammoth score of 565,080 in the phone section of the 1959 *CQ* World Wide DX contest. This placed him fourth highest in the world for single operator stations.

DX Briefs

G3IPV has obtained a maritime mobile licence and will welcome contacts with stations in coastal areas. The suffix /MA will be used when anchored. Address in *QTH Corner*.

The following stations are known to be active from **Brunei**: VS5AD (14, 21 and 28 Mc/s); VS5PM (c.w.); VS5BY (soon to be on s.s.b.), and VS5GS, who has stated that he will not be sending cards for any future contacts.

Nepal is now represented by 9N1s GW, CJ, FV, TB and MM. Between them these stations cover all modes and have been worked on 14 and 21 Mc/s.

ZL4JF is apparently located at the present time on the Campbell Islands, south of New Zealand. QSLs should go via ZL2GX.

JZ0PO has been heard on 14 Mc/s c.w. and asks for QSLs via the R.S.G.B. Bureau. JZ0HA will be leaving during August.

ZA2BAK is still active and is now giving an address for QSL purposes. It is to be hoped that he is genuine.

RA0YAA has been worked on 28 Mc/s phone giving his QTH as Kizil in Tannu Tuva. Apparently all UA0 (or RA0) stations suffixed with the letter Y (or KY) are in Zone 23. A new one on s.s.b. is UL7KBK in **Kazakh**. His signals have been heard on the high end of 14 Mc/s.

Aves Islands. Activity may be expected shortly from this spot using the calls YV0AA and YV0AB, on c.w., a.m. and s.s.b. Definite dates later.

QTH Corner

FR7ZD	Guy Hoarau, Tampon, Reunion Island.
G3IPV	Radio Supervisor, 4K1 Mess, *H.M.S. Hermes*, c/o G.P.O., London
HS1E	C/o A.P.O. 146, San Francisco, Calif., U.S.A.
KG4AO	P.O. Box 55, Navy 115, F.P.O., N.Y., N.Y., U.S.A.
KG6NAB	Box 153, Navy 926, F.P.O., San Francisco.
KH6DMP	623 Sperry Loop, A.P.O. 915, San Francisco.
MP4BDC	F. S. Peacock, A.M.W.D., R.A.F., Bahrain, Persian Gulf, B.F.P.O. 63.
PX1PA	A. P. Bartolome, Avenue Meritxell, Andorra-Lavella.
VK5TA	G. Cole, 8 Farrell St., Glenelg, South Australia.
VP8EM	P.O. Box 107, Port Stanley, Falkland Islands.
VQ4FO	P.O. Box 30021, Nairobi, Kenya.
VQ1HX	via VQ4 Bureau.
YA1AC	J. A. Cole, U.S.O.M., American Embassy, Kabul, Afghanistan.
YA1BW	via DL8AX.
ZA2BAK	SHNUM, Tirana, Albania.
9G1 QSL Bureau	c/o 9G1CW, H. Suess, P.O. Box 1945, Kumasi, Ghana.

* * *

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

Chatham Island. ZL3VB will be active most Sunday mornings on about 14,010 kc/s between 04.30 and 05.30. (Thanks to the *DX-press* for these two items.)

AP2CR states **AP4M** is definitely not licensed, whilst the F.E.A.R.L. denounce **KA2AH**. MP4BBW reports that the **MP4QAK** (who is G3HCV) call is being misused.

LA1HP/P, LA8FG/P and LA9RG/P are all currently active from **Spitzbergen,** usually on 14 Mc/s c.w.

K6CQV/KS6 will be at Pago Pago until the summer of 1961, so easy on the pile-ups!

28 Mc/s

Whilst the fourth harmonic of Radio Cairo can always be relied upon, patchy conditions have made DX hard to find on this band.

However, **G3BHW** (Margate) reports phone contacts with VQ3PBD (18.15, '250), VQ5EK (12.45, '180), ZD2AMS (13.50, '290), ZS3RO (15.10, '300) and 9K2AP (18.00, '250). **G3AAE** (Coulsdon) found time to converse with VP8EM (18.45, '445), CE3BZ (19.10, '352), VK9RO (11.15, '210) and VQ8AV (16.40, '270). **G3MVV** (Romford) worked YA1BW (13.19, '310) who was also reported by **B.R.S.20317** (Bromley) in addition to 9M2EB (16.05, '250), RJ8AAB (13.35, '550) and VQ8AV (12.00, '275). **ZD2JKO** (Zaria) found CR7AU (15.00), HK7AB (14.00), PJ2AF (13.30) and ZS7L (16.00/17.00).

B.R.S.22013 (Hereford) offers amongst others ZS3HX (17.27), EL4A (17.35) and OQ0JH (18.45). From Virginia, U.S.A. **F.R.S.309** reports YN1JB (19.05), XE1H (21.21), KZ5MS (21.35) and OA4HK (14.46).

Commonwealth Competition

	28 Mc/s	21 Mc/s	14 Mc/s	7 Mc/s	3·5 Mc/s	Total
G3BHW	41	53	48	4	—	146
VE7KX	14	38	29	32	27	140
G8KP	18	32	35	26	18	129
ZD2JKO	27	39	30	22	6	124
G3AAE	45	24	40	14	—	123
G4CP	15	29	41	18	15	118
G5VU	20	27	38	10	9	104
G8DI	12	11	18	12	18	71
GM2DBX	37	21	8	—	—	66
VO2NA	7	10	24	14	6	61
MP4BBW	—	10	48	—	—	58
G2BLA...	12	13	9	10	3	47
G3KHA	13	—	27	—	—	40
G3BRE	—	2	8	8	18	36
G2DCG	7	21	3	—	—	31
G3KSH	7	9	6	4	3	29
G3GMY	12	12	3	—	—	27
G3MCN	10	12	1	—	—	23
G3MGL	8	2	6	4	—	20
VE2BAT	—	—	15	2	—	17

Band Leaders

28 Mc/s—G3AAE
14 Mc/s—G3BHW and MP4BBW
21 Mc/s—G3BHW
7 Mc/s—VE7KX
3·5 Mc/s—VE7KX

	28 Mc/s	21 Mc/s	14 Mc/s	7 Mc/s	3·5 Mc/s	Total
B.R.S.20317	39	54	56	44	30	223
B.R.S.15844	32	45	49	51	28	205
B.R.S.22013	26	49	61	18	6	160
A.1859	33	54	40	4	3	134
B.R.S.21008	36	53	34	4	—	127
B.R.S.2292	25	29	26	18	—	98
B.R.S.22249	29	25	23	14	3	94
A.1902	32	38	16	—	—	86
A.1583	23	44	18	—	—	85
A.2065	24	27	25	2	3	81
A.1792	19	32	19	—	—	70
A.1965	12	30	11	2	3	58
A.1980	22	28	6	—	—	56
B.R.S.21457	—	—	51	—	—	51
A.1946	7	9	12	2	3	33

Band Leaders

28 Mc/s—B.R.S.20317
14 Mc/s—B.R.S.22013
21 Mc/s— B.R.S.20317 and A.1859
7 Mc/s— B.R.S.15844
3·5 Mc/s—B.R.S.20317

21 Mc/s

Although far from 100 per cent. this band continues to produce some very worthwhile DX and will stand close scrutiny even during summer conditions.

The VK6GU beam of **G3FPQ** (Elstead) intercepted a.m. r.f. from CR8AC (19.30, '150), FK8AU (10.25, '165), VR2BC (09.00, '230), VS5GS (15.55, '110), VS9MB (15.15, '140), 9N1CJ (16.25, '220) and 9N1TB (17.30, '180). **G3BHW** conversed with I5TUF (17.32, '230), KG4AO (22.33, '250) VQ1HX (18.50, '180) and W2AYN/EP (17.55, '150). **ZD2JKO** submits a list of very choice DX from which we select HI8JSM (23.30), HV1CN (17.25), ZD4DT (06.30), ZS9A (17.30) and 4S7YL (17.10), all on a.m., on which mode **G3MVV** exchanged reports with VK9AN (13.20, '150) and widely worked VQ1HX (22.35, '180), operated by VQ4HX.

From more than a dozen listener reports we choose the following submitted by **B.R.S.20317,** all on c.w.: ZK1BS (09.50, '050), 7G1A (12.30, '035), LA4CG/P (19.00, '050) and KW6CS (10.00, '035). **F.R.S.309** lists amongst others TI2RO (22.55), FS7RT (21.36) and YS1LA (23.30). **A.1736** (Corby) has heard a great deal on A3 including CE3JE (21.37), VQ6GM (21.00), VP8CP (20.20 King George Is.) and CR8AC (21.30). The S.640 of **B.R.S.22299** (Preston) produced signals from VR2AS (07.25), KR6QM (16.30), KH6BGF (07.20), BV1US (17.00) and UA0LA (18.40) and **B.R.S.22795** (Kingston-on-Thames) heard KW6DA/KM6 (06.38), 4S7YL (18.29) and VS9MB (16.01).

The extensive report of **A.1902** (Reading) includes a.m. from VS9AE (14.43), KR6IF (15.20), VU2NR (20.22) and UI8AG (15.07).

14 Mc/s

This band has frequently remained open round the clock and has brought forth a good quantity of DX, mainly on c.w. and s.s.b.

S.S.B.

Unless otherwise mentioned all frequencies lie between 14,280 and 14,350.

MP4BBW (Bahrain) conversed with DU7SV (15.16), ZS7P (19.50), KG6NAB (14.42), HS1B (15.51), KC4USB (18.13), UR2KAA (17.38), KW6DB (19.14) and EA6AR (16.19). Ian's DXCC rating is 166/155 and for WPX 273/249. **G3FPQ** reports contacts with FB8CP (18.00), OA4BN (07.35), TA3GI (20.45), VQ4RF (20.50), VS1JO (17.00) and PZ1AX (21.45, '190). **G6UT** (Great Hallingbury) communicated via the upper s.b. with XZ2SY (18.02), KH6KH (08.30), YS1MS (23.15), KC4USH (07.20) and TI9SB (07.30).

