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R.S.G.B. BULLETIN

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The R.S.G.B Bulletin is published on or about the 15th of each month as its official Journal by the Radio Society of Great Britain and issued free to members.

THIS MONTH'S BARGAINS

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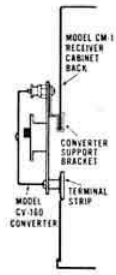

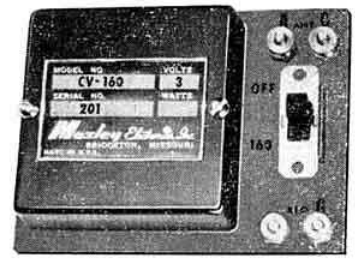

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Current Comment

discusses topics of the day

New Lamps for Old

WITHOUT doubt the Radio Communications Exhibition held in the Seymour Hall, London from October 31 to November 3, 1962, appealed to the vast majority of members, yet there were some who were critical, not of the venue—which was excellent—but of the " fare " provided.

The failure of component and valve manufacturers to support the Exhibition and the fact that a good deal of space was taken up by book publishers and Service organizations were the chief points of criticism, although it has become evident from the letters that have been sent in for publication that many members regret the fact that simple transmitting and receiving equipment has, to all intents and purposes, disappeared from the market.

The days of the DX2 Receiver and the DX3 Transmitter have gone—presumably for good—yet the thought persists that if some of the Society's more technically minded members could be persuaded to turn their attentions to the task of producing 1963 versions of these simple sets they would be performing a most useful service to many present day amateurs as well as to hundreds of others who are anxious to enter our ranks but are deterred from doing so because they fear that the cost and complications of modern equipment will be too great for them. And that applies, in particular, to countless teenagers still at school who would like to become licensed amateurs.

With the pantomime season upon us the cry " New Lamps for Old " will be heard wherever the story of Aladdin is unfolded to spellbound audiences of sophisticated youngsters of all ages. Cannot we, the modern users of magic lamps, look upon that cry as a challenge with a view to using some of the new devices—valves and semiconductors—now on the market to produce prototypes of highly efficient yet simple pieces of equipment that can be built by the tyro for a few pounds?

At the Geneva Radio Conference in 1959 the problem of providing simple receivers for the new and developing countries was taken a stage further at subsequent Plenary Meetings of the International Radio Consultative Committee (C.C.I.R.) who realized that the possession of a simple receiver would bring added pleasure to the lives of countless thousands living in the thickly populated yet poorly developed countries of the world. In like manner, the possession of up-to-date yet simple Amateur Radio equipment would bring many new amateurs into our movement. With the passing of time most of them would buy or build, as generations of amateurs did before them, more elaborate equipment.

If the Society could offer really simple designs and demonstrate them as working pieces of gear at Exhibitions throughout the country it is certain that a very wide chink in our technical armoury would be closed.

Golden Jubilee Year should provide golden opportunities of pursuing the idea. J. C.

Personal

ON January 12, 1937, the then Secretary of the Society took over the full responsibilities attaching to the post of Editor of *The T & R Bulletin*, a task he had undertaken unofficially for the previous three years.

On January 12, 1963—just 26 years afterwards—the same Secretary was due to hand over his editorial responsibilities to a younger man—John Rouse.

The problems of the past 26 years have been many and varied, especially those that were encountered and surmounted whilst the world was at war, but most of them were interesting and some of them challenging.

Since 1937 the Society's Journal has grown in stature and in technical merit. It now commands the respect of an ever-increasing number of members and is read by as large a number again " from the side lines."

May the new lamp that will soon shine above the Editor's desk at Headquarters help to bring fresh lustre to the Society and to its JOURNAL.

To everyone who has helped me to keep the old lamp burning for so long, I offer my most grateful thanks.

G6CL

Installation of President

Mr. Norman Caws, F.C.A., G3BVG, will be installed as the 29th President of the Society during the course of a Social Evening to be held at the

Kingsley Hotel,

Bloomsbury Way, London, W.C.1

on

Friday, January 25, 1963

Commencing at 7 p.m.

For further details of the arrangements see page 368.

A Triple Conversion Receiver for Two Metres

By JOHN GAZELEY (B.R.S.20533) *

THE inexpensive Philco (U.S.A.) 2N1742 transistor with its high gain and excellent noise factor makes possible the design of compact yet ambitious portable or mobile transistor receivers for the 144 Mc/s band. Measuring only 6 in. × 6 in. × 4½ in. and weighing some 6 lb. complete with batteries, the unit to be described has a performance comparable with the best valve type converter and communications receiver line-up so commonly employed in "fixed" 2m stations, yet battery consumption is only 40 mA at 9 volts and 10 mA at 4·5 volts. In all, 17 transistors and five semiconductor diodes are used.

The design (see Fig. 1) comprises a crystal controlled converter in front of a double conversion receiver tuning from approximately 24 Mc/s to 26 Mc/s. Unit type construction is employed to facilitate ease of adjustment but as the reader may not wish to copy the design exactly complete mechanical details have not been included. In any case, with the exception of the converter section, layout is not important.

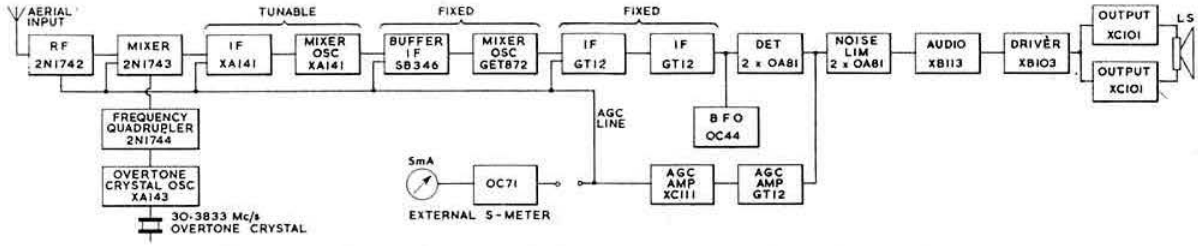

Fig. 1. Block diagram of the complete triple conversion transistor receiver for 144 Mc/s.

The Converter

The circuit of the front-end section is shown in Fig. 2(a). A 2N1742 micro-alloy diffused base transistor is employed as a grounded base r.f. amplifier, a circuit configuration that has many advantages over the grounded emitter arrangement previously employed.† There is really no need to tune the input and neutralization is unnecessary. The gain is slightly lower as is front-end selectivity but the noise factor is improved and circuit adjustment considerably simplified although there is a tendency towards regeneration with the aerial disconnected or with a mis-matched aerial system. In fact the transistor behaves in exactly the same manner as a grounded grid valve amplifier. The circuit arrangement adopted, that of earthing the bases of all the transistors to d.c. in the r.f. and i.f. sections, makes this similarity even greater.

The tuning of the collector circuit, L1, C3, of the r.f. amplifier is fairly sharp and in some cases it may be necessary to damp it with a 10 K ohm resistor, though if wire no thicker than 20 s.w.g. is used this should not be necessary.

L2, C5 is inductively coupled to L1, C3 (see Fig. 3) and tunes the base circuit of TR2 (the mixer transistor). The base of TR2 is tapped about one turn from the earthy end of L2 and the tuning of L2, C5 is accordingly much flatter than L1, C3. Some experimentation with this tapping may be necessary to obtain the best bandpass characteristic between L1, C3 and L2, C5. Oscillator injection is accomplished by interwinding the emitter lead of TR2 with L7, the multiplier (TR4) collector coil. L3, C6 form the collector tuned circuit for TR2 and are resonated at the nominal intermediate

* 192 Haselbury Road, Edmonton, London, N.9.

† "A High Gain Low Noise Transistorized Crystal Controlled Converter for 144 Mc/s", R.S.G.B. BULLETIN, April 1961.

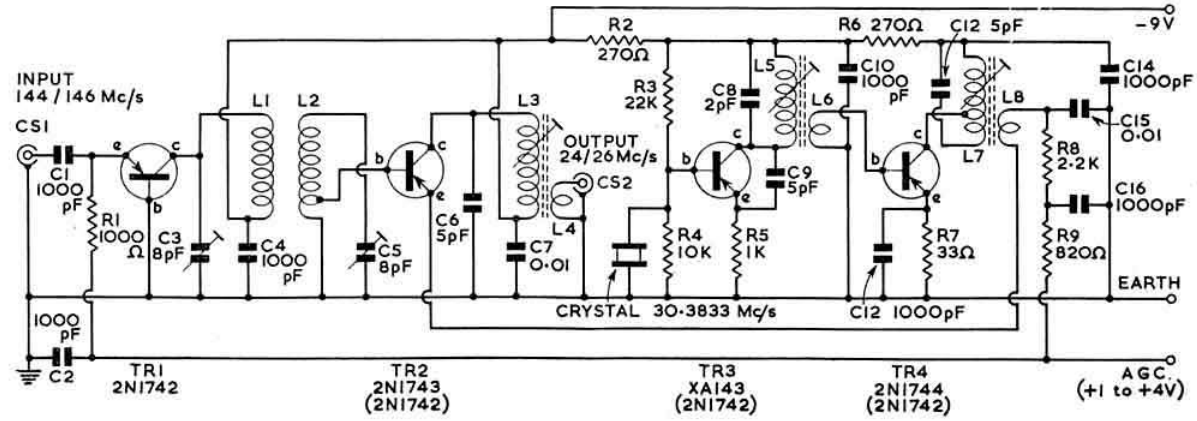

Fig. 2(a). Circuit diagram of the 144 Mc/s front-end section.

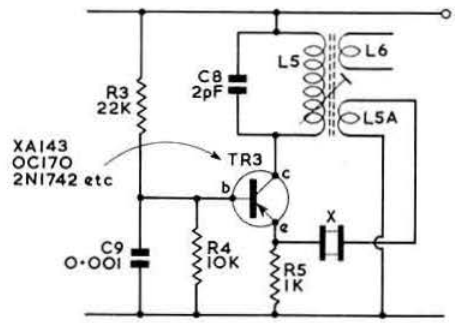

Fig. 2(b). Alternative overtone oscillator circuit for use in Fig. 2(a).

(output) frequency of 25 Mc/s. The response curve of L3, C6 should be very flat and for this reason a thin gauge wire is recommended for L3. The output coupling coil (L4) should be interwound with the middle of L3.

TR3 is a type XA143 drift transistor used as a third overtone oscillator of rather unusual design, the frequency being controlled by a 30·3833 Mc/s overtone crystal, the necessary feedback from the collector to emitter being via

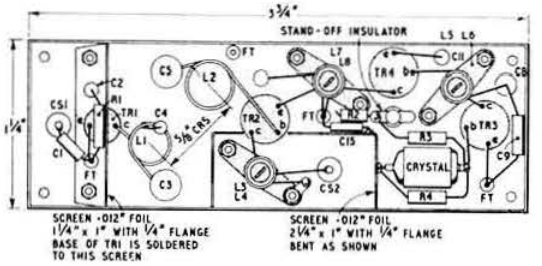

Fig. 3. Layout of the principal components in the 144 Mc/s front-end.

C10. The base earth return is via the crystal in a series resonance overtone mode. TR4 (2N1744) is employed as a frequency quadrupler, the coupling winding L6 being formed by the base lead being interwound at the earthy end of L5. The emitter lead is earthed via a 33 ohm resistor (R7), bypassed by a 0·001 μF capacitor (C11), to prevent thermal runaway. L7, C12 is tuned to the desired injection frequency. Details of the coils are given in the accompanying table.

The use of a separate bias supply simplifies construction and gives very great flexibility of a.g.c. or manual gain control, both the r.f. and mixer stages being controlled by a.g.c.

Tunable I.F. Section

It will be seen from Fig. 4(a) that an XA141 transistor serves as the tunable i.f. amplifier. An OC170 could be used here with some advantage as the XA141 is working close to its alpha cutoff frequency; however there is plenty of gain in hand from the converter section, so that actual gain from this stage (TR5) is not important. The transistor is operated in the grounded base mode to eliminate the need for neutralization. Like TR1, the base is earthed direct to the chassis or screen, gain being controlled either by varying the emitter resistor or the potential (positive) to which the resistor R10 is returned.

TR6 is also an XA141 and is used as a self-oscillating mixer in a similar configuration to that employed in most transistor portable broadcast receivers. Potentiometer

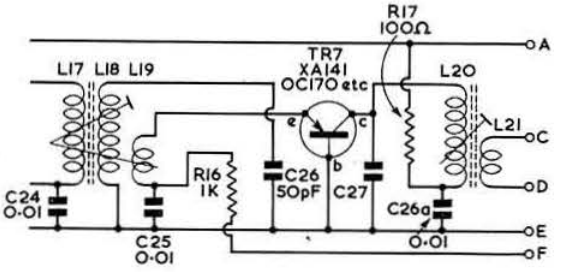

Fig. 4(b). Alternative buffer i.f. amplifier for use with XA131, XA141 or OC170.

type biasing and stabilizing circuits are used and the supply voltage is Zener diode controlled at approximately 6 volts. The oscillator operates on the lower side of the signal (tunable i.f.) frequency to produce a second i.f. of approximately 4 Mc/s.

TR7 (an SB346) serves as a buffer amplifier between the second and third mixer stages and although the gain is unimportant it is desirable to control it both manually and by a.g.c. Due to the low voltage rating of surface barrier transistors the collector is earthed as far as d.c. is concerned and potentiometer type biasing is employed. A.g.c. or manual gain control is achieved by varying the potential of the emitter line. An OC170 could be used in this stage, and the alternative circuit is shown in Fig. 4(b).

TR8 (Fig. 5) serves as a self-oscillating mixer in the same circuit configuration as TR6, converting from 4 Mc/s down to 470 kc/s. The supply is Zener diode controlled from the same source as that for TR6.

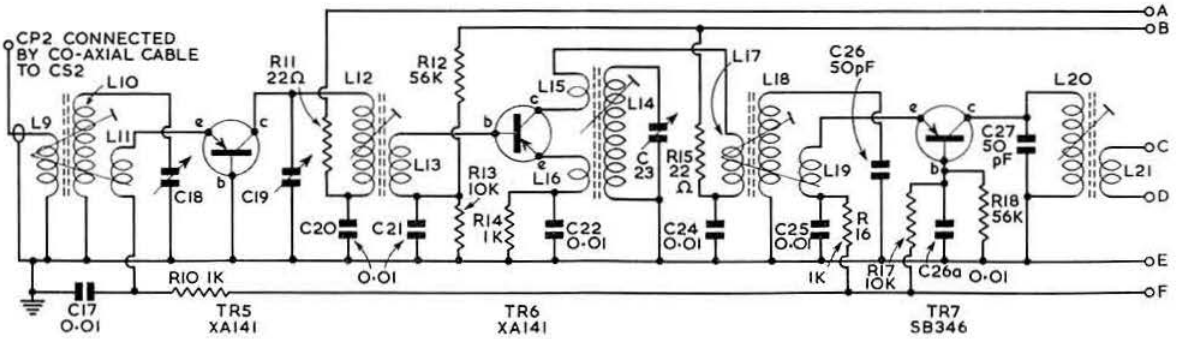

Fig. 4(a). Tunable i.f. stage and buffer i.f. stage. C18, C19, C23, three gang 15 pF.

Coil Table

L1, 5 turns 20 s.w.g., ¼ in. inside diam., ¼ in. long.
L2, 6 turns 20 s.w.g., ¼ in. inside diam., ¼ in. long, tapped 1 turn from earthy end.
L3, 32 s.w.g. enam. on ¼ in. slug tuned former, winding length ⅜ in.
L4, 4 turns 32 s.w.g. enam. interwound at middle of L3.
L5, 32 s.w.g. enam. on ¼ in. slug tuned former, winding length ¼ in.
L6, base lead of TR4 covered with sleeving and interwound 1 turn at the earthy end of L5.
L7, 5 turns 20 s.w.g. on ¼ in. slug tuned former, ⅜ in. long, centre tapped.
L8, emitter lead of TR2 covered with sleeving and interwound 1 turn at the earthy end of L7.

I.F.T.1
L9, 4 turns 32 s.w.g. enam. on earthy end of L10.
L10 (tuned winding), 10 turns 24 s.w.g. enam. to occupy 1 in. on ¼ in. former with dust-iron core.
L11, 1 turn link (emitter lead of TR5) at earthy end L10.

I.F.T.2
L12, (tuned winding), same as L10.
L13, 2 turn link of 32 s.w.g. at earthy end of L12.

Oscillator T1
L14 (tuned winding), 8 turns 24 s.w.g. enam. to occupy 1 in. on ¼ in. former with dust-iron slug.
L15, 4 turns 32 s.w.g. enam. interwound at cold end of L14.
L16, 2 turns 32 s.w.g. enam. interwound at cold end of L14.

I.F.T.3
L17, 15 turns 32 s.w.g. enam. interwound at earthy end of L18.
L18, 32 s.w.g., winding length 1 in. on ¼ in. diam. former with dust-iron core.
L19, 4 turns 32 s.w.g. enam. interwound at earthy end of L18.

I.F.T.4
L20, 32 s.w.g., winding length 1 in. on ¼ in. diam. former with dust-iron core.
L21, 6 turns 32 s.w.g. enam. interwound at earthy end of L20.

Oscillator T2
L22, 10 turns 32 s.w.g. enam. interwound at earthy end of L23.
L23, 32 s.w.g., winding length ⅜ in. on ¼ in. diam. former.
L24, 4 turns 32 s.w.g. interwound at earthy end of L23.

I.F.T.5
Weymouth Radio P50/2CC. 470 kc/s i.f. transformer.

In spite of the high tunable intermediate frequency and the use of self-oscillating mixers in the second and third frequency conversion stages, stability is extremely good. Set to zero beat with GB3VHF the note was quite low pitched after 2 hours continuous running. There is of course no warm up drift and s.s.b. can be copied very well provided the transmitter does not drift.

Provided the necessary modifications in bias circuitry are carried out, there is no reason why OC170, OC171, XA131 and 2N1742 transistors should not be used in the tunable i.f. section.

Final I.F. and Audio Section

TR9 and TR10, both GT12 transistors, serve as neutralized 470 kc/s i.f. amplifiers, though any of the XA101 or OC45 range will operate satisfactorily with the minimum of circuit changes. The bases of these i.f. transistors are earthed for d.c., a.g.c. control being accomplished by varying the emitter bias of TR9. TR10 is uncontrolled.

An OC44 (TR11) serves as the b.f.o. It was not found necessary to crystal control this stage nor was Zener diode stabilization of the supply voltage adopted, there being no noticeable oscillator pulling or chirp on c.w. signals even though a.g.c. is permanently connected. The supply voltage fluctuations are small even on very strong signals. Emitter bias a.g.c. is the primary reason for this.

A high impedance diode detector circuit is used necessitating the use of a further i.f. transformer link coupled via the low impedance windings to the collector tuned circuit of TR10. B.f.o. injection is applied via C46 to this link. A voltage doubler type of detector is used: CR2 and CR3, both type OA81, feed into a 100 K ohm load consisting of a 50 K ohm potentiometer (VR1) in series with a 47 K ohm resistor, R35. The circuit is shown in Fig. 6.

VR1 (the panel mounted noise limiter control) sets the modulation level at which the series diode CR4 ceases to conduct and the shunt diode CR5 starts to conduct. Clipping occurs at 100 per cent modulation when the slider of VR1 is at the detector end and at zero modulation when the slider is at the R35 end. The circuit is similar to that employed in the AR88 receiver and is permanently connected. Very little distortion is caused unless the signal is overmodulated or an s.s.b. signal overmodulates the b.f.o. This noise limiter is especially effective when receiving weak c.w. as the panel control can be adjusted to such a level that clipping is just taking place, so that all unwanted noise ceases. On weak signals or with no signal at all no trace of ignition noise can be detected, only the receiver hiss. Strong signals do have a trace of ignition noise but override it completely. On the debit side there is a loss of audio output but this is overcome by employing an audio stage TR12 (XB103 or XB113) prior to the driver TR13 (XB103 or XB113).

The detector load is matched into the base impedance of TR12 by using a step-down transformer AT1 of 8·5 to 1 ratio with the audio gain control VR2 across the secondary.

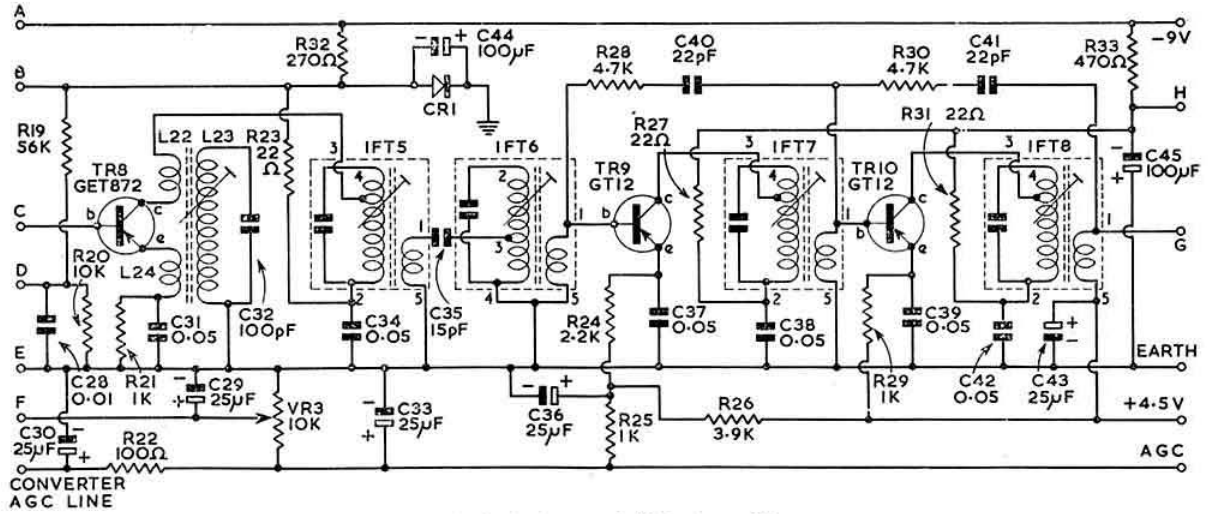

Fig. 5. Final mixer and 470 kc/s amplifier.

The slider of VR2 is connected to the base of TR12 via the blocking capacitor C51. TR12 is d.c. coupled to TR13 with negative feedback, both d.c. and audio, applied via the network R39, C52 to maintain a good balance of audio frequencies and to effect stabilization of the working point of TR12.

A pair of matched XC101 (TR14 and TR15) in class B as the output stage give up to ½ watt of audio power into an internal 3 ohm 2½ in. speaker. The jack J4 provides for the use of an external loudspeaker or phones.

A.G.C. Circuit

A two stage d.c. amplifier comprising TR16 (GT12, XA101, OC45 or OC71) and TR17 (XC121 or OC72) is used in the a.g.c. circuit, the arrangement operating as follows: the base of TR16 is connected to the junction of CR3, C48 and VR1 via R34, a 100 K ohm resistor. The negative d.c component of a received signal causes base current to flow in TR16 and an amplified current flows through the collector circuit load resistor R49, which is also the bias resistor of TR17. Increased current flow causes increased voltage drop through R49 and the base current of TR17 falls accordingly, causing the collector current of TR17 to fall. The emitter circuits of all the controlled stages form the load for TR17, so that as the current through TR17 falls the voltage on the collector of TR17 rises with respect to its emitter circuit and falls with respect to the earth; that is, become more negative or less positive. This in turn reduces the emitter-to-collector voltage of the controlled stages and at the same time reduces the emitter-to-base voltage of these stages, which results in less current being passed. The gain of the controlled stages is therefore reduced.

There is a voltage swing on the a.g.c. line from 4 volts (no signal) to 1 volt (on very strong signals) and a transistor type voltmeter is employed as an external S meter using a cheap audio transistor, though an OC70, OC71, XB102, XB103 or XB104 would be suitable.

A 10 K ohm potentiometer VR3 across the a.g.c. line and earth provides an i.f. gain control, the emitter bias of TR5 and TR7 being so controlled. Use of this control prevents the receiver blocking on very strong local signals which, though fully under a.g.c. control when tuned in, can cause pulling of one or other of the tunable oscillators within 500 kc/s of the offending station's frequency. This is due to lack of front-end selectivity coupled with very high gain.*

When used in conjunction with a transmitter the emitter bias supply (4·5 volts) is broken leaving the 9 volt collector supply connected—this ensures that no destructive base-emitter current can flow, and as it is extremely unlikely that the base to collector maximum voltage rating would be exceeded even if the aerial changeover relay stuck a protection diode has not been included in the design.

Alignment

The 144 Mc/s converter section should be put into operation first. After checking the wiring carefully, power should be applied: 9 volts *negative* for the collector supply and 3 volts *positive* for the emitter bias line, though at this stage the 3 volt supply can be left disconnected until the oscillator section has been correctly tuned. The services of a separate receiver are now needed.

A coaxial lead should be taken from CS2 to the aerial socket on the receiver which should be tuned to 30·38 Mc/s. The core of L5, L6 should then be adjusted until the circuit commences to oscillate (the current consumed by the converter without emitter bias is about 2 mA and this should rise to 3 mA or more when oscillation starts as TR4 will then commence to take current). The slug should be adjusted until the oscillator is crystal controlled and remains so even when the oscillator has been switched off and then on again. Should there be any difficulty in getting the crystal to oscillate on its overtone frequency the alternative circuit of Fig. 2(b) may be tried, but attention should first be paid to the bias components R3 and R4 and to the value of C8 and C9. This circuit works well with all but high self-capacity crystals with which the circuit of Fig. 2(a) will be found to be more satisfactory.

It remains to peak the multiplier stage tuning (C12, L7) and to do this it is necessary to connect the 3 volt bias supply. It is inadvisable to connect the bias supply with the collector

* Since this article was prepared, this effect has been cured by employing separate oscillator and mixer transistors in place of the self-excited mixers TR6 and TR8.

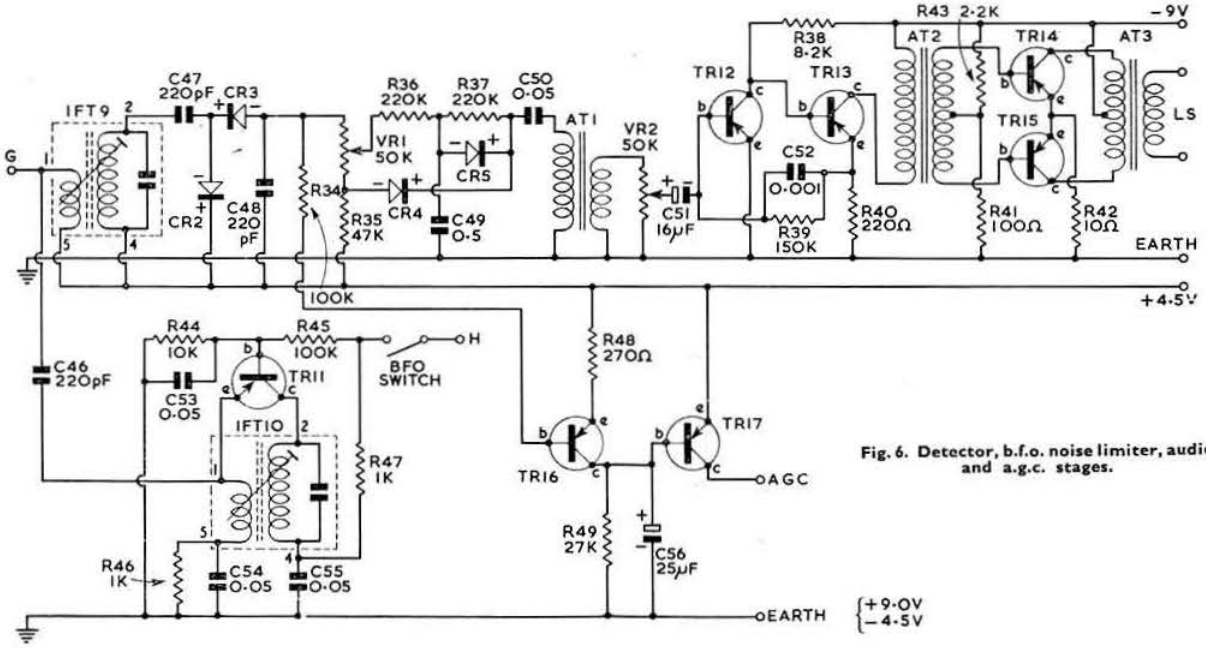

Fig. 6. Detector, b.f.o. noise limiter, audio and a.g.c. stages.

supply disconnected because of the possibility of damage to TR1 and TR2. The converter current should now rise to 5 or 6 mA.

The main receiver can next be set to 25 Mc/s and L3 and L7 peaked for maximum noise. At this stage in the alignment procedure the collector current of TR2 should show a slight rise which can be dipped if an absorption wavemeter tuned to 121·3 Mc/s is held near L7.

An aerial can be connected to C51, and C3 and C5 adjusted until either a noise peak is found or local car ignition noises can be heard. If the main receiver is now tuned over the band 23·5 Mc/s to 25·5 Mc/s it should be possible to hear local 2 metre stations and C3, C5, L3 and L7, can be adjusted for the best results, first on strong signals and finally on weak signals.

To align the other sections it is best to deal with them as individual units. The 470 kc/s i.f. section can be aligned with the aid of a modulated signal generator tuned to 470 kc/s. C35 may be disconnected from i.f.t.5 so that the signal can be injected. Failing the resources of a signal generator a lead may be taken from C35 and placed near one of the i.f. stages of a broadcast band receiver tuned to a powerful local station. I.f.t.6, 7, 8, 9, can then be peaked for maximum output.

The modulation from the signal generator can next be switched off and the S meter plugged in. I.f.t.6, 7, 8, 9, can be checked at this point to see that they are properly peaked. The b.f.o. should be switched on and adjusted to zero beat. This is not normal procedure, but is the best in the circumstances. Selectivity is not very sharp, though adequate for normal 144 Mc/s work, and the b.f.o. is not adjustable so a compromise is made with the disadvantage that c.w. signals are receivable each side of zero beat.

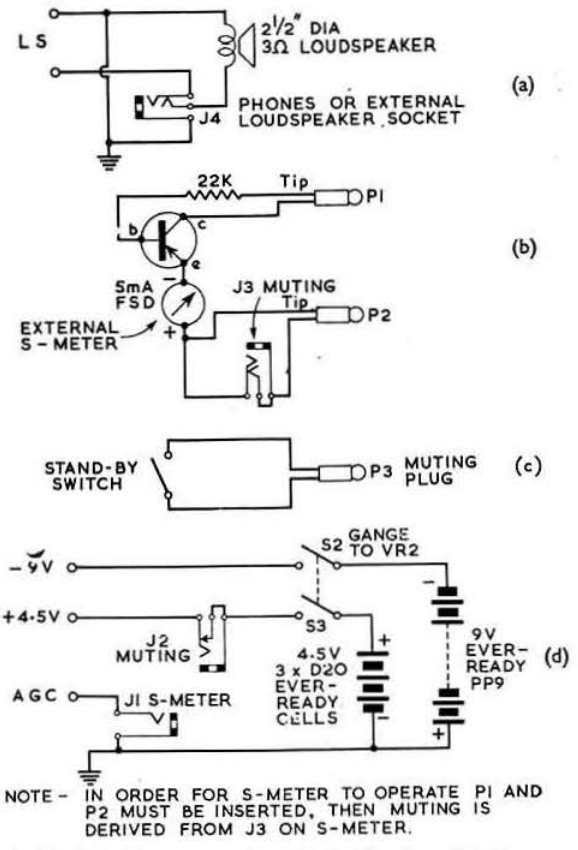

Fig. 7. Switching systems for (a) loudspeaker, (b) S meter (c) muting plug, and (d) battery supply.

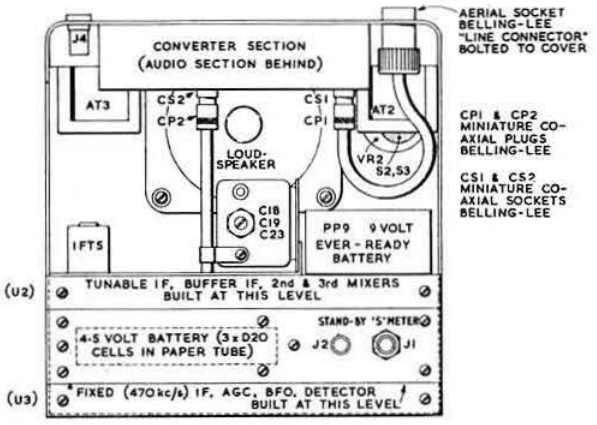

Fig. 8. Rear view of the complete receiver.

The tunable i.f. section can be aligned by using a signal generator or by using the output from the 144 Mc/s converter unit, already aligned. The writer has not measured the exact frequency of the buffer i.f. section and must confess that brute force and hit and miss methods were used in its alignment. A lot can be done using a noise generator and an output meter if a signal generator is not available, and a crystal oscillator using an 8 Mc/s crystal will give quite a strong signal on the third harmonic at 24 Mc/s and 18th harmonic at 144 Mc/s.

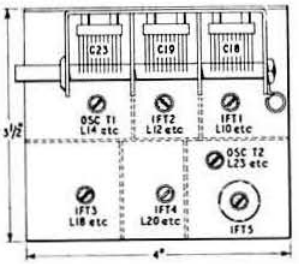

Fig. 9. Position of the tuning capacitor in the tunable i.f. and associated stages on chassis plate U.2. All coils are screened from beneath the chassis as indicated by the dotted lines (see Fig. 8). Chassis plate U.3 is the same size as U.2 and spaced 1¾ in. below.

After the receiver has been fully assembled the various trimmers and coil slugs may be finally adjusted to give the best performance on weak signals.

Results

Sensitivity compares very favourably with a cascode converter into an AR88 receiver and the noise factor is better than 5db for the complete receiver and about 4db for the converter alone. Apart from the audio image on c.w. no trace of second channel or spurious responses can be found even on GB3VHF (this can be read using a 3 in. screwdriver blade as an aerial at the writer's home).

The audio quality with the internal speaker is somewhat thin but on a 6 in. × 4 in. external speaker it is excellent from the communication standpoint.

The writer is indebted to G3FD, G3GOZ, G6LL and other members for their help and testing of the receiver at their home stations.

Second Thoughts on Clamp Modulation

By B. PRIESTLEY, B.Sc. (G3JGO)*

CLAMP modulation, although not as popular as it was some years ago, is still a subject of interest in amateur circles, some being violently against it, whilst others are equally violently in favour. The present article is a record of one operator's results (including the distortion!) with an attempt to explain how the system was designed and adjusted to give good modulation.

As several arrangements are known as clamp modulation, a short description of the set-up in mind may be helpful. Referring to Fig. 1 the clamp valve is without bias under quiescent conditions and so conducts heavily, drawing current through the p.a. screen dropper R1, so reducing the p.a. screen voltage (and hence anode current) to a low level. When modulation is applied to the grid of the clamp valve, the resulting flow of grid current charges the capacitor C which has a high resistance discharge path via Rg so that if the time constant CRg is suitably chosen, a bias nearly equal to the peak amplitude of the modulation is produced—exactly as in a grid leak biased class C stage. Thus the p.a. valve is unclamped sufficiently to accommodate the amount of modulation impressed on its screen.

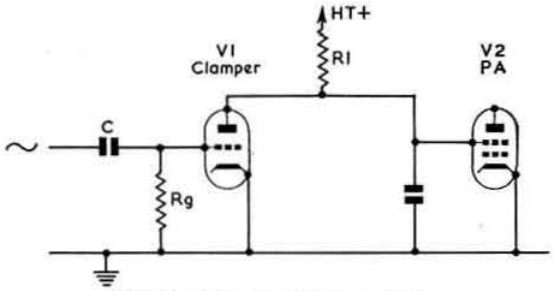

Fig. 1. Basic clamp modulator circuit

Hence a controlled carrier constant modulation percentage output should be produced by the p.a. (Fig. 2).

The writer's first experiments with clamp modulation were on conventional lines in which the 6V6 choke modulator in a Top Band rig was replaced by a 6J5 used as a clamp valve fed from the normal speech amplifier. This produced a spectacular amount of modulation, with only 1 watt of residual carrier output, but the very polite comments of local stations that the quality was " rather rough " caused a quick return to the use of choke modulation with much better reports.

Improving the Quality

At this stage, long periods of enforced inactivity resulted in some deep thought on the problem. Fairly obviously, distortion was caused by grid current in the clamp valve clipping the positive peaks, giving the effect of downward overmodulation of the output, with consequential splatter and distortion. However, it was known that some amateurs had obtained good results and, after all, class B audio amplifiers run into grid current without prohibitive distortion. A search was therefore made for ways and means of improving the system. Food for thought was found in the 6T8, a triple diode triode used for a.m./f.m. receivers. Due to

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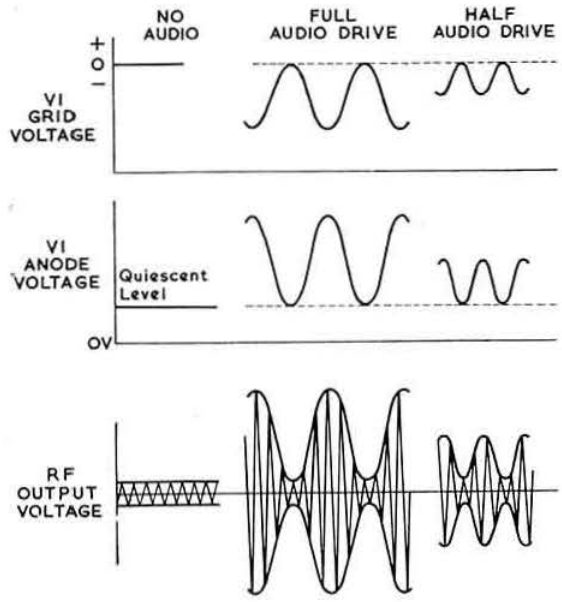

Fig. 2. Relationship of audio input to the clamp valve and r.f. output from the p.a.

the requirements of the ratio detector, the triode cathode must be earthed directly, so the triode is used as a grid leak biased class A amplifier. With a 10 Megohm grid leak and a 0·005μF coupling capacitor the valve is rated at 0·5 per cent distortion, under conditions almost identical to clamper service.

At about the same time some work was being done on the loss of amplitude when a rectangular wavetrain is passed through a d.c. restorer (Fig. 3). This is done to clamp the positive peak to earth potential when the d.c. level has been lost by a.c. couplings. It will be seen that this is identical to the grid circuit of a clamper valve.

The reduction in peak amplitude is given by

$$k = \frac{1}{1 + (1 + m)\ \dfrac{Rs}{R}}$$

where m = mark/space ratio, if CR is large in comparison with the repetition interval. A similar formula would be true for any waveform if a suitable value were given to m.

If the clamper is driven from the normal amplifier a typical value for Rs would be 100 K ohms, which, with a value of R of 1 Megohm, would give considerable loss in amplitude, i.e., clipping. If however the clamper is driven from a cathode follower, where Rs may be 500 ohms or less, clipping can be made negligible. Thus good undistorted modulation requires (a) a large grid leak so that little grid current

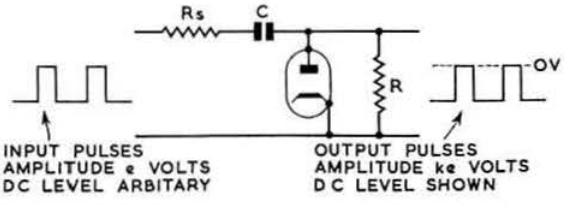

Fig. 3. D.C. restorer circuit

is required to maintain the charge in capacitor C, and (b) a low grid drive source impedance capable of supplying grid current without voltage drop.

