



# ***RSGB***

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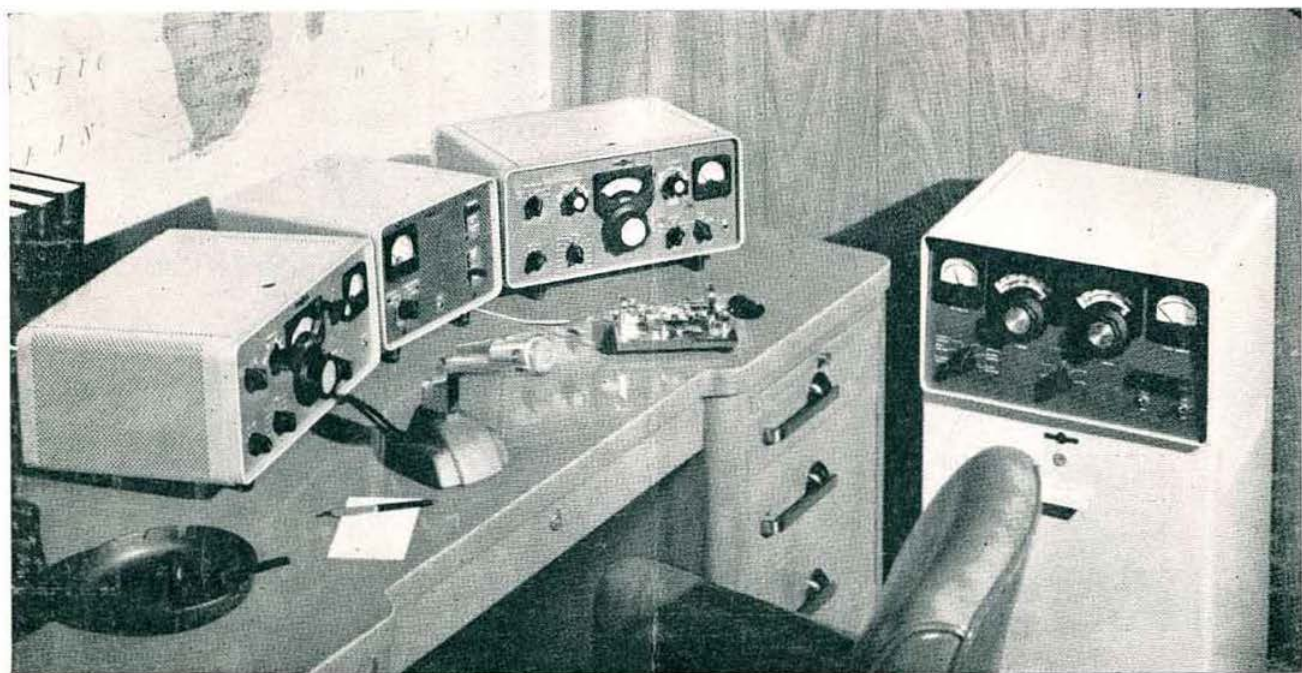
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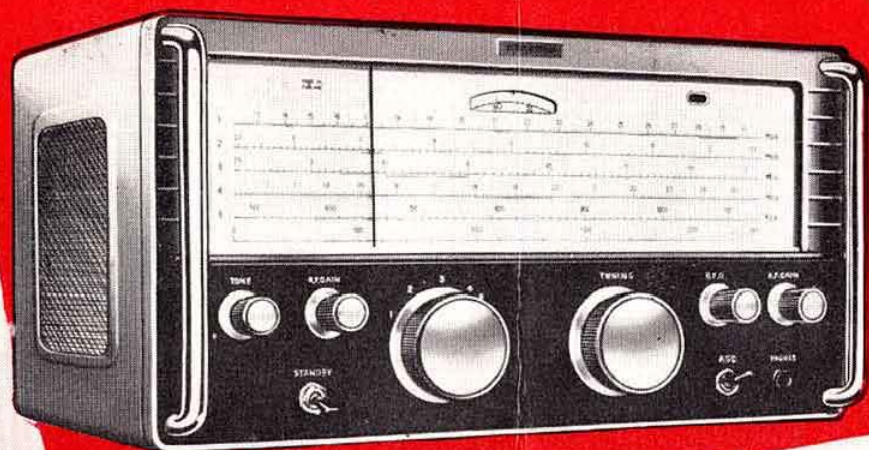


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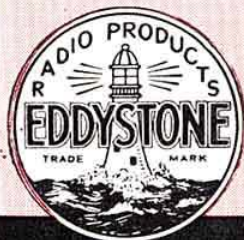
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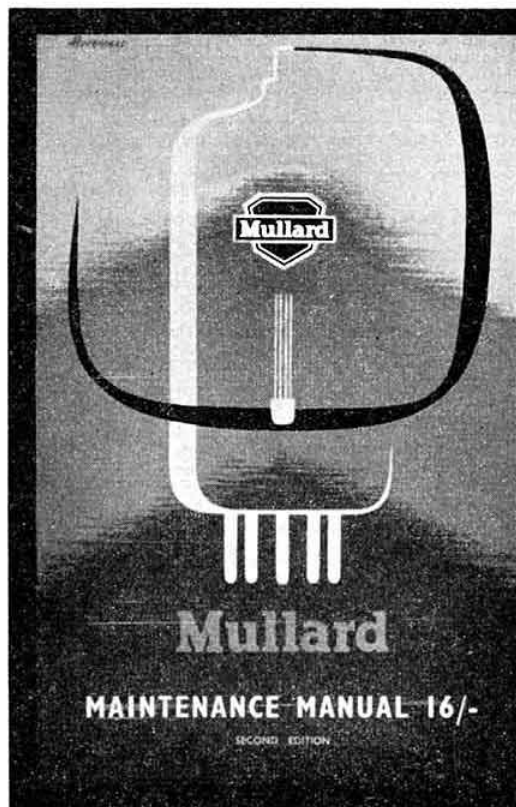
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**September 1963**

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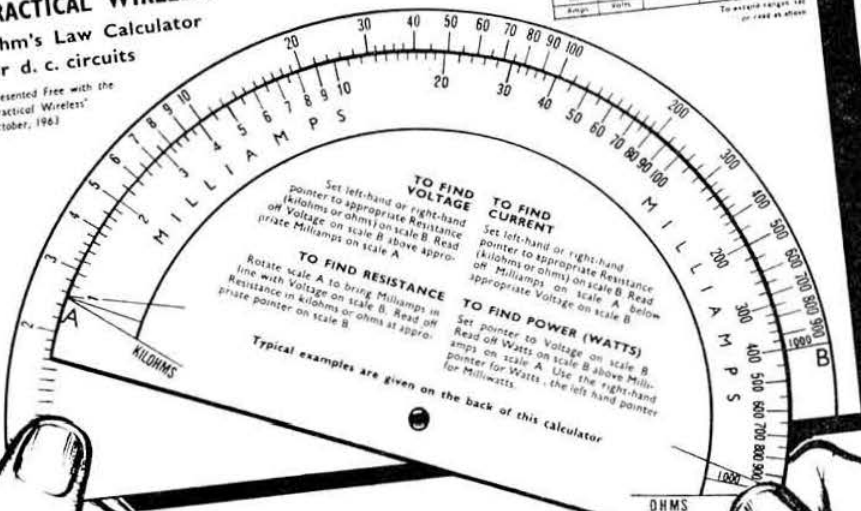
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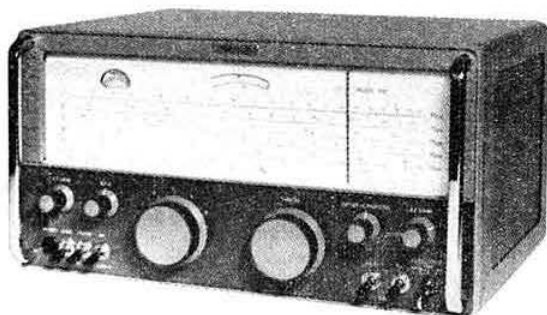
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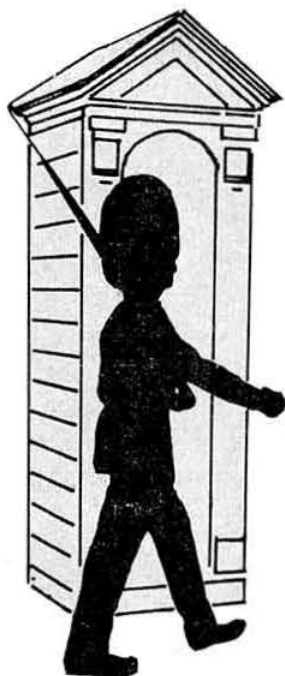
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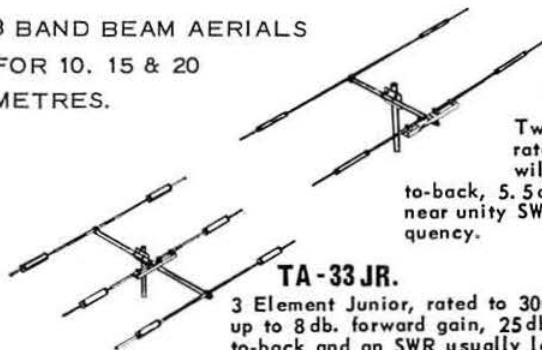
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# Current Comment

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## Technical Contributions

THE Society's membership of more than 11,000 represents a very high proportion of the active amateurs in the country and yet the material offered for use in the Society's publications—the BULLETIN in particular—relies on the work of an energetic few.

While those regularly participating in the supply of articles are prepared to go on producing material, it is nevertheless true that as time goes by these members, apart from doing a lot of donkey work, must of necessity be themselves progressing to higher quality and more refined equipment, and are therefore getting somewhat removed from the interests of the newcomer and less experienced amateur. With a membership of the present size, including as it does persons from all walks of life, with quite a sprinkling from the teaching profession, it is surprising so little is ever heard of the equipment that is made and put into operation by the many who are doing very useful work, as is evidenced by the displays at local clubs and other gatherings. It is certain that there are many hundreds of interesting pieces of equipment which are the pride and joy of the builder but which are kept hidden under the proverbial "bushel."

Harsh comments are sometimes made that the equipment shown at exhibitions is of a commercial standard and that the average amateur cannot, without the assistance of a professional workshop, do any worthwhile work. This is nonsense; many good things have been built into the "old tin" before now, and no doubt will be in the future. Much excellent equipment is still built on kitchen tables.

Some people seem to be reluctant to write articles for fear of possible criticism. There is really no need to worry about this. If you have built a piece of apparatus that works then let the rest of us know about it and do not be afraid of the few who destructively criticize. These armchair critics exist in all forms of activity and organization but they should, in a healthy

society, be largely swamped by the enthusiastic work of the vast majority.

Take pride in having descriptions of your own equipment published: in this connection it should be remembered that the Society annually awards trophies and prizes for outstanding articles which have appeared in the BULLETIN. So pick up that pen and get busy: it does not matter if the device is a Morse test oscillator or a panoramic receiver: others will be interested to read about it and you will be paid too! G. R. J.

## SOUTH WALES GOLDEN JUBILEE CONVENTION

NATURAL HISTORY WING,  
UNIVERSITY COLLEGE,  
PARK PLACE,  
CARDIFF

Saturday, September 14, 1963

### Programme

- |            |  |
|------------|--|
| 11.00 a.m. | Lectures and Demonstrations of Equipment |
| 2.30 p.m.  | Business Meeting and Official Opening    |
| 5.0 p.m.   | High Tea                                 |
| 6.0 p.m.   | Raffle and Official Lecture              |

In addition to the formal programme, there will be competitions for home-constructed equipment and various prizes for mobile entries.

A free car park for up to approximately 100 vehicles will be within the College grounds. Lunch in the College will be available, the cost of which is not included in the ticket price below. Full details will be circulated within the Region as soon as they are available.

Tickets, price 13/6d. each including high tea, are available from Mr. D. J. C. Green, GW3MRI, 36 St. Augustine Road, Heath, Cardiff. No applications can be accepted after September 7, 1963.

The Council will be represented by the President, Mr. Norman Caws, G3BVG, Mr. J. W. Swinnerton, G2YS, the Zonal Representative, Mr. A. C. Williams, GW5VX, and the General Secretary, Mr. John Clarricoats, O.B.E., G6CL.

# The BC453 in an S.S.B. Transceiver

By ROBERT T. BOWDEN, G3IXZ\*

**S**INGLE sideband, as a high efficiency system with an interesting variety of constructional problems, is gaining devotees at an accelerating rate. In recent months, a growing band of Top Band sideband stations have been heard or worked with the equipment to be described. A transceiver (transmitter-receiver) is a device which lends itself particularly to s.s.b. since, in the main, contacts take place with both stations on the same nominal carrier frequency.

The BC453 is basically a superhet receiver covering the range 200 to 550 kc/s with an intermediate frequency of

tuned circuit which not only tracked with the receiver, but also tracked with the transmitter tuned circuits at 1.8 to 2.15 Mc/s. An age-old problem of conflicting capacitor laws resulted, which, in the writer's case, proved insoluble and image signals came whistling through.

The design finally adopted uses the second method and has proved perfectly satisfactory in practice. The principle of operation can best be understood by reference to the block diagram of Fig. 1.

In the receive condition, signals in the band 1.8 to 2.15 Mc/s are amplified by an EF91 r.f. stage (Fig. 2) before being applied to the mixer half of a 6J6, the other section of the same valve functioning as the first oscillator on 2350 kc/s. The output of this mixer is an inverted band, 550 to 200 kc/s, which is tuned on the BC453. To determine a suitable carrier frequency for the single sideband generator, the necessary procedure is to add the maximum and minimum

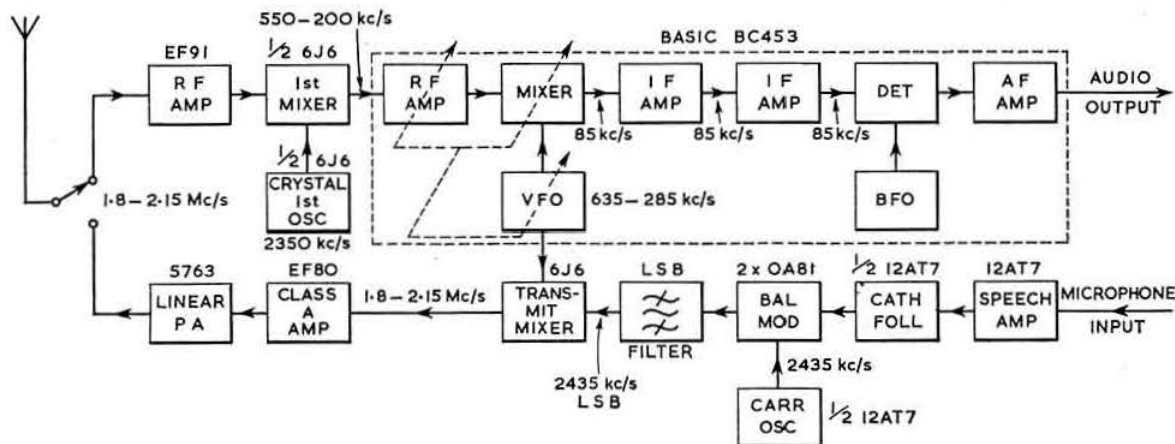


Fig. 1. Block diagram of complete transceiver.

85 kc/s. Because of the low i.f., and the consequent narrow bandwidth, the device has been popular over the years as an additional unit to provide better selectivity. It can be used in a transceiver in two ways:

- The i.f. amplifier can be used both to generate the s.s.b. signal on "transmit" and to select the desired sideband on "receive." The same oscillator could, of course, be used for both conditions.
- The equipment can be used mainly as a tunable i.f. for reception, the transmitted signal being generated on a different (but associated) frequency and utilizing the variable oscillator (which in the Command equipment is, of course, very stable).

Initial experiments were along the lines of the first method and a very presentable single sideband signal was in fact derived from the 85 kc/s i.f. strip by using the b.f.o. as a carrier generator in conjunction with a simple diode balanced modulator. At this point, however, things began to get a little tricky. Since the first mixer had to heterodyne the signal into the band 200 to 550 kc/s in association with the 285 to 635 kc/s local oscillator, it was necessary to have a

frequencies of the BC453 v.f.o. range to the minimum and maximum frequencies respectively of the desired radiated signal coverage. The result of both calculations is equal to a constant, which in this case is 2435 kc/s. When the carrier oscillator and filter are aligned to 2435 kc/s, subtraction of the v.f.o. frequency in the 6J6 mixer produces the required s.s.b. signal which is passed directly to the two subsequent class A and AB1 amplifier stages.

The only variable in this system, apart from the common v.f.o., is the 85 kc/s b.f.o. in the receiver section, and periodic adjustment of this is all that is necessary to maintain exact parity of received and transmitted frequencies. It can be seen, therefore, that the transmit and receive paths are in fact quite independent, except for the common v.f.o.

## Transmitter Circuit

Audio signals from a crystal microphone are amplified by a 12AT7 speech amplifier V3 (Fig. 3) which is impedance matched to a simple OA81 balanced modulator by the cathode follower V4a (one half of a 12AT7). V4b is the carrier generator. The d.s.b. signal from the balanced modulator is passed to the crystal filter to reject the upper sideband, and is then fed directly into one grid of the transmitter mixer V5, a cathode coupled 6J6. Local oscillator voltage is also lightly

\* Pennins, Outwood Common Road, Billericay, Essex.



coupled from the receiver into the other grid of the same valve. The anode circuit of this mixer is tuned over the range 1.8 to 2.15 Mc/s by a front panel drive control. The resultant lower sideband signal is subsequently amplified by a class A EF80 (V6), and this in turn drives a single 5763 (V7) in class AB1 to about 15 watts p.e.p.

### Carrier Crystal and Sideband Filter

The crystal for the carrier was obtained from surplus sources and etched to the exact frequency using ammonium bifluoride solution.\* A simple half-lattice filter to pass the lower sideband was etched from two similar crystals of the 10X type with a nominal frequency of 2431 kc/s. The two quartz plates are clamped in a single 10X type case (Fig. 4). This makes the filter fairly compact, an important point in the prototype, since it was desired to construct the power supply and transmitter section on a chassis exactly matching the BC453.

The single sideband signal at 2435 kc/s could well be

\* "Crystal Erosion Made Easy," by J. Hum, R.S.G.B. BULLETIN, July, 1960, p. 26; and *Letters to the Editor*, October, 1960, p. 178; November, 1960, p. 244; February, 1961, p. 386.

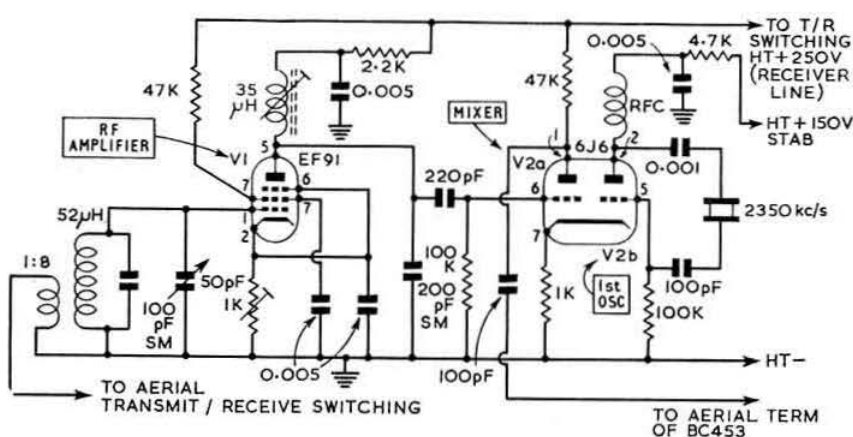


Fig. 2. Receiver converter comprising an r.f. amplifier, mixer, and crystal oscillator.

generated by the phasing method and applied to the transmitter mixer (although a buffer would probably be necessary), but after a couple of years of using various home-brew high frequency filters the writer is convinced that once one has mastered the art of etching, even the construction of sophisticated filters becomes relatively easy. Coupling the filter crystals and matching to the mixer is accomplished with a ferrite toroidal transformer.

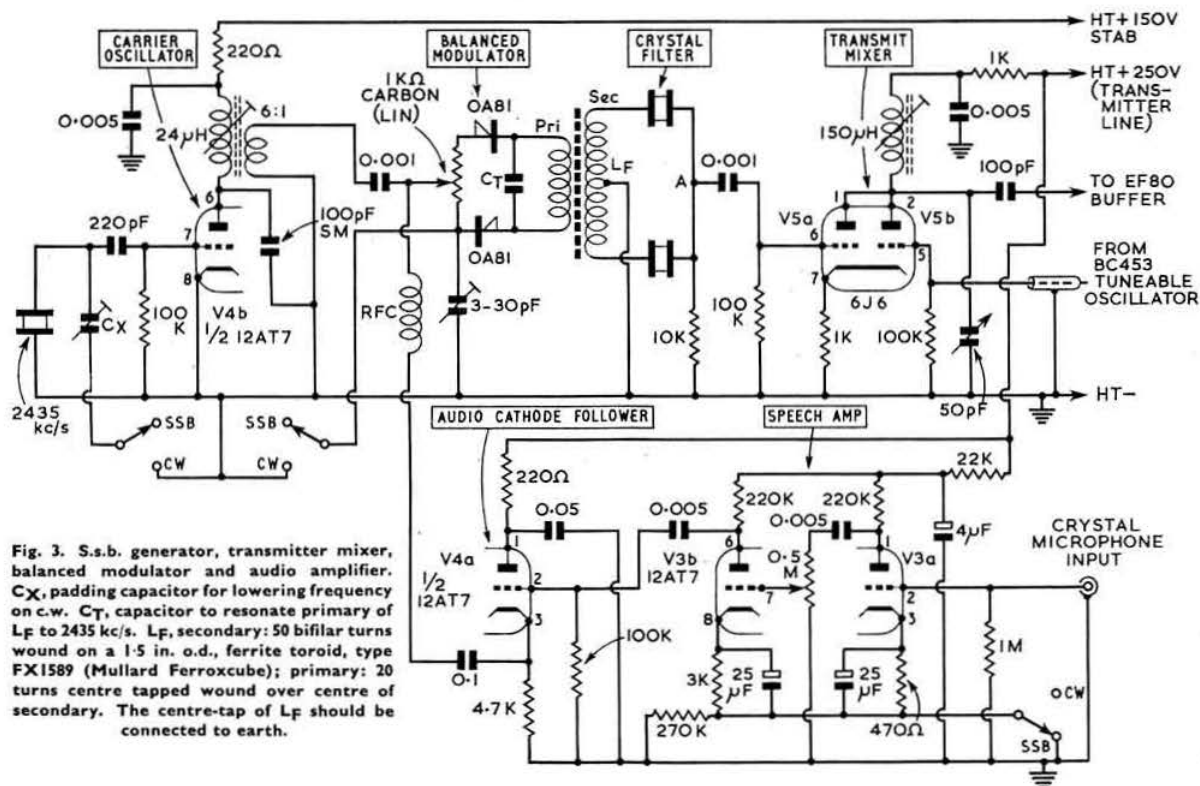


Fig. 3. S.s.b. generator, transmitter mixer, balanced modulator and audio amplifier. CX, padding capacitor for lowering frequency on c.w. CT, capacitor to resonate primary of L<sub>p</sub> to 2435 kc/s. L<sub>p</sub>, secondary: 50 bifilar turns wound on a 1.5 in. o.d., ferrite toroid, type FX1589 (Mullard Ferroxcube); primary: 20 turns centre tapped wound over centre of secondary. The centre-tap of L<sub>p</sub> should be connected to earth.

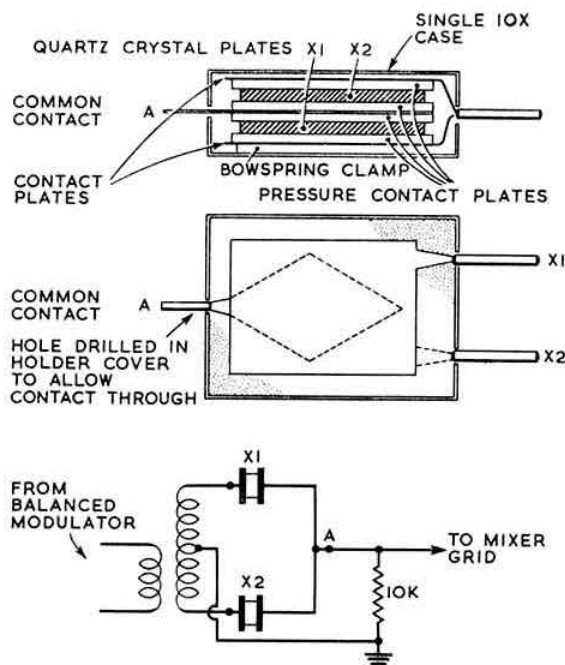


Fig. 4. Method of assembling quartz crystals in 10X holder.

#### Modifications to the BC453

Few modifications to the BC453 are necessary, beyond those which are normally carried out to enable the unit to function as a "Q-Fiver." Such alterations have been described in the literature.\*

The rear chassis, which originally housed a dynamotor, should be cleared of unnecessary parts to allow space for the Top Band crystal controlled converter, which is constructed on a snug-fitting sub-chassis. Other modifications consist of the inclusion of front panel a.f. and i.f. gain controls, the addition of a small variable capacitor, shaft driven from the front panel to peak the grid circuit of the EF91 r.f. stage, and the replacement of the valves by 6.3 volt equivalents.

The oscillator injection signal to the transmitter mixer is taken to a co-ax socket on the rear of the converter chassis. The output signal from the converter is fed under the chassis to the inside of the BC453 aerial terminal. This removes any possibility of signal pick-up in the tunable i.f. band.

It was found necessary to realign the 85 kc/s i.f. strip slightly. This was done to ensure that the b.f.o. was on exactly 85 kc/s, so that carrier generation could take

place on exactly 2435 kc/s. In order to favour the lower side-band, the i.f. strip was in fact tuned to approximately 83 kc/s.

#### C.W./S.S.B. Switching

If the actual operating practice with a transceiver is considered, it will be realized that it is convenient when using s.s.b. to have the outgoing carrier effectively zero beat with the receiver b.f.o. On the other hand, when c.w. is being used, this cannot be so if a 1 kc/s beat note is required. Although the difference in carrier frequencies is only equal to the audio beat being used, it is undesirable, nevertheless, and the situation should be remedied.

One easy solution is to key an audio tone and feed it into the microphone socket, with the transmitter adjusted for s.s.b. This method was tried for a while, and although perfectly usable, it has the disadvantage of sounding rather like A2. A spectrum analysis showed that this was not in fact due to the simple filter in use, but the harmonics of the audio oscillator. The first one tried was a transistorized Wien bridge type and to all intents and purposes the output was a perfect sine wave; but when the oscillator was replaced with a borrowed (and expensive) commercial unit, the actual harmonic content of the original oscillator became immediately apparent. The system eventually adopted is basically simple, consisting of lowering the frequency of the carrier crystal about 500-1000 c/s when switching to c.w. The same function switch also serves to unbalance the modulator, and removes the h.t. from the speech amplifier stages. Keying is accomplished by breaking the cathode connection of the class A EF80 buffer stage (see Fig. 5).

All oscillators are kept in continuous operation, and on receive the h.t. is removed only from the transmitter mixer, buffer and p.a. stages. On transmit, the receiver aerial terminal is earthed, and the h.t. on all stages in the receiver, except for the oscillators, is dropped to a very low value by the insertion of a series resistor. This enables the outgoing signal to be monitored without blocking.

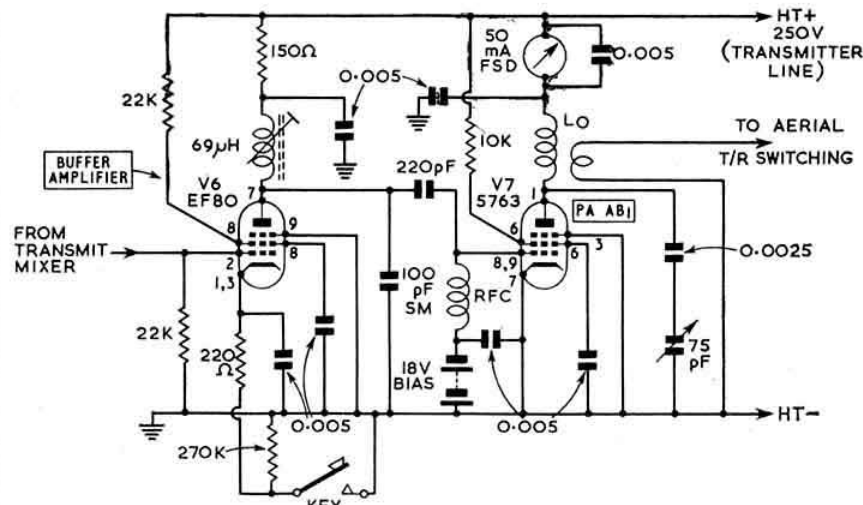


Fig. 5. The buffer and p.a. stages.  $L_O$  comprises 80 turns of 28 s.w.g. s.c.c. wound on a 1 in. former with a 15 turn output link.

\* "The 'Q-5'er'," by Phillip S. Rand, WIDBM, QST, December, 1947, p. 18.

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# A 144 Mc/s Grounded Grid Converter

By GEORGE R. JESSOP, G6JP \*

THERE has been a noticeable trend recently towards the adoption of cascode r.f. amplifiers in 144 Mc/s converters. There does not, however, appear to be much justification for the popularity of this arrangement, particularly as cascode stages require neutralization, a procedure which frequently gives rise to difficulties.

Work on 430 Mc/s using A.2521 valves as grounded-grid amplifiers shows that this configuration exhibits performance in no way inferior to that of an amplifier employing a similar number of correctly adjusted cascode stages. In fact, a higher gain can be obtained from the grounded-grid amplifier with no degradation of the signal-to-noise ratio. It must be stressed, however, that the input to the cathode of the first stage should be correctly matched to the aerial feeder for the best results, although it is doubtful whether this would be worthwhile in many urban areas owing to the high noise level, and an approximation would probably suffice in most cases.

The advantages of the grounded-grid arrangement and the relative lack of disadvantages led to the design of the converter to be discussed in this article. Various preamplifiers of this type have been described in the past, most using only

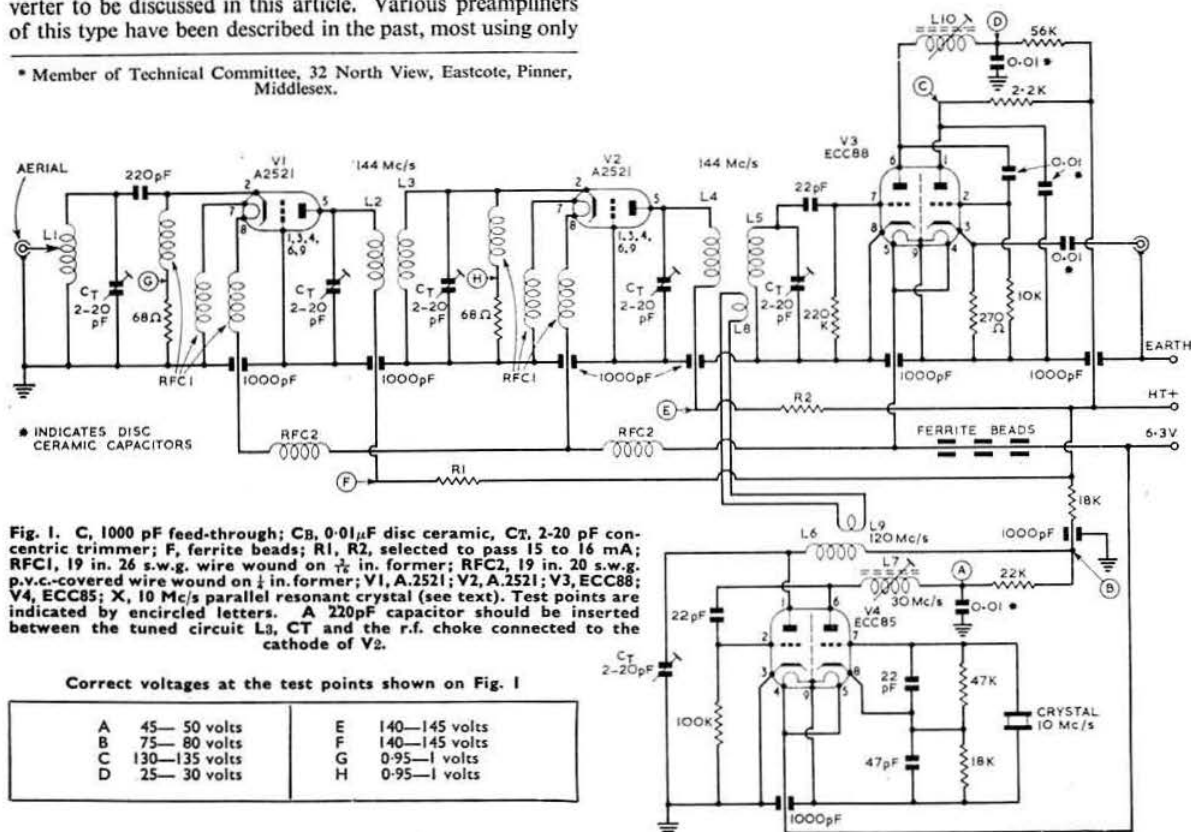
one grounded-grid stage in conjunction with a grounded-cathode amplifier. A two-stage grounded-grid amplifier is described in the V.H.F./U.H.F. Receivers Chapter of the *RSGB Amateur Radio Handbook* and could be regarded as a classic design. Some refinements and alterations have, however, been made in the circuit used in the converter, the most notable being the inclusion of inductive coupling between stages to reduce interaction when peaking the tuned circuits. Tuned circuits are also considered desirable in place of the more common broad-band, untuned arrangements.