Worthwhile DX is reported by the many listeners on this band and from these we select KR6FG (14.15), HR2DK (23.51) and HI8GA (07.31) from **B.R.S.22013.** **A.1918** (Eccles) has heard most of the stations already listed and in addition W4HIM/KL7 (09.00) and ET2US (22.25). The 5RV aerial of **A.2273** (Dudley) helped him to produce a long list of which 9N1CJ (15.40) and CR9AH (17.57) receive special mention. **A.1883** (Barrow-in-Furness) found much DX which included ZK1BS, TG9PS, AP2CR and OK7HZ/YI (since landed at Bombay). On a R.107 **B.R.S.22795** heard VS6AZ (22.08), MP4BCC/MM (15.43) and ZS3RO (19.34).

C.W.

G3YF (Chingford) keyed with VK0PM (18.10), 9N1GW (13.30), FR7ZD (17.45), 7G1A (00.05), UA0FE (18.40) and UM8KAA (13.15), whilst RST from DU1OR (20.23), ZA1KC (19.16) and ZS7R (19.10) was entered in the log of **G3BHW.** **G3AAE** contacted VS9OC (23.17), FY7YI (21.05), 7G1A (19.52) and HL9KT (19.55).

From the log of **B.R.S.20104** (Harrow), OR4TX (19.40),

4S7EC (19.00) and FB8ZZ (16.45, Amsterdam Is.) are quoted. **B.R.S.22013** reports VS9ARF (18.37), VS9OA (21.06), CP3CD (00.21) and HL9KT (19.29).

Frequencies for this section are between 14,000 and 14,100 kc/s.

The Lower Frequencies

Reports are few for 7 Mc/s but versatile **G3FPQ** used A1 to contact EL4A (20.37, '007), FF8BF (21.42, '015), VS9OA (22.40, '011), UA3CF (20.40, '020) and ZD2JKO (21.00, '040). All band listener **B.R.S.20317** logged OR4TX (23.00, '012), UM8KAB (23.25, '010), UL7AA (23.20, '015), W2AIS/KV4 (22.33, '001) and CX1OP (23.45, '010).

On 3.5 Mc/s **G3FPQ** worked VS9OA on c.w. at 22.50 ('520). This station is located with the R.A.F. Detachment on Masirah Island, Oman. **B.R.S.20317** mentions CT3AV (23.40, '506), UN1AU (22.05, '515) and UL7LA (23.55, '508).

Top Band brought **5A2CW** and **G3FPQ** a 20 minute QSO on 1875 kc/s, reports being 449 and 579 respectively.

* * *

In addition to the correspondents already mentioned this month the following are thanked for their letters: A.2252, A.2111, A.1844, A.2099, A.1543, A.2132, A.1513 and B.R.S.1457. It will be appreciated that a number of stations are widely reported and this, combined with the limitation of space, means that all lists cannot be fully quoted. Nevertheless your offerings are always gratefully received, so please keep your band reports and news items rolling in to reach R.S.G.B. Headquarters not later than June 17 for the July issue.

S.S.B. Association

S.S.B. enthusiasts will be interested to know that the Single Sideband Amateur Radio Association has recently been formed in U.S.A. The annual subscription, including the Association's monthly magazine, *The Sidebander*, is $3. A news bulletin is transmitted on s.s.b. every day at 20.00, 22.00, 01.30 and 06.30 G.M.T. on 14,289 kc/s or 14,329 kc/s.

Membership application forms and sample copies of *The Sidebander* may be obtained from the Association at 12 Elm Street, Lynbrook, New York, U.S.A.

R.A.E.N. Notes and News

By E. ARNOLD MATTHEWS (G3FZW) *

BRITISH Red Cross Society headquarters has proposed that a nation-wide communications test be held in order to test the ability of R.A.E.N. members to maintain contact between London and the various County Branch H.Q.s. Such an exercise would be preceded by a series of regional schemes similar, perhaps, to the one held a few months ago in Essex and adjacent counties. In this connection controllers are asked to overhaul their arrangements for contact with neighbouring groups. Good liaison and preparation now will save much time later on.

Around the Groups

On May 4 the **North Norfolk** Group was called out in a test alert, having been warned two months ago that the test would be carried out sometime in the next six months. The result was surprisingly satisfactory; 12 of the 16 members being "on watch" within 20 minutes of the alert being called by the A.C., G3MWV, whose area covers 300 square miles. Of the members who were unable to participate one was ill, one away from home, and two at business would have reported for duty had the alert been "the real thing." Radio was not used for the call-out. It is considered that standing arrangments made with Norfolk Police will enable public telephones to be used in all but the most sudden emergencies.

R.A.E.N. Inter-County V.H.F. Links

Council have recommended that 144·12 Mc/s be used as a working frequency for trunk routes and inter-county nets in all areas of the U.K.

The **Birmingham** Group participated in a disaster relief exercise held by St.J.A.B. on May 15. Two St.J.A.B. divisions acted as relief teams and a third provided the "casualties." It was assumed that an aircraft had crashed on a works' sports field in a built-up area of the city. Activities were controlled from St.J.A.B. H.Q. in the centre of the city. R.A.E.N. operations were carried out on 160m with two fixed stations and two mobiles, and on 2m with one fixed station and four mobiles. Despite St.J.A.B. personnel having no previous experience of the use of radio, R.A.E.N.'s part in the exercise went off well and the County Commissioner, Brigadier M. L. Hayne, C.B.E., expressed his satisfaction with the Network's services.

The C.C., G3CNV, comments that the use of headphones at the control stations made for considerably less distraction of operators who were situated in the "operations room." It was also found that it was almost essential for all 2m stations in the net to use the same polarization of aerials.

Exercise "Wessex" organized by Southampton A.C., G3GOP and B.R.S.16075 was carried out by **Hampshire** Group on April 24 to check communications between the C.C. and the A.C.s, and to find the level of interference between stations participating. Fifteen stations linked six "incidents" with control at Winchester County Police H.Q. Each area group had at least one "incident," ranging from an air crash in the Isle of Wight to a fire at Fawley refinery. Several routing difficulties occurred and relay working had to be adopted. This threw a heavy load on G3GOP, who handled 59 messages in 2¾ hours. Mobiles at incident sites showed much imagination in framing their reports. Message handling and procedure has improved but there was some "nattering"—a thing which has no place in R.A.E.N. nets. In a letter of thanks to members the C.C., G3ION, outlines the problems brought to light by the exercise and local schemes are being held to work out the answers.

Somerset Group is now well set to expand, five A.C.s having been recently appointed. The C.C., G5TN, reports that the mobile stations have little difficulty in working throughout the county. An exercise with user services is in the offing.

Personnel

Mr. T. H. Felton (G2ATS), The Priory, Laceby, Grimsby, Lincolnshire, has been appointed County Controller, Lincolnshire.

The following have been appointed Area Controllers: A. E. Tillyard (G2IJ), 268 Copnor Road, Portsmouth, Hants.; B. Booth (G3NXU), 18 Broadlands Avenue, Keynsham, near Bristol; B. J. Clark (G3BEC), 107 Eastland Road, Yeovil; J. Etherington (G5UG), "Cronk Moray," Worlebury Park, Weston-super-Mare; M. D. Evans (G3NNE), 64 Trull Road, Taunton; J. F. R. Weston (G3LYW), "Tudor Lodge," Kingsdown, near Box, Somerset.

The following have resigned their offices as Area Controllers: D. M. Pratt, G3KEP (Bingley); G. L. Fish, G3ADJ (Reading); C. J. Spencer, G3GRA (Plymouth) (upon removal to Kent).

* *1 Shortbutts Lane, Lichfield, Staffs.*

A Personal Story

Amateur Radio in the Balkans

BY GEOFFREY CROYSDALE, B.Sc. (G3HQZ) *

TO anyone who listens on 20m s.s.b., the happy voice of YU1AD, will be well known. My father, G5US, and I have often been in touch with him over the air during the past few years, and recently I had the pleasure of meeting him in person. Having decided to take a rest from motoring, I arranged to travel by rail, spending a few days in Yugoslavia, before venturing a little further along the line into Bulgaria to have a first peep behind the "Iron Curtain."

Although the trip was limited to only sixteen days a short visit was paid to I1ACL in Venice and from his magnificent and lavishly-equipped station no difficulty was experienced in making a really "solid" QSO with G5US on 20m.

It was a rather long and tedious journey to Belgrade but I soon cheered up when YU1AD (Mirko) came to the hotel. We spent the first day sightseeing and then went to his home for a short QSO with G5US, again on s.s.b. YU1AD has a fine home-built rig and his efforts in radio construction have won him national recognition. At the radio club, Mirko, who is evidently well-liked among the other YU amateurs, introduced me to many of the members, most of whom could speak some English or German. Every encouragement seems to be given to beginners in their well-equipped workshop. The evening finished with a delicious supper at one of the open-air restaurants.

In the train from Belgrade to Sofia the first hint of Bulgarian hospitality became obvious, when a party of students welcomed me across the "Iron Curtain" with wine and music. As I stepped out onto the platform in Sofia, I was amazed to hear my own call-sign "G3HQZ" being whistled in Morse code! LZ1AF and three members of the club station LZ1KPC had come to meet me. A few weeks before leaving I had written to the club, mentioning that I would like to meet some of the members, but I hardly expected such a reception as this. It also turned out that G5US had been speaking to LZ1AF only a few days previously when OK7HZ was in Bulgaria with his mobile station. LZ1AF acted as guide and interpreter during the visit. As well as being a linguist and sculptor of some repute, he is a first-class c.w. operator. At the Sofia City Radio Club, LZ1KBA, I was once more impressed by the team-spirit, excellent organization and good facilities for the younger members. All their gear, which included tape recorders and miniature transistorized receivers, was skilfully constructed from the precious components, most of which were of Russian manufacture, with characteristics very similar to those made in England.