A Practical Circuit

With the above ideas in mind, the circuit of Fig. 4 was evolved. The clamp valve grid is fed from a cathode follower with an output impedance of about 400 ohms. The grid leak is 1 Megohm, the maximum for the 6SN7. The coupling capacitor is not too large so that the clamp shuts down fairly quickly between sentences; too large a capacitance could cause clipping at very low frequencies, but these are removed earlier in the speech amplifier as they impair

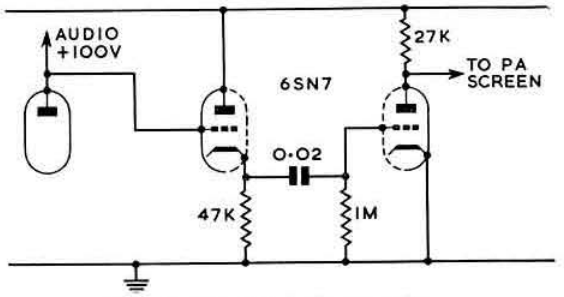

Fig. 4. Practical triode clamp modulator

the intelligibility of the transmission. This is not a function of clamp modulation but seems to be a general result.

With the same speech amplifier and facilities for rapid change back to the normal anode and screen modulation, tests were carried out with G3OHI, about a mile away, who reported " No change in speech quality, about one S point weaker, occupies slightly less space, seems to get distorted slightly sooner as I mistune but no distortion or splatter." This was about what was expected. The reduction in signal strength was inevitable, since even with the clamp valve cut off the p.a. is only running under the condition corresponding to no modulation under normal operation, i.e., a decrease in signal strength of 6db. It was found that the receiver a.v.c. had to be turned off, as it tried to follow the mean carrier level, resulting in distortion. " Hang " a.v.c. of the type used with s.s.b. would probably be suitable, but was not tried.

Further experiments showed that the modulation was very sensitive to aerial loading and drive. It was found almost impossible to re-tune without going back to the c.w. position. It was realized that if a linear V_{RF}/Vg_2 characteristic was obtained, the efficiency would be very low under quiescent conditions, as efficiency must be proportional to screen voltage. Thus tuning up under quiescent conditions is likely to result in loading too lightly and to raise the efficiency at this level, resulting in a highly non-linear characteristic (Fig. 5) which when modulated will give considerable distortion and little modulation.

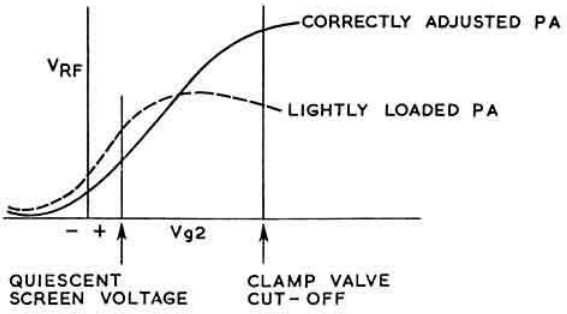

Fig. 5. Screen voltage v. r.f. output characteristics of the p.a. under loaded conditions

This is a characteristic of any system of efficiency modulation, screen, grid or cathode, but the difficulties are greater with clamp modulation as it is not possible to load correctly until shift in anode current under modulation is minimized. Thus it is desirable to tune up under c.w. conditions corresponding to maximum modulation or better still, observe the modulation characteristic on an oscilloscope by the trapezoidal method and adjust to obtain a linear characteristic of the form shown in Fig. 5.

Conclusions

Clamp modulation is capable of giving audio quality indistinguishable from conventional anode and screen modulation without powerful and expensive components and consumes less power than a conventional set of similar sideband output. It does however require more care in design and adjustment. The associated power supply also needs modification if the 6db loss in the change from c.w. to telephony is to be made good.

For the amateur prepared to exercise due care the system has certain advantages. Suggestions for improvements on the circuit described above are (a) the use of a tetrode clamper with its screen taken to a fixed potential of about 150 volts and its cathode to a negative potential of about −50 volts. By these means more effective clamping with greater economy and greater modulation capability will be possible; (b) by using a bridge rectifier the p.a. h.t. can be doubled, resulting in a sideband output equal to that of a high level modulated p.a. Care must be taken that the regulation is suitable for the transient load; it is particularly undesirable that fluctuations be present on the v.f.o. h.t. supply as these could cause frequency modulation; (c) if a low pass filter is added between the clamp valve anode and the p.a. screen, the grid of the clamp valve may be over-driven and high level speech clipping obtained.

New Radio Telescope Gathers Data on Jupiter

A GIGANTIC radio telescope with a dish-shaped aerial 300 ft. in diameter is collecting data on the moon-ringed planet Jupiter. Built at a cost of $1,000,000 the radio telescope collects more information in one day than smaller instruments do in a month.

The mammoth structure, including the " dish " balancing on two huge steel towers, weighs 600 tons and is located at the National Radio Astronomy Observatory of the National Science Foundation at Green Bank, West Virginia, U.S.A.

The new Green Bank instrument—completed in September 1962—is called a " transit " telescope and the dish moves only in a north-south direction. In operation it is pointed at a specific " radio source " such as Jupiter, and the rotation of the earth carries the source through the telescope's beam. The telescope remains still. During this " transit," generally a matter of a minute or so, radio emissions are automatically recorded on paper charts and the data are punched at high speed on to tapes and fed into a computer for analysis. Astronomers expect to get more precise information on the Van Allen type radiation belts surrounding Jupiter, its magnetic field, and its 12 moons.—*Science Horizons*

Enquiries Regarding Bulletin Articles

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A Transistor Transmitter for 70 Mc/s

By NORMAN G. HYDE, A.M.BRIT.I.R.E. (G2AIH)*

A CONSIDERABLE amount of work has already been carried out on the design of transistorized receivers for the v.h.f. bands, but very little appears to have been attempted in regard to transmitters. This has probably been due to the non-availability, until recently, of transistors capable of producing a reasonable output power at these frequencies.

The 70 Mc/s transmitter to be described has been designed around the Texas Instruments Type 2G110 as a power amplifier. This is a germanium *p-n-p* diffused-alloy mesa transistor having a *f1* of 350 Mc/s. It is rated at a maximum collector dissipation of 250 mW at 25° C. ambient temperature and as an r.f. amplifier delivers an output of 100 mW at 100 Mc/s with an efficiency of 35 per cent. In the present application the transistor is operated at an input of 250 mW (18 mA approximately at 15 volts).

The crystal oscillator and frequency multiplying stages of the transmitter employ v.h.f. receiving-type transistors. For the oscillator and first multiplier either Texas 2G401 or Mullard OC170 transistors are suitable. The second multiplier uses a Texas 2G402 or Mullard OC171.

Another type of transistor suitable for the power amplifier stage of a v.h.f. transmitter is the Texas 2S131. This is a silicon *n-p-n* epitaxial transistor having a collector dissipation of 300 mW at an ambient temperature of 25° C. This transistor will deliver an r.f. output power of 150 mW at 100 Mc/s, with a positive collector supply of 18 volts. The Texas 2N715 and 2N716 are rated for operation up to 200 Mc/s, and will give an output at 70 Mc/s of 400 and 600 mW respectively.

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Circuit Description

The circuit of the transmitter is shown in Fig. 1. TR1 functions as a crystal oscillator; feedback at the resonant frequency of the crystal is applied between collector and base of the transistor. The collector tuned circuit L1, C1, C2 resonates at the fundamental crystal frequency, which is between 7·8 and 7·822 Mc/s to produce final frequencies from 70·2 to 70·4 Mc/s.

Positive emitter bias to ensure the oscillator starting is provided by connecting the base to a negative potential derived from R1 and R2 across the d.c. supply. R3, in conjunction with R1 and R2, provides d.c. stabilization of the transistor collector current.

The r.f. output from TR1 is applied to the base of the grounded emitter frequency tripler TR2 via L2. L1, L2, form a step-down transformer to match the impedance of TR1 collector circuit to the lower impedance of TR2 base circuit. The third harmonic of the crystal frequency appearing across L3, C5 is similarly applied to the second frequency tripler TR3. Emitter resistors R4 and R5 provide d.c. stabilization for the frequency multiplying stages; the value of these resistors is selected during initial alignment to give maximum r.f. output within the limits of the collector dissipation of the transistors.

The output from TR3 at 70 Mc/s is coupled to the grounded-base amplifier TR4 via L5, C8 and L6, C11. Although the input impedance of TR4 is 75 ohms only, it has been found that greater drive to the emitter results when L6 is tuned. TR4 operates in class B, with a slight forward emitter bias of the order of 0·1 volt, obtained from the junction of R6 and R7, R6 being adjusted to give maximum r.f. output from the stage. The collector circuit of the amplifier is coupled to a 75 ohm unbalanced load through the pi-network C13, L7, C14.

For c.w. working the collector supply to TR3 is keyed. TR2 is thus operating continuously which maintains a constant load on the oscillator. In this service the secondary of the modulation transformer is short-circuited by a contact S1a of a d.p.c.o. switch. For phone operation S1a is changed

(*Continued on page 339*)

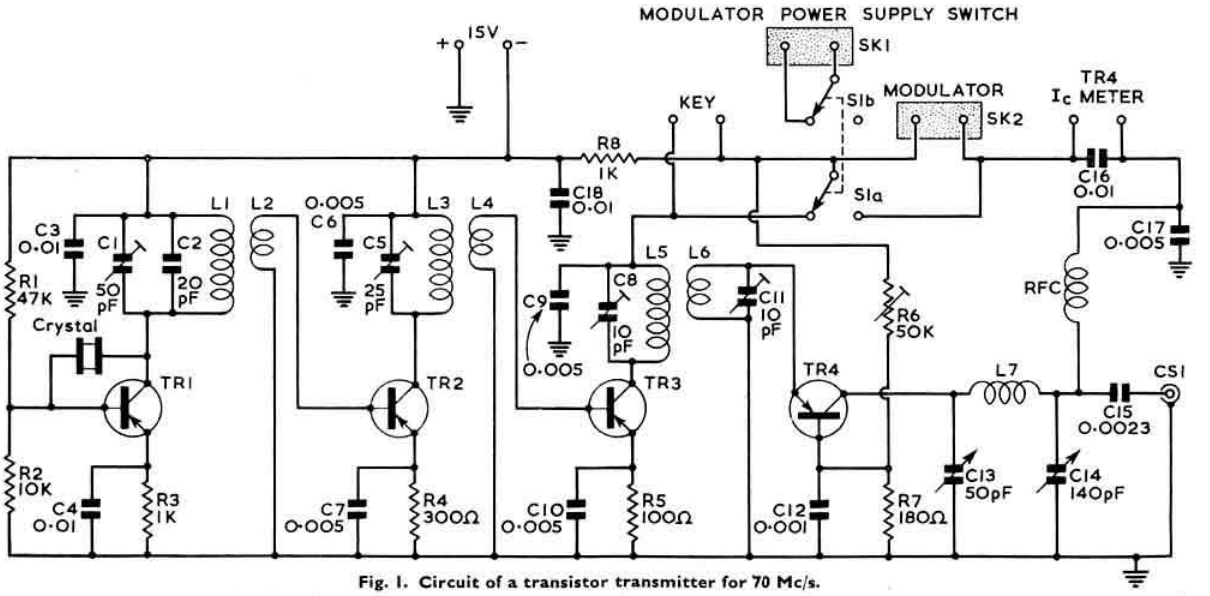

Fig. 1. Circuit of a transistor transmitter for 70 Mc/s.

L1, 42 turns 28 s.w.g. enam. $\frac{3}{8}$ in. dia.; L2, 8 turns 28 s.w.g. enam. overwound at low-potential end of L1; L3, 18 turns 28 s.w.g. enam. $\frac{3}{8}$ in. dia.; L4, 5 turns 28 s.w.g. enam. overwound at low-potential end of L3; L5, 12½ turns 22 s.w.g. enam. 0·3 in. dia.; L6, 5 turns 26 s.w.g. silk-covered interwound at low-potential end of L5; L7, 8 turns 16 s.w.g. silver-plated $\frac{1}{16}$ in. dia., $\frac{7}{8}$ in. long (0·3 μH); RFC, 42 in. 28 s.w.g. enam. wound on $\frac{3}{8}$ in. dia. former; TR1, Texas 2G401, Mullard OC170; TR2, TR3, Texas 2G402, Mullard OC171; TR4, Texas 2G110. In this diagram the − 15V line should be connected to the end of R8 adjacent to the key.

An R.F. Ultra Linear Amplifier

By E. W. HOLT (G3MHQ)*

THE linear amplifier the circuit of which is shown in Fig. 1 is intended as an amplifier for any transmitter having a power output of between 50 and 75 watts p.e.p. The valve is operated in grounded grid with low impedance input to the cathode (in this case the filament of an 813) and it is essential that a correct input match is obtained. This is no problem if the existing transmitter has a pi-network output.

It will be seen that the anode circuit of the amplifier differs from the conventional pi-network in that the usual r.f. choke feeding h.t. to the anode has been replaced by an r.f. transformer with a negative feedback winding connected to the screen grid. This ensures that as the anode voltage changes, the screen grid voltage does likewise, though by a reduced amount, in phase with the anode. In a conventional power amplifier, as the anode voltage falls the screen grid begins to draw more screen current, and if the anode voltage falls lower than the screen voltage severe distortion takes place, the screen grid overheats, and the valve is quickly ruined. In order to obtain a large anode voltage swing without distortion it is usual to run an 813 with an h.t. voltage of anything up to 3000, and a screen voltage of 750. In the present design only 1200 volts are used on the anode and 450 volts on the screen. This makes the power supplies much less costly to construct.

The R.F. Transformer

For the construction of the r.f. transformer, a 1 in. diameter polythene tube 4 in. long is used as the former, the anode winding (L4) being 3 in. long and close wound with 28 s.w.g. enamel wire. The feedback winding (L3) for the screen is 1 in. long and wound over the h.t. end of the anode winding. It is essential that both windings are wound in the same direction and that the top end of the long winding is connected to the anode, and the top end of the feedback winding to the screen. As there is a potential difference of several hundred volts between the two windings, a good insulating material, such as polythene sheet, should be wrapped round the bottom end of L4 before winding on L3.

The pi tank output circuit is almost conventional but instead of employing a single tuning capacitor of 280 pF, two 140 pF capacitors are used, the 28 Mc/s coil (L1) connecting the two sections. This provides capacity of reduced value to tune the 28 Mc/s band. A conventional pi output circuit can be substituted if preferred, but whichever is used the tuning capacitors must be of the high quality, double spaced, p.a. tank type. The three gang 500 pF per section output capacitor is an ordinary receiver type.

Power Supplies

While the more conventional full wave power supplies are perfectly suitable, a transformer rated at 1200-0-1200 volts at 250 mA is an expensive item, and it was decided, therefore, to use two ex-W.D. 600-0-600 volts units in series, as shown in Fig. 2. With this arrangement, transformers of different voltages can be employed, i.e. T1 could be 450-0-450 volts, and T2 could be 750-0-750 volts, which would still provide an output of 1200 volts. If transformers of different voltages are to be employed, then the higher voltage transformer should be T2 as the insulation between the windings must be able to withstand a voltage of 1200. Fortunately most ex-W.D. transformers are well insulated. If on completing the power pack, there is no high voltage output, then probably the two transformers are wired in anti-phase. Changing over the two top caps of the U19 rectifiers is all that is necessary to make the circuit work correctly.

Inductor Table

L1, 4 turns ⅛ in. copper tube 1¼ in. diameter.
L2, 18 turns ⅛ in. copper tubing silver plated on 2½ in. diameter ceramic former, tapped at 1 turn, 4 turns and 10 turns from the anode end. (If copper tube is not available, 12 s.w.g. wire may be used).
L3, L4, r.f. transformer (see text).
RFC1, RFC2, 30 turns 16 s.w.g. enam. close wound on 1 in. diameter formers.

The double pole switch S2 is used to control the mains supply to T1, and when in the OFF position reduces the output voltage to 600 for tuning up.

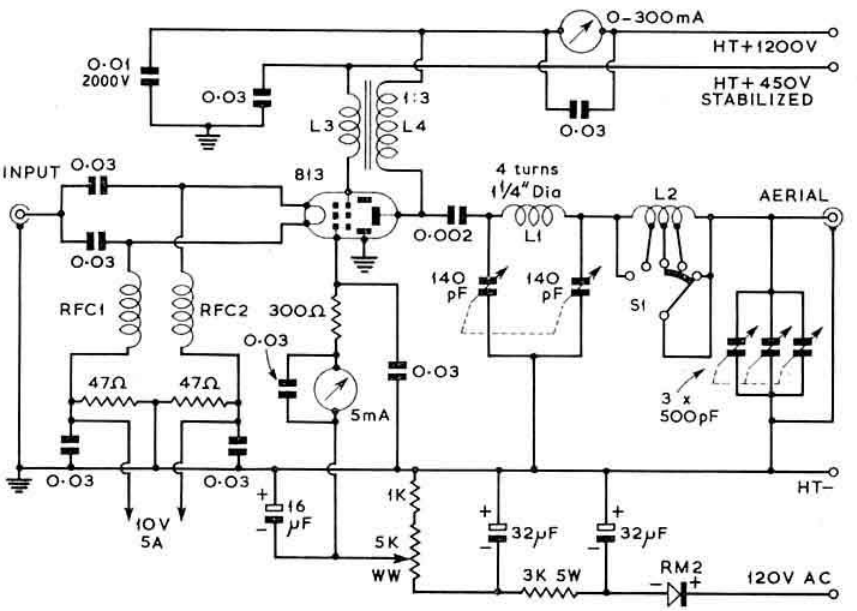

Fig. 1. Circuit diagram of the r.f. ultra linear amplifier. Details of the coils are given in the accompanying table The 5 K wire wound potentiometer should be marked VR1.

* 26 Beethoven Street, London, W.10.

Adjusting the Amplifier

With a dummy load connected to the output socket, set VR1 to the maximum bias position. Switch on the h.t. supplies, adjust VR1 until the p.a. anode current is about 40 mA, and increase the drive from the main transmitter until the 813 runs about 2 mA grid current.

Tune the p.a. tank capacitor for minimum anode current and the pi output capacitor for maximum power to the dummy load, as indicated by an r.f. ammeter in series with it. Repeat the adjustments to the tuning and loading capacitors until maximum output is obtained.

To test the amplifier for linearity a two tone test signal should be injected and the output displayed on an oscilloscope. It should be noted that this amplifier will not improve non-linearity if any is present in the input from the transmitter used to drive it. With grid current between 2 and 3 mA the p.a. will deliver approximately 200 to 250 watts p.e.p to the aerial, including most of the drive.

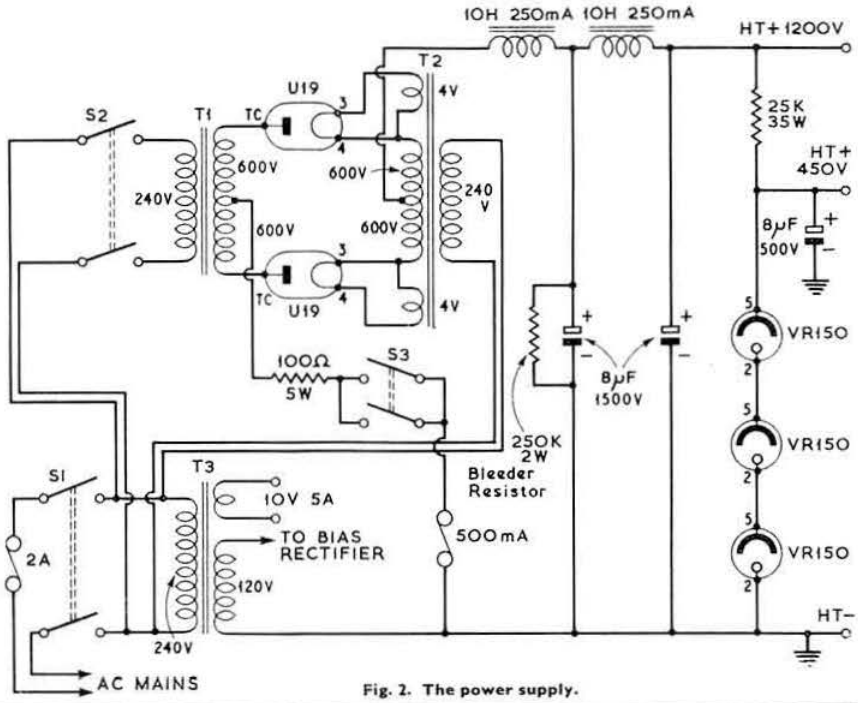

Fig. 2. The power supply.

Transistor Transmitter for 70 Mc/s

(Continued from page 337)

over, which removes the short-circuit from the modulation transformer secondary in the collector feed to TR4, and short-circuits the key; the second contact S1b of the switch is now closed to complete the power supply circuit of the modulator.

When operating from a 15 volt negative power supply the oscillator draws a collector current of approximately 4 mA. Each of the frequency multipliers draws 8 to 10 mA, which provides sufficient r.f. to drive the p.a. to 25 mA collector current.

Construction

Normal techniques were adopted for the construction of the transmitter, which is assembled on a chassis measuring

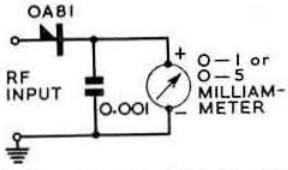

Fig. 2. R.f. voltmeter for alignment of the 70 Mc/s transistor transmitter.

5 in. square and 1½ in. high. All components with the exception of the crystal and output transistor are mounted on the underside of the chassis. TR4 is mounted on a small strip of polystyrene with the three leads projecting through a hole to the underside of the chassis. The emitter and collector circuits of this stage are shielded by a screen, but this is not essential provided that L5, L6 and L7 are mounted at right-angles and are not closely spaced to each other.

Alignment

Alignment is best carried out by connecting the transistors in circuit one at a time, commencing with TR1, and tuning the appropriate collector circuit for maximum output as indicated on an r.f. voltmeter across the emitter winding of the succeeding stage. The circuit of a suitable meter is shown in Fig. 2. When the transistor is substituted for the meter it may be necessary to re-peak the preceding tuned circuit. It is essential that the frequency of each tuned circuit is checked by an absorption wavemeter during alignment as many frequencies are generated by the transistors, possibly due to leakage through the base-to-collector capacitance, together with the diode formed by the emitter-to-base junction acting as a mixer. It should be remembered that until drive from the oscillator is applied, TR2, TR3 and TR4 are in the cut-off condition.

The second frequency multiplier is tuned by adjusting C8 and C11 to drive TR4 to maximum collector current with R6 set to maximum resistance. To tune the collector circuit of the amplifier stage, a 75 ohm resistor is connected across the coaxial socket CS1, and with C14 at maximum capacitance, C13 is tuned to resonance. The capacitance of C14 is then reduced in steps and C13 re-adjusted each time until maximum r.f. output is obtained. After the stage has been tuned R6 is adjusted to give maximum output.

A convenient method of measuring the r.f. output is by a transistorized field-strength meter similar to that described on page 483 of *The Amateur Radio Handbook*, Third Edition. R.f. pick-up may be by a short length of wire located adjacent to the output socket of the transmitter. When adjusting each stage it is essential that the collector current of the transistor is monitored to ensure that the rated input is not exceeded.

Results

Using c.w. and with an input to the p.a. of 250 mW, G3JHM/A reported an RST599 signal over a 30 mile path. Telephony was received RS58, but the transmitter was considerably under-modulated as only 40 mW of audio power was available from the transistor modulator.

Telephony contacts have also been made with G3NDF (six miles) RS59, G2BDX (21 miles) RS56, G3CCM (28 miles) RS56, G5FK (17 miles) RS56 and G3KEU/P (50 miles) RS57.

Echo II Predictions and Scatter Experiments

By R. G. FLAVELL (G3LTP)*

IN an article in the October issue of *QST* [1], Paul Kirchner (W2YBP) discusses satellite position prediction in connection with the possibility of contacts by forward scatter using the giant orbiting reflecting sphere at present known as *Echo A-12*, which will be called *Echo II* after launch. Naturally, much of the information he gives is based on the assumption that the reader lives on the North American continent and that his source of orbital information will be W1AW, the Headquarters station of the American Radio Relay League.

In this country prediction information will be broadcast by the R.S.G.B. station GB2RS, by arrangement with the Director of Radio Research, D.S.I.R., and this article attempts to explain what to do with that information in order to plan propagation experiments by reflection off the satellite.

The Track Diagram

In order to conserve space, it will be assumed that anyone interested in *Echo* prediction data will already have tried his hand at amateur satellite reception using one or both of the *Oscar* projects, and will be reasonably familiar with the form of the predictions and the method of using them. This has already been covered in a previous issue of the R.S.G.B. BULLETIN [2] and the earlier article also contains both a track diagram base map and a graph to enable angle of elevation to be found from a knowledge of satellite height and distance, taking the earth's curvature into account. The track diagram is reproduced in the present article on a larger scale.

As soon as possible after launch, and subsequently whenever changes are necessary, data will be made available for the preparation of a transparent overlay to the base map, and this, when properly aligned to the longitude where the satellite's orbital plane crosses 50°N. will show the points on the earth's surface which are directly below the satellite at minute intervals. As with *Oscar*, the times given in the predictions are those when the orbit crosses 50°N., and the intervals marked on the track diagram refer to minutes before and after this event.

The two tracks will be given in the form of a series of latitudes and longitudes, the northbound one passing to the east of the north point, the southbound passing to the east of south. The earlier article describes how these are marked together on the overlay with their appropriate minute intervals carefully labelled as to sign so as to avoid any confusion. Kirchner has made a simplification here by drawing one line labelled " northbound," then turning over the transparency right side to left and labelling the same line " southbound " on the reverse. A slight error may be introduced by assuming that the minute intervals on both tracks are equal, but nevertheless this method may be thought an advantage.

Initial Attempts at Communication

Let us assume that the track diagram has been prepared, that prediction times and longitudes are available, and that an attempt is to be made at communication via the big ball. What next? Obviously this is no hit-or-miss affair and careful planning will be necessary beforehand.

Initially at any rate, there will be no question of attempting to follow the satellite in the fashion popularized by television coverage of the Telstar experiments. Until contacts via *Echo II* are known to be a practical proposition with amateur orders of power it will be preferable for both stations attempting communication to aim their aerials at a particular point on the orbit and wait for the satellite to pass through it. With stations on approximately the same latitude and an average aerial beamwidth this will give something of the order of 90 seconds in which to establish contact and exchange reports without moving the beam, which should be ample time in which to prove the point one way or the other, particularly to anyone versed in the art of communication by meteor scatter!

Locating the Orbital Plane

It is very important to realize the intimate connection between the time and longitude information given in the predictions. These define the position of the earth's orbital plane, which may be visualized as a disc passing through the centre of a globe and inclined a few degrees away from the line of the axis of rotation. Somewhere on the outside of this disc (which, of course is independent of the globe's rotation) is the satellite, at the mercy of atmospheric drag and the effects of radiation pressure if it is of large volume like *Echo II*. But no matter how bad the predictions may seem, if you keep watching a point on the orbital plane the satellite must at some time pass through it. Obviously this is of prime importance if it is hoped to scatter energy off its surface, and is much more important than a knowledge of the exact time when it will take place.

In its early days *Echo II* will be accompanied by a beacon transmitter operating at about 136 Mc/s. This will not only provide confirmation of estimated beam headings, but will ensure that the satellite is within " sight " of the station at the time of the experiment. The lifetime of this transmitter is not known, but it is likely to be relatively short, certainly in relation to the expected lifetime of the passive reflector, so that ultimately forward scatter experiments will have to be made " in the blind," and absolute reliance placed on prediction data from official sources. When this happens, bear in mind that the predictions are locating the orbital plane for you and that this will move westwards at approximately one degree of longitude for every four minutes of time. Remember that no matter how wrong the predicted time may be as an indication of the time of nearest approach, if you select a point on the orbital plane using the track diagram and follow it as it appears to move westward due to the rotation of the earth (which is what the allowance of one degree every four minutes is doing), the satellite will at some time on that revolution pass through it. There is no need to be sceptical about this; it is the way that optical observers align their telescopes and cameras and it really

TABLE I

Elevation Angle of Aerial Beam	Radius of Circle in Degrees of Latitude (nautical miles ÷ 60)
15 degrees	20·7 degrees
20 degrees	17·8 degrees
25 degrees	15·4 degrees
30 degrees	13·3 degrees
35 degrees	11·5 degrees

* *141 Clyfford Road, Ruislip, Middlesex.*

does work! The only thing outstanding now is which point to choose on the orbital track.

Which Point to Aim For?

As anyone who has followed *Oscar I* or *II* will have discovered, bearings change most rapidly around the point of closest approach, but relatively slowly when the satellite is near the horizon. Any experiment at constant azimuth must therefore take place when the reflector is within sight of both transmitter and receiver at low elevation angles.

On a suitable map, draw circles around the locations of the participating stations (which are best located when at approximately the same latitude), representing the points where the centre of the aerial beam reaches the height of the satellite. This is easily found by taking the elevation angle of the aerial beam and the satellite height in nautical miles (to be given with the predictions) and applying them to the satellite elevation grid, which was Fig. 3 in the April, 1962, BULLETIN article. Alternatively, by assuming a height of 750 statute miles, W2YBP has been able to compile a table, reproduced here, which will permit some pre-launch estimations.

The satellite is " visible " to both stations where the two circles intersect, and these two points should be transferred to the track diagram base map. It is only when the satellite passes close to one or other of these two points that conditions are likely to be favourable for communication without

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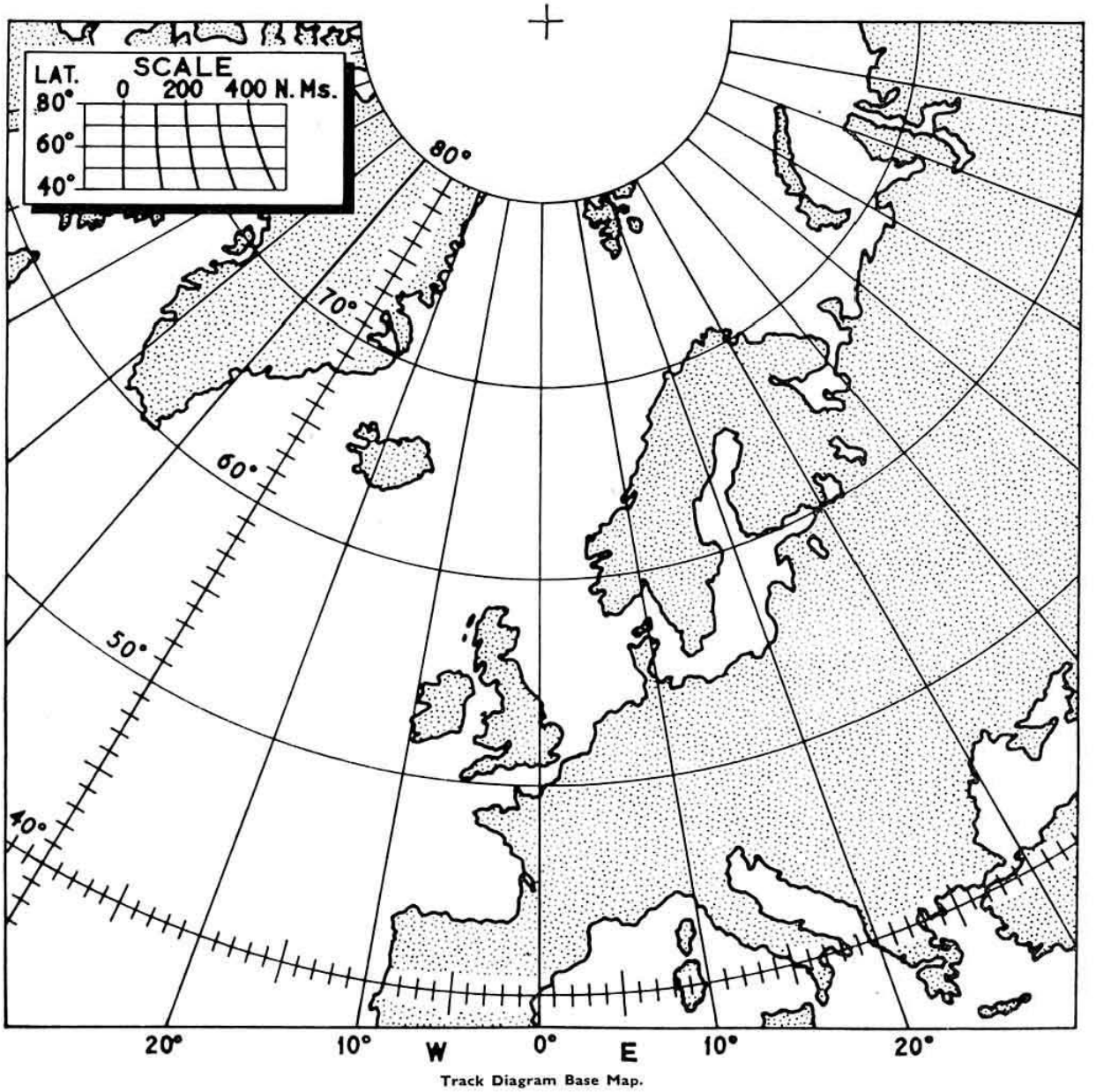

Track Diagram Base Map.

Nuvistor Valves

BY G. R. JESSOP (G6JP)*

SINCE the first of the Nuvistor range of small high performance valves, the 6CW4, was introduced by R.C.A. some time ago, the number of types available has been steadily increasing. All have low heater consumption (1 watt approximately) and high slope at low cathode current giving high gain with low noise making them especially suitable for use in the v.h.f. and u.h.f. region.

Considerable interest has been shown in these valves for use in the front-ends of v.h.f./u.h.f. receivers and it is thought that a summary (Table 1) of the characteristics of those at present manufactured would prove useful to members. No attempt is made here to evaluate the performance of the individual types but undoubtedly they will find favour in many applications particularly where size, weight and power consumption are of particular concern.

Probably the best known Nuvistors are the 6CW4 or 7895 and the 8058, the latter being suitable as an r.f. amplifier for 420 Mc/s. It is interesting to compare its performance with that of the A.2521 which is already well known in this service (Table 2).

The 6CW4 (and its 2 volt equivalent, the 2CW4) is a high mu triode intended for use in grounded cathode neutralized r.f. amplifiers. The 6DS4 is similar but with extended cut-off characteristics. The 7895 is also similar to the 6CW4 and is suitable for neutralized r.f. amplifiers and oscillator service. The 8058 is a high mu double ended triode for grounded grid amplifier operation at up to 1200 Mc/s. The 7586 is a general purpose triode while the 7587 is a general purpose sharp cut-off tetrode suitable for r.f./i.f. video amplifier and mixer use.

TABLE 2

Type	450 Mc/s		1200 Mc/s	
	Gain	N.F.	Gain	N.F.
8058	16.5db	6.5db	10.5db	12.5db
A.2521	17db	6.7db	13db	11.5db

TABLE 1

Valve Type	Heater		Capacities (pF)			Ratings			Typical Operation			
	Voltage	Current	$C_{g\text{-}a}$	$C_{g\text{-}in}$	$C_{a\text{-}out}$	V_a	I_k	W_a	V_a	μ	gm	I_a
6CW4* 2CW4*	6·3 2.0	0·13 0·45	0·92	4·1	1·7	125V	15mA	1W	70	68	12·5	8
6DS4*	6·3	0·135	0·92	4·1	1·7	135V	15mA	1W	70	68	12·5	8
7586*†‡	6·3	0·14	2·2	4·0	1·4	110V	20mA	1W	75	32	11·5	10·5
7587*†‡	6·3	0·15	0·01	6·5	1·4	250 (110) (Screen)	20mA	2·2W	125 (50) (Screen)	—	10·6	10
7895*†‡	6·3	0·135	0·9	4·2	1·7	110	15mA	1W	110	64	9·4	7·1
8056*	6·3	0·135	2·1	4.0	1.7	50	15mA	0.45W	24	11·5	7·0	8·5
8058*	6·3	0·135	0·046 $C_{a\text{-}k}$	6·0 $C_{k\text{-}all}$	1·3 $C_{a\text{-}all}$	150	15mA	1·5W	110	76	12·4	10

* R.C.A. † Mullard. ‡ Siemens.

* *32 North View, Eastcote, Middlesex.*

Calibration of an Absorption Frequency Meter

By T. CHARLES BRYANT (G3SB)*

THE writer wished to calibrate a general coverage frequency meter using three plug-in coils for the range 1—32 Mc/s. As a tunable oscillator covering these frequencies was not available, the following method, which proved simple and efficient, was adopted.

A crystal-controlled 1000/100 kc/s oscillator (used in the station as a band edge marker) was very loosely coupled by a co-axial link to the absorption frequency meter. The aerial was removed from the general coverage receiver (a National HRO) and a short piece of co-axial cable attached to the aerial terminal. The screening was removed from the last inch of the other end of this co-ax lead, which was placed near the absorption frequency meter. The harmonics of the oscillator were, in turn, located on the receiver and the position of the co-ax lead to the receiver adjusted until the signal was barely audible so that on tuning the absorption frequency meter, a distinct peak in signal strength was obtained and the dial reading noted. On the lower frequencies readings were taken at 100 kc/s intervals but on the higher frequencies, 1 Mc/s points were used.

The writer has not previously seen this method suggested and several local R.S.G.B. members have remarked on the simplicity of the procedure.

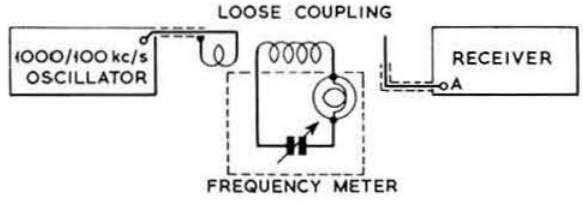

Fig. 1. Arrangement for calibrating an absorption frequency meter.

* *15 Filton Avenue, Bristol, 7.*

Single Sideband

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

MOST of the amateur literature dealing with crystal filters suggests that FT241 crystals can be moved higher in frequency by edge grinding. Ideally all four edges should be ground equally. In practice this is a most difficult procedure because it means demounting the crystal from the two base support wires without disturbing the fine axial wires spot soldered to the silver plating on the quartz plate. With the aid of an instrument soldering iron, a pair of fine tweezers, a steady hand and infinite patience, it can be done. Unfortunately the crystal must be resoldered to its support wires each time it is desired to check its frequency, and if necessary unsoldered again for more grinding. The whole procedure is very tedious, most chancy, and is not recommended.

Fortunately for the amateur constructor there is an alternative procedure that is relatively simple—grinding one edge only with the crystal still supported on its mountings. This will be considered in detail.

Edge Grinding Crystals

A method commonly advocated is to hold the crystal on its mountings, between thumb and finger, while rubbing

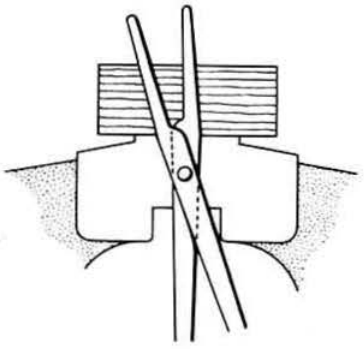

Fig. 1 Using dental forceps as a jig for a crystal. The vertical leg is gripped in the jaws of the vice. The block of wood takes the weight of the FT241 moulded base and lifts the crystal plate to a convenient height to be gripped in the jig.

backward and forward on a sheet of fine emery paper laid on a piece of plate glass. Beware—do not under any circumstances try to do this. The crystal plate is so small it is quite impossible in practice to hold it firmly and it will twist round in the fingers and break one or both of the support wires away from the silver plating. Generally the small pip of solder in the centre of the quartz plate will pull away on the wire, and take a piece of the silver plating with it. If this happens that crystal is beyond repair and just another item for the junk box.