The mixer is designed around a high slope valve which requires less than average oscillator injection to achieve satisfactory frequency conversion. Inductive coupling between the output stage of the oscillator chain and the mixer reduces the likelihood of unwanted noise.

## The Circuit

The complete circuit of the converter is shown in Fig. 1. The first two stages, grounded-grid r.f. amplifiers using A.2521 valves (V1 and V2), are inductively coupled and employ tuned cathode and anode circuits. One half of V3, an ECC88 double triode, serves as the mixer, the other half acting as an output cathode follower. The principal reason for the use of a cathode follower is the sensibly flat response

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attainable, which is highly desirable with a variable first intermediate frequency.

The frequency of the oscillator crystal depends both on the desired output i.f. range and the sequence of steps used to multiply the fundamental frequency. The writer's converter requires a crystal of 10 Mc/s which is tripled in the anode circuit of the oscillator valve to 30 Mc/s and then to 120 Mc/s by the second half of V4. Injection from the quadrupler stage to the grid circuit of the mixer section of V3 is via L9 and L8 to L5. It would be possible to use a 6 Mc/s crystal for the same i.f. range but this would necessitate tighter coupling to V3 to compensate for the somewhat reduced output from the oscillator chain.

Should the i.f. requirements differ from those used in the prototype, it will be necessary to redesign the circuits associated with V4. In this connection, it should be borne in mind that the oscillator will operate best when its anode circuit is tuned to an odd harmonic of the crystal frequency, particularly when this is a factor of three or five. Even harmonics should be avoided.

### Construction

The layout (Fig. 2) of the converter is basically similar to the designs described previously by the writer.\* The dimensions and layout of the chassis illustrated is based on the Eddystone die-cast box No. 845. In the present case, however, the cast zinc alloy lid is replaced by a 16 s.w.g. brass plate. The more ambitious may like to silver plate the original alloy lid. It is unnecessary at 144 Mc/s to plate brass or copper sheet if this is used.

Although not directly concerned with the construction of the unit, it is worth remembering that newly rolled sheet metal is usually covered with a thin film of lubricant to prevent oxidation. If care is taken, this film can be left undisturbed until connections are soldered to the metal.

It will be seen from the layout illustrated in Fig. 2 that the oscillator-multiplier, V4, is screened from the r.f. and mixer stages by a U-channel (Fig. 3) which runs the length of the chassis. Whilst serving a dual purpose, the main reason for its inclusion is to provide an isolated compartment for routing the power supply leads to the various stages of the converter. Once r.f. has been filtered from the h.t. and heater

lines no additional pick-up can occur thus preventing instability. Additional screens fitted across the r.f. amplifier triodes help to eliminate feedback between the pins of the valveholder and adjacent wiring.

When the profiles of the valveholders for V1 and V2 are cut in the screens, small "tails" should be left adjacent to pins 3, 4, and 6 to provide low impedance connections to the grid of each triode. The other connections to the grids via pins 1 and 9 can be made with thick copper wire or strip.

All the resonant coils, with the exception of L10, are wound with 18 s.w.g. enamelled copper wire, and the leads bent and routed to the appropriate adjacent components. The two link couplings, L8 and L9, comprise a few turns of 20 s.w.g. p.v.c.-covered wire. The r.f. chokes in the heater and cathode leads are wound with 26 s.w.g. enamelled wire

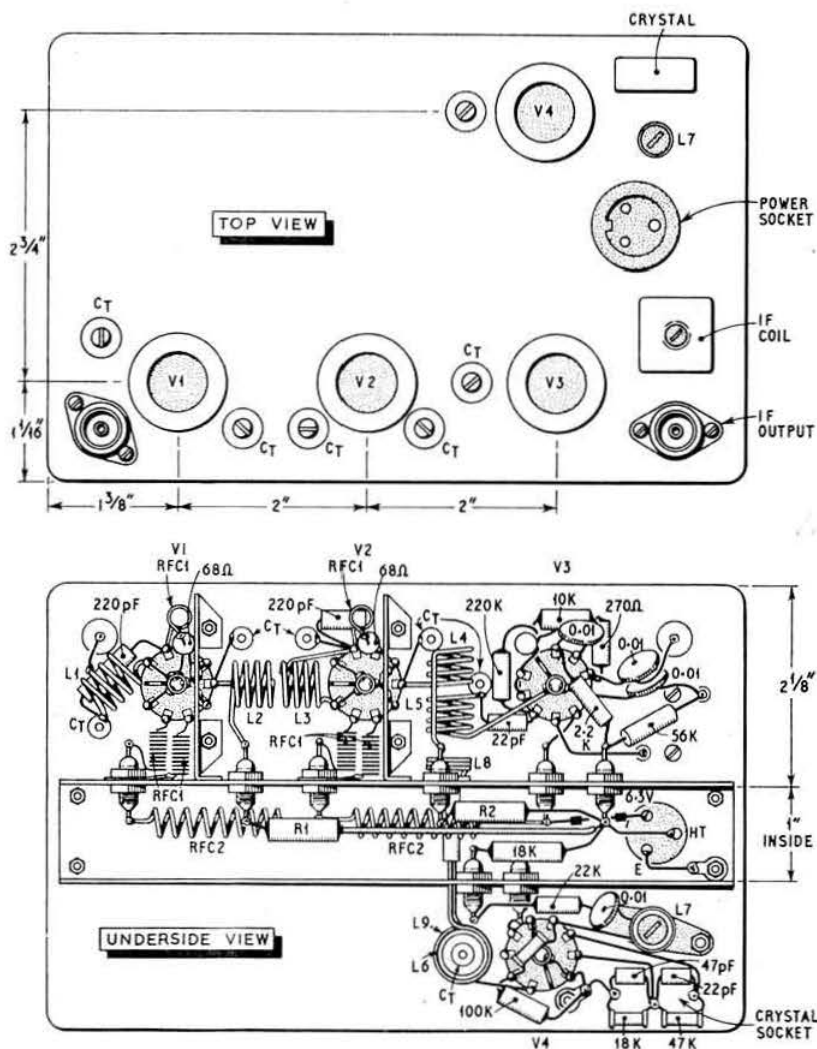


Fig. 2. Layout of the grounded-grid converter for 144 Mc/s. In this diagram, L3 should be connected to CT, and not to pin 2 of V2.

\* "An Improved Low Noise Crystal-Controlled Converter for 144 Mc/s," RSGB BULLETIN, June, 1960.

TABLE I  
Coil Data

Coil	Turns	Wire	Spacing	i.d.	
L1	4	18e	wire dia.	$\frac{7}{16}$	adjust tap for optimum noise factor. spaced $\frac{7}{16}$ to $\frac{1}{2}$ in. apart. spaced $\frac{7}{16}$ to $\frac{1}{2}$ in. apart.
L2	4 $\frac{1}{2}$	18e	wire dia.	$\frac{7}{16}$	
L3	4	18e	wire dia.	$\frac{7}{16}$	
L4	4 $\frac{1}{2}$	18e	wire dia.	$\frac{7}{16}$	
L5	4	18e	wire dia.	$\frac{7}{16}$	
L6	5	18e	wire dia.	$\frac{7}{16}$	Neosid F804 with dust core. $\frac{7}{16}$ — $\frac{1}{2}$ in. from earthy end of L5. wound over last turn of L6 Neosid former with core and can.
L7	19	18e	cls. wnd.	$\frac{11}{16}$	
L8	3	20 pvc	cls. wnd.	$\frac{1}{4}$	
L9	2	20 pvc	cls. wnd.	$\frac{1}{2}$	
L10	30	26e	cls. wnd.	7-5 mm	

and those in the power supply compartment with 18 s.w.g. wire.

Details of a power unit for the converter are not given here as most constructors will probably obtain the necessary supplies from the main receiver. If a separate power supply is required, a suitable unit was described in the October, 1962, issue of the BULLETIN.\*

### Alignment and Operation

Alignment is quite conventional and satisfactory operation can be realized by simply peaking the tuned circuits with the aid of a grid dip oscillator. For the best performance, however, the use of a noise generator is desirable.

To facilitate the checking of the d.c. conditions, lettered test points are shown in Fig. 1 and a list of the correct d.c. potentials below the caption.

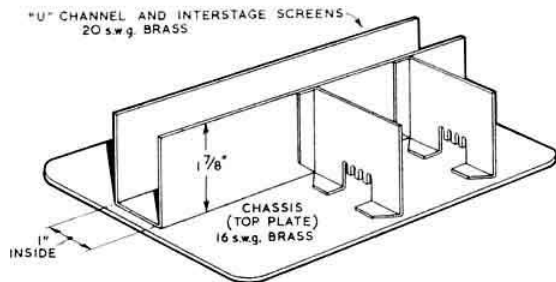


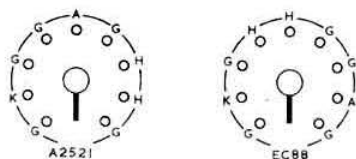
Fig. 3. Chassis for the converter showing the U-channel and inter-stage screens.

The values of R1 and R2 should be selected so that each of the r.f. amplifier valves draws about 15-16 mA.

### Choice of Valves

Although A.2521 valves were used in the prototype, there is no reason why other types intended for grounded-grid operation should not be employed. For example, the EC88 is suitable, although the manufacturers' data suggest the noise characteristics are not quite so good as the A.2521. It should be noted, however, that the pin connections for the EC88 differ from those for the A.2521 and if it is desired to use the former valve the layout of the converter should be a

\* "Simple High Performance Converters for 70 and 144 Mc/s using a Nuvistor R.F. Stage," by G. M. C. Stone, G3FZL, and E. W. Yeomanson, G3IIR, *RSGB BULLETIN*, October, 1962, p. 154.



**Fig. 4. Pin connections for the A.2521 and EC88 valves viewed from below chassis.**

mirror image of that shown in Fig. 2. It is therefore essential to make the choice of valve type before construction is started.

## Project Oscar

By W. H. ALLEN, M.B.E., G2UJ\*

FROM the *Oscar Newsletter* published in July it is learned that although the "bread-board" version of the repeater satellite *Oscar III* has been operating satisfactorily for some time, a number of difficult problems are being encountered as the complex device is turned into what is expressively termed "space hardware" preparatory to the carrying out of pre-flight tests.

As foreshadowed in a previous article, one of the major difficulties is concerned with the power supply. The prototype required 5 watts of primary power—too much to be supplied by batteries in the space available for the *Oscar* package in the launching vehicle. Some intensive work on the transistor linear amplifier has resulted in the overall power requirements being cut to 2.5 watts with a slight sacrifice of translator output. A further study of the linear amplifier stages is going forward in an effort to raise the stage gain and decrease the intermodulation distortion while at the same time decreasing the power drain still further.

The aim is either to achieve a "life" for the translator in space of three to four weeks from the available battery supply or a somewhat longer period by a combination of battery and solar charging cells. According to a previous announcement, there is not sufficient surface area available on the package for a full complement of solar cells owing to the necessity of leaving an adequate area for heat radiation. Progress is being made, but failing a major breakthrough in the design of the amplifier and/or power supply a launch in 1963 is said to be problematical.

Project Osca Inc. will shortly move from their present makeshift premises to a building made available to them by Foothill College in Los Altos, California, where, with the aid of the College, a complete space science facility is to be set up. The equipment will include a 16 in. optical and a 28 ft. radio telescope, a planetarium and all the necessary radio gear and aerials for a comprehensive satellite tracking station.

W6CYL has taken over the task of organizing the communications network for *Oscar III* and is planning to transmit information, when the time comes, on both RTTY and s.s.b. on the 3.5, 7 and 14 Mc/s bands and on a.m. on Top Band and 2m. It is hoped to find a suitable relay station on the East Coast of the United States to retransmit the bulletins to the International Radio Club station 4U1ITU in Geneva so that pre-flight information will be available to European co-operators. IARU member societies will be provided with news for local rebroadcasts.

Further information will become available as plans progress.

\* Project Oscar Co-ordinator for the UK, 24 Arundel Road, Tunbridge Wells, Kent.

# Trends in H.F. Receiver Front-ends

By PAT HAWKER, G3VA

RECENTLY, the design of h.f. communications receiver "front-ends"—by which we refer to the r.f. amplifier(s), (first) mixer and h.f. oscillator stages—has tended to become much more flexible. Changes have been encouraged by the need to improve specific performance characteristics to provide more satisfactory s.s.b. reception but their influence extends to all modes of reception. Many of the new (or revived) techniques have been adapted from v.h.f. practice, and indeed the h.f. enthusiast has reason to be grateful for the ready availability of high-performance valves and components at mass-production prices, developed for v.h.f. television and f.m. radio.

The old problem of sensitivity and signal-to-noise ratios has become much less important, since maximum usable sensitivity is limited by the relatively high h.f. "aerial noise" (see Chapter 15 of the R.S.G.B. *Amateur Radio Handbook*) to a noise factor of roughly 6-7db. But many other problems have come to the fore. These include cross-modulation and stability, and it is with these in mind that we have examined a number of arrangements used in both factory- and home-built designs employing valves. It is felt that a survey of this data will be of interest to amateurs thinking of building or modifying receivers, even though no attempt will be made to lay down "best" techniques. What is best for one amateur is not necessarily the most suitable for another.

## Front-end Design

The design of the front-end of a receiver determines—or at least materially affects—such fundamental performance characteristics as sensitivity, susceptibility to image response, susceptibility to cross-modulation or blocking, stability, and tuning rate. As W0DAN has pointed out [1], not all recent trends have been beneficial. The "classic" designs—in which more emphasis was placed on good r.f. selectivity—still have much to commend them, and it is worth taking a quick glance at the evolution of communication receivers.

Historically, the high-performance superhet h.f. receiver was developed in the mid-thirties. An outstanding design, which first appeared in 1936, was the National HRO. This set—at least in the writer's opinion—combined fairly simple but sound circuitry with excellent mechanical design; it was later paid the compliment of being closely copied by both the Germans and the Japanese during the 1939-45 war. The senior model included a most useful provision for rapid conversion from general coverage to amateur-bands-only operation. A single conversion superhet, it achieved reasonably good image suppression, even on 28 Mc/s, by the use of two r.f. stages with the associated three signal-frequency high  $Q$  tuned circuits.

But all pre-war and war-time HROs were fitted with r.f. and mixer valves—usually 6D6, 6C6—which are very noisy by modern standards. For example, the later metal-valve version (HRO-5, HRO-M and even the 1947 HRO-7) used two 6K7 valves in the r.f. stages. This valve has an equivalent noise resistance (e.n.r. or  $R_{eq}$ ) of about 16,400 ohms, resulting for a bandwidth of 10 kc/s in a noise voltage at the grid of the first stage of the order of 1.3  $\mu$ V. The noise factor of such sets would be about 12-16db. Performance on the higher bands was thus a good deal less than optimum.

The next major step forward came with the introduction of lower noise valves. Here again one can point to another classic design—the RCA AR88 which came out about 1941, intended primarily for commercial use. Its high price would normally have put this set beyond the reach of most amateurs had it not been for the large number acquired and later released by the British Services.

This receiver used type 6SG7 valves which have an e.n.r. of about 3300 ohms, representing a first stage noise voltage of about 0.5  $\mu$ V. On 14 and 28 Mc/s the maker's sensitivity figures give 1-2  $\mu$ V input for a readable output (6db signal-to-noise ratio). Even today such figures would be quite acceptable to most h.f. amateurs. The image response on 28 Mc/s is 200 times down.

The main drawback from an amateur viewpoint is the general coverage, and hence rather high tuning rate. There is also some tendency to cross-modulation though a modification to the a.g.c. circuit to reduce this has been published [2].

Although the e.n.r. of pentodes and tetrodes has since dropped well below that of the 6SG7 (see Table 1), the improved sensitivity—at least for those of us with average sites—is more theoretical than practical, except perhaps on 28 Mc/s.

On reflection, it would seem that many of the designs introduced during the late forties and early fifties were aimed at achieving good sensitivity and selectivity more economically rather than attempting any fundamental improvement in performance. Not, of course, that low cost is unimportant. The double-conversion model with low second i.f. was used to obtain selectivity with a minimum number of tuned

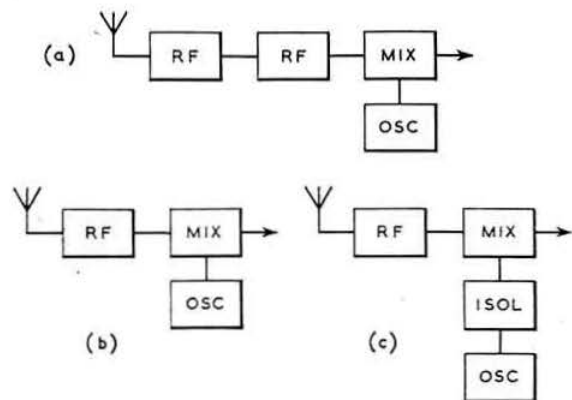


Fig. 1. Three typical arrangements for h.f. front-ends.

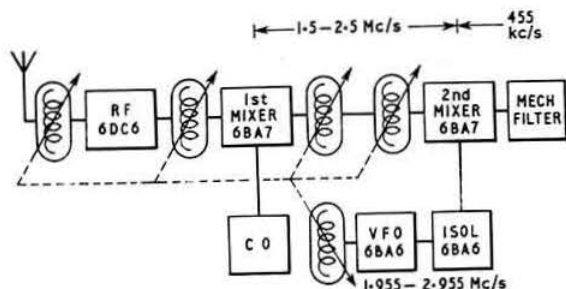


Fig. 2. Front-end arrangement used on the Collins 75A4 receiver

circuits and without a crystal filter (even now it must be admitted some amateurs dislike using single-crystal filters).

The two gang-tuned r.f. stages (requiring a four-gang capacitor) of the classic designs were expensive to manufacture. Since, with lower noise valves, only one stage is needed to obtain maximum usable sensitivity various devices were adopted to allow this to be done without seriously lowering image protection. Some single-conversion models, such as the Eddystone S640 and DCR19, used an i.f. around 1600 kc/s. Many others—of which one of the first was the "Commander"—adopted double conversion with fixed first and second i.f.

But one notable exception to this general economy drive appeared as early as 1948 and continues to influence design trends right down to the present time. This was the Collins 75A series of which the last representative—the 75A4—cost around \$695 (£250) in the States. The remarkable permeability tuning system remains, we believe, unique in amateur receivers but many designers—notably G2DAF—have proved that the general principle of a high performance receiver with a crystal-controlled h.f. oscillator and tunable first i.f. is practical for home- as well as factory-built sets. Fig. 2 shows the 75A arrangement.

The first of the series, the 75A1, used a 6AK5 r.f. and 6SA7 first mixer; this became 6AK5, 6BE6 in the 75A2; 6CB6, 6BA7 in the 75A3; and 6DC6, 6BA7 in the 75A4. The 75A3 incidentally was the first receiver for amateurs using an electro-mechanical filter. All these front-ends allowed a noise factor of about 6db to be achieved.

The adoption, in the 75A4, of the 6DC6 (and the 6BA7 in the 75A3) marked an increasing awareness on the part of designers of the worsening cross-modulation situation particularly alongside the many 1 kW stations in the United States. This began to be noticed much more with the increasing use of s.s.b. which often led to complaints of transmitter splatter when the real fault was in the receiver.

### Cross-modulation

A brief note on what cross-modulation is seems necessary. The textbooks tell us that this—and the corresponding blocking with c.w. signals—is the result of operating a valve with a total input so large that the linear portion of its characteristic is exceeded. The valve then acts as a modulator, impressing on a desired signal the modulation of a strong undesired signal which may be well outside the passband of the later i.f. stages. Once this modulation has occurred nothing can be done to remedy the situation. A strong c.w. carrier reduces the gain of the stage in which

blocking occurs so that the wanted signal drops in strength every time the undesired signal is keyed.

Many textbooks state that while cross-modulation was a serious problem with early receivers it disappeared with the introduction of variable-mu valves. While this is largely true of broadcast sets (though we have seen some beautiful examples of cross-modulation between sound and vision signals on TV sets) this is far from the case with high-gain communications receivers. One reason is that because of the lower noise of straight pentodes compared with variable-mu types these were often fitted in the past in the r.f. stage. But another cause is the very wide variation in signal strength within small sections of the amateur bands. While we are straining for an S2 DX signal on 14,020 kc/s, several S9 + 40db stations may be calling him around the frequency, and the chap down the street—who knocks the S-meter right off the scale—may be innocently calling CQ on 14,050 kc/s. Even if all the strong signals are free from clicks and well outside the passband of our receiver, we shall be fortunate if they have no effect at all on our DX signal.

If a local station "splatters," remove or attenuate the aerial and note whether the signals appear to clean up—where they do the cause of the spread is almost certainly cross-modulation in the receiver.

This situation is particularly true above about 10 Mc/s where the protection afforded by most signal frequency tuned circuits becomes almost negligible (none at all if we use "broad-banded" r.f. circuits to avoid gang tuning). Fig. 3 shows what might happen to the signals in a typical single- and double-conversion situation (which will be worse if there is any gain placed between the two mixers). In this article it is assumed for convenience that a single selective filter (crystal or mechanical) shapes the i.f. response curve to a large extent in "one go." Where conventional i.f. transformers or pot cores only are used, the final i.f. response will not emerge until towards the end of the i.f. chain, so that cross-modulation could occur in the early i.f. stages: see Fig. 4.

These diagrams show that a receiver operating with high gain in order to hear a weak signal builds up strong signals to an extent where there is little hope of avoiding cross-modulation with normal receiving valves (W1DX has suggested [3] jokingly that one solution would be to fit transmitting valves in linear class A). Ultra-linear valves with special cathodes intended to reduce cross-modulation have been reported under development in the United States but have not yet appeared on the market.

Cross-modulation is most likely to occur in the non-linear

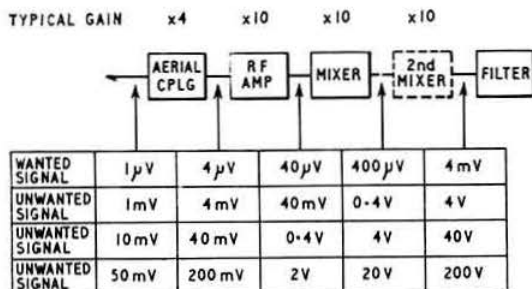
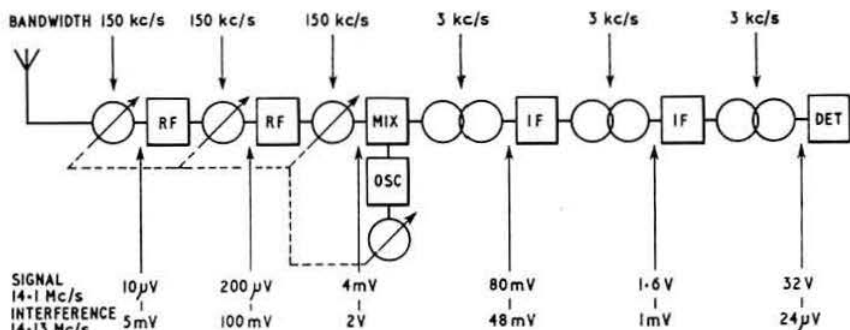


Fig. 3. This diagram shows how unwanted signals are built up in high gain front-ends to levels at which cross-modulation will occur.



Fig. 4. This diagram, based on one prepared by OKIVEX, illustrates the progress of a weak wanted signal on 14,100 kc/s and a strong unwanted signal on 14,130 kc/s through a single conversion receiver having high gain r.f. stages. The danger of cross-modulation, particularly in the mixer, is very clearly shown.



mixer valves but on extremely strong signals may occur in the r.f. stage(s). Remote and semi-remote cut-off valves will be much less readily affected than sharp cut-off types. For this reason, particularly in the U.S.A., more and more receivers have dropped the extremely low-noise short-based pentodes from r.f. stages in favour of the slightly noisier semi-remote cut-off types. As shown in Table 2, particular favourites in the United States are the 6DC6 and the 6BZ6, neither of which appear to be made over here. The EF85 (or equivalent W719, 6BY7, 6F19) is probably one of the best of the European types with an e.n.r. of only 1500 ohms.

What else can be done to reduce cross-modulation?

On the lower frequency bands, more protection can be given by increasing the number or  $Q$  of the signal frequency tuned circuits, but even on the l.f. bands the percentage difference in frequency wanted and unwanted signals may be extremely small. Inevitably, the first tuned circuit will be damped by the aerial.

On telephony, the a.g.c. line is often a major contributor

and we suggest that it should be switched off in such conditions, or—if its use is considered essential—the pattern of voltage distribution may require modification. An interesting technique which was introduced with the Hallicrafters SX115 is to have two a.g.c. loops. The first a.g.c. signal is taken out at a point of medium selectivity, amplified and used to control the gain of the r.f. stage only. This a.g.c. signal is delayed and does not act at all on very weak signals, although on such signals normal i.f. a.g.c. is obtained in the usual manner by taking out a voltage at the end of the i.f. chain. When signals increase to a level over a few microvolts, the first a.g.c. line takes over and holds overall gain fairly constant. The makers claim that the receiver will handle input signals up to 2 volts without overload.

The same type of approach can be adopted very simply by removing the r.f. stage(s) from the a.g.c. line altogether and using a separate manual gain control; this is done (in conjunction with limited maximum gain) in the W7KCS/9 receiver [4] we shall be discussing later.

#### Gain Distribution

This brings us to the question of gain distribution through the receiver, held by some to be the key to the whole problem of combining good sensitivity with freedom from cross-modulation. As we have seen, strong unwanted signals are built up to quite high voltages by the gain of the early stages before their elimination in the selective circuits. Why not keep such signals relatively weak by limiting the gain in these stages?

This approach was advocated as long ago as 1951 in an article [5] on reducing cross-modulation in commercial v.h.f. mobile equipment where cross-modulation can be a most serious problem since sets are often called upon to receive a weak signal while near the base station of another network possibly operating on an adjacent channel.

Fig. 5 shows a low cross-modulation mobile unit then described. Apart from a voltage step up of about five in the input coupler circuit and an r.f. gain of five, the remaining stages right up to the 455 kc/s filter operated near unity gain. The total voltage gain to this point was thus only about 30.

To allow pre-mixer gain to be kept low while preserving good signal-to-noise ratio, mixer noise must be low. Older multi-grid mixers had an e.n.r. of some 200,000 ohms (see Table 1) representing some 4-5 μV of noise referred to the grid. More modern types such as the 6BA7 and ECH81 have reduced this to around 60,000 ohms (about 2.25 μV noise). There has also been a great increase in pentode mixers such as the 6U8 (ECF82) with an e.n.r. of only about 9000 ohms.

TABLE 1

#### Equivalent Noise Resistance of Typical Valves.

R.F. Amplifiers			
6AC7 ...	720	EF85 ...	1500
6AG5 ...	1900	EF91 ...	1200
6AK5 ...	1880	EF183 ...	490
6AK5 ...	385	EF184 ...	300
(triode connected)		KTW61 ...	5000
6BA6 ...	3520	Z77 ...	1000
6F23 ...	670		
6F24 ...	370		
6J6 ...	470		
6K7 ...	16,400		
6SG7 ...	3300	6AK5 ...	7520
6SH7 ...	2850	6BA6 ...	14,080
6SJ7 ...	5840	6BA7 ...	60,000
6SK7 ...	10,500	6BE6 ...	190,000
954 ...	6600	6J6 ...	1880
955 ...	1250	6K8 ...	290,000
956 ...	9400	6L7 ...	255,000
ECC84 ...	*420	6SA7 ...	240,000
ECC85 ...	500	6SB7Y ...	62,000
EF42 ...	750	6U8 (pentode) ...	*9300
EF50 ...	1400	6U8 (triode) ...	2000
EF54 ...	700	12AT7 ...	2000
		ECF86 (pentode) ...	*2700
		ECH81 ...	66,000

\* Calculated.

Notes: The above values are normally optimum makers' figures and the e.n.r. will rise sharply when the mutual conductance is lowered by increasing the bias or due to valve ageing.

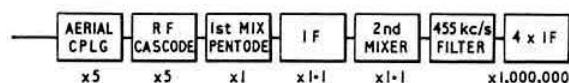


Fig. 5. Voltage gain distribution in a v.h.f. mobile receiver designed for maximum adjacent-channel rejection.

Even lower mixer noise is possible with triodes. The 6J6 has a mixer e.n.r. of only about 1880 ohms. It is thus quite true to say that today it is possible to design a high sensitivity h.f. receiver without any r.f. stage at all (but remember that this stage has other functions than just to increase sensitivity). It should be noted that the cross-modulation characteristics of these lower noise mixers may not be as good as those of the multi-grid types.

With such low-noise mixers, however, r.f. amplifier gain can be reduced. The recent—and extremely interesting—design by W7KCS/9, "The KCS Compactron"[4] for home-construction uses a 6BZ6 operating at a maximum gain of five with no a.g.c. applied, in front of a rather unusual twin triode mixer, the first half of which acts as a cathode follower. This particular design—which took over a year to finalize—makes full use of multi-electrode "Compactron" valves and in fact the twin-triode mixer and h.f. triode crystal oscillator use a single 6D10. By using four multi-section Compactrons only eight valves altogether are needed to perform 17 functions, and the entire receiver is in an  $14\frac{1}{2}$  in.  $\times$  8 in.  $\times$  10 in. cabinet with silicon h.t. rectifiers to reduce heat.

Still less r.f. gain has been suggested by W0DAN [1]. In his proposed front-end a parallel-connected twin-triode valve with very low anode impedance actually attenuates the signal (0.8 "gain") but the stage contributes an overall voltage gain due to the input step-up ratio of five. Detailed cross-modulation charts prepared by W0DAN show that very satisfactory cross-modulation characteristics can be achieved with this front-end. He also makes an important

\* Manufactured by American General Electric.

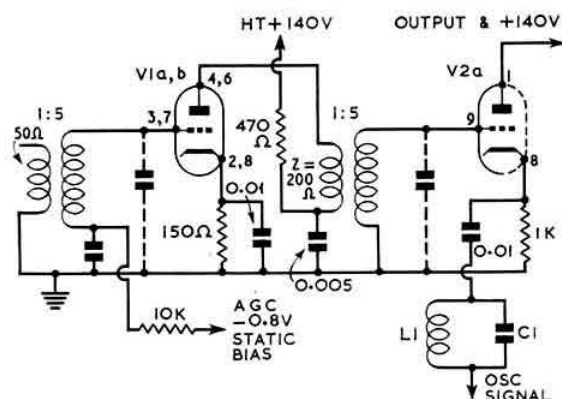


Fig. 7. Low noise r.f. amplifier and triode mixer designed for good cross-modulation characteristics. V1a, b, two sections of 6386 in parallel; V2a, triode section of 6U8A.

point, not seen elsewhere, that when using a low noise triode mixer it is "quite necessary to have a low noise injection system as well as a source impedance of 50 ohms or less." This is why an i.f. trap (L1, C1, Fig. 7) is included in the injection circuit. The source impedance, states W0DAN, can be measured simply if a valve-voltmeter with r.f. probe is available. The probe is connected across the unloaded output circuit of the h.f. oscillator and different value resistors placed across the output circuit. A resistor value which drops the meter reading by half is equal to the source impedance.

Table 2 shows that there has already been a marked swing towards triode mixers, though r.f. pentodes remain in general use for r.f. amplification. It seems quite likely, however, that the article by WODAN (who is with Collins) may foreshadow the introduction of triode r.f. amplifiers of this type into factory-built models.

Does this all mean that we should hasten to modify existing

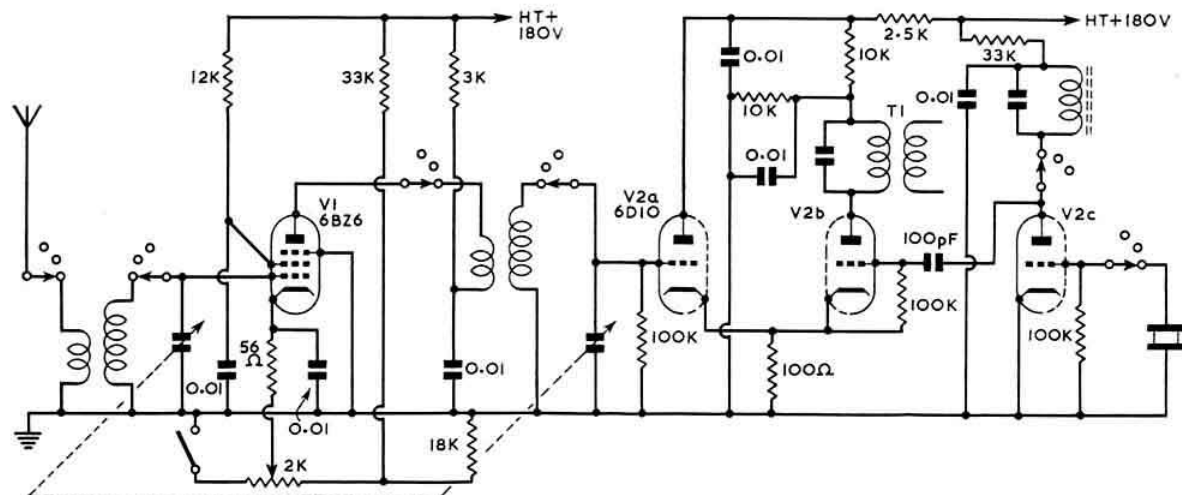


Fig. 6. Simplified circuit of the front-end of the "KCS Compactron" receiver. V1, 6BZ6; V2, 6D10. In this type of triode mixer the mutual conductance of V2a must be large compared with V2b. This is achieved by reducing anode voltage on V2b (V2b 40V, V2a 140V).

receivers to low-gain triode front-ends? In many cases this would be difficult to do. We would stress that from the point of view of cross-modulation there would be little point in just fitting an all-triode converter in front of an existing receiver, since this only puts further stages between the aerial and the selective circuits.