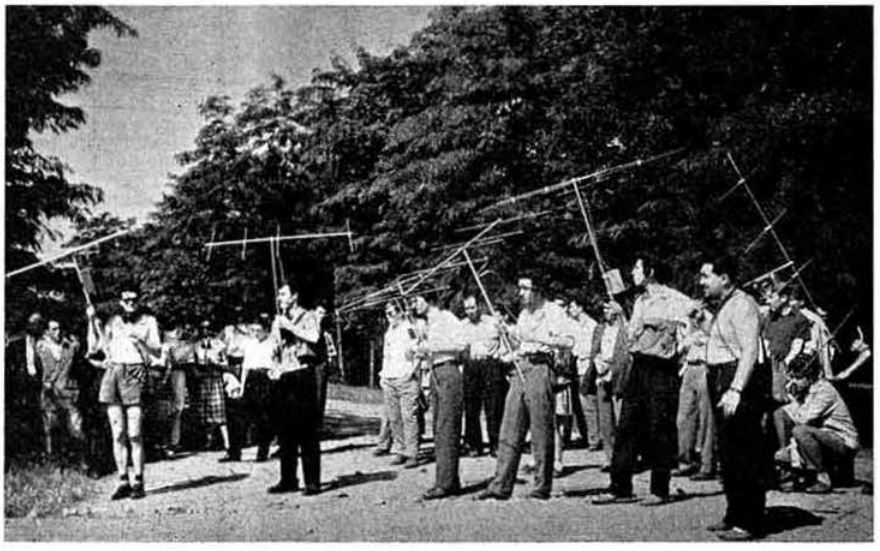
The national championship contest for Morse code reception took place during the visit and was won by a girl at the phenomenal speed of 400 cyphers per minute. Later that day I was interviewed by LZ1AF and the recording was included in the special Amateur Radio programme which is broadcast on the first Friday of each month at 19.30 G.M.T. on 9·7 Mc/s.

At the TV studios, LZ1AB proudly showed me photographs of the television pictures they had received from London and New York.

On the last day the national "fox hunt" competition took place in one of Sofia's vast parks.

In Hungary, on the return journey I stayed in Budapest.

LZ1AF outside the Academy of Sculpture in Sofia.



A group of Bulgarian D/F enthusiasts ready for a "fox hunt" in West Sofia Park.

* *74 Beverley Road, Ruislip Manor, Mddx.*

This picture of YU1AD, one of the best-known Yugoslav radio amateurs, was taken in Belgrade.

Following an introduction by LZ1AF, here I met HA5AM, and some of the members of the Budapest Radio Club, HA5KDQ, including HA5DD, their secretary. They arranged outings and an interview for their own "DX Programme," which is broadcast at 20.15 G.M.T. every Tuesday on 9,833 kc/s.

Through being an amateur, I felt I had a unique opportunity for meeting many people whom, in spite of different political circumstances, I may now count as personal friends. Furthermore we are fortunate in being able to make contact from time to time on the air.

National Radio Show, 1960

MEMBERS willing to assist in manning the Society's stand at the National Radio Show, to be held at Earls Court, London, from August 24 to September 3, are invited to write to G. W. Norris (G3ICI), 134 Meads Lane, Seven Kings, Essex, stating when they will be available.

Southampton Show

THE Southampton R.S.G.B. Group will be taking part in the Southampton Show, Southampton Common, on July 8 and 9. In addition to displays of home-constructed gear, three stations will be in operation: G2FGD/A on 3·5 Mc/s and other bands up to 28 Mc/s; G3JLS/A on 1·8 Mc/s and other bands up to 28 Mc/s. and G3HKT/P on 144 Mc/s.

Contacts will be appreciated and visiting mobiles can be talked in.

R.O.A.R.!

DOUG. EDWARDS (G3DO), of Sutton Coldfield, Warwickshire, who is a keen Rotarian, has recently been elected to membership of the Rotarians of Amateur Radio, an organization fostered by the Glencoe Rotary Club of Illinois, U.S.A. Up to the end of April 1960 nearly 250 Rotarians who are radio amateurs had become members of R.O.A.R.

Further details can be obtained from W9JKC, P.O. Box 366, Glencoe, Illinois, U.S.A.

Listeners' DX Bulletin

MEMBERS interested in a proposal to publish a private weekly DX bulletin primarily for listeners are invited to communicate with G. Curtis (B.R.S.20104), 45 Holyrood Avenue, South Harrow, Middlesex.

B.A.T.C. at Dagenham Show

ACTIVITIES at the Dagenham Town Show from July 2-10, 1960, will be televised on a closed circuit by members of the South-West Essex Group of the British Amateur Television Club. The pictures will be displayed on television receivers throughout the showground.

Yugoslav National Convention

INFORMATION regarding the Fifth Yugoslav Radio Amateurs' Meeting, organized by S.R.J. and to be held in Skopje from July 2-5, may be obtained from Republicki Odhor Savez Radioamatera Jugoslavije za Makedoniju, Partizanska, 16, Skopje, Yugoslavia.

Silent Keys

S. W. J. BUTTERS (G6UB)

The sudden death on Tuesday, May 10, 1960, of Steve Butters (G6UB) deprived the Society of one of its senior members and Amateur Radio of an old timer of nearly 40 years standing. Mr. Butters lived in Banstead, Surrey for many years and it was there that he became a founder member of that well-known between-the-wars group—the SLIDERS. Steve was a keen supporter of the London Members' Luncheon Club and a founder member of the Radio Amateur Old Timers' Association; in fact the last Amateur Radio function he attended was the R.A.O.T.A. Reunion on April 1 when he was seated among many of his old friends from South London.

During recent months Steve had been living just outside Brighton, preparatory to moving into a new house at Lingfield, Sussex.

News of his death has been received with sorrow by a wide circle of radio friends who join Headquarters staff in extending condolences to his daughter Marguerite. Mrs. Butters died some years ago.

The General Secretary and Miss Gadsden represented the R.S.G.B. and R.A.O.T.A. at the funeral which took place at Brighton Crematorium on May 13; Frank Fletcher (G2FUX) represented the L.M.L.C. J. C.

H. C. KENWORTHY, O.B.E. (G6HX)

We record with deep regret the death on April 12, 1960 of Harold Kenworthy, O.B.E. (G6HX), of Banstead, Surrey. Mr. Kenworthy had been a member of the Society since 1927 and was a founder member of the Radio Amateur Old Timers' Association. He had been in poor health for some time: a fact which prevented him from attending the last R.A.O.T.A. Reunion.

Condolences are offered to Mrs. Kenworthy and her family in their bereavement.

CHARLES V. W. LEFTWICH (G3GSE)

It is with profound sorrow we record the death on March 11, 1960, of Charles Leftwich (G3GSE).

Although interested in Amateur Radio since the 1920's it was not until after the Second World War that Mr. Leftwich received his licence. His great interest lay in 144 and 420 Mc/s work and he will be particularly missed by mobile operators on these bands. He was also well-known in the Scout Movement and as an accomplished pianist.

To his sisters, we express our sympathy in their bereavement.

H. F. S.

LESLIE W. PARRY (ex-G6PY)

It is with deep sorrow that we record the death of Mr. L. W. Parry (ex-G6PY), of Orpington, Kent.

From just after the termination of the first World War, until a few years ago, his call-sign was frequently heard on all bands. He was an early member of the Barnsley & District Amateur Radio Society, and for some long time was the Society's District Representative for the North-east of England, devoting much of his time and efforts in that capacity.

Although he relinquished his transmitting licence when he moved from his native town to Orpington he nevertheless kept in touch with many of his old friends.

His loss is deeply regretted and our heartfelt sympathies are extended to his wife and her family.

G. W. W.

F. M. SMITH (G2ATL)

It is with deep regret that we record the death of F. M. (Fred) Smith (G2ATL) of Birkenhead, Cheshire.

Mr. Smith had been a member of the Wirral Amateur Radio Society for some years and was principally active on the low frequency bands.

To his widow and three sons we express our sympathies at this time. A. S.

Society News

Appeals for Rare Drugs

MEMBERS are advised that the policy of the British Red Cross Society is not to accept requests for rare drugs from individual radio amateurs even when such requests are passed on to them via the police authorities. The British Red Cross Society recommend that when a United Kingdom amateur is asked by a foreign amateur to accept a message for a rare drug he should advise the sender to contact his National Red Cross Society.

Only requests from, or through, National Red Cross Societies, can be dealt with by the British Red Cross Society and any drugs obtained would be sent to the National Red Cross Society concerned.

Mr. J. A. J. Cooper

MEMBERS of long standing will be sorry to learn that Mr. J. A. J. Cooper passed away last month. Mr. Cooper was the first editor of the *T & R Bulletin*, an office he held from July 1925 until February 1928.

Mr. Cooper was with the B.B.C. for more than 30 years retiring a few years ago on pension. He had more recently been with a firm of tape-recording manufacturers.

Mr. Cooper was not an active amateur during the time he was editor of the *T & R Bulletin* but he had earlier held the call 5TR.

Society Films

ANY member in the London area with the necessary knowledge and equipment, including a viewer, willing to assist in editing a number of very old 9mm. Society films is invited to contact C. H. L. Edwards (G8TL), 28 Morgan Crescent, Theydon Bois, Epping, Essex.

R.A.E. Course in Norwich

MEMBERS in the Norwich area who would be interested in attending classes in preparation for the R.A.E. in May 1961 under the auspices of the Norfolk County Council's Further Education Department, are invited to write to Mr. P. J. A. Gowen (G3IOR), 71 Links Avenue, Hellesdon, Norwich, enclosing a stamped addressed envelope. The minimum number of students required is 12.

The cost of the course, including Morse instruction, will be as follows: under 16, no fee; 16-21, 12/6d. for the year; over 21, 12/6d. per term (three terms in the year).

Pirates Fined

A North London youth—Keir Talbot Huxtable of Myddelton Road, Bowes Park—was fined £15 by Wood Green Magistrates on May 6, 1960, on each of two summonses for installing a wireless transmitter without a licence and using the transmitter without a licence. He was also ordered to pay £3 3s. costs. The court was told that the transmitter was used in the premises behind his father's shop in Station Road, New Southgate.

Huxtable, who admitted the offences, told the Court that he was not previously aware he had to have a licence.

* * *

AT the Magistrates' Court, Newport, Isle of Wight, on April 22, 1960, B. D. Cole, 5 Danes Hill Flats, Victoria Grove, East Cowes, pleaded guilty to using radio transmitting apparatus without a licence. He was fined £7, ordered to pay £3 costs and to forfeit his apparatus.

Royal Naval Amateur Radio Society

ALL Royal Naval or ex-R.N. personnel interested in Amateur Radio are invited to attend the inaugural meeting of the Royal Naval Amateur Radio Society to be held at the Royal Naval Signal School, *H.M.S. Mercury*, on June 25, 1960, commencing at 5.30 p.m.

Those who intend being present are asked to communicate with the Hon. Secretary, Royal Naval Amateur Radio Society, *H.M.S. Mercury*, Leydene House, near Petersfield, Hampshire. (Petersfield 760, Extension 22.)