The only satisfactory method of edge grinding is to hold the crystal plate in a jig so that it cannot possibly move under any circumstances, and then apply the grinding medium to it in the form of a rigid flat surface such as a carborundum slip stone. The "jig" that has been successfully used over the years by G2DAF to grind more than 100 surplus crystals is a pair of dental forceps held in an upright position by clamping one arm in a bench vice. A block of wood is placed on the top of the vice jaws so that when the crystal base is laid flat and pushed sideways the quartz

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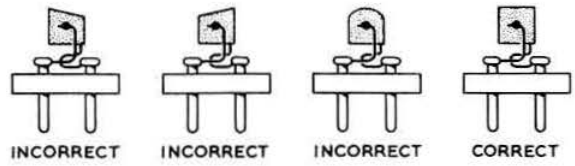

Fig. 2 The FT241 quartz plate on its mounting. The top edge is ground exactly parallel to the bottom edge as shown on the right. If the edge slopes or is rounded there will be serious loss of crystal Q.

plate is at the right height to be gripped by the forceps jaws (see Fig. 1). (To prevent the crystal being chipped by the serrated teeth, the jig jaws are covered by a sing'e layer of black insulating tape.) A carborundum slip stone 3 in. × 1 in. × ½ in. of No. 280 grit, obtainable from local hardware dealers, is placed on the bench behind the vice so that it is ready to hand.

Remove the box cover from the FT241 crystal by undoing the two machine screws in the base and breaking the seal with a sharp knife. Insert the knife edge between the rubber sealing washer and the *cover* so that the seal is left adhering to the base. When the seal is completely broken—and not before—carefully lift off the box in a straight line so that it does not foul the quartz plate support wires.

Stand immediately in front of the bench vice, looking vertically down at the jig. Open the jig jaws by pressure from the right hand thumb and fingers on the free handle, at the same time placing the crystal (flat side of the base down) on the block of wood with the left hand and pushing it sideways until the quartz plate is positioned between the jaws. Close the jig by pressure from the fingers of the right hand. The crystal plate is now lying horizontally and rigidly held in position, with the weight of the moulded base taken on the wood block so that there is no strain on the fine axial support wires. Still holding the quartz plate firmly by the pressure of the right hand fingers, place the left hand right round the back of the vice so that the fingers of the left hand can maintain pressure on the arm of the jig and allow the right hand to be withdrawn. Pick up from the bench the carborundum slip that was previously laid at the rear of the vice, and holding this in the right hand, place the flat face against the edge of the quartz plate. It is most important that the edge is ground exactly parallel to the original edge and in a perfectly straight line as shown in Fig. 2, so that the two adjacent corners are exactly 90°. Because the operator's eyes are immediately above and in line with the crystal, it is easy to sight down on the work and accurately line up the slip stone with the edge to be ground.

Using a firm but light pressure, rub the stone either backward and forward, or in a circular motion, across the crystal 10 times. Remove from the jig and measure the frequency with a BC221 frequency meter and a valve voltmeter. From this, an approximation can be made to determine how much more grinding is necessary. Remember, you can grind quartz off a crystal plate but you can't put it back again, so don't overshoot! When you are within 20 or 30 cycles of the final frequency reduce the number of rubs to four or five and check with the BC221 often. It is generally considered that a shift of one kilocycle is about as far as it is possible to go without losing too much crystal activity. However if the crystal is really active to start with, it is possible to go further than this and in fact the writer successfully ground one 54th harmonic crystal 2·4 kc/s and it still showed 10 volts deflection on the valve voltmeter.

Finally, remember that there is nothing in edge grinding that is complicated or difficult. If you handle your crystals gently and with confidence you should have a large measure of success. Confidence comes with practice, so select a few of your sluggish crystals (you wouldn't use these in your filter anyway) and have a go. If you initially break one or

two the loss is little compared to the experience gained and the fascination and reward of being able to make up a really first class sideband filter from low cost surplus material.

Cleaning and Plating Crystals

Any crystals that are low in activity should be examined for excessive tarnishing of the silver plating. In the majority of cases removal of the tarnish will restore the crystal to its normal activity. A cleaning agent that has been used for many years by sideband operators is " Silver Dip." This is a proprietary brand of silver cleaning liquid obtainable from the ironmongers and department stores. The crystal is immersed in the solution for a few seconds only, and then removed and thoroughly washed under warm running water. Allow to dry *completely*—warm air from a turbo heater or a hair dryer is ideal—before testing.

In general, cleaning crystals improves the activity and the *Q*. However, the writer has had the experience of cleaning certain crystals and finding a *loss* of activity. The reason for this is not known—but it certainly can happen. The procedure adopted by G2DAF is as follows: (i) If the crystal is active (i.e. 8 to 10 volts deflection on the V.V.), leave it alone. (ii) If the crystal is sluggish (i.e. 4 to 8 volts deflection) try cleaning it. The cleaning method suggested by G3KRC in the November issue of the BULLETIN (page 220) has not been tried by the writer, but it would be interesting to know if it always improves the *Q*, or whether G3KRC has experienced some " failures."

The other method of changing a crystal frequency is by plating and this shifts the frequency lower. It is a very convenient method in practice, because if too much plating has been deposited on the quartz plate and it has been taken too far, a reversal of the battery will take the plating off again. Additionally, as the crystal is not being mechanically handled in any way, there is negligible risk of breaking it.

Notwithstanding these advantages, the writer will be perfectly honest and report that he personally has had no success with the plating method—this applies to both copper and silver plating. In all cases, depositing material on the quartz plate has resulted in a loss of *Q* to an extent that was not acceptable. Because of this experience, all crystal manipulation by G2DAF is carried out by the edge grinding method. It would therefore be out of place to include working details in *Single Sideband* of a method the writer does not use. Please do not read into these remarks more than has been intended—the comment is purely a personal one. Some amateurs prefer plating methods, so presumably are getting satisfactory results.

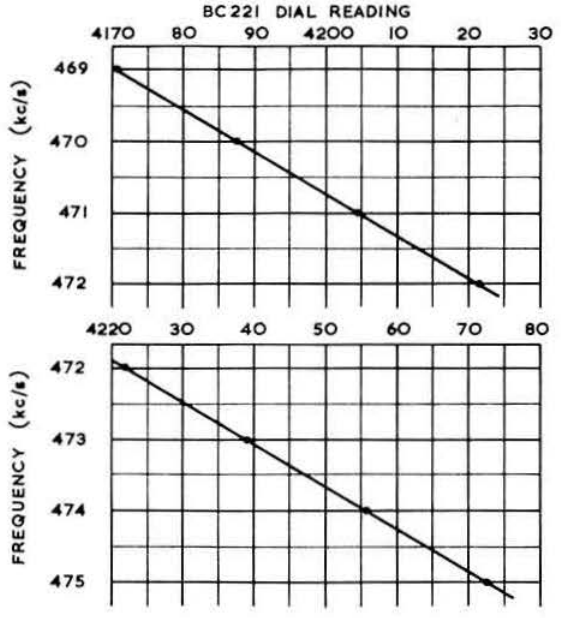

Fig. 3 Specimen calibration graph for the BC221 for accurate frequency measurement.

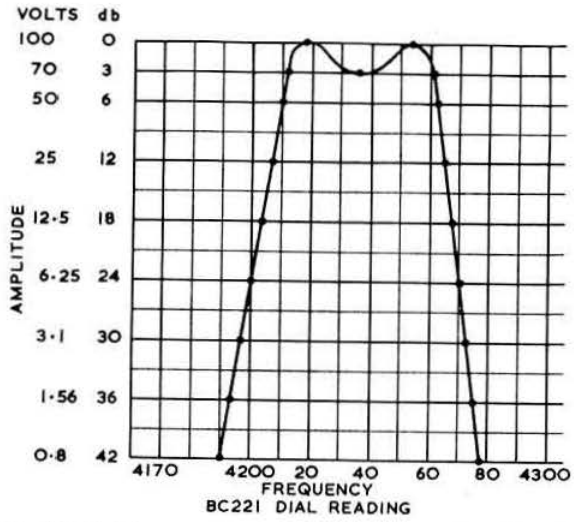

Fig. 4 Typical frequency response curve showing the method of scaling the millimetre squared graph paper in volts and decibels on the vertical and the BC221 dial readings on the horizontal ordinate.

Frequency Interpolation and Plotting

The calibration steps given in the BC221 frequency meter calibration book are too coarse to enable the series resonant frequency of a crystal to be read directly. It is necessary to make a calibration graph of frequency plotted against dial readings, covering the range of the channel frequencies in use. Sheets of 10 in. × 8 in. graph paper divided into tenths, ½ and 1 in. are very convenient with the horizontal scale reading 10° of the BC221 dial per inch, and the vertical scale reading 1 kc/s per inch. A specimen graph is shown in Fig. 3.

With regard to response curve plotting, it is much more convenient to use 10 in. × 8 in. sheets of graph paper divided into millimetres and centimetres, and plot the BC221 dial reading (not the actual frequency) on the horizontal scale with the scale reading 10° per centimetre. The vertical scale is marked to read 3db per centimetre, and this gives a response curve height of just over 13cm (5¼ in.) for a 40db range. Additionally the voltage scale is written in at the side of the db scale. This is necessary because the indicating meter used to measure the amplitude of the r.f. across the most convenient circuit (last i.f. anode in a receiver—anode of filter amplifier or grid of p.a. in a transmitter) is a linear instrument reading voltage.

The writer's valve voltmeter uses a 100 μA meter movement and it can be accurately read to 1 μA. This is a ratio of 100 to 1 or 40db. In practice a response curve plotted to 40db down is usually sufficient. (The height of any side lobes can be checked by swinging the BC221 4 or 5 kc/s either side of the passband skirts, and if the V.V. does not show any deflection at all, it is safe to assume that the lobes are at least 50db down.) The maximum passband response is

(*Continued on page 347*)

The Use and Adjustment of P.O. 3000-type Relays

By E. P. ESSERY, M.I.R.E. (G3KFE)*

RELAYS of the P.O. 3000- and 600-types are often found in surplus equipment and can be obtained at low prices from various firms. Their applications in the amateur station are many and varied and it is the purpose of this article to provide some data on their adjustment and use.

Circuit Symbols for Relays

When a number of relays appear on a diagram, it is usual to insert the contacts in the circuit where necessary and not to attach them to the coils. Thus relay A may be in the middle of a drawing, contact A1 on the lower right and contact A2 on the upper left where it is most convenient. The relay itself is denoted by using its letter symbol as the numerator of a fraction, the denominator indicating the number of contacts on the relay; for example, a relay marked A/4 would have four contacts. If a contact is spare, it is normal practice to draw it near the relay coil and give it an appropriate designation. For example, if a relay has six spring sets, five of which are used, the sixth one is given a number and appears on the drawing to avoid confusion. A normal 3000-type may have up to eight springs on each side of the buffer block; the left-hand pile is numbered for identification purposes from 1 to 8, while the right-hand pile numbers from 21 to 28, looking at the front of the relay, and numbering from the armature upwards.

Coil tags on the back of the coil are lettered " a " to " e " from left to right, looking at the tags in the position they would appear on the relay—see Fig. 1. It will be seen that the lettering refers to the position of a tag; the tags of a single winding always appear across tags " a " and " e "; on a relay having two windings, the first winding appears at " a-b " and the second at " d-e " with " c " spare. If three windings are fitted, tag " c " (the middle one) is the common terminal.

A relay may be made to release slowly by fitting a slug of copper at the " heel-end " or back of the coil. The effect is

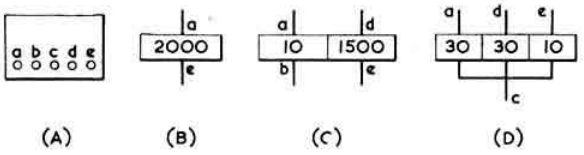

Fig. 1 (a) Identification of tags on a relay operating coil. (b) Relay with single coil wired across tags " a " and " e " (c) Relay with two coils. (d) Relay with three coils, " c " being the common connection.

that of a short-circuited turn, so that when current to the relay is interrupted, the decay of flux across the armature is delayed and the relay becomes slow to release. Slow operation is obtained by fitting the slug at the armature or front end of the coil. In this case, the slug tends to oppose the rising magnetic flux at switch-on and keep it away from the airgap between the armature and coil airgap. At switch-off, the armature-end slug behaves like the heel-end slug. Thus the slow-to-operate slugged relay is also slow to release. The location of the slugs is shown diagrammatically in Fig. 2 together with the appropriate symbols.

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Adjustment of 3000-type and 600-type Relay Armatures

As can be seen from Fig. 2, the armature, in its normal position, is not parallel with the face of the coil cheek, and due allowance must be made when using feeler gauges. The residual gap is the first point to consider—it may take the form of a phosphor-bronze stud of 4, 12 or 20 thou. nominal airgap, or a screw of non-ferrous material which is adjustable and can be set at about 8 thou. The airgap should be measured at its narrowest point with the armature operated. Less than 2 thou. residual airgap is liable to cause faulty operation.

The armature travel distance (the distance between the residual stud and the core face when the relay armature is normal) is most important. On all standard 3000-type

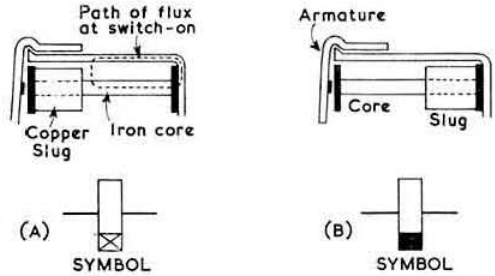


Fig. 2 (a) Slow operate and release relay. (b) Slow release relay.

relays this travel should be 31 thou. Non-standard relays may be found with 25 thou. or 43 thou. travel; these usually also have short or long operating pins to give special operating characteristics. When measuring the travel with a feeler gauge care should be taken not to allow the relay armature to come off its knife edge. If the travel is incorrect, force can be used but it should be remembered that the armature material is springy, and when it does bend it is liable to bend quite a long way. However, the operation is not difficult if care is exercised.

Spring Adjustments

It is a fundamental requirement that all relay springs should be straight. Those springs which are moved by the armature via a lifting pin should be straight when the armature is midway between the normal and operated positions. Those which rest on the central buffer-block should be straight when they are so resting, i.e. the buffer springs of normally made contacts (known as " breaks ") when the armature is operated, and the buffer springs of normally broken contacts (known as " makes ") when the armature is normal. If this requirement is met all clearances will be correct.

It is first of all necessary to ensure that the spring is straight. Once this has been achieved the tension can be applied by means of a " set " applied at the root of the spring. However this is not as easy to accomplish as might at first appear. If the " set " is applied at the root of the spring (say, in a downward direction), the spring will develop a bow dipping towards the yoke in the centre, as shown in Fig. 3.

For amateur purposes it may be said that provided each buffered spring is tensioned lightly—about 18 grammes—

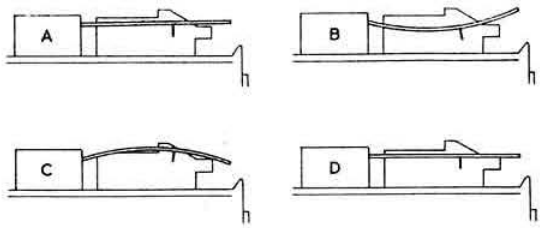


Fig. 3 (a) Straight spring. (b) "Set" applied. (c) Bending the spring to remove the "bow." (d) "Set" applied to spring shown in (c).

against its buffer and the lever springs are so tensioned that they are always in contact with each other and pressing lightly on the armature, operation will be correct.

Twin contacts should make or break simultaneously; to achieve this the individual "tongues" may be bent slightly, provided that the rule all "make" contacts make before any "break" contacts break is followed.

If the correct clearances cannot be obtained the springs are not straight. *Buffer blocks never need filing to achieve correct clearances.*

Spring Contact Materials

Springs are normally made of silver steel, but the twin contacts are domes of silver capable of coping with resistive circuits only carrying up to 300 mA. Similar springs with a vee-shape notch in each tongue of the spring have platinum contacts for use on inductive circuits or on resistive circuits carrying up to about 5 amps. Springs with single large contacts are normally made of tungsten or "Elkonite" and are intended to handle heavy currents or high voltages.

Circuits for Relays

The fundamental consideration when designing relay circuits is that no coil is capable of dissipating more than 9 watts safely. Relays of the 3000- or 600-type can be made to perform reliably on 12, 24 or 50 volts provided the resistance is suitable and the resultant current is adequate. Often as little as 1·8 watts will be sufficient to operate a reasonably high resistance relay.

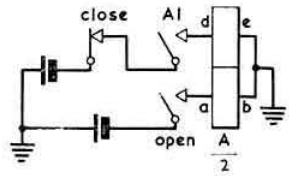


Fig. 4 Circuit arrangement for "locking" a relay with its own contacts.

A relay can be locked on with its own contacts to provide push-button operating facilities (Fig. 4) so that closing the "open" switch operates the relay, which locks over A1 until such time as the "close" switch is operated. A rather unusual circuit is shown in Fig. 5 in which a normal relay is released by energizing a second winding termed a "knock-

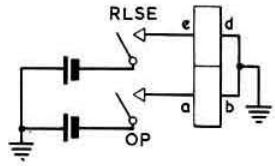


Fig. 5 Method of releasing a relay by energizing a second winding.

down" winding. Operation of the circuit is as follows: the relay is energized by the operate switch; subsequent energizing of the second winding by the release switch causes a current to flow in the second winding such that the total flux is reduced, due to the reversal of the connections to "d" and "e" on the coil tags. If a relay has two identical windings this arrangement is very efficient but it also works quite well on some relays with unlike windings.

Relays fitted with slugs are, as already explained, slow to operate or slow to release. Relays can also be slugged by a capacitor or rectifier in parallel, or by short-circuiting windings. One method of obtaining slow operate and fast release is to arrange a two-coil relay so that the second winding is short-circuited by a normally made contact of

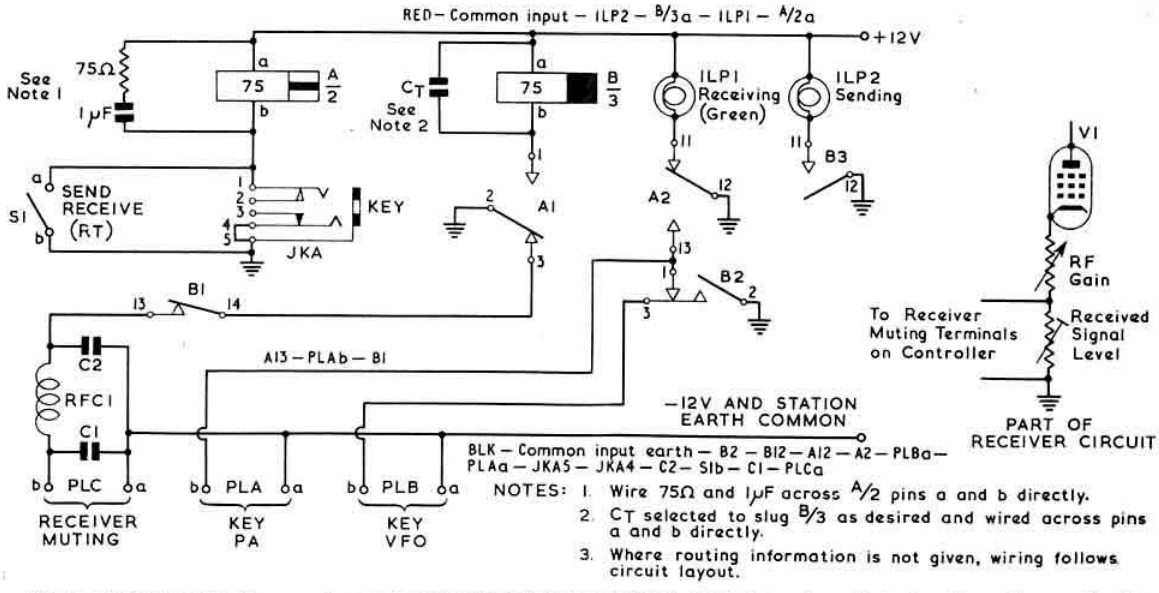


Fig. 6. Typical routed diagram of an automatic transmitter control unit employing relays. Note how the wiring routing is included to ease fault tracing.

the relay; when the relay operates it breaks the short circuit across the winding which can then be used for some other function, such as holding or "knock down." "Slugged" or slow to operate or release is a relative term and about 0·8 second is the maximum delay possible.

A typical circuit incorporating relays is shown in Fig. 6 and is an automatic controller to provide break-in facilities with a transmitter. The circuit is intended to be used with an electronic T/R switch. It is assumed that the transmitter with which it is to be employed can be keyed in the oscillator and p.a. cathode circuits. The receiver should be modified by providing an additional control in series with the normal r.f. gain control in the cathode of the first r.f. stage. The value of the potentiometer required to set the level of the received signal should be found by experiment—typically, 50 K ohms will be satisfactory for a CR100.

With the receiver in operation, the received signal level potentiometer is short-circuited by contacts A1 and B1 in the control unit. Closing switch S1 causes relay A/2 to operate, whereupon contact A1 opens, removing the short-circuit on the received signal level control, so disabling the receiver to a level determined by the potentiometer. Contact A1 also closes the operate circuit for relay B/2. Contact A2 disconnects the indicator lamp ILP1 and energises the p.a. through PLA. A2 also energises the v.f.o. through part of contact B2 and PLB. When relay B/3 operates, contact B1 opens the muting circuit of the receiver, contact B2 transfers control of the v.f.o. to relay B/3 by disconnecting the earth at contact A2 and substituting the earth at B2, which also lights ILP2. On changing over to receive, switch S1 is opened and relay A/2 releases quickly but the receiver remains muted until relay B/3 releases. Contact A2 switches off the p.a. and A1 releases relay B/3 which opens slowly. When relay B/3 opens after a lag depending on the value of the capacitor CT, contact B1 reconnects the receiver by shorting out the muting circuit, B2 releases the v.f.o. and B3 extinguishes the indicator ILP2.

On c.w. the sequence when the key is first closed is as already described, but although relay A/2 follows the keying and contact A2 controls the p.a., the slow releasing relay B/3 maintains the muting and keeps the v.f.o. in operation. The operation and release of contact B2 is timed so that it reconnects springs 1 and 3 when releasing before it makes springs 13 and 14, so preventing a "yoop" from the receiver. The relay should normally operate in this way but it is best to make a visual check before using the control unit.

The indicator ILP1 lights whenever the key is up, although the receiver remains desensitized. This is done for two reasons: (i) to check operation of the keying circuit (contacts have been known to become welded), (ii) to provide a visual check on sending when listening off the transmitted frequency. After a little practice it is possible to read the "darkenings" of ILP1 quite well at the speeds normally used with a hand key.

It is recommended that relay A/2 should be either a twin contact Siemens high speed type or alternatively a 600-type which is a smaller version of the 3000-type with a simplified layout. Adjustment is similar to that for the larger type. If no high speed or 600-type is available a 3000-type may be used provided all the surplus contacts are removed but it will be found much more noisy.

The control unit has been used with several transmitters at G3KFE and has been found most satisfactory.

* * *

The information in this short article should enable the reader to obtain reliable operation from 3000- and 600-type relays. It is hoped that sufficient has been said to indicate the many applications of relays, even to completely automatic operation of a station and automatic shut-down in the event of equipment failure.

Single Sideband (Continued from page 344)

therefore the full scale deflection of the meter and this is marked 100 volts and 0db on the graph paper. As 6db is a 2:1 voltage ratio, 6db down will be 50 volts; 12db down 25 volts and so on, as shown in Fig. 4. (3db down = 0·707 or 70 volts on the scale.)

Take the output from the BC221 via a Philips 3-30 pF trimmer capacitor (push the leg of the trimmer directly into the terminal of the BC221) and a screened lead terminated with two crocodile clips. (The screening is bonded to the BC221 case.) Adjust the Philips trimmer so that there is only just enough signal being fed into the transmitter or the receiver to give a full scale reading on the V.V. when the frequency is at the peak of the response curve—this is 0db or 100 on the voltage scale. Detune the BC221 until the V.V. reads 70 and plot the dial reading on the graph. Detune further until the V.V. reading is 50, plot the dial reading—and so on down to 0·8 volts. Swing the BC221 the other side of the original peak and then plot the remaining side of the response curve. Finally, set the BC221 dial half-way between the two shoulders and note the V.V. reading—this is the dip in the centre of the passband and completes the filter response curve.

A little thought will show that the valve voltmeter has been indicating a *ratio* (i.e., the amplitude of the signal at differing points throughout the passband, relative to the maximum signal amplitude) therefore the *actual* voltage value is not of any importance and the V.V. can be used on any range that is convenient. The only point to watch here is that the stage across which the V.V. is connected is capable of supplying the required full-scale input voltage without overloading. A safe limit for the last i.f. in a receiver would be 20 to 25 volts r.m.s.

The most convenient point for injecting the BC221 signal is the grid of the carrier oscillator in the transmitter, and the grid of the second converter in the receiver. Finally to avoid spurious outputs remove the carrier crystals and disable the v.f.o. by removing the valve. Additionally, do not forget either to switch the a.g.c. system to OFF or if there is no OFF position short circuit the grid feed line to chassis. The term "a.g.c." includes peak limiter circuits in the transmitter.

Next month's *Single Sideband* will deal with filter alignment and the use of a ganging oscillator and oscilloscope.

RTTY

A Quarterly Review of Amateur Radio Teleprinting News and Views

By ARTHUR C. GEE (G2UK)*

THE A.G.M. and Annual Get-Together of the British Amateur Radio Teleprinter Group, held at "The Olive Branch," Marylebone, London, on the final Saturday evening of the R.S.G.B. Radio Communications Exhibition, proved as enjoyable and interesting an occasion as had been the previous two such events. Some 26 RTTY enthusiasts were present, including three overseas representatives. The meeting was particularly honoured to have Per Gunderson (LA5LG), President of the Norwegian Radio Relay League as a guest. LA5LG is a keen RTTY enthusiast, operating on both the DX bands and the Norwegian local 80m net, and he was able to take back to his LA RTTY Group the best wishes of B.A.R.T.G. members. LA amateurs have been much helped with regard to RTTY by the release of a considerable number of teleprinters from Army sources, which have been distributed via their National Radio Society to those amateurs wanting them, at very reasonable prices.

The other two overseas guests were from Holland. PA0FB, needs no introduction to British v.h.f. or RTTY enthusiasts. Harry Grimbergen (PA0LQ) who was also present, is the second operator of the V.E.R.O.N. H.Q. station PA0AA, the RTTY activities of which were described in this feature in last October's issue. He gave the gathering a very good description of PA0AA, illustrated by some excellent colour transparencies. This was followed by slides of G3NES's station at Canterbury and a number of slides of RTTY interest from G2UK's collection.

The remainder of the evening was spent rag-chewing and renewing personal contacts. With RTTY activity growing steadily in Europe, we look forward to even more overseas visitors next year.

The Teletype Model 14 Machine

In the second article in this series (October 1961), reference was made to the two teleprinters most commonly available to the British radio amateur, the Creed Type 3 and the Creed Type 7, the first being a "tape" printer, the second a page printer. Apart from this difference, these two machines work more or less on the same system, and the electrical circuitry in each is the same. Those who have read the *B.A.R.T.G. Manual* will know that the electromagnet is operated by a double current system, an 80-0-80 volt d.c. power supply being switched by a double throw, single pole transmitting contact to actuate a two coil electromagnet with its armature placed between the two coils, which thus moves in step with the transmitting contact, being driven back and forth electromagnetically between the two coils. The transmitting contact is of course coupled to the receiving electromagnet system either via a landline or by radio. In the latter case, the polar relay contacts become the "transmitting contacts" if the type of terminal unit already described is used.

Quite obviously, it would be possible to dispense with one of the electromagnetic coils and have the armature pulled back by a spring. Only one set of contacts would then be needed on the transmitting unit. This arrangement, known as the single current system, is the one usually found on American teleprinters, a number of which are beginning to find their way into British Amateur Radio shacks. The writer for instance has recently acquired a tape printer made by the Teletype Corporation, designated by the code number "Simplex 2 B." On inspection, this proved to be identical with the Teletype 14 machine, which is well described and illustrated in the *New RTTY Handbook*, published by the Cowan Publishing Corp., publishers of *CQ Magazine*. Furthermore, a series of teleprinters manufactured by Lorenz, also seem practically identical to this model and these too are quite frequently to be found at surplus stores.

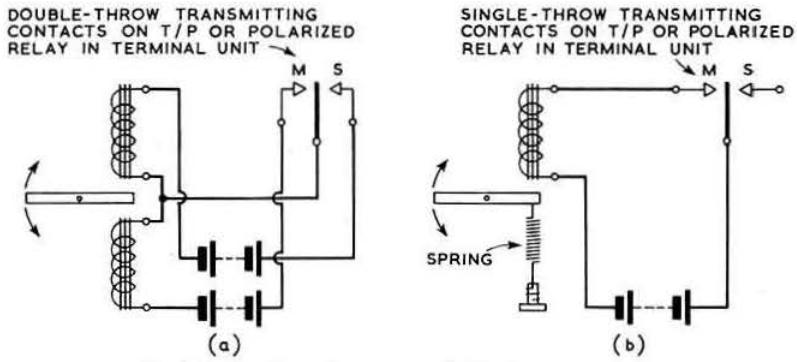


Fig. 1. (a) Double current system; (b) Single current system.

On the receiving side, the single current system can be used quite satisfactorily with the two pole relay shown in the terminal unit described in the April 1962 issue of the BULLETIN by using only one of the fixed contacts and the moving one. On the transmitting side, the contacts on these machines are, naturally, single throw types, which does present some problems when required to key the f.s.k. on some types of transmitter v.f.o. circuits. In later articles we shall describe in detail the electrical circuits and power supply requirements of typical types of printers. In the meantime, readers should note this essential difference which may be found between British and American machines.

Activity

When RTTY first began in this country, it was easy for the Hon. Secretary of B.A.R.T.G. to keep track of the new RTTY stations as they came on the air. Recently, however, particularly with the extension of RTTY activity on 2m, this has become more and more difficult, and readers of these notes who are active on RTTY and who have not contacted the writer are asked to do so. A card index is kept of all RTTY stations which the writer gets to know about, so please

(*Continued on page 363*)

* *East Keal, Romany Road, Oulton Broad, Suffolk.*

Mobile Column

By C. R. PLANT (G5CP)*

IN *Society News* in the October issue of the BULLETIN appeared a paragraph which stated that the Council had approved the appointment of nine mobile amateurs, residing in all parts of Great Britain, to act as local advisers to the Mobile Committee. This committee under the Chairmanship of Mr. C. H. L. Edwards (G8TL) looks after the interests of the mobile fraternity and is actively engaged to that end. The Committee felt that being centred on London it often tended to miss the feelings of more remote sections of the Society and the new appointments have been made in an endeavour to improve the relationships with all clubs holding mobile rallies. The appointed members will be available in an advisory capacity to assist any club proposing to hold a rally. The word " advisory " is used deliberately; it is not intended that these amateurs are to do anything more, unless specifically requested, than offer advice when this is called for. In short, the club in question will run the rally and if the local representative can help, he will be pleased to do so.

It is thought that occasions may arise when information can be passed from the Mobile Committee at Headquarters to the club concerned and vice versa when points arise which need clarification, or if any assistance not available locally, is needed. In some cases when an official R.S.G.B. mobile rally is held in his area of operation, the member may be co-opted to the Mobile Committee to help organize the event. In a similar manner for other rallies, the local committee may wish to do this too. The writer has for several years been a co-opted member of the Derby Mobile Committee and has found it to be an extremely interesting experience.

Electrical Interference

Judging by letters received the major trouble the newcomer experiences is interference from the parent car—ignition takes first place with generator noise as a close second. It may, therefore, be worthwhile to take another look at this problem. An examination of Fig. 1—a normal car electrical system—shows that this consists of the following pieces of equipment: dynamo, battery, voltage regulator, cut-out, ignition coil, h.t. distributor and spark plugs. All are capable of causing trouble though in the case of the battery this is only likely to be a failure to hold a charge in the later stages of its useful life.

When a spark occurs at the plug an oscillation takes place in the h.t. system—this is virtually untuned and so can be heard over a wide range of frequencies. The oscillation from an individual spark is of very short duration but because of the high frequency of sparking (possibly as high as 25,000 a minute) the noise caused is similar to a " machine-gun like " rattle.

It is possible to obtain spark plugs with a suitable suppressor resistor built into the plug itself; this is a good feature because the nearer the resistor is placed to the spark, the more effective it becomes. Most garages carry suitable suppressors and if serious difficulty is experienced, provided the installation is of a proprietary brand, the manufacturer concerned will give valuable help—the writer has had personal experience of this service.

G3JDM reports that Bosch market a full range of " suppressed " plugs somewhat cheaper than the English counterparts—apparently plugs are not readily available for the more popular light cars in other brands. In extreme cases it may be necessary for the h.t. system to be wired in screened cable but fortunately this is rarely necessary.

Again the constant making and breaking of the low tension coil contacts add to the noise even though there is a spark suppression capacitor fitted as a standard unit. The h.t. distributor, too, is a source of noise, performing as it does the duty of passing the h.t. to the appropriate plug at precisely the correct moment. The automatic voltage regulator also adds its quota and the dynamo is often a serious noise source. Fortunately in most cases the simple additions shown will reduce interference to a reasonably low level and the inclusion in the receiver chain of a simple noise limiter (see *Mobile Column*, May, 1962) will make reception even better.

Electrical noises may also emanate from dashboard instruments, screen wipers and other ancillary equipment; static build-up on brakes and tyres too may appear, but all may be dealt with by the use of suitable capacitors and resistors, or discharge devices. It is never possible to completely suppress all car noises—the aim must be to reduce them to a point where a weak signal can be read satisfactorily and leave it at that.

Operating News

G3JDM (Wolverhampton, Staffs.) writes to tell of a long and unhappy experience with unsuitable " suppressed "

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

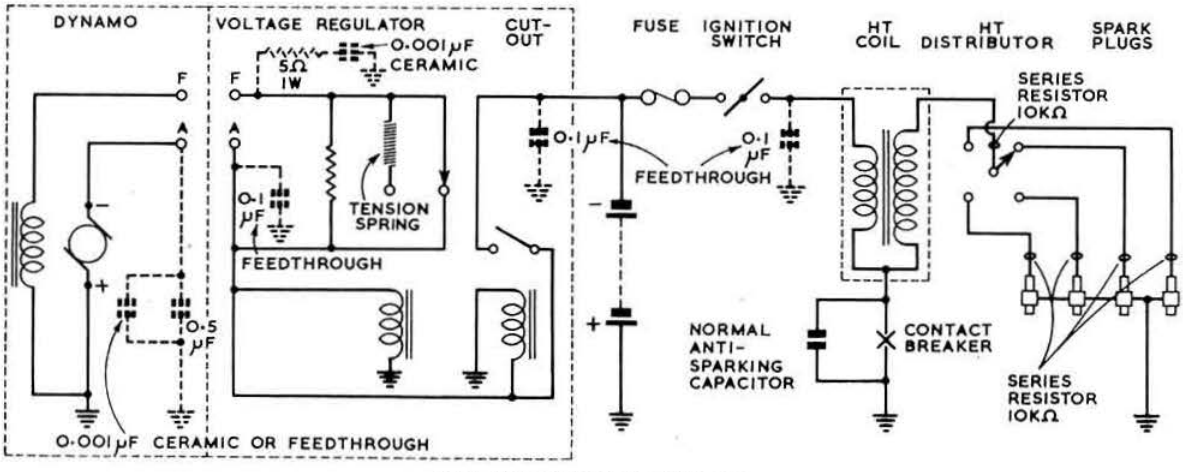


Fig. 1 Normal car electrical system

plugs in his Austin Mini-Van. The plugs failed after only 2,000 miles running and the manufacturers replaced them with the standard non-suppressed plug. It was subsequently discovered that Bosch make a full range of suppressed plugs for most makes of car and these are a little cheaper than the British counterparts. The 144 Mc/s transmitter in use has an 832 p.a. driven by a 5763 and EF91s while the receiver is a copy of the one described by G3ENY in the BULLETIN† some years ago. The power supply is a home-built transistorized unit giving 270 mA at 270 volt. A new rig has recently been built using a QQV03-10 in the p.a., modulated by a pair of 6BW6s—this should increase the depth of modulation considerably with a consequently greater effectiveness. The crystal microphone is mounted on a P.O. " breast-type " fitting thus leaving both hands free to drive the car. Modifications are well under way to an Ekco CR61 which should prove to be an excellent receiver for mobile working.

G6DN (Manchester) runs an A55 and operates mobile on Top Band, 7 and 14 Mc/s with an input of 8 watts and a home-built transistorized power pack. The BC car radio is transistorized and into this is fed the output of a crystal controlled converter using the modern 12 volt valves which do not require an h.t. supply, the 12 volt battery potential being sufficient. A long succession of aerial experiments, particularly on loading coils, has convinced G6DN that there is no future in ferrite rod types for transmitting. He has finally settled on two Top Band aerial coils, one being wound on a 1 in. former with 20 s.w.g. d.c.c. copper wire covering 23 in. and the alternative on a ¾ in. former using 28 s.w.g. covering 12 in.—the latter is used as bottom loading on to the BC aerial base whereas the former is fixed 2 ft. 2 in. up on an aluminium tube fitted to the rear bumper. A similar upper section of aerial is attached to both. The results show that the smaller coil brings in signal reports of only one " S " point down on the larger and more elaborate aerial system. Contacts to date include: *Top Band*—Manchester/Thanet, Cleveleys/Londonderry, Aberystwyth, Lanarkshire. *7 Mc/s*—Fleetwood/Paris, Berlin, Stockholm. *14 Mc/s.*—All Europe, and one VE on the key. Contrary to the widely held belief that the lower part of a mobile whip and the coil radiate the major portion, G6DN says that he is prepared to put forward points to substantiate that the upper part of the whip is also a useful contributor to the sum total. **G2DHV** (Sidcup) operating as GB3RES heard and worked several new mobile stations on 144 Mc/s including G3ABB, G3MCG and G3OTN. He missed the S.W. Mobile Rally due to an attack of influenza—better luck next year.

DL4GF (Darmstadt) is an electronics engineer with the U.S. Forces in Germany and uses a Mk V T23S Command transmitter on 144 Mc/s, a unit similar to the well-known SCR522. The receiver is a Tiger Nuvistor converter into a communications set. He hopes shortly to instal this into his car and so put Darmstadt/Mainz Highway on the map on 144 Mc/s! He is at present having difficulty in clearing ignition interference due to a super h.t. coil he installed—probably the easy way out is to replace the original coil! He has promised to send some information on halo aerials for publication in the *Column*.

G4JW (Sheffield) writes to say that the report in the November issue that he had won the double beam oscilloscope at Harewood is incorrect: he won the frequency contest and received a safety harness. We therefore are still unaware of the winner of the premier prize; can anyone pass the information, please?

A report from the Hon. Secretary of A.R.M.S., G3FPK, tells of the successful stand at the R.S.G.B. Radio Communications Exhibition when 73 new members were enrolled. The star exhibit was the " Courier " s.s.b. transceivers, developed for them by G3BXI and G3NMR, the former being an all-band model and the latter 14 Mc/s only. So successful have these been that it is likely that they will be manufactured in this country in the near future. It appears that some confusion is taking place due to the similarity in title between A.R.M.S. and the newly-formed Northern Mobile Amateur Radio Society—N.A.R.M.S. There is in fact no connection between the two.