Furthermore, the gain removed from the front-end stages has to be made good in the i.f. stages (again, after, not before, the main selectivity has been shaped). This may well prove difficult to do in an existing set without introducing instability, since an overall i.f. voltage gain of around one million may be needed. In the W7KCS design, a twin high-slope (14 mA/V) "Compactron" pentode is used in conjunction with a bridge neutralizing circuit: see Fig. 8 (and *Technical Topics*, November, 1959). Another possibility which should not be overlooked is the use of high gain product detectors (see *Technical Topics*, December, 1961). Very high gain following the selective filter increases the possibility that the i.f. passband may be broadened by strong signals leaking round the filter, unfortunately.

It must be stressed that in respect of cross-modulation, amateur designers are still to some extent working rather in the dark. This may be why some receivers, which appear to break the rules of good practice, give satisfactory results, and vice versa. Of course, this may also be because in some locations cross-modulation is much more likely to prove a problem than in others.

There is, for instance, little readily available information on the susceptibilities in this respect of individual types of valves. It was suggested [6] as long ago as 1940 that such data should be published by the valve makers and various methods of measurement were proposed. Since then,

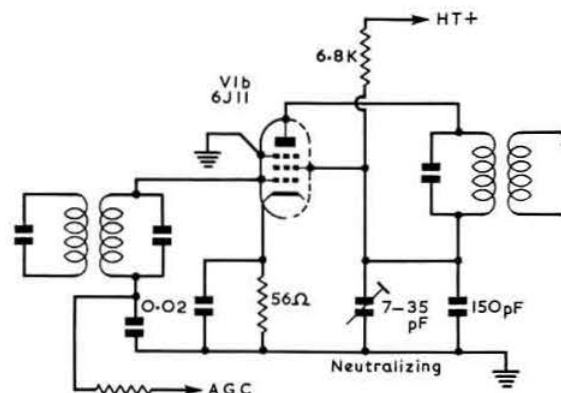


Fig. 8. Neutralising circuit used in second high-gain i.f. amplifier with a double-pentode Compactron valve, type 6J11.

investigations must have been carried out many times; for example by those responsible for installing Naval equipment where several transmitters and receivers may all be in close proximity, or for wired-TV distribution relay systems, etc. But so far we have failed to unearth such data in a form suitable for use for our purpose.\* One is left to wonder, for example, the relative ratings in this respect of the cascode and the semi-remote cut-off pentode. Or how triode mixers compare with pentodes; and pentodes with pentagrids. W0SYF and W0DAN have given a good deal of useful data, though W0SYF summed it up [7] by saying "the matter of cross-modulation characteristics is extremely complicated, so just taking a given valve and applying a.g.c. bias is not the whole answer." For those seeking a detailed practical assessment of the effects of cross-modulation references [1] and [7] are to be particularly recommended.

A paper by Mr. A. Cormack, of the G.E.C., at the recent I.E.E. H.F. Communication Convention, on the design of an h.f. receiver for use by the Navy in close proximity to a number of transmitters stressed particularly the importance of (i) maximum selectivity before the first non-linear (mixer) stage—no less than six very high  $Q$  i.f. circuits are used with two low-gain r.f. stages; (ii) valve stages are designed for maximum linearity (for example, a B329—equivalents ECC82, 12AU7—cascode circuit was chosen for the r.f. amplifiers as giving the "best compromise between linearity and noise factor"); (iii) the mixer ("chosen after a study of many different valves and circuits") uses a B329 with the two halves connected in push-pull; (iv) the signal is kept at as low a level as is practicable until maximum selectivity has been achieved (by a 1.6 Mc/s crystal filter). The receiver described has an elaborate frequency synthesizer h.f. oscillator but the points concerned with the reduction of spurious responses are of course equally applicable to amateur receivers. The use of a single conversion circuit with a balanced triode mixer is particularly interesting. Incidentally, the receiver, which covers 2-30 Mc/s, has an overall noise factor of 10db  $\pm$  2db as it is claimed that even in quiet areas an h.f. receiver noise factor of 12db is more than adequate in this application. A noise factor of 8-12db may seem a high figure for a receiver using two cascode r.f. stages but the gain of

\* Valve manufacturers do provide cross-modulation curves for some valves.

TABLE 2

Front-ends of Some Modern Overseas Receivers

Receiver	R.F. Amplifier	Mixer	Oscillator	I.F.
Collins 75A4 75C3	6DC6 6DC6	6BA7 Triode 6U8A	12AT7 (co) Pentode 6U8A (co)	1.5—2.5 Mc/s 2.955—3.155 Mc/s
KWM2	6DC6	Triode 6U8A	Pentode 6U8A (co) Triode 6U8A (cf)	2.955—3.155 Mc/s
Drake 2A, 2B	6BZ6	Pentode 6U8	Triode 6U8 (co)	3.5—4.1 Mc/s
Max Funke RX60	EF85	$\frac{1}{2} \times$ ECC81	$\frac{1}{2} \times$ ECC81 (vfo)	1.6 Mc/s
Hallcrafters SX111 SX115	6DC6 6DC6	6BY6 6BA7	6C4 (vfo) 12AT7 (co)	1650 kc/s 6—6.5 Mc/s
Hammarlund HQ180	6BZ6	6BE6	6C4 (vfo)	455 or 3035 kc/s
Mosley CM-1	—	Triode 6AW8A	Pentode 6AW8A (co)	3.5—4.1 Mc/s
National NC155, NC190, NC270	6BZ6	6BE6	(6BE6) (vfo)	2215 kc/s
RME 6900	6BA6	Pentode 6U8	Triode 6U8 (vfo)	2195 kc/s

these stages is kept so low that some degradation of the signal-to-noise ratio is deliberately allowed to occur. It certainly suggests that one can carry the quest for low-noise too far, at the cost of other equally important characteristics.

### Oscillator Stability

Another important trend in front-end design is the drive towards greater stability, a by-product of s.s.b. reception but just as important for high-selectivity c.w. reception. There is space here for only a brief outline of some of the ways in which receiver stability is currently being improved. There are still many receivers in use in which a good i.f. filter cannot be fitted because of oscillator drift.

It is worth emphasizing that the minimum incoming signal voltage that can be read depends not only on the noise characteristics of the first stage and the aerial matching but is also proportional to the square root of the overall bandwidth of the set. On c.w. a 155 kc/s-wide filter would allow us to copy a signal only *one-eighth* the input voltage readable with a 10 kc/s bandwidth. Sharp filters are practicable only with stable oscillators (unfortunately, in the distant transmitter as well as in the receiver) and where "ringing" can be kept low.

One of the most ingenious systems must surely be the automatic drift correction in the triple-conversion Racal RA17, another pace-setting design. Any drift in the v.f.o. alters the frequency from the first i.f. to the same extent and provides automatic correction. But few amateurs would care to tackle at home a full scale duplication of the complex RA17 system—though we seem to recall having heard of at least one successful attempt. A full description of the RA17 will be found in [8].

In commercial s.s.b. practice the latest trend to obtain reset accuracy and stability has been the increasing adoption of frequency-synthesizer techniques in receivers as well as transmitters but—at present at least—this again is beyond the scope of even a high grade amateur receiver.

As indicated earlier, the basic crystal-controlled h.f. oscillator arrangement has been widely adopted. This type of circuit does not call for many comments since the necessary stability can be achieved without real difficulty. However, while most designers are satisfied with a Miller type crystal oscillator, the 75A series (and we believe the SX115) find it worth while using two triode sections in the higher stability Butler series-mode circuit: see Fig. 9.

With tunable oscillators (whether for first or second conversion) considerable variation can be found in recent designs—almost all of the popular transmitter v.f.o. circuits have been adopted. The e.c.o. (HRO, G2DAF, etc.), the Clapp (W6STA, QST, July, 1958), the Tesla or Vackar (W9BIY and W9IHT, QST, May, 1960), the Franklin (W2LYH, QST, October, 1961), the cathode-coupled Butler (see *Technical Topics*, June and August, 1960). Of all these, the Butler and Franklin have perhaps been the least exploited, yet appear to offer a number of advantages.

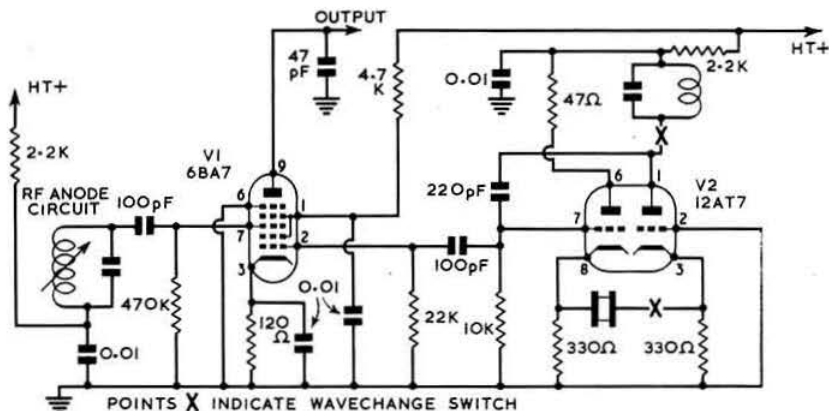


Fig. 9. Simplified circuit of the first mixer in the Collins 75A4. V1, 6BA7, V2, 12AT7.

Use has also been made in several s.s.b. transceivers of variable crystal oscillators for receiver tuning as well as transmitting—a technique which also offers possibilities for c.w. receivers intended to cover only the l.f. ends of the bands. It is, however, rather difficult to obtain a linear calibration.

Stability can be improved by interposing an isolating stage between the oscillator and the mixer; this is done in the tunable (second) oscillators in the 75A series and the G2DAF. In many cathode-coupled twin-triode mixers, one section operates as a cathode-follower isolator.

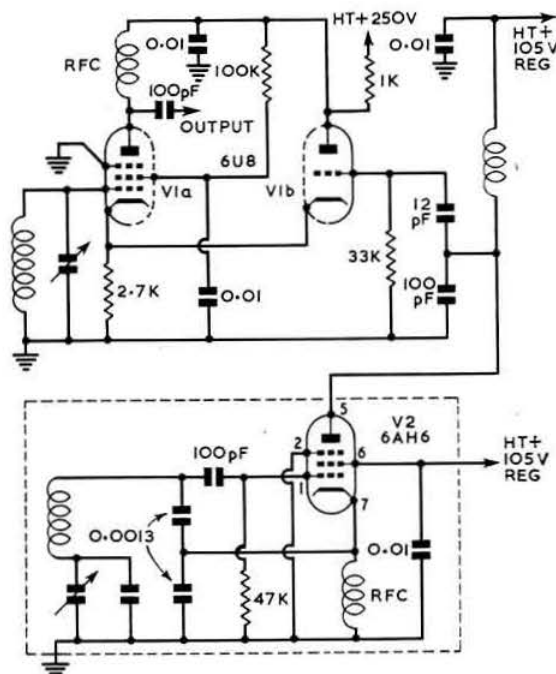


Fig. 10. Mixer circuit using a 6U8 pentode mixer with triode isolating stage and 6AH6 Clapp oscillator. Simplified from design for an 80m tuner by W6STA in QST, July 1958.



A new technique with interesting possibilities has made its appearance in the 75S3 receiver; this is the use of semiconductor diode switching (see *T.T.*, February, 1963) for range switching on the v.f.o. to eliminate the well-known difficulties of conventional switching of r.f. circuits. Another semiconductor technique (although so far confined to transistorized equipment) is the use of voltage variable diodes in which the capacitance is varied by changing an applied d.c. voltage; tuning capacitors are thus replaced by potentiometers. However, this characteristic of semiconductor diodes has been used in a valve receiver (Max Funke, RX60, see *RSGB BULLETIN*, September, 1961) to provide a small readily-adjustable trimmer to bring calibration spot on.

Generally, however, the circuitry used in the h.f. oscillator is less important than the many questions of mechanical and thermal stability. These include not only the more obvious requirements of good mechanical rigidity and good temperature compensation (usually by using negative-temperature-coefficient capacitors for a small portion of the total tuning capacitance), but also such points as the physical construction of the tuning capacitors, coil formers, coil-winding techniques, etc. Many components, unless chosen with care, are still "non-cyclic" to heat cycles which means that when they cool down they do not return exactly to their original values. It is the absence of heat which makes the transistor receiver such an attractive proposition, particularly if and

when cross-modulation problems in transistors can be overcome. Further information on the choice of components will be found in the *RSGB Handbook*; an interesting account of the steps taken to use suitable components for the Services R210 receiver will be found in [9].

To sum up: this survey has not attempted to tell the

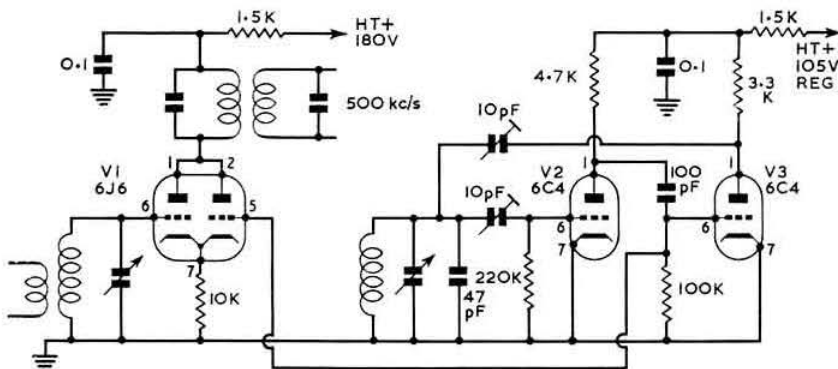


Fig. 12. Triode mixer circuit used with a Franklin oscillator simplified from the 3-4 Mc/s tuning section of a design by W2LYH in *QST*, October, 1961.

reader that a triode mixer is "better" than any other; or that a double superhet with fixed h.f. oscillator is the "ideal" arrangement. We must not forget that single-conversion has (at least potentially) a number of advantages. So much will depend upon the particular circumstances and on the type of i.f. selectivity filter used.

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## New TV Engineering Award

The Television Society is to institute an international Television Engineering Award which will be presented annually beginning in 1964. This new award is to be known as the Geoffrey Parr Award and will be made either to an individual or to a team in recognition of an outstanding contribution to television engineering or an associated science. Geoffrey Parr was for many years editor of the *Journal of the Television Society* and was Honorary Secretary from 1946 to 1961. He died in May, 1961.

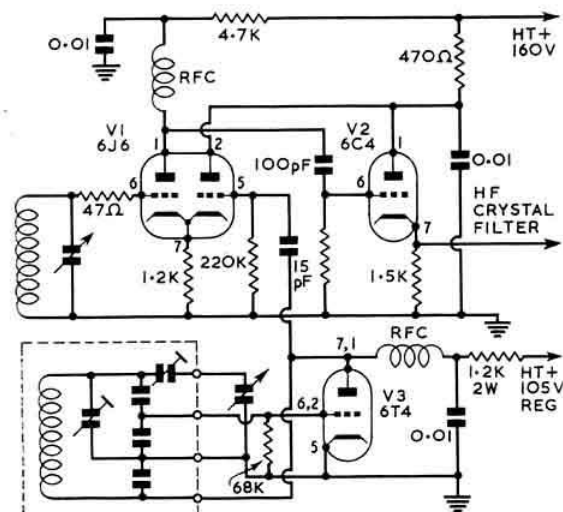
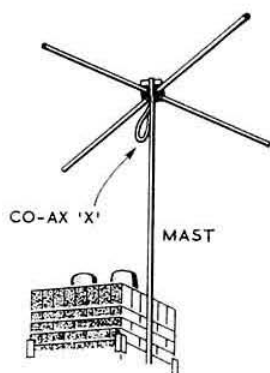


Fig. 11. A 6J6 triode mixer feeding into a 6C4 cathode follower with a 6T4 Tesla oscillator. Simplified from a design by W9BIY and W9IHT in *QST*, May 1960.

# Omni-aerials for V.H.F. Nets

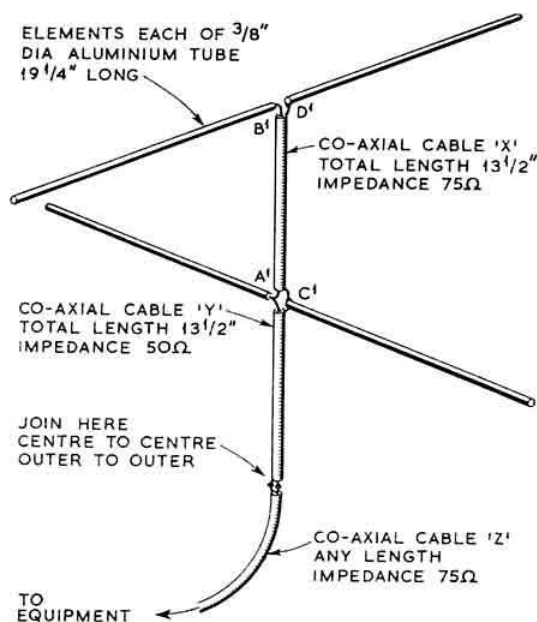
By JACK HUM,  
G5UM\*



NOT many v.h.f. nets exist at the present time, though one would say that they are bound to increase—especially on 2m—if development in communication follows the trend experienced on the lower frequency bands. One might add parenthetically that strictly speaking a net is a group of stations operating on a common frequency—very much the exception on 2m; more often than not so called “nets” comprise a number of stations utilizing whatever crystals they normally employ. The consequence: operation is scattered over a number of random frequencies instead of concentrated on one.

All this by the way, however: the purpose of the present

\*Bulls Green, Knebworth, Herts.



article is to consider one of the major problems of 2m net operation, which is: “What aerial shall I use?”

This particular question had been uppermost in the minds of the members of the Mid Herts Net since it was initiated seven or eight years ago. Operation was by stations within a box approximately ten miles square, where quite obviously not all beams could conveniently be turned at short notice upon the station transmitting at any one time. When a particular station started to send, his first words or even sentences would be lost through the need to turn the beam upon him as soon as his signal appeared on the channel. There was no point in operating a net unless, it was thought, all stations could be at constant strength to one another—which is not the case when nulls appear during the course of beam turning!

Dipoles were not the answer, for they, too, possessed directional effects almost as embarrassing as those of beams.

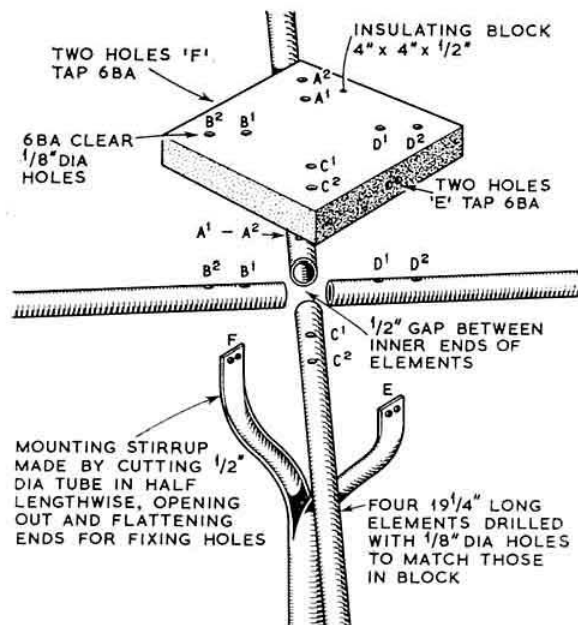


Fig. 2. Mechanical details of the “G3DXI Special.” The ends of the four 19½ in. elements are brought together at an insulating block which is clamped in the stirrup shown beneath it. Positions of bolt-holes in the block are lettered to correspond with the holes in the aerial elements.

Nor was vertical polarization considered desirable, for a number of evident reasons.

Before long two varieties of horizontally polarized omni-directional aerial had been designed from the readily available data. One exceedingly effective system worked out by Maurice Pyle, G2BLA, quickly earned the title of the “Welwyn Special” (he lives there); while a few miles away Clive Scott, G3DXI, wrote down the details of a parallel design for the benefit of those members who were anxious to copy it.

Fig. 1 shows the electrical details of “The Scott Special” and Fig. 2 the mechanical information required by members who may wish to make it up. Its radiation pattern being virtually circular enables any station in the net to be contacted at pretty constant signal strength.

Fig. 1. Electrical details of the “G3DXI Special” 2m crossed dipole aerial for omni-directional radiation. For mechanical details see Fig. 2. The dipoles are disposed at right angles to one another. The letters at the connecting points relate to the same letters in Fig. 2. In practice, the length of co-axial cable “X” is allowed to hang down in a loop.

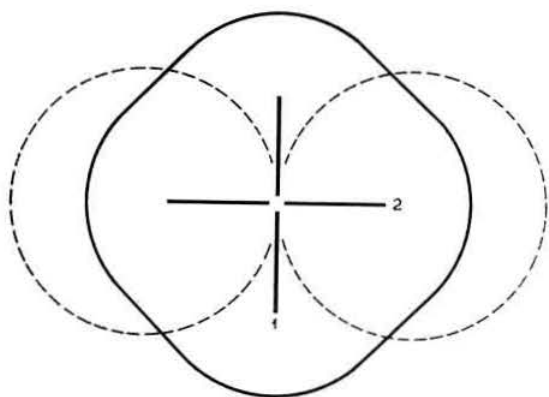


Fig. 3. How the radiation patterns of two directional dipoles combine to give a non-directional pattern in the crossed-dipole mode.

The radiation pattern shown in Fig. 3 is the combination of the two familiar doughnut shaped lobes from each dipole. The effective radiated power is less than that of a dipole, since a given amount of transmitter r.f. output will obviously

do more work if radiated by a single dipole than if shared between two; but the slight reduction in range is compensated by the omni directional characteristic of the system.

The electrical appearance shown in Fig. 1 separates the elements for convenience of drawing. Mechanically they are in close proximity, and the  $1\frac{1}{2}$  in. length impedance matching co-axial cable which is connected between the two dipole sections is allowed to hang loose. Mechanically, the elements are secured to an insulating block of polythene, paxolin or resin-bonded fabric; a high dielectric constant is not vitally important at this low impedance point. How each element locates with the 6BA holes in the insulating block is clear from Fig. 2. The whole assembly is secured by means of a mounting stirrup fashioned from half inch light metal tube with ends flattened out to enable the holes to be drilled.

\* \* \*

This article has intentionally avoided any sort of mathematical calculations that purport to show how the aerial functions. To many readers maths won't do this because they won't be understood. If you want the mathematical proofs you can find them in the established text-books.

Did someone say "What about rotation?" You don't need to worry about this: it's an omni!

### Notes on the G3HBW Transistorized Communications Receiver

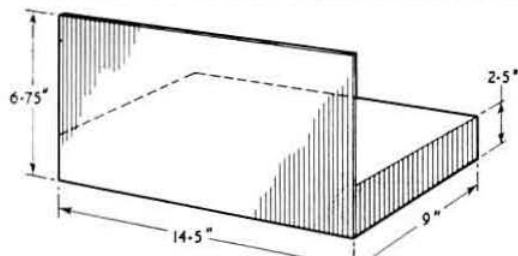
Since the publication of the article in the February issue of the BULLETIN, several queries have been raised in connection with the equipment. Mr A. L. Mynett, G3HBW, tells us that the following are answers to the more common queries:

Philco International Ltd., 30-32 Gray's Inn Road, London, W.C.1, hold stocks of the 2N1742, 2N1743, 2N1744 and 2N2398 (T2028) transistors. The type 2N384 could, however, be replaced by either a Mullard OC170 or OC171 transistor, for which there are numerous suppliers.

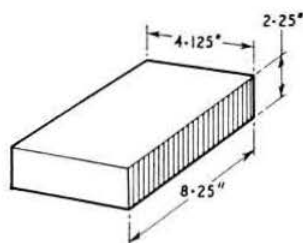
A minor mistake unfortunately occurred in the 456 kc/s

i.f. strip of the h.f./v.h.f. receiver. In the circuit diagram, Fig. 3, series networks comprising a 56pF capacitor and a 1.2K ohm resistor were shown connecting the neutralizing windings IFT3-7 to the bases of TR19-21. These were originally inserted when OC44s were used experimentally, and are unnecessary with GET875s and OC170s. A slight reduction in gain is in fact apparent when the neutralizing networks are left in circuit.

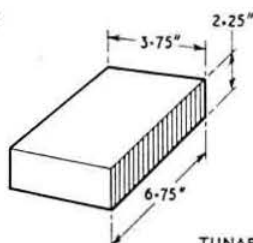
In response to many requests, Fig. 1 gives practical information for the fabrication of the chassis and panels. These details were omitted in the original article because it was not realized so many members would wish to copy the design in detail.



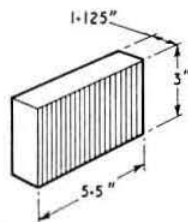
MAIN CHASSIS AND FRONT PANEL  
BOTH 16 swg ALUMINIUM



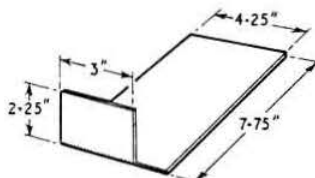
BANDSWITCHED CONVERTER  
SUB-CHASSIS 18 swg ALUMINIUM



TUNABLE IF  
SUB-CHASSIS  
18 swg ALUMINIUM



TWO METRE  
AND  
TEN METRE  
CONVERTER  
SUB-CHASSIS  
18 swg ALUMINIUM



IF - AM PLATE  
18 swg ALUMINIUM

Fig. 1. Constructional details of the chassis and panels.

# Single Sideband

By G. R. B. THORNLEY, G2DAF\*

THE very interesting review of Amateur Radio over the last 50 years, published in the July BULLETIN brought back many nostalgic memories. In the 'thirties a transmitter with a Taylor T20 in the p.a. was excellence indeed and the station which could boast a pair of T40s or 35Ts was the envy of all.

In those days c.w. was the predominant method of operation using a simple 0-V-1 receiver. This was generally home-constructed but there was—even then—a commercially manufactured battery operated 0-V-1 receiver, the Eddystone "Short Wave Two," that eventually became very popular and was used all over the world. With the reaction advanced to the point of oscillation—a necessity in order to produce an audible beat-note—the selectivity was quite high. However, with the reaction reduced for phone reception the selectivity was also reduced and left a lot to be desired.

Around this time, as the interest in phone operation increased, factory-built communication receivers of the National HRO, RME69 and Hammarlund Super Pro class became available and the slow but steady change to general coverage, mains operated, superhet receivers began. Compared to the familiar 0-V-1, these multi-valve receivers were extremely complex.

So far as reception is concerned that was the general pattern of Amateur Radio in 1939 when all activity ceased with the commencement of the Second World War. War-time activity brought many newcomers to the RSGB and with the re-allocation of transmitting licences in 1946 many more amateurs set up transmitting stations. At this time first class superhet communication receivers of the CR100, AR88 and BC348 class became available as war-time surplus at attractive prices. Consequently the great

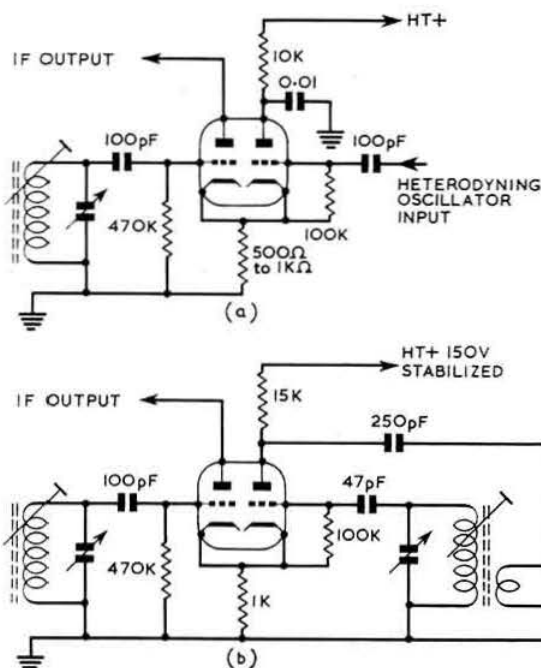


Fig. 2. Low-noise triode converter circuits. Suitable valves are the 12AT7 or ECC85 or the 6U8A with the pentode section strapped as a triode. In circuit (b) the second triode is used as a tunable self-excited oscillator.

majority of transmitting stations were equipped with factory-made receivers with performance far superior to anything previously used, and interest in receiver home construction virtually died.

For the normal requirements of amateur communication up to about 1958, these receivers proved to be perfectly adequate. From then onwards, due to the growing popularity of s.s.b., particularly on the 20m DX band, and the

\* 5 Janice Drive, Fulwood, Preston, Lancs.

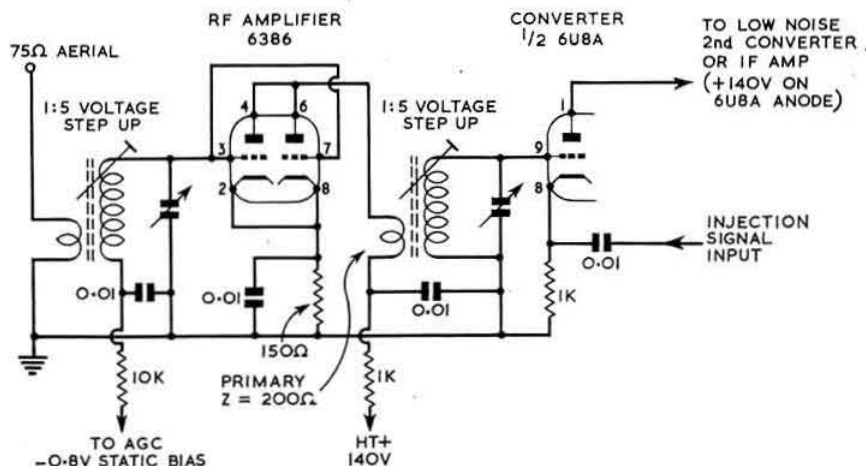


Fig. 1. Low-noise triode r.f. amplifier-mixer circuit with good cross-modulation characteristics. The r.f. amplifier stage gain = 0.8. The coupling transformer voltage gain of 5, combined with a valve voltage gain of 0.8, provides an overall r.f. stage gain of 4, which is adequate to overcome the converter noise.



poorer band conditions due to the declining sunspot activity, the limitations of these receivers became more evident. This, together with the poorer propagation conditions for inter-G working on 80m, forced concentration on two aspects of receiver performance formerly not considered of very great importance. These are: (i) the shape factor of the selectivity curve, i.e. the skirt selectivity; and (ii) cross-modulation at the receiver front-end.

### Recent Trends in Receiver Design

Modern, commercially-made communication receivers with superior performance meeting modern operating parameters are relatively expensive and beyond the reach of the majority of amateurs. It is therefore understandable that interest in receiver home-construction—at its lowest ebb in the early 'fifties—has gradually revived until at the present time it is occupying the major interest of a large section of RSGB membership. Here then are a few current ideas for the constructor.

Fig. 1 shows the circuit (due to E. A. Andrade, W0DAN, Engineering Department, Collins Radio Co.) of a low-noise triode r.f. amplifier-mixer circuit with good cross-modulation characteristics. The theory here is to keep the r.f. stage-gain as low as possible in order to protect the converter from overload—and therefore cross-modulation. To avoid having to neutralize the r.f. valve the voltage gain from grid to anode of the 6386 is kept less than unity by working the valve into a very low anode load of 200 ohms. A low r.f. stage-gain is only practicable if the converter noise is also low, and a triode converter of the type shown in Fig. 2 is

recommended as giving satisfactory conversion gain together with good "linearity" and low noise output.

### Impulse Noise Suppression

Many older operators will remember the Lamb noise suppressor of the late 'thirties. This was a true noise "blanker," i.e. it punched a hole in the receiver passband for the duration of the interfering pulse. As would be expected, the circuit is more complex than a simple diode clipper, but it did work effectively on the 9 kc/s bandwidth a.m. receivers of that period. The effectiveness of any noise limiter is directly dependent on the receiver bandwidth—ideally the bandwidth of the i.f. strip should be much greater than the bandwidth necessary to pass the highest audio frequency. In order to be able to discriminate against noise pulses without distortion of the desired signal, it is necessary for the pulse to have a duration less than that of a half-cycle of the highest modulation frequency. This implies that the bandwidth of the section of the receiver prior to the detector should be greater than that needed for the reception of the transmitted modulation sideband. Unfortunately the requirement for amateur communication is the greatest possible selectivity that can be used without impairing the signal intelligibility; that is an i.f. bandwidth of 2.5 to 3.0 kc/s, and under these conditions the selectivity of the tuned circuits will effectively widen each noise pulse, and for this reason noise limiters in narrow band communication receivers can never be really effective. However, some receivers have variable selectivity and in the wider bandwidth positions and provided the interference is of the true short impulse

type—such as Loran, power line and car ignition—a good noise limiter can help to improve the signal-to-noise ratio.