Richard Thurlow (G3WW) to attend American Bar Association Convention

MEMBERS in the legal profession will be interested to learn that Mr. R. F. G. Thurlow (G3WW), who is Clerk to the Isle of Ely Council, and Mrs. Thurlow are planning to attend the Convention of the American Bar Association in Washington, D.C., from August 27 to September 2. More than 12,000 persons are expected to attend the Convention.

Mr. and Mrs. Thurlow will be the guests of Mr. Fred Alberson (W3FMC) while in Washington. During their visit, they will attend a reception at the White House given by President and Mrs. Eisenhower.

Before and after the Convention Mr. and Mrs. Thurlow will be staying with their daughter at Princeton.

NORTH EAST OF ENGLAND OFFICIAL REGIONAL MEETING COATHAM HOTEL, REDCAR

June 26, 1960

Programme:

10 a.m. onwards		**Talk-in on Top Band. (Talk-in station G3JYH/A on 1980 kc/s.)**
1 p.m.	... ...	**Judging of Mobiles.**
2.30 p.m.	...	**Business Meeting.**
4.30 p.m.	...	**High Tea.**
5.30 p.m.	...	**Prize Distribution.**

Headquarters will be represented by the President (Mr. W. R. Metcalfe, G3DQ), the Zone A Representative (Mr. P. H. Wade, G2BPJ) and the Zone B Representative (Mr. F. K. Parker, G3FUR).

Newsreading on Sunday

The background story of the R.S.G.B. News Bulletins

By JACK HUM (G5UM) *

EVERY Sunday morning for about 15 minutes seven transmitting stations engage the attention of probably the greater part of the British Amateur Radio fraternity. They are the stations which broadcast the official R.S.G.B. news bulletins on 80m and 2m and whose operating schedules have been appearing regularly in this journal for the last several years.

" From where does the news come which is broadcast with such unfailing regularity? " The question largely answers itself by the actual context of the bulletins themselves. From all over the country R.S.G.B. Groups contribute advance information about their forthcoming activities, and by doing so help keep members in touch with current events.

" How do I go about getting something broadcast? " This is another natural question which many listeners must have asked themselves. The main purpose of the present article is to answer it.

Special Permit

Because the British Amateur Radio transmitting licence authorises operators to transmit to one another but not to undertake broadcasting *per se*, a special licence was required from the General Post Office before the Society could start its regular news bulletin service. Another requirement was that scripts should be approved by the G.P.O. before transmissions.

Seven Strategic Stations

As may be seen from the GB2RS schedule the stations are sited to give the best possible national coverage. Behind them is an adequate reserve of further operators who can " stand-in " whenever the need should arise.

As is also stated in the schedule, " items for inclusion in the news bulletins should reach Headquarters not later than first post on the Thursday preceding transmission." Upon receipt of the material Headquarters staff do a rapid editing job of tidying it up, typing it and forwarding it to the G.P.O. for approval—and in view of the tightness of the deadline it *must* be a rapid job, even though the incoming texts may be vague, inaccurate or even illegible! Soon, presentable texts are on their way to G.P.O. Headquarters who in turn do another quick job of work to clear typescripts equivalent to 10-15 minutes' news reading (something like 1,000-1,500 words).

The sequence of operations has been discussed in some detail to acquaint members with the time scale involved. For example, news of a DXpedition due to occur on a certain weekend would hardly be topical if broadcast on the Sunday of the actual weekend itself. But it *would* be topical if a week's notice could be given; in other words, the information should be at R.S.G.B. Headquarters *two* Thursdays ahead of the event.

It is for this reason that such things as short-term frequency predictions and propagation forecasts cannot usefully be given, but advance news of human endeavour certainly can.

Your Nose for News

For any who feel that the news bulletins do not contain enough topical news, one piece of advice may be given: if you yourself learn of an item of Amateur Radio news likely to interest the majority of members, send it in to R.S.G.B. Headquarters—but do so only if it is substantiated and if it will still be topical after it has been broadcast the next Sunday!

To offer a typical example, here is a piece written by a Town Representative and intended for inclusion in the news bulletins put out on Sunday July 10:

" Something new in the calendar of the Welwyn Garden City group of the R.S.G.B. is to be attempted next Thursday evening July 14. It is the group's own private mobile rally. The objective is to put on the air as many mobile stations as the group can muster and attempt to make contact with one another and with fixed and mobile stations beyond. Most stations will operate on 160m and 2m and in addition to announcing their own call-signs will state that they are members of the Welwyn Garden City Group. Everyone who can operate on these bands and would like to enjoy some unusual contacts is invited by the Welwyn Garden City Group to listen out for their members between 8 and 10.30 next Thursday evening, July 14."

It will be noticed that no individual call-signs or names are mentioned in the above news story. In some cases however, the names of lecturers, key participants or Town Representatives must be introduced for the sake of completeness.

* *Bulls Green, Knebworth, Herts.*

Amateur Radio on Southern TV

ON April 20, Southern Television filmed a short QSO between G3LEQ/A (operating from the West Kent Amateur Radio Society's stand at the Tunbridge Wells Round Table Exhibition) and G3MQT of St. Leonards. The film was televised during news bulletins on April 25.

Electronics and Instruments Exhibition

THE Fifteenth Annual Electronics and Instruments Exhibition and Convention organized by the Northern Division of the Institution of Electronics will be held at the Manchester College of Science and Technology from July 7 to 13, 1960. Tickets and further information may be obtained from W. Birtwistle, General Secretary, Institution of Electronics, 78 Shaw Road, Rochdale, Lancashire.

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
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
145·3—145·4 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.

CONTEST NEWS

RESULTS — REPORTS — RULES

1250 Mc/s Tests 1960

THE 1250 Mc/s Tests organized by the R.S.G.B. took place this year on March 26 and 27. Seven logs were submitted for consideration and one other station was known to be active during the period. This represents a considerable increase in activity over last year's tests and it is encouraging to note that at least four of the participants were using relatively simple equipment. Most of the stations were in contact with all the others at some time or other during the weekend although reports varied from 59 on phone to 539 on c.w. In quite a few cases contact was made cross-band to 70cm.

Some of the more regular entrants have repeated their results of previous tests after some modification to their equipment while G3FUL and G3BVU have added one more county to their lists bringing the total number worked two-way on 23cm up to eight. These two stations were the only portable stations involved in this year's test and suffered more than any from the poor weather conditions. With a view to encouraging more portable activity on this band, an effort will be made to fix the date of next year's test in the more hospitable summer months.

The Contests Committee has decided to recommend the award of the Arthur Watts Trophy for 1960 to B. R. Arnold (G3FP) of Thornton Heath, Surrey who, more than any other competitor, has achieved consistent results using probably the simplest form of crystal controlled equipment. However, the Committee would like to express its thanks to all the other participants in the Tests for the logs they submitted, the general standard of which was first class.

Entries were received from G3BVU, G3FP, G3FUL, G3HBW, G3HWR, G5DT and G8AL.

Second 144 Mc/s Field Day 1960

R.S.G.B. members throughout Europe are invited to take part in this contest, the details of which are given below.

When: 10.00 G.M.T. to 19.00 G.M.T. on Sunday, July 3, 1960.

Sections: (a) *Portables* must operate from the same site throughout the contest.
(b) *Mobiles* must quote the location from which each contact is made.

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 (see R.S.G.B. Contests Rule 7).

Contacts: May be made on A1, A3 or A3a 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 for contacts with other portables or mobiles.

Contest Exchanges: RST (RS) reports followed by the band identification letter A and the contact number and location (e.g. RST559A001 5NE Luton). The location given on the Cover Sheet must be transmitted for each contact. (This location is to be identifiable on the Ordnance Survey, 10 mile to the inch map.)

Logs: (a) Must be tabulated 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," " Location of Station 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.
(c) Entries must be postmarked not later than Monday, July 18, 1960.

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 leading mobile station. A **certificate of merit** will also be awarded 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 423 of the March 1960 *Bulletin* apply to the contest.

D/F Qualifying Events

FOURTEEN of the 18 starters in the Oxford D/F Qualifying Event on April 24, 1960, succeeded in finding the hidden transmitter operated by the organizer, F. A. Jefferies (G8PX). First to arrive was G. Nicholson (G3HKC) of the Slade Radio Society at 14.51 followed one minute later by Colin Mather (B.R.S.20837) of the Oxford and District Amateur Radio Society and L. C. P. Boby, also of Oxford.

The Contests Committee was represented by Messrs. R. C. Hills (G3HRH) and D. A. Findlay, D.F.C. (G3BZG).

Following tea at the Eastgate Hotel, Oxford, there was a lively discussion on D/F matters.

* * *

Details of the Wessex event to be held on July 10 are as follows:

Sunday, July 10.
Organizer: H. J. Fenn (B.R.S.2515), 6 Church Street, Great Bedwyn, Marlborough, Wilts.
Frequency: 1875 kc/s.
Call-sign: G3LLK/P.
Map: Ordnance Survey, New Popular Edition, Sheet 168.
Assembly Point: Redenham (N.G.R. 300497.)
Assembly Time: 13.30 B.S.T.
Entries and Tea: Intending competitors should notify the Organizer by July 1, stating the number in their party requiring tea.

R.S.G.B. 21/28 Mc/s Telephony Contest 1959

IN the report on the 1959 Telephony Contest which was published in the April BULLETIN, the call-sign of W1RWU was incorrectly given as W1RWH. An asterisk should have been shown against the call-sign of ZB1CA indicating that he is a certificate winner.

144 Mc/s C.W. Contest, 1960

THE Contests Committee regrets that in the report of the 144 Mc/s C.W. Contest, 1960, published in the April issue of the BULLETIN, the score of 225 points made by GM2FXN was omitted. All GM2FXN's contacts were with Scottish stations.

Grafton Radio Society Top Band Contest

A TOTAL of 29 logs was received for the Top Band Contest organized by the Grafton Radio Society and held on March 26-27 and April 2-3. The Members' Section was won by G3JVV with 132 points, followed by G3RX and G3MFU. The leading station in the Open Section was G3ERN, who scored 111 points, with G3MYI in second place and G3FS third.