† "A Two Metre Mobile/Portable Transmitter-Receiver", R.S.G.B. BULLETIN, February, 1958.

International Mobile Rally

G3BID (London, N.W.3.) has sent information on a rally to be held in Belgium, under the auspices of U.B.A., on Sunday, April 28, 1963. The location will be Verviers, in the Province of Liège. The " talk-in " bands will be 3·5 and 144 Mc/s and there will be an entrance fee of 100 Belgian francs. Temporary mobile licences with an ON5 prefix are expected to be issued to foreign amateurs attending the rally. These licences will be valid from April 26 to May 3 inclusive and will cover the following bands: 3·5-3·8, 7·0-7·1, 14·0-14·35, 21·0-21·45, 28·0-29·70, 144·0-146·0 and 430-440 Mc/s. Applications should be sent to Monsieur Rene Vanmuysen (ON4VY), 81 rue Joseph Baus, Wezembeek-Oppem, Bt., Belgium, to arrive before April 5, 1963. Applicants should state clearly that they intend to participate in the rally and photostatic copies of home station licences must be provided. It is perhaps a pity that the rally does not take place two weeks earlier during the Easter holiday—presumably it will be difficult for most amateurs to take advantage of this international occasion because of business commitments. A report by anyone attending this rally will be greatly appreciated.

Surrey R.A.E.N. Group

THE call-sign G3POL has been issued to the Surrey and Thames Valley R.A.E.N. Group for its amateur station at the Surrey County Constabulary Headquarters in Guildford. The licensee is the County Controller for Surrey, John D. Kingston (G3VK), with other members of the group as additional operators. The station is equipped for Top Band and 2m operation.

R.S.G.B. Log Book

A WELL-BOUND 120 page log book is now available from Headquarters, price 15s., plus 1s. 6d. postage and packing.

Echo II Predictions and Scatter Experiments

(Continued from page 341)

the complication of tracking, and the nearest part of the track to one of these is the place to aim your aerial toward.

To take advantage of the shorter range when the satellite is nearest its closest approach it will be necessary to increase the angles of elevation of the two aerials, thereby reducing the radius of the circles around the stations, bringing the beam intersections at satellite height closer to hand. However, the higher the beam angle the shorter the time that the satellite will be within it, as may be appreciated by drawing the angle of beamwidth on the track diagram base map. At times, *Echo II* will be clearly visible morning or evening, and at such times the services of a colleague will allow 100 per cent accurate alignments, particularly if arrangements are made to tilt the beam. The satellite elevation grid will provide angles of elevation from height and distance information for any point on the track diagram.

So now it is up to you. May we wish you the very best of luck, OM, and may you have many happy returns!

References

[1] Kirchner, P. H., " Position Prediction for the Echo II Satellite," *QST*, October, 1962.
[2] Flavell, R. G., " Using Oscar Predictions," R.S.G.B. BULLETIN, April, 1962.

THE MONTH ON THE AIR

A CHRONICLE OF EVENTS ON THE HF AMATEUR BANDS

By R. F. STEVENS (G2BVN)*

THE activities of W4BPD and his spells of operation during recent months from various DXotic locations have attracted world-wide attention from the DX fraternity. For various reasons it has not been possible to despatch the QSLs as speedily as the DXpedition sponsors would have wished and it is now opportune to set out some of the facts relating to the W4BPD saga. W4ECI, who is undertaking the massive chore of handling the QSLs, has advised the writer that all cards for the following calls used by Gus were despatched through the world bureaux by December 1: VQ9A, VQ9AA, VQ9AN, VQ9C, VQ9A/8C, VQ9HB, 3A2BW, 9U5BH and 9U5ZZ. These were complete with the exception of VQ9A during the month of July, and all QSOs from VQ9A/7, the copy logs for which were lost in the post.

During his recent LH4C operation from Bouvet Is., W4BPD made 3,800 QSOs and this type of performance has been duplicated at all the places from which he has operated. At the request of W4ECI, and in order to avoid the possibility of the loss of the original logs in the post, Gus despatches copies only to his QSL manager, and this process entails considerable extra work. Incidentally, Gus, being left-handed, is able to keep his log with this hand and use the keyer with his right hand. The cost of the massive QSL operation is high, and as an indication W4ECI mentions that the postage on the last batch of QSL cards was $96; practically all of the financial assistance comes from N. America. It should be emphasized that at no time has the despatch of a QSL been dependent upon any financial inducement. Further complications are that a large proportion of the IRC received from foreign stations were originally purchased in the U.S.A. and are therefore not exchangeable in that country, and other foreign coupons (e.g. from Mexico) realize only four cents on encashment. W4ECI regrets that the sheer volume of cards received precludes direct replies and assures that QSLs will be sent to everyone in the logs whether or not a QSL has been received. It is hoped that the facts outlined will enable a correct appreciation of this sustained DXpedition, initially based on superb operating by W4BPD, followed by much hard work on the part of W4ECI and his helpers.

Future plans at the time of writing envisage a trip to the Malagasy Republic during the latter part of January, and if this should not materialize, then operation from ZS7 and ZS9 is contemplated. W4BPD holds licences for East and West Pakistan, and has permission to operate from Sikkim and Bhutan, and it is hoped that these countries will figure on the itinerary during 1963.

News from Overseas

5N2JKO is now on his way home to the U.K. and will not be heard from Nigeria until the beginning of May 1963. **5N2RDG** is also leaving for the U.K. this month, and his home address will be found in *QTH Corner*. **5N2NFS** hopes to be active shortly as G3PBM, and his address is correct in the current *R.S.G.B. Call Book*. A new call will be heard in the near future when John Morgan, ex-9G1AE, ex-EI6AE and ex-ZD4BY, receives his licence. Unwelcome news for Nigerian licensees is that after January 1, 1963, a fee will be payable for all licences. **5N2IJS** is now in St. Kitts operating under the call VP2KR, and the address will be found in *QTH Corner*. 5N2JKO hopes to able to attend one of the meetings of the London Members' Luncheon Club during the period that he will be home on leave, and comments favourably on the recent talk given by the General Secretary, G6CL, on the B.B.C. General Overseas Service, which dealt with Amateur Radio and the Society, and was well received in Nigeria.

VQ8BM has now returned to the U.K. where he hopes to resume operation under his former call, G3GVQ. He will be pleased to answer QSL requests for genuine contacts and the address for these will be found in *QTH Corner*.

The official net meetings of the **Ex-G Radio Club** take place on Sundays at 19.00 on 14,345 kc/s. but poor conditions recently have prevented participation by many members. Commencing on December 16 an additional net meeting is scheduled weekly for **15.00** on **21,395** kc/s. It is hoped that this will make possible a continuation of Club activities during the winter months.

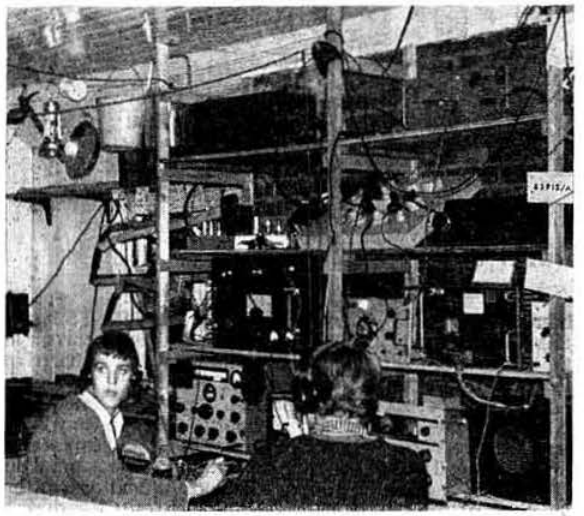
GM3JDX is now en route to Antarctica from where he hopes to commence operation in January or February for a period of two years from Adelaide Island. Activity is contemplated on 7 and 14 Mc/s, both 'phone and c.w., and U.K. QSOs will be especially welcome. It is intended to QSL on returning to the U.K. in 1965.

ST2AR has been very active on c.w. but unfortunately trouble with crystals in the filter section of the new s.s.b. exciter has prevented any operation on sideband. It is hoped that it will not be too long before this can be rectified.

At present active in Ethiopia are two members of the

FG7XT/MM

* *Please send all reports to R.S.G.B. Headquarters to arrive not later than* **February 7** *for the* **March** *issue.*



G3PIZ and G3RDQ operating G3OJE/A at the Chalfont Heights Scout Camp in Buckinghamshire, during the Jamboree-on-the-Air in October, 1962. *(Photo by G3OJE)*

West Pennsylvania DX Society in the persons of **ET3JK** (Jack) and **ET3FW** (Frank). Activity is mainly on s.s.b. and c.w. on 7 and 14 Mc/s between 15.00 and 20.00 during the week, and at various times over the weekends. The QSL manager is K3QHJ, and a reply envelope and I.R.C. are requested for a direct reply.

VQ4IQ writes that he is always pleased to make contacts with the U.K., and will usually be found on c.w. on 14 Mc/s. He anticipates being in Kenya until 1965, when he will be resuming operation from the U.K. under the call G3LCJ. The p.a. in the transmitter has recently been converted from an 807 to a 6DQ5 following the suggestion in *73 Magazine* of July 1962. VQ4IQ mentions the frustration of reading the BULLETIN some two months after publication, a point often mentioned over the air by overseas members. Unfortunately the cost of sending the BULLETIN by second class air mail is high, being usually 6d. a half ounce, giving a postage charge of probably 4s. 6d. per issue.

W2CTN, Jack Cummings, known throughout the world as a conscientious QSL manager for numerous DX stations, is reported to be in hospital in New York. It is certain that readers will wish to extend their wishes for a speedy recovery.

The following stations are known to be active from the **Antarctic** area, but a note of any additions or amendments will be welcomed.

VP8AI	Falkland Is.	QSL via W2CTN
VP8BW	Antarctica	
VP8EL	S. Georgia	
VP8FV	Antarctica (Halley Bay)	
VP8GB	S. Shetlands	QSL via W5QK
VP8GQ	S. Orkneys	QSL via G3PAG
VP8GR	S. Shetlands	
VP8GU	Antarctica (Adelaide Is.)	
VP8GV	Antarctica (Grahamland)	
VP8HD	Falkland Is.	QSL via G3PEK

Of the Argentinian stations, LU-ZA, ZG, ZM are located in the S. Orkneys; LU-ZI, ZO, ZS in the S. Shetlands and LU-ZY in S. Sandwich. The remainder of the LU stations are located on the mainland of Antarctica. CE9AF, AS, AW and AY are call-signs allocated to Chilean bases in the Antarctica area.

DXpeditions

A trip to **San Felix Island,** recently declared a separate "country" for DXCC, is envisaged by the Florida DX Club, and it is hoped that this will take place during April, 1963. A six-man team will probably go, and five or six day operation is contemplated. The Florida DX Club will be remembered as the sponsors of the HK0ZU activity from San Andres Is. during the c.w. section of the *CQ* Contest. QSLs for contacts made during this time have arrived in the U.K. exceedingly swiftly through the courtesy of W4BJ.

KH6PD/KG6 is now active on 14 Mc/s s.s.b. from **Marcus Island** usually around 14,295 kc/s. Unfortunately he is not often active at times favourable for U.K. contacts, but as he will be there for about nine months no doubt some suitable arrangements will be made to accommodate European stations. QSLs are being handled by W2VCZ, 30 Pitcairn Avenue, Ho-Ho-Kus, N.J., U.S.A.

Activity from **Trinidade Island** will be sponsored by **PY4s AS, GA** and **OD,** the first named handling the s.s.b. contacts, whilst 'GA and 'OD operate in the c.w. section. This trip will probably take place in late January or early February.

DL1TH and DJ0HF amassed 550 contacts during the thirty-six hours of their operation from Luxembourg between November 23 and 26. DL1TH was allocated the call **LX3TH,** but DJ0HF was not eligible for a LX call in view of his U.S. citizenship. The equipment used was a 40 watt c.w. transmitter, a K.W. Viceroy, two Drake 2B receivers and a Collins 75S1. Suitable aerials presented a problem which was eventually overcome by the use of mast sections loaned by DL4FKT (a club station in Frankfurt), and a multi-band dipole, 25 ft. above the ground, was erected along the line of the Mosel valley and running North-South. Varying line voltage was also a problem, especially as on occasion this dropped to as low as 180 volts. Most of the contacts were with European stations, and the U.K., Germany and Czechoslovakia accounted for two-thirds of the total number. Although radio conditions were not good the trip was considered to be most enjoyable, and QSL cards are in the press and all contacts will be confirmed.

Kamaran Island will be revisited by VS9AAA and party during the last week in January and the first week in February. Operation will be on 14, 21 and 28 Mc/s, and the call-signs **VS9s KAA, KSS and KRK.**

DXCC News

It is reported that QSLs from **TA4RZ** are now being accepted by the A.R.R.L. for DXCC credit.

The total number of DXCC certificates issued to September 30, 1962 is 8,755, and the listing in *QST* for December shows the leading U.K. representatives as **G4CP** (305/318), **G2PL** (304/316) and **G3AAM** (303/316).

In response to requests, a list of effective dates for DXCC credit for the newly independent countries has been compiled and will appear in the next issue.

Contests

The *CQ* Contests of 1962 attracted considerable attention and a number of comments have been received on the various aspects. **ST2AR** erected an aerial consisting of two full wave loops at right angles, a coaxial feeder being fed to one or the other through a relay operated from the shack. Designed for 14 Mc/s only, it netted Eric 82 countries in 33 zones for a total of 166,635 points. Another c.w. single band effort was that by **5N2JKO,** who entered on 21 Mc/s only, and claimed 530 QSOs for a total of 141,496 points. The period of the R.S.G.B. 21/28 Mc/s contest was marked by a breakdown in the local generating station which severely restricted operating hours.

G3PVS (Woking) took part in the c.w. section and noted that 7 Mc/s offered the usual European and semi-DX contacts, with, in addition, IT1AGA (23.20), UF8KAF (03.10), CX2CO (05.00) who, it was felt, was too good to be true, and 4X9HQ (after 06.00) operating from a club station. Nothing

was heard from W or VK. On 14 Mc/s 6O1ND was heard weakly at 07.50, with KA5RA (11.44) calling CQ under QRM from Soviet stations. A 7 Mc/s dipole and an input of 70 watts produced a number of N. American QSOs with received signal reports of 599. N. Africa was readily workable and 5N2RSB was noted knocking off the contacts at a very fast rate. The only VE worked was VE2NV (15.15), whilst VK6SM, VK4CO and VS9AAA were heard and obviously in great demand. **G3PSY** (Thorpe Bay) took part in the *CQ* contest mainly to find some new countries, and 17½ hours of operation produced 169 contacts in 14 different zones and 42 countries, totalling 8,021 points. After his experience this year G3PSY feels that a really herculean effort is needed throughout the 48 hours of the contest to make a score that is likely to be amongst the leaders, and the competition is really between those few operators prepared to make this sort of effort. It is suggested that all DX contests should be limited to 24 hours of operation and also restricted to inter-continental QSOs. It is felt that inter-European contacts are hardly DX and considerably reduce the chance of real DX stations being heard through the resultant QRM.

The R.T.F. have announced a competition for short wave listeners in connection with the programme **"Cap a l'Ouest"** (Sailing Westward), which was referred to in *M.O.T.A.* last month. The contest broadly follows that intended for the transmitting amateur and a copy of the rules may be obtained from R.S.G.B. H.Q. by sending a s.a.e.

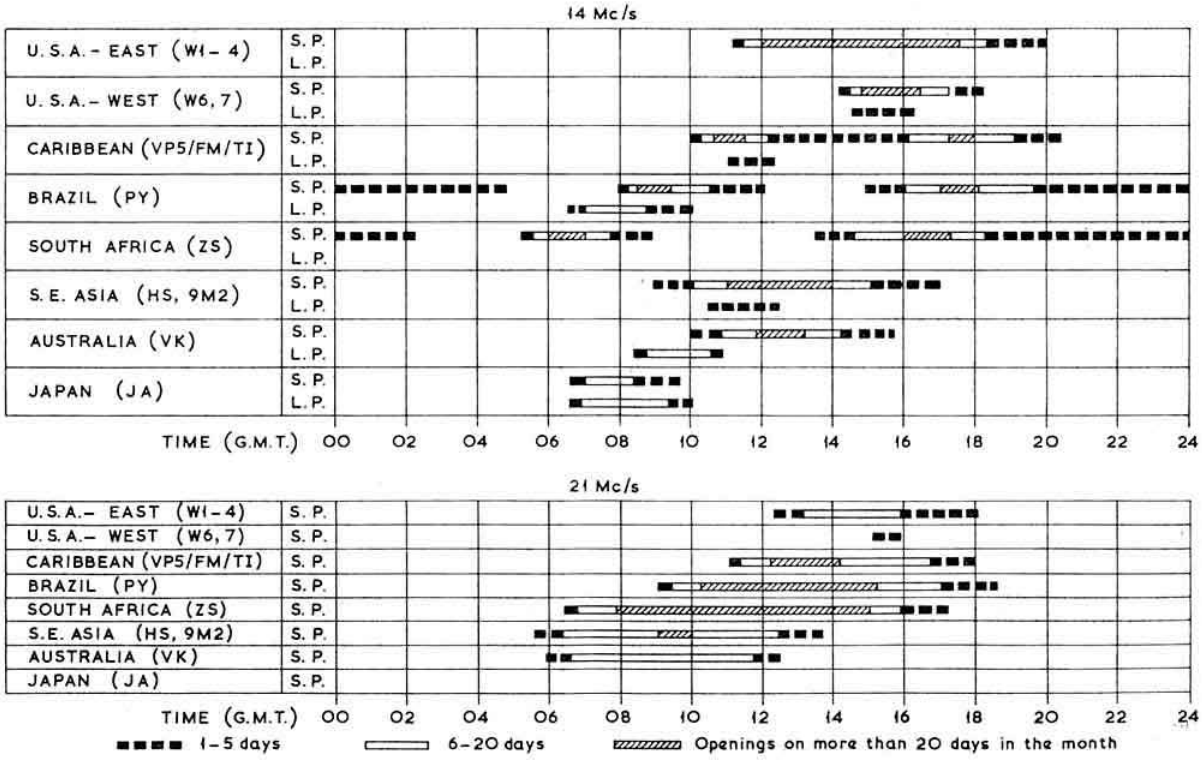
The annual **Quarter Century Wireless Association** party will take place from 22.00 on Friday, February 15, until 22.00 on Sunday, February 17. Intended basically for QCWA members only, the contest exchanges consist of a signal report, QCWA number, location a ndname. However, contacts with non-CWA members are welcomed as all operators are prospective members. (Tks to G5GH).

Awards

The Western Transvaal Branch of the South African Radio League announce the introduction of a new award known as **"Worked Western Transvaal"** (W.W.T.). Requirements are: Amateurs outside Zone 38 are required to contact six amateurs in the West Transvaal on at least two amateur bands. Contacts after January 1, 1962, will count, and these may be 'phone, c.w. or mixed. Applicants for the award need not wait for proof of contacts, but must be

PROPAGATION PREDICTIONS

The latter weeks of January and the beginning of February will continue the trend of the previous eight weeks, and it will be seen that the two charts for 14 and 21 Mc/s show little alteration from those published last month. Unless the m.u.f. rises to an unexpectedly high figure there will be no DX opening on 28 Mc/s. The most rewarding time for activity on this band will probably be around noon when openings on the southerly path may occur. Sunspot Cycle 19 continues its decline and is approaching the point where conditions will show only seasonal alteration over the next four years. The mean sunspot number for November was 23, compared with 39 for October and 52 for September, and the minimum is expected to occur early in 1965 with a sunspot number of 5. The predicted smoothed sunspot number provided by the Zurich Observatory for May 1963 is 21, which shows little difference from the present activity. On days when there are severe disturbances in the earth's magnetic field it may be possible to establish contact with other European stations on the h.f. bands by means of auroral reflection, i.e. both stations beaming to the North, and c.w. signals will show poor tonal qualities. At the present time there is considerable professional interest in communication by this means. On 7 Mc/s the best time for North American contacts should be around midnight, and the l.u.f. on the New York path falls to its minimum between 06.00 and 08.00. It is noticed that the l.u.f. on the path from New York to the U.K. falls to a lower value than on the west-east path, which may mean that on 1·8 Mc/s U.K. stations will be not so well heard as the U.S.A. stations in this country. For those operators seeking VP8GQ on 1·8 Mc/s the predictions show that the most likely period lies between midnight and 05.30, and signals are unlikely to be consistent for any length of time.



certain that each station in West Transvaal has received his QSL card. The best way to ensure this is to enclose QSLs with the application for the Award, the cost of which is five IRC or 25 cents in South African currency. Applications should be accompanied by a list giving full details of contacts, and should be sent to: The Award Manager, S.A.R.L., West Transvaal Branch, P.O. Box 21, Klerksdorp, Republic of South Africa.

The Yugoslav national society, S.R.J., announces the **Heard All Yugoslav Republics Award** for short wave listeners who submit proof of having heard amateur stations in each of the six Yugoslav federal republics as follows: Listeners in European countries must submit QSLs from two stations in each republic, i.e. 12 cards in all; listeners outside Europe must send one card per republic. The call-signs of the republics run from YU1 through YU6, and each card sent must be from a different station. Applications must be accompanied by a list giving details of the cards submitted, together with five IRC, and should be sent to S.R.J. (HAYUR Award), Post Box 324, Belgrade, Yugoslavia.

The **Code Proficiency Award** issued by the Dutch national society, V.E.R.O.N., may be claimed by operators who can submit faultless copy, for at least one minute, of the text transmitted by the society station, PA0AA, on the last Friday in each month on 3525 kc/s. The code runs are transmitted at speeds of 15, 20, 25, 30, 35 and 40 w.p.m., each for five minutes. The original copy of the transmission must be submitted together with a declaration that no mechanical aids have been used. Applications, together with two IRC, should be sent to: Traffic Bureau, V.E.R.O.N., P.O. Box 9, Amsterdam, Holland.

The award of the first Empire DX Certificate to be endorsed " two way s.s.b." to **W0CVU** of Cedar Rapids has created considerable interest in the recipient's home area. Mention in the Press and talks at local functions were followed by an appearance on television station WMT.

Applicants for the *CQ* **Worked 100 S.S.B.** award may obtain suitable forms from G2BVN who is authorized to check QSL cards from U.K. stations. Operators who have included a card from 9U5KU (Ruanda Urundi) amongst their total will have credit for this country deleted when cards are submitted for separate Rwanda and Burundi credit, i.e. 9U5BH and 9U5ZZ. It is noted that many operators send QSL cards by registered post and it is felt that this may be an unnecessary expense. The G.P.O. have ruled that such items are of no intrinsic value and it is doubtful therefore if any monetary claim could be made in the event of loss. It is felt that operators usually employ the registered post so that proof of delivery may be obtained. In these cases it is suggested that use could be made of Recorded Delivery for inland letter post, the cost of which is 6d. only, and which offers compensation (under certain conditions) up to £2.

Issue No. 29 of ***The Directory of Certificates and Awards*** will be available in January and may be ordered through G2BVN. The cost of the *Directory*, including three subsequent revision supplements, is 30s., and a three ring binder costs a further 7s. 6d. Stocks of the *Directory* are not held in the U.K., and delivery direct from K6BX ensures that only up-to-date volumes are distributed.

A new edition of the **R.S.G.B. Certificates leaflet** is now available from Headquarters. This contains the list of Commonwealth Call Areas for the Empire DX Certificate and other awards.

Around the Bands

With effect from the February issue the compilation of the band reports will be in the hands of Mr. J. C. Cottrell (G3PSY), to whom the writer is indebted for agreeing to undertake this task. There will be no alteration in the destination of the reports, which should be sent, as hitherto, to R.S.G.B. Headquarters. ***It would, however, facilitate matters if log extracts could be made on a separate sheet from any other information.***

The highlight of the month on **1·8 Mc/s** has undoubtedly been the contacts between **VP8GQ** in the South Orkneys and several U.K. stations. The first of the QSOs is believed to have been with **G3FPQ** at 23.45 on December 3. G3FPQ first contacted VP8GQ on 7 Mc/s at 22.30, later working him on 3·5 Mc/s and moving up to 1·8 Mc/s at about 23.20. Contact was established at 23.45 with a 339 report to '8GQ. Subsequent QSOs were made with **G3ERN** and **G6BQ** on December 14 at about 05.00, whilst **G5XB** was lucky between 01.25 and 01.35 on December 16. VP8GQ was heard at 549 on 1801 kc/s at 01.25 but had faded to almost zero when last heard around 02.00. The aerial used by G5XB was a 38 ft. top loaded vertical, and signals from VP8GQ could not be detected on a half-wave horizontal aerial 42 ft. high. G5XB rightly contends that unless one can lift a half-wave aerial up to 80 or 90 ft. above ground then it is not so effective as a properly loaded vertical. At **G8PG/A** W1BB was audible on November 25 from 06.00, giving a report of 339 to '8PG at 06.20. DL1FF was QSO'd by W1BB at 06.35, who later called OY7ML. Other stations heard were W2IU (06.40), W2FYT (07.28) and OZ7RL at 08.05 on 1827 kc/s. These signals were 449 and G8PG hastens to point out that it was definitely OZ7RL and not OY7ML! Between 11.40 and 12.20 on this day G8PG worked four countries on the band in daylight, i.e. GM3PBA, GI3RJJ, GD3HQR and G3LWQ. On the morning of the first official test on December 2, W1ME was the only U.S. station heard, and could not be raised around 05.30. **B.R.S.20317** confirms the poor conditions on December 2, but was pleased to log HC1DC at 05.40 on 1804 kc/s. On December 9 our reporter logged PA0PN on 1825 kc/s at 00.20 to make his 30th country on this band. SV0WZ was heard at 05.00 and PA0SS at 05.23 on 1829 kc/s. The path to the U.S.A. was open from 05.30 to 07.20 with signals averaging S4 from the six stations appearing in the log: W1ME, W1TX, W2EQS, W2FYT, W2GGL and W2KHT. G8PG reports the same stations heard at his Wirral QTH with W1ME the strongest station at RST559. The last station heard was W2UWD (RST229) working G6GM at

QTH Corner

ET3FW, ET3JK	via K3HQJ, 1213 Drey St., Arnold, Penna, U.S.A.
FK8AH	via W2CTN
HI8MV	Box 1157, Santo Domingo, Dominican Republic.
HK0TU	now via W4DQS, 928 Trinidad, Cocoa Beach, Fla. U.S.A.
JT1KAC	M. Novak, Francouzska 25, Praha, 2, Czechoslovakia.
KH6PD/KG6	via W2CVZ, 30 Pitcairn Avenue, Ho-Ho-Kus, N.J., U.S.A.
K5FOQ/KS6	Detachment A, JTF8, APO 953, San Francisco, Calif., U.S.A.
KL7DBG/KS6	W. F. Lancaster, 11750 S. Homan, Box 17A, Chicago 55, Ill., U.S.A.
LX1TH	via DL1TH, Wolfgangstrasse 84, Frankfurt-am-Main, W. Germany.
VK9LA	L. Allen, Box 5, P.O., Cocos (Keeling) Is.
VP2KR	J. Stratfull, c/o Audit Dept., St. Kitts, W. Indies.
VP2LS	via K8ONV
VP2ML	via K8ONV, 32805 Riverside Dr., Birmingham, Michigan, U.S.A.
VP8GR	R. Lewis, Deception Is., via Port Stanley Falkland Is.
VQ8BM	M. Bates, 118, The Dale, Widley, Nr. Portsmouth, Hants.
YK1AK	Box 35, Damascus, Syria.
ZS7M	via W2CTN
4X9HQ	via 4X4JU
5B4 QSL Bureau	P.O. Box 216, Famagusta, Cyprus.
5H3HZ	C. W. Barrett, Box 260, Mbeya, Tanganyika.
5N2RDG	R. D. Glynn, Hillside, St. Stephens, Launceston, Cornwall.
9Q5RK	via LX1RK

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

07.58. G8PG mentions the difficult conditions prevailing on December 9, when signals were subject to heavy fading, and Loran interference seemed to be causing trouble to the U.S. stations. A further factor is the presence on 1805 kc/s of a French coast station, who obviously has priority on this band. However, as our correspondent points out, the regulations do not allow for 150 per cent modulation. **5B4PB** has been active on this band and reports the night of November 25 as being particularly good, when contacts were made with G3PU, G6BQ, G3ATU, G3ERN, G3FGT, G3HEZ, G3IGW, GW3JI, in addition to DL1FF and other European stations. 5B4PB sends a copy of the Cyprus Amateur Radio Society News Letter which deals with activity in that part of the world and confirms the presence on Top Band of SV0WZ who was worked during November.

On **3·5 Mc/s** there has not been the DX that might have been expected, but possibly this is due to lack of activity or lack of reports. **G3FPQ** (Elstead) records QSOs on s.s.b. with FG7XT, HK5CR, KP4s, VE8ML, VK2AVA, VP2LS, VP2ML, VP9s and YV5ANS. A new country for **B.R.S.20317** was HK0ZU from San Andres at 06.20, and other c.w. stations logged were 5A5TW (05.25), KP4AXU (05.35), ZP9AY (07.35), YV5AGD (07.50) and OH0NI (08.00). U.S. signals averaged S5/6, the best being from W4DHZ (07.05) and K0UTX (07.20).

In contrast **7 Mc/s** has apparently yielded a good selection of DX, and our three reporters on this band all mention signals from the West Coast of the U.S.A. heard and worked around 15.00. **G3LPS** (Blackburn) records QSOs with HI8XAG (22.12), HK0ZU (09.05), HK1QQ (23.38), PX1AI (16.40), UH8BI (19.58), VQ4IV (21.10), W6ULS (15.17), W6GRX (15.22) and W6EPZ (15.10) all on the long path, ZB1CR (17.16), ZL2GS (07.50), 4X9HQ (16.47) and 5N2LKA (21.30). VQ4IV reported being called by, and worked, a KC6 on this band. **G3JAG** (Rochdale) reports an excellent month, a feature of which has been the morning openings to Japan. JA8LN has been an outstanding signal on most days peaking 579-599 around 08.00. G3JAG keeps a daily sked with ZL2GS who is always audible by 07.45, and qualifies for a " signal of the month " citation. Other openings to Japan have occurred between 10.00 and 15.00 and JA6AKW, using 15 watts to a ground plane, was 459 at 12.30, whilst JA3CYY was 559 at 12.45 on December 15. Confirmation of these excellent openings to JA comes from **B.R.S.20317,** who has logged those stations already reported, with, in addition, JA1KFN (10.30 and 13.50), JA4YC, JA6YG, and JA3BDO, the last three around 14.30. A good catch on the path to the East was HL9KH, worked by **G3JAG** at 13.05 on December 15. The log extract from 'JAG is in time order: 00.15 VP7CS; 01.00 HK1QQ and VQ4IV; 04.40 ZS1A; 05.20 LA2NG/P; 05.40 OH0NF; 06.00 4U1ITU; 07.40 JA1CQR, JA3LAZ and PY7AKQ; 08.00 JA8LN and ZL2GS; 08.20 JA8AJS; 08.30 XE1OE; 08.55 JA7AKC; 09.10 HK0ZU; 13.05 HL9KH; 15.15 W6GRX, VK3XB; 15.20 VK9KK (Christmas Is.); 15.45 4X9HQ; 16.25 OY2H; 16.40 VK4SS; 17.50 UA1KAE; 19.30 9K2AD; 22.00 KV4CI; 22.15 UF6DD; 23.00 UJ8KAA; 23.30 VS9AAA and 23.45 VP8GQ. G3JAG would like to hear that VK9KK on Christmas Island is genuine. The name given was Frank and the frequency 7005 kc/s. LH4C was heard early in the morning with weak signals, and it is felt that had Gus come on the band before 01.30-02.00 many of the European stations would have been able to work him. Other points mentioned by our correspondent are the importance of ensuring that aerials for the l.f. bands are as high as possible, and the perennial problem of how to convince European stations that " CQ DX " is DX and not anyone, apart from the solution of not calling CQ.

B.R.S.20317 has concentrated his activities on this band and records in continental order. Oceania: the best signal has undoubtedly been VK3AZZ using a beam on Asia, and

G3PAA operating transistorized 1·8 Mc/s equipment on the end o the pier at Eastbourne. The transmitter employs 10 transistors measures 5½ in. × 11½ in. × 7½ in. high complete with its batteries and can be run at inputs from 70 mW to 7 watts on phone. Power is derived from PP9 batteries.

heard at S7 at 14.55. Other Australian loggings include: VK2QL (14.40), VK3MH (10.15), VK3RW (14.50), VK3XB (08.45, 10.00 and 15.30), and VK3YU (13.50). ZL2GS (07.40 to 09.30) is the sole N.Z. call in the log, whilst KG6NAA at 13.40 was an all time new one for this band. From South America the best signal was HK1QQ (00.15), with PY5ATL (23.30), VP8GQ (23.45) and LH4C (00.30). Central American calls in the log include: KV4AA (00.15), VP5BL (00.20), VP7CS (00.30), XE1OK (09.15) and YN1AA (09.40). TG9AD was a new all time one on c.w. at 05.50. Africa yielded: EA9AP (14.00), SM5CGK/9Q5 (00.05), VQ4IV (18.50) and ZE8JJ (23.42). In addition to the JA stations already mentioned our reporter logged KR6ML between 14.15 and 16.15, HL9KH between 13.20 and 16.00, and 9K2AD (18.30). The West Coast U.S.A. stations were heard between 14.10 and 15.55, and of these W6ULS was the most consistent, but the strongest signals came from K6EVR and K6VTQ (14.35). From this area KL7MF was an unusual one at 14.45, whilst the signal from W4DKK was still audible at 10.50, the latest time so far this winter.

Turning now to **14 Mc/s** the difference in conditions between the U.K. and Central Europe is evident from the s.s.b. log of **OE1ME** (Vienna) who records FK8AZ (07.06L), KC4USB (19.43), KX6BC (07.10), KX6BU (08.17), VP2LS (12.20), VP2ML (12.30), VQ1GDW (18.42), VR5AA (07.26), ZL1ABZ (06.40 and 07.43), ZS6BBB/9 (18.52) and ZS6PC/9 (15.10), 5R8CM (17.38L), 5X5IU (19.44) and 9Q5RK (15.25). OE1ME reports good signals from ZL1ABZ on the Kermadec Islands with signals peaking around 06.30-07.45, and although ZL1ABZ has been worked from the U.K. by a small number of stations, the received signals have been poor. A s.s.b. log from **A.2404** includes FK8AZ (07.45L), KP4TL (11.10), LX1DE (13.00), OX3KW (15.20), UD6KAC (12.55), UO5SA (07.55), VE8MD (17.25L), VQ2AF (16.55), and XE1CE (13.20). In sending his log extract **G3AAE** comments that each month the list gets smaller, fortunately however the quality seems to be maintained in the shape of EA0AC (18.20), FB8XX (16.50), FK8AT (08.30), FR7ZD (16.30), JT1AG (07.45), LH4C (16.50), TT8AL (09.10), TU2AP (16.45), VQ8AI (16.30), 5R8CJ (16.15), and SM5CGK/9Q5 (17.00). G3AAE has joined near neighbour G3YF (Chingford) in that select band who have amassed over 300 countries confirmed, and offers QSL manager services to any station in a country which he

has not worked! **G3HDA** (Stratford-on-Avon) worked (on c.w.) F2CB/FC (14.20), FG7XJ (10.20), HK0ZU (11.54), HL9KH (07.50), KG4AM (17.16), LH4C (17.12), MP4QAQ (08.45) and UA0KYA (09.32). **G3PSY** (Thorpe Bay) exchanged RST with CN8FE (10.09), CT3AV (10.43), K7CAD (16.34), OY2H (10.38), PY4OD (20.07), ST2AR (18.54), TF3AB (12.14), UA1KAE/2 (19.27), UA9BZ (12.08), UL7KBK (13.51), W6RW (17.44), 4X4BG (16.48), and 5B4AK (15.38), **5N2JKO** (Zaria) worked CR4AH (07.15), TT8AJ (17.05), UM8KAB (06.00), VE6UM (21.03) VKs (S.P. 16.00 and L.P. 07.00), VP7NT (06.00), VP8GQ (21.35), VU2GG (14.50), ZM6AW (03.15), 6O1ND (05.25), and 9M2s (14.00-16.00).

G8PL (London N.W.3.) offers the heard/worked listing which follows: *06.00/07.00* EP2BQ, HZ1HZ, KL7WAH, OD5AX, ST2AR, SU1IM, TT8AJ, TT8AL, TU2AP, UA0KAD, UD6GW, UA9BZ, UF6CW, UI8KHA, UL7KCR, UM8KAB, UQ2AE/MM, UW9CO, 4X4s, 5A3TS, 5A4JN and 5B4GT. *07.00/08.00* CN8FE, JA1BK, JA2ANX, MP4BDD, ST2AR, TT8AL, UA0KSB, UA9s, UF6CW, UH8AD, UI8AB, UL7KFA, UV3TC, UW9CA, YU3FU/MM, YV6GM, 4X4s, 4X9HQ, 5A3CR, 9L1RO. *08.00/09.00* CX2CO, EA8DO, JA2CMD, UG6KAA, UL7LA, ZL1AV, 4X9HQ. *09.00/10.00* CT3AV, F2CB/FC, LA9RG/P, TF2WG, 5A1TW, 9L1RO. G8PL comments that the appearance of OD5AX may indicate that the Lebanese stations are on the air again.

From reports received it would appear that conditions on **21 Mc/s** have often been quite good but that there has been insufficient supporting activity. **G3AAE** keyed with LH4C (16.15), TT8AL (09.30), TU2AF (09.15), VK7SM (11.25) and 6O1ND (08.40), and **G3PSY** received reports from KP4CC (13.10), UH8DA (12.32), UO5AA (13.25), VQ2W (14.52), ZP5LS (14.32) and 5A2TS (11.26). Having completed the transfer of his equipment to a new vehicle **G3NXU/M** (Bristol) records a.m. QSOs with LZ2KWR (13.00), K2LOK (13.20), K3IVM (13.21), TU2AP (12.52), UA3HT (13.00), W1LIB (12.51), ZB1CR (12.52) and 9G1EE (13.05). **5N2JKO** spoke with HK3AFB (19.15), KZ5JW (20.30), OA3J (19.45), PJ2AL (19.30), TG9BM/6 Mobile (20.00), TI2OSL (20.00), VP7CT (21.21), XE1IL (20.15), YN6HH (19.45), ZD6HK (17.00) and 9Q5JE (15.05). **A.3295** (Lincoln) logged many of the above plus EL5C (15.51), MP4BDC (14.00), MP4TAC (13.13), TT8AL (11.24), VQ2BK (11.31), XE3AF (15.31), ZE1AO (16.04), 4S7BR (10.56), 5H3IW (11.16), 5R8DX (15.15), 5N2RSB (14.52) and 9G1AB (13.15). **G3LPS** exchanged c.w. reports with HC1DC (16.10), TU2AP (11.12), VK6SM (10.37), VQ2W (15.50), and 5N2s RSB and JKO (10.50).

DX Briefs

The Cyprus Amateur Radio Society, through their President, 5B4IP, have advised that w.e.f. January 1, 1963, the address of the **5B4 Bureau** will be P.O. Box 216, Famagusta, Cyprus.

In connection with the recent reappearance of Finnish stations on Top Band, G2MI points out that **OH3NY** was worked by many U.K. stations, including himself, on or around January 24, 1953. The November QSO between G3MYI and OH2NB was not therefore an all time first.