Nowadays the Lamb circuit is rarely shown in amateur textbooks. Fairly recently the Hammarlund company has marketed a noise blanker as an add-on unit for the HQ170 and HQ180 receivers. This is basically the original Lamb circuit with slight modifications. The centre-tapped secondary i.f.t. feeding a full-wave demodulator has been replaced by a standard transformer and a single diode. This enables the silencer to be built using standard i.f.t.'s and makes it more practicable for home construction. For those experimentally minded, the circuit is shown in Fig. 3. The silencer is intended for operation in some part of the 450/465 kc/s i.f. chain. Ideally, it would be better to feed in the interfering pulses from the second converter anode before the filter selectivity has lengthened the

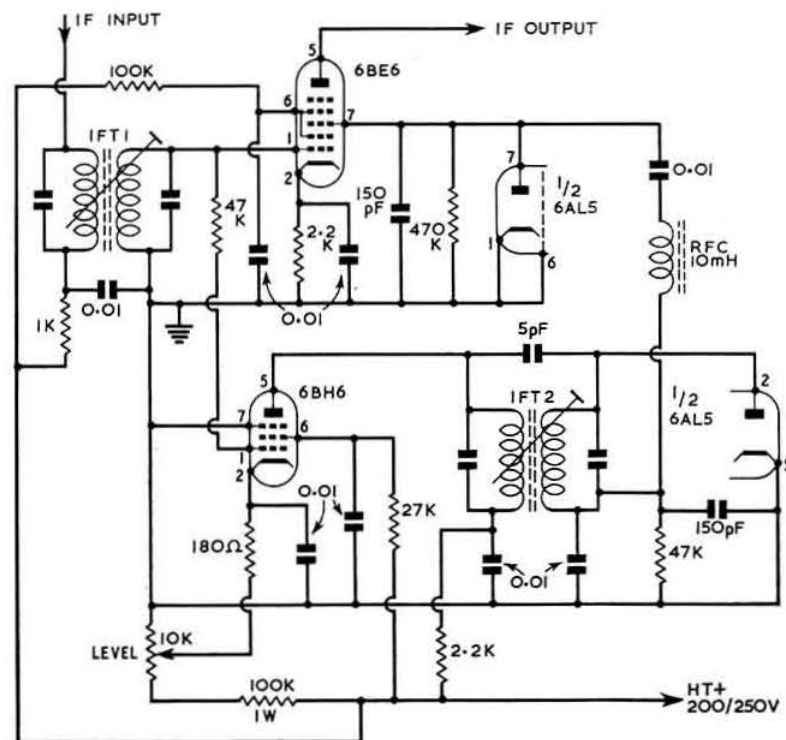


Fig. 3. Hammarlund i.f. noise silencer. The unit is connected into the receiver so that the low gain 6BE6 amplifier is in series with the existing i.f. amplifier chain. Noise pulses cause this valve to cease conducting and the receiver "blanks out" for the duration of the interfering pulse.



The first British s.s.b. transceiver is the K.W. Project 2000 manufactured by K. W. Electronics Ltd. of Dartford, Kent. The transceiver covers all bands from 10 to 160m in 200 kc/s sections. The p.e.p. input is 90 watts except on Top Band.

(Photo by courtesy of K. W. Electronics Ltd.)

pulse duration. Practically the circuit requires a large amplitude i.f. signal to operate really satisfactorily, and this is more easily obtained from the second or third i.f. amplifier. As so often happens with radio apparatus, the best position for the most effective results is inherently a compromise between conflicting parameters, and is best found experimentally.

The action of the circuit is as follows: Signals and noise at the input end of the silencer are amplified by the 6BH6 and then demodulated by the diode (one half of a 6AL5). The resulting audio signal is a.c. coupled to grid 3 of the 6BE6 i.f. amplifier, across which there is also a diode (one half of a 6AL5) which clips off the positive going side of the signal. The negative swings reduce the gain of the 6BE6 and since this valve is in series with the receiver i.f. chain, also reduces the total i.f. gain. A gain control (threshold control) in the 6BH6 cathode allows adjustment of the noise amplifier gain so that the 6BE6 will be "blanked" by noise pulses having amplitudes greater than that of the desired signal, but will not be affected by the signal itself. The exact setting will depend on the strength of the received signal, the strength of the noise and the type of noise. Excessive noise amplifier gain will cause the overall amplification to be varied by the distorted waveform that is present on pin 7 of the 6BE6 resulting in a noticeable degradation of speech in the loudspeaker. This control must be adjusted to suit existing signal and noise conditions.

For the information of the less experienced constructor, the writer would like to make it clear that inclusion of the Lamb noise limiter circuit in *Single Sideband* does not imply that this is considered to be the best arrangement; or in fact that—so far as single sideband reception is concerned—a noise limiter is any benefit at all!

#### Claims for RSGB Certificates

Members are reminded that claims for RSGB Certificates should be sent direct to Headquarters. Claims are acknowledged on arrival and passed to the Honorary Certificates Manager for attention.

#### Region 1 Field Day

The Region 1 Field Day will take place this year on September 22, from 09.00 to 17.00 GMT. Individual groups, however small, may compete provided the transmitters are operated by members residing in Region 1. Competing stations will be looking for contacts with portable stations outside the Region.

Copies of the rules are available from the Regional Representative, B. O'Brien, G2AMV, 1 Waterpark Road, Prenton, Birkenhead.

#### Silver Plating

A useful booklet—No. 503D—on silver plating is available to RSGB members from the Sales Dept., W. Canning & Co. Ltd., Great Hampton Street, Birmingham 18.

## RSGB INTERNATIONAL RADIO COMMUNICATIONS EXHIBITION

SEYMOUR HALL, LONDON, W.1

October 30 to November 2, 1963

#### Offers of Equipment for Display

Members are reminded that offers of home constructed equipment for display on the Society's stand are still required and should be sent to the Honorary Secretary of the Exhibition Committee at the address below.

A Silver Plaque will be awarded for the best piece of home constructed equipment displayed. For exhibits by members residing outside Region 7 (London Area) there will be two further prizes, consisting of vouchers to the value of ten guineas and five guineas.

A special award of a voucher for five guineas will be made for the best piece of home constructed equipment entered by a member who is not, nor has been, employed in the radio or electronics industry. Entrants will be required to submit a signed declaration to the effect that they are not and never have been employed in the radio or electronics industry, that the item was constructed at their home, and that the construction and design is entirely their own work. It is emphasized that the smartest (in appearance) exhibit may not necessarily win the award.

#### Offers of Assistance

The Exhibition Committee requires offers of assistance to man the RSGB stands during the period of the Exhibition. Offers should be sent to the Honorary Secretary of the Exhibition Committee.

#### Exhibition Stations

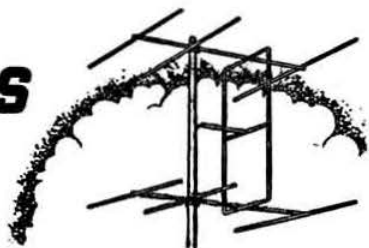
GB3RS will be operating on phone on 160—15m, and on c.w. on 160m for limited periods.

GB2VHF will operate on phone on 4 and 2m.

Details of the operating schedules and frequencies will be given in the October issue of the BULLETIN. Please send all offers of equipment and assistance to: R. G. B. Vaughan, G3FRV, Honorary Secretary, RSGB Exhibition Committee, 9 Hawkins Road, Tilgate, Crawley, Sussex.



## FOUR METRES AND DOWN



*First Cross-Channel Contact on 1296 Mc/s—Perseids Results—S.S.B. on 144 Mc/s*

**By F. G. LAMBETH, G2AIW \***

AS reported briefly last month, the first F/G QSO on 1296 Mc/s, between F8MX/A (St. Valéry en Caux, near Dieppe) and G5NF (Farnham, Surrey), over a distance of approximately 113 miles, took place on July 31 at 21.10 GMT. Signals were S9 plus both ways on phone, with some QSB occasionally.

F8MX was on 1297.25 Mc/s with a horn aerial, whilst G5NF was on 1296.65 Mc/s with an 8-over-8 slot fed beam aerial.

The gear at G5NF, all of which was constructed by G3MPS, comprised a 70cm transmitter with a DET24 p.a. driving a 2C39A tripler in a cavity to 1296 Mc/s. The receiver employed a radial cavity, crystal mixer, 12AT7 crystal oscillator, 6J6/6AF4 multiplier to 600 Mc/s, 446A doubler to 1200 Mc/s, to give an i.f. of 26-30 Mc/s into an R208.

F8MX's transmitter ran 40 watts input, and provided about 8-10 watts output to the horn aerial.

The first successful contact was the culmination of a series of tests initially between F8MX/A and G3MPS. Eventually G3MPS's equipment was moved to G5NF who has a much better site.

F8MX, reporting on his 1296 Mc/s QSO with G5NF, says that initial contact was made on 2m at 21.00 GMT. G5NF received 1296 Mc/s signals from F8MX well, so he switched over to the higher frequency band also. At first, signals were quite weak and modulation level low. However, G3MPS soon attended to the modulator and transmitter. Thus the first G/F QSO was made at 21.50 GMT.

F8MX uses the G2RD square cavity exhibited at the 1963 V.H.F./U.H.F. Convention in London. The input to the 2C39 is about 38 watts and the output 8 watts, according to a Bird Thru-line wattmeter. A 100 per cent modulation is applied to the 2C39 and 50 per cent to the QQE06/40 driver on 430 Mc/s. The aerial is a 50cm x 50cm horn designed by F3SK. The converter employs flat lines in the G2DD system manner and is double conversion: 1297 Mc/s to 156 Mc/s, then to 29 Mc/s. Only one crystal—7044.4 kc/s—is used.

### Meteor Scatter News

G3LTF worked HG5KBP during the Perseids shower on August 12 at S25 both ways. This QSO was followed by G3HBW who worked the Budapest station over a period of two hours giving S2/5 and receiving S2/8. Apart from this, G3LTF has been very busy during the Perseids, with other skeds to UP2ABA (he has heard pings and short bursts from this one) and LZ1DW, which is ranging far afield but he has already had "near miss" results, as full information was received from him in a long long burst but due to bad flutter could not be deciphered until the tape was played

\* 21 Bridge Way, Whitton, Twickenham, Middx. Please send reports for the October issue to arrive by September 6 and for the November issue by October 10.

later at a slow speed. Better luck next time! Other skeds known to be running this time are UR2BU/PA0QC and ON4FG and OK2LG/G3CCH. G3LTF reports that ON4FG worked HG5KBP on July 29 for the first HG/ON contact. PA0OKH has also worked the HG.

On August 13 from 08.00-10.00 GMT G3LTF worked UR2BU (Tartu, Estonia) for the first G/UR contact on 144 Mc/s and G3LTF's twenty-second country on the band. UR2BU's signals were S22 and G3LTF's S25.

### Single Sideband Two Metre Equipment

Some information on 2m s.s.b., which may be useful to intending users, has been received as a result of recent references to the subject. G3OCB (Stithians, nr. Truro) has submitted a block diagram (Fig. 1) together with details of his transverter. Fig. 1 includes details of the tuning arrangements, which should be followed for ease of adjustment and to provide adequate selectivity.

The 7225 kc/s crystal frequency is multiplied by 18 and the resulting 130.6 Mc/s (approximately) is fed to the control grid of the 5763 mixer. The s.s.b. signal at 14 Mc/s is then fed to the screen grid. The class A 5763 works at low level (approximately 200V h.t.), and the p.a. is a QQV06/40A with 1000 volts on the anode, 300 volts on the screen, and 30 mA quiescent current, peaking to approximately 150-200 mA at full drive.

The unit is built on a chassis measuring 6 in. x 10 in. x 2 1/2 in. high, with a panel on one side of the 6 in. edges. A 200 mA meter indicates p.a. anode current, and a 20 mA meter is switched to read grid and screen current. Other controls include bias adjustment (for p.a. standing current), meter switch, p.a. tuning, and p.a. link tuning. The p.a. tank assembly is the complete SCR522 butterfly capacitor and coil, which performs quite well, although improved efficiency would result from the use of a cavity or line type of tank. A relay is used on the chassis to mute the unit during reception, in order to eliminate hash. This relay is actuated by the main s.s.b. exciter relay.

Power requirements are about 180 to 250 volts at 60 to 80

### LONDON U.H.F. GROUP

will meet at the

### BULL AND MOUTH TAVERN

corner of Bloomsbury Way and  
Bury Place, London, W.C.1.

at 7.30 p.m. on Thursday, September 5, 1963

All v.h.f. and u.h.f. enthusiasts welcome

**NOTE THE NEW VENUE!**

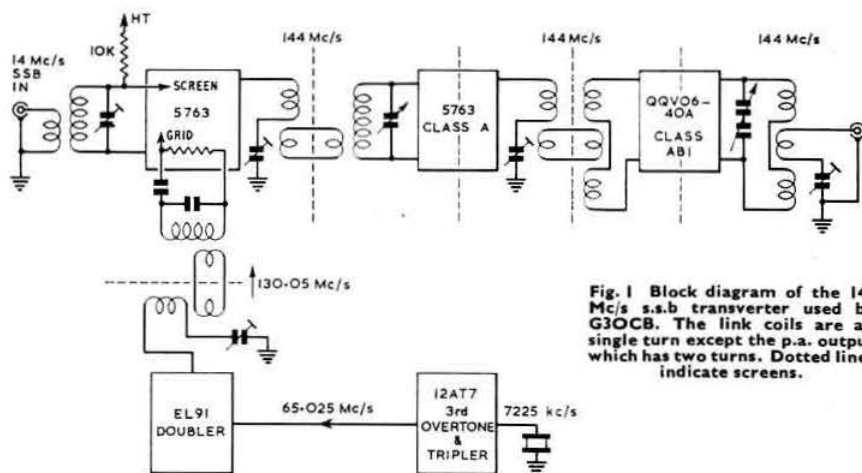


Fig. 1 Block diagram of the 144 Mc/s s.s.b. transmitter used by G3OCB. The link coils are all single turn except the p.a. output which has two turns. Dotted lines indicate screens.

mA for the oscillator/multiplier chain and driver, 300 volts (stabilized) and 1000 volts for the p.a. screens and anode, with current drains of approximately 20 and 200 mA peak respectively, and a negative supply of 50 volts or greater for muting and bias. Only a few milliwatts of 14 Mc/s s.s.b. are required to drive the p.a. fully. Tuning is very simple and involves inserting some carrier into the s.s.b. exciter until the QV06/40A shows a trace of grid current. The p.a. current, off resonance, should be above 200 mA, the residual anode current being approximately 30 mA. The p.a. should be loaded to about 160-180 mA. The screen current is about 16 to 18 mA when correctly loaded. During the tuning up process it is important to keep the drive to the p.a. just at the level point where grid current just flows. It is also important to tune up as rapidly as possible, as the valve will not stand 200 mA anode current for longer than a few seconds at one time. It may be safer for less experienced operators to carry out preliminary tuning at, say, 500 to 600 volts, although of course the loading at this voltage will not be the same as for 1 kV.

When loaded, remove the carrier and set the drive so that the grid needle indicates a trace of grid current on occasional peaks. The more common method of watching anode current swing with a meter is misleading, as it depends on the meter damping, although of course if an oscilloscope is available this can be used to advantage. The above method of loading, however, is very satisfactory and has been used on a variety of linears always with reports of good quality and sideband suppression.

## Two Metre News and Views

EI2W (Dublin) reports that conditions were very good on the nights of July 28 and 29. On both nights, F8MX was peaking S9 for several hours, but appeared to be too busy arranging 23cm tests to tune the 2m band! EI2W called him many times without effect, while some other French stations were heard working inter-French v.h.f. stations. The GMs were very strong on the night of July 29 and GM2FHH (Aberdeen) and GM3JFG (Invergordon) were worked for the first time. Other GMs contacted were GM3GUI (Frickheim, Angus) and GM4HR (Dundee, Angus). Stations in both Kent and Surrey were very active on both nights. A new 11 element wide spaced 2m beam, designed by EI2W and built by Arrell Electrical Accessories Ltd., is giving good results. GM3FYG (Ross and Cromarty) was worked the first time it was in use. On July 31, EI2W worked

F9JY, and heard F8MX again on August 1 (apparently still not tuning the band!).

From G3HBW (Bushey Heath, Herts.) there is a detailed story of HBIADT's appearance on the band. Following a telephone call from G3PCR at 17.30 GMT, G3HBW heard the Swiss station at about 18.00 GMT with very good signals, and called him, but he went back to G3BLP for his first QSO with a G station. G3HBW was the second at 18.10 GMT with S9 reports both ways. HBIADT was on 144.96 Mc/s. Many other G stations then made contact, G3HQ being next, followed by among others, G3JXN, G3IAS, G6NB, and G3GWL. Later that evening G6NB worked F8CV on

c.w. at about 19.40 GMT; then, at 21.10 GMT he worked HB9MY (20 miles south of Zurich) on phone. Neither of these stations was audible at G3HBW. All the above took place on July 28, but on the following night a weak signal was heard from HBIADT on 144.96 Mc/s at 18.50 GMT. He replied to a call with S9+ signals, giving G3HBW the same report evidently after turning his beam. Although he announced that he would be operating from the same QTH (given as Mount Tendre, in the Swiss Jura) for the remainder of the week he was not heard again. The QTH was given as 1650m a.s.l., and the equipment included a 50 watt input transmitter, a 7 element Yagi, and a Nogoton receiver. G3HBW mentions a note from G3GJ that G5ZT had recently worked HBIADT from Devon.

G3LGK (Ilkeston) comments on last month's note on the Nuvistor Converter for 144 Mc/s. He designed an almost identical unit recently, and says constructors who use a 1.6 Mc/s i.f. in the main receiver (e.g. 888A, etc) are liable to find a large spurious beat. The cause is the fifth harmonic of the 6440/6450 kc/s crystal coming in on second channel (32.25 Mc/s  $\times$  3.2 = 29.05 Mc/s and similar). The cure is either a higher crystal frequency or an overtone circuit. At G3LGK the cure was to use a crystal on 11.600 Mc/s multiplied by five to 58 Mc/s then by two to 116 Mc/s.

G2BJY (Walsall) found conditions very erratic during the period, with signals varying between S9 and S3 during a QSO. There was some improvement to the North and Yorkshire has provided some excellent signals, with G5YV and G3RND S9+ at times. Both were audible when conditions were very bad. Others worked were G5MN (Hull) G3FFV (York), G3OHT (nr. Spurn Head), G5HA (Hull), G3NEO (nr. Sheffield), G6XX (Howden) and G3JMA/P (nr. Hull), those in Hull and on the East Coast being over 150m away. From the south east, G5ZG (Dunmow), G6RH (Bexley), G6QN and G3KBP in London were also contacted. Welsh contacts included GW5BI (Cardiff) and GW3LZN/M (nr. Conway). Nearer home G3MP and G6CW were strong signals, and it was very pleasing to have a QSO with G2WS (Coventry) who was radiating a fine signal in spite of a temporary hook-up. HBIADT was heard but not worked by G2BJY. At least two Midlands stations were lucky, however.

G3LTF (Galleywood) worked G3OCB and GW3MFY on s.s.b. both ways on July 18. G3OJY was called "till my wrist was sore." Another QSO with G3OCB followed on July 19, and with G5ZT, both two way s.s.b. G3BNC and GW8SU were also raised. On July 20 (with Dresden TV an S2 direct signal), DJ1SI (Hanover) and DJ2OB were





During his visit in May, Ed Tilton, W1HDQ, was invited to the home of Ray Hills, G3HRH, RSGB V.H.F. Manager, near Welwyn in Hertfordshire to meet some of the mainstay of local v.h.f. activity in that area. One of the members, G3BJC, took this picture showing Ed seated (left) with Ray, who is Chairman of the Society's V.H.F. Committee. Behind G3HRH is Frank Green, G3GMY, Honorary Secretary of the V.H.F. Committee, while second from right is Jack Hum, G5UM, a member of the Committee. Next day Ed emplaned at London Airport after a highly successful lightning tour of some of the main centres of v.h.f. activity in the United Kingdom. He was guest of honour at the Ninth Annual International V.H.F. Convention on May 18, 1963. Others in the picture, l. to r. are G3HXL, G3NDT/A, G3FUR, G2BLA, G3GKG, G6LL, and G3LXP.

worked, and PA0FB on two way s.s.b. On July 21 DM2AIO (East Berlin) was called for some time without result. He was calling G6OX, apparently to no avail. Dresden TV was S4 at the time. Later, conditions swung to the north east and G3LTF worked SM7AED, DJ5HG (Hamburg), SM6LYZ, SM7BAE, SM6CSY, SM7ZN, OZ9KY, SM7BLO, SM6CSO SM5CAY/6 and SM7AED again, this time for a 70cm test which was not successful. Most of these QSO's were s.s.b. /phone or s.s.b./c.w. On July 27 G15AJ was worked on s.s.b. in addition to several North Country s.s.b. stations, and EI2A. On July 28 HB1ADT was worked at S9+ both ways. On August 9 GB2GC (Sark) was worked for a new one.

G3IIT (Gt. Shelford) was lucky enough to work HB1ADT on July 28 with a report of S9. On July 30 G3ILD and G3JYH (Durham) were worked for a new county. These contacts were made from the home station running 80 watts to an 8-over-8 slot fed Yagi. On July 31 G3RND and G5HA (Yorkshire) were worked from the car at Barkway, nr. Royston, at 08.15/08.45 GMT using 5 watts to a bent dipole.

G3EMU (Canterbury) has a new converter, with a front-end based on the G2UJ preamplifier, but using an EC88, followed by an EC91 mixer to 33 Mc/s, an EF184 mixer to 4 Mc/s, and a 6J6 oscillator at 37 Mc/s and 111 Mc/s, tuning from 2 to 4 Mc/s. The performance is the best G3EMU has yet experienced. A report of 559 from Dunkirk was received on the signal from a pair of OC171s in the p.a. of a transistor transmitter. While the HB and LX stations were coming in recently, all the signals went over G3EMU and he heard nothing of them. To counter this loss, however, he worked PA0EO every lunchtime, except for one, during the three weeks up to August 6. Sometimes there are some odd QSOs; one afternoon when conditions were normal a PA near the German border was worked RS58 both ways, but otherwise there was simply nothing audible, and 15 minutes later even the PA was gone.

G3OCB (nr. Truro) found conditions much better during the month with over 130 QSOs in the log from 66 stations in 27 counties, and four countries. Although the openings

were not sustained, the average level of propagation was quite good for a fair part of the period. The only continentals heard were French stations, some of whom were quite consistent, and also HB1ADT. The latter was apparently 5 and 9 at about 19.00 GMT, but G3OCB was not aware of this until advised by G5ZT at 20.20 GMT, by which time the HB was much weaker.

The portable/mobile rig has now been well aired, and has given a very good account of itself, being responsible for about 55 of the QSOs, especially those other than in the Home Counties which is the only favourable direction from the home QTH. Mobile QSOs using the halo include G3NIL (Dorset) and GC2FZC. Several local QSOs have also been made whilst mobile. Portable working from several sites 600-700 ft. a.s.l. has brought many QSOs, including G5YV (c.w.), G3RMB, G3KMT, G3BA, GW8UH, GW3LJP, GW3LIT/P, GW3IRA/P, GW3MFY, GW3PHF/P, GW2HIY/P, F3XY/P, GC2TR, GC2FZC, G4LU, G8SB (s.s.b.), G3EGK (s.s.b.), G3RND, G3EWZ, G3BNL, G3AQX and G3HRH/M/P. A3a from home has brought many QSOs, which include, among others, G3RMB, G2JF, G3JMA, G2DQ, G4DC, G3JXN, G3LTF (s.s.b.), G2BYK, G3MCS, G3IAS, and G3LBA (s.s.b.).

G2JF has been very consistent recently. His new aerial certainly appears to be functioning excellently. The news bulletin from G6OX has been quite readable on phone on several Sundays, at a time when, on most occasions, no other signals could be heard from the London area and Home Counties. Similarly, on one Saturday afternoon, G3LBA was worked two way on s.s.b., at RS56/7 both ways, and G2JF 59+ both ways with no other signals audible from the East!

For those still interested in Cornish contacts, the following list may be of interest:

Call	Location	Frequency Mc/s	Mode	Activity
G3OCB	(nr. Truro)	144-05	s.s.b. (v.f.o. much control)	
		144-03	A3/P	much
		144-13		
G3XC	(Indian Queens)	144-01	A3	much
G3OJY	(nr. Penzance)	144-055	A3 and A1 (v.f.o.)	much
G3IGV	(St. Austell)	144-165	A3	much
G3EKM	(Truro)	144-04	A3	fair
G3CZZ/M	(nr. Redruth)	144-09	A3	fair
G3NVJ	(Redruth)	144-12	A3	new station

G2BHW (Falmouth) may appear on the band soon owing to a burnt out mains transformer in the l.f. transmitter!

G3JGJ (nr. Newton Abbot) reports working G6XD (Plymouth), and hearing G3IEA (Torquay) working G5ZT

#### 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

#### RSGB V.H.F. BEACON STATION GB3VHF

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

Date	Time	Error
July 23, 1963	10.15 GMT	400 c/s high
July 30, 1963	...	No measurement made
August 6, 1963	14.25 GMT	1290 c/s high
August 13, 1963	...	No measurement made

(Plymouth). He also had a sked on July 16 with GC2FZC, who was using 4 watts input to a 6J6. G2JF (nr. Ashford) and G3XC were worked with 4 watts on July 18, G3LGY (Wolverhampton) was heard on July 19. On July 20, G3OBD, G3OJY and G3MVA were heard. The following day, July 21, G3HRH/P was heard working G5ZT. G3OCB and G3OAB were also heard. Other local and semi-local stations were heard and worked later in the month. GB3CTC was in evidence on July 21 at RST559. On July 24, GB3CTC was RST579 at 21.00 GMT, but inaudible at 20.05 GMT. On July 25 there was a report of 599 from GC2FZC on a 4 watt sked transmission. July 28 brought signals from such stations as F3XY/A (50 miles south of Cherbourg), G3KHA/P, G3IAF, G5NF, G3IAS and G6NB, with G3ICO worked. From July 29 to August 8, GB3CTC was audible on many occasions, though generally weak, with GC2FZC and GC3OBM both worked on August 8.

G3BLP (Woldingham), who was the first G to work HBIADT on July 28 first heard him when beaming south-west and so turned the beam south-east and called him rather belatedly at 17.28 GMT. There was no response then, and he was heard calling CQ in various directions until 17.35 GMT when another call was made with no result. A QSO finally commenced at 17.59 GMT. When the QSO finished at 18.10 GMT the band was very lively and many other stations worked HBIADT, as already reported. Since he was on a frequency very close to the one normally used by G3BLP, the latter station moved to 144.735 Mc/s for the rest of the evening. Later that night G3BLP worked EI2A, G3JYH (Stockton-on-Tees), and GM3EGW, and on July 29, G3BW, GM3EGW, G3JYP and G3BJD were also worked.

G3LHA (Coventry) is devoting all further time this year to constructing and testing gear for future v.h.f. contests. Portable working has been fairly frequent, from various local high spots, and some good contacts were made in July including some with EI2A (Co. Meath), G3BJD (Seascale-Cumberland), and G3ILD (Darlington), but no EDX was either heard or worked. On July 28 a visit was paid to a site in the Peak District (four miles north-east of Leek), at 1,600 ft. a.s.l. The transmitter was running 10 watts input to a three element Yagi at 14 ft. GDX QSOs with G3MEH (Croydon), G2UX (Norwich), and G3RK (Bungay, Suffolk) were made during a total operating time of two hours. Band conditions were generally good.

G2WS (Coventry) received c.w. signals from GB2GC at 18.20 GMT on August 14 on a three element Yagi 16 ft. above ground level. The signals were maximum 569 with QSB. Weather was poor at the time, the barometer very low and heavy cloud in the region.

#### To Argyllshire again

During the week commencing Monday, September 23, it may be possible for those anxious to work the county of Argyll to do so. G5UM is taking his "pipsqueak" rig along in the car once again and will be operating from the south end of the Kintyre peninsula during that week. Operation will be on 145.8 Mc/s every evening from September 23 to 28 inclusive from 8.30 to 10 p.m. clock time using the call-sign G5UM/P.

During the return journey the "M" will be dropped when "Uncle Mike" will be in Northumberland on Sunday, September 29, again operating between 8.30 and 10 p.m. as G5UM/P.

#### DXpedition to Cumberland

On September 21-22, members of the Pye Telecommunications Amateur Radio Group will be operating G3PYE/P on 2m and G3KBC/P on Top Band. Both phone and c.w. will be in use and the 2m station will operate on a frequency in the correct zone.

### NORTH WEST V.H.F. CONVENTION QUEEN'S HOTEL, PICCADILLY, MANCHESTER SATURDAY, OCTOBER 5, 1963

Talk-in Station  
G3OHF/A

The programme will commence at 2 p.m. with visits, discussions, a trade show and a display of equipment.

Tickets, price 25/- each (including the Dinner in the evening), may be obtained from Tom Davidson, G3AGS, 101 Grange Drive, Blackley, Manchester 9. Mr. Davidson can arrange accommodation at the hotel at the reduced charge of 37/6 for bed and breakfast. Tickets may also be obtained from Fred Nichols, G3MAX, 52 Great Ancoats Street, Manchester 4 (Telephone: Cen 6276).

Organised by the North West VHF Group

#### Four Metre News

EI2W (Dublin) reports that on July 28 conditions were very good on 4m, but activity did not appear to be as high as might have been expected. Stations worked included G2AIH, G3JJI, G3NZ, G3NDF, G3LHQ, G3AYT/P, G3BNL, G4GM, G6NB, GM3EGW and GW3LJF. EI2W has asked us to tell these rare counties (Lincoln, Cornwall, Norfolk, etc.) that if they watch for him on 70.296 Mc/s, when conditions are reasonable, they may hear a signal that is to their advantage.

G3LHA hopes to be portable from Northants and Leicestershire soon, running 30 watts to an 832 and a three element Yagi.

B.R.S.21476 (Shrewsbury) has been listening on the band, and signals heard during the period include G3PJK, G3EHY, EI2W, G3IUD and G3JIV. EI2W was audible at Shrewsbury on both July 21 and 28 at good signal strength.

#### Seventy Centimetres

G3EMU (Canterbury) reports that the receiver is now operating well again, and that there are now 24 elements on the mast.

G2XV (Cambridge) states that GM3FYB (Dunfermline) is frequently reporting reception of his 70 cm signals, and G2XV has heard GM3FYB's signals on one occasion. However, they are still awaiting that elusive QSO.

G3LTF (Galleywood) worked PA0EZ (Nijmegen) on July 20 crossband 2m/70cm. On July 29 he copied G3ILD on s.s.b., the first s.s.b. signal he has heard on 70cm.

On 23cm G3LTF (Galleywood) had a test with G3LQR on August 7. G3LQR's signal was S5.

September 7-8, 1963

#### V.H.F. NATIONAL FIELD DAY

For rules, see page 373, January 1963

#### REGION 1 IARU V.H.F. CONTEST

For rules, see page 138, August, 1963

#### SECOND 420 Mc/s CONTEST

October 27

For details see page 137, August, 1963

# THE MONTH ON THE AIR

A CHRONICLE OF EVENTS ON THE HF AMATEUR BANDS

By R. F. STEVENS, G2BVN \*

ACCORDING to comments heard on the air the present decline in operating habits is due partly to the practice of amateur journals publishing features dealing with DXpeditions, contests, and with competitive DX generally. However, a journal without a DX feature is unacceptable editorially, and no doubt further offence to the pundits will be caused by some comments on that ever topical subject, QSL cards.

Probably the question most often asked during discussions on DX is the enquiry as to whether a QSL from some rare station has been received, and the answer may cause joy or much gnashing of teeth, according to the circumstances. Certainly there has been world-wide dissatisfaction with the QSL performance of VP2KP/A who operated from Anguilla during October, 1962. However, a long account of the reasons for the delay with these cards has been given by VP2KP to W2MES of the Long Island DX Association, and it is hoped that cards may soon be on their way.

YAIK, who asked for cards via K5YYP, has similarly made large numbers of people unhappy, and it is reported that letters addressed to the K5YYP QTH have been returned. The activities of PY1BCR from Trindade Island attracted considerable attention last year, but very few QSLs have been reported. How do they select the lucky few? Perhaps all the cards are put in a hat and thereafter first out get the QSLs. In many cases stations manned by members of the US forces, often only on a temporary basis, have very bad QSL records, and in this respect some of the operators of KG6IJ are far from blameless. Others, it is good to say, are speedy senders of the precious pasteboards.

The organization of W4ECI and his helpers could well be emulated by others; the QSLs for the many thousands of contacts made by Gus are dealt with immediately on the receipt of the logs. Tromelin logs were recently received and many stations will no doubt have already had their cards. Incidentally, the FR7ZC/T card recently pictured in *MOTA*, and which caused heart burning in some quarters, was not a valid QSL. Logs for the VQ9A/AN operation were lost, but duplicates have come to hand, and these cards will be going out in the near future.