CONTESTS DIARY

June 19	70 Mc/s Contest (For details see page 512, May 1960)
July 3	Second 144 Mc/s Field Day* (For details see this page)
July 10	D/F Qualifying Event (Wessex) (For details see this page)
August 27-28	All Asia DX Contest

September 3-4	- European V.H.F. Contest
September 3-4	- National 144 and 420 Mc/s Contests*
September 4	- D/F National Final
September 25	- Low Power Field Day
October 2	- R.A.E.N. Rally
November 6	- Second 1·8 Mc/s Contest
December 3-4	- R.S.G.B. Telephony Contest R.S.G.B. Telephony Receiving Contest

**To coincide with Region 1 I.A.R.U. v.h.f. contest dates.*

Letters to the Editor . . .

Neither the Editor nor the Council of the Radio Society of Great Britain can accept responsibility for views expressed by correspondents.

Licence Matters

DEAR SIR,—In recent months the G.P.O. has apparently toughened its attitude towards radio amateurs who permit unauthorized persons to operate their stations. Lately, I have had many discussions with other members on this topic and it is often suggested that the G.P.O. is being unreasonably officious in this matter. Having listened carefully to both sides, I disagree with this view.

The Amateur (Sound) Licence states quite clearly that the station may only be operated by the licensee or other authorized person, the latter meaning any other licensed British amateur. Some confusion has arisen regarding the word " operate " it being assumed by many that, if one does not touch any switches or knobs but only speaks into a microphone, then one is not operating the station. This is nonsense, of course, for the following reason. To convey intelligence one either speaks into a microphone or uses a Morse key or teleprinter. I do not think anybody would dispute that in the latter two cases the station is being operated by the person tapping the key, even if somebody else throws a few switches. It follows that, in the case of telephony, it is the person doing the talking who is the operator. Technically then, it is a breach of the license regulations if one allows a member of the family merely to say " Good evening " if that person does not hold a licence.

At first I thought this was rather mean, but on reflection it could lead to piracy. I am quite sure that, whilst we wish to give the newcomers to our hobby every possible encouragement, none of us would like to be held responsible for cases of piracy. All too frequently these menaces cause severe interference to other services for which radio amateurs in general get the blame.

A kindred subject that has been written about many times before is reciprocal licensing. At the London Members' Luncheon Club, we usually have a few visitors from the U.S.A. who are stationed over here for up to three years in government or military service. I for one feel very sorry for these fellows who cannot enjoy their hobby to the full. There is no logical reason why the NATO countries, at least, should not conclude reciprocal licensing agreements. In most of these countries, if the person applying for a licence is considered a security risk, the licence would not be granted. In any case, if an undesirable character wanted to transmit to an unfriendly power from the U.K. he is hardly likely to apply to the P.M.G. for the necessary licence!

It is often erroneously suggested that it is the G.P.O. that will not entertain the idea of foreigners holding even a temporary licence here. As many members must know by now, it is part of an Act of Parliament which states that licences can only be granted to British subjects. One way to change this is by a Private Member's Bill in the House of Commons. I believe that at least one amateur is an M.P. so this is not so far-fetched as it sounds.

I trust that these comments will give food for thought and perhaps evoke statements from official quarters. It seems to me that the G.P.O. has been getting some undeserved criticism of late which is a pity, since it is sympathetic towards the Amateur Radio movement.

Yours faithfully,

London, E.10. N. A. S. FITCH (G3FPK).

Message Handling

DEAR SIR,—What a pleasant surprise it was to see the letter on message handling by G3JMO in the February BULLETIN! For too long now has the potential importance of the radio amateur in the public service been neglected. He has a licence to transmit to other amateur stations matter of a personal nature, not involving third parties, but why shouldn't this matter involve third parties? Surely if the amateur was allowed to transmit messages of a secondary nature as envisaged by G3JMO he would be of greater value to the community at large, and this is the goal of every responsible person. If our own bands prove inadequate for this task why not allot special traffic bands? But perhaps this is being a trifle too progressive!

A message handling group could be formed whose members could ensure that traffic is handed on and delivered wherever possible. To these alone would permission to pass third party messages be granted. Membership of this group would be open to those who had had, say, a year of operating experience on phone and c.w.

The value of this service if founded would be increased even more if message handling could be arranged on an international basis, but at first the system would have to be well tried " at home." I feel sure that if the majority of R.S.G.B. members were in favour of third party traffic handling the Council would see fit to appoint representatives to discuss this very important topic with the Post Office.

Yours faithfully,

South Croydon, Surrey. J. MALCOLM NISBET (A.1777).

DEAR SIR,—May I heartily endorse the letter by G3JMO in the February R.S.G.B. BULLETIN, headed " Message Handling." I hope to add a few comments which may strengthen the argument in favour of third party messages by amateurs within the field already mapped out by G3JMO. Firstly, the G.P.O.'s fear and trembling for their monopoly of internal message handling appears to have no good cause. The kind of message we amateurs would handle (such as " parents in Bootle to Johnny in Cyprus ") would not be taking money from the G.P.O., but instead adding to its coffers. I feel sure that most of this kind of traffic would not occur at the expense of G.P.O. services but would supplement them. Neither Johnny nor his parents would consider paying for a telephone call or a telegram at such an expense, unless it was for emergency reasons. Thus outside special occasions there is a void that we could fill with 'phone patches and messages, which at some point probably require recourse to the telephone or postal system of this country. As I see it, the G.P.O. would stand to gain, not lose by the establishment of this kind of traffic service. Of course, I must stress that the traffic envisaged must not be for business, political or military purposes.

So much to satisfy the self-interest of the G.P.O. From the amateurs' point of view, we could gain considerably. With the era of TVI and increasing public awareness of our existence, free message handling of the nature outlined above could do an enormous amount of good for our public relations—coupled, of course, with the spirited work of the R.A.E.N. If Johnny's parents had been helped by an amateur they might well be more favourably disposed towards the struggle of an amateur against TVI. Further, traffic handling would lend more meaning to the title " Amateur Service " which we are given, while it would sharpen our operating skills and organization. The moan about a JA or SV0 sitting for hours on one frequency passing traffic to a W2 may seem justified until one considers the good will he is creating in reuniting divided families for a few brief moments. Generally, the pique felt at this behaviour is more because we want to work the JA or SV0. As we cannot do so, we vent our frustration unfairly on the idea and operation of traffic handling.

That traffic handling is abused (especially for handling military messages) I do not doubt, but as in all our activities, it is up to us to regulate ourselves and to confine our activities to the limits we would most like to have imposed. The service we can give to the ordinary people of this world where normal communications are out of the question is a satisfaction to ourselves, a justification of our privileged position, and I am quite sure of no possible harm to the G.P.O. I sincerely hope G3JMO can muster sufficient support to see further progress in British amateur traffic handling.

Yours faithfully,

Winchmore Hill, London, N.21. I. S. DAVIES (G3KZR).

DEAR SIR,—I was very pleased to see a letter in the February issue of the BULLETIN from Mr. Allen L. Taylor (G3JMO) on the subject of message handling as I had been thinking for some time as to how best to broach this subject to British amateurs.

The writer has operated an amateur station for thirty years and looking back over this long and varied experience the most rewarding memories are those of the genuine gratitude and appreciation of those people who have sent and received personal third party messages via Amateur Radio. Many real friendships and introductions to various community affairs outside of Amateur Radio are the reward of the amateur who renders these services.

In the field of emergency communications nothing can replace

experience and ability to handle quickly and correctly, live, interesting and worthwhile personal messages. It gives the amateur operator confidence and proficiency that can never be obtained by participating in " simulated emergencies " or monotonous repetitive " drill sessions." Disaster strikes with scant regard to plans and in the most unlikely places and having been through several emergency sessions where the sole station in a stricken isolated community had no experience in traffic handling I can assure you they were ghastly experiences indeed.

It may not be realized that a large proportion of message traffic is from one amateur to another. Instead of searching the bands for days trying to locate an old friend it is much more practical to be able to put a message to him " on the net " giving news of what's doing around the bands or around the " shack."

Here in Canada we receive many requests to pass personal messages to friends and relatives in the U.K. but we must refuse and explain that while one can do so to some twenty other countries, the U.K. is still " Behind the Curtain." It is earnestly hoped that Mr. Taylor's suggestion will lead to efforts being made to relax the restrictions and permit British amateurs to participate in this vital and rewarding phase of Amateur Radio.

Yours sincerely,

Vancouver, Canada. JAMES T. HEPBURN (VE7KX, G3NJD).

(In February we wrote " Now for the deluge "! The " deluge " consisted of three letters and a postcard in support of G3JMO's views. Presumably the 8,700 other licensed amateurs couldn't care less—or could they?—EDITOR.)

The QSL—National Prestige

DEAR SIR,—I have just received the following note (with a QSL) by air, from K5KWU, New Mexico—one of the tricky States for those seeking their W.A.S. I quote:

" You are the thirty-third G4 I have worked. I sent out 25 cards and received none! So I gave up trying and quit sending out cards. Thanks very much for yours, etc."

As an old-timer (ex-G2JA, 1929/36) recently returned to activity (May 1959), who can still recall the pleasure and importance of a QSL in those days, may I add a few observations?

In my nine months of renewed activity I have QSL'd every " first time " contact—some 700 cards all told. In the case of G's, about 80 per cent were sent direct. And the returns? DX, including such as ZL, VK, ZS, JA, etc., about 95 per cent. W/K/VE stations show about 75 per cent, but my fellow-countrymen, no more than 25 per cent! I have been simmering for a time on the matter, but this note from K5KWU has made me boil—with the " shame " of being a G4! If a choice morsel of DX failed to supply the necessary means for some of these individuals to obtain the particular " sheepskin " they sought, the shriek of indignation would be heard across the world (by courtesy of Amateur Radio!).

I endorse all that GM3BCL said in his letter in the November 1959 BULLETIN, with the rider that not only GM stations should take note of his comment, but every defaulting U.K. amateur.

The apathy in our ranks on this subject is additionally underlined by the utter lack of originality, almost to the point of stereotype, in presentday U.K. cards when compared with the average Colonial and foreign card: vide G4CP's selection on the cover of the Society's publication *Certificates and Awards.*

Come on chaps, don't be responsible for killing an old " ham custom." The bulk of us have sought a card from the other fellow at some time in our experience. Above all, don't let us bring worldwide disrepute and scorn on the head of one of the most famous prefixes in the world (that letter G worn by aircraft and ships everywhere) in respect of a matter which so essentially cements a QSO and helps foster the spirit of International Amateur Radio.