A recent visitor to R.S.G.B. HQ, MP4QTL, will be going to **Kuwait** and should be active on 21 Mc/s during January. Other operators to be heard from this area include 9K2AD, usually found on 21 Mc/s c.w.; 9K2AP, on s.s.b. only and 9K2AX, active on c.w. and a.m. on 21, 14, 7 and 3·5 Mc/s.

UA2AO continues to provide the only regular representation from **Kaliningradsk** on sideband, and will usually be found on Sunday mornings (G.M.T.) on 14 Mc/s. Anly is at present constructing a new linear to boost his signals. After collecting some fifty awards UA2AB has neither transmitter nor receiver at the present time, whilst UA2AK and UA2AW are both building new exciters. The only YL operator in the country, UA2YL, who is the wife of UA2AO, will be found on 7 Mc/s c.w. after 20.00.

Activity from the **Malagasy Republic** (Zone 39) is concentrated in 5R8CM, who is often available on 14 Mc/s s.s.b. after 16.00, and 5R8s AS and BX, who operate 21 Mc/s a.m. after 15.00.

From **Senegal,** 6W8DD may be heard on c.w. on 14 and 21 Mc/s; 6W8s DE and DF concentrate exclusively on 14 Mc/s c.w., whilst 6W8DM may be found on a.m. also on 14 Mc/s.

YI2WS giving QTH as Baghdad and name Ali was heard on 14,042 between 06.30 and 07.30 by G8PL. The operator was most emphatic about no direct QSLs, and this may possibly be a station operating under cover.

G3YF reports hearing FB8XX saying that **FB8WW** will be operating on Crozet Island after January 15 on 7 Mc/s.

* * *

Thanks are offered to the numerous correspondents and acknowledgement is made to the *DX'Press* (PA0FX), the West Gulf DX Club *Bulletin* (K5ADQ), *The DX'er* (K6CQM), *DX* (W4KVX) and *Florida DX Report* (W4CKB). Please send items for the **March issue** to arrive at R.S.G.B. Headquarters not later than **February 7.**

R.S.G.B. Morse Practice Tape

A MORSE code practice tape, recorded at 3¾ in. per second, is now available from Headquarters, price 17s. 6d. post paid. The speed of sending on the 450 ft. tape is approximately 14 w.p.m.

The exercises are not intended to teach the code but by running the tape at 1⅞ in. per second useful practice is available for beginners. The recording can also be run at 7½ in. per second for high speed practice.

A.R.R.L. DX Contest 1963

THE following is a summary of the rules for this year's A.R.R.L. DX Contest.

1. The contest periods are: **Telephony, February 9-10, and March 9-10; C.w., February 23-24, and March 23-24**
2. The commencing time in each instance is **24.00 G.M.T. Friday,** and the finishing time **24.00 G.M.T. Sunday.**
3. **The object** is to work as many W-K-VE-VO-KH6-KL7 stations as possible in as many different call areas as possible **per band.**
4. **DX stations** will send the RS or RST report followed by a three-digit number representing power input. U.S.A.-Canada stations will send a number consisting of the RS or RST report followed by an abbreviation of the name of their state or province.
5. **Repeat contacts** on additional bands are permitted. The multiplier is the total call areas contacted on each band (maximum of 21 per band). Each completed QSO counts three points and an incompleted contact two points. The final score is the number of QSO points times the multiplier.
6. **Logs** should contain calls, dates, times (G.M.T.), bands, exchanges and points. The summary sheet should indicate the sections of the contest, name, address and call-sign of the entrant, equipment used and power input, number of W/K/VE/VO call areas worked on each band, number of contacts on each band, number of hours' operation, names and call-signs of assisting persons, points claimed, multiplier and claimed score. A declaration stating " I certify, on my honour, that I have observed all competition rules as well as all regulations established for amateur radio in my country, and that my report is correct and true to the best of my belief. I agree to be bound by decisions of the A.R.R.L. Award Committee " is required. Logs and accompanying summary sheets should be sent to A.R.R.L. DX Contest, 38 La Salle Road, West Hartford, 7, Conn., U.S.A., and should be postmarked not later than **April 27, 1963.** Free log forms are available on request from A.R.R.L.

One Man Versus the World

Being the Tale of G3KZR and the R.S.G.B. 7 Mc/s Contest

Told by I. S. DAVIES (G3KZR)*

PROD . . . PROD . . . In the cold grey light of pre-dawn, a small recumbant figure nudged a larger one and whispered something about it being "a quarter to six." The larger form grunted, peered at the luminous hands of the clock and wished that it wasn't there. Saturday, November 3, 1962, was just about to dawn, and, at 06.00 G.M.T. precisely, the R.S.G.B. 7 Mc/s contest was due to begin. I had been telling my XYL months in advance about this, softening her up, and I now found myself being fanatically urged out of bed. It served me right. Ah well; pullover, slippers and scruffy trousers on and tip-toe out of the room to avoid waking the baby and thus set off a chain reaction that would explode the whole ne'ghbourhood. Light on, rig on, coffee on, and G3KZR was off.

Splendid! SP8YA after the first CQ, but not a very good report. Another CQ, another, and yet another, but all to no avail. Something was wrong—half an hour had elapsed and the situation was becoming desperate, but wait a moment . . . that aerial tuning does look a bit odd. Perhaps something is adrift outside?

It was, unfortunately, still a grizzled grey outdoors and not the time for an aerial inspection. How about the long wire on the roof? Now this laughingly called aerial was a patchwork quilt of five pieces of scrap box wire soldered together to make up 66 ft., the idea being to use it to test a transistor transmitter on 80 and 160. It ran from the ground floor shack up to the chimney stack, had snagged in the gutter, and finally immersed itself in a maze of branches on the cherry-tree to which the fickle dipole was also attached. I had once received 599 from SM5 with it, so perhaps it would do some good? Mercifully I had soon worked OH, SM and then received 569 from ZB1CR on this precarious arrangement and was back in the hunt. A few QSO's later, XYL and junior op appeared for breakfast, not looking best pleased at daddy being incommunicado (unlike some virtuosos he cannot do anything but grunt non-committally when operating), but soon the contacts were onto the second page of the log. By 11.30, however, the junior op had decided that daddy must be assisted by pulling the headphone lead (painful with stethoscope 'phones!), pinching the log or pencil, asking to be walked and finally demanding to sit on his knee. This latter move served to give her a better vantage point from which to repeat the previous manoeuvres. This accounts for the appalling sending, squiffy logging and the final cessation of operation at about this time.

There was anyway the enigma of the "official" aerial, i.e., the dipole, which still had to be looked into. Therefore daddy and junior op meandered down the garden to see what the trouble was all about. Having checked the remaining michaelmas daisies and a leaf or two, the aerial was finally inspected and the 20m dipole was found to have entwined itself with the 40m one; they shared the same feed point. The disentangling complete, shopping had to be done and food to be consumed, but by 13.30 G3KZR was back on the bug again. The deserted spouse was engaged in a whirl of annoyed cleaning (there is no other form of cleaning) and QRM from vacuum cleaners was at times something of a trial!

Despite these machinations progress was pretty good up till about 22.00, when the going became very sticky. After an age of waiting while he worked the entire G population, I finally caught up with 4X4DH, but gathered a very puny report. As other signals from that area were completely unworkable, but appeared to be the only ones on, a form of frantic frustration set in. It became obvious that the dipole was more strongly directional than previously thought, so back to the end-fed. Well, two useful QSO's resulted from that move, but the hoped for PY's and W's remained well down in the mud. By this time, too, a pair of operator's eyes were all but stuck together with fatigue . . . so off to bed.

At 04.45 on the Sunday morning the eyes were in the process of being unglued once more, focusing, like the mind, none too steadily on the job in hand. Curses! The W's just weren't there and that meant a very nasty gap in the log, but to dispell some of the gloom the good fairies overpowered the more established gremlins and produced 5N2JKO with a comfortingly low serial number. From then on it was a goodly rattle until 10.00, by which time there appeared to be nothing but overheated G's on the band. Having unpicked myself from the entanglement, I creaked around the house, hotly pursued by the junior op, and made peace with the XYL by lighting the fire and helping with the dinner. Lunch consumed, there was obviously only one thing in mind (besides G3FXB's astronominal serial number) and that was more sleep.

Now, if you have ever fallen asleep after a heavy Sunday meal and woken again later, you will no doubt remember the feeling of acute dyspepsia which then broods over you. Well, so do I. Thus it was that the Hercules of North London made a tricky decision and was to be seen quietly depositing the world for a few more hours while strolling in the park with his retinue. Partial sanity returned.

This pastoral idyll ended abruptly at 16.30 and the battle was joined again. It did not take long for the band to return to its claggy state of the previous night and it seemed to crouch over me like a leering Cheshire cat as UB5's, YO's and so on rattled off the QSO's with everyone but me. I knew that the end-fed was again the answer, but I also knew that it was not TVI proof, and, what was more, the Royal Command Performance was going on, "Before their very eyes."

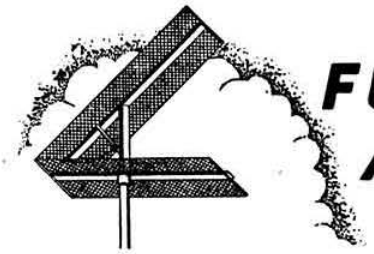
Having no desire to provoke a premature Guy Fawkes display I kept my head down, ate some food and tried, unsuccessfully, to reorientate the dipole until, by my computation, all the worthy citizens of the neighbourhood had gone commercial again. Posterity will be able to admire the fine little last spurt G3KZR made when he switched over just before 23.00. By this time, however, the call of the electric blanket was too much and he shambled off, ears ringing, nerves jangling, to a beautiful oblivion.

With no more than half the contacts of the leaders and a mere 25 countries logged, no doubt I shall come well down the list, but still there were a few new countries for the band to reward me, junior op did get her walk, the XYL eventually proved quite sympathetic, and daddy also learnt a lot about his aerials. The moral, if there must be one, is that a makeshift aerial is not as laughable as it first seems!

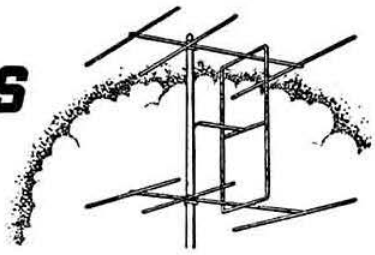
* *12 Old Park Road, Palmers Green, London, N.13.*

Fahrenheit—Centigrade Calculator

THE move towards using the Centigrade temperature scale instead of Fahrenheit has prompted Negretti and Zambra Ltd. of 122 Regent Street, London, W.1, to produce a Fahrenheit/Centigrade Calculator. Conversions can be made anywhere within the ranges of 0°F to 4352°F (−17·8°C to 2400°C). The calculator is being sold at 5s.



FOUR METRES AND DOWN



By F. G. LAMBETH (G2AIW)*

IT is some time since parametric amplifiers have been mentioned in *Four Metres and Down* and it is accordingly a pleasure to report the experiences of G3CCA (Oadby, Leicester) during the opening at the beginning of December 1962, although he says it is unfortunate that his tests should have been made during that period. As most of the operating was done in the mornings and afternoons of December 3-5 the evening QRM was missed, with the result that PA, ON, OZ, SM and DL stations were worked with ease on 144 Mc/s. Moreover, the paramp proved worthwhile, as the noise level for 15db of gain was 0·5db, giving less than 1db for the whole receiving system. Tests with PA0GE 5 miles south of Amsterdam were carried out during the morning of the 3rd, and with the parametric amplifier connected to the input of the Nuvistor converter, the gain of the Eddystone 840C turned down gave a *noise-free* signal like a B.B.C. v.h.f. transmission at Oadby. Without the paramp a very small amount of noise was noticed. During the following days many stations heard G3CCA and PA0GE discussing the amplifier, and numerous calls were received from PAs, ONs and OZ asking for details. Unfortunately QRM became very bad on the continent and several tests had to be abandoned including one with PA0ROY. After the opening a south-west path was tested with G3EHY (Banwell) and again the amplifier proved its worth over long distances. The transmitter employs a QQV06/40A at 50 watts. The receiving system, however, is different: a parametric amplifier using a Ferranti ZC20C varactor diode as a coaxial line amplifier with an A.2599-DET29 pump oscillator on approximately 650 Mc/s, followed by a 6CW4 cascode and an 8058 grounded grid Nuvistor stage, the noise from this stage being 2·9db, into an A.2599 mixer and cathode follower providing output in the 24 Mc/s region. Further experiments are going on to re-design the amplifier to use a simple inexpensive pump oscillator around 1500 Mc/s—a proposition for any amateur, says G3CCA, who is on any lunch-time from 12.45-13.15 G.M.T. using the parametric equipment for anyone interested.

R.S.G.B. V.H.F. Beacon Station

Following the recent overhaul of the transmitter, it has been discovered that an intermittent fault has arisen in the aerial system at the Society's v.h.f. beacon station, GB3VHF, on 145·5 Mc/s. It may be some time before the fault can be rectified but in view of its intermittent nature the station is being left in operation.

Seventy Centimetre Reports

G3NOH (Bournemouth), with a QQV06/40A p.a. at 60 watts, and receiving on a G6JP converter and G6JP preamp into an HRO, has worked 14 stations in nine counties and two countries (G and GW). During the late evening of December 3, G3LQR and G3MCS were worked at RS59.

G3JMA (Harlow) had a contact with OZ9AC (near Copenhagen) at 19.06 G.M.T. on December 3 (briefly reported last month) which is probably the first G-OZ 430 Mc/s QSO. After this contact, the Danish station was worked by G3LTF, G3LQR and G2CIW. SM6BAE, several PA stations, DL6SV (near Hamburg), DL1LB, ON4HN, F3LP and G5QA with several other items of G-DX were also worked—a total of seven countries in one evening.

G3LTF (Galleywood) reports a QSO between G3LQR (near Colchester) and LA9T (Moss, Oslo) which is believed to be the first LA/G contact on the band. G3LTF also worked LA9T, the distance, 666 miles, being only about 10 miles less than the existing record.

G3BIK (Gosforth) has had a sked for three months with G2XV and the first QSO was made on November 29, although each had previously heard the other on a number of occasions. This appeared to presage a u.h.f. opening and surely enough December 2 found the band wide open. G3BIK's beam was turned east, and although all the Southern England stations were S8/9 off the side of the beam, they were not worked. However, PAs were coming in at S9+ and two QSOs were made with no bother. December 3 brought a QSO with DL1PS at 579 and the following day the DL path was wide open. On the Wednesday a QSO was made with G3LQR while both beams were pointed East. This was a phenomenal opening. The QSO with G2XV made his 40th county, and G3BIK's present score is eight counties and four countries (G, GM, DL, PA).

G3LQR (near Colchester) says that the opening was the best he has experienced. Starting on December 2, contacts were made with G6NB, G3KPT, DL1PS, PA0EZ, G2BDQ (5/8 from Newcastle), G3ILD, PA0LWJ, and PA0COB. On the 3rd SM7BAE, DL6SU (S9+, near Hamburg) several PAs, OZ9AC, F8KF, DL1LB and many Gs were worked. On the 4th SM7BAE, OZ9AC, DL1LB, ON4HW, G3ILD, G3KKD/T, G3RIZ/T, G5LL, G3PDO/T, LA9T and PA0TR were contacted. December 5 brought DLs, Fs, and G2BDX, whilst the 6th produced SM7BAE (59), SM7BE (58), SM6ANR (589) and F3LP (59+). What a feast! The total score on 430 Mc/s after two years' operation is 123 stations in 29 counties and eight countries.

G3OSS (London, N.W.) with 1½ watt output worked G3FAN, G2CIW, PA0KPO (57) and PA0COB (5/7/8) during the opening.

G5LK (Mitcham), who is not very well placed, worked SM6PU and an OZ station.

Two Metres

A.1795 (Weymouth) comments that there seems to be a lack of listener reports and accordingly sends a welcome letter on the early December opening. Three new countries were heard, OZ, PA and SM, the stations being OZ5AB, PA0FB, PA0BM and SM6CLN, making the countries heard in just over a year seven, and about 35 counties. A.1795 has passed the R.A.E. and after much Morse practice hopes to be on soon.

G3NOH (Bournemouth) has applied for the *Four Metres and Down* award, with 39 counties and six countries worked

* *R.S.G.B. V.H.F. Manager, 21 Bridge Way, Whitton, Twickenham, Middlesex. Please send reports for the* March *issue to arrive by* February 7.

This photo was taken by G3ILD and shows the television picture of Mrs. Jeremy Royle received from G3NOX/T on December 5, 1962, over a path of about 200 miles. The photograph was taken on a 2¼ in. twin lens reflex camera at a distance of 36 in. from the screen of the TV receiver. The exposure was ½ sec. at f/4 on Kodak Panatomic X.

on 2m. During the evening of December 3 the band was a solid mass of stations including SM and OZ, PA, etc. but only OZ was worked. The transmitter runs 75 watts to a QQV06/40A and the receiver is a G6JP converter into an HRO. The aerial is a 12-element stack at 45 ft.

G3OCB (Stithians, Truro) did not expect to have much to report after the general falling off of conditions during November, and says it was very pleasing to him as a newcomer to the band to see how it could open up " this late in the year." He hardly expected to hear Continental stations again until next summer. In fact the only station heard locally during five and a half weeks in October/November was G3OJY, after a personal QSO resulted in a sked. For this reason, local stations have tended to consider 2m as a waste of time, and to keep them happy, Monday night has been designated " Cornish Activity Night," in keeping with National Activity Night. This may encourage some people to look towards Cornwall when conditions are reasonable. Stations participating include G3OCB, G3OJY, G2BHW, G5ZT and G3LMG (Devon). G3XC is moving QTH and should be installed in a much better 2m location by the time this appears. G3AET is moving to an excellent 2m location soon (600 ft. a.s.l. and clear all round). The aerial system for the beacon station GB3CTC suffered damage in severe gales and was malfunctioning for a time. The fault resulted in a loss of strength over large areas.

On November 20 a few weak carriers were heard and one station at about S4/5 which sounded like G6GN (Bristol). On the 26th things were better. G5ZT and G3OJY were worked and G3MTG Bristol (S6 out, S0/6 incoming). Later G2JF (Kent) was worked S7 out, S9 in. Other signals were heard including G3JMA S6/7, G3ICO, G5HZ (S4/5) and several more. On the 27th, conditions were not quite so good but G3LTN was worked at S7/8 both ways and G3CLW was raised on c.w. GW3MFY and G3JMA were called with no luck. On the 28th only G5ZT and G3IEA were worked. The band was not checked then until December 3, when things were very much better. Not many stations were worked, however, as all the Gs appeared to be beaming east or north-east. The only G-DX worked was G3JXN (59+ both ways). The only other DX worked was PA0GE (Amsterdam) at 58 both ways. Many Gs were S9 even off the backs of their beams. Notable signals were G6NB, G2JF, G3OSS, G3FZL, G6DW and G5TZ. Four or five PAs were heard, the best being PA0FB (59) and PA0GE. F2XO was the only Frenchman noted who was 59. The best DX, however, were OZ5AB (55) and SM7DLC (559). Other weak OZ stations were heard, but no other QSOs resulted. It was frustrating to hear OZ5AB going back to S9 " local " Gs and never bothering to tune below 144·5 Mc/s. December 4 was better for G3OCB. The E-DX was apparently not so attractive as few were heard calling it, and it was no longer audible in Cornwall in the afternoon or evening. Local QSOs were made with G3LMG and G5ZT and with G3OBD and G3EGV semi-locals. Others worked were G3JXG, G3JNQ, G3OSS, G5HZ, G3GVV, G3HQ, G2DQ, G3BNC and G3LTN. Incidentally, GB3VHF was S1/2 all the evening of December 3 and about S1 on December 4 at 15.00 G.M.T. On the 5th several stations were heard but the only QSO was with G3MTG (near Bristol).

G3OJY (near Penzance) also reports the events of December 1-4 when OZ, PA and ON were all heard, but unfortunately not raised. The old Cornish complaint is repeated, that very few turned their beams in that direction, although the band was alive with signals " off the back " of London area beams. Only G3CLW was contacted on phone after G3OJY had fruitlessly called various home stations and Continentals, and he reiterates that his QTH is 250 miles from London. A few of the stations worked during the period are G3OSS, G3NGS, G3FUR, G3MTG, G2FMO, G2BJY, EI2A and G3JXN, all on phone. Most of these are well over 200 miles distant. G3OJY asks for long calls on Cornish Activity Nights, as it takes them some two minutes to tune the entire band, as they also look for *weak* signals phone or c.w.

G2BJY (Walsall) says " it certainly was a fine opening." The signs were there on December 2 when the beacons were strong and G3EVV (Rochester) was worked at S8 both ways. Later in the day came the first QSO with G3OJY (Cornwall) and GC2FZC (Guernsey). On Monday evening the band was wide open with DJ/DL, ON, OZ, and PA signals. The most interesting contacts were with PA0FB who said he was receiving excellent pictures from the B.B.C. experimental 625 line transmitter at Alexandra Palace and that a friend was getting good reception from the colour transmitter. OZ4HK was S6 both ways and DJ7XE with 14 watts and an indoor aerial was S5. Many G stations using low power and simple aerial systems were worked—the sort of stations that get overlooked under ordinary conditions. To the North, things were not so good and nothing was heard north of Lancashire and Yorkshire. The transmitter at G2BJY runs 40 watts input to a QQV06/40. The receiver is home-built, the front-end being designed around the R.S.G.B. tunable converter. The aerial is a five element Yagi at 30 ft. and the location is 700 ft. a.s.l. The score has gone up quite a bit lately and is now 10 countries, 51 counties and 225 stations.

G3OSS (London, N.W.) during the opening worked G3IOE (Northumberland), (539 c.w.), GM2UU (Stranraer) on phone, GI3RMD (Co. Antrim) and was the first London QSO for EI4Q (Dublin). Many PAs and several OZs and

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

Call-sign	Location	Nominal Frequency	Emission	Aerial Direction
GB3CTC	Redruth, Cornwall	144.10 Mc/s	A1	North East
GB3VHF	Wrotham, Kent	144.50 Mc/s	A1	North West
GB3GEC	Hammersmith, London	431.5 Mc/s	A1	East

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

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

Date	Time	Error
December 4, 1962	11.50 G.M.T.	1800 c/s high
December 11, 1962	12.50 G.M.T.	1500 c/s high
December 18, 1962	13.18 G.M.T.	1850 c/s high
December 25, 1962	19.45 G.M.T.	1930 c/s high

SMs were also worked. GC2FZC was an exceptional phone QSO. The most interesting QSO, however, was with G3FAN when using 20 mW input to push-pull AF102s. The report was 54.

B.R.S.21476 (Shrewsbury) enjoyed the good conditions of November 27-December 5 which brought the heaviest QRM ever heard on the band—it sounded like 80 on Sunday mornings. Stations were heard working ON, PA, LA, OZ and F, but only PA was heard by B.R.S.21476 from outside U.K. (the beam is only 10 ft. at its highest point from ground level). The best G-DX signals were GC2FZC and G3FZL among many from the London area and the South. New stations heard included G3RME and GW3RBM. The converter is 417A-6J4 cascode, 24-26 Mc/s i.f. to a 4-6 Mc/s second i.f. into a Command receiver.

G3JGJ (near Newton Abbot) reports activity within 100 miles has been quite fair during the past three months. During a portable expedition near home in September, when the transmitter broke down, much DX was heard including GC2FZC, Midlands stations, GW3CBY, EI2W and others at excellent strengths including G5NF and G3BA. On December 2, GC2FZC and GC3OBM were worked, at S5/9+ both ways, the loudest signals ever exchanged between them. On the same day many Home Counties stations were heard at S9+ including G3OSS, G3JMA, G2JF, with G3LIL, G3MER, G3IAS and G3MTG worked. On December 5, GC2FZC was worked with a small 6J6 p.a. (portable transmitter) RST57/89 with only 4 watts input. G3JXN and G3MRA were heard.

G2JF (Wye, Ashford) reports that the period of good propagation conditions extended from November 25 until December 6, with the highlight of the opening on December 3, when 26 Scandinavian QSOs were made: 12 OZs, 12 SMs and two LAs. During this period many new G stations were heard and worked, including G3KKB, G3CRN, G3BNC, G3PAH/A, G3JJA, G3PMC, G3IOE, G3ATZ, G3HWC, G3EWZ, GI3OFT, GI3RMD, G3LVX, G3PLX, G3PTJ, G3CDX, G3JNQ, G3HZF, G3FRO, G3FVG, G5US, G8VP, G3MWB and G2AMX. The total number of stations now worked on 2m by G2JF now stands at 1,364. One little bit of excitement occurred on November 28 when a Swedish training ship in the Channel signing SL8AY/MM was contacted en route to West Africa.

During the opening many stations have been reported heard including UP1KA?, OH5D and others. These are of course subject to confirmation which has so far not arrived.

G3HBW reports that during the Geminids shower, **OK2WCG** worked **UA1DZ** in Leningrad.

V.H.F. Band Plans

All v.h.f. operators are reminded of the British Isles Two Metre and Seventy Centimetre Band Plans, which are sponsored by the Society. Observance of these plans will assist in DX working and in avoiding QRM to Service frequencies in the 144-145 Mc/s band.

Zone	2 metres	70 cm.	Area
1	144·0–144·1	432·0–432·1	Cornwall, Devon, Somerset.
2	144·1–144·25	432·1–432·25	Berkshire, Dorset, Hampshire, Wiltshire, Channel Isles.
3	144·25–144·5	432·25–432·5	Brecon, Cardiganshire, Carmarthenshire, Glamorganshire, Gloucestershire, Herefordshire, Monmouthshire, Pembrokeshire, Radnorshire, Worcestershire.
4	144·5–144·7	432·5–432·7	Kent, Surrey, Sussex.
5	144·7–145·1	432·7–433·1	Bedfordshire, Buckinghamshire, Essex, Hertfordshire, London, Middlesex.
6	145·1–145·3	433·1–433·3	Cambridgeshire, Huntingdonshire, Leicestershire, Norfolk, Northamptonshire, Oxfordshire, Rutland, Suffolk, Warwickshire.
7	145·3–145·5	433·3–433·5	Anglesey, Caernarvonshire, Cheshire, Denbighshire, Flintshire, Merionethshire, Montgomeryshire, Shropshire, Staffordshire.
8	145·5–145·8	433·5–433·8	Derbyshire, Lancashire, Lincolnshire, Nottinghamshire, Yorkshire.
9	145·8–146	433·8–434	All Scotland, Northern Ireland, Isle of Man, Cumberland, Co. Durham, Northumberland, Westmorland.

Two Metre Band Guard Channels: **The following frequencies in the 144-145 Mc/s portion of the 2-metre band are tabulated on the schedule to the Amateur (Sound) Licence to be avoided as they are allocated to Service use: 144·0, 144·09, 144·18, 144·27, 144·36, 144·45, 144·54, 144·63, 144·72, 144·81 and 144·9 Mc/s.** *Remember!* **The safety of aircraft and human lives depend upon the interference-free use of the channels.**

V.H.F. QSY

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

Crystals Offered

By G3AAJ, 94 Herongate Road, London, E.12, 12,9125 kc/s, B7G type. 5882 kc/s, 8025 kc/s, FT243 type.

Crystals Required

By G3AAJ, as above, 8055 to 8065 kc/s, 6250 kc/s, 6500 kc/s, 8375 kc/s, 8500 kc/s in FT241 or FT243 cases.

Four Metres

Those operators who are regularly using this band (and there are many of them) are urged, *please*, to send reports of their activities. There is a very good reason for this, so please send in those reports, and keep up the activity!

G3NOH (Bournemouth) who is running 10 watts to a 5763, with a 6BQ7A converter and a two element beam at 40 ft., has worked G3KEU and G3KEU/P.

G3OSB (Lincoln) has given details of activity over about four months although until recently the aerial was at a very poor height. Several good contacts have been made with locals and semi-locals including G5CP/A (Chesterfield), G3AZU (Bradford), G6XX (Goole), G4OF (Gainsborough), G3HRP and G3KNP (Scunthorpe) and G3BNL and G3MNQ (Nottingham). Recently the aerial went up to 35 ft. and there have since been two QSOs with G3EHY (Banwell). G3OSB's main activity periods are on Sunday mornings, but apart from G3EHY and G3JHM/A few stations are heard because "few seem to turn their beams on Lincoln." Other stations which sometimes come up locally are G3MZB and G3PVU.

A welcome report from **B.R.S.21476** (Shrewsbury) lists G3PTO, G3PJK, G5JU, G3EHY, G3IUD, G3PLX and G3OSS, all heard on a 6AK5-ECC85 cascode converter.

Twenty-three Centimetres

G2RD (Wallington) reports that during the period of good conditions at the beginning of December G2FN (Surbiton), G2RD and G3FP (Thornton Heath) made two-way QSOs with G3KPT (West Bromwich) on 1296 Mc/s. As far as is known these are the first recorded instances of this band opening up. The path is obviously not line of sight, and all the Home Counties stations were at their home QTHs. The distance between G3KPT and G2RD is 112 miles and this may be a European record.

R.S.G.B. 144 Mc/s C.W. Contest

The Contests Committee has asked that attention be drawn to the 144 Mc/s C.W. Contest, to be held on January 27, 1963. The value of c.w. on v.h.f. is well known and has been stressed many times. The object of this special note is to interest as many operators as possible and get a real bumper contest. Keep the date open—January 27!

" Welsh Two-Quest "

By T. P. DOUGLAS, M.B.E. (G3BA)*

DURING May, 1962, G4LU and I were having one of our usual midday contacts. At the time the weather was really fine with blue skies and all the promise of a spell of good conditions for the v.h.f. bands in the days to follow. The idea of mounting a DXpedition later in the summer was suggested and so, full of enthusiasm, we commenced to lay our plans over the following six weeks. The date for departure was finally fixed for July 29 for a week. It was very necessary, we felt, gradually to get people to know that we were going off into the fastnesses of Wales so the facilities of the R.S.G.B. News Service were utilized along with the monthly magazines to give the requisite advance publicity. Precise details were not given at this time as we wished to work up to this towards the middle of July after the propaganda had begun to make itself felt and the boys commenced gossiping on the band as to what we might do.

Planning

Stan and I held a preliminary meeting at a hostelry at Shifnal midway between our home addresses in late June and in this pleasant atmosphere the main plan was agreed upon. There were two major sides to this, one technical and the other domestic. The technical side was relatively easy, as both had gear which was immediately operational and had been fully tested for several months under all conditions and it could reasonably be expected that these rigs would behave themselves when we eventually took to the road. The frequency of operation, chosen after poring through our logbooks seeing where there was a clear channel in what might be regarded as the DX end of the 144 Mc/s band, was finally fixed as 145·79 Mc/s. Other channels were available in case of emergency but our plan was to use only the chosen frequency as much as possible as once people knew where we were on their dials, this was half the battle. It was also considered essential that we had a large number of " path finders " to aid those in less favourable QTHs to know that we definitely were in action and that if they turned their beams in the right direction we should hear a large number of the operators in the vicinity geographically of the " path finders." Schedules were invited and the timings of these were liberally sprinkled over the hours of operation which we had agreed should be 7.30 p.m. clock time to midnight. Again, we had to fix our route so that too much travelling was avoided and if possible should start in a relatively easy county where a large number of people would hear us clearly and so pin point our QRG. It was decided to go to Radnor first. A general look at the map showed that we could best go in a clockwise circle round the middle south of Wales and up to Cardigan Bay to finish at Merioneth which was fairly near G4LU's home.

On the domestic front it was considered best to use two cars and fit out each as a complete station and also as living quarters. G4LU had a Vauxhall Victor Estate car and this was an excellent vehicle for stowing away all manner of things technical or otherwise. My own car, a Standard 10, was more modest in size and as I would be the only occupant I took out the passenger seat at the front and replaced it with a wooden box of the same height as the rear seats. This box housed foodstuffs and crockery and acted as a support for a 6 ft. × 2½ ft. divan mattress which would be my bed for the week. Complete cooking facilities were arranged using Calor gas and a double burner stove.

The great day came at last and after doing my News reading stint on GB2RS I set off westwards from Sutton Coldfield about midday. The sun was shining and everything seemed set perfectly for the start of the DXpedition.

The journey to our rendezvous was quite uneventful and at 3 p.m. precisely I called G4LU on the mobile and back he came to say that he had reached our meeting point and had in fact reconnoitred one or two of the spots which we had ringed on the Ordnance Survey maps of the district. After we met, by good fortune or judgment G4LU decided to take a track off the road along which we had been travelling and see what was up on the hill. I stayed at the junction and awaited Stan's verdict. It was apparently promising so off I started up the track to join him. Sure enough when we got to the summit it was a very good location indeed in all directions with plenty of space to manoeuvre the cars and set up the mast. At 4 p.m. we started to rig the aerial on Stan's telescopic 30 ft. mast and I was instructed how to put the thing up single handed.

The Band Wakes Up

After getting in each other's way at times we eventually managed to set it up according to plan and being a little bit curious as to what the place was like we diffidently put out a tentative CQ. All hell was set loose and the band was full of stations at 9+ all calling their heads off to contact GW4LU/P (Radnor). We had a quick report or two and decided that we had to get ourselves properly organized so closed down and set to work.

The two cars were parked so that the aerial mast was turnable from the second operator position in Stan's vehicle. The sked list was clipped to the sun visor and the QSL cards were set out in the glove compartments with *Call Books* and station frequencies readily available to both operators. On the point of QSLs I should mention that we had agreed that by far the best thing to do was to have special cards printed so that each QSO would be QSL'ed direct from the county of operation—this meant that we made out the cards as we went along. The Victory Press at Northampton were first class at providing 250 QSLs by return of post to our special design and we were very happy about this side of things altogether. I think I would be right in saying that, like professional stage actors, we too had " butterflies " with excitement but these turned to moths as the evening was to wear on and we realized a tin of fly and insect exterminator is an essential on any expedition of this nature.

When the standby gear was tested and petrol generator warmed up and we had made our first meal, we both sat down in the operator's positions at last and decided that although it was early for the advertised start of transmissions we might as well have a go and see what was doing and get our hands in. Stan put out a short CQ and we were off. QSOs were soon being done at the rate of one every minute or so right up till the skeds commenced at 7.25 with G3EJO in Birmingham. We alternated skeds with CQs and the time just whistled by so that by midnight we had made 70 contacts, made the cards out for them, and had the log up to date. We turned in very weary but pleased at the start having been so successful. The stars looked wonderful as I lay in my bed of luxury and peered out of the car window and the sound of the breeze on the three-over-three and the seven element Yagi soon lulled me to sleep.

Came the next morning and all our exuberance of the previous evening was running out as it was very cold, very, very wet and thoroughly unpleasant. It was the funniest sight on earth to see Stan attempting to cook bacon and eggs in a frying pan with rain dripping off his " ratting hat " into the breakfast and I suppose that I did not look so bright myself attempting to keep my pyjamas out of the driving rain which seemed to come into the car from all angles. We packed up rather roughly and got all the mast gear stowed and laughed at each other at being such fools as not to have enough weatherproof apparel to render ourselves immune from what was really only the sort of weather one expects

* *141 Russell Bank Road, Four Oaks, Sutton Coldfield, Warwickshire.*

on high mountains in Wales. We drove off down to Knighton and posted our QSLs and went shopping and tidied ourselves up a bit.

One of the essentials which we had to buy was a decent tarpaulin 9 ft. × 6 ft. with eyelet holes which we could use as a tent between the two car roof racks and provide us with shelter if it should rain and so enabling us to cook without undue effort. We bought one up in Buith Wells and it was to be very useful in the days to come.

Of course the tour was meant to be a holiday as well as a radio jaunt so we made use of the mornings and afternoons doing what we felt like. In the case of the journey from Radnor to Brecon we paid a visit to GW3LJP in Cross Gates and had morning coffee with him and his business associates, then we went on to visit a colleague at the B.B.C. Transmitting Station at Llandindrod Wells, saw his very nice professional set up and had lunch with him and then set off again.

We had learned by now that it was very handy to have the mobile rigs running all the time we were on the move so that we could discuss the scenery, places of historic and other interest as well as planning our shopping and visiting places *en route*. In traffic too it helped no end and saved many hours we felt sure in keeping us fully acquainted with what was in each other's mind and aiding us so as to avoid traffic hazards particularly on the narrow lanes up in the hills.

Into Brecon

We surveyed several sites in Brecon, all of which were passable, but we were pretty fussy to see that we had a full 360° view from whatever spot we chose as we did not want to disappoint anybody if at all possible. We finally came to an artillery range and were pleased to see that the red flag denoting firing practice was not flying so we pressed on and surveyed a possible site near Drover's Arms. Certainly the Army had been about as the ground was all churned up with the vehicle tracks, but it looked reasonable and a track of sorts led up to the trig point on the hill. G4LU went ahead and after 200 yards got stuck in a deep rut up to the chassis. After 30 minutes very hard work Stan's car was released. with no damage discernible and we made for the summit. Again we had chosen well as it was a perfect site in all directions and the ground was reasonably hard. The erection drill went into operation and in another half an hour we were set for operation. Not having eaten since lunch time we cooked a three-course meal plus coffee and sat down ready for 7.25 p.m. Dead on the dot G3EJO was there to give us a 59 report, followed by G2BJY and all the rest of the gang. The band seemed only inhabited by people calling GW3BA/P and of course it was very gratifying to know that so much interest should have been aroused in our trip.

We totted up 66 contacts that night by midnight and again we felt that this was the life and we were all great fellows! We kept the aerial rigged until the morning and worked G2CIW over breakfast when conditions were first class and both beacon stations very strong. The weather was kind to us that morning and we set off in sunshine for Carmarthen full of *joie de vivre* and corn flakes. On the way down the hill trying to avoid Stan's bad patch I ran straight into a rock with the rear end and bent over my nearside mud guard. Despite this minor catastrophe we motored on to Brecon and posted our cards and from thence to Llandilo which we reached at 12.30 p.m. We agreed to investigate our site then as there was a doubt as to its being just ideal and with mobile radio on, we traversed hills and dales to the appointed map reference. It was certainly better than I expected but we had to get into a field to be out of the way of traffic so we looked for the farmer to seek his permission. After a few minutes the sound of a tractor ploughing nearby took us to the man himself and soon we had the spot we wanted. I ran up my seven element Yagi and we worked G3EJO at lunch time to prove that the path was not being shielded by hills to the east towards the Midlands. Having satisfied ourselves on this point, we both drove off to spend the day on the beach in Carmarthen Bay. After tea in town we tore back to the site but I lost my way and had to be directed by radio as to where to go! We got to the field at 7.00 p.m. and just got the routine finished in time for the field strength check with G3EJO at 7.25 p.m. Operating was much as on the previous two nights and 51 stations were added to the log before we got into our sleeping bags for the night.

Pembrokeshire

One thing which struck us, however, was that our QSL stock was getting pretty low and something would have to be done if we were to keep up the plan of " QSL as you QSO ". In the morning I telephoned John Tibbett of the Victory Press who said he would send off 200 cards immediately he printed them to be collected poste restante at Dolgelly. This was a load off our minds and so we went into Pembrokeshire to see more of the countryside. By 4 p.m. we consulted our O.S. maps once more and set off for the mountains of Prescelly. We split forces and surveyed several hills passing information over the radio but none were just ideal in all directions. We hared off to one good site on the map and found that it had gone " commercial " with a 750 ft. mast on its top—we felt that it was not quite the thing to ask the engineers there for a loan of it, so we took the next best place about two miles further west. The place was reasonable we thought and as time was pressing very close we set up shop and put out a call at 7.25 p.m. as usual. The silence was S9 plus! We tried another call and a wee peep of a signal came back from G3EJO followed by another from G2BJY just about as bad but we kept on and worked stations fairly steadily but at poor strength in the Midlands and London areas. The rest of the country was excellent for reports and we even heard G3MED/M at S9+ and thought he was round the bend in the road and having us on but he was over near North Hessary Tor in Devon fortifying himself and his co-pilot with beer to keep away the lightning, I believe—anyway so he said! We ran out of QSLs that night and worked a mere 27 stations—we felt that we were just not quite the fine fellows we thought we were and went off to sleep much humbled.