One of the subjects discussed at the recent IARU Conference at Malmö was the desirability of limiting the frequencies used during contests which were not of an international character; in other words local and national contests should occupy part of the appropriate sub-band only. It was noted with pleasure that during a recent WSEM contest, restricted to stations in the USSR, operation appeared to be confined to the first 50 kc/s of the 14 Mc/s band. The last Conference was the first that has been attended by representatives of the USSR and international co-operation has brought swift benefits. Writing in the *DXpress*, PA0FX makes similar comments expressing

appreciation of the action taken by the Central Radio Club for a purely national contest.

The propagation predictions presented in *MOTA* have received general approval and the opportunity is taken to express thanks to DJ2BC, Dr. G. Lange-Hesse of the Max-Planck-Institut für Aeronomie, for his co-operation in providing valuable information.

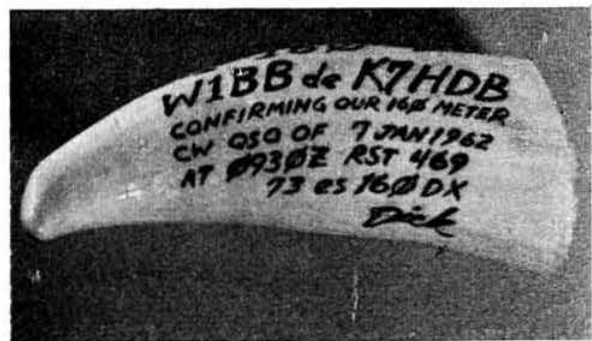
## News from Overseas

Angus Murray-Stone, ex-5N2AMS, etc., is now based in Saudi Arabia with the call HZIAMS, and is also licensed for operation in Bahrain (MP4BEF), Qatar (MP4QBD), Muscat (MP4MAP) and the Trucial States (MP4TAX). Angus hopes to acquire a licence in Jordan and is looking forward to renewing on the air acquaintance with old friends.

Tony Willis, latterly VS9ANW, and also ex-ZL3GI, ZD1NWW and ZD2NWW, is now in Port Sudan for a tour of two years, with little prospect of obtaining a licence. Having recently had a spell in Indonesia, Tony feels that his amateur career is not particularly brilliant due to no fault of his own, pointing out that listening is a poor substitute for a QSO.

Writing from VS9OC at Masirah Island, Muscat, and Oman, Jeff Rackstraw asks that stations still looking for a QSL should write to the address given in *QTH Corner* when he will be pleased to oblige. Jeff has been at Masirah for seven months only and whilst willing to help in this way, is unwilling to take responsibility for past deficiencies in QSL returns. VS9OC is generally on the air between 15.00 and 19.00 on 21 Mc/s and 14 Mc/s using a Racal receiver and a type 1509 transmitter. It is hoped that s.s.b. operation will commence in the near future.

ZD9AM is the call of the operator on Gough Island and the present holder is Rob Johnson whose home address is PO Box 197, Benoni, Transvaal, South Africa. Rob will return to South Africa in April, 1964, when he will collect



K7HDB of Warrenton, Oregon, who is in the whaling business, uses this unusual QSL "card" made from a real whale-tooth. K7HDB is regularly to be found on 1998 kc/s during the Top Band DX season.

(Photo via W1BB)

\* Please send all news items to RSGB Headquarters to arrive not later than September 6 for the October issue and October 11 for the November issue.



his cards and deal with reply QSLs. In passing this information, ZS1AW asks for patience until this time.

During the visit of the recent Hammarlund DXpedition to Corsica, some facts regarding the operation of F9UC/FC came to light and have been passed along by DL9PF. Some time ago the equipment, logs and QSLs of F9UC/FC were destroyed in a snow storm, but one old log book and a batch of unanswered QSLs were unearthed. Those QSLs enclosing s.a.s.e. have already been answered, whilst all others (about 2,000) will be replied to by DL9PF with cards to be printed shortly. Also, all legible entries in the old log mainly relating to a.m. QSOs on 14 Mc/s will be QSL'd. In future, DL9PF will act as the QSL manager for F9UC/FC, whilst HB9TL will perform a similar chore for F9RY/FC.

After a spell on 14 Mc/s s.s.b. 5N2JKO reverted to a.m. on 7, 21 and 28 Mc/s, and found that DX was correspondingly harder to come by. The 28 Mc/s band is open to Europe on most days between 15.00 and 18.00 but there is little activity except from CT and DL. There is considerable a.m. activity on 21 Mc/s, but s.s.b. stations are far and few between on this band. 5N2JKO reports that 7 Mc/s starts producing European signals at around 19.00, but that contacts are difficult before 20.00. 5N2ACB, who is able to be on the band later, has had no difficulty in making European QSOs around midnight. 6W8AE told 5N2JKO that there is at present no s.s.b. activity from Senegal, but that 6W8CK is building an exciter.

The new licence regulations for Nigeria have been recently produced and, with necessary substitutions, these are identical with the UK licence. Only citizens of Nigeria or the Commonwealth are eligible to hold licences, and the cost of the standard 150 watt permit has been reduced to £3 p.a. An interesting point is that mobile operation is now allowed for the first time at a fee of £2 p.a., but a /T licence costs £10 p.a.! Provision has been made for Morse and technical examinations and generally the Nigerian authorities seem to have put Amateur Radio on a most sensible and satisfactory basis.

VS9AAA reports s.s.b. contacts with G3GAW (Driffield) on four bands on August 4. Contact was established on 7 Mc/s at 17.30, and successive frequencies of 14,110,

21,400 and 28,600 kc/s were used, all within half an hour of the original contact. VS9AAA will be looking for UK contacts on 7 Mc/s around 17.30 and will soon be active on 3.5 Mc/s using a ground plane. G3GAW reports that 28 Mc/s has been open to Africa on seven days out of ten, and contacts have also been made with South America around 21.00/22.00.

Further East, VS1LU concentrates exclusively on 7 Mc/s c.w. using a TCS transmitter with 40 watts input feeding a 7 Mc/s dipole, and a Japanese 9R59 receiver. The country score on this band is now 18 since early May, and VS1LU comments that he has exactly the same troubles to contend with as we have in the UK, i.e. wierdies, creepy crawlies, jammers and assorted rubbish. About ten BY stations have been heard, the most consistent being BY1PK and BY9SX (both of these have been heard in the UK) always working other BYs and using English in the process! One of the outstanding European signals is F7DB, and VS1LU looks forward to the day when his QRP signals will penetrate the mid-European funny noises barrier. Other Singapore stations active on 7 Mc/s include VS1s, LG, LJ, LS, LT, LU, and LX. The latter is also active on 14 Mc/s and often puts a good signal into the UK around 16.30 (00.30 local time).

On July 4 William Willis left Peru on a solo raft voyage to last from three to five months sailing the Humboldt current to Australia via Samoa. The only means of communication during the period will be by a hand powered transceiver. The 70-year-old American navigator will transmit daily position reports on 8364 kc/s, between two and three hours before and after sunrise, using the identification Salvita Three.

VR6AC, Floyd McCoy returned to Pitcairn Island in the *Gothic* during early August, but it is unlikely that he will be heard on the air again. In expressing our best wishes to VR6AC we are certain that we speak for his many friends all over the world.

## DXpeditions

ZD7BW commenced operation on August 7 and will be active from St. Helena until November using s.s.b. and c.w. QSLs should go to his home address which is given in *QTH Corner*.

W9NLJ/VE1 will operate from Prince Edward Island between September 24 and 30 using c.w. (mainly) and s.s.b. in the 3.5, 7 and 14 Mc/s bands, using frequencies 42 kc/s up from the band edges. No doubt seekers after the *WAVE Award* will take advantage of this trip, and QSLs may be sent via the Bureau or direct (with s.a.s.e. please) to 5138 Pepin Place, Madison 5, Wisconsin, USA.

The Cannock Chase ARS will be operating GW3RSX/P from Montgomeryshire on the night of September 7 on 1.8 Mc/s, and on 144 Mc/s during the daytime on September 8. (G3FZW).

GW3MWZ/P will be active on 1818 and 1875 kc/s from Anglesey on September 16, Cardigan on September 17, Radnor on September 18 and Montgomery on September 19, from 19.00 to 23.00 GMT. Skeds can be arranged if required. All contacts will be QSL'd through the Bureau.

On September 21-22, members of the Pye Telecommunications Amateur Radio Group will be operating G3PYE/P on 2m and G3KBC/P on Top Band in Cumberland. Both phone and c.w. will be in use.

JA1BRK/MM was heard by G3YF whilst on his way to Turishima Island some 500 miles from the main islands of Japan. It is believed that activity will be mainly on s.s.b.

At the time of writing AC5A has not been well heard in Europe although it is believed that he has been active on most days. The location at Thimpu is badly screened and this is probably the cause of the indifferent signals. The

## QTH Corner

AC5A	via W4ECI
CR5AA	W9JIF, 125 Eastview Terrace, Lombard, Illinois, USA
EP2RV	via G5RV (home call)
FP8AE	via VE7IR
GC2HFD/A	Dr. H. Reeve, 20 Lock Chase, Blackheath, London, S.E.3
GC3IFB	via G3IFB (home call)
HB1VL/FL	via HB9VL
H18AT	Box 999, Santo Domingo, Dominican Republic
H18MMN	via W2CTN
HL9KO	via W2LSX
W6FAY/KP6	via W6FAY (home call)
LX3CF	via ON4CF
LX3UL	via DL7UL
OA3M	via WA4AYX
SV0WL	Box 134, Salonika, Greece
WA2YUU/TAIAS	via WA2YUU, 43 Seabreeze Rd., Messingpique, NY, USA
VP2AV	via W2CTN
VS1LU	M. Hutchins, 17 Ernani St., Opera Estate, Singapore 16
VS9OC	SAC Rackstraw J. G., Twynham Eleven, RAF, Masirah, BFPO 69
ZD7BW	G3PEU, Burton End, Church Drive, Linby, Notts.
ZM7AD	via K6ERV
9G1EW	Box 194, Accra, Ghana
5X5JC	Box 355, Kampala, Uganda

RSGB QSL Bureau: G2MI, Bromley, Kent



operation from AC4 over the weekend August 17-18 produced one of the largest pile-ups yet. An unusual feature was the many West Coast American stations worked by AC5A/AC4. AC3 remains on the itinerary of Gus and his mammoth expedition but there may be some difficulty with this one.

The DXpedition calendar at present reads:

September 14-15 OH2EW/OH0 on all bands  
 September 15 W6FAY/KP6 from Jarvis Is.  
 September VS4 and VS5 on s.s.b. by VK2ADK.  
 September ZL4JF on Campbell Is. will be more active.  
 September Possible Aves Island trip.  
 September K4UTE and others possibly to Anguilla.  
 September VS9AAA and group from Kuria Muria.  
 At any time VK4JQ from Willis Island.  
 At any time HZ1AMS from JY1.

## Contests

The results of the **Fourth Annual CQ 160 Metre C.W. Contest** show that 1,167 stations from 28 countries participated, including 253 from the UK, which, after the USA (731), showed the second highest number of participants. Leading stations were: G3IGW 13,685 points; G5JU 12,210; G3GRL 8,334; G3NHE 4,212; G3NIS 3,940; G2DC 3,150; G5ZT 2,794; G3RSR 2,432; G8PG 1,476; G3HSL 1,379; G3PEO 1,316; G3JKY 1,040; G3MWZ 749. Sole entrants

from Northern Ireland, Scotland and Wales were: GI6TK 17,232; GM3PBA 5,040 and GW3JI 16,104.

The **1963 CQ WW DX Contest** will take place on the following dates:

Phone Section: 00.00 October 26 to 24.00 October 27.

C.w. Section: 00.00 November 23 to 24.00 November 24.

No changes from the rules applying to last year's event have been made and the usual summary of these will appear in the October *Bulletin*. In due course log sheets will be available from G2BVN.

The Traffic Dept. of EDR (the Danish national society) say that the results of the **1962 Scandinavian Activity Contest** will be available by the end of August.

## Awards

In connection with the **S.S.B. Certificates** awarded by *CQ Magazine* the following countries are being deleted from the listings: CN2 Tangier; CR8 Goa; ET2 Eritrea; FF8 French West Africa; FQ8 French Equatorial Africa; IS Italian Somaliland; VQ6 British Somaliland; ZD4 Gold Coast and 9U5 Ruanda-Urundi. In the near future a new form will be available and which will form a permanent record of all credits, and which will be mailed back and forth eliminating the many forms for each station and the subsequent difficulty of checking for duplications. In due course these forms will be available from G2BVN.

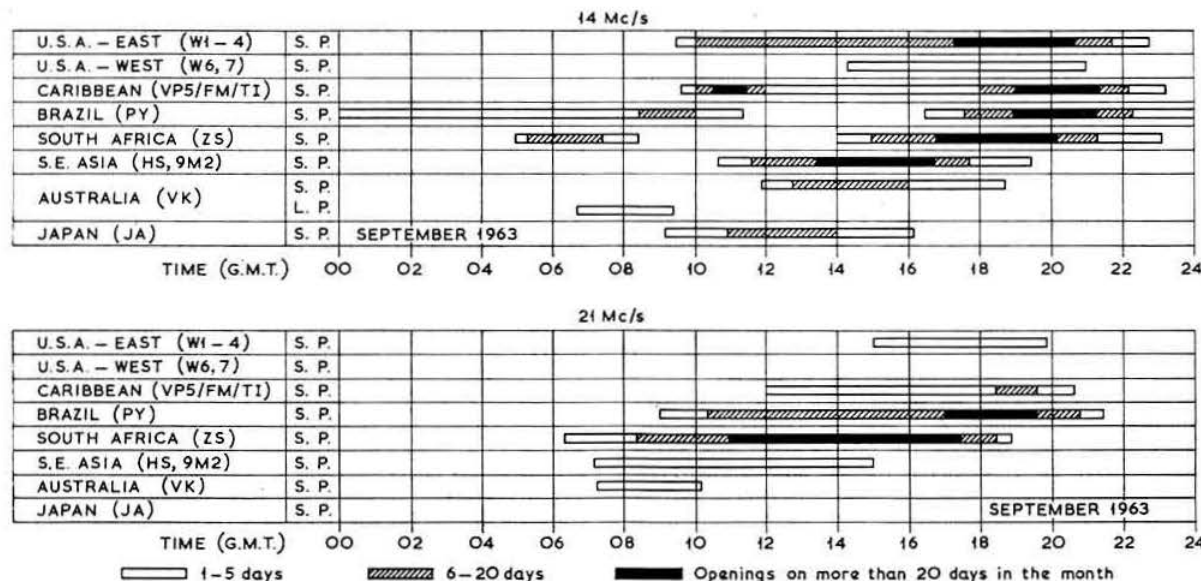
Readers interested in the **Directory of Certificates** and

## Propagation Predictions

September will see the slow change from summer to winter conditions, but during this period approaching sunspot minimum the increase in daytime F2 m.u.f.'s will be small and conditions will show only a slight improvement over the summer months. Contacts with Africa (09.00 to 18.30) and South America (14.00 to 18.30) will be possible on days on higher than average m.u.f.'s, but contacts by sporadic E reflection will no longer be expected. This does not apply to short skip contacts by auroral reflection which may be experienced on isolated occasions on 28 and 21 Mc/s. DX contacts on 21 Mc/s will be limited to the paths to Africa and South America, although the East coast of North America may be heard on isolated occasions. The 14 Mc/s band will continue to carry the bulk of the DX traffic and at this time,

when day and night are of equal duration, few contacts will be possible by the long path. With longer nights towards the end of the month there will be fewer opportunities for DX working on 14 Mc/s, and 7 Mc/s will come into use as a DX band. The seasonal decrease in atmospheric noise will favour working on this band, and also 3.5 Mc/s, particularly when the greater portion of the transmission path lies in darkness.

The provisional sunspot number for July was 19, with the greatest period of activity lying during the last three days of the month. This figure of 19, issued by the Zurich Observatory, compares with 36 for June and predicted figures of 18 and 17 for October and November, 1963.



associated publications are referred to the announcement on page 112 of the August *Bulletin* for details of the new arrangements w.e.f. October 1, 1963.

The **Aruba Amateur Radio Club** announce a modified version of the former WANA Award entitled the **Aruba Ariba Award** which can be claimed by all amateurs who have worked three members of the Aruba Amateur Radio Club after January 1, 1963. A list showing complete log data and signed by two licensed amateurs or one official of a recognised Amateur Radio club verifying that QSL cards are held by the applicant should be sent. QSL cards are not required. The list, together with one dollar or ten IRC, should be sent to Award Manager, AARC, PO Box 273, San Nicolas, Aruba, Netherlands Antilles. Members of the AARC include PJ2s AE, AF, AL, AQ, AW, AZ; PJ3s AC, AF, AJ, AL, AM, AN, AO, AP, AQ, AT, AS, and AT.

The **WCV Award** is offered by the Cray Valley society to any licensed amateur who can produce proof of contact after January 1, 1962, to gain the required number of points applicable to his locality: G stations require 15 points, European stations require ten points and DX stations require five points. GM, GD, GC, GI and GW are counted as European for the purposes of this award. One point is given for contacting each society member, and three points for contacting the society station G3RCV. A log extract certified by two other licensed amateurs, together with 5 IRC (or 2s. 6d.) should be sent to G3MCA, 13 Greenfield Gardens, Orpington, Kent. With over 30 active members in the Cray Valley society this award should present only a reasonable standard of difficulty.

The **Worked Ten Ceylon Award**, sponsored by the Radio Society of Ceylon, is available to all licensed amateurs who can produce proof of contact with ten different licensed Amateur Radio stations in Ceylon. Cross-band contacts are not permitted and all QSOs must be after January 1, 1963, with a minimum readability report of three and minimum tone report of eight. Applications for the Award must be accompanied by a list of the stations worked with complete log data but QSL cards need not be sent. All applications must be accompanied by IRC to cover the despatch of the certificate by registered post, and should be sent to The Activities Manager, Radio Society of Ceylon, PO Box 907, Colombo, Ceylon.

The majority of the awards now being offered by societies all over the world do not call for the production of supporting QSL cards, but instead a log extract must be certified by two other licensed amateurs or an official of a national society. This rule is generally known as "GCR" (General Certification Rule), and to avoid repetition when giving conditions of awards, will be referred to as such in *MOTA*.

#### Around the Bands\*

A very sparse month for reports since many correspondents are on holiday. However, some interesting information has come to hand including reports from new correspondents as far apart as Sweden and the Aden Protectorate. These are welcomed and help to improve the overall picture of conditions.

Generally the situation is that 1-8 Mc/s is pretty dead. The 3-5 Mc/s band is very much a local one although some DX can be found and 7 Mc/s is fairly active with DX whilst 14, as usual, is very busy. Lack of reports for 21 and 28 Mc/s makes assessment of conditions impossible.

The only report for 3-8 Mc/s this month is from B.R.S.20317 (Bromley) who by dint of hard listening found a couple of new ones for this band. Firstly, F9RY/FC was heard between 22.45 and 00.00 calling CQ but only getting a few returns. His companion F9UC/FC was doing better on c.w. Secondly, UG6AJ (23.38-55) at 579 (3510) was working

into Europe and G15UR and G3NVO were heard calling him. Other stations heard were W4BPD/4WI (01.40) at 459, 5B4LN, IT1AGA and VP8GQ (23.48) at 3/449, VE1ZZ also around midnight.

On 7 Mc/s a newcomer A.3543 (Sweden) reports hearing UD6AI (23.30), PX1IK (22.21) and 11BDE (23.39). B.R.S. 20317 (Bromley) reports fair conditions including F9UC/FC and UQ2BD from Europe and, summarizing by Continent:

**Asia.** A new country W4BPD/4WI (00.30) at S6.7 and UA00E (16.50).

**Africa.** DX sparse but 5A3CJ active, 5N2ACB (22.30) at S6, SM5DIC/9Q5 (23.28).

**North America.** FP8CG caused a pile-up at 23.45 and K1UHN, K3GKF, VE1ZZ, VE1CT all at S7 around the same time.

**Central America.** Produced an outstanding S8 from KV4CI (23.00). Also heard were VP6LJ, KP4BJU and KZ5MQ (00.52).

**South America.** Produced YV2AH, YV4BE and YV5AE (23.00) but otherwise little of note.

The 14 Mc/s band is still very active and open up to midnight and beyond quite regularly. G3YF (Chingford) provides a wide flung list limited in its scope only by reduced operating time. He reports on s.s.b. KH6DAV (06.15), TU2AU (18.10), AP5KC (07.20), AC5A (16.33), VK9DR (15.30), KB6CP (08.50), XW8AL (15.50), UM8KAD (15.55), 9N1MM (16.00), UA1CC/UJ (17.10), KG6IJ (14.20), KG6AJB (13.50), SV1SV (17.55), CR5AA (12.50) whilst c.w. yielded VP2AV (22.35), VK0VK (05.45), JT1CA (13.15), VK9NT (13.20), JT1KAA (07.30), BY1PK (07.45), VS9MB (17.40), 6W8AC (08.00), ZK1BV (07.30), HB1AAV/FL (10.00). A.3699 (Renfrewshire) comments that Australia has not been heard at all but reports finding on s.s.b. VE8TU (07.00), 4U1ITU (14.16), 5B4TJ (15.05), UD6KAR (15.05), AP2NM (15.07), JA1DLM (15.16), TF2WHP (15.25), XW8AU (15.40), 9G1DY (16.01), VS9MB (16.12), 5N2JL (17.11), 4X4QYC (17.30), VS9AMB (17.35), W6JIE (17.44), UD6BR (17.45), VQ4ERR (18.22), CR5AA (18.44), VQ2SM (19.16), VQ4RF (19.32), 5X5IO (19.36), 5A4TW (19.46), 5A4TR (19.46), HB1AAV/FL (19.50), OA4CV (20.25), ZB1CR (20.25), V6BVD (21.00), HK3VV (21.16), KZ5AX (21.28), VP4TI (21.37), KL7BJC (21.40), PY2CK (21.56), F9RY/FC (22.16), HI8AKU (22.16). A.2114 (Richmond, Surrey) also reports a comprehensive list (s.s.b.) as follows: ZE7JR (05.20), PX1IK (07.20), VR4CU (13.10), HI8XAA (12.47), VS1LP (14.35), 5X4MR (15.35), KZSLC (16.00), ZD6OL (16.55), ZS7R (16.56), FP8CB (17.13), XW8AL (17.15), ET3OH (17.18), TF2WIG (17.23), CR9AH (14.20), 9L1RO (17.58), ST2AR (18.00), 9N1DD (18.01), HZ1AB (18.05), MP4BBW (18.30), UR1CC/UJ8 (18.43), VE3BGV/SU (19.15), ZP5CC (19.54), LU7DX (20.00), VQ2AB (20.05), TU2AU (20.15), CP1BH (20.17), CX3BM (20.30), A.3598 (Pontypool) also heard on s.s.b. KL7FAF (08.05), 9M2CP (14.00), 9G1DY (14.50), KR6SQ (14.55), ZS6HY (17.20), 9G1DZ (19.35), LU7DX (20.05), FG7XT (20.40), YV5CZ (21.25), CX2CO (21.30). 5N2JKO (Nigeria) has just started on s.s.b. and found 60 countries in the first two weeks including CR5AA (08.45), EL1P (20.20), EL7A (08.55), EL8AF (20.40), ET3OH (16.50), ET3PP (15.55), F9RY/FC (08.25), HC2JT (22.00), HL9KR (17.30), KR6FQ (15.50), LX1DE/M (15.00), OX3JV (17.50), OY7ML (08.45), ST2AR (17.50), SV0WO (06.50), TU2AE (19.40), TU2AU (15.30), UF6FB (18.45), UA1CC/UJ8 (16.20), UJ8KAA (15.15), UL7JA (17.30), XE1SN (20.45), XE1TJ (20.45), ZD6OL (15.30), ZP5CF (18.00), 5X5FS (16.40). OZSS (Copenhagen) reports his c.w. activity giving contacts with AC5A (16.32), JT1CA (16.21), JT1KAA (15.20), KV4AA (22.50), OX3DL (22.16), YV5AXA (22.09), TI2PZ (23.17), CP2RC (19.07), 6W8AC (10.52) and JA6HW (15.25).

On 21 Mc/s A.2114 (Richmond, Surrey) reports hearing

\*Compiled by J. G. Cottrell G3PSY.

VQ4AA on s.s.b. at 18.20 whilst for 28 Mc/s A.2498 (Co. Durham) comments that many good European stations are to be heard, particularly from Scandinavia in the early evenings. However, no DX is in evidence.

That is the lot for this month but your compiler looks forward to being able to provide fuller cover next month when the lull due to holidays will doubtless be declining.

#### DX Briefs

PZ1AP is on a four-year course in Holland, occasionally operating under the call PA0AJP. He has his PZ1AP logs and some QSL cards with him and will be pleased to deal with any outstanding requests if these are sent to: PA0AJP, Hattensweg 71, Apeldore, Holland. (G3ID).

4W1AA, worked by many people and always claiming to be in the Yemen, is now beyond doubt a pirate. This is confirmed by SU11M, his alleged QSL manager, who has no knowledge of 4W1AA.

ZAIK worked recently on 14 Mc/s claims to be a licensed OK operator and asks for QSLs via the Czech Bureau. W4EC1 is amongst those would like some news as to his status.

### Top Band Operation from Angus and Kincardine

Listeners to the RSGB News Bulletin on July 21 will have heard the announcement that there would be a station operating from Angus and Kincardine for a week. This is the story behind that announcement.

The 92nd Signal Regiment, Army Emergency Reserve, were having their annual training during the last fortnight of July. The Commanding Officer, GM6RI, suggested that the Regiment's Radio Club should utilize some of its spare time in putting two rare GM counties on the air.

Equipment for the occasion was provided by Signalman Michael Francis G3LOV (who loaded the boot of his Ford Consul with his KW Valiant, SX100, and Z Match, and motored from Surrey to Scotland thus loaded), and by Lieutenant Jack Clark, GM2HIK (who provided an HRO, a home-built transmitter for 1.8 Mc/s, and an aerial loading unit). The construction of suitable aerials was undertaken by Cpl. Frank Buck, G3JNO, and by Signalman Alf Cook, GW3PPS—they produced a half-wave dipole for Top Band, and a long wire really worthy of the name (it was 250 ft. long!)



The equipment used at GM3UUU/P in Kincardine. To the right of the HRO is the aerial tuning unit and the EF91, EF91, TT11 transmitter.

(Photo via G3GVV)

PY1BCR is now again operating from Trindade Island with a characteristic drifting note on 14 Mc/s c.w. Unfortunately QSLs for the last period of operation are still awaited.

VP8HJ, on the Falkland Is., has according to rumour, been dispensing s.s.b. QSOs, however, it is believed that operators may well have been deceived by the controlled carrier modulation of a DX40.

Old friends of G6YQ will be interested to know he is once again GW6YQ. His new address is 14 West Avenue, Bryn Newydd, Prestatyn, Flintshire.

Referring to the last paragraph on page 113 of the August Bulletin the call sign G2TS should, of course, be G2TG (Sunderland).

Acknowledgement is made to numerous correspondents and also to the *DXpress* (PA0FX), the West Gulf DX Club Bulletin (W5IGJ), the LIDXA Bulletin (W2MES), the *Florida DX Report* (K4IIF) and *The DX'er* (WA6TGY). Please send all items to RSGB Headquarters to arrive not later than September 6, for the October issue and October 11, for the November issue.

Operating was carried out in the late evening and night. On Top Band, static made reception difficult at times; nevertheless, OK was worked as the best DX, with some twenty-five counties contacted in G, GM, GW, and EI.

Encouraged by these results, the Club proposes to extend its scope next year, probably by operating a v.h.f. station at a suitable QTH in the Highlands. Details of this will be given early in 1964, in order that schedules may be arranged well in advance.

Members who are interested in the Regiment's activities, both during working hours (when it carries out its role of providing long-range, H/F W/T communication), and in the Radio Club, are invited to write to GM6RI, Schoolhouse, Tannadice, by Forfar, Scotland, or to G3GVV, Farleigh, 65 Harlands Road, Haywards Heath, Sussex.

### Special Events Stations

On September 14, GB3EE will be active on the h.f. bands at the Eastern Electricity Board's Open Day at Finborough Hall, near Stowmarket, Suffolk.

Members of the Guildford and District Radio Society will be operating GB3GTS at the Guildford Town Show in Stoke Park, Guildford, on September 6-7. GB3GTS will be active on the h.f. bands and on 2m. Contacts will be appreciated. The Guildford Show is one of the largest of its kind in the country. Visitors will be most welcome at the Amateur Radio tent.

### BBC Experimental Stereophonic Transmissions

The BBC's experimental transmissions using the Zenith-GE pilot-tone system have been increased from one period per week to three per week. The new schedule of transmissions from the Wrotham Third Programme transmitter on 91.3 Mc/s is as follows on Tuesday, Wednesday and Thursday mornings each week:

10.30—11.00 Tone test transmission

11.15—11.45 Programme test transmission

Both transmissions are preceded by four minutes of tuning signal consisting of two tones of different pitch, the one of lower pitch being on the A (left-hand) channel, followed by one minute with no modulation. At the beginning of the programme period there will be a stereophonic announcement for setting-up purposes and the tone transmission will be preceded by an explanatory announcement.



# The Economical Use of the H.F. Amateur Bands\*

THE latest estimates of the number of licensed amateur stations show that the USA now has approximately 250,000 whilst those in the rest of the world total about 120,000. The number of amateur stations has increased yearly since licences were restored after World War II, and the rate of increase shows no signs of slackening. At the same time that the number of stations was increasing rapidly so was the width of some of the bands of frequency between 1.8 and 30 Mc/s available to amateurs being reduced, until, at the present day, there is the position that the highest number of amateur stations ever known have proportionately less spectrum space in which to operate.

In order that amateur stations may be able to effect reliable communication with the least amount of interference it is necessary that all operators should design and use their equipment in accordance with highest possible practicable standards.

Also, it must be shown to all other users at the next International Telecommunications Conference that the Amateur Radio movement is thoroughly conversant with modern practice and that its equipment and operating procedure conform to, or exceed, the best commercial practice.

Methods by which operators can achieve efficiency in design and operating procedure include the following:

## Technical

- (i) All transmitters should incorporate a means of reducing the output power so that the minimum power necessary for efficient communication may be used. This facility should be 6db minimum.
- (ii) Wherever possible, directional aerials should be used so that the power radiated in unwanted directions is reduced to a minimum.
- (iii) An effective form of frequency stabilization should be employed so that frequency drift from one channel will not cause interference to users of adjoining frequencies.
- (iv) Transmitter design should be such that the power of any harmonic at the aerial should be at least 40db below the power of the fundamental frequency.
- (v) The bandwidths of the various types of emissions should be held to the minimum necessary for efficient communication, e.g. A1 100 c/s, A3  $\pm$  3 kc/s, A3a 3 kc/s; n.b.f.m.  $\pm$  2.5 kc/s. Key clicks and spurious emissions should be suppressed.
- (vi) It is desirable that double sideband telephony should be replaced by single sideband suppressed carrier systems, thus effecting a very considerable increase in effective spectrum space. The interim use of the double sideband suppressed carrier system, to which existing a.m. equipment can be adapted, will reduce the problem of mutual interference.
- (vii) To reduce the possibility of interference to stations in adjacent channels the intermodulation distortion of r.f. linear amplifiers used in single sideband systems should be kept as low as possible; an ideal signal-to-distortion ratio would be 35db.
- (viii) All stations should be equipped with continuous monitoring systems, preferably of the oscilloscope type.

## Operating

- (i) Call-signs should be given clearly, using an inter-

nationally recognised phonetic alphabet and at no greater intervals than 10 minutes.

- (ii) CQ calls should not exceed one minute in duration.
- (iii) Propagation characteristics should be studied so that it will be known at what times a particular path may be open, and therefore unproductive calls may be avoided.
- (iv) Stations in contact should, wherever possible, operate on the same frequency and the "zero beating" of one transmission with another should be carefully carried out, with the transmitter in a non-radiating condition.
- (v) The frequency should be chosen, bearing in mind the type of contact to be carried on, i.e. 14 Mc/s should not be used for local communication, which work should be transferred to 28 Mc/s or to one of the v.h.f. bands.
- (vi) Operation on the different modes should be in accordance with the European Band Plan, which was inaugurated by the RSGB and approved by the Region I Societies of the IARU.

## Conclusion

Adherence by all operators to these basic principles will help to ensure that the best possible use is made of the existing amateur bands between 1.8 and 30 Mc/s, and that operators may carry on communication with the greatest reliability and least mutual interference.

## Collaboration In Space

Agreement has been reached by British Aircraft Corporation and Marconi's Wireless Telegraph Company Limited on plans for collaboration to enable them to participate fully in the design and manufacture of complete satellite communications systems. The two companies, each of which has built up considerable specialized, but complementary, experience of satellites and satellite communications, will pool their full resources for research and development.

British Aircraft Corporation was recently awarded the contract for the manufacture of UK-3, the first all-British satellite, and has already had much practical experience of developing equipment for space satellites. The Corporation has produced equipment and instrumentation for Ariel, the UK-1 satellite now in orbit, and for UK-2, due to be launched later this year. The Corporation's other work in this field has included the preparation of payloads for Skylark sounding rockets and detailed investigation of many aspects of communications satellite operation.