Yours faithfully,

ALAN D. STENNING.

Baschurch, Shropshire. (G4JA, F.O.C./T.O.P.S.).

Poor Return

DEAR SIR,—I have been licensed for five months and during this time I have sent out 400 QSL cards but received only 30 in return, including seven from local amateurs. As a mere listener, the percentage of returns was about 50 per cent.!

The R.S.G.B. QSL Bureau does a fine job sending out my cards and I am sure it would do the same the other way round if given the chance.

Yours faithfully,

Mill Hill, London, N.W.7. C. A. HOGG (G3NRZ)

Talk—Power

DEAR SIR,—The recent articles about s.s.b. have been most illuminating. But when I got to page 418 of the March issue, I was somewhat at a loss to see why the s.s.b. transmitter is quoted as having four times the " talk power " of an a.m. rig.

I don't mind an 813 running at about five or six times its linear rating, and I am quite happy about 600 watts out for only 320 watts in. My only comment on these is that we are obviously talking about peak output. So why not do the same for the a.m. rig?

The same 813 running at 150 watts input in a.m. will have this figure for its average d.c. input throughout the r.f. cycle. If the duty cycle is about 120°, as it usually is, the average power in the duty cycle will be 450 watts. If we modulate correctly, this will be increased by 50 per cent., making 675 watts. If the efficiency of conversion of d.c. to r.f. is a modest 66 per cent., we shall get 450 watts average per duty cycle. Since the duty cycle at 120° will approximate in wave shape to a half sine wave, we shall have to multiply this average figure by 1·58 to get the peak instantaneous r.f. watts and this comes to 712 watts. As a concession, we will define peak talk power as excess of peak watts over average input watts, and this is 562 watts. Surely not bad for a back number.

If I am right, then the transmitter G2DAF has quoted as having equal power to the s.s.b. job would in fact have peaks well into the kilowatt range. Or can I go round fitting lower rated capacitors in my rig?

Another point on which I am left in doubt is how the relative freedom from selective fading, distortion, etc., works in view of the fact that, since the double-sided types also detect only one sideband in their diodes, then any given frequency within that sideband must fade, distort or what have you, more if it has a carrier with it than if it does not. Does the ionosphere know a s.s.b. sideband from an a.m. sideband?

We are told that we can have clickless thumpless keying—just as we can with an a.m. transmitter used on c.w. But we are not told how much of it we can have. An a.m. transmitter with an 813 at 150 watts will churn out a nice steady 100 watts or more of r.f.—average this time, not peak.

Obviously, communication can be carried on without a transmitted carrier, which does not necessarily mean that the carrier serves no useful purpose. But if it is foolish to decry s.s.b. it is no less so to claim too much for it. We must remember that many of the B.B.C. relays from overseas are carried on G.P.O. s.s.b. equipment—and if not, why not? Yet with all the power and equipment used we still often find that distortion, fading and interference have not been quite eliminated, despite allocated channels and notwithstanding that they have been using it for about 30 years. If some of the less responsible claims are taken seriously, we must have an awful lot to teach them!

Yours sincerely,

Worksop, Notts. H. S. CHADWICK (G8ON).

Forthcoming Events

Details for inclusion in this feature should be sent to the appropriate Regional Representatives. 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 copy in the style used below.

DATES FOR YOUR DIARY

June 19.—Amateur Radio Mobile Society Rally at R.A.F. Croughton, Barford St. John.
June 19.—Southampton District R.S. Treasure Hunt.
June 26.—Longleat Mobile Rally.
June 26.—Region 2 O.R.M. at Redcar.
July 3.—Harlow Mobile Rally.
July 3.—Hunstanton Mobile Rally and "Bucket and Spade" party.
July 8-9.—Southampton R.S. Group exhibition at Southampton Civic Show.
July 10.—South Shields Mobile Rally.
July 10.—Worthing "Bucket and Spade" Party.
July 17.—Southern Counties Mobile Rally at the Vintage Car Museum, Beaulieu Abbey, near Southampton.
August 14.—Derby Mobile Rally.
August 24-September 3.—National Radio and Television Show, Earls Court, London.
August 28.—South Manchester Radio Club and Stockport Radio Society Joint Rally.
August 28.—G6UT's "Ham Party."
September 10.—British Amateur Television Club Convention.
September 11.—Region 1 Field Day.
September 15-17.—R.S.G.B. National Convention, Cambridge.
September 18. — Lincoln Hamfest and Mobile Rally.
October 2.—Region 9 O.R.M. at Weymouth.
November 23-26.—R.S.G.B. International Radio Hobbies Exhibition.
December 16.—Annual General Meeting at Over-Seas House, London, S.W.1.

REGION 1

Ainsdale.—Wednesdays, 8 p.m., 37 Hawthorne Grove, Southport.
Blackburn.—Fridays, 8 p.m., West View Hotel, Revidge Road.
Blackpool (B. & F.A.R.S.).—Tuesdays, 8 p.m., Squires Gate Holiday Camp.
Bury (B.R.S.).—June 14 (Junk Sale), July 12 (Discussion Night), 8 p.m., George Hotel, Kay Gardens.
Chester.—Tuesdays, 8 p.m., Y.M.C.A.
Crosby (C.A.R.S.).—Tuesdays, 8.30 p.m., Colonsay, Crosby Road South, Waterloo.
Liverpool (L. & D.A.R.S.).—Tuesdays, 8 p.m., June 21 (open night), June 28 (Members' D.F. Contest), Gladstone Mission Hall, Queens Drive, Stoneycroft.
Macclesfield (M. & D.R.S.).—June 28, July 12, 26, The Bruce Arms, Crompton Road.
Manchester (M. & D.R.S.).—July 11, Wellington Hotel, Nicholas Croft, High Street, off Market Street.
Manchester (S.M.R.C.).—Fridays, 7.30 p.m., Ladybarn House, Mauldeth Road, Fallowfield.
Morecambe (M.A.R.S.).—July 6, 125 Regent Road.
Preston (P.A.R.S.).—June 28, Visit to R.N.V.R. Training Establishment, July 12, St. Paul's School, Pole Street.
Southport.—Thursdays, 8 p.m., The Esplanade.
Stockport (S.R.S.).—June 22, July 6, 20, The Blossoms Hotel, Buxton Road.
Wirral (W.A.R.S.).—June 17, July 1 (Junk Sale), July 15 (Lecture and Demonstration on /M and /P Rig, by G2AMV), 7.45 p.m. No. 4, Hamilton Square, Birkenhead.

REGION 2

Barnsley.—June 24 ("A Specialized S.S.B. Receiver," by H. Eyre, G5KM), July 8 (R.S.G.B. Recorded Lecture), September 9 (A.G.M.), 7.30 p.m., King George Hotel, Peel Street.
Bradford (B.A.R.S.).—June 28, 7.30 p.m., Cambridge House, Little Horton Lane, Bradford 5. July 12, visit to Broadcasting House, Leeds.
Cleckheaton (S.V.A.R.S.).—June 21, July 6 (A.G.M.), 7.30 p.m., George Hotel, Cleckheaton. June 23, Annual Dinner at Kingsway Café, Dewsbury.
Halifax.—June 28 (Informal), July 5 (Halifax Show arrangements), July 19 (Informal), Sportsman Inn, Ogden.
Leeds (L.A.R.S.).—June 15, 22, 29, Swarthmore Education Centre, 4 Woodhouse Square, Leeds 3.
Scarborough (S.A.R.S.).—Thursdays, 7.30 p.m., Chapman's Yard, North Street, Scarborough.

REGION 3

Birmingham (Slade).—June 17 ("The Collins S-Line Equipment and KWM—2 Mobile by J. Savage of Collins Radio Co. of England Ltd.), 7.45 p.m., The Church House, High Street, Erdington.
Birmingham South (A.R.S.)—June 23 ("Communication Receivers," by G3GVA), 7.30 p.m., Friends Meeting House, Moseley Road, Birmingham; July 2, Exhibition, Highbury Park, King's Norton.
Stourbridge.—July 5 (Talk or Film), 8 p.m., Brotherhood Hall, Scotts Road, Stourbridge.

REGION 4

Derby (D.& D.A.R.S.).—June 22 (Open Night), June 29 (Direction Finding Practice Run), July 6 (Surplus Sale), July 13 (Open Night), 7.30 p.m., Room No. 4, 119 Green Lane, Derby.
Derby (D.S.W. Exp. S.).—Thursdays, 7.30 p.m., Sundays 10.30 a.m., Club Room, Nunsfield House, Boulton Lane, Alvaston, Derby.
Grimsby (A.R.C.).—June 23, July 7, 8 p.m., R.A.F.A., Abbey Drive West, Grimsby.
Leicester (L.R.S.).—June 20 (Special Item), 7.30 p.m., Old Hall Farm, Braunstone Lane, Leicester.
Lincoln (L.S.W.C.).—June 15, June 29, July 13, 7.30 p.m., Room No. 19, Technical College, Cathedral Street, Lincoln.
Melton Mowbray (A.R.C.).—No Meetings until September.
Newark (N. & D.A.R.S.).—July 5, 7.15 p.m., Northgate House, Newark, Notts.
Nottingham (A.R.C.).—Tuesdays and Thursdays, 7.30 p.m., Community Centre, Woodthorpe House, Mansfield Road, Sherwood, Nottingham.
Peterborough (P. & D.A.R.S.).—July 1, 7.30 p.m., Peterborough Technical College. July 3, Mobile Rally and "Bucket and Spade Party" at Hunstanton.
Retford & Worksop (N.N.R.C.).—Tuesdays, Thursdays and Fridays, 7.30 p.m., Victoria Hall, Eastgate, Worksop, Notts.

REGION 6

Cheltenham.—First Thursday in each month, 8 p.m., Great Western Hotel, Clarence Street.
Stroud.—Wednesdays, 8 p.m., Subscription Rooms, Stroud.