Cardigan

After working G3CCH and G3BOC in the morning at breakfast time we made for Cardigan having learned the lesson not to go to a site late again but to survey well beforehand with full field strength checks if possible.

The Cardigan site was just south of Newquay and was easy to get to being on a B-class road. We set up the Yagi again at lunch time and worked G3EJO without difficulty and made excuses for ourselves for the performance the previous night. The trouble was due to the aerial top just being a foot or so below the level of the ground to the east of us and so cut off signals in that direction. After the site test we hied ourselves off to the coast to take colour movies and have a lazy day on the beach. We were very hungry when we got back in the early evening so had another of our speedily cooked three-course dinners. After dinner we got down in earnest to operating and all went as it should have with 58 QSOs in the log book. We felt much happier that night and reckoned that we had earned our keep on this occasion.

We rose at 6.00 a.m. and struck camp as soon after breakfast as we could as we had a long day ahead of us. We spruced up at Aberystwyth and radio mobiled up to Machynlleth and Cross Foxes and on to Dolgelly where we collected the QSLs at the G.P.O. as promised and had a coffee before making for Llandanwyg near Harlech where we were to spend the day messing about in boats. Before we got to our destination the rain started and it kept on pretty well until we made the harbour at Llandanwyg. Our host for the day was there

to greet us all done up in weatherproof clothing whilst we poor mutts had only landlubbers outfits. Very wet we clambered aboard the 25 ft. yacht and were instructed on what to do if we were to drown! The weather was getting quite rough and I remembered what the weather man on the radio had said that morning about a strength seven wind in Cardigan Bay. He was dead right, when we got over the bar we knew what a strength seven wind does to the sea—we " tacked " and " pulled on sheets " and did several other nautical things like that and had the time of our lives, but I somehow felt a certain amount of relief when we made off to our mooring buoy in the anchorage. We might as well have swum ashore as being rowed back all three of us in a thing they called a " pram," the water just sloshed over the sides until it was nigh on sinking. Some hours later the visibility was pretty putrid but we made our way over the hills and valleys again for Bala in Merioneth. We arrived at the planned objective at Bwlch Groes and the gale blew and rain came down in torrents and all we could do was to make grunting noises at each other and make out QSLs through the windows of our cars to while away the time.

Merioneth

Soon after 6 p.m. we saw a break in the sky in the west and the signs of a front. We wrapped ourselves up warm and did a quick recce in the rain to see the best spot but could only take what we had got there as the hills were waterlogged and it would have been madness to risk a car in such conditions. We finally decided to use the temporary aerial strapped to a shortened section of mast and clamped to the roof rack of my car. Stan's car was parked on the lee side and we put the tarpaulin right across my weather side to help break the elements somewhat. To try and cook outside under such conditions was out of the question so I cooked a bare meal on the driving seat in my car and had to be thankful we had a gas stove to do this. A quick test on this temporary aerial proved the beacons were both fine signals so we said we would keep faith with the boys waiting to work us and started at the scheduled time although it was difficult to hear at times with the gale raging outside. To make things a little more difficult I could hear noises from the rear of the operating vehicle where Stan was trying his verbal best to get the petrol generator to run, but it had decided it was just *not* going to play and died on us. So we had to run the car engine to keep the accumulators alive; in any case the car heater was a boon. Fifty stations were worked but we have to apologize to our northern colleagues who did not work us as we were cut off in that direction by a very close hill. We completed our backlog of QSLs and all the cards for the QSOs that night and although our cars were rocking with the wind we did not require that to make us sleep.

The next morning broke with lovely sunshine and we took some more movies and very reluctantly made for Bala to post the mail. The journey to Oswestry seemed an anti-climax after all the bustle and rush of the previous days. We had lunch and bade each other adieu and vowed that we were still the best of friends and what were we going to do next year? May I add Stan's thanks to those of my own for the good manners of those stations who wished to work us and for the meticulous time keeping and perseverance of the sked stations and to all those numerous unmentioned friends who contributed in some way or another in making our venture in the land of the Red Dragon so rewarding.

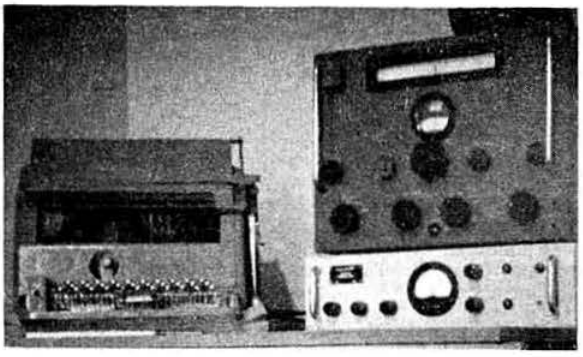
RTTY **(Continued from page 348)**

send a postcard giving brief details of your station. It is possible that an *RTTY Call Book* may be produced and if this does materialize it is almost certain that B.A.R.T.G. will be asked to provide the list of British entries.

The extent to which RTTY activity has invaded 2m can be judged from the following list of call-signs of stations known to be active on this band: G2AK, G2DZH, G2FGD, G3BPT, G3GGR, G3HKT, G3IIR, G3ION, G3KND, G3LAY, G3LOK, G3MCS, G3MRA, G3MOH, G3NAE, G3NJH, G3PDG and G3PJI.

On 80m the " active " list includes G6CW, G3IVP, G3CQE, G3NPF, G2HIO, G3FHL, G3HVB, G2FUD, G2UK, PA0FB and ON4UN.

Mention should also be made of the fact that a number of listener enthusiasts have taken up RTTY, which provides them with a most interesting new field of activity and they can be pretty well assured of an acknowledgment of any reports—and tapes—they may send the transmitting fraternity. The " printing only " RTTY enthusiast who is experimentally inclined can have a most interesting time trying out various terminal unit circuits and making other experiments.



The very neat RTTY " printing only " station of John Vears, who is one of the growing number of non-transmitting RTTY enthusiasts. The teleprinter shown is the Teletype Corporation's Model 14 mentioned in the text. The receiver is a CR100, which has proved quite suitable for RTTY purposes. It stands on an RTTY terminal unit, a home-built unit based on the W2PAT circuit similar to that described in an earlier article in this series. The gear works excellently and John has recently received QSL's from DL6EQ and LA6J for reports he has sent them on their RTTY transmissions.

Ceramic Rod Generates Electricity

A SIMPLE ceramic rod which spontaneously generates electricity has been developed by engineers at the Martin Marietta Corporation's Nuclear Division near Baltimore, Maryland, U.S.A.

The Corporation's scientists have combined two forms of the element strontium into a one-piece thermoelectric generator which serves as its own heat source. The small strontium titanate rod has radioactive strontium-90 concentrated at one end. This spontaneously produces heat, which is converted to electrical energy through the thermoelectric effect in the strontium titanate.

Power output of the experimental rod is a fraction of a watt. The U.S. Atomic Energy Commission has awarded a contract for further work during which the Martin engineers hope to increase both efficiency and power output of the generator.

Martin Marietta Corporation is developing other thermoelectric materials which might use the same principle, including barium and cerium titanates.—*Science Horizons*

Enquiries Regarding Bulletin Articles

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

Supplementary Report of the Council*

THE Report which follows deals with some of the more important events and happenings that have taken place since June 30, 1962.

Articles of Association

The Council having found that certain of the present Articles of Association occasionally give rise to difficulties in administration and interpretation decided some months ago to set up a Committee to prepare a comprehensive redraft.

The redraft was submitted to the Board of Trade in October, 1962, for its comments. When these comments have been received, and assuming they are generally favourable, members will be given an opportunity of discussing the redraft before it is presented to a Special General Meeting sometime during 1963.

Exhibitions

The Society's stand at the National Radio and Television Show at Earl's Court, London (August 22 to September 1, 1962) once again attracted much attention due, no doubt, to the fact that it was especially well sited. During the ten days of the Show more than 100 new members were enrolled.

The International Radio Communications Exhibition held at the Seymour Hall, London (October 31 to November 4, 1962) was an unqualified success although the total attendance was somewhat lower than in recent years.

The Exhibition was opened by Mr. A. H. Mumford, O.B.E. (Engineer-in-Chief of the G.P.O.) in the presence of a distinguished company of representatives from the Services, industry and the technical press.

The Horace Freeman Trophy was awarded to Mr. J. C. Huntley, G3PPI, whose Top Band Transceiver was judged to be the outstanding piece of home constructed equipment on display at the Exhibition.

The Society's stand at this Exhibition and at Earl's Court was under the management of Mr. F. F. Ruth, G2BRH, whilst the overall organization was undertaken by the Exhibition Committee (Chairman, Mr. C. H. L. Edwards, A.M.I.E.E., G8TL).

New Society Publications

The publication, towards the end of October, of *Radio Data Reference Book* brought the number of current R.S.G.B. publications to eight. This new publication, compiled by Mr. G. R. Jessop, A.M.Brit.I.R.E., G6JP, brings together in convenient form essential reference data for the radio amateur, engineer and designer. The data is mainly presented in the form of curves, tables, and charts with only sufficient text to permit its effective use.

Mr. Jessop was also responsible for compiling an enlarged edition of *Service Valve Equivalents*. A revised system of coding was introduced to simplify the use of the tabulated information.

The 1963 edition of the *R.S.G.B. Amateur Radio Call Book* (compiled by the General Secretary and Miss May Gadsden) appeared in time for it to be placed on sale at the Radio Communications Exhibition. The new edition contained more than 2,150 amendments and additions to the 1962 edition.

A third printing of the current edition of the *Amateur Radio Handbook* appeared in October bringing the total produced in less than a year to 15,000 copies, of which number some 12,000 have been sold to date.

Golden Jubilee Week Celebrations

The Golden Jubilee Celebrations Committee has drawn up a preliminary programme of events for celebrating the Golden Jubilee of the Society and copies of this programme have been sent to the technical press and to I.A.R.U. Societies.

As part of the celebrations the Council has authorized the Region 15 Representative to hold a special Golden Jubilee event in Belfast on Saturday, May 4, 1963. The Council hopes that other Regional Representatives will follow the example set by Mr. J. William Douglas.

Official Regional Meetings

A very successful Mobile Rally and Official Regional Meeting organized by the Regional Representative (Mr. R. E. Griffin, G5UH) and the Somerset County Representative (Mr. J. Etherington, G5UG) was held at Weston-super-Mare during the weekend September 22 to 23, 1962. The rally was supported by 44 mobile stations with a total attendance of more than 200. The Official Regional Meeting (held at the Grand Atlantic Hotel) was opened by the Mayor of Weston-super-Mare (Mr. Councillor C. B. Moore, J.P.) in the presence of more than 150 members and their ladies.

On Saturday, October 6, 1962, an Official Regional Meeting organized by the Regional Representative (Mr. P. A. Thorogood, G4KD) was held in the South Restaurant, Earl's Court, London. Unfortunately the function did not receive the support expected; the total attendance was about 70 which included 20 ladies. In view of the excellence of the venue and the programme the Council much regrets that more members living in the London Region—of which there are more than 2,000—did not attend.

London Lecture Meeting

About 100 members were present at the Institution of Electrical Engineers on October 27, 1962, to hear Mr. R. W. White, Senior Controller of Experiments at the G.P.O. Station, Goonhilly Down, Cornwall, lecture on Satellite Communication. This was one of the most important and topical lectures delivered to a meeting of Society members for many years.

National Mobile Rally

A well-supported Mobile Rally was held at Woburn Abbey, Bedfordshire, on Sunday, September 9, 1962. The organization of this event was undertaken by the Mobile Committee (Chairman, Mr. C. H. L. Edwards, A.M.I.E.E., G8TL).

Merseyside Lecture

The first of a series of Regional Lectures took place in Liverpool on November 16, 1962, when Dr. R. C. Jennison of the Jodrell Bank Radio Astronomy Department, Manchester University, was the speaker. The meeting, organized by the Region 1 Representative (Mr. B. O'Brien, G2AMV), was honoured by the presence of the President (Mr. E. G. Ingram, GM6IZ). There was an attendance of more than 100 members.

Television and Broadcast Interference

MEMBERS with television or broadcast interference problems are invited to write to Headquarters for a copy of the TVI/BCI Committee's interference questionnaire. This form is designed to give the Committee a comprehensive picture on which to base their advice to a member.

* Read to the members present at the Annual General Meeting of the Society held in London on December 15, 1962.

Annual General Meeting

Minutes of the 36th Annual General Meeting of the Radio Society of Great Britain, held at Overseas House, Park Place, St. James's Street, London, W.1, on Saturday, December 15, 1962, at 2.30 p.m.

Present: The President (Mr. E. G. Ingram in the Chair), the Immediate Past President (Major-General E. S. Cole, C.B., C.B.E.), the Honorary Treasurer and Executive Vice-President (Mr. Norman Caws, F.C.A.), Messrs. H. A. Bartlett, R. C. Hills, B.Sc.(Eng.), A.M.Brit.I.R.E., L. E. Newnham, B.Sc., A. D. Patterson, G. M. C. Stone, A.M.I.E.E., A.M.Brit.I.R.E., R. F. Stevens, J. W. Swinnerton, T.D., B.Sc.(Econ.)(Hons.), A.I.L., P. H. Wade, E. W. Yeomanson (Members of the Council), Mr. John Clarricoats, O.B.E. (General Secretary and Editor), Mr. John A. Rouse (Deputy Editor) and Miss May Gadsden (Assistant Secretary). About 65 other members were present.

Apologies: Apologies for absence were received from Messrs. C. H. L. Edwards, A. O. Milne and F. K. Parker (Members of the Council) and Mr. V. M. Desmond (Past President).

Apologies for absence were also received from a number of members to whom trophies had been awarded.

Notice Convening the Meeting

The General Secretary read the notice convening the meeting.

Minutes

It was moved by Mr. Leicester, seconded by Mr. Kingston and RESOLVED that the Minutes of the 35th Annual General Meeting, as published in the January, 1962, issue of the R.S.G.B. BULLETIN be taken as read, approved and signed.

Annual Report of the Council

It was moved by the President and RESOLVED, unanimously, that the Annual Report of the Council as published in the November, 1962, issue of the R.S.G.B. BULLETIN be received and adopted.

The General Secretary read a Supplementary Report of the Council covering the period from July 1, 1962, to early December, 1962. (The Report appears on page 364 of this issue.—EDITOR.)

Report of the Honorary Treasurer and Audited Accounts for the year to June 30, 1962

Before moving the adoption of his Report and the Audited Accounts, the Honorary Treasurer (Mr. N. Caws) referred briefly to the various items of income and expenditure and explained the reasons for any major variations that had occurred compared with the previous year.

In connection with the Headquarters Fund Account Mr. Caws stated that the members of an *ad hoc* Committee were continuing to seek suitable premises in the London area.

Mr. Gray (B.R.S.23279) inquired whether it was the intention of the Council to increase the annual subscription to £5 5s. as suggested by Mr. A. G. Fowler in a letter to the Editor published in the November, 1962, issue of the BULLETIN. The Honorary Treasurer stated that the Council had no intention at the present time of asking members to pay higher subscriptions.

It was then moved by Mr. Caws, seconded by Mr. H. A. M. Clark and RESOLVED, unanimously, that the Report of the Honorary Treasurer and the Audited Accounts for the year to June 30, 1962, be approved and adopted.

Election of Council

The President announced that the following members had been elected to fill the vacancies which will occur in the respective offices on December 31, 1962:

President: Mr. Norman Caws, F.C.A. (G3BVG). Unopposed.

Executive Vice-President: Mr. G. M. C. Stone, A.M.I.E.E., A.M.Brit.I.R.E. (G3FZL). Unopposed.

Zone B Representative: Mr. F. K. Parker (G3FUR). Unopposed.

Zone D Representative: Mr. H. A. Bartlett (G5QA). Unopposed.

Zone F Representative: Mr. A. D. Patterson (GI3KYP). Unopposed.

The President announced the result, as follows, of the ballot to fill the four vacancies which will occur on December 31, 1962, among the Ordinary Members of Council:

Mr. C. H. L. Edwards (G8TL)	1,369 votes
Mr. D. A. Findlay (G3BZG)	713 votes
Mr. J. C. Graham (G3TR)	655 votes
Mr. F. E. A. Green (G3GMY)	467 votes
Mr. R. C. Hills (G3HRH)	1,083 votes
Mr. J. D. Kay (G3AAE)	1,023 votes
Mr. A. O. Milne (G2MI)	1,377 votes

The President declared that Messrs. Edwards, Hills, Kay and Milne had therefore been elected. He also announced that the following members of the 1962 Council were not required to stand for election in their respective offices:

Mr. E. G. Ingram (GM6IZ). Retiring President.

Major-General E. S. Cole (G2EC). Retiring Immediate Past President.

Mr. N. Caws (G3BVG). Honorary Treasurer.

Mr. L. E. Newnham (G6NZ)
Mr. R. F. Stevens (G2BVN)
Mr. J. W. Swinnerton (G2YS) } Ordinary Members of Council

Mr. P. H. Wade (G2BPJ)
Mr. E. W. Yeomanson (G3IIR)
Mr. A. C. Williams (GW5VX) } Zonal Representatives.

The President reported that the scrutineers had accepted 1,721 Ballot Papers and rejected 33.

The President, on behalf of the members, thanked the scrutineers, Mr. F. W. Fletcher (G2FUX) and Miss B. Fletcher (B.R.S.20988) for the very efficient manner in which they had scrutinized the ballot. He also thanked Mr. R. J. M. Morgan (G3KGC) for assisting the scrutineers.

Auditors

It was moved by Mr. Caws, seconded by Mr. Leicester and RESOLVED that Edward Moore & Sons be re-appointed Auditors for the year to June 30, 1963, at a fee of 100 guineas.

Thanks to the Staff

The President thanked the General Secretary (Mr. John Clarricoats, O.B.E.), the Assistant Secretary (Miss May Gadsden), the Deputy Editor (Mr. John A. Rouse) and the other members of the staff for their services to the Society during the year. Mr. Ingram referred in particular to the fine work done by the staff concerned in producing a new edition of the *Handbook*.

The Meeting terminated at 3.15 p.m.

Informal Discussion

During the informal discussion that followed the Annual General Meeting, Mr. A. M. Smith (G3IAS) enquired whether the Council would consider holding the Annual General

Meeting on Friday evenings as had been the practice until recently. On a show of hands of the members present it appeared that the majority favoured a Saturday afternoon meeting. The President stated that the matter would be considered by the Council.

Following a suggestion that the A.G.M. should be held during the first few days in December, thus avoiding the Christmas season, Mr. Caws explained the problems attendant upon moving the date forward, mentioning in particular the difficulty of completing the audit in time for the accounts and notices to appear in the October BULLETIN. He explained, however, that with a change of publishing date it may be possible to hold the meeting earlier in December.

Mr. H. A. M. Clark (G6OT) suggested that many of the present problems could be overcome if the Society's financial year ended on a date other than June 30.

After Mr. F. W. Fletcher (G2FUX) had suggested that the BULLETIN should be sent only to those members who really require it, Mr. Gray (B.R.S.23279) expressed the opinion that B.R.S. members in particular read the BULLETIN.

Mr. G. P. B. S. Lovelock (G3III) commented upon the poor position of the R.S.G.B. stand at the Radio Communications Exhibition. The President stated that the point raised by Mr. Lovelock had already been discussed by the Council.

Mr. P. A. Thorogood (G4KD) enquired whether the increased subscription would cover the larger size issues of the BULLETIN and increased postages. Mr. Caws stated that the position appears to be satisfactory, provided advertising revenue is well maintained. He also explained that a 64 page issue is, *pro rata*, less expensive to produce than say a 56 page issue.

Mr. M. Margolis (G3NMR) enquired whether the Society followed up the suggestions he made a year earlier in respect of Headquarters premises. Mr. Caws stated that the suggestions made by Mr. Margolis and by other members had been followed up without success. Mr. Caws mentioned in particular the Church Commissioners, the Nuffield Trust for the Forces, the 1851 Exhibition Trustees and the Ministry of Education.

Mr. Thorogood offered to organize a giant raffle with all proceeds to the Headquarters Fund. The President suggested that Mr. Thorogood should put forward his suggestion to the Society in writing.

Welcome to Professor T. Palmer Allen

The General Secretary, on behalf of the members present, extended a warm welcome to Mr. T. Palmer Allen, M.Sc., M.I.E.E., Professor of Light Electrical Engineering at The Queens' University, Belfast. He reminded members that Professor Allen had been instrumental in bringing to fruition in 1927 the Society's first experimental section, known for many years as Contact Bureau. His services to the Society since then had been legion. (Applause.)

Professor Allen thanked the members for their kind reception and expressed his pleasure at being present at his first Annual General Meeting of the Society after having been a member since 1926.

The informal proceedings then terminated.

* * *

Presentation of Trophies

At the conclusion of the informal discussion the President (Mr. E. G. Ingram, GM6IZ) presented the following trophies and awards:

Courtenay Price—Mr. R. C. Hills (G3HRH). Founder's—Mr. R. S. Biggs (G2FLG). Freeman—Mr. J. C. Huntley (G3PPI). Bevan Swift Memorial Prize—Mr. J. C. Hateley (G3HAT). N.F.D. Shield and Edgware—Stourbridge and District Amateur Radio Society. Gravesend—Stamford and District R.S.G.B. Group. Bristol—Wolverton & District

(Contined on page 369)

The President (Mr. E. G. Ingram, GM6IZ) with trophy winners after the Annual General Meeting on December 15, 1962.

Mr. R. S. Biggs (G2FLG) received the Founder's Cup.

Mr. R. J. Pearson (G3NUJ) accepted a special certificate on behalf of members of the Cornwall R.S.G.B. Group and the Cornish Radio and Television Club.

The Bristol Trophy was won by Wolverton and District Radio Club.

Stamford R.S.G.B. Group was the winner of the Gravesend Trophy in N.F.D. 1962.

Mr. J. C. Huntley (G3PPI) received the Horace Freeman Trophy.

Mr. R. C. Hills (G3HRH) was awarded the Courtenay Price Trophy.

Society News

Golden Jubilee Dinner

FURTHER to the statement published in the December 1962 issue of the R.S.G.B. BULLETIN, the Immediate Past President (Mr. E. G. Ingram) has now been informed by the Private Secretary to The Duke of Edinburgh, K.G. that His Royal Highness is unable to accept the Society's invitation to attend the Golden Jubilee Dinner on July 5, 1963.

The Gerald Marcuse Memorial Award

AT the 1962 Reunion of the Radio Amateur Old Timers' Association it was decided to establish an Annual Prize Award in memory of the late Gerald Marcuse (G2NM).

The terms of the award are as follows:

(1) The Award will be made annually in April (beginning 1963) to the United Kingdom licensed radio amateur under 21 years of age on December 31 previously, who shall have submitted to the Radio Amateur Old Timers' Association the most meritorious article describing a piece of equipment which he shall have constructed and used in his station, or a journey which he shall have made during the previous twelve months to a Commonwealth or foreign country where he met and visited other licensed radio amateurs. Entrants must be Corporate members of the Radio Society of Great Britain.

(2) The manuscript of the article shall be either typed, using double spacing, or written legibly on lined foolscap.

(3) All manuscripts will be judged by a panel consisting of three members of the Association.

(4) The closing date for entries shall be January 31.

(5) The winner of the Award will be invited to attend the Annual Reunion of the Association as a guest of the Association.

(6) The Award will take the form of books or book tokens to a value of not less than two pounds.

(7) The winning manuscript will be offered to the Editor of the R.S.G.B. BULLETIN for publication.

Entries should be sent to the Founder-Secretary, R.A.O.T.A., 16 Ashridge Gardens, London, N.13.

International Radio Conferences 1963

THE year now opening will be a particularly busy one in the field of International Telecommunications.

The Xth Plenary Assembly of the International Radio Consultative Committee (C.C.I.R.) will open in Geneva on January 16, and will run for a month. In many spheres the Assembly will open up new vistas for science and engineering of which the problems of space communication will be among the top priority subjects to be discussed. It was originally planned to hold the Plenary Assembly in New Delhi but the venue was changed just before Christmas to Geneva.

Geneva—home of the International Telecommunication Union—will also be the venue for a meeting of the 18th Session of the I.T.U. Council from March 23 to April 26, and for an African V.H.F./U.H.F. Conference from April 29 to May 31. The V.H.F./U.H.F. Conference will draw up frequency assignments and associated agreements for national sound broadcasting and television in the African Region. From June 4 to 24, the Panel of Experts will hold their second session (also in Geneva) to consider measures to reduce congestion in the frequency band between 4 and 27·5 Mc/s.

An Extraordinary Administrative Radio Conference on Space Communication will open in Geneva on October 7. It is not yet known whether frequencies used by the Amateur Service are likely to come under critical survey at the E.A.R.C. but the question will be kept under constant review by the Executive Committee of I.A.R.U. Region I Division.

Installation of New President

MR. NORMAN CAWS, F.C.A., G3BVG, will be installed as the 29th President of the Society during the course of a social evening at the Kingsley Hotel, Bloomsbury Way, London, W.C.1, on Friday, January 25, 1963. On that occasion the new President and Mrs. Caws will be pleased to meet as many members and their ladies as are able to attend. Mr. Caws hopes that members will also take this opportunity of meeting Council members personally.

The proceedings will start at 7 p.m. and the President will be installed at 8 p.m.

In order that suitable accommodation and light refreshments can be provided, admission will have to be by ticket only. A postcard to Headquarters stating whether a single or double ticket is required is all that will be necessary. Telephone bookings cannot be accepted.

Prior to the Installation Ceremony it is anticipated that a number of members and their ladies will dine informally at the Kingsley Hotel, the restaurant of which is open from 6 p.m.

Provincial members who plan to visit London for the ceremony may like to know that the Kingsley Hotel has offered a preferential rate for those who stay for two nights and who mention the name of the Society when booking accommodation.

MULLARD AWARD FOR 1962 NOMINATIONS INVITED

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

(1) *The Award is offered annually by Mullard Limited during the pleasure of the Directors of that Company.*

(2) *The Award will take the form of a gift in kind (preferably electronic or electrical apparatus and/or books) to the value of £25, and a plaque.*

(3) *The Award will be made to the member of the Radio Society of Great Britain resident in the United Kingdom who (in the opinion of a Committee consisting of three representatives of Mullard Limited and three representatives of the Council of the Radio Society of Great Britain) has, through the medium of Amateur Radio during the preceding calendar year, rendered outstanding personal service to the community by his own endeavour or by his own example of fortitude and courage.*

(4) *The presentation of the Award will take place during the month of April each year on a date and at a place to be decided by the Committee.*

(5) *In January of each year, the Radio Society of Great Britain shall, through its official journal, invite nominations for the Award. Each such nomination shall be supported by at least three Corporate Members of the Society and shall be accompanied by a brief factual account of the personal service rendered by the nominee.*

In accordance with Rule 5, the Council invites nominations for consideration for the Mullard Award for 1962. Such nominations should be sent in writing to the General Secretary at R.S.G.B. Headquarters to arrive not later than February 14, 1963.

Headquarters Fund—List No. 16

THE following is the sixteenth list of those who had contributed to the Headquarters Fund up to December 31, 1962:

P. Brodribb (B.R.S.22616), W. L. Wright (A.3094), K. M. Fraser (GM4FK), W. R. Sharples (B.R.S.20859), W. F. Williams (G3RFJ).

Total amount contributed to date: £1,610 13s. 8d.

Bulletin Contributors

MEMBERS who are prepared to contribute articles to the Society's Journal are reminded that some notes are available to help them prepare manuscripts in a form that will assist in securing uniformity of presentation, simplify the work of the Society's printers and draughtsmen and help ensure that their instructions are easily understood. A copy of *Hints to Contributors* can be obtained on application to the Editor.

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

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

The amount of the copyright fee paid to contributors to the R.S.G.B. BULLETIN ranges from £2 2s. to £5 5s. per 1,000 words.

Bulletin Contributors and the Copyright Position

THE Finance and Staff Committee wish it to be known generally that there has been a long standing arrangement between the Member Societies of the International Amateur Radio Union that material published in the Journal of one society may be reproduced in the Journal of any other society provided acknowledgment to source is given. It is not often that articles which have appeared in the R.S.G.B. BULLETIN are reproduced in the Journal of another I.A.R.U. Member Society but when that happens the Society is normally approached beforehand by the Editor of the Journal in question and permission sought.

The Society purchases the copyright of all articles published in the R.S.G.B. BULLETIN and other publications unless the author specifically asks for the copyright to be reserved.

Posting Certificate

ALL copies of the December issue of the R.S.G.B. BULLETIN were posted on Tuesday, December 18, 1962, and the Society holds a certificate to that effect from the Letchworth, Herts, Post Office.

More Pirates Fined

ON September 19, 1962, at Manchester City Magistrates' Court Thomas Edward Critchley and Mrs. Kathleen Critchley, both of 180 Charlestown Road, Blackley, Manchester 9, were prosecuted for offences against Section 1(1) of the Wireless Telegraphy Act, 1949, for installing and using wireless telegraphy equipment without the necessary licence.

Mr. Critchley was fined £2 10s. on a charge of using transmitting apparatus in a motor vehicle and Mrs. Critchley was fined £2 10s. for using transmitting apparatus. Mr. Critchley was also found guilty on charges of installing a transmitter at his home address, installing a transmitter in a motor vehicle and a further charge of using a radio transmitter. He was given a conditional discharge on each of these three offences.

On November 1, 1962, at Bedford Magistrates' Court, Ernest Reginald Wiles of Streatham House, Wilden, Bedford, pleaded guilty to a charge of using wireless telegraphy transmitting apparatus without the necessary licence. He was fined £10, ordered to pay £3 3s. costs and to forfeit the apparatus to the Postmaster-General.

The Television Society

SIR ROBERT FRASER, O.B.E., Director-General of the Independent Television Authority, has been elected President of the Television Society for a period of two years. He succeeds Sir Harold Bishop, C.B.E., Director of Engineering of the B.B.C.

International Radio Amateurs' Symposium

DURING the period of the International Aeronautical and Space Fair to be held in São Paulo from April 7-11, 1963, the São Paulo Division of the Brazilian League of Radio Amateurs (L.A.B.R.E.) is arranging, with the co-operation of Fundacão Santos Dumont, an International Symposium for Radio Amateurs. An extensive programme of events has been arranged, including exhibitions, visits to electronics and radio plants and culminating with a banquet. Details of travel and hotel arrangements may be obtained from International Travel Promotion, Rua 24 de Maio, 35, Sala 1806, Post Box 4976, São Paulo, Brazil.

British Aerial Standards Council

AN association of aerial manufacturers, to be known as the British Aerial Standards Council, has been formed by Aerialite Ltd., Antiference Ltd., Belling & Lee Ltd., J-Beam Aerials Ltd., Telerection Ltd. and Wolsey Electronics Ltd. The main object of the council will be to implement commercially the recommendations of the R.E.C.M.F. Panel K (aerials) and to adopt the appropriate recommendations of the British Standards Institute and the International Electrotechnical Commission.

FEBRUARY 7, 1963

This is the closing date for all copy for the March 1963 issue of the R.S.G.B. BULLETIN.

Presentation of Trophies (Continued from page 366)

Radio Club. Somerset—I. T. Cashmore (G3BMY). Watts—Messrs. R. E. T. Dabbs (G2RD) and G. V. Farrance (G3KPT). Miniatures—A. M. Smith (G3IAS), H. Jones (G5ZT) and P. K. Blair (G3LTF).

Group Captain H. W. Evens accepted the Calcutta Key on behalf of Mr. W. E. Nutton (G6NU) who was indisposed. Mr. A. D. Patterson accepted the ROTAB Trophy on behalf of Mr. R. Barr (GI5UR); Mr. G. P. B. S. Lovelock accepted the B.E.R.U. Senior Trophy on behalf of Mr. D. H. Parr (ZB1HC).

A special certificate awarded to the Cornwall R.S.G.B. Group and the Cornish Radio and Television Club in recognition of services rendered to Amateur Radio in connection with the 60th Anniversary of the first Transatlantic Wireless Message (December 12, 1961) was accepted by Mr. R. J. Pearson (G3NUJ) on behalf of Cornish members.

The President and Mr. Patterson accepted miniature N.F.D. shields on behalf of the Aberdeen and Belfast Groups—leading stations on 14 Mc/s and 21 Mc/s respectively.

Deputy Regional Representatives

THE following is an addition to the list published in the December 1962 issue.

REGION 3—WARWICKSHIRE
G. A. SWINNERTON (G6AS), 120 Grange Road, Olton, Birmingham.

Representation

THE following are additions or amendments to the list of Representatives published in the December 1961 issue.

REGION 7—LONDON EAST
ILFORD
L. A. CRANE (G3PED), 114 Blythswood Road, Goodmayes.

REGION 17—BERKSHIRE
NORTH BERKS AREA (12 miles radius of Harwell)
C. SHARPE (G2HIF), 20 Harcourt Road, Charlton House Estate, Wantage.

—HAMPSHIRE
LYMINGTON AREA
A. H. TRIGELL (G3JAF), Lynwood, Everton Road, Hordle.

Affiliated Society Representatives

THE following have been duly nominated to act as Affiliated Society Representatives for the year 1963:

HULL AND DISTRICT AMATEUR RADIO SOCIETY
C. Norman (G3FCY), 30 Oldstead Avenue, Inglemire Lane, Hull.

NORWICH AND DISTRICT RADIO CLUB
O. F. Simkin (G3HYJ), 15 Hillside Road, Thorpe next Norwich, Norfolk. NOR 48T.

PRESTON AMATEUR RADIO SOCIETY
G. Lancefield (G3DWQ), 35 Brixton Road, Frenchwood, Preston, Lancs.

SCHOOL OF ELECTRONIC ENGINEERING AMATEUR RADIO SOCIETY
Lt.-Col. (Retd.) W. D. Horniman (G2WH), 58 Sturges Road, Wokingham, Berks.

SOUTHPORT RADIO SOCIETY
E. S. Ellis (G3LSF), 5 Woodmoss Lane, Bescar Lane, Scarisbrick, Nr. Ormskirk, Lancs.

Bulletin Stencil Plates

IT occasionally happens that a stencil plate used for the preparation of a particular BULLETIN wrapper becomes worn or loses ink, with the result that the Post Office experience difficulty in tracing the address.

Members who notice that the address on the wrapper used for their copy of the BULLETIN is indistinct, or in any way faulty, are asked to advise Headquarters.

Receipts

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

Silent Keys

PHILIP H. WADE (G2BPJ)

It is our sad duty to report the death, suddenly on Christmas Eve, 1962, of Philip Wade (G2BPJ) of Leeds, Yorkshire.

Mr. Wade had been a member of the Council of the Society since March 1959 when he succeeded the late W. R. (Cliffe) Metcalfe (G3DQ) in the office of Zone A Representative. During the time Philip served on the Council he had been very regular in his attendance at meetings of that body and of the Finance & Staff Committee, of which Committee he had been a valued member.

Mr. Wade was granted an Artificial Aerial Licence some years before the Second World War and became fully licensed as G2BPJ shortly after hostilities ceased.

While serving the Society as a Zonal Representative Philip Wade attended Amateur Radio functions in many parts of his Zone and elsewhere. He was present at the recently-held Regional lecture in Liverpool and at the Society's Annual General Meeting on December 14, 1962, in London. He was a partner in the well-known Leeds firm of Ben Wade Ltd., briar pipe manufacturers.

In addition to his interest in Amateur Radio—he was active on the air up to within a short time of his death—Philip was a member of the Leeds Film Society, of which society he was Chairman. He was also Vice-President of the Leeds Opera Circle. During the Second World War, Mr. Wade was area organizer for films to the troops and frequently organized film shows and concerts for patients at Harewood House, which was then being used as a military hospital. Mr. Wade was very well known to the Princess Royal (who is the godmother of one of his three children) and became a personal friend of Lord Harewood. He was an expert on old gramophone records and Lord Harewood had often visited Philip's home to listen to records from his collection.

The sympathies of all members, and in particular the sympathies of the President, Council and Headquarters staff, are extended to Mrs. Wade and to her family in their great loss.

A private cremation service took place at Lawnswood Cemetery on Saturday, December 29, 1962. J. C.

FRED MAYER (G2LZ)

Yet another of the real Old Timers of Amateur Radio has passed on. Fred Mayer (G2LZ) whose death occurred on November 19, 1962, first became interested in things electrical whilst at school at the beginning of the present century. From 1914 to 1918 he served in the Royal Engineers and was chief wireless officer at Bazra during the campaign in Mesopotamia. He was licensed just after the first World War and in 1926 took part in a three continent contact with amateur stations in the U.S.A. and New Zealand. In the same year he worked stations in Manila, New Zealand, French Indo-China, Cairo, Australia, South Africa, Canada and U.S.A. in the space of six hours.

From 1939 to 1946 he served with the R.N.V.R. During this period he gave the first news of a disastrous earthquake in New Zealand which he had received from a ZL amateur. Throughout World War II and up to 1961 Fred Mayer and his wife lived aboard the *M.V. Rona* in Poole harbour and later in Weymouth Harbour. In 1961 they moved to the Isle of Wight.

Fred Mayer's voice was one of the best known on 80 metres on which band he had regular QSOs with many other old timers. He was an old friend of the late Gerald Marcuse (G2NM) whose death occurred in April 1961.

Fred was a member of the Radio Amateur Old Timers' Association.

The funeral service, followed by cremation, took place at Whippingham, Isle of Wight, on November 23, when four old radio friends in the persons of G2NV, G3LOK, G5TZ and G6UH attended with family mourners. Wreaths were sent by R.A.O.T.A., G2DQ, 2NV, 5SN, 5TZ, 5US, 6OT, 6UH, 8TH, 2AKC, 2ALB, 3EGR and 3LOK.

Sympathies are extended to Mrs. Mayer—Sunshine to all her friends in Amateur Radio—in her great loss. Fred's cheerful voice will be sadly missed. J. C.

H. H. THOMPSON (G2FXK)

It is with great regret that we record the death in hospital at Salisbury on November 9, 1962, shortly after his 70th birthday, of Harold Thompson (G2FXK) of Aldridge, Staffs, and latterly of West Knoyle, Wiltshire.

His interest in radio, in fact in all things electrical and mechanical, both in the way of business and as a hobby, dated back many years. He was also well known in Amateur Radio circles of Birmingham, Wolverhampton and Stourbridge. His cheery manner and his ability to make friends, combined with his love of discussion, made him a very popular figure. He never begrudged giving of his time, his technical ability or even of his equipment in the interests of the various club activities with which he was associated. His knowledge and ability were put to good use during the last war, in a certain government organization located in North London.

Harold was active on all bands from 160m to 2m and was well known on them all, 2m in particular, until his move to Wiltshire a few years ago, since when he was confined almost entirely to 80m.

Despite a disability he was extremely active and when his health broke down forcing inactivity upon him, his manner on the air remained cheerful as always, only those nearest to him realizing how hard he found it to " take things easy." His call will be sorely missed on the amateur bands, both by all his old friends in the Midlands and the new ones he made in the South.

To his widow, Molly, we extend our deepest sympathies.

G2AK, G2NV, G2HKG

Council Proceedings

Résumé of the Minutes of the Proceedings at a Meeting of the Council of the Radio Society of Great Britain, held at New Ruskin House, Little Russell Street, London, W.C.1, on Monday, November 19, 1962, at 6 p.m.