Marconi's Wireless Telegraph Company has manufactured high-power communications equipment for more than half a century and includes in its present range of products transmitters of the type required for communications satellite systems. It has recently completed a major study of the requirements for a satellite communications ground transmitting and receiving station. It is also engaged on a study of the communications equipment required in the satellite itself.

## British Amateur Television Club

Mr. D. S. Reid, M.A., who until last month was Honorary Secretary of the British Amateur Television Club, has handed over the UK part of his duties to Mr. John Tanner, G3NDT/T, although he hopes to continue with some of his duties. Mr. Reid is now Chief Engineer with Sierra Leone Television and his address is c/o S.L.T., Private Mail Bag, Freetown, Sierra Leone.

Mr. Martin Salter, G3RJO/T, 4 Inwood Close, Shirley, Croydon, Surrey, is the new Editor of CQ-TV to whom all official BATC correspondence should be sent.

\* A paper submitted by RSGB to the Region I IARU Conference at Malmö, Sweden, in June, 1963.



# The Malmö IARU Region I Conference

By JOHN CLARRICOATS, O.B.E., G6CL\*

IN the July, 1963 issue of the RSGB BULLETIN it was reported that three Committees were set up at the first Plenary Meeting of the IARU Region I Division Conference held at the Hotel Arkaden, Malmö, Sweden, from June 10 to 14, 1963. The recommendations of the Credentials and Finance Committee were reported upon in that issue. In this article a brief account will be given of the recommendations of the other two Committees as accepted at the final Plenary Meeting.

## Administrative and Operational Committee

This Committee was under the Chairmanship of Lt.-Col. Per-Anders Kinnman, SM5ZD, with Mr. R. F. Stevens, G2BVN, acting as Secretary.

Recommendations adopted by the Committee and later accepted (some with amendments) by the Conference at the final Plenary Meeting were as follows:

1. Subscribing Member Societies were asked to secure publication in their respective National Journals of a Malmö Conference document submitted by RSGB and entitled "The Economical Use of the H.F. Amateur Bands" (the paper is published on page 182 of this issue).

2. Subscribing Member Societies were asked to set up a permanent Working Group within their respective organizations for the monitoring and logging of intruders in exclusive amateur bands.

Societies were asked to report infringements in accordance with the provisions of the Geneva Radio Regulations (1959); to co-ordinate reporting by regularly exchanging résumés of information with other Member Societies; to present information on intruders to their national licensing authority in an approved form; to maintain close liaison with their national licensing authority; to encourage official action against intruders.

Information about the RSGB Intruder Watch was given to the meeting.

3. In order to assist the radio amateurs of the Federal German Republic, Finland and the Netherlands (who are authorized to use only a limited segment of Top Band), amateurs in Subscribing Member Societies who have use of the full (1800-2000 kc/s) band were asked to leave that portion of the band between 1825 and 1835 kc/s clear for operation by amateurs in the aforementioned countries. This portion would be divided as follows:

1825-1832 kc/s c.w. only.

1832-1835 kc/s s.s.b. telephony only.

The recommendation is to be effective from October 1, 1963.

The Conference recommended no other changes in so far as the European Band Plan is concerned except that the segment 14,100-14,110 kc/s shall be assigned to radio teleprinting and c.w.

It was agreed that "telephony" would include all modes of this form of transmission.

The Conference strongly advised that amateurs should use the 7Mc/s band even in conditions of severe interference. To vacate this band would be to run the risk of losing it.

4. It was agreed that Subscribing Member Societies who wish amateurs in their respective countries to operate in the band 1800-2000 kc/s should ask their telecommunications authorities to take steps to add the name of their country to



Delegates outside the Arkaden Hotel, Malmö. Left to right DL2NE, DL1XJ, VE3CJ, DL1JB, W6ZH, OH2TK and F9DW.

(Photo by G6CL)

Footnote 194 of Article 5 of the Geneva Radio Regulations. (This recommendation does not apply to those countries already listed in Footnote 194.)

5. Subscribing Member Societies are requested to use only parts of the amateur bands for contests and to inform other countries about those parts (RSGB and USKA voted against this recommendation).

6. It was agreed that details of contests should be sent to Member Societies to arrive not later than 90 days before the date of the contest. It was also agreed that international contests should as far as practicable be held on corresponding weekends in each year.

7. It was agreed that Member Societies should co-operate in International Quiet Sun Year projects with DARC and RSGB, who will carry out the scientific analysis. It was also agreed that Member Societies should publish their plans for IQSY participation and exchange this information with other societies.

8. The Conference recognized that within Region I the co-ordination of News Bulletin Transmissions and Morse Code Practices by Subscribing Member Societies is desirable and agreed that, as far as practicable, transmissions in the 3.5 Mc/s band shall take place on a common frequency, for instance 3600 kc/s.

It was also agreed that Societies, working in collaboration with the Executive Committee, should endeavour to secure further co-ordination.

9. The Conference considered that the promotion and co-ordination of Amateur Radio in the developing countries is important and agreed that the Executive Committee should, through appropriate channels, investigate whether material assistance would be of help to societies and groups of amateurs in such countries. It was also agreed that the Executive Committee should assess how eventual material assistance can be given by Subscribing Member Societies in Region I.

The ARRL/IARU representatives asked that the Executive Committee should co-ordinate activities with Member Societies in Region II.

10. The Conference agreed that all possible approaches

\* General Secretary, Radio Society of Great Britain. Honorary Secretary, IARU Region I Division.



Ernst Krenkel, RAEM, president of the Radio Sports Federation of the USSR, right, with Dick Van Breen, PA0FX, editor of the VERON DX Bulletin.

(Photo by G6CL)

should be made to secure the entry of non-member National Societies into IARU Region I Division. The Executive Committee was instructed to issue invitations as coming from the Conference and these should be pursued through all possible channels.

11. It was agreed that the business at Region I Division Conferences shall be conducted in one common official language, namely English, and that partial translations in or from other languages, if obtainable by reasonable means, shall be sought at every Conference.

It was agreed that full translations by official translators would involve a financial burden beyond the capabilities of Region I funds.

12. It was agreed that IARU Region I Division shall be represented at the Conference on Space Communication in Geneva during October, 1963.

13. It was agreed to continue publication of the *IARU Region I News Bulletin*. (This is issued to officials of National Societies.)

14. It was agreed to continue publication of the annual list of DX Contests.

15. It was agreed that all ways and means should be used to propagate the concepts and ideals of Amateur Radio to a wider section of the community. It was further agreed that Subscribing Member Societies should maintain close, regular and effective liaison with the Executive Committee; that Societies should give full coverage through their bulletins and any other appropriate channel, of international news, the activities of the Division, ITU problems, frequency claims etc.; that Societies should establish close and effective liaison and co-operation with their telecommunications authorities; that Societies generally, should sponsor all activities whereby the cause of Amateur Radio can be strengthened both nationally and internationally.

16. Rules for Fox Hunting (D/F) Championships were approved.

17. The invitation of PZK to hold the 1965 Fox Hunting Championships in Poland was accepted.

18. It was agreed that at the Final Plenary Meeting of each

Conference the Member Societies represented in person or by proxy shall decide whether Working Groups shall be set up to continue work in between Conferences and that the expenses of such Groups may, within reason but only in relation to the Honorary Secretary of each Group, be brought in as a charge on Region I funds; that the Honorary Secretaries shall submit in advance for approval to the Executive Committee an estimate of expenses. It was also agreed that the period of office of such Groups shall be from the 15th day of the month following the end of the Conference at which they are appointed to the 14th day of the month following the next Conference.

19. The Conference agreed to recommend that QSL cards exchanged through the Bureaux of the Member Societies should have a minimum size of 8cm by 13.5cm and a maximum size of 10.5cm by 15cm and that the call-sign of the recipient shall be shown clearly on the reverse side.

20. It was agreed that the Radio Sports Federation of USSR would prepare during the first three months of 1964 draft basic rules for International Contests and forward them to the Executive Committee for submission to Member Societies in Region I for their comments; such comments to be received not later than December 31, 1964.

#### Recommendations of the V.H.F. Committee

The following recommendations of the V.H.F. Committee were accepted at the Final Plenary Meeting.

1. In the results of International Region I V.H.F./U.H.F. contests, the multi-operator stations shall be clearly indicated.

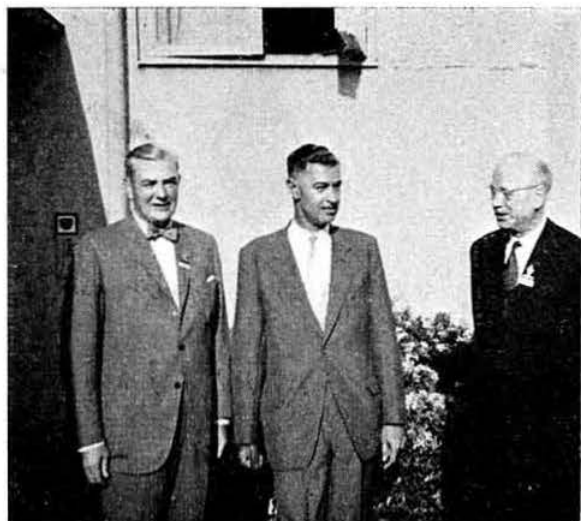
2. The sub-Regional V.H.F./U.H.F. Contests which take place during the first weekends of March, May and July shall be held between 18.00 GMT on Saturdays and 18.00 GMT on Sundays, the exact times and/or time intervals being at the discretion of the organizing National Society, provided they fall between these time limits.

3. Each V.H.F. Manager, or properly constituted Contests Committee, will check a sufficient number of the logs submitted by entrants in International V.H.F./U.H.F. Contests to establish the first three stations in each section, the check



Some of those who visited Lund University on June 13. Left to right, VE3CJ, —, W1LVQ, G3BVG, HB9GA, PA0QX and G6NZ.

(Photo by G6CL)



Presidents of three of the IARU Member Societies represented at the Malmö Conference. From left to right, Herbert Hoover, Jr., W6ZH (ARRL), W. J. L. Dalmijn, PA0DD (VERON) and Norman Caws, G3BYG (RSGB).

(Photo by G6CL)

being made in accordance with a formula agreed at the Conference.

A certain amount of standardization of the log sheets to be used in International V.H.F./U.H.F. Contests will be introduced. (DARC and RSGB log sheets will be used as the basis.)

4. The following amendments to the rules for International V.H.F./U.H.F. Contests, as established at the Folkestone Conference in 1960, were approved:

(a) Add to Rule 10: "Contest entrants will not be penalized for failure of non-entrants to comply with these rules."

(b) In Rule 10 after the words "an obviously wrongly stated QTH" add "when no QRA Locator is exchanged."

(c) Add to Rule 7: "QTH's may be exchanged if desired."

5. When QRA Locators are used they must comprise five characters, the last letter indicating the third subdivision. The centre square of this third subdivision will be given the letter "J."

6. All v.h.f. field days organized within Region I Division shall coincide as to date and time limits with the sub-Regional or International V.H.F./U.H.F. Contests.

7. All V.H.F. Managers shall send information about the V.H.F./U.H.F. Contests organized in their countries to the Honorary Secretary of the V.H.F. Working Group not later than November 1 each year in order to enable him to make up a complete list for publication in the monthly News Letter.

8. For the time being 2m s.s.b. stations will work in the sub-band 145.75-145.85 Mc/s. (The Committee noted that for domestic reasons RSGB is at the moment unable to be bound by this agreement.)

9. In order to make a valid meteor scatter contact the following minimum information must be received by both stations:

Both call-signs, report, confirmation of reception.

10. During the International Year of the Quiet Sun, all National Societies shall co-operate with DARC and RSGB in their scientific programme. Close liaison will be kept between the scientific institutes of Germany and of the United Kingdom which will handle the data.

11. All V.H.F. Managers shall send a list of the V.H.F./

U.H.F. certificates available in their respective countries, together with all relevant data, to the Honorary Secretary of the V.H.F. Working Group, in order to enable him to prepare and issue a comprehensive list.

12. The following procedure shall be used in preparing for the recognition of V.H.F./U.H.F. records:

(i) The V.H.F. Manager of the Society concerned will check the claim, gathering all data appertaining to the QSO.

(ii) This data, together with a photocopy of the QSL card certified by the V.H.F. Manager, will be sent to the Honorary Secretary of the V.H.F. Working Group who will obtain a certified Great Circle distance calculation.

13. The Honorary Secretary of the V.H.F. Working Group need not be the V.H.F. Manager of his respective country.

(At the Final Plenary Meeting it was agreed to confirm the appointment of Dr. Karl Lichfeld, DL3FM, as Chairman and Mr. F. G. Lambeth, G2AIW, as Honorary Secretary of the V.H.F. Group.)

14. The Honorary Secretary of the V.H.F. Working Group will be empowered to call a meeting of V.H.F. Managers between Conferences, if necessary, after having consulted the Executive Committee.

At the final Plenary Meeting it was decided that the Chairman of the V.H.F. Working Group should be authorized to request the Executive Committee to issue Region I certificates for special v.h.f. performances.

It was agreed that if meetings of the V.H.F. Working Group become necessary between the present and the next Conference the first meeting shall take place in Western Germany.

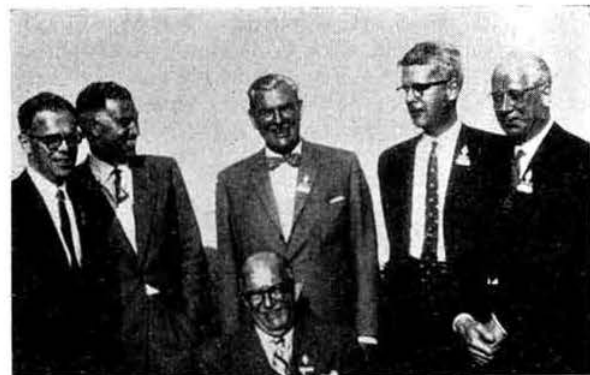
#### Final Plenary Meeting

At the final Plenary Meeting the members of the Executive Committee, Mr. H. A. Laett, HB9GA (Chairman), Lt.-Col. Per-Anders Kinnman, SM5ZD (Vice-Chairman), Mr. John Clarricoats, O.B.E., G6CL (Secretary), Dr. Jacques Simonnet (Treasurer), F9DW, Mr. A. Schädlich, DL1XJ, and Mr. J. Znidarsic, YU1AA, were re-elected *en bloc*.

During the final Plenary Meeting a message of greetings was read from Mr. Herbert Hoover Jr. W6ZH (President ARRL, IARU) who, for domestic reasons, had been compelled to return to the USA.

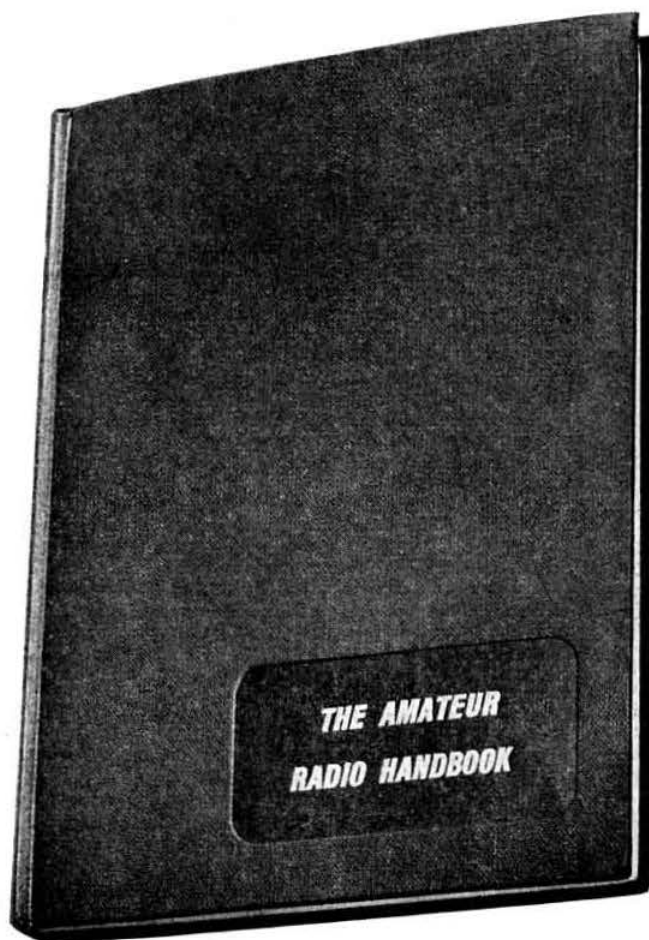
At the end of the Conference presentations were made to Mr. John Huntoon, Mr. John Clarricoats and to the six ladies who had assisted with the organization and secretarial arrangements.

A vote of thanks was recorded to Lt.-Col. and Mrs. Kinnman for their work in connection with the Conference and to SSA for acting as the Host Society.



From left to right, John Huntoon, W1LVQ, W. J. L. Dalmijn, PA0DD, Herbert Hoover, Jr., W6ZH, Noel Eaton, VE3CJ, Norman Caws, G3BYG. Seated, John Clarricoats, G6CL.

(Photo by G3BYG)



# THE RSGB AMATEUR RADIO HANDBOOK

**34/-** POSTAGE AND  
PACKING 2/6

Among the contributors to this 544 page Third Edition of the *Amateur Radio Handbook* are W. H. Allen, M.B.E., G2UJ, A. J. Bayliss, B.Sc., G8PD, G. L. Benbow, M.Sc., A.M.I.E.E., G3HB, F. J. H. Charman, B.E.M., G6CJ, D. N. Corfield, D.L.C. (Hons.), A.M.I.E.E., G5CD, G. C. Fox, A.M.I.E.E., G3AEX, D. W. Furby, G3EOH, W. E. Green, G3FBA, D. E. A. Harvey, Grad.I.E.E., J. P. Hawker,

G3VA, D. W. Heightman, M.Brit.I.R.E., G6DH, H. M. Humphreys, G13EVU, N. G. Hyde, A.M. Brit.I.R.E., G2AIH, J. H. Jowett, ex-G3CFR, J. Douglas Kay, G3AAE, L. A. Moxon, B.Sc., G6XN, R. D. Nicol, G3ENQ, S. N. Radcliffe, M.A., G3GZB, R. F. Stevens, G2BVN, and G. M. C. Stone, A.M.I.E.E., A.M.Brit.I.R.E., G3FZL.

EDITOR: JOHN A. ROUSE, G2AHL

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# Mobile Column

By E. ARNOLD MATTHEWS, G3FZW\*

FIRST of all the new writer of this feature would like to express his appreciation of the good work which C. R. Plant, G5CP has performed for Amateur Mobile Radio through *Mobile Column*, which he has written since 1961. We hope that his increased business commitments will bring him increased prosperity, yet allow him time to continue to radiate his potent /M signal. At the time of writing he is taking a well-earned holiday in Caernarvon.

G5CP's comments last month on the difficulty of fitting mobile gear into a small car gave much food for thought. The modern small car has much more space available for storage than its counterpart of a decade ago, but this space seems to be distributed about the car in small pockets. It seems logical therefore to build mobile equipment in sections which can be fitted into the nooks and crannies. Since the commercial designer has to aim at a dual function to obtain a greater marketing potential he is at a disadvantage in that it is obviously more convenient to have a station which performs the dual role of home and mobile station in one box. The man who builds his own gear has every advantage provided that he gives sufficient care to the placement of controls, which has a great effect on road safety. The Society's mobile recommendations that setting-up operations should not be carried out on the move, and in any case the Highway Code says that the driver's hands should not be taken off the steering wheel except for actions of operating car controls or making hand signals. This suggests that the send/receive function switch should be placed either on the steering column in the form of a long-dollied trafficator type switch, or mounted on a spoke of the steering wheel itself by adapting a motor-cycle handlebar-mounting switch, which is very much cheaper if not so neat, since sufficient loose wire must be allowed for turning the wheel to full lock in both directions.

## Rally News

Owing to circumstances beyond their control, Thames Valley Amateur Radio Transmitters' Society regret that they will be unable to hold their Mobile Rally planned for September 8. It is hoped that it will be possible to arrange the event during 1964.

Detailed arrangements for the RSGB Mobile Rally at Woburn Abbey on September 22 are well in hand. In addition to the talk-in station on 160 and 2m there will also be a station on 4m. The channel will be monitored for five minutes every half hour commencing at the hour and the half hour. All stations will use the call-sign GB3RS and will be in operation from about 10.30 a.m.

The usual raffle, balloon race and trade exhibitions will be held.

The RAF Stradishall Mobile Rally, held on July 28 by kind permission of the Station Commander, G/Capt. D. Clare, D.F.C., attracted an attendance of 300 cars, of which 116 were fitted with mobile equipment. The Mobile Committee was represented by C. L. Fenton, G3ABB, N. O. Miller, G3MVB, C. L. Waterman, G3NKK, B. W. Winsford, G4DC, and E. W. Yeomanson, G3IIR. The weather was perfect and a very full programme of events had been arranged by F/Lts. G. C. Moore, G3MCY, N. F. Cutter, G3PQG, and A. McMillan on behalf of RAFARS, Stradishall.

The talk-in station GB3RAF operated on 160 and 2m,

\* 1 Shortbatts Lane, Lichfield, Staffs.

the latter being equipped and manned by members of Pye Telecommunications Amateur Radio Group.

Prizes for the various competitions and for the draw were presented by Mrs. Clare, wife of the Station Commander, winners being as follows: Best Home Constructed Mobile (h.f.)—G3OGB/M (Morris Oxford); Best Home Constructed Mobile (v.h.f.)—G3JEQ/M (Morris Traveller); Safest Installation—G3HCK/M (Citroen); Furthest Distance Travelled—G5WZ/M, who came from York. The prize draw was very well supported and there were no less than 91 prizes.

The Cambridge Group of BATC gave a demonstration of amateur television, pictures being received from a /T station in the locality. Two "roving eye" vans transmitted a live picture of go-cart races.

RAF displays and demonstrations included working installations of GEE, Rebecca and Radio Compass and various flight instruments. Air navigation techniques were demonstrated by members of No. 1 Air Navigation School. Sea Survival equipment shown included dinghies, lifesaving apparatus and a solar still.

West Suffolk Police had a radar speed meter in operation and visitors were able to check their vehicles' speedometers against it. Boys of all ages found the "Scalextric" model racing cars an attraction. British Aircraft Corporation showed a prototype of UK3, the first all-British satellite.

Specially for XYL's and YL's were a beauty demonstration by a qualified beautician, and a floral arrangement display by Mrs. R. F. Pilkington, wife of G3IAG.

The Midland Radio Contest Club is holding a mobile rally on September 28 from 2-11 p.m. in conjunction with the Birmingham Association of Youth Clubs Annual Fête at Windmill House. Attractions will include a Bar-B-Q, side-shows, Miss BAYC contest and dance. Admission will be by programme at the reduced price of 1/6 each for advance bookings. Further details may be obtained from J. Lockyer, G3OVA, 23 Beechwood Road, Kings Heath, Birmingham 14.

G3JMY reports that the next Longleat Mobile Rally has been fixed for Sunday, June 21, 1964.

## Operating Notes

G13PLL reports his best yet QSO was with W1JFG on 20m. Activity has been mainly on 80m, working into G and GM without trouble, a good one being with GM4HZ/M in Ayrshire. Top Band has been tried, using a loading coil in series with the 80m helical aerial. A proposed tour has had to be postponed until September-October, when G13PLL hopes to be in G and GM for three weeks putting some rare counties on the map on 160 and 80m.

## RSGB NATIONAL MOBILE RALLY

Woburn Abbey, Bletchley, Buckinghamshire

(by permission of His Grace the Duke of Bedford)

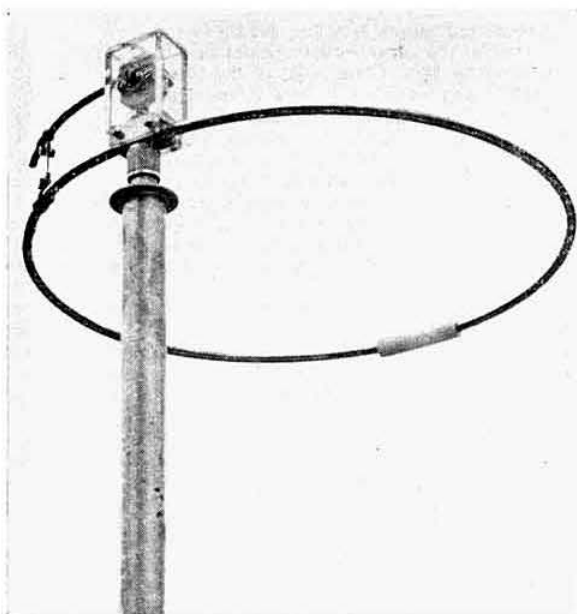
SUNDAY, SEPTEMBER 22, 1963

- \* Park opens 11 a.m.
- \* State Apartments open.
- \* More than 3,000 acres and 2,000 animals.
- \* Children's Playground, Pets' Corner and Boating Lake.
- \* Restaurants and Snack Bars.
- \* Specially reserved rally car parks.

## TALK-IN STATION

GB3RS on 2 and 160 metres

Organized by the RSGB Mobile Committee



G3AEX's 2m halo with tuned gamma matching section based on the design by G3HRH, published in the November, 1959 Bulletin. The construction and dimensions are similar to those given in the article but a modified mounting and feeding system have been incorporated. The protective cover over the tuning capacitor (10pF maximum) is of Perspex, jointed with a solution of Perspex in benzene. Excellent results have been obtained with an input power to the aerial of 5 watts, stations up to 100 miles distant being worked from favourable locations on phone.

G3BYY (Wraysbury, Staines) sends a description of his new 2m mobile. The transmitter uses a 12AT7 overtone crystal oscillator/tripler into an E180F doubler, into a 6146 running at 20 watts input. The modulator is a 6BR7 directly coupled to another 6BR7 triode connected phase splitter into an ECC82 in push-pull driving a pair of EL81s. The power pack employs a pair of OC28s mounted on home-made heat sinks and a home-wound toroid ("wound by hand sitting in a deckchair when we had summer in early June!") This delivers 250mA at 250V. All the equipment goes into one box measuring  $11 \times 8\frac{1}{2} \times 7\frac{1}{2}$  in. stowed in the boot of an Austin "Cambridge" saloon, near the base of a J-Beam halo aerial. A hybrid circuit receiver comprises an AFZ12 r.f. and mixer, AF102 tunable first oscillator and OC171 first i.f. amplifier at 30.4 Mc/s., followed by an EF97 second i.f.,

#### MOBILE RALLIES

##### 1963

- |              |  |
|--------------|--|
| September 14 | Whitewess Radio Club, Hamfest and Mobile Rally, Whitewess Manor, Kingsgate, Broadstairs, Kent. |
| September 15 | Lincoln Hamfest and Mobile Rally, Kesteven Grammar School, North Hykeham, Lincoln.             |
| September 22 | RSGB Woburn Abbey Mobile Rally.  |
| September 22 | International Red Cross Centenary Mobile Rally, Brussels, Belgium.                             |
| September 28 | Midland Radio Contest Club Rally.  |

##### 1964

- |         |                        |
|---------|------------------------|
| June 21 | Longleat Mobile Rally. |
|---------|------------------------|

ECH83 crystal controlled second mixer, EF97 and ECH83 first and second i.f. amplifiers at 1.6 Mc/s. The triode of the second ECH83 acts as first a.f. amplifier, followed by an OC71 and an XC141. An "Electroniques" detector unit has been modified to include a peak noise limiter self-adjusting to carrier level. A miniature moving coil microphone clipped to the operator's jacket lapel feeds the modulator via an OC71 and OC72 pre-amplifier.

First contact with this gear was with G3JHM/A at a distance of 50 miles, and several solid contacts have been made with London stations. Like many others, G3BYY has found that mobile operation has re-awakened his interest in motoring, "which present-day roads were rapidly suppressing."

G3IKR will be touring Ireland from September 5 until September 17 using the call-signs EI9AP/M and G3IKR/M, 'phone and c.w. on 160 and 80m.

#### Chicago Meeting

Members of the RSGB visiting the USA are cordially invited to attend the 10th Annual W9DXCC Meeting at the Sheraton Hotel, Chicago, on September 14, commencing at 1 p.m. Further details may be obtained from W. M. Reynolds, W9EVI, 664 Caroline Court, Deerfield, Illinois, USA.

#### RSGB QSL Bureau Sub-Managers

The following is a list of the RSGB 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, G3NXX, 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, 250 Gloucester Road, Cheltenham, Gloucestershire.             |
| G3SAA-SZZ:                        | E. G. Allen, G3DRN, 65A Melbury Gardens, London, S.W.20.                        |
| GD:                               | T. R. Moore, GD3ENK, "Glyn Moar," St. John's, Isle of Man.                      |
| GI:                               | R. R. Parsons, G13HXV, 45 Erinvale Avenue, Finaghy, Belfast.                    |
| GM:                               | D. Macadie, GM6MD, 154 Kings-acre Road, Glasgow, S.4.                           |
| GW:                               | J. L. Reid, GW3ANU, 28 Waterston Road, Gabalfa, Cardiff.                        |
| DL2:                              | 4027469 C/T Griffiths, DL20X, 212 Hohenzollern 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.

# Society News

## Election of Council 1964

In accordance with Article 55 of the Society's Articles of Association the Council have nominated the following Corporate members to fill the vacancies in the Council which will occur on December 31 next:

### Officers:

President: Mr. G. M. C. Stone, G3FZL

Executive Vice-President: Mr. E. W. Yeomanson, G3IIR

Honorary Treasurer: Mr. N. Caws, G3BVG

### Ordinary Members:

Mr. F. E. A. Green, G3GMY

Mr. L. E. Newnham, G6NZ

\* \* \*

Not later than October 24 next any 10 Corporate Members may nominate any other Corporate Member to serve on the Council by delivering their nomination in writing in a single document to the Secretary, together with the written consent of such nominee to accept office if elected, but each nominator shall be debarred from nominating any other person for this election.

## Zonal Representation on Council

Not later than October 24 next any 10 Corporate Members resident in Zone A (Regions 1 and 2), Zone C (Regions 5, 7, 8, 16) and Zone E (Regions 10 and 11) may nominate any other duly qualified Corporate Member to serve as a Zonal Representative on the Council by delivering their nomination in writing in a single document to the Secretary together with the written consent of such nominee to accept office if elected, but each such nominator shall be debarred from nominating any other person for this election.

Candidates for Zonal Representative must be resident within the Zone for which they are nominated and the nominators must be resident in that Zone.

The present Zonal Representatives are Mr. L. N. Goldsbrough (Zone A), Mr. E. W. Yeomanson (Zone C) and Mr. A. C. Williams (Zone E). The last two named have decided not to seek nomination again as Zonal Representatives.

## Affiliated Societies' Representatives

Acting on the advice of the Membership and Representation Committee the Council has decided that as from January 1, 1964, the Honorary Secretary of each society affiliated to the RSGB shall automatically become the ASR (irrespective of his personal membership or otherwise of the RSGB) unless the members of a particular society desire to nominate and appoint another of their members to serve as ASR. In that event the Council suggest it would be desirable for the person nominated to be a Corporate Member of RSGB.

As from January 1, 1964, ASR's will not be eligible to claim expenses from the RSGB.

## DL Licences

Members of H.M. Forces who hold a UK Amateur (Sound) Licence may obtain a DL licence whilst serving with the British Forces in Germany. Applications should be addressed to the Joint Communications Electronics Board, c/o HQ, BAOR, BFPO 40.

Amateurs who return to the UK with a current DL licence may apply for the reissue of their original UK licence without taking further tests.

## Mr. W. H. Martin, G15HV, Elected a Vice-President

At a meeting of the Council held on July 29, 1963, Mr. W. H. Martin, G15HV, of Greenisland, Co. Antrim, Northern Ireland, was elected a Vice-President in recognition of his outstanding services to the Society over a period of many years and in particular for his services as Northern Ireland QSL Manager.

Mr. Martin is the first Northern Ireland member to be so honoured. He became a member in 1926 and was licensed in 1928.

## RSGB QSL Bureau

Members in Northern Ireland are asked to note that Mr. R. R. Parsons, G13HXX, 45 Erinvale Avenue, Finaghy, Belfast, has taken over the duties of QSL Bureau Sub-Manager from Mr. W. H. Martin, G15HV.

## Geloso Tape Recorder

Headquarters has for disposal a small Geloso Tape Recorder in carrying case complete with microphone and telephone pick-up. The best offer over £5 received by September 30, 1963, will be accepted. Letters should be addressed to the General Secretary, RSGB Headquarters.

## Silent Keys

### JOHN P. BLAIR, GM5FT

It is with much sorrow that we record the death on August 5, 1963, of Mr. John P. Blair, GM5FT, of Selkirk.

John had been a Society member since 1942 and a member of the Radio Amateur Old Timers' Association for several years, having been licensed in 1935. He will be sadly missed by a large number of radio friends far and near, as his station was frequently to be heard on 10, 15 and 80m.

The funeral was attended by GM3BGA, GM3BQA and GM6SR.

Heartfelt sympathy is extended to Mrs. Blair and to her daughter in their sad loss.

S. W. R.

### G. T. CANTLEY, B.R.S.23158

It is with deep regret that we report the death of George T. Cantley on July 30, 1963, after an illness lasting some months.