REGION 7

Acton, Brentford and Chiswick.—June 21 ("New Test Gear," by G4LS), 7.30 p.m., A.E.U. Rooms, 66 High Road, Chiswick.
Barnet.—June 28 ("Metal Rectifiers" by the Rectifier Division of Standard Telephones and Cables Ltd.), 7.30 p.m., Red Lion Hotel, Barnet.
Bexleyheath (N.K.R.S.).—June 23 ("N.F.D. Inquest" and Film Show), July 14, 8 p.m., Congregational Hall, Bexleyheath (near Clock Tower).
Croydon (S.R.C.C.).—July 12, 7.30 p.m., "Blacksmith's Arms," South End, Croydon.
Dorking (D. & D.R.S.).—Second and fourth Tuesday in each month, 8 p.m., Star and Garter Hotel, Dorking.
Ealing.—Sundays, 11 a.m., ABC Restaurant, Ealing Broadway, W.5.
East Molesey (T.V.A.R.T.S.).—July 6 (Lecture on Transistors), Carnarvon Castle Hotel, Hampton Court.
Enfield & District.—June 23 ("Electronically Stabilized Power Supply," by G3EOH), 7.30 p.m., George Spicer School, Southbury Road, Enfield.
Harlow and District.—Thursdays, 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), Fridays (Club), 7 p.m, Montem School, Hornsey Road, N.7. June 18/19, Grafton Field Day, Tumulus Field, Hampstead Heath, N.W.3. Visitors welcomed.
Ilford.—Thursdays, 8 p.m., 579 High Road, Ilford (near 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).
Mitcham (M. & D.R.S.).—Fridays, 8 p.m., "The Cannons," Madeira Road, Mitcham.
New Cross (C.A.R.S.).—Fridays, 7.30 p.m., Sundays 11.30 a.m. (Audio Section last Tuesday in each month, 7.30 p.m.), 225 New Cross Road, London, S.E.14. June 26, Second D.F. Contest, rendezvous at Green Street Green, Kent, 10.30 a.m.
Norwood and South London.—July 9, 8 p.m., second Saturday and last Tuesday each month, 8 p.m., Windermere House, Westow Street, Crystal Palace.
Romford (R. & D.R.S.).—Tuesdays, 8.15 p.m., R.A.F.A. House, 18 Charlton Road, Romford.
Slough.—July 4, 8 p.m., Stag Hotel, Wexham Street, Wexham.
South Kensington (C.S.R.S.).—June 21, 6 p.m., Science Museum, South Kensington.
Welwyn Garden City.—July 14, Group Mobile Rally.

LONDON MEMBERS' LUNCHEON CLUB

will meet at the Bedford Corner Hotel, Bayley Street, Tottenham Court Road,

at 12.30 p.m. on Fridays, June 17, July 15, August 19 and September 16,1960.

Telephone table reservations to HOL 7373 prior to day of luncheon. Visiting amateurs especially welcome.

REGION 8

Crawley (C.A.R.C.).— June 23 (Visit by T.V.A.R.T.S.), July 14 (Informal), 7.30 p.m., "The Brewery Shades," Crawley High Street.

REGION 9

Bideford.—First Thursday in each month, 7.30 p.m., alternatively at G2FKO (T. G. Ward), 38 Clovelly Road (Phone Bideford 964) and G3BO (D. H. Jones), Rosebank, Westcombe (Phone Bideford 550).
Bristol.—June 17 ("Modern Amateur Equipment"—discussion and demonstration of locally constructed equipment followed by "Longleat Mobile Rally 1959," colour slides by A. H. Radford, G6YA), 7.15 p.m., Carwardine's Restaurant, Baldwin Street, Bristol 1.
Exeter.—July 14 ("Design and Construction of a Multi-band Beam," by J. Forward, G3HTA and J. Bright), 8 p.m., Y.M.C.A., St. David's Hill, Exeter.
Falmouth (F.R.C.).—First Wednesday in each month, Y.M.C.A., Falmouth.
Torquay.—June 18 ("Two Metre Activity and Experiences," by Arthur Bullock, G3IEA), Y.M.C.A., The Castle, Torquay.
Weston-Super-Mare.—Second Wednesday in each month, 7.15 p.m., Technical College, Lower Church Road, Weston-Super-Mare.
Yeovil (Y.A.R.C.).—Wednesdays, 7.30 a.m., Grove House, Preston Road, Yeovil.

(Continued on page 567)

REGION 10

Cardiff.—July 11 (Quiz), 7.30 p.m., Sgts. Mess, T.A. Centre, Park Street, Cardiff.

REGION 11

Prestatyn (F.R.S.).—July 4 (" Subscriber Trunk Dialling," by T. A. P. Colledge of G.P.O.), 7.30 p.m., Ffrith Hotel, Ffrith, Prestatyn.

REGION 14

Glasgow.—Last Friday in each month, 7.30 p.m., Christian Institute, 70 Bothwell Street, Glasgow, C.2.

Prestwick.—Third Sunday in each month, 7.15 p.m., Royal Hotel, Prestwick.

REGION 17

Portsmouth.—Thursdays, 7.30 p.m., Scarrs, 183A Albert Road.

Southampton.—First Saturday in each month, 7 p.m., Prospect House (back of Gas Board showrooms), Above Bar, July 2, " Oceanography," by Cmdr. Macmillan, M.B.E., R.N.R., F.R.I.C.S., F.I.M. (illustrated with films).

Regional and Club News

Army Wireless Reserve Amateur Radio Society.—An effort is to be made to get other Royal Signals and R.E.M.E. amateur clubs to affiliate to the society. Club secretaries interested in such a proposal are invited to contact GW3NMQ at 21 Med. Regt. R.A., Rhyl, North Wales. Arrangements are being made for the society to be represented at mobile rallies. *Hon. Secretary:* Major D. W. J. Haylock, R. Sigs. R.A.R.O. (G3ADZ), 3 Norris Gardens, Grange Estate, Havant, Hants.

Bradford Amateur Radio Society.—At the A.G.M. the following were elected: *President*—D. Binns (G3MGI); *Vice-President*—L. A. F. Stockley (G3EKE); *Hon. Treasurer*—E. J. Davies (G3KSS); *Hon. Secretary*—M. T. Powell (G3NNO); *Public Relations Officer*—P. A. Dennison (G3NOE). Members were due to visit Holme Moss TV station on June 14. Details of meetings are given in *Forthcoming Events.*

British Two-Call Club.—Publication of the club's *Newsletter* has been unavoidably delayed. The *Hon. Secretary*, G. V. Haylock (G2DHV) is now resident at 28 Longlands Road, Sidcup, Kent.

Bristol.—Seventy-four members and visitors were present at the May meeting when a lecture and demonstration on " Transmitting Aerials " was given by H. V. Sims, M.Brit.I.R.E., Assoc.I.E.E., Senior Lecturer at the B.B.C. Engineering Training Dept. On June 17, there will be the usual annual demonstration of locally-constructed equipment which will be described by the members concerned. Coloured slides taken at last year's Longleat Mobile Rally by A. H. Radford (G6YA) will be screened with a commentary by D. V. Newport (G3CHW). G3CHW will also be speaking at the July meeting when he will be describing some of the latest Heathkit equipment loaned by Daystrom Ltd. *Hon. Secretary:* D. F. Davies (G3RQ), 51 Theresa Avenue, Bishopston, Bristol, 7.

Cambridge and District Amateur Radio Club.—Louis Varney (G5RV) will give an illustrated talk entitled " Some experiences of an amateur in Latin America " at the " Jolly Waterman," Chesterton Road, Cambridge, on June 24 at 7 p.m. *Hon. Secretary:* A. H. G. Waton (G3GGJ), Arkengathdale, New Road, Barton, Cambs.

Cheltenham.—The Mobile Rally on May 8 was the most successful yet in this area, over 100 cars attending. On the previous evening 39 local and visiting amateurs spent enjoyable hours at an informal dinner, and it was unfortunate that many others who were interested could not be accommodated. It is hoped to rectify this next year. On May 22, the first of six D/F Hunts was held, following up the N.F.D. aerial tests in the full outdoor programme arranged for this year. *Town Representative:* John J. Yeend (G3CGD), 30 St. Lukes Road, Cheltenham, Glos.

Cornish Radio and Television Club.—At the May meeting at the Y.M.C.A., Falmouth, there was a discusson on aerials and feeders. A tape recording from ZS5JF was played back. *Hon. Secretary:* W. J. Gilbert, 7 Poltair Road, Penryn, Cornwall.

Crawley Amateur Radio Club.—Members of the Thames Valley Amateur Radio Transmitting Society will be visiting the club on June 23 at 8 p.m. when Joe Hill (G3JIP) will be the speaker. The meeting will be held at " The Brewery Shades," Crawley High Street. *Hon. Secretary:* R. G. B. Vaughan (G3FRV), 9 Hawkins Road, Tilgate, Crawley, Sussex.

Dunfermline.—At the April meeting George Martin (G3NVQ), who has been a stalwart of N.F.D. in the past, bade farewell on rejoining the R.A.F. The Group hoped to use a transistorized receiver and power supply built by GM3CIG in this year's event. Prospective members are invited to attend meetings at the Carnegie Bath, Pilmuir Street, Dunfermline, on the second Wednesday in each month at 7.30 p.m. *Hon. Secretary:* A. H. Kightley, 28 Castlandhill Road, Rosyth, Fife.

East Kent Radio Society.—The " Williams Trophy " has been won by R. Dale with his self-contained transmitter. R.A.E. classes were started in January and five members took the exam. last month. Meetings are held on Tuesdays at 7 p.m. at Canterbury Technical College, Longport Street. *Hon. Secretary:* D. Williams (G3MDO), " Llandogo," Bridge, near Canterbury.

Halifax and District Amateur Radio Society.—At the A.G.M. the following were elected: *Chairman*—H. Swift (G3ADG); *Hon. Secretary/Treasurer*—A. Robinson (G3MDW); *Minute Secretary/Librarian*—G. Sunter. Meetings will be held at the Sportsman Inn, Ogden, at 7.30 p.m. on June 28 and July 5 (when a proposal to run an exhibition station at the Halifax Agricultural Show will be discussed).

Harrow, Radio Society of.—On June 17, R. Ray (G2TA) will give a talk on Mobile Receivers, and on July 1 the R.S.G.B. recorded lecture " The Human Machine as a Radio Operator " by F. J. H. Charman (G6CJ) will be presented. Meetings are held on Fridays in the Science Lab. at Roxeth Manor Secondary School, Eastcote Lane, South Harrow, at 8 p.m. Visitors are cordially invited to attend. *Hon. Secretary:* S. C. J. Phillips, 131 Belmont Road, Harrow Weald.

Leeds Amateur Radio Society.—Details of activities may be obtained from the *Hon. Secretary*, D. Dinsdale, at his new address: 69 Spen Lane, Leeds, 16.

Mitcham and District Radio Society.—The society is now licensed as G3OCT. No formal meetings will be held during July and August but the club room at " The Canons," Madeira Road, will be open as usual on Friday evenings. *Hon. Secretary:* M. Pharaoh (G3LCH), 1 Madeira Road, Mitcham.

LONDON U.H.F. GROUP
will meet at the Bedford Corner Hotel, Bayley Street, Tottenham Court Road,
at 7.30 p.m. on Thursday, July 7, 1960
All v.h.f. and u.h.f. enthusiasts welcome.

Morecambe.—The Lancaster and District Amateur Radio Society is now known as the Morecambe Amateur Radio Society. Meetings are held on the first Wednesday in each month at the permanent clubroom, 125 Regent Road, Morecambe. Visitors will be welcomed. *Hon. Secretary:* A. R. Thompson (G2FCL), 20 Brendjean Road, Morecambe.

North Kent Radio Society.—This society publishes one of the most informative Newsletters to reach Headquarters and each issue contains excellent summaries of technical lectures given at meetings, in addition to topical items. Details of activities may be obtained from the *Hon. Secretary:* D. W. Wooderson (G3HKX), 75 Mount Road, Bexleyheath, Kent.

Peterborough and District Amateur Radio Society.—The latest colour films on transistor circuitry by Mullard were shown at the meeting at Peterborough Technical College on May 6. Arrangements were discussed for the Mobile Rally and " Bucket and Spade " party to be held at Hunstanton on Sunday July 3, when there will be " talk-in " stations on both Top Band and Two Metres.

Plymouth Radio Club.—At the A.G.M. the following were elected: *President*—Harold Jones (G5ZT); *Vice-President*—Ellis Diggle (G3LSD); *Chairman*—Cyril Teale (G3JYB); *Vice-Chairman and Hon. Secretary*—Ron Hooper, 2 Chestnut Road, Peverell, Plymouth: *Assistant Secretary*—Roger Davey; *Hon. Treasurer*—Ted Fallon. During the meeting the " G5ZT Trophy " and the " Ernie Hillyard Trophy " were both presented to John Fallon.

Reading Amateur Radio Club.—Recent lectures have been on workshop practice and on interference suppression. Information regarding future meetings may be obtained from the *Hon. Secretary:* R. J. Nash (G3EJA), 9 Holybrook Road, Reading.

Reigate Amateur Transmitting Society.—An inquest on N.F.D. will take place at the meeting on June 18 while a demonstration of Amateur Radio will be given at the Fuller's Earth Union Fete at Nutfield on July 9 using the call-sign G3NKT/A on 1·8, 3·5 and 7 Mc/s. Informal meetings will be held on July 16 and August 20 and the regular programme will be resumed in

September. Meetings are held at The Tower, High Street, Redhill, commencing at 7.30 p.m. and prospective members and visitors will be warmly welcomed. *Hon. Secretary:* F. D. Thom (G3NKT), 12 Willow Road, Redhill, Surrey.

Shefford and District Amateur Radio Society.—At the meeting on June 23 at 7.45 p.m. in Digswell House, G. R. Cobb will give a talk entitled " Coping with your Woodwork and Finishing." An R.S.G.B. Film Show is being arranged for June 30.

Southgate, Finchley and District.—This group is another to put out a first class newsletter which contains technical information as well as news items of local interest. *Area Representative:* W. A. J. Smith (G3MXQ), 57 Oakwood Crescent, Winchmore Hill, London, N.21.

Stoke-on-Trent Amateur Radio Society.—Meetings are held on Mondays and Thursdays at 8 p.m. at the rear of the Cottage Inn, London Road, Oakhill. Details of a special series of Morse classes may be obtained from the *Hon. Secretary:* V. J. Reynolds (G3COY), 90 Prince's Road, Hartshill, Stoke-on-Trent.

Torbay Amateur Radio Society.—There was an attendance of 30 at the May meeting when Arthur Hook (G3CMT) gave a lecture entitled " Modern Valve Technique." At the June meeting Arthur Bullock (G3IEA) will give a talk on v.h.f. work. *Hon. Secretary:* George Western (G3LFL), 118 Salisbury Avenue, Barton, Torquay.

Saundersfoot "Bucket and Spade" Party

A "bucket and spade" party will be held at Saundersfoot, South Wales, on *Saturday*, June 25, 1960. Mobiles will be talked in by GW2OP/A and GW3LXI/M on 1876 kc/s. Visitors should assemble at the Argosy Café (which has its own car park) at 2 p.m. when they will be piloted to see the new oil tanker terminal and other items of interest in South Pembrokeshire. Those intending to be present are asked to notify GW2OP or GW3LXI as far in advance as possible so that suitable arrangements may be made for tea at 3/6 per head (minimum number required is 40).

Falkirk Meeting

A meeting of the Falkirk Group will be held at the Temperance Café, Falkirk, on June 23, 1960, at 7.30 p.m. when there will be a discussion on future plans. Visitors will be most welcome.

Representation

THE following are additions to the list published in the December 1959 issue:

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D. Tannock (GM2BUD), 45 Sunnyside Crescent, Mauchline.

Can You Help?

● E. A. Bovey (B.R.S.19530), 1 Chapel Lane, Dartmouth, Devon, who requires information on the power supplies for the R.F. Driver Unit type AP67931 which comprises an EL32 crystal oscillator, two 807s as triplers and a pair of STC4304CA/CBs as push-pull doublers?

● F. W. Fairclough (G3OEI), 28 Rimmer Green, Carr Cross, Southport, Lancashire, who requires the circuit diagram and/or manual for the Canadian R103 Mk I receiver?

● D. Yeo (A.1550), c/o King, 3 Warrender Park Terrace, Edinburgh 9, who requires the manual for the Labgear h.f. bands converter (the model number is not known but it has a half-moon dial and the valves used are EF50 and ECH35)?

Slow Morse Practice Transmissions

Time	Call-sign	kc/s	Town
Sundays			
09.00	G3BHS	1810	Southampton
11.00	G3GZE	1840	Blackburn
11.00	G2FXA	1900	Stockton-on-Tees
11.00	G3HZM	1860	Manchester
12.00	G3LP	1850	Cheltenham
12.00	GI5UR	1860	Belfast
20.00	G3MRA	1915	Southampton
20.30	G3HTA	1850	Exeter
21.00	G2FIX	1812	near Salisbury
Mondays			
18.30	G3NC	1825	Swindon
19.00	G3EJF	1820	Bury, Lancs.
19.00	G3KTP	1850	Heanor, Derby
19.00	G3LMT	1850	Exeter
20.00 †	G3EWE / G3IAF	1975	Woking
20.00	G3GZE	1840	Blackburn
20.00	G3MDH	1915	Southampton
20.30	G3AGN	1875	Felixstowe
20.30	G3MXI	1910	Derby
21.30 †	G3LGK / G3MXI	1980 / 1980	Ilkeston, Derbys. / West Hallam, Derbys.
21.45	G3JKY	1900	Beckenham
Tuesdays			
17.30	G2AAM	1875	Swanwick, Derbys.
18.00	G3GZE	1840	Blackburn
18.30	G2FXA	1900	Stockton-on-Tees
20.00	G2FCI	1850	Exeter
20.00	G3IBI	1915	Southampton
20.00	G3NHR	1900	Hounslow
20.15	G2AYQ	1875	St. Agnes, Cornwall
20.30	G3MEH	1900	Sutton, Surrey
20.30	G3MZD / G3NKX	1875 / 1875	Harlow / Loughton
21.00	G3EFA	1855	Southport
21.00	G3LSC / G3MKN / G3NUN	1875	Poole
21.15	G2CPL	1875	Felixstowe
21.45	G2UK	1875	Lowestoft
Wednesdays			
19.00	G3EJF	1820	Bury, Lancs.
19.00 †	G3MCJ / G3FLK / G2FCI / G3HTA	1845	Exeter
19.00	G3LZC	1830	Heanor, Derby
Wednesdays			
19.00	G8RQ	1850	Chesterfield
20.00	G3BHS	1915	Southampton
20.00	G3GZE	1840	Blackburn
20.00	G3INZ / G3KRR / G3LSK / G3MGH	1920	High Wycombe
20.15	G2AYQ	1875	St. Agnes, Cornwall
20.30	G3MXI	1910	Derby
21.00 / 22.00	G3AGX	1920	Hull
22.00 †	G3LGK / G3MXI	1980 / 1980	Ilkeston, Derbys. / West Hallam, Derbys.
Thursdays			
17.30	G2AAM	1981	Swanwick, Derbys.
18.30	G3NC	1825	Swindon
20.00	G3NBV	1915	Southampton
20.00	G3NHR	1900	Hounslow
20.15	G2AYQ	1875	St. Agnes, Cornwall
20.30	G3GDZ	1910	Kingsbury, N.W.9
20.00 †	G3EWE / G3IAF	1975	Woking
21.30	G3HMY	1850	Exeter
Fridays			
18.30	G3DMN / G3FVP	1880	Ipswich
19.30	G3FUA	1850	Kilburn, Derby
19.30	G3MHR	1850	Swanwick, Derbys.
20.00	G3JQS	1915	Totton
20.00	G3INZ / G3KRR / G3LSK / G3MGH	1920	High Wycombe
20.15	G2AYQ	1875	St. Agnes, Cornwall
20.30	G3ICX	1915	Sutton Coldfield
20.30	G3KGU	1915	Theydon Bois, Essex
21.30 †	G3NPO / G3KSS	1900	Bradford
22.00 †	G3LGK / G3MXI	1980 / 1980	Ilkeston, Derbys. / West Hallam, Derbys.
Saturdays			
13.00	G2FXA	1900	Stockton-on-Tees
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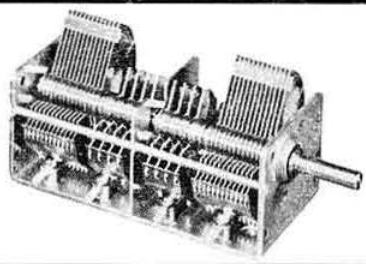

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