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

Apologies

Apologies for absence were received from Mr. A. C. Williams, who was indisposed, and later from Major-General E. S. Cole.

Membership

Resolved (i) to elect 141 Corporate Members and 45Associates; (ii) to grant Corporate Membership to seven Associates who had applied for transfer.

Applications for Affiliation

Resolved to grant affiliation to the Birmingham University Radio Society.

Installation of New President

Resolved (i) to agree in principle to a suggestion put forward by Mr. Caws that the President for 1963 be installed during the course of a social function to be held in London during January 1963; (ii) that all members be invited to attend the installation ceremony, (iii) that admission be by ticket obtainable in advance from Headquarters; (iv) that ladies be invited to attend the ceremony; (v) that the cost of the function to the Society be not greater than that which the Society would pay if the meeting were held at the Institution of Electrical Engineers.

I.A.R.U. Region I Conference

Resolved to notify the Hon. Secretary, I.A.R.U. Region I Division that the R.S.G.B. will be represented at the I.A.R.U. Region I Division Conference to be held in Malmo, Sweden, during June, 1963, by a minimum of five delegates.

Golden Jubilee Year Programme

Resolved to authorize the Region 15 Representative to proceed with plans for holding a Golden Jubilee Year celebration in Belfast on Saturday, May 4, 1963.

Reports of Committees

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

Committee	*1962*
R.A.E.N.	October 20
Golden Jubilee Celebrations	October 27
TVI/BCI	November 7

Resolved to receive the Reports and to accept certain of the Recommendations contained therein.

The Recommendations dealt with the International Emergency Service (R.A.E.N.) and problems associated with complaints of TVI in the London area.

News Bulletin Service

It was agreed to enquire from the Radio Services Dept. whether the G.P.O. would permit R.S.G.B. News Bulletins to be transmitted by means of RTTY.

Orbital Times

It was reported that a letter had been sent to the G.P.O. asking for an extension of the R.S.G.B. News Bulletin Service to permit the mid-week transmission of orbital times in connection with earth satellites (The G.P.O. have now advised the Society that permission to transmit mid-week News Bulletins cannot be granted—Ed.)

Small Advertisements

Attention was drawn to the fact that the Society's Advertisement Managers apparently make a practice of writing to persons who insert small advertisements in other radio journals inviting them to advertise in the R.S.G.B. BULLETIN. A member of the Council felt that the practice was to be deprecated.

It was reported to the meeting that the practice is common throughout the advertising world and that in the case of the R.S.G.B. BULLETIN the letters of invitation follow a standard pattern. It was further reported that on only one previous occasion had a member complained of the practice.

Accident Insurance

It was confirmed that all members of the Council are insured against accidents whilst travelling on behalf of the Society.

The meeting terminated at 10.25 p.m.

Can You Help?

● J. J. Malone (EI4N), 136 Mount Prospect Avenue, Clontarf, Dublin, who urgently requires the instruction manuals for the ex-Admiralty Receiver type B.29, Receiver type P.104 and Power Unit for the P.36?

● W. J. McClune, Harlam Lodge, Lansdown, Bath, who requires the circuit diagram of the LM-7 frequency meter?

● J. K. West (B.R.S.24809), 64 Mayfield Road, Sanderstead, Surrey, who requiries details of modifications to the HRO?

GOLDEN JUBILEE CELEBRATIONS

PRELIMINARY PROGRAMME

To enable overseas and provincial members to make plans for attending the Golden Jubilee celebrations of the Society in London during the first week of July 1963 the following preliminary programme has been drawn up by the Society's Golden Jubilee Celebrations Committee.

Monday, July 1	Visits to B.B.C., D.S.I.R., Slough, and other places of technical interest.
Tuesday, July 2	Visits to B.B.C., D.S.I.R., Slough, and other places of technical interest.
Wednesday, July 3	12.30 p.m. Informal Luncheon arranged by London Members' Luncheon Club. Evening. Special presentation at London Planetarium, and Official Reception.
Thursday, July 4	River Trip by private launch from Westminster to Hampton Court. Evening. Social Evening arranged by the London U.H.F. Group.
Friday, July 5	Evening. Golden Jubilee Dinner at the Connaught Rooms, London.

Radio Amateurs' Examination

THE question paper set by the City and Guilds of London Institute for the Radio Amateurs' Examination on May 11, 1962, was as follows:

Eight questions in all are to be attempted, as under:

Both questions in Part I (which are compulsory) and six others from Part II. Failure in either part will carry with it failure in the examination as a whole. Mathematical tables are supplied: they must be given up at the close of the examination. Slide rules may be used.

Part I

Both questions must be attempted in this part

1. (*a*) What conditions are imposed on the licensee of an Amateur (Sound) Radio station as regards aerials and masts in relation to:

(*i*) aerodromes,
and (*ii*) overhead power lines?

(*b*) For how long does an Amateur (Sound) Licence remain in force after issue, and what must the licensee do to renew it?

(*c*) In what circumstances can the Post Office be expected to demand the closing down of an amateur transmitting station?

2. Describe three safeguards which can be incorporated in an amateur radio transmitter to ensure that the radiation of harmonics is kept to a minimum.

Part II

Six questions only to be attempted in this part

3. Describe and explain the action of a quartz crystal controlled oscillator.

4. Describe and explain the action of the frequency-changer stage of a superheterodyne receiver.

5. Describe the construction of a two-gang variable capacitor suitable for use in a superheterodyne receiver. State typical values for the capacitor you have described.

6. What is an *alternating current of sine waveform*? What is meant by voltage and current being *out of phase* and what factors in an a.c. circuit would cause the current to (*a*) lead, and (*b*) lag on the voltage?

7. Three resistances having values of 10 ohms, 20 ohms, and 40 ohms respectively are joined (*a*) in series and (b) in parallel. What is the total resistance in each case and what current would flow if the combinations were connected to a source of d.c. having an e.m.f. of 10 volts and negligible internal resistance?

8. With the aid of diagrams explain the effects of the ionospheric layers on signals radiated in (*a*) the 1·8 Mc/s band, and (*b*) the 14 Mc/s band.

9. Describe a frequency meter having crystal check points.

10. What is meant by standing waves on an aerial feeder? How may they be detected and what can be done to reduce them?

Examiners' Report

The following general report is given on the papers as a whole and is not applicable to the work from individual schools.

Home Candidates	1962	1961	1960
Total	1189	1251	1274
Passed	808 (67·1%)	866 (69·2%)	699 (54·9%)
Failed	381 (32·9%)	385 (30·8%)	575 (45·1%)

Overseas Candidates	1962	1961	1960
Total	56	76	59
Passed	21 (37·5%)	49 (64·5%)	36 (61%)
Failed	35 (62·5%)	27 (35·5%)	23 (39%)

Question 1. Most candidates had a satisfactory knowledge of the subject of the question.

Question 2. In general this question was very poorly answered. In far too many cases candidates were content to state methods of harmonic suppression and made little or no attempt to describe them.

Questions 3 and 4. Neither of these questions appeared to present much difficulty to the majority of candidates except that in quite a large number of cases explanations of the actions were weak. Circuit diagrams were generally good.

Question 5. Quite well done especially where illustrated with simple sketches.

Question 6. Reasonably well done but many answers tended to be too brief and sketchy.

Question 7. Very well done by nearly all candidates.

Question 8. The answers given by many candidates showed only a confused understanding of the propagation of electromagnetic waves. Only a minority were able to give a concise and clear explanation.

Question 9. Answers to this question varied widely from very good indeed to very poor demonstrating only a very limited knowledge.

Question 10. Most candidates had some knowledge of the subject but many answers showed it to be confused and not clearly understood.

Receipts

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

Rules for the V.H.F. National Field Day 1963

THE results of the V.H.F. N.F.D. 1962 have been examined and this experience, coupled with the contestants' comments, and other valuable suggestions, have enabled the Contests Committee to draw up the following amended rules. Contestants are asked to read the rules carefully as many changes have been made.

Entrants are strongly recommended to operate within their local frequency zones in the 144-146 Mc/s, 432-434 Mc/s and 1296-1298 Mc/s bands.

The General Rules for R.S.G.B. Contests shall apply except where superseded by the rules of this Contest.

Log forms and cover sheets are available from R.S.G.B. Headquarters on request.

RULES

1. **Duration.** From 18.00 G.M.T., September 7 to 18.00 G.M.T. September 8, 1963.
2. **Eligible Entrants.** Any group of R.S.G.B. members within the British Isles (which for the purposes of the contest comprise the prefix zones, G, GC, GD, GI, GM, and GW) may enter. The group may be any group of R.S.G.B. members, a club or an Affiliated Society.
3. **Operators.** Operators of portable stations competing in the contest must each hold a current United Kingdom Amateur (Sound) Licence and must be fully paid up Corporate Members of the R.S.G.B. at the time of the contest.
4. **Power Supplies.** Power for any part of the station shall not be derived from supply mains.
5. **Stations.** Each competing group will be permitted to place one or two stations ("A" and "B") in operation; these two stations must use different call-signs. There is no restriction on the combination of bands allocated to each call, but only one station may be operated on each band and no station may operate simultaneously on more than one band. Both stations may operate from the same site or from different sites; it will be permissible for two groups within a single Region or in adjacent Regions to amalgamate for the purpose of scoring; if this is done frequency bands must be allocated between the two stations as detailed above.
6. **Apparatus.** No apparatus may be erected on the site prior to 12.00 G.M.T. on September 7, 1963. This rule includes aerials and aerial fittings as well as accommodation for the stations, but does not apply to accommodation to be used for storage purposes.
7. **Contacts.** May be made on either A1, A3, A3a or F3 in the bands 70·2 to 70·4 Mc/s, 144 to 145 Mc/s and 420 to 450 Mc/s with an input not exceeding 25 watts to any stage of the transmitter; or in any amateur band above 1215 Mc/s with any power or type of emission permitted under the terms of the ordinary Amateur (Sound) Licence.
8. **Scoring.** Points will be scored on a distance basis in accordance with the following table:

Band	Contacts with fixed stations	Contacts with mobile or portable stations
70 Mc/s	1 point per kilometre	2 points per kilometre
144 Mc/s	1 point per kilometre	2 points per kilometre
420 Mc/s	3 points per kilometre	6 points per kilometre
Any other u.h.f. band	10 points per kilometre	20 points per kilometre
Cross-band contacts will not count for points		

9. **Contest Exchanges.** RST or RS reports followed by the contact number (starting at 001 for each station and continuing in sequence irrespective of band), and location. Location must be specified as a distance and bearing from a nearby town for contacts between British stations. QRA locators may be exchanged with Continental stations. It is the responsibility of the receiving operator to obtain the information he requires to calculate distances correctly. Operators are advised in cases of doubt to verify the band with the statement "We are listening in the ..... Mc/s band."

Only one contact on each band may be claimed with a specific station whether fixed, portable, mobile or alternative address. Duplicate contacts must be logged and clearly marked as duplicates without claim for points. Proof of contact may be required.

10. **Logs** (a). Separate logs must be submitted for each band and tabulated in columns headed (in this order): date/time (G.M.T.); call-sign of station contacted; our report on his signal and serial number sent; his report on our signal and serial number received; location of station contacted as received; distance; operator's call-sign; points claimed.

(b) The cover sheet must be made out in accordance with R.S.G.B. General Rule 5 and the declaration signed by a responsible licensed member of the group who was present at the station. The **cover sheet** must contain the following special information: bands worked, individual band scores, total score, list of operators for each station, their call-signs and signatures, the location of each station as sent, the full 6-figure national grid reference in the case of stations in G, GD, GW and GM and latitude and longitude in the cases of GC and GI. Contacts made by an operator whose personal signature does not appear on the cover sheet may be disallowed.

11. **Entries.** Must be postmarked not later than **September 30, 1963.**
12. **Awards.** At the discretion of Council **an award** will be made to the overall winner and to the leading station on each band. **Certificates of merit** will be awarded to the runners-up in each band in which in the opinion of the Contests Committee there is sufficient activity, and to the leading station in each country of the British Isles for 144 and 420 Mc/s.

New Books

SINGLE SIDEBAND FOR THE RADIO AMATEUR (Third Edition, 1962), edited by the Headquarters Staff of the A.R.R.L. 224 pages, profusely illustrated in *QST* format. Price, 18/6d., postage paid, from R.S.G.B. Publications, 28 Little Russell Street, London, W.C.1.

This book, like the *Antenna Book* and the *Mobile Manual*, looks like a bumper edition of *QST*, and indeed consists of a comprehensive digest of some 75 *QST* articles on the subject of single sideband transmission and reception, fully revised and expanded in line with current practice.

The editors have avoided the main disadvantages of such a discrete presentation of a rather complex subject by very careful selection of the material and a wide coverage in subject matter. The aim has been to produce a book from which, as stated in the Foreword, "you can learn how single sideband works, you can read how to duplicate a proven design, or you can gather enough ideas and inspiration to establish a starting point for your own individual design or modification."

This book is suitable for operators, builders, or designers alike, and as well as being a valuable and interesting symposium, is very good value.

T. P. A.

RADIO CONTROL BIG FOUR, published by Model Aeronautical Press Ltd., 38 Clarendon Road, Watford, Herts. (Price 5s.)

This book describes four kits of parts available for those who wish to construct model aircraft which can be radio controlled. The kits described are Mercury Galahad, Frog Jackdaw, Keil Craft Super 60, and Vernon Viscount, each contributed by the original designers. Useful advice is given on assembling the kits and on installing the radio control equipment. The book is well illustrated, nicely produced and the line drawings are excellent.

The Radio Handbook

THE 16th Edition of *The Radio Handbook* published by Editors & Engineers Ltd, Summerland, California, is a mighty tome, running to more than 800 pages. It sells in the U.S. for $9.50.

The new edition includes fresh chapters on electronic computers, r.f. feedback amplifiers and high fidelity techniques. The earlier chapters on semiconductors and special valve circuits have been greatly extended.

Other chapters have been thoroughly revised and brought up-to-date, touching briefly on those aspects in the industrial and military electronic fields that are of immediate interest to the radio amateur and electronic engineer. The construction chapters have been completely re-edited. All new equipments described are of modern design, free of TVI-producing problems and various unwanted parasitic oscillations. The general editor is William I. Orr (W6SAI) who has been able to call upon the skilled assistance of a strong team of co-editors.

The appearance of this edition is to some extent marred by a mixture of type faces—due presumably to the fact that certain chapters have been completely reset.

The diagrams on the whole are excellent but the lettering in some cases is rather small.

Technically the book should have a wide appeal—especially in the U.S.A.

J. C.

CONTEST NEWS

— RESULTS — REPORTS — RULES —

First 1·8 Mc/s Contest, March 16-17, 1963

THE rules for this event are given below and it should be noted that they are considerably changed from those of recent years. This has been done to improve the scores which can be obtained by stations in sparsely populated areas.

1. **When:** 21.00 G.M.T. on Saturday, March 16, to 03.00 G.M.T. on Sunday, March 17, 1963.
2. **Eligible Entrants:** All fully paid-up Corporate Members of the R.S.G.B. resident in G, GC, GD, GI, GM, and GW.
3. The General Rules published in the January 1963 issue of the R.S.G.B. BULLETIN relating to R.S.G.B. Contests will apply except as superseded by the rules of this Contest.
4. **Contacts:** May be made on c.w. (A1) only in the 1·8 Mc/s band.
5. **Scoring:** Three points for contacts with stations in the entrant's own county and those counties having a common boundary with that of the entrant and five points for all other contacts.
6. **Contest Exchanges:** RST reports followed by the county code letters given on page 376 and the contact number starting with 001, e.g. for a contact from Surrey 579SY005. All reports must be acknowledged with "R."
7. **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, county code letters and serial number received," " Points claimed."

(b) The cover sheet must be made out in accordance with R.S.G.B. Contest Rule 5. The declaration must be signed.

(c) Entries must be postmarked not later than **April 1, 1963.**
8. **Power Input:** The d.c. input to any stage of the transmitter shall not exceed 10 watts.
9. **Awards:** At the discretion of the Council, the **Somerset Trophy** will be awarded to the winning station and certificates of merit to the stations placed second and third. In addition, the **Maitland Trophy** will be awarded to the Scottish member with the highest aggregate number of points in this contest combined with the Second 1·8 Mc/s Contest 1962. A **certificate of merit** will also be awarded to the non-transmitting member submitting the best check log.

144 Mc/s Open Contest 1963

R.S.G.B. members throughout Europe are invited to take part in this popular v.h.f. contest. Both phone and c.w. may be used. Contestants are requested to distinguish carefully between the words " county " and " country."

1. **When:** 17.00 G.M.T. on Saturday, March 2, 1963, to 19.00 G.M.T. on Sunday, March 3, 1963.
2. **Eligible Entrants.** All fully paid-up members of the R.S.G.B. resident in Europe.
3. The General Rules published in the January 1963 issue of the R.S.G.B. BULLETIN relating to R.S.G.B. Contests will apply except as superseded by the rules of this Contest.
4. **Contacts:** May be made on either A1, A3, A3a or F3 in accordance with the terms of the Amateur (Sound) Licence.
5. **Scoring:** For each completed contact in the operator's own **country,** 10 points may be claimed; for each completed contact with a station in any other **country,** 25 points may be claimed. In addition a bonus of 25 points may be claimed for the first contact in each new **county** in accordance with the list on page 376. The whole of the London Postal Districts will count as one county only.
6. **Contest Exchanges.** RST or RS reports followed by the contact number, the location and county (e.g. RST559001 Digswell, Herts). Since distances do not have to be calculated in this contest the restriction of QTH to one found on the 10m to 1 in. Ordnance maps does not apply: any convenient town or village may be given for the location.
7. **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 and County of station worked," " Points Claimed."

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

(c) Entries must be postmarked not later than **March 18, 1963.**
8. **Awards:** At the discretion of the Council, the **Mitchell-Milling Trophy** will be awarded to the winning entrant and a certificate of merit to the entrant placed second.

Listeners' V.H.F. Contest 1963

THE following are the details of the Listeners' V.H.F. Contest to be held at the same time as the 144 Mc/s Open Contest.

1. **Eligible Entrants.** The contest is open to all fully paid-up members of the R.S.G.B. resident in Europe. Only the entrant may operate his receiving station for the duration of the contest. Holders of amateur transmitting licences are *not* eligible to take part if they own transmitting equipment for the 144 Mc/s band.
2. **Duration.** The contest will commence at 17.00 G.M.T. on Saturday, March 2, and end at 19.00 G.M.T. on Sunday, March 3, 1963.
3. **Scoring.** Entrants will be required to log stations operating in the 144-146 Mc/s band. Each complete log entry of a telephony transmission will score 10 points; for each complete entry of a telegraphy transmission 20 points may be claimed. In addition a bonus of 25 points may be claimed for the first station logged in each new **county** in accordance with the list given on page 376. The whole of the London Postal Districts will count as one county only. Stations outside the entrant's own **country** will score 25 points (50 points if on telegraphy) for each complete log entry.
4. **Entries.** (a) To count for points, logs must show, in columns, (i) Date/Time (G.M.T.); (ii) Call-sign of Station Heard; (iii) Report and Serial Number Sent by Station Heard; (iv) My Report on the Signal Heard; (v) County of Station Heard; (vi) Call-sign of Station being worked; (vii) Points claimed.

(b) Entries must be set out on R.S.G.B. Contest Log Sheets available from R.S.G.B. Headquarters or on one side only of foolscap paper.

(c) The cover sheet must be made out in accordance with R.S.G.B. Contests Rule 5 and must certify that the entrant does not possess transmitting equipment for the 144 Mc/s band.

(d) Entries must be postmarked not later than **March 18, 1963.**
5. **Awards.** At the discretion of the Council, certificates of merit will be awarded to the winner and to the runner-up.

CONTESTS DIARY

January 26-27 - CQ WW 160m. Contest.
January 27 - 144 Mc/s C.W. Contest. (For rules, see this page).
February 2-3 - Affiliated Societies' Contest. (For rules, see this page).
February 9-10 - A.R.R.L. DX (phone) Contest. (For details see page 356).
February 16-17 B.E.R.U. Contests (For rules see page 254, November 1962).
February 23-24 A.R.R.L. DX Contest, (C.W). (For details see page 356).

March 2-3	—	YL/OM Contest (phone).
March 2-3	—	144 Mc/s Open and Listeners' V.H.F. Contests. * (For details, see this page).
March 9-10	—	A.R.R.L. DX Contest (phone).
March 16-17	—	First 1·8 Mc/s Contest (For details, see this page).
March 16-17	—	YL/OM Contest (c.w.).
March 23-24	—	A.R.R.L. DX Contest (c.w.).
March 23	—	Pakistan Day DX Contest.
March 30-31	—	CQ W.W. S.S.B. Contest.
March 30-31	—	R.E.F. (c.w.).
April 6-7	—	Low Power Contest.
April 6-7	—	PZK (c.w.) Contest.
April 13-14	—	PZK (phone)
April 21	—	D/F Qualifying Event.
April 20-21	—	R.E.F. (phone).
April 20-21	—	Helvetia 22
April 27-28	—	PACC (c.w.).
May 4-5	—	PACC (phone).
May 4-5	—	U.S.S.R. DX (c.w.) Contest.
May 5	—	First 144 Mc/s Portable Contest. *
May 12	—	D/F Qualifying Event.
May 19	—	D/F Qualifying Event.
May 26	—	First 420 Mc/s Contest. *
June 1-3	—	CHC/HTH QSO Party.
June 8-9	—	National Field Day. (For rules, see page 308)
June 15-16	—	70 Mc/s Contest.
June 23	—	1250 Mc/s Tests.
June 30	—	D/F Qualifying Event.
July 6-7	—	Second 144 Mc/s Portable Contest.*
July 21	—	D/F Qualifying Event.
September 7-8	—	V.H.F. National Field Day (For rules, see page 373).
September 15	—	D/F National Final.
September 22	—	Low Power Field Day.
October 6	—	R.A.E.N. Rally.
October 19-20	—	7 Mc/s DX Contest (phone).
October 27	—	Second 420 Mc/s Contest.
November 2-3	—	7 Mc/s DX Contest (c.w.).
November 9-10	—	Second 1·8 Mc/s Contest.
November 16-17		R.S.G.B. 21/28 Mc/s Telephony Contests.

** To coincide with Region 1 I.A.R.U. Contest dates.*

R.A.E.N. Rally 1962

DESPITE complaints of lack of activity, the number of participating stations in the R.A.E.N. Rally, held on October 7, 1962, was well up to the previous year's figure.

It appeared in 1961 that the passing of a test phrase was becoming too easy and, in consequence, the phrases in the 1962 event were made more complicated. The result of this is shown in the log sheets by the comparatively large number of errors which occurred in the circulation of the messages.

Stringent marking has taken place and the originator of a wrongly passed test phrase has been laboriously located and penalised. In cases where the culprit was not traced, entrants have been given the benefit of the doubt. One station was responsible for introducing three errors due, in the main, to untidy log keeping. Phrases such as " exponential density " became " experimental density "; " integration domain " inexplicably became " integral group " whilst the *pièce de résistance* was " statistical hypothesis " which was transformed into " statistical hypnosis." It should be appreciated that the accurate passing of the test phrase is the essence of the exercise and if there is any doubt at all as to the wording a repeat should be demanded. Another point, having ensured that the message has been written down as passed do not alter the wording because it looks wrong!

There was less mobile activity than in 1961 though the figures given do not describe the full story since some stations operated portable for one period of the contest and then fixed for the other thus grouping their scores under Section A of the Rally.

There was the usual number who failed to read the rules and some who did read the rules failed to apply them. Admittedly, the rules were made a little more complicated than previously in an effort to overcome some anomalies which have occurred in the past but there seemed little criticism of them and most entrants conformed. Although not explicit in the rules, the normal contest ruling is that a station may be worked only once. One station adopted the ruse of working the same station twice in the same period, but since only the one entrant interpreted the rules in this way, points have reluctantly been deducted from his score. This matter will be cleared up when the rules for the 1963 Rally are published.

There was a smattering of 2m activity in the Norfolk and Southampton areas but the bulk of message handling took place on Top Band and 80m, the popularity of these bands being about even.

There was a surprising dearth of activity in areas where it is known that a lot of R.A.E.N. activity takes place. One station in Essex, who complained that he " must have been the only Essex, Herts, Kent or Suffolk station on the air " operated all morning and until 15.20 to get rid of his test phrase. Conditions up North seemed a little better however and the Norfolk, Grimsby, North East Coast, Sutton Coldfield, Manchester and Cheshire stations were very active. Only one GM entry was received and, surprisingly, no GW and no GI.

There was a suggestion that bonus points should be given for GMs and GIs but they are in no worse position than stations on the South Coast who would immediately raise the cudgels if any action of this type were taken on this. The general comments from all those who took part was that, though more difficult than last year, it was most enjoyable and all are eagerly awaiting the next Rally.

The winner of Fixed Station Section this year was also the winner of the Fixed Section last year and congratulations are due to C. D. Hyde (G3OFU) who topped the list by a good margin. M. Knights (G3NJF/P) who was second in the Mobile Section last year moves up to first place whilst Syd Clements moves up from sixth to top in the Listeners' Section.

It was disappointing to see a reduced entry from listeners this year and the R.A.E.N. Committee would appreciate any comments from members to increase the interest in this section of the Rally. Many listeners seemed content to " sit on the back " of their nearest transmitting station and to log his contacts. A higher score would have been achieved had there been more band searching.

Check logs from G3CKC, G3ELZ and Martin Harrison are gratefully acknowledged. In a contest of this sort where a search may be necessary to find the originator of a wrongly passed phrase, check logs are of great assistance.

RESULTS—R.A.E.N. RALLY 1962

Transmitting Section

(Fixed and Mobile Stations)

Position	Call-sign	Points	Position	Call-sign	Points
1	G3OFU	64	19	G4XC	26
2	G3OLN	43	20	G3DTD	25
3	G3OHX	42		G3NOJ	25
	G3KPU	42	22	G6ZG	23
5	G4HZ	41	23	G3NSI	22
6	G3GFU	40		G3NZ	22
7	G3PNR/A	37	25	G2ARN	21
8	G3HIU	34		G3JEY	20
9	G3PJK	33	26	G3MDH	20
	G3NJQ/A	33		G3HMF	20
	G3HTI	33		G3NHU	20
	G3OJI	33	30	G3EHX	17
13	G3HRK	32		G3LNN	17
14	GM3OWU/A	31	32	G3MXZ	16
15	G3JVD	30	33	G3MWZ	15
17	G2TG	30	34	G3AVE	14
	G3CGD/A	28		G3ICX	14
	G3OOA	28	36	G3HPR	11
			37	G3NOD	9

(Mobile or Portable Stations only)

1	G3NJF/P	60	4	G3LGN/P	33
2	G3ISV/M	44	5	G3BTU/P	20
3	G3NLR/M	41			

(Receiving Section)

Posn.	Name	Pts.	Posn.	Name	Pts.
1	S. Clements	92	5	A. Stamp	48
2	R. Johnson	86	6	T. Barclay	39
3	M. Cole	70	7	K. Sketheway	35
4	A. Nichols	58	8	R.Western	21

R.S.G.B. QSL Bureau Sub-Managers

THE following is a list of the R.S.G.B. QSL Bureau Sub-Managers showing the call-sign groups for which they are responsible:

G2:	**S. Marsh (G2CZU), 10 Vernham Grove, Odd Down, Bath, Somerset.**
G3, 4 and 5 two-letter calls & GC	**E. G. Allen (G3DRN), 65a Melbury Gardens, London, S.W.20.**
G6 and G8:	**A. J. Mathews (G6QM), 62 Ashlands Road, Hesters Way Estate, Cheltenham.**
G3AAA-BZZ:	**C. C. Olley (G3AIZ), 157 Wanstead Park Road, Ilford, Essex.**
G3CAA-DZZ:	**C. A. Bradbury (B.R.S. 1066), 13 Salisbury Avenue, Cheltenham.**
G3EAA-HZZ:	**W. J. Green (G3FBA), 790 Rochester Way, Sidcup, Kent.**
G3IAA-KZZ, B.R.S. and A numbers	**T. D. J. Miles (G3NXR), 7 Hampden Road, Wantage, Berks.**
G3LAA-MZZ:	**C. Harrington (B.R.S. 2292), 91 Brabazon Road, Hounslow, Middlesex.**
G3NAA-NZZ:	**C. R. Emary (G5GH), 133 Fairlands Road, Thornton Heath, Surrey.**
G3OAA-PZZ:	**J. H. Brazzill (G3WP), 43 Forest Drive, Chelmsford, Essex.**
G3RAA-RZZ:	**K. Walden (G3OLN), 1 Hawthorn Road, Cheltenham, Gloucestershire.**
GD:	**T. R. Moore (GD3ENK), " Glyn Moar," St. John's, Isle of Man.**
GI:	**W. H. Martin (GI5HV), " Swallow Lodge," Greenisland, Co. Antrim, Northern Ireland.**
GM:	**D. Macadie (GM6MD), 154 Kingsacre Road, Glasgow, S.4.**
GW:	**J. L. Reid (GW3ANU), 28 Waterston Road, Gabalfa, Cardiff.**
DL2:	**4027469 C/T Griffiths (DL2OX), 212 Hohenzollen Str., Munchen Gladbach, Germany.**

Cards must be sent to G2MI but envelopes may be sent to the appropriate Sub-Manager or to G2MI.

The address of the QSL Bureau Manager (Mr. A. O. Milne, G2MI) is 29 Kechill Gardens, Bromley, Kent.

List of Counties for R.S.G.B. Contests

England (G)

1	Bedford	BD	22	London (Postal Districts)	LD
2	Berkshire	BE	23	Middlesex	MX
3	Bucks	BS	24	Monmouth	MH
4	Cambridge	CE	25	Norfolk	NK
5	Cheshire	CH	26	Northampton	NR
6	Cornwall	CL	27	Northumberland	ND
7	Cumberland	CD	28	Nottingham	NM
8	Derby	DY	29	Oxford	OX
9	Devon	DN	30	Rutland	RD
10	Dorset	DT	31	Shropshire	SE
11	Durham	DH	32	Somerset	ST
12	Essex	EX	33	Stafford	SD
13	Gloucester	GR	34	Suffolk	SF
14	Hampshire	HE	35	Surrey	SY
15	Hereford	HD	36	Sussex	SX
16	Hertford	HF	37	Warwickshire	WK
17	Huntingdon	HN	38	Westmorland	WD
18	Kent	KT	39	Wiltshire	WE
19	Lancashire	LE	40	Worcestershire	WR
20	Leicester	LR	41	Yorkshire	YS
21	Lincoln	LN			

Scotland (GM)

42	Aberdeen	AN	59	Lanark	LK
43	Angus	AS	60	Mid-Lothian	MN
44	Argyll	AL	61	Moray	MY
45	Ayr	AY	62	Nairn	NN
46	Banff	BF	63	Orkney	OY
47	Berwick	BW	64	Peebles	PB
48	Bute	BU	65	Perth	PH
49	Caithness	CT	66	Renfrew	RW
50	Clackmannan	CN	67	Ross & Cromarty	RY
51	Dumbarton	DU	68	Roxburgh	RH
52	Dumfries	DF	69	Selkirk	SK
53	East Lothian	EL	70	Shetland	SL
54	Fife	FE	71	Stirling	SG
55	Inverness	IS	72	Sutherland	SU
56	Kincardine	KE	73	West Lothian	WN
57	Kinross	KS	74	Wigtown	WG
58	Kirkcudbright	KB			

Wales (GW)

75	Anglesey	AY	81	Flint	FT
76	Brecknock	BR	82	Glamorgan	GN
77	Cardigan	CA	83	Merioneth	MR
78	Carmarthen	CR	84	Montgomery	MG
79	Caernarvon	CV	85	Pembroke	PK
80	Denbigh	DB	86	Radnor	RN

Northern Ireland (GI)

87	Antrim	AM	90	Fermanagh	FH
88	Armagh	AR	91	Londonderry	LY
89	Down	DW	92	Tyrone	TE

Channel Islands (GC)

93	Alderney	AD	95	Jersey	JY
94	Guernsey	GY	96	Sark	SR

97 **Isle of Man (GD)** IM

CLOSING DATE
FOR THE MARCH 1963 ISSUE
FEBRUARY 7

General Rules for R.S.G.B. Contests 1963

THE following rules apply to all R.S.G.B. Contests except where modified in individual events and are to be read in conjunction with the details for each contest published in the R.S.G.B. BULLETIN.

Rule 1. **Entrants** must operate in accordance with the terms of their licences. (N.B. /T stations are ineligible by the terms of their licence to take part in contests).

Rule 2. **Unlicensed Stations.** Contacts with unlicensed stations will not count for points.

Rule 3. **Contest Exchanges.** An exchange of RST or RS reports followed by a three figure serial number starting with 001 for the first contact and increasing by one for each successive contact (i.e. 559001 or 58001) must be made before points can be claimed. All reports must be acknowledged. In the case of **v.h.f./u.h.f. contests,** the location must also be exchanged. The location must be either a town found on the 10 m. to 1 in. Ordnance Survey Maps or in distance and direction from such a town (i.e. 559001 Oxford or 56001 10W Cambridge). In large towns and cities, the location must be given in distance and direction from a small town on such a map.

Rule 4. **Contacts.** Only one contact on each band may be made with a specific station, whether fixed, portable, mobile or alternate address. Duplicate contacts must be logged and clearly marked as duplicates without claim for points. Cross-band contacts may not be claimed. Proof of contact may be required.

Rule 5. **Entries** must be clearly written or typed ON ONE SIDE ONLY of R.S.G.B. contest log forms or on foolscap or quarto paper and must be set out in the form prescribed in the published details for the contest concerned. The **cover sheet** of an entry must be made out in the following form and all the information filled in:

Contest.....Date.....Claimed Score.....
Section (if any)..... Call-sign.....
Name .....
Home Address .....
.....
Address of station or Portable Location .....
(if other than home address above)
.....
QTH as transmitted.....
National Grid Six Figure Reference, County Code No. or other co-ordinates (see contest details).....
Transmitter(s) .....
Receiver(s) .....
Aerial(s) .....

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

Date ..... Signed .....

Failure to complete the cover sheet or sign the declaration will involve disqualification of the entry.

Rule 6. **Submission of Entries.** Entries must be addressed to the Contests Committee, Radio Society of Great Britain, 28-30 Little Russell Street, London, W.C.1, England, and must be post-marked not later than the date stated in the published details governing the contest concerned. The name of the contest must be clearly shown at the top left-hand corner of the envelope. All entries become the property of the Radio Society of Great Britain.

Rule 7. **Multiple Operator Entries.** Unless otherwise stated, single operator entries only will be accepted. A single operator station is one manned by an individual operator who receives no assistance from other persons during the contest periods. A multi-operator station is one who does not conform to this definition. In those contests where multiple operator entries are allowed, such entries will only be accepted provided that:

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

Rule 8. **Portable stations** must operate from the same site for the duration of a contest. Power must not be derived from public or private supply mains. No apparatus may be erected on the site prior to the day of the event. For the purposes of R.S.G.B. contests, **mobile stations** are stations installed in motor vehicles or vessels on inland waterways and so equipped that they are capable of operation in motion without any alteration.

Rule 9. The details relating to specific contests published in the *R.S.G.B. Bulletin* shall be regarded together with these general rules as the rules of the contest.

Rule 10. In the event of any dispute, the ruling of the Council of the Radio Society of Great Britain shall be final.

Rule 11. **Check logs** submitted by non-transmitting members for consideration for the award of certificates of merit should give in this order the following details: Date, Time (G.M.T.); Band; Call-sign of station heard; Report and serial number sent by station heard; Call-sign of station being worked; any other information required by contest rules.

Letters to the Editor . . .

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

GC2CNC

DEAR SIR,—It is with great regret that we notice an advertisement carried in the latest *Short Wave Magazine* from a well-known amateur, who finds it necessary to sell all his equipment to finance expenses involved in undergoing operations to his eyes.

We refer to E. (Monty) Banks (GC2CNC), of St. Helier, Jersey, C.I. It is not known whether or not he is a member of the R.S.G.B., but we feel that some means of assistance should be available through our National Society. Should this not be so, we believe that many of his friends would, in true " Ham Spirit," wish to be of some help. Perhaps a member would be willing to organize something on these lines.

Yours faithfully,
G. GEARING (G3JJG)
London, S.W.2. C. J. SPENCER (G3GRA)

(Editorial note: At the moment there is no official means of assistance for a matter of this nature through the R.S.G.B.)

The Bulletin

DEAR SIR,—I should like heartily to support the views expressed by Mr. J. N. Roe (G2VV) and the Rev. Canon Noel Waring (EI8J) in their letters published in the November BULLETIN.

Progress we surely must have, radio and electronics being well to the fore in modern science. But please spare some space in the enlarged BULLETIN for junior members, and also maybe for some of the older ones who have fallen by the technical wayside in the past decade.

The membership analysis figures in the November issue are surely a pointer here. The figures show a nett gain of 267 in the B.R.S. and Associates section against 224 in the licensed section. How many articles have catered for the non-transmitter during the past year? Not many I fear.

By a fortunate coincidence an article in the November issue by Mr. D. J. Bradford (G3LCK) gives a good illustration of the enthusiasm that can be aroused if things are presented in the right way for both juniors and adults alike. Perhaps Mr. Bradford could be tempted to offer some ideas on this matter.

I hope that it will be possible in the near future to devote space each month to our quite large percentage of short wave listeners and not too advanced junior members. After all, it is in all our interests to try to maintain the Society membership and to increase it steadily, and a bigger and brighter " BULL " will surely help that trend. Thinking back over the years, if I remember rightly, both Mr. Roe (G2VV) and Mr. Hum (G5UM) have contributed the kind of articles, both constructive and instructive, which present the right approach to the subjects they tackle.

In conclusion please don't think I am dissatisfied with the BULLETIN as it is today; I'm not, but I do think we are missing out (as both G2VV and EI8J say) on the friendly spirit of Amateur Radio of yester-year. Browse through the old copies and you'll see what I mean!

Yours faithfully,
JACK LAMBERT (G3TA, VP5TA, VP4WD)
Iver, Bucks.

(Editorial note: It is planned to begin a series of articles for the newcomer to Amateur Radio later in the present year)

Subscription Rates

DEAR SIR,—I feel I must protest at the deplorable attitude taken by Mr. Fowler (GM8SV/MP4BBQ) in his letter published in the November 1962 issue.

It may be of interest to Mr. Fowler that there are members who, even in this affluent society, find that their incomes barely cover the rising cost of the necessities of life and for whom an increase in the subscription rates to £5 5s. would be a very good reason for leaving the Society in spite of the benefits it provides.

In view of the already high turnover in membership surely a more realistic approach would be to practice every financial economy to retain the present subscription rate as long as possible, if this is not already being done.

Yours faithfully,
P. J. BALL (G3HQT)
Morden, Surrey.

Telegraphy and Telephony Allocations

DEAR SIR,—I am not certain how the original amateur band allocations for telegraphy and telephony were determined but it occurs to me that if they were to be re-determined, one of the more logical ways of doing it would be to (*a*) decide what proportion of amateurs were likely to use each mode, (b) decide the maximum bandwidths a good transmission of each type would occupy, and then (*c*) allocate the space available on this basis.

Taking these points in turn:

(*a*) would be almost impossible to determine, but it would be fair to assume a 50/50 division.

(*b*) is considerably easier to assess. A really good c.w. transmission should not require more than about 50 c/s, assuming average keying rates and characteristics, but it appears to be generally accepted that the minimum practical receiver bandwidth for Amateur Radio purposes is about 250 c/s. 'Phone transmissions need only occupy about ten times this figure, i.e., 2·5 kc/s.