He had been a member of the Society since 1961, had passed his RAE and was studying for his Morse test when he was taken ill. George led a full life and was untiring in his efforts for others. He will be particularly remembered in the Ruislip and Watford areas for his work for spastic children and as scoutmaster of the 2nd Ruislip St. Martin's Troop to which he willingly gave so much of his time. He organized participation by the Troop in the Scout Jamboree-on-the-Air in October, 1962, and, with the knowledge that he would probably not be there, he had already made arrangements for the Troop to be on the air for the next Jamboree in October.

He will be sadly missed by his many friends. To his widow, son and daughter we extend our sincere condolences.

G.S.F.

### H. F. C. JAMES, B.R.S.12639

We regret to record the death of H. F. C. James, B.R.S.12639, of Epping, Essex, who had been a member of the Society since 1946.

To his widow, we express our sympathy at this time.

### J. J. PAINE, G6PR

We record with deep sorrow the death, on August 4, 1963, of J. J. ("Jack") Paine, G6PR, of Slough at the age of 67.

Active since the 1920's, Jack was a member of the London Members' Luncheon Club and the Radio Amateur Old Timers' Association. He will be sadly missed by his many friends on the DX bands. For some years he was a radio instructor with the Slough Air Training Corps. His other interests included gardening, the ICI Veterans' Club and cycling.

Our deepest sympathy is extended to his widow and four children.

### Official Regional Meeting in Folkestone

An Official Regional Meeting is to be held on Sunday, October 20, 1963, in the famous Sun Lounge of the Leas Cliff Hall, Folkestone, overlooking the English Channel. The programme will include an official business meeting for members and an interesting short talk, to be held in the afternoon, followed by tea and social activities open also to wives or friends accompanying members.

Members of the RSGB Council and John Clarricoats, O.B.E., G6CL, General Secretary of the Society will be present. It is planned also to hold a small exhibition of contemporary radio gear produced especially for the amateur.

Admission will be by ticket only, obtainable shortly from Area and Affiliated Society Representatives or direct from the Regional Representative, Norman D. Mattock, G2DFG, 70 Bouverie Road West, Folkestone, price 4s. 6d. for members and 3s. for wives and friends. Both include an entitlement to six raffle tickets; tea will also be provided. Members who are students or otherwise non-wage-earning can apply to the RR for free admission tickets, if required. Applications should be accompanied by a letter of confirmation of the circumstances from another RSGB member.

Local members have volunteered to "talk-in" mobiles on Top Band and it is hoped that this meeting, which will be the first of its kind in Region 8 for many years, will be well attended. All members throughout the Region are urged to make the effort and to take this opportunity to get acquainted with their fellow amateurs in the furtherance of Amateur Radio in the South-East.

### Ghana Amateur Radio Society

The Ghana Amateur Radio Society is now a Member Society in the International Amateur Radio Union. Voting on the proposal to admit the Ghana Society to membership was carried by 35 votes to none opposed.

### IARU Region II Meeting Proposed

The Liga Mexicana de Radio Experimentadores has decided to hold, in Mexico City from April 15-18, 1964, an Amateur Radio Convention to which all IARU Member Societies in Region II will be invited. LMRE hope that this meeting will lead to the start of a Region II Division similar to that which is already working successfully in Region I.

### Retirement of the General Secretary

On December 31 this year our General Secretary, Mr. John Clarricoats, O.B.E., G6CL, retires after over 30 years' service with the Society. It is a great tribute to him that we are a thriving and vigorous Society today, for if it had not been for his foresight and enthusiasm, we should in all probability have ceased to exist during the war years.

I believe that many members would like to contribute towards a presentation to be made to him on his retirement. This is of course over and above the pension arrangements already made by the Council. If you wish to make a donation please send it to Mr. A. O. Milne, G2MI, who has agreed to act as a treasurer for this presentation, at 29 Kechill Gardens, Hayes, Bromley, Kent, marking the outside of the envelope "G.S. Presentation." Cheques should be made payable to A. O. Milne, No. 2 A/c.

Norman Caws, G3BVG,  
President

### REGION 16 LECTURE

#### "Radio Astronomy"

by Frank Hyde, F.R.S.A., F.R.A.S., M.S.E.,

at 7.30 p.m.

on Tuesday, October 1, 1963

at

Marconi College

Arbour Lane

(off Springfield Road)

Chelmsford, Essex

*It would be appreciated by Chelmsford Amateur Radio Club if those intending to be present would inform the Regional Representative, P. J. Naish, G3EIX, 6 Mildmays, Danbury, Chelmsford, Essex, in advance.*

### Representation

The following is an addition to the list of Town Representatives published in the December, 1961, issue.

#### REGION 7—LONDON EAST

LEYTON AND LEYTONSTONE

A. W. Rix, G3RYF, 17 Forest Drive East, Leytonstone, London, E.11.

### Affiliated Society Representatives

The following are additions to the list of Affiliated Society Representatives published in the December, 1962, issue.

#### BASINGSTOKE AMATEUR RADIO CLUB

P. J. STERRY, G3CBU, Ashley, Orchard Road, Basingstoke, Hants.

#### E.M.I. SPORTS AND SOCIAL CLUB

C. REED, G3MQQ, 12 Knowle Lane, Wookey, Wells, Somerset.

#### GUILDFORD AND DISTRICT RADIO SOCIETY

D. H. MEAD, G3OXI, 41 Egley Road, Woking, Surrey.

#### UXBRIDGE RADIO SOCIETY

J. F. BATTEN, B.R.S. 24871, 36 Collingwood Road, Hillingdon Heath, Middlesex.

### Wired Television

With the increasing use of wired television, members may like to know that where interference is caused to such services using carrier frequencies embracing the bands assigned for amateur operation, the Post Office refers complainants to the relay company concerned. The Post Office normally looks to the relay companies to attend to their systems in order to prevent the interference.

### Editorial Vacancy on Headquarters Staff

There is an important vacancy at Headquarters in the editorial team responsible for the RSGB BULLETIN, *Amateur Radio Handbook*, and other technical publications.

A good command of English, the ability to write quickly and well on a wide variety of subjects, and enthusiasm are essential. A knowledge of Amateur Radio, preferably as a licensed amateur, would be an advantage.

The successful applicant, who will probably be in the age group 25-35, will be expected to qualify for the position of Assistant Editor of the RSGB BULLETIN within a reasonable time.

Write in confidence, giving details of career to date, to the General Secretary, Radio Society of Great Britain, 28 Little Russell Street, London, W.C.1.



# Society Affairs

*A digest of the business discussed at the June, 1963, meeting of the Council.*

The June meeting of the Council was held on June 29, 1963, and was attended by Messrs. N. Caws (President), H. A. Bartlett, L. N. Goldsbrough, J. C. Graham, R. C. Hills, E. G. Ingram, J. Douglas Kay, A. O. Milne, L. E. Newnham, R. F. Stevens, G. M. C. Stone (Executive Vice-President), J. W. Swinnerton and E. W. Yeomanson (Members of the Council), John Clarricoats (General Secretary) and John A. Rouse (Editor).

Apologies for absence were submitted on behalf of Major-General E. S. Cole, Mr. F. K. Parker, Mr. A. D. Patterson and Mr. A. C. Williams.

\* \* \*

## Affiliated Societies' Contest

The President stated that the Contests Committee had prepared a draft of a letter explaining why it had been decided to make no award in connection with the 1963 Affiliated Societies' Contest. It was agreed to send the letter to every club which had taken part in the contest.

## Claimed Scores

It was agreed that details of scores claimed in RSGB Contests should be made available for publication in *The Month on the Air* and in *Four Metres and Down*.

## Investments

In connection with an investment with Luton Corporation, it was agreed that Mr. N. Caws, Mr. E. G. Ingram and Mr. G. M. C. Stone should act as trustees for the Society.

## Insurance

Arising out of a discussion of the Society's insurance policies it was decided to invite Sedgwick Collins and Co. Ltd., a firm of insurance brokers, to advise the Council.

## Staff Matters

The President and the Chairman of the Finance and Staff Committee were authorized (i) to draw up a new agreement between the Society and Mr. J. A. Rouse, (ii) to prepare a draft agreement between the Society and Mr. A. J. Reynolds. (Mr. Reynolds joined the Headquarters Staff as a secretary-accountant on August 1, 1963.)

The General Secretary was authorized to engage a copy typist, to purchase a dictating machine, and to dispose of a small tape recorder no longer required.

## Honorary Treasurer

It was agreed that no action should be taken at this meeting to fill the vacant office of Honorary Treasurer.

## Malmö Conference

The President reported briefly on the Region I Conference held in Malmö.

## Terms of Reference

Terms of Reference for Committees and the Honorary Certificates, QSL and V.H.F. Managers were approved.

## North West V.H.F. Convention

The Council agreed that the President, Mr. Norman Caws, should represent the Society at the North West V.H.F. Convention on October 5, 1963.

## Membership

The Council approved 135 applications for membership (99 Corporate and 36 Associate). In addition, 6 applications for transfer from Associate to Corporate grade were accepted.

The Council accepted 3 applications for affiliation from the Mid-Warwickshire Amateur Radio Society, Uxbridge Radio Society and the Marton Branch (No. 23) of the New Zealand Association of Radio Transmitters.

## New Publications

A quotation from Loxley Bros. Ltd., for the printing of a new publication tentatively entitled the *Experimenters' Gen Book* was accepted.

## Committee Reports

When the TVI/BCI Committee met on April 10, problems connected with Town and Country Planning (for administrative reasons, the Committee advises members on planning problems arising from the erection of aerial masts), with TVI cases and with a revised summary of P.O. procedure in dealing with cases of interference were considered.

The V.H.F. Committee on May 6 discussed final plans for the International V.H.F./U.H.F. Convention, the British Isles Two Metre Band Plan, Beacon Stations, Project Oscar and High Power Permits.

The Golden Jubilee Rally at Wethersfield was discussed by the Mobile Committee at its meetings on May 15 and May 26. At the latter meeting, consideration was also given to the National Mobile Rally to be held at Woburn Abbey on September 22.

The Technical Committee reported on its meeting on May 16 when the technical articles programme, the *Experimenters' Gen Book*, the Committee's Terms of Reference and the Society's "build-it-yourself" leaflets were discussed. The Committee also considered at some length a complaint made against an advertiser in the RSGB BULLETIN.

The following day, May 17, the Exhibition Committee gave detailed consideration to plans for the Golden Jubilee Year Radio Communications Exhibition to be held at the Seymour Hall, London, from October 30 to November 2. It was decided that the Society's own stand should be much larger than at previous exhibitions and should be in a more prominent position.

A joint meeting of the V.H.F. and Contests Committees was held on May 23 to discuss items to be considered at the Region I IARU Conference in Malmö.

At its meeting on June 2, the Contests Committee dealt with matters relating to the RSGB 7 Mc/s DX Contest, the 144 Mc/s Open, the Listeners' V.H.F. and the Low Power Contests, arrangements for checking N.F.D. entries and the results of the BERU Contest.

\* \* \*

*The Council was in session for 5½ hours.*

## GB2RS SCHEDULE

RSGB 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
	10.15 a.m.	Belfast
	10.30 a.m.	North Midlands
	11 a.m.	North East England
	11.30 a.m.	South West Scotland
145.30 Mc/s	12 noon	North East Scotland
	10.30 a.m.	Beaming north west from Sutton Coldfield
145.50 Mc/s	10.45 a.m.	Beaming south west from Sutton Coldfield
	11.00 a.m.	Beaming north from Leeds
145.8 Mc/s	11.15 a.m.	Beaming east from Leeds
	11.30 a.m.	Beaming west from Belfast
145.10 Mc/s	11.45 a.m.	Beaming north east from Belfast
	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.

# RAEN Notes and News

By E. ARNOLD MATTHEWS, G3FZW \*

## East Midlands Members' Meeting

A meeting open to all RAEN members will be held at Kesteven Grammar School, North Hykeham, Lincoln, at 11.15 a.m. on Sunday, September 15. The RAEN Committee will be represented by C. L. Fenton, G3ABB and E. A. Matthews, G3FZW. The main feature of the programme will be Mr. Fenton's address dealing with the plans for the future of RAEN now being considered by the Committee.

The event will take place on the same day and at the same venue as the Lincoln Hamfest and all RAEN members attending will be welcome.

## RAEN aids East Pakistan Amateurs

Some three years ago we supplied, through Lt.-Col. H. G. Beard, a member of the Society, considerable detail of the organization and application of RAEN to amateurs in East Pakistan. A short while ago we received further correspondence from Col. Beard, enclosing Press cuttings about a cyclone which made many thousands of people homeless in Chittagong and the south-east coastal areas.

The first warning of the disaster was given by an AP5 station (not named) working to a plan based on information about RAEN, and it appears that for at least five hours this station was the only means of communication between Dacca and Chittagong during which time the station functioned without interruption.

## Conditions of Membership

The RAEN Committee, in discussing proposed new rules, has on its hands a problem concerning the activity level of members. Increasingly we are aware that there are two types of member, those who are prepared to "go the whole hog" and carry out exercises at frequent intervals, build gear specially for the job and put themselves to some inconvenience for the sake of the cause; and those who would turn out in time of actual emergency need using what gear they had functioning at the time.

As the standards of efficiency of the former types of members increases, so the gap between the two types becomes more difficult to bridge. This has become particularly noticeable where groups are participating in local authorities' "crash plans" in which a considerable amount of prior arrangement and practice are needed to reach an acceptable speed of turnout.

There is no doubt in the minds of the Committee that the latter type of member can give extremely valuable assistance in some circumstances, yet it is not easy to blend the two types into a group. The keen type says, "The limited members contribute little and are a drag on the group," and the others say, "It's all very well for you folk who have the time and money to spare for these /M exercises!"

The Committee feels that it is opportune, now that a system of annual re-registration is being considered, to seek members' views on this problem, and to ask for suggestions for a workable scheme which will accommodate a two-level membership in a way which will allow the less active members to fit into an active group without friction.

On the subject of annual re-registration it is felt that after due notice over a period in the BULLETIN all members should be required to re-register annually, and that the responsibility for returning membership cards for franking should rest with the members.

## Group Reports

The newly formed Bedford Group is now active and nets

\* 1 Shortbatts Lane, Lichfield, Staffs.

are held on 1920 kc/s. A group meeting was held on August 21.

A lengthy letter from G3HRK reports considerable activity in Norfolk. An analysis of the "G3NJQ exercise" held earlier this year showed that 83 per cent of the traffic passed was usable, and in view of the popularity of the type of exercise, which was adapted from the RAEN Rally, it should be repeated. Each area in the country is to organize one in turn. G4LM and G3SZ are carrying out tests from Watton Police station to increase county coverage.

Insp. Dodds, of Norfolk Constabulary, has informed the group that a "surprise" exercise will be held shortly. The only information available is that it will take place after normal working hours: will involve all classes of members and will be of several hours duration! With a welcome increase in /M and /P gear the group is all geared up for this "nearly-the-real-thing" scheme.

## Deputy Controllers

As controllers are aware, they may appoint deputies at their own discretion without reference to the RAEN Committee. This has resulted, in some cases, in the identities of deputies not being notified to the Committee and it is felt that it would be advantageous for the names and addresses of all deputy controllers to be notified to the Honorary Secretary.

## Change of Address

On September 2 the Honorary Secretary to the RAEN Committee, E. R. L. Bassett, B.R.S.16075, changed his address to "Rydal," Upper St. Helen's Road, Hedge End, Southampton, Hants.

## RAEN Rally, 1963

This year's Rally takes place on October 6. The rules are given in full on page 195.

## THE RADIO AMATEURS' EXAMINATION MANUAL

Compiled by

B. W. F. MAINPRISE, B.SC. (ENG.), A.M.I.E.E., G5MP

*This RSGB publication is intended to help those studying for the Radio Amateurs' Examination of the City and Guilds of London Institute. The subject matter is treated mainly in question and answer form and the text is fully illustrated.*

### CONTENTS

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## RSGB PUBLICATIONS

28 LITTLE RUSSELL STREET, LONDON, W.C.1.

# Courses of Instruction for the RAE

THE following are additions to the list of courses for the RAE published on page 135 of the August, 1963 issue of the BULLETIN.

**Beckenham Evening Education Centre, 28 Beckenham Road, Beckenham, Kent.** Information on classes to be held on Thursdays from 7-9 p.m. commencing September 26 may be obtained from the instructor, M. D. Bass, B.Sc., G3OJE, 42 Clevedon Road, London, S.E.20.

**Birmingham: Central Evening Institute, Lea Mason Centre, Bell Barn Road, Birmingham.** Classes will be held on two evenings a week, from 7 to 9.30 p.m. The instructors will be M. A. Brett, G3HBE, on Mondays, H. B. Bligh on Wednesdays. Enrolment will take place during the normal school enrolment period in early September. Prospective students are advised to contact the Institute immediately for further details.

**Brighton Technical College, Coombe Road, Brighton 7.** Three courses for radio and television examinations will be taking place during the 1963-64 session, which begins on September 19: (i) RAE Course, one evening per week; (ii) City and Guilds Radio and Television Servicing Course—two courses will be run simultaneously, each covering both the Intermediate and Final Examination syllabuses. One will take place on an evening and one day per week, whilst the other is to be held on two evenings per week; (iii) Introductory Course for Colour Television—a one evening per week course. Each course will be under the supervision of Mr. F. R. Canning, AMIEE, G6YJ.

Enrolment must be made during the period September 9-12, 1963, at Fawcett School. Further details may be obtained from the Head of the Electrical Engineering Department, Brighton Technical College, Richmond Terrace, Brighton.

**Cannock Chase Mining and Technical College, Cannock, Staffordshire.** Classes will be held on Tuesdays and Fridays, in preparation for the May 1964 RAE. Each session will last from 7 to 9 p.m., the first hour being devoted to Morse practice. Enquiries should be addressed to C. J. Morris, G3ABG, The School House, 24 Walhouse Street, Cannock, or the Cannock Technical College.

**Crawley Evening Institute, Crawley, Sussex.** A course for the RAE will commence in September, 1963. No previous knowledge will be required. There will be facilities available for some practical work. Application should be made to the instructor, A. J. Gibbs, G3PHG, 6 Dairyfields, Gossops Green, Crawley, Sussex.

**Derby and District College of Technology, Kedleston Road, Derby.** A course lasting for three terms will be conducted by F. C. Ward, G2CVV. Theory classes will be held on Tuesdays from 7-9 p.m., laboratory and practical sessions on Fridays at the same time. Enrolment will take place on September 16, 17 and 18. The fee will be 35/- for adults and 15/- for juniors.

## Radio Amateurs' Examination to be held on December 13, 1963

The City and Guilds of London Institute has informed the Society that the date of the next Radio Amateurs' Examination has been changed to December 13, 1963.

## FOR YOUR BOOKSHELF

### RSGB PUBLICATIONS

The Amateur Radio Handbook	-	-	-	36/6
Radio Data Reference Book	-	-	-	14/-
Radio Amateurs' Examination Manual	-	-	-	5/6
RSGB Amateur Radio Call Book	-	-	-	5/-
A Guide to Amateur Radio (Tenth Edition)	-	-	-	4/-
Service Valve Equivalents (Fifth Edition)	-	-	-	3/6
Communication Receivers	-	-	-	3/-
The Morse Code for Radio Amateurs	-	-	-	1/9
RSGB Morse Instruction Tape (900 ft. 3 3/4 i.p.s.)	-	-	-	35/-
RSGB Morse Practice Tape (450 ft., 3 3/4 i.p.s.)	-	-	-	17/6

### AMERICAN PUBLICATIONS

Radio Amateur's Handbook, 1962 (ARRL)	-	-	-	38/6
CQ New Sideband Handbook (Cowan)	-	-	-	25/6
Mobile Manual for Radio Amateurs (ARRL)	-	-	-	25/-
CQ Mobile Handbook (Cowan)	-	-	-	24/6
Diode Source Book	-	-	-	20/6
Antenna Book, 9th Edition (ARRL)	-	-	-	19/6
CQ Anthology, 1952-59 (Cowan)	-	-	-	23/-
Single Sideband for the Amateur (ARRL)	-	-	-	14/6
Hints and Kinks, Volume 6 (ARRL)	-	-	-	10/6
A Course in Radio Fundamentals	-	-	-	10/6
How to Become a Radio Amateur (ARRL)	-	-	-	5/-
Learning the Radiotelegraph Code (ARRL)	-	-	-	5/-
RTTY Handbook (Cowan)	-	-	-	30/-
Surplus Schematics (Cowan)	-	-	-	19/6
Television Interference (Rand)	-	-	-	14/6
Understanding Amateur Radio (ARRL)	-	-	-	18/-

### AMERICAN MAGAZINE SUBSCRIPTIONS

CQ (Cowan) Monthly	-	(p.a.)	-	44/-
QST (ARRL) Monthly	-	(p.a.)	-	43/6
73 Magazine (73 Inc.) Monthly	-	(p.a.)	-	28/6

### BRITISH PUBLICATIONS

Manual of Transistor Circuits (Mullard)	-	-	-	13/6
Wireless World Radio Valve Data (Iliffe)	-	-	-	7/-
Short Wave Receivers for the Beginner (Data Publications)	-	-	-	6/6
Radio Amateur Operator's Handbook (Data)	-	-	-	4/-
Guide to Broadcasting Stations (Iliffe)	-	-	-	4/-
Log Book (Webbs)	-	-	-	6/-
Panel-Signs, Sets 1, 2, 3 and 4 (Data) per set	-	-	-	4/-

British Isles QRA Locator Map	-	-	-	2/6
RSGB Countries List	-	-	-	9d.

### RSGB MEMBERS ONLY

Car Badge (De Luxe type with call-sign)*	-	-	-	18/6
(Postage on overseas orders 5/6 extra)	-	-	-	
Car Badge (RSGB Emblem with call-sign)	-	-	-	
(5 characters)*	-	-	-	11/6
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Society Tie (all silk)	-	-	-	16/6
Pennants (RSGB) 12" long for car	-	-	-	8/9
Blazer Badge	-	-	-	7/-
Headed Notepaper (RSGB) per 100 sheets	-	-	-	
(Large) 9/- (Small) 6/6	-	-	-	
Call-sign Lapel Badges (5 characters)*	-	-	-	6/-
*Delivery 6-8 weeks	-	-	-	

All prices include cost of packing and postage and are subject to alteration without notice.

### RSGB PUBLICATIONS (Dept. B)

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

# CONTEST NEWS



— RESULTS — REPORTS — RULES —

## D/F Qualifying Events

### High Wycombe

The High Wycombe D/F Event was held on June 16, in weather conditions very different from those of previous years, rain or drizzle continuing throughout most of the afternoon. Two transmitters had been well hidden, G3MPL/P some ten miles to the north of the start in a thick wood at the end of a narrow track, and G8VZ/P some 5½ miles south of the start in a car in an open air car park near a Thames-side picnic and bathing spot.

Both proved quite difficult to unearth and although three competitors located the first and five the second, only E. L. Mollart and E. W. Bristow, both of the Oxford group, successfully found both before the contest ended at 16.30.

After tea at the Little Abbey Hotel, Mrs. Janet Atkinson of RSGB Headquarters, Secretary of the Contests Committee, presented the High Wycombe D/F Trophy to Eric Mollart who now retains it, having won it three times in succession. Mr. D. A. Findlay, of the Contests Committee, who had also competed, thanked Mr. G. T. Peck, his helpers and the operators for an interesting and well-organized event, and Mr. Peck promised that there would be another Challenge Trophy next year.

### South Manchester

Seven teams took part in the South Manchester D/F Qualifying Event held on June 23. All but one heard station A but as station B was not heard, the starter declared the competition to be a one station contest. The operators of station B found their fault and were on the air at 14.20.

Despite the very hilly nature of the area, Mr. Smart of Slade Radio arrived at 14.15 BST, closely followed by Mr. Hitchcock of Derby at 14.18 and Mr. Smith of Derby at 14.19. All other teams were in the immediate area by 14.30. Four of the seven teams also found the B station which was hidden in a wood at the edge of the map.

The teams met and had tea later at the Moorside Hotel, Disley.

The event was organized by J. A. Elliott, G3KIQ.

### Derby

The Derby Qualifying Event held on June 30, 1963 was marred only by very heavy rain in the morning but fortunately this cleared by around noon to give the competitors a comparatively dry afternoon. Not so the transmitting party at the B station, who were soaked to the skin while taking the gear to the site.

There was a gratifying entry of 12 teams at the start and the first to find both stations was Mr. E. Mollart at 15.45, followed by Mr. G. Taylor at 16.05 BST and, after great physical endurance and perseverance, by Mr. P. Williams at 16.25. These three were the only entrants to locate both transmitters.

The A station, operated by G3IFA/P, was situated on the side of the road near Muggington (NGR 287435) and the B station on a high footpath at Kings Mills (NGR 415271).

The event was organized by A. D. Hitchcock, G3ESB, and F. Allsopp, G3IFA, on behalf of the Derby and District Amateur Radio Society.

### Wirral

The Wirral D/F Qualifying Event took place on July 21 in fine warm weather. Six teams assembled at the Crown Hotel, Tarporly under the control of the starter, Basil O'Brien, G2AMV, Region 1 Representative. After a delayed start caused by accumulator failure at the A station, G3NWR/A operated by A. Seed, G3FOO, five teams left at 14.00 BST.

All the teams found B station, G3NTI/A, operated by R. Blain, concealed in a wood on the slopes of the rock on which stands Beeston Castle, but only two teams located G3NWR/A hidden in a hedge at Oakmere about eight miles from the other station.

After tea at the Crown Hotel, Mrs. O'Brien presented a prize donated by Wirral Amateur Radio Society to the winner, Mr. A. Hitchcock of Derby, who had already qualified in a previous event for entry to the National Final.

The results were as follows:

	Station A	Station B
1. A. Hitchcock, Derby	14.54 BST	16.10 BST
2. M. D. Fowler, Slade	16.48 BST	15.36 BST
3. R. J. Parsons, Oxford	—	15.22 BST
4. F. N. Kendrick, Wirral	—	15.30 BST
5. R. Bridson, Wirral	—	15.38 BST



Members of the teams which took part in the Derby D/F Qualifying Event on June 30.

(Photo by A.1706)



## 70 Mc/s Contest 1963

Late in the evening of June 15, a front crossed the Bristol Channel in the north west-south east direction and produced excellent propagation for the 70 Mc/s Contest 1963, particularly east-west from the London area. With TV on Channel 5 (63-67 Mc/s) South Wales stations were restricted to about two hours during the contest in which to operate without TVI. (Members are asked to send observations on conditions during contests for inclusion in *Four Metres and Down* direct to G2AIW, and not to include them with contest entries. By the time the logs are examined it is too late for the news to be forwarded. Comments on contests as such are of course most welcome by the Contests Committee.)

EI2W, having changed his frequency, was very welcome on the band, and with good effect too. He suggests that the county should be given in all reports. He spent an hour in a library to fix only one QTH!

### Comments

"What puzzles me," says G3OWA, "is where all the stations get to for the rest of the year? ... perhaps two contests will help." G3FZL also says "How about a 4m c.w. only contest for the winter?" This is a severe criticism on the lack of use of this excellent band and the suggestion falls upon the table of a much overworked Committee when BERU, NFD, 70 Mc/s, Second 114 Mc/s Portable, and 1250 Mc/s Tests have been keeping them busy weekly for more than three months. The point will however be considered in due course.

G4AC/P reported very deep and prolonged QSB on signals from G3KMP and G3FZL. G3OHH called G3OJE/P many times and understands that G3FZL had been frantically calling him, but no signal was heard. G3OHH is another to add a plea for a second contest. A prize rogationist however comes from the winner, G3PIA/P "Our first venture on to the 70 Mc/s band ... we always support NFD, MCC and 144 Mc/s Contests. Several members undertook to construct gear and, in fact, other than for one six mile QSO, no signals had ever been heard on 70 Mc/s before. Even our site, two miles south of Wantage, Berks. ... had not been tried on any band ... Our operators found it hard going and had to dig for most of the QSOs ... We concentrated mainly on winking out the weak c.w. signals, picking up the S9+ phones during quiet periods. The experience gained has proved most valuable ... and although we cannot hope to win(!) we all enjoyed the contest."

The best DX of this contest was made by G3PIA/P and GM6XW/P at 334 miles, closely followed by GM3EGW at 330 miles also worked by the winner.

Check logs from G4JW, G3MI, G3IUL, B.R.S. 13336 and A.3278, were welcomed by the Committee. A.3278, with a poor location, his second converter and only about three months' experience of the band, received the certificate in the section.

Position	Call-sign	Points	Position	Call-sign	Points
1.*	G3PIA/P	6,113 M	17.	G3JDM/P	1,376 S
2.*	EI2W	5,426 S	18.	G3MFB/P	1,295 M
3.	G3AYT/P	4,736 M	19.	G3LQR	1,280 S
4.	G3PYE/P	4,566 M	20.	GM6XW/P	1,236 S
5.	G3OJE/P	4,389 M	21.	G3BJR	1,194 S
6.	G8PD/A	4,304 S	22.	G2DSP/P	986 S
7.	G3KEU/P	3,273 M	23.	G3RWW/A	977 S
8.	G3PIK	2,997 S	24.	G3HXV	860 S
9.	G3NDF	2,971 S	25.	G3OWA	584 S
10.	G2AIH	2,784 S	26.	GW3RPE/A	369 S
11.	G5FK	2,595 M	27.	G3GOX	311 S
12.	G3CCM	2,289 S	28.	G3HWR	297 S
13.	G3FZL/P	1,986 M	29.	G2AVC	267 S
14.	G3OHH	1,913 S	30.	G4AC/P	150 S
15.	GM3EGW	1,762 S	31.	GW3CBY	147 S
16.	G3RND	1,721 S			

\* Certificate winners. S Single operator station.  
M Multi-operator station.

## Second 1.8 Mc/s Contest 1963

The rules for this year's second Top Band contest are as follows:

- When:** 22.00 GMT on Saturday, November 9, to 08.00 GMT on Sunday, November 10, 1963.
- Eligible Entrants:** All fully paid-up Corporate Members of the RSGB resident in G, GC, GD, GI, GM, and GW.
- The General Rules published in the January 1963 issue of the RSGB Bulletin relating to RSGB Contests will apply except as superseded by the rules of this Contest.
- Contacts:** May be made on c.w. (A1) only in the 1.8 Mc/s band.
- 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.
- Contest Exchanges:** RST reports followed by the county code letters given on page 376 of the January 1963 issue of the Bulletin and the contact number starting with 001, e.g. for a contact from Surrey 5795Y005. All reports must be acknowledged with "R".
- Logs:** (a) Must be tabulated in columns headed (in this order): "Date/Time GMT," "Call-sign of station worked," "My reports on his signals and serial number sent," "His report on my signals, county code letters and serial number received," "Points claimed." The county code letters as sent must be entered at the top of each log sheet.  
(b) The cover sheet must be made out in accordance with RSGB Contest Rule 5. The declaration must be signed.  
(c) Entries must be postmarked not later than **November 25, 1963.**
- Power Input:** The d.c. input to any stage of the transmitter shall not exceed 10 watts.
- Awards:** At the discretion of the Council, the **Victor Desmond 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 First 1.8 Mc/s Contest 1964. A certificate of merit will also be awarded to the non-transmitting member submitting the best check log.  
It should be noted that the county code letters for Anglesey are AG and not as published in the list on page 376 of the January 1963 issue of the RSGB Bulletin.

## Rules for the RAEN Rally, 1963

- The Rally is open to all RAEN members and consists of three sections.
  - Fixed, Portable and Mobile.** This section enables an operator to work as a fixed station for one period and a portable or mobile for the other. It also includes a station which transmits from a fixed site throughout.
  - Portable and Mobile.** This section is for contestants who operate portable or mobile for two periods of the Rally.
  - Receiving (RAEN members operating as receiving stations only from fixed or portable sites).**  
Stations must be individually operated and Group operation of a single station is not permitted.
- The Rally will take place on **Sunday, October 6, 1963**, in three periods 09.00-12.00 GMT, 14.00-17.00 GMT (telephony) and from 18.00-21.00 GMT (Morse Code A1).  
Operation will be in the 1.8, 3.5, 28 and 144 Mc/s bands. RSGB band planning should be observed and licensed power must not be exceeded.
- Outstation equipment must not be connected in any way to the public mains electricity supply and must be located at least one mile from home or other normal operating site.
- Scoring: Transmitting Section**  
 Outstation to outstation: 5 points  
 Outstation to fixed station: 3 points  
 Outstation to non-RAEN station: 1 point  
 Fixed station to fixed station: 2 points  
 Fixed station to outstation: 3 points  
 Fixed station to non-RAEN station: 1 point  
 Only ten contacts with non-RAEN stations will be counted for the entire rally.  
 Not more than one section of the Rally may be entered. Participating stations may not claim points for repeat contacts with the same stations in the same period of the Rally.  
 The score will be the combined best two periods of operation.
- Participants will apply to the Honorary Rally Secretary, G3FZW, 1 Shortbatts Lane, Lichfield, Staffs., for a test phrase and number. These applications may be in bulk but the call-signs of the stations requiring them should be stated and a stamped addressed foolscap envelope provided. A log sheet will be forwarded at the same time. Listeners entering the Receiving Section should apply for the special log sheets.  
 The test phrase and number will be passed to the first RAEN station contacted in exchange for a test phrase from that station. The second test phrase will subsequently be passed to the next RAEN station worked. Test phrases will not be passed to non-RAEN stations.
- Stations will call "CQ from Raynet Station. . . ." on telephony and "CQ RR de. . ." on c.w. The use of the letters or word RAEN is expressly forbidden.
- Completed entries should be forwarded to the Honorary Rally Secretary, G3FZW, 1 Shortbatts Lane, Lichfield, Staffs., to arrive not later than first post on **Monday, October 21, 1963.** The declaration sheet must be completed and signed.
- Scoring: Receiving Stations.**  
 Receiving stations will score three points for each RAEN station heard in contact with another RAEN station and two points for every RAEN

station heard in contact with a non-RAEN station provided that the log is completed as required with all details of the contact. Receiving stations operating portable or mobile will receive a bonus of one point for each contact logged. Rules regarding operation of mobile or portable equipment will apply as for the transmitting section.

The score will be based on the best of two periods of operation. Logs must be submitted on the printed sheets provided and the declaration completed and signed. Entries to arrive as in Section 7 above. 9. Awards will be made to the participants who score the highest number of points in each section.

### Can You Help?

- Bernard Panneton, VE2LE, 12098 Lachapelle, Montreal 9, P.Q., Canada, who requires the circuit diagram and instruction manual for the Frequency Indicator Type C2 (C.M.C. 106-500), R.C.A.F. Ref. No. 10D/3789?
- Michael G. Barclay, VE3CIH, 248 Romeo St. South, Stratford, Ontario, Canada, who requires the circuit diagram and any other information on the Transmitter-Receiver Type TR1143 comprising the Receiver Type 19 (Ref. No. 10P/2), Transmitter Type 17 (Ref. No. 10R/1) and Amplifier Unit Type 18 (Ref. No. 10/2)?
- G. A. Nunn, B.R.S.25360, 1 Elm Hayes, Prospect, Corsham,

## CONTESTS DIARY

- September 7-8 - V.H.F. National Field Day (For rules, see page 373, January, 1963).
- September 7-8 - Region I IARU V.H.F. Contest. (see page 138, August, 1963.)
- September 14-15 Scandinavian Activity Contest (C.W.).
- September 15 - D/F National Final.
- September 21-22 Scandinavian Activity Contest (Phone).
- September 22 - Low Power Field Day. (see page 66, July, 1963.)
- October 6 - RAEN Rally (see page 195.)
- October 19-20 - 7 Mc/s DX Contest (phone) (see page 67, July, 1963.)
- October 26-27 - CQ WW DX Contest (phone)
- October 27 - Second 420 Mc/s Contest. (See page 137, August 1963.)
- November 2-3 - 7 Mc/s DX Contest (c.w.).
- November 9-10 - Second 1-8 Mc/s Contest.
- November 16-17 - RSGB 21/28 Mc/s Telephony Contests. (see page 126, August, 1963.)
- November 23-24 - CQ WW DX Contest (c.w.).

### 1964

- January 26 - 144 Mc/s C.W. Contest.
- February 1-2 - Affiliated Societies' Contest.
- February 15-16 - BERU.
- February 29-1 - First Top Band Contest.
- \*March 7-8 - 144 Mc/s Open and Listeners' V.H.F. Contests.
- April 5 - Low Power Contest.
- April 12 - D/F Qualifying Event.
- April 19 - D/F Qualifying Event.
- April 26 - D/F Qualifying Event.
- \*May 2-3 - First 144 Mc/s Portable Contest.
- May 10 - D/F Qualifying Event.
- \*May 30-31 - First 420 Mc/s Contest.
- June 6-7 - National Field Day.
- June 14 - D/F Qualifying Event.
- June 20-21 - 70 Mc/s Contest.
- June 27-28 - D/F Qualifying Event.
- June 27-28 - 1250 Mc/s Tests.
- \*July 4-5 - Second 144 Mc/s Portable Contest.
- July 12 - D/F Qualifying Event.
- July 19 - D/F Qualifying Event.
- July 26 - D/F Qualifying Event.
- \*September 5-6 - V.H.F. National Field Day.
- September 13 - D/F National Final.
- September 19-20 - Low Power Field Day.
- October 3-4 - RAEN Rally.
- October 21-22 - Second 420 Mc/s Contest.
- October 31-1 - 7 Mc/s DX Contest (Phone).
- November 21-22 - 7 Mc/s DX Contest (C.W.).
- November 28-29 - Second Top Band Contest.
- December 5-6 - 21/28 Mc/s Telephony/Receiving Contests.

\* To coincide with Region I IARU dates.

Wilts., who requires information on the adjustment and calibration of a receiver built by Panda Equipments Ltd., and covering 2-16 Mc/s in three switched bands? The receiver has an i.f. of 465 kc/s and uses nine valves.

● M. J. Wickstead, B.R.S.25581, 99 Earlsfield Road, London, S.W.18, who requires the manual and/or circuit diagram of the Hallicrafters Model S40B receiver?

● I. G. Mant, A.3776, 28 Wellbourne Road, Childwall, Liverpool 16, Lancashire, who requires circuit diagrams for the Valve Tester type 314, Receiver type BC966A, Receiver Type ABK5 and Receiver type SCR595?

● R. Broadberry, B.R.S.25181, 6 Albert Road, Staple Hill, Bristol, who requires a circuit diagram for an oscilloscope using the type 3BP1 tube?

## Aveley Electric Open Day

On July 27, 1963, Aveley Electric Ltd. held its first Open Day for radio amateurs at its plant in South Ockenden, Essex. So successful was the event that it is likely to be held annually in future.

The programme started at 10 a.m. with coffee, followed by a most interesting tour of the Aveley Products Ltd. factory, where modern techniques of winding toroidal transformers were described and demonstrated. A lecture on V.H.F. Aerial Measurements, using the Zg Diagram, was later given by E. C. Waite.

After lunch at a local inn, there was a technical film show and a most impressive demonstration of high fidelity stereophonic sound reproduction by the Audio Division using amplifiers employing toroidally-wound output transformers, Acoustic Research loudspeakers and the Bang and Olufsen Stereodyne record player.

A display of wartime equipment designed by J. I. Brown, G3EUR, now Managing Director of Aveley, aroused considerable interest. The gear on show included the B2 transmitter-receiver and the MCR1 receiver.

Among those present were the President of RSGB, Norman Caws, G3BVG, R. F. Stevens, G2BVN, Eric Yeomanson, G3IIR, J. W. Mathews, G6LL, T. Withers, G3HGE, John Salvage, G3HRO, Rowley Shears, G8KW, and P. W. Winsford, G4DC.

Aveley Electric hope to re-establish an amateur station at the factory soon. In addition to G3EUR, Alan Williams, G3MHD, Arthur Butcher, G3KJP and P. Barry, G3KFU, work for the organization.



Mr. J. I. Brown, G3EUR, Managing Director of Aveley Electric Ltd., describing the method of winding toroidal transformers with the aid of a special coil winding machine. Looking on are G2BVN, G6LL, G3HGE and G2AHL.

(Photo by courtesy of Aveley Electric Ltd.)

# CLUBROOM

A Monthly Survey of Group and Club Activities

A NUMBER of clubs operate a "QSL Box" as a service to members who send their cards through the RSGB QSL Bureau. Not only does this save individual postage and packing, but it also helps the Society's busy QSL Manager, who has only to receive and open one packet instead of several from one area. The saving in postage represents a real benefit of club membership, and the idea is simple to operate. All that is required is a volunteer to empty the box at regular intervals and to despatch the contents to G2MI, sorted as far as possible into call areas and countries.

## New Ventures

This month comes news of formation of a new club and the reconstitution of an old one. The first is intended to serve Leyton, Leytonstone and Walthamstow and will be inaugurated at Leyton Senior Institute, Essex Road, E.10 at 7.30 p.m. on September 24. A. Rix, 17 Forest Drive East, E.11, will be pleased to hear from intending members.

The re-formed Wimbledon and District Radio Society has already met to elect officials, and will meet again on the second Friday of each month at 8 p.m. at the Community Centre, St. Georges Road, S.W.19. G6QN is Acting Secretary.

## News from the Newsletters

This month two overseas Newsletters appear in the postbag. The ARLM Satellite published by the Amateur Radio League of Manitoba announces that Manitoba amateurs can now display their call-signs as car licence plates, provided that they apply through their own society. Mention is also made of the reactivation of Loran on 1900 kc/s, which will affect W/VE frequencies during the coming 160m DX season.

The South India Radio Amateurs Newsreel (Editor VU2GV) is interested in exchanging copies with other club magazines throughout the world. *SIRAN* is a 19-page publication

covering a wide range of topics, and includes SWL and YL sections.

*Mercury* is the newsletter of the Royal Signals ARS and its fifteen pages include not only news of past and present members of the Corps but also some very readable articles on technical topics. Major (TOT) F. A. Davidson, Signals 2(a), The War Office, Whitehall, S.W.1. will be pleased to enrol new members.

"How about a simple transistorized D/F receiver for 160 metres?" asks G3GOP in the current issue of Southern Hampshire QUA. G3NXY strikes a new idea in the same issue by giving a synopsis of the contents of recent issues of CQ and QST. The Wolverhampton Newsletter ranges from a description of a 20m ground plane to a cartoon and an article by the XYL of G8KL on their "no amateur radio" Silver Wedding trip to Paris—and the amateurs they met. WAMRAC look forward to their second "Wamfest" on October 5 at Wesley's Chapel, City Road, E.C.1: further details from G3NGF. CQ-TV 50 from the British Amateur Television Club advises that all correspondence should now be addressed to 4 Inwood Close, Shirley, Croydon, Surrey. The News Letter of the Cray Valley Radio Society gives details of the "WCV Award" for communication with club members: details from G3MCA. North Kent RS Newsletter No. 70 informs members that there is now a "junior members' spokesman" with a special interest in their welfare and ideas.

The reception accorded to the Loughton and District News has prompted the editors to essay a second issue—G3PAT will be pleased to receive material for the next issue at the fortnightly meetings at Loughton Community Centre, Debden (No. 167 bus passes the door). The Lea Valley Reflector of the Enfield Group tells of three competitors making independently for the same site for the Second 144 Mc/s Portable Contest—a situation fortunately happily resolved but at the cost of an hour's delay for the Group station. Crystal Palace in Newsletter No. 92 welcome the inclusion of the four metre band in the forthcoming V.H.F. N.F.D. on September 7/8.

The Surrey Radio Contact Club's Monthly News reporting the sojourn of member G8TB in hospital comments "At least he's out of the rain!" The club will be holding a Two Metre D/F Hunt on September 22 from 2 p.m.: anyone interested is invited to take part.

## Points North

Halifax and District ARS meetings will begin in future at 7 p.m. and the main lecture at 8 p.m. will be preceded by help to RAE candidates. The AGM will be held at the Beehive and Crosskeys on October 1. New students at the University of Keele will be interested to hear of the Students' Union Radio Society: information from V. J. Reynolds, G3COY, Dept. of Communication (Tel. Keele Park 371 Ext. 34). Spen Valley ARS, which recently elected G3MMK as President and G2HHV Vice-President, begins its autumn programme at Heckmondwike Grammar School on September 19. Honorary Secretary K. Pride (100 Raikes Lane, Birkstall) will supply details of membership. The Lothians RS—featured in these columns last month—recommends the appointment of a Press Secretary as a means of relieving the hard-pressed secretary of work while ensuring maximum publicity. Next meeting—September 12 and thereafter on the second and fourth Thursdays of each month at the YMCA, South St. Andrew Street, Edinburgh. Scarborough



The winner of the Surrey Radio Contact Club's Constructional Contest 1963 was Bob Benyon, G3FXG, centre, who displayed his all-band receiver. In this picture he is seen receiving the 1953 Coronation Committee Cup from the donor, David Deacon, G3BCM, on the left. Gordon Mitchell, G3OFJ, right, came third with his s.s.b. transmitter. Second place was taken by Frank Garrett, G3MVZ, who exhibited an all-band transmitter.

(Photo by courtesy of The Croydon Advertiser)



ARS reports sustained interest, with attendances averaging 30: Council Member G2YS was a recent visitor, and contributed to a lively discussion on RSGB matters. September Events include "At Home" visits on September 12, a talk by G3JTG on September 19, and a two-team Quiz on September 26. Wirral ARS meet on September 18 for a talk on "Valve Uses" and on October 2 for the AGM. Club members G2AMV, G3CSG and G3EGX operated GW3-NWR/A on "Top" and "Two" from Anglesey, while the local D/F Qualifying Round stimulated members to put in some D/F practice of their own. Operation from GW is planned for V.H.F. N.F.D.

Lack of midland reports leads us to include the **Midland Radio Contest Club** in this section: no objections will follow—we hope—from either MRCC or our more northern groups! This club operated GW3RSR/A from Montgomeryshire on Top Band phone on July 27. A Mobile Rally will be held on September 28—details from G3OVA or at club HQ (Windmill House, Weatheroak, Wythall, Birmingham) on September 6. See also *Mobile Column*.

### South of England

Few clubs from the South report this month, probably due to the summer holiday QRM. **Dorking and District ARS** hope to welcome many visitors to their stand at the local Model Railways and Engineering Exhibition at the Dorking Halls on October 3-5, when G3CZU will be in action alongside displays of club activities. G2FTB will chat about "Electrolytics" at the September 24 meeting at the "Star and Garter," Dorking. **Crawley ARC** plan to operate in the V.H.F. N.F.D. on four bands from a good site on the South Downs. Members are busy constructing s.s.b. equipment for the coming winter, and an RAE course is planned in conjunction with West Sussex County Council.

**Reading ARC**, meeting at Palmer Hall, West Street, will hear G8SC on "Transistor Power Supplies" on September 28, followed by "Equipment for 435 and 1296 Mc/s" on October 26.

At the meeting planned for September 25 at the West Green Centre, G3HGE will be lecturing on "TW Equipment." **South Dorset RS** held its August meeting at the Weymouth Model Engineering Exhibition, when displays of gear added to the attraction of a "live" station operating chiefly on 80m. The 150 or so contacts made during the six days will receive a special QSL card.

### "Town" and Around

Reorganization at the **Hounslow and District RS** includes a new venue at The Canteen, Mogden Works, Isleworth, in which fortnightly meetings are planned (commencing August 12) at 7.30 p.m. G3MUV is the new Chairman and G3NHH is Honorary Secretary, and may be contacted at 383 Whitton Dene, Isleworth. **East London District Group** operated GB3DTS at Dagenham Town Show on July 6 on both h.f. and v.h.f. bands: 65 contacts were made on 2m, while on s.s.b. the equipment built by G3MVV did well on h.f. bands. G3NNK built the v.h.f. gear to run 75 watts into a six element Yagi aerial. **Clifton ARS** are looking forward to two events in September—the last D/F Contest of the season on September 14-15, and the club's own QRP Field Day timed to coincide with the RSGB event on September 22. Morse classes are held on free Wednesdays and Fridays—further details from G3OGE.

**Clifton HQ** is in New Cross, London, S.E.14, and not in Beckenham as reported last month. (Sorry!)

**Mitcham and District RS** will be holding a "Sale of Unwanted Apparatus" at HQ, The Canons, Madeira Road on September 13—even the old Junk Sale has become "refeined" it seems! G3MCH will be showing films on October 11.

### Western Mail

The **Bristol Group** met on July 26 at the University to hear G3SB and G3JMY lecture on "A crystal controlled converter," "Little Oskey," and "A single switch controlled transmitter for 1.8 and 7 Mc/s." **Yeovil ARC** has been very active, with 25 members visiting Somerton Radio Station and Longleat Mobile Rally, the latter party including three SWL/M stations. At the Park Lodge clubroom G3BEC conducts Morse classes each Wednesday from 7.30 p.m. **Torbay ARS** also reports a well attended July meeting, when G3SCH was acclaimed on the acquisition of his call-sign, and three SWL members on their success in the RAE. The Golden Jubilee Bucket and Spade Party held at **Saundersfoot** (Pembroke) on June 30 was favoured by "gloriously fine weather," reports GW2OP. While GW2OP/A and GW3-LXI/M talked-in mobiles, the local XYLS served tea to 48 visitors, some of whom had journeyed 60 miles. On all counts the event was voted a big success.

### Club of the Month

#### MIDLAND AMATEUR RADIO SOCIETY

"Whatever activity you name in the electronic field—we have a member to cover it" is the proud boast of the 100-strong Midland Amateur Radio Society centred on Birmingham. Founded in 1931, this society now claims a world-wide membership, and its monthly *Newsletter* finds its way to members in USA, Rhodesia and Australia as well as to those able to attend the monthly meetings held at the Midland Institute in Paradise Street. Affiliation to the Birmingham and Midland Institute has not only set the seal on the society's status in this "city of a thousand trades" but has also enabled it to use facilities for its activities which are unequalled elsewhere in the country.

Many prominent call-signs and active experimenters can claim membership, although the society is also concerned to promote the interest of the newcomer to the hobby. Several recent licences result from the efforts of G3HBB and G3HBE at the Evening Classes held under Education Committee auspices, while these two calls are active in the v.h.f. field. Old-timer G5BJ is well known on the DX bands, while G5PP's call is likely to pop up from all kinds of unlikely places on Top Band. G3KPT is a leading exponent of 432 and 1296 Mc/s techniques, and Amateur Television has a strong following.

Open-air activities and contests figure largely in the society's calendar. Highlight of the year is the Mobile Rally at Trentham Gardens, at which mounting attendances and enthusiasm suggest that it is "on the ball." The annual Birmingham Show is the occasion for not only a multiband "special events" station but also a live TV demonstration to show their paces before the large crowds which this event attracts from a wide area of the Midlands. A happy feature of the year's competitive activity is the annual contest with two sister clubs—Coventry and Bristol. That with the former club has been running (except for the war years) for a quarter of a century. These contests are one-day affairs with flexible operating times so that as many members as possible can participate and both h.f. and v.h.f. bands are covered.

Under Chairman Trevor Talboys, G2ATK, Honorary Secretary G3JDJ and *Newsletter* Editors G3HBE and G3KPT the society tries to cater for all tastes, by meetings on the third Tuesday in each month, the *Newsletter* with first-rate technical articles, and frequent operation of the club station G3MAR. This service is covered by an annual subscription of one guinea—reduced for juniors under 17 and for country members more than 20 miles from the city

(Continued on page 201)



# 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.

## Bulletin Advertising Pays

DEAR SIR,—Under the heading "Gone Lazy, Static and H.F." which being interpreted means too many home-made dry joints, no longer /M and abandoning v.h.f., but none of the other reasons later alleged by some s.s.b. operators on 80m, I sent in a For Sale advertisement of 15 items at sensible prices for the July issue of the BULLETIN.

My BULL arrived at 7.20 a.m. on July 3 and by 7.40 when I left for London the Collins filter had been sold after a telephone call. By the time I reached home at 6.45 p.m. my wife had a long list of telephone sales and by 10 p.m. every item, except an odd valve or so, had been sold and several could have been sold twice over. July 4 started at 7.30 a.m. with the arrival of one collector for his purchases—and two items not advertised!—followed by a large post containing cheques and postal orders, eighteen 'phone calls from as far away as GI and GM and a final collector from London at 10 p.m. Friday dawned with the arrival of six letters, followed by seven 'phone calls, the last at 11.45 p.m. Saturday brought twenty more letters replying to the BULLETIN advertisement and more 'phone calls. Two heavy posts again on Monday and several 'phone calls and more post on Tuesday.

The results of the BULL advertisement have been staggering—I frankly expected each item would be wanted by someone—and stated the price accordingly remembering I had had the fun of building and/or using the items, but not each by at least four and sometimes ten. I have been told since that the prices should have been doubled, or at least fixed to show no loss, but should I have sold them?

Why has the Readers' Advertisement column been so neglected recently? Maybe my experience is proof of its capabilities.

Yours sincerely,

R. F. G. THURLOW, G3WW

Wimblington, March, Cambs.

## Membership and the Competitive Spirit

DEAR SIR,—It seems from articles and correspondence in the BULLETIN that one of the major occupations of amateurs is contests. The competitive spirit would appear as strong as any in keeping the amateur movement on its toes, be it individually or collectively, as referenced by the clatter each week on the bands and the support there always is for NFD and similar events.

The *Current Comment* in the May issue suggested that each club should try, as its part in the Jubilee Celebrations, to enrol as many new members for RSGB as possible.

Surely here is room for another contest, with a list of membership application forms received from each affiliated club or society published monthly plus a final end-of-year total. I would willingly start it rolling by chasing a few of our non-RSGB members.

Yours faithfully,

Torquay, Devon.

E. I. HAYMAN, G3ABU  
Chairman, Torbay Amateur Radio Society.

## The Bulletin

DEAR SIR,—I agree with Mr. Jessop's, G6JP, sentiments that the title BULLETIN is unsuitable for the Society's journal. The journal is a magazine devoted to Amateur Radio in general and the affairs of the RSGB in particular and so I would like to suggest it be renamed either *The RSGB Magazine* or *Amateur Radio*.

Whilst writing about the journal, I must say I deplore Mr. Taylor's attitude towards humorous articles. Surely Amateur Radio is a hobby to be enjoyed? I do not for one minute suggest that the journal be filled with lots of pseudo-humorous rubbish, but a sound technical article presented in a light-hearted way will attract far more readers than a stuffy one containing unnecessary graphs, tables and mathematical wizardry.

I feel that the Editor should be a little tougher on some authors

who waffle on for pages describing something that could easily have been covered in two or three. I suspect that the majority of readers, when confronted by a monster article on a relatively simple piece of equipment, only look at the circuit diagram, parts list and layout and then, only when they have built it and it doesn't work, do they bother to read bits of it.

One can detect the "wind of change" blowing through the pages of the journal and I am 100 per cent in favour of it. The *Society Affairs* page is a case in point and it was high time that the dreary, though necessary, *Council Proceedings* were reported in a less formal way.

Yours faithfully,

NORMAN A. S. FITCH, G3FPK

London, E.10.

(The title *Amateur Radio* suggested by Mr. Fitch is already in use by the Wireless Institute of Australia.—Editor.)

DEAR SIR,—With reference to the letter entitled "Is 'Bulletin' Outmoded?" (RSGB BULLETIN, May, 1963), the writer may have used a rather narrow definition of "bulletin." One of our (in USA) definitions is "a periodical publication, as of the proceedings of a society." While this appears to be quite apropos, I do not know if it conforms to accepted British usage. However, whether or not suitable in this case, "bulletin" does tend to carry a connotation of abbreviation or superficiality in the public mind.

A perusal of the BULLETIN full cover title reveals that it already has a most befitting name, hidden in the third line. If we should strike out the word "bulletin," and into its position shift the word "journal," we would have, as title, "RSGB JOURNAL of the Radio Society of Great Britain." This simple change would put the publication in eminent company, e.g., "Journal of the IEE," and should satisfy the most discriminating. As a further consideration, how much more elegant it would be to refer to the "Jour" than to the "Bull."

Yours faithfully,

ARTHUR M. BRAATEN, W2BSR

Riverhead, Long Island, N.Y.

## G2DAF Linear Amplifier

DEAR SIR,—I have read with interest the article in the April issue of the BULLETIN. Mr. Thornley is to be congratulated for devising a new arrangement for us to experiment with in the linear amplifier field.

Without wishing to in any way detract from the features of this design, it is, as I see it, an r.f. version of that popular series gate modulator in which the screen voltage, together with the modulating waveform, was derived from the audio source. The simplicity of this new arrangement is most attractive.

There are, however, I think some rather misleading claims (on page 526 of the April issue) for its advantages and I should like to comment on these. They are:

- (ii) Increased efficiency.
- (ix) Simple and stable operation.
- (x) Heavy grid swamping, resulting in more constant load on the driver valve.
- (xi) Very low intermodulation distortion product level.
- (xii) High power gain.

Dealing with each of the above:

**Increased Efficiency.** The claims, as far as the amplifier is concerned, show economies in that no screen or bias supply is required and there is a real saving in that there is no wasted power consumed by stabilizers and the like.

The amplification under (ii) is that there is an increased efficiency over and above items (iv), (v) and (vi); this cannot be any better than that for a valve(s) operating in conventional conditions at similar h.t. voltages. The use of relatively high anode voltages does, of course, contribute to the low screen current demand due to secondary emission effects.

**Simple and Stable Operation, Heavy Grid Swamping, High Power Gain.** None of these claims apply only to the circuit under discussion; equal claims can be justly applied to operation under conventional conditions where similar grid damping and low screen voltages are applied.

**Very Low Intermodulation Distortion Product Level.** At first sight and in the absence of actual analytical measurements, this seems very unlikely and in fact may very well be higher than for other forms such as conventional class AB1. It may possibly be true when the valves used are relatively large and significantly

underrun, as in the examples quoted (low screen voltages), but if they were loaded to full power levels it is doubtful if this claim would be justified.

The attractiveness of the new arrangement is sufficiently interesting without these particular claims being made for it, which do not seem to be wholly justifiable.

It is hoped that these comments will not be regarded as destructive—this is not my intention.

Yours faithfully,

G. R. JESSOP, G6JP

Eastcote, Pinner, Middlesex.

DEAR SIR.—Mr. Jessop has apparently come to the conclusion that five of the claims made for the G2DAF Linear Amplifier are misleading and cannot be wholly justified. This conclusion appears to be made on a basis of confusion that includes (i) a statement in regard to the action of the series gate modulator that is technically incorrect, and (ii) a failure to appreciate the basic difference between the G2DAF method of linear amplifier operation and the method used in other circuits.

The series gate modulator does not in fact obtain the screen voltage from the audio source—the necessary potential is supplied from an external h.t. power supply. This is also the case with the G2MA, ZL Special and similar clamp tube amplifiers. In the G2DAF amplifier the necessary screen voltage is obtained from the r.f. driving signal—there are no external h.t. supplies of any kind whatsoever. This is an entirely original method of operation and because of its originality a British patent has been granted. G6JP may be interested to know that the patent also includes provision of screen potential by rectification of the amplifier r.f. output signal and also covers the application of the basic methods to class AB and class B audio amplifiers.

Taking the disputed claims in order, I should like to comment as follows:

**Increased Efficiency.** That the implication under this heading is an increased efficiency over and above claims 4, 5 and 6 is quite correct. This is exactly what it was intended to mean. The term "efficiency" was used in its normal context to indicate the amplifier efficiency measured in the usually accepted manner. The maximum signal conditions given in Table 1 quote 65 per cent and 54 per cent for single tone and two tone inputs; the Mullard figures for the same valves at the same anode voltage are 58 per cent and 44 per cent. The Eimac maximum signal conditions for two 4-125A valves at the same h.t. voltage give a single tone efficiency of 60 per cent.

**Simple and Stable Operation.** The amplifier is simple because it requires less components than other grid driven tetrode amplifier, and there is no adjustment or setting up procedure. The stability is such that it cannot "take-off" under any conditions whatsoever—this includes completely removing the "passive grid" resistor.

**Heavy Grid Swamping.** An inherent function of the two diode rectifiers across the input circuit is to provide a low value of impedance such that the valve is completely stable without additional resistive damping as already stated. This is a measure of grid swamping that is not provided by any other grid driven p.a. circuit.

**High Power Gain.** Power gain is a relative term—for instance, the power gain of a neutralized class AB1 amplifier with a resonant grid circuit can be 100 or more. Compared with this the G2DAF amplifier is poor and shows a low power gain. Obviously the comparison was "like against like"; the G2DAF amplifier relative to other methods not requiring bias or external screen voltage, i.e. grounded grid operation or zero bias triodes using standard valves. In this context the claim of a high power gain up to 10 is correct and justifiable.

**Very Low Distortion Level.** If it had been possible to make relative measurements of intermodulation distortion product level, these figures would have been included in the BULLETIN article. However the writer does not have access to a spectrum analyser and it was necessary to rely on reports from amateur stations equipped with selectable sideband receivers. When the amplifier was changed over from AB1 operation to the G2DAF method all stations reported an improvement in distortion product level, the average figure given being of the order 5 to 6db. Many well-known s.s.b. workers have been using widely different valve types in the G2DAF circuit for some time and have also had the same favourable reports.

The statement, "It may possibly be true when the valves used are relatively large and significantly underrun, as in the example quoted (low screen voltage)..." is not understood. Since when

was a valve of the 125 watts anode dissipation class "relatively large"? Valves of this rating have almost become standardized for U.K. amateur phone operation for a considerable number of years. Two of the most popular transmitter designs to appear in the BULLETIN since the War used 813 p.a.'s as does the commercially made LG300, also used in large numbers. Mr. Jessop must also be aware that the comparison of one p.a. valve in an a.m. transmitter with two p.a. valves in an s.s.b. transmitter is not only misleading but grossly unfair. The 813 in an a.m. transmitter is quite incapable of supplying an anode modulated 150 watt signal and the two 807s in the modulator are an integral and essential part of the transmitter output circuits. The combined anode dissipation of these valves is 185 watts and this figure should be used when the relative size of an amplifier is under consideration.

In regard to the valves in the G2DAF amplifier being "significantly underrun"—how does Mr. Jessop reconcile this statement with the power input and output figures quoted in Table 1? These are greatly in excess of either the Mullard or the Eimac figures for the same valves at the same anode voltage used in the conventional manner.

Yours faithfully,

G. R. B. THORNLEY, G2DAF

Fulwood, Preston, Lancashire.

DEAR SIR.—May I extend my heartiest congratulations to "Dick" Thornley on the excellent articles he has written and, in particular, his description of the G2DAF Linear.

I am certain that many amateurs would greatly appreciate the publication, at some future date, of dynamic characteristics (in the G2DAF mode) of various popular valves such as the 807, 6146, TT21 and 813.

Yours faithfully,

MIKE CREIGHTON, 9M2MC, G3NBM,  
DL2AL, ZC4MC

Malacca, Malaya.

### Hifix

DEAR SIR.—I feel sure that the article in the May issue must have proved a great consolation to those who, like myself, are unfortunate enough to live close to one of these systems and as a result, have lost the use of anything from 20 to 60 kc/s of Top Band. We realize that systems such as this take priority over amateur communication, but why we should have to devote part of our subscription to subsidizing what is, in effect, manufacturers' publicity literature is another matter. In my daily work I have a considerable interest in radio navigation systems, but the place to read details of these is in one of the trade periodicals, not in a journal supposedly devoted to amateur radio.

Yours faithfully,

A. D. TAYLOR, G8PG/GW8PG

Greasby, Upton, Wirral.

### Co-operation or Chaos?

DEAR SIR.—I cast my vote for co-operation.

In a band 2000 kc/s wide there is room for everyone, if everyone exercises a little self-discipline and forbearance (known in other contexts as civilized behaviour). G3EGK has put forward a sensible compromise—I Mc/s apportioned regionally according to a Band Plan and the other megacycle a free-for-all. The difficulty about altering the current plan, however, is that some stations would remain on their existing frequencies through sheer inertia and the present non-co-operators would be just as likely to appear in the regional megacycle (possibly in the wrong zone) as in the free-for-all megacycle, in order to demonstrate their legal rights, operating efficiency or whatever phrase may be employed to describe what, to the observer, is not easily distinguishable from the antisocial.

I therefore fear that, although the arrangement suggested by G3EGK would have been a very good one indeed if it could have been introduced many years ago, it may not effect much improvement now. That being so, I think it might be better to leave the present Band Plan unaltered even though it is not entirely satisfactory. Surely the chief attraction of 144 Mc/s working is that it is such a contrast to l.f. band working. There is, of course, no possible objection to the use of a v.f.o. on 144 Mc/s, within the confines of the Band Plan, but other "slick" operating techniques seem to me to be quite unnecessary on this band. To those who want to make full use of such techniques on v.h.f.,

I suggest they do it on 70 Mc/s, where the limited bandwidth available may justify it.

Observing your injunction to restrict letters to a moderate length (space planning?), may I end by suggesting that if any change needs to be made to the existing Band Plan at any time some form of referendum should be employed to determine the views of all users of the band?

Yours faithfully,

H. W. DARVILL, G3OHD

Petts Wood, Kent.

DEAR SIR,—Why all the fuss about the Band Plan for Two Metres? The fact is that most conform with it under normal conditions.

With a good many years on the band behind me I can call to mind only one station which operates regularly out of zone and has done so since the very beginning of the 2m band. Strange to say, he is in Zone I but I do not register this as a complaint, but merely to persuade Mr. Colclough to take the beam out of his own zone's eye before he complains of sporadic occupancy of his frequencies on a field day. However, although most stations abide by the Plan for most of the year that does not mean that it meets every eventuality, for under conditions of full band-occupancy it is quite evident that the Plan does not operate equitably. In the main, this is because operators tend, for psychological reasons, to tune from the ends of the band, usually the lower one, and we who stay in our Zone in the top half of the band usually finish with laryngitis and few contacts when the Europeans are coming in. It is all very well for those, like the Editor of one club's news letter, to say that they get contacts operating around 145.5 Mc/s but the facts are they would get more by going I.F. It surely is no coincidence that most of the top stations in the countries worked list of another magazine either live in the Eastern counties of Great Britain (where there are more frequent opportunities of working EDX) or are located in Zones with frequencies in the lower half of the band. What is wrong then in going I.F. when the Continentals are coming in? To a station in Berlin, Warsaw, or Prague it is virtually the same distance to me as it is to a station in Kent or Surrey and if I go into the Kent or Surrey zones to obtain a fair share of the QSOs I am only competing with the indigenous stations on an equitable basis. QRM will not be caused to a local QSO in those zones and from experience during