(*c*) The space available need then be disposed only in accordance with (*b*); a ratio of 1 to 10, in order to give both modes equal space. For instance, taking the 80 metre band, 300 kc/s are available which divided in the ratio given above will result in an allocation of something like 30 kc/s for c.w. and 270 kc/s for 'phone.

Perhaps a reallocation on these lines would persuade the c.w. enthusiasts to get down to designing some *really* stable equipment that could cope with bandwidths of 10 c/s or so! I don't think there has been a single article in the Amateur Radio magazines over the last few years on the construction of stable, very narrow-band, equipment for c.w. only, or even on the problems to be considered in such a design—and problems there are!

Yours faithfully,
W. BLANCHARD (G3JKV)
East Grinstead, Sussex.

Only Those Who Think First—Talk Sense

DEAR SIR,—Whatever happened to that wonderfully correct-sounding method of terminating a phone transmission which went " . . . G2XXX from G3XXX, over."?

Not so many years ago this method was almost universally used by the British amateur. Today our bands are flooded with meaningless inanities such as " Break-break," " Kay, please," " What say?", " Dah-de-dah " and that supreme time-waster " . . . G2XXX, you have G3XXX standing by for you."

No one can say how much of this gibberish reaches the ears of the general public, but it is certain that none of it is likely to further our cause in their eyes.

Let us remember that anyone can sit and chatter into a microphone, but only those who think first, talk sense.

Yours faithfully,
F. ALLAN HERRIDGE (G3IDG)
Basingstoke, Hants. (Life Member)

Amateur Radio—A Far Cry!

DEAR SIR,—Good luck to the Royal Air Force with their splendidly equipped new Headquarters Station which was given a full page spread on page 229 of the November BULLETIN. However, it seems to me to be a far cry from "AMATEUR" radio with such a rig (£660 supplied by Nuffield Trust, plus Club Funds and by courtesy of Collins Radio).

As one in the Cinderella service, I shall continue to plug away (in my " amateurish " fashion) at further TVI mods to my WS36, until I have saved enough for a DX40U (second-hand, of course) or W.H.Y. Fairy Godmother?

Yours faithfully,
L. BEAUMONT,
York. *Major, Royal Signals*

Build-It-Yourself Leaflets

THE following leaflets and pamphlets, originally produced for sale on the Society's stands at exhibitions, are available from Headquarters. Apart from the BULLETIN reprints, the text is in typescript. Please order by number and title.

No.	Title	Price
1.	A Simple Receiver for the Beginner	6d.
2.	Morse Sender	3d.
3.	One Valve, Two Stage Pick-up Amplifier	3d.
4.	A Home-made Crystal Set	3d.
5.	A Simple Transistor Amplifier	3d.
6.	Progressive Three Receiver	6d.
7.	Three in One Receiver	6d.
8.	Crystal Controlled Converter for 144 Mc/s	6d.
9.	Set of Four TVI reprints†	2/6d.
10.	Improving the War Surplus HRO Receiver†	9d.
11.	R.S.G.B. Two Metre Converter†	1/-
12.	Beginner's Amateur Bandspread Receiver	6d.
13.	All Band Grid Dip Oscillator†	1/-
14.	Simple T.R.F. Receiver using Miniature Valves	6d.
15.	Transistor Tester	6d.
16.	Maxi-Q Transistor Receiver	6d.
17.	160 Metre Transmitter using Miniature Valves and Series Gate Modulation	1/-
18.	Transistor Code Practice Audio Oscillator	6d.
19.	Transistor Crystal Marker Oscillator	6d.
20.	Radio Amateur Applications of the Transistor	2/6d.
21.	G5BJ Single Sideband Exciter	2/6d.
22.	Morse Practice Oscillator	6d.
23.	Morse Practice Oscillator (four valve)	9d.
24.	Progressive Four Stage Transistor Receiver for the Beginner	1/3d.
25.	144 Mc/s Mobile Transmitter	1/6d.
26.	Simple Mains Power Supply for a Receiver for the Beginner	6d.
27.	Mobile All Band Amateur Band Converter	1/6d.
28.	The Britannia Receiver†	2/-
29.	144 Mc/s Receiver with Converter and I.F. Strip, suitable for static or mobile use	2/-

All prices plus 3d. postage and packing.

† BULLETIN reprint

GB2RS SCHEDULE

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

Frequency	Time	Location of Station
3600 kc/s	9.30 a.m.	South East England
	10 a.m.	Severn Area
	10.30 a.m.	North Midlands
	11 a.m.	North East England
	11.30 a.m.	South West Scotland
	12 noon	North East Scotland
145·30 Mc/s	10.30 a.m.	Beaming north west from Sutton Coldfield
	10.45 a.m.	Beaming south west from Sutton Coldfield
145·50 Mc/s	11.00 a.m.	Beaming north from Leeds
	11.15 a.m.	Beaming east from Leeds
145·10 Mc/s	12 noon	Beaming north from London area
	12.15 p.m.	Beaming west from London area

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

Forthcoming Events

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

LOOKING AHEAD

January 25.—Installation of Mr. Norman Caws as President, Kingsley Hotel, London, W.C.1. (See separate announcement.)
March 29.—London Lecture Meeting at I.E.E.
April 28.—Midlands Mobile Rally and Region 3 O.R.M. at Trentham Gardens.
April 28.—U.B.A. Mobile Rally, Verviers, Liège, Belgium.
May 3.—R.A.O.T.A. Reunion, Horse Shoe Hotel, London, W.1.
May 4.—Northern Ireland Golden Jubilee Year Celebrations.
June 2.—R.S.G.B. Golden Jubilee Mobile Rally, Wethersfield, Essex.
June 10-15.—Region 1 I.A.R.U. Conference, Malmö, Sweden.
June 16.—A.R.M.S. Rally, U.S. Air Force Base, Barford, St. John, Oxon.
June 23.—Bridlington Mobile Rally.
July 5.—R.S.G.B. Golden Jubilee Dinner.
July 7.—South Shields Mobile Rally.
August 18.—Derby Mobile Rally.
September 8.—G6UT's Ham Party.
September 15.—Lincoln Mobile Rally.
September 22.—Woburn Abbey National Mobile Rally.
September 22.—Surrey Radio Contact Club, 144 Mc/s D/F Hunt.
September 29.—South West Mobile Rally, Weston-super-Mare.

REGION 1

Ainsdale (A.R.S.).—January 16, February 6, 20, 37 Hawthorne Grove, Southport.
Blackburn.—Fridays, 8 p.m., West View Hotel, Revidge Road.
Blackpool (B. & F.A.R.S.).—Mondays, 8 p.m., Pontins Holiday Camp, Squires Gate.
Bury (B.R.S.).—February 12, 8 p.m., Knowsley Hotel, Kay Gardens.
Chester.—Tuesdays, 8 p.m., Y.M.C.A.
Eccles (E. & D.R.C.).—Tuesdays, 8 p.m., The Congregational Mission Church, King Street.
Liverpool (L. & D.A.R.S.).—Tuesdays, 8 p.m., The Gladstone Mission Hall, Queens Drive, Stoneycroft.
Macclesfield.—February 5, 19, 42 Jordongate.
Manchester (M. & D.A.R.S.).—Wednesdays, 7.30 p.m., Newton House Community Centre, Droylsden Road, Newton Heath, Manchester 10.
(S.M.R.C.).—Fridays, 7.45 p.m., Rackhouse Community Centre, "Rackhouse," Daine Avenue, Northenden.
Morecambe.—February 6, 125 Regent Road.
Preston.—January 22, February 12, 26 (Meetings start with a Morse practice at 7.30 p.m.), St. Paul's School, Pole Street.
Southport (S.R.S.).—Wednesdays, 8.30 p.m., Sea Cadets Camp, The Esplanade.
Stockport.—January 16, 30, February 13, 27, 8 p.m. The Blossoms Hotel, Buxton Road.
Wirral.—January 16, February 6, 20, 7.45 p.m., Harding House, Park Road West, Claughton.

REGION 2

Halifax (Northern Heights A.R.S.).—January 16, 30 ("Radio on Stamps," by G3OMM), February 13, 7.30 p.m., Sportsman Inn, Ogden.
Heckmondwike (S.V.A.R.S.).—January 24 ("Communication Systems of British Railways" by S. D. Jones), February 7 ("Converters, Receivers and Transmitters" by T. Withers), February 21 ("What's New," by S. Marsden), 7.15 p.m., Grammar School, Heckmondwike.

REGION 3

Birmingham (M.A.R.S.).—January 17, 7.30 p.m. Birmingham & Midland Institute, Paradise Street, Birmingham **(Slade).**—January 25 ("Contest Operating" by G8GF), February 8, 7.45 p.m., The Church House, High St., Erdington. **(South).**—January 17, 7.45 p.m. Friend's Institute, Moseley Road, Birmingham. **(M.R.C.C.).**—February 1, 7.30 p.m., Windmill House, Weatheroak, Wythall, Birmingham.
Cannock (A.R.S.).—February 7, 7.45 p.m., The Tavern, Bridgtown, Cannock.
Lichfield (A.R.S.).—January 15, February 4, 7.30 p.m., Swann Inn, Lichfield.
Coventry (C.A.R.S.).—Mondays, 8 p.m., Willenhall Scout H.Q., Little Farm Buildings, Littlethorpe, St. James Lane, Willenhall, Coventry
Stourbridge.—February 5, 7.45 p.m., Foley College, Stourbridge.
Sutton Coldfield.—January 24, February 14, 7.30 p.m., 92 The Parade, Sutton Coldfield.
Wolverhampton.—January 21, February 4, 8 p.m., Neachells Cottage, Stockwell End, Tettenhall.

REGION 4

Burton-on-Trent (A.R.S.).—First Wednesday in each month, R.A.E. Lecture, 7.30 p.m., Club Rooms, Stapenhill Institute, Burton-on-Trent. February 13 (Single Sideband Transmission, W. Hazelden, G3KBE).
Chesterfield (C. & D.A.R.S.).—January 16, 30, 7.30 p.m., Newbold Observatory, Newbold Road, Chesterfield.
Derby (D. & D.A.R.S.).—January 16 (Open Evening), January 23 (Members' Exhibition Evening), January 30 (Industrial Colour Photography, by M. Haes,). February 3 (G5YY Trophy Contest), February 6 (Annual General Meeting), 7.30 p.m., Room No. 4, 119, Green Lane, Derby. **(D.S.W.Exp. Soc.).**—Fridays, 7.30 p.m., Sundays, 10.30 a.m., Club Rooms, Nunsfield House, Boulton Lane, Alvaston.
Grantham (G. & D.A.R.S.).—Mondays, 7.30 p.m., Club Rooms, rear of Manners Arms Hotel, London Road, Grantham.
Grimsby (G. & D.A.R.S.).—January 15, 29, 8 p.m., R.A.F.A. Headquarters, Abbey Drive West, Grimsby.
Lincoln (L.S.W.C.).—Wednesdays, 7.30 p.m., Lincoln Technical College, Cathedral Street, Lincoln.
Loughborough (A.R.S.).—Fridays, 7.30 p.m., Corporation Hotel, Wharncliffe Road, Loughborough.
Nottingham (A.R.C.N.).—Tuesdays (R.A.E.), Thursdays (Lecture), Room No. 3, Sherwood Community Centre, Woodthorpe House, Mansfield Road, Sherwood, Nottingham.
Northampton (N.S.W.C.).—Thursdays, 7 p.m., Allen's Pram Works, 8, Duke Street, Northampton.
Peterborough (P. & D.A.R.S.).—February 1 (Aerial), 7.30 p.m., Technical College, Peterborough.
Retford & Worksop (N.N.R.C.).—Tuesdays (Beginners), Thursdays (Informal), 7.30 p.m., Club Rooms, Victoria Institute, Worksop, Notts.

REGION 5

Cambridge (C. & D.A.R.C.).—Fridays, 7.30 p.m., Club Headquarters, Corporation Yard, Victoria Road, Cambridge.
March (M. & D.A.R.S.).—Tuesdays, 7.30 p.m., Police Headquarters, High Street.

REGION 6

Cheltenham.—First Thursday in each month, 8 p.m., Great Western Hotel, Clarence Street.
High Wycombe (C.A.R.C.).—Last Thursday in each month, 8 p.m., British Legion, St. Mary Street, High Wycombe. January 31—"B.B.C. Relay Station at Oxford."
Stroud.—Wednesdays, 8 p.m., Arundel Mills, London Road, Stroud.

REGION 7

Acton, Brentford & Chiswick (A.B.C.R.C.).—January 15 (A.G.M.), 7.30 p.m., A.E.U. Club, 66 High Road, Chiswick.
Barnet (B.R.C.).—January 29 ("Hints and Kinks for Home Constructors," by Keith Clarke G3KRC), 8 p.m., Red Lion Hotel, Barnet.
Bexleyheath (N.K.R.S.).—January 24 (Lecture), 8 p.m., Congregational Hall, near Clock Tower, Bexleyheath.
Croydon (S.R.C.C.).—February 12, 8 p.m., Blacksmiths Arms, Southend, Croydon.
East Ham.—Tuesdays fortnightly, 8 p.m., Leigh Road, East Ham.
East London.—January 20, 2.30 p.m., Lambourne Room, Town Hall, Ilford.
East Molesey (T.V.A.R.T.S.).—February 5, Carnarvon Castle Hotel, Hampton Court.
Edgware & Hendon (E. & D.R.S.).—January 28 (Junk Sale), John Keeble Hall, Church Close, Deans Lane, Edgware, Middx.
Enfield.—January 24, 7.30 p.m., George Spicer School, Southbury Road, Enfield.
Gravesend (G.R.S.).—Thursdays, 7.30 p.m., R.A.F.A. Club, Overcliffe, Gravesend.
Harlow.—Tuesdays, 7.30 p.m., rear of G3ERN (G. E. Read), High Street, Harlow.
Harrow (R.S.H.).—January 18 (A.G.M.), January 21 (Practical), February 1 (Junk Sale), 8. p.m., Roxeth Manor County School, Eastcote Lane, Harrow.
Holloway (G.R.S.).—Mondays, Tuesdays and Wednesdays, 7 p.m. (R.A.E. & Morse), Fridays (Club), 7.30 p.m., Montem School, Hornsey Road, N.7.
Hounslow (H.A.D.R.C.).—Mondays, 7.30 p.m., Isleworth Town Hall, Twickenham Road, Hounslow.
Ilford.—Thursdays, 8 p.m., 579 High Road, Ilford (near Seven Kings Station).
Kingston.—Alternate Thursdays (Lectures), 8 p.m., Y.M.C.A., Eden Street, Kingston. Weekly Morse Classes at 2 Sunray Avenue, Tolworth.

LONDON MEMBERS' LUNCHEON CLUB

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

at 12.30 p.m. on Friday, January 18, February 15 and March 15, 1963

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

Mitcham (M. & D.R.S.).—Alternate Fridays (Lectures and Morse Classes), 7 p.m., "The Canons," Madeira Road, Mitcham.
New Cross (C.A.R.S.).—Fridays, 7.30 p.m., 225 New Cross Road, S.E.14.
Norwood & South London (C.P. & D.R.C.).—January 15 ("K.W. Products," by G8KW), 8 p.m., C.D. Training Centre, Bromley Road, Catford.
Paddington (P. & D.A.R.S.).—Wednesdays, 7.30 p.m., Beauchamp Lodge, 2 Warwick Crescent, W.12.
Purley (P. & D.R.C.).—First and Third Friday in each month, 8 p.m., January 18 (Lecture), Railway Mens Hall (side entrance), Whytecliffe Road, Purley.
Reigate (R.A.T.S.).—January 19 (A.G.M.), 8 p.m., The Tower, High Street, Reigate. January 26 (Annual Dinner), Mill House, Salfords, Redhill.
Romford (R. & D.R.S.).—Tuesdays, 8.15 p.m., R.A.F.A. House, 18 Carlton Road, Romford.
Science Museum (C.S.R.S.).—January 15 (Informal Meeting and GB2SM), February 5 (Lecture by Avo Ltd.), 6 p.m., Science Museum, South Kensington.
Sidcup (C.V.R.S.).—February 7 ("I.T.U. Conference, Geneva, 1959," by G2MI), 8 p.m., Congregational Church Hall, Court Road, Eltham.

Southgate & District.—January 15, 8 p.m., Arnos School, Wilmer Way, N.11.
Slough (S.A.R.S.).—First Wednesday in each month, 8 p.m., United Service Club, Wellington Street, Slough.
Sutton & Cheam (S.C.R.S.).—January 15, "The Harrow," High Street, Cheam.
Welwyn Garden City.—February 14, 7.30 p.m., Conference Room, Murphy Radio, Bessemer Road, Welwyn Garden City.

REGION 8

Crawley (C.A.R.C.).—January 23 ("Unusual Radio Equipment" by G3GVV), 8 p.m., West Green Centre; February 13, for details contact G3FRV.

REGION 9

Bath.—January 16, 7.30 p.m., Committee Room, Bath Technical College, Lower Borough Walls, Bath.
Bristol.—Fourth Friday in each month, 7.15 p.m., Royal Fort, Bristol University.
Burham-on-Sea.—Second Tuesday in each month, 8 p.m., Crown Hotel, Oxford Street.
Exeter.—First Tuesday in each month, 7.30 p.m., Y.M.C.A., St. David's Hill, Exeter.
Camborne (C.R. & T.C.).—First Thursday in each month, S.W.E.B. H.Q., Pool.
Plymouth (P.R.C.).—First Tuesday in each month, 7.30 p.m., Guild of Social Service Building, Plymouth. Other Tuesdays, Virginia House Settlement, St. Andrews Cross, Plymouth.
South Dorset (S.D.R.S.).—First Friday in each month, 7.30 p.m., alternately at Waverley Hotel, Westham, Weymouth and Labour Rooms, West Walks, Dorchester. February meeting is at Weymouth.
Torquay (T.A.R.S.).—Second Saturday in each month, Y.M.C.A., The Castle, Torquay.
Weston-super-Mare.—First Tuesday in each month, 7.15 p.m., Technical College, Lower Church Road.
Yeovil (Y.A.R.C.).—Wednesdays, 7.30 p.m., Park Lodge, The Park, Yeovil.

REGION 10

Cardiff.—February 11 ("The Principles of Transistors," by R. A. Stevens, GW3GQM), 7.30 p.m., T.A. Centre, Park Street, Cardiff.

REGION 13

Edinburgh (L.R.S.).—January 24 (Film Show), February 14 ("Brains Trust"), February 28 ("Two Metre Aerials and Propagation" by Rev. W. Ferrier, GM3BDA), 7.30 p.m., Y.M.C.A., 14 South Saint Andrew Street, Edinburgh 2.

REGION 14

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

REGION 17

Reading (R.A.R.C.).—January 26 (A.G.M.), 7.30 p.m., Palmers Hall, West Street, Reading.

Area and Town Representatives and club secretaries are asked to note that information for inclusion in *Forthcoming Events* should reach Regional Representatives by the first of the month preceding publication.

Regional and Club News

Barnet Radio Club.—At the November meeting John Kay (G3AAE) gave a talk on Propagation. The Annual Christmas Party was due to be held on December 22. The following have been elected to serve on the Committee: *Chairman and Hon. Secretary:* Frank Green (G3GMY); *Minute Secretary:* Harry Sparks (B.R.S.24942); *Hon. Treasurer:* Derek Purchese (G3LXP); *Publicity Officer:* David Bootman (G3MWG); *Committee Members:* Bob Cook (G3DOX); Keith Clarke (G3KRC), Eddie Brett (G3LUY), Peter Toynton (G3GRA) and Michael Holmes. Details of the club's activities may be obtained from F. E. A. Green (G3GMY), 48 Borough Way, Potters Bar, Middlesex.

Bristol.—There was an attendance of 45 at the December meeting when John Tanner (G3NDT/T) gave a talk on "Colour Television." The lecture was illustrated by a demonstration of a colour bar generator, shadow mask tube and the use of dichroic mirrors in the production of colour signals. The next meeting is arranged for January 18. *Hon. Secretary:* E. C. Halliday (G3JMY), 4 Parkside Avenue, Winterbourne, Bristol.

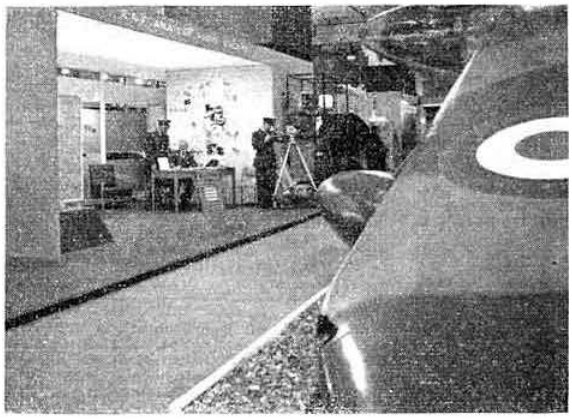
Bromsgrove.—A meeting to discuss the formation of a club or group in the area is to be held at the Dragoon Inn, Aston Fields, Bromsgrove, on Thursday, January 31, at 8 p.m. All local radio amateurs and short wave listeners are invited to attend. Further details may be obtained from L. Hickingbotham, 95 Oakenshaw Road, Redditch, Worcestershire.

Crawley Amateur Radio Club.—At the November meeting Frank Fletcher (G2FUX) gave the first of his talks on his trip to America. The A.G.M. was due to be held on December 19 while at the January meeting on the 23rd G3GVV will lecture on "Unusual Radio Equipment." The third Annual Dinner is to be held on March 2, when the Guest of Honour will be Stanley Vanstone (G2AYC), chairman of the London Members' Luncheon Club and President of the Sutton and Cheam Radio Society. Further details may be obtained from the *Hon. Secretary:* R. G. B. Vaughan (G3FRV), 9 Hawkins Road, Tilgate, Crawley, Sussex.

Clifton Amateur Radio Society.—The winner of the annual Constructional Contest was Bert Green (ex-2FLZ) who exhibited a 144 Mc/s Nuvistor converter. G3OYU was runner-up with a 1·8 Mc/s c.w. transmitter with complete break-in facilities while G3JKY was placed third with a c.w./s.s.b. transceiver. Leader of the Junior Section was Clive Jenner whose exhibit was a hi-fi pre-amplifier. *Hon. Secretary:* C. E. Godsmark (G3IWL), 211 Manwood Road, London, S.E.4.

Cray Valley Radio Society.—Owing to fog the meeting arranged for December 6 had to be cancelled. A sale of surplus equipment

Darlington and District Mobile Picnic at Jackson's Field, Croft-on-Tees, Co. Durham on August 19, 1962. The talk-in stations on Top Band were G3CDM/M and G3NQV/M. Those present included G3AWL, G3KQU, G3NT, G3LUV, G3OGW, G3NQV, G3CKF, G2CKN, G3CDM, G3CKC, G3KQN, G3ISV, G3NAD, G2FXA, G3JMO, G3KBM, G3LBR, G3NOQ, G3NJZ, B.R.S.19480 and B.R.S.23429.
(Photo by G2CKN)



A view of the R.A.F. Amateur Radio Society's stand at the National Radio and Television Show, 1962, Earls Court, London.
(Crown Copyright Reserved)

was due to be held on January 3. *Hon. Secretary:* S. Coursey (G3JJC), 49 Dulverton Road, London, S.E.9.

Harrow, Radio Society of.—The A.G.M. is arranged for January 18 at 8 p.m. at Roxeth Manor Secondary School, Eastcote Lane, South Harrow. The 25th will be a practical night, and on February 1 there will be a Junk Sale. *Hon. Secretary:* A. C. W. Biddell, 114 Kingshill Avenue, Kenton, Harrow, Middlesex.

Norfolk Amateur Radio Club.—Meetings continue to be successful and are now held every fortnight. A 150 watt all-band transmitter has been donated to the club by ex-G3ASQ. *Hon. Secretary:* J. D. Simpson (G3NJQ), 50 Vicarage Road, Norwich.

Northern Heights Amateur Radio Society.—Recent activities have included the Annual Dinner and a film show. The Guest of Honour at the Dinner was W. Daugherty of the Percival Whitley College of Further Education. Details of future meetings are given in *Forthcoming Events*. *Hon. Secretary:* Arthur Robinson (G3MDW), Candy Cabin, Ogden, Halifax.

Lichfield Amateur Radio Society.—The Annual Dinner was due to be held on January 11. Details of other activities may be obtained from the *Hon. Secretary:* V. Hickman (G3LXR), 143 Main Street, Stonnall, near Walsall, Staffs.

Peterborough Amateur Radio Society.—At the December meeting, John Sager (G3ARS) gave a talk on 2m mobile transceivers and G3HXR and G3EEL demonstrated their v.h.f. gear. Meetings are held on the first Friday in each month at the Technical College. *Hon. Secretary:* D. Byrne (G3KPO), Jersey House, Eye, Peterborough.

Reigate Amateur Transmitting Society.—Entries in the Constructional Contest held last month were judged by G3TR, G3FRV and G3PHG of Crawley and G3HZJ of Dorking. The "XYL Cup" was presented to G3RIM for his Top Band transmitter and the "G8KW Cup" to G3NZP for his s.s.b. exciter. The fourth A.G.M. is to be held at The Tower, Redhill, on January 19 at 7.30 p.m. and the annual Dinner-Dance at The Mill House, Salfords, on January 26. Tickets may be obtained from the *Hon. Secretary:* F. D. Thom (G3NKT), 12 Willow Road, Redhill, Surrey.

CLOSING DATE
FOR THE MARCH 1963 ISSUE

Owing to a rearrangement of the printing schedule, the March issue of the R.S.G.B. BULLETIN will close for press on FEBRUARY 7. Copy received after that date will be held over for use in the April issue if still topical.

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...TO HELP YOU!

South Birmingham Radio Society.—From the December issue of *QSP*, the society's newsletter, it is learnt that an Extraordinary General Meeting is to be held on January 17 and that a visit to Telephone House is arranged for February 6. *Hon. Secretary:* T. W. Legg, 80 Alcester Road, Birmingham 13.

South Dorset Radio Society.—At the December meeting, F. Marshall (G2XQ) showed films loaned by the U.K.A.E.A. on the development of reactors at the Winfrith A.E.A. Establishment. *Hon. Secretary:* C. E. Biggs (G2TZ), 54 Prince of Wales Road, Dorchester, Dorset.

Surrey Radio Contact Club.—Looking well ahead, the club has decided on September 22 for its next 144 Mc/s D/F Hunt. The annual Constructional Contest is to be held in May. Further details of activities may be obtained from the *Hon. Secretary:* S. A. Morley (G3FWR), 22 Old Farleigh Road, Selsdon, South Croydon, Surrey.

Wirral Amateur Radio Society.—On January 16 D. Smith (G3LIS) will give a lecture entitled "Interference as it affects amateurs" and on February 6 H. M. Synge (G3BOC) will give a talk on 2m operation. *Hon. Secretary:* A. Seed (G3FOO), 31 Withert Avenue, Bebington, Wirral, Cheshire.

York Amateur Radio Society.—Visitors will be most welcome at the British Legion (second floor), 61 Micklegate, York, where meetings are held on Thursdays at 7.30 p.m. *Hon. Secretary:* H. Ferguson (G3HSZ), 29 Victor Street, Bishophill, York.

Ex-G Radio Club.—Because of poor conditions on 20m a new net has been started on 21.395 kc/s at 15.00 G.M.T. on Sundays. DX stations are now checked into the net first. *Hon. Secretary:* Don Rayner (W3CTR), 416 Burkhart Street, Johnstown, Pa., U.S.A.

Can You Help?

- A. D. Couchman (B.R.S.19443), 17 Ramsyle Road, Tunbridge Wells, Kent, who requires the circuit diagram and other information on the Wireless Set No. 19 Mk III/T?
- T. R. George (A.3098), 9 York Road, Edgbaston, Birmingham 16, who would like to hear from any member who has a set of the L.O. Sparkes coils types K1, K2 and K3 or can suggest any alternative coils for the Kestrel Mk II S.W. 3-valve receiver? Mr. George also requires a wiring diagram for this receiver.
- J. Joslin (G3NPY), 13 Talbot Road, Skegness, Lincs., who requires the circuit diagram and/or manual for the Cossor Oscilloscope No. 6A Diagram SA9125?
- A. Melhuish, 31 Shepherds Bush Green, London, W.2., who requires the manual for the B.47 receiver?

CLASSIFIED ADVERTISEMENTS

ADVERTISEMENT RATES. Members' Private Advertisements 3d. per word, minimum charge 5s. Trade Advertisements 9d. per word, minimum charge 12s. All capitals 1s. per word, minimum charge 18s. Write clearly. No responsibility accepted for errors. Use of Box number 1s. 6d. extra. Send copy to Sawell & Sons Ltd., 4 Ludgate Circus, London, E.C.4.

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CR100 stabilized oscillator £18, Erskine Oscilloscope £15, both purchased six months and good condition.—Walker, Woodcote, Tubney, nr. Abingdon, Berks.

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EDDYSTONE RECEIVER 680X, practically as new, with matching speaker, cost £140—£80, o.n.o.—Eastell, Glen Nurseries, Shipley, Yorks. (Shipley 53545.)

MINIMITTER T.X. 120 watt, excellent condition, with low pass filter, aerial tuning unit, and xtal mic: £50. Delivered 100 miles.—G3JNI, 63 The Chase, Holland-on-Sea, Essex.

OFFERS? Class D. Wavemeter, mains. Range 1,900 kc/s to 8,000 kc/s with 1 Mc markers to 30 Mc/s. Also plate transformer 1,900-0-1,900 200 mA. **Wanted:** panel meters, 300 mA, 100 mA, and 50 mA.—G4AH, 160 Cathill, Barnet, Herts. BAR. 4272.

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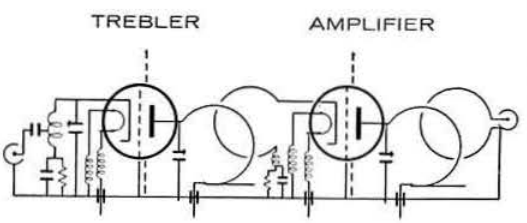

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OZ4	5/-	6AC7	3/-	6K6GT	7/-	12BE6	5/-	30F5	6/9	814	20/-	5787	10/-	CY31	6/-	EBL1	11/-	EF39	4/-
1A3	3/-	6AG5	3/-	6K7G	2/-	12C8	3/-	30FL1	9/6	815	40/-	6005	9/-	DA30	10/-	EBL21	12/6	EF40	10/-
1A5GT/G	5/-	6AG7	7/-	6K8	8/-	12E1	20/-	30L15	12/-	832	15/-	6072	15/-	DA41	30/-	EC91	3/-	EF41	8/-
1A7GT	10/-	6AH6	11/-	6L5G	6/-	12J5GT	3/-	30PL1	10/6	838	12/-	6080	30/-	DAF96	7/6	ECC32	4/-	EF42	7/6
1G6GT/G	7/-	6AK5	5/-	6L6	9/-	12K7GT	7/-	30PL13	10/6	866A	12/-	6111A	15/-	DF96	7/6	ECC40	9/-	EF50	1/6
1H5GT	9/-	6AK6	7/-	6L6G	6/-	12K8	10/-	35L6GT	8/-	90AV	15/-	6146	22/6	DH63	6/-	ECC70	15/-	EF80	6/-
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1LN5	5/-	6AM5	3/-	6N7GT	5/-	12SC7	4/-	35Z5GT	7/-	954	5/-	7586	22/6	DL96	7/6	ECC88	15/-	EF89	7/-
1N5GT	9/-	6AM6	4/6	6Q7G	6/-	12SD7	3/-	42	5/-	955	3/-	7895	22/6	DM70	4/6	ECF80	10/-	EF98	10/-
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1U4	7/-	6B7	5/-	6SK7	5/-	1487	14/-	76	5/-	5670	10/-	ATP4	5/-	EAF42	8/6	ECH83	8/6	EL38	15/-
1U5	6/-	6B8	5/-	6SL7GT	6/6													EL41	8/-
1V	5/-	6B8G	2/6	6SN7GT	4/6													EL42	9/-
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2D21	6/-	6BR8	5/-	6X5GT	6/6													EM84	9/6
2E26	20/-	6BW6	9/-	6Y6G	6/-													EM85	10/-
2X2	3/-	6BW7	9/-	6Z4	5/-													EN31	10/-
2X2A	7/-	6C4	2/6	7B6	9/-													EN32	10/-
3A4	4/-	6C5	8/-	7B7	8/-													EY51	8/-
3A5	5/-	6C5G	5/-	7C5	12/-													EY81	9/-
3D6	4/-	6C6	4/-	7C7	5/-													EY84	7/6
3Q4	7/-	6C8G	7/-	7E5	5/-													EY86	8/-
3S4	6/-	6CD6G	17/6	7H7	8/-													EY91	3/-
3V4	6/6	6CH6	6/-	7Q7	7/-													EZ40	7/-
5B/254M	30/-	6CL6	10/-	7S7	7/-													EZ41	8/6
5R4GY	9/-	6CW4	14/6	7Z4	4/-													EZ80	6/-
5T4	8/-	6D4	17/6	10F1	7/-													EZ81	7/-
5U4G	5/-	6D6	3/-	11E2	20/-													HL2K	3/-
5V4G	8/-	6F5	6/-	11E3	20/-													HL23DD	6/-
5Y3G	4/-	6F7	6/-	12A6	3/-													HL41	4/-
5Y3GT	6/-	6F8G	6/6	12AGT	5/-													KT8C	25/-
5Z3	6/-	6F17	5/-	12AH7GT	5/-													KT33C	6/-
5Z4	9/-	6F32	5/-	12AH8	11/-													KT66	10/-

EBC21	7/6	ECL80	7/6	KT41	12/6	U25	11/-												
EBC41	7/9	ECL82	8/6	KT61	7/-	U26	11/-												
EBC81	7/9	ECL83	14/-	KT66	15/-	U191	12/6												
EBF80	9/6	ECL86	11/-	KTW61	7/-	U281	15/-												
EBF83	12/-	EF22	7/-	KTZ41	6/-	U301	12/9												
EBF89	8/-	EF37A	8/-	ML6	6/-	U801	20/-												
EBL1	11/-	EF39	4/-	MU12/14	7/-	UABC80	8/6												
EBL21	12/6	EF40	10/-	PABC80	8/6	UAF42	8/-												
EC91	3/-	EF41	8/-	PC97	10/-	UBC41	7/-												
ECC32	4/-	EF42	7/6	PCC84	8/-	UBC81	8/-												
ECC40	9/-	EF50	1/6	PCC85	8/-	UBF80	8/6												
ECC70	15/-	EF80	6/-	PCC88	13/-	UBF89	8/6												
ECC84	8/-	EF85	6/6	PCC89	11/-	UBL21	12/-												
ECC85	8/-	EF86	7/6	PCF80	9/6	UCC84	9/-												
ECC88	15/-	EF89	7/-	PCF82	9/9	UCC85	8/-												
ECF80	10/-	EF98	10/-	PCF86	14/-	UCH21	9/6												
ECF82	9/-	EF183	10/-	PCL81	9/-	UCH42	8/-												
ECH35	10/-	EF184	10/-	PCL82	10/-	UCH81	9/-												
ECH42	9/6	EL32	4/-	PCL83	10/-	UCL82	11/-												
ECH81	7/6	EL33	7/-	PCL84	10/-	UCL83	12/6												
ECH83	8/6	EL34	12/-	PCL85	11/-	UF41	9/-												
		EL38	15/-	PCL86	11/-	UF42	9/-												
		EL41	8/-	PEN46	6/-	UF80	7/6												
		EL42	8/-	PL36	11/-	UF85	8/-												
		EL81	9/-	PL81	10/-	UF86	12/-												
		EL83	7/6	PL82	8/-	UF89	8/6												
		EL84	7/-	PL83	8/-	UL41	9/6												
		EL95	6/6	PL84	8/-	UL84	8/-												
		EM34	9/6	PX25	10/-	UU6	12/-												
		EM80	10/-	PY33	12/-	UY21	6/6												
		EM84	9/6	PY80	7/-	UY41	8/-												
		EM85	10/-	PY81	7/6	UY85	7/-												
		EN31	10/-	PY82	7/-	VR40	10/-												
		EN32	10/-	PY83	8/-	VR53	4/-												
		EY51	8/-	PY88	9/-	VR56	4/6												
		EY81	9/-	PY800	10/-	VR57	6/-												
		EY84	7/6	PY801	10/-	VR65	4/-												
		EY86	8/-	QP25	5/-	VR100	6/-												
		EY91	3/-	Q810/45	15/-	VR119	3/-												
		EZ40	7/-	Q8150/15	10/-	VR133	2/6												
		EZ41	8/6	QV04-7	7/-	VR137	4/6												
		EZ80	6/-	RL18	12/6	VU33	3/-												
		EZ81	7/-	8P2	3/6	VU111	5/-												
		HL2K	3/-			VU120	8/6												
		HL23DD	6/-	TT11	3/-														
		HL41	4/-	TT15	35/-	W81M	6/-												
		KT8C	25/-	TZ40	30/-	X65	5/6												
		KT33C	6/-	U20	8/6	X66	8/-												
		KT66	10/-	U24	12/6	X81M	7/-												

MINIATURE MULLARD CAPACITORS

Polyester 10% tolerance, 400V DC working: 0·001, 0·0022, 0·0033, 0·0047, 0·0068, 0·01, 0·022 9d. 0·047, 0·068, 1/2; 0·1μF, 1/3.

Transistor type electrolytics:

2μF 10V, 1/9; 10μF 10V, 16μF 10V, 20μF 6V, 1/8. 25μF 25V 1/3; 32μF 40V 1/8; 40μF 16V 1/3; 64μF 25V, 1/8. Packing and postage: One to six capacitors, 9d. Seven or over 1/-.

ACRO CATHODE RAY TUBES

2 in. screen medium persistence tube equivalent to VCR 139A. Requires only 450V EHT. 30/-, p.p. 3/-.

TRANSISTORS

OC44, 7/6; OC45, 6/6; OC72, 8/-; OC78, 7/-; OC78D, 7/-; OC81, 7/-; OC81D, 7/-. Set of 2 matched OC78 and one OC78D, 18/-. Set of 2 matched OC81 and one OC81D, 18/-. Pair of matched OC78 or OC81, 13/-. R.C.A. 2N410 (OC45), 5/-; 2N412 (OC44), 5/-; red spot (L.F.), 2/8; white spot (H.F.), 2/8; green spot (L.F., 3V), 1/6; yellow spot (L.F., 6V), 1/10.

CRYSTAL DIODES

BY100 Silicon Rectifiers 700 p.i.v. 450mA 8/-
SX641 .. 60 p.i.v. 250mA 3/-
SX642 .. 120 p.i.v. 270mA 3/6
SX643 .. 180 p.i.v. 260mA 3/6
SX647 .. 400 p.i.v. 190mA 15/-
SX781 .. 60 p.i.v. 50mA 4/6
(High speed switching)
Packing and postage: 1 to 6—6d.; 7 or more 1/-.

VHF TRANSMITTER CHASSIS BC625

Complete, in good order, without valves, with circuit diagram, 10/-. P.P. 7/6.

VHF RECEIVER CHASSIS BC624

Complete, in good order, without valves and squelch relay, with circuit diagram, 7/6. P.P. 7/6.

BATTERY CHARGER TRANSFORMERS 200-250V input:

MT3AT, 0-12-15-20-24-30V, 2A .. 25/6
MT16AT, 24V, 5A 38/6
MT21AT, 0-12-15-20-24-30V, 4A .. 38/-
Packing and postage 5/-.

IF UNDELIVERED Return to:— R.S.G.B., NEW RUSKIN HOUSE, LITTLE RUSSELL STREET W.C.1

IF UNDELIVERED Return to:— R.S.G.B., NEW RUSKIN HOUSE, LITTLE RUSSELL STREET W.C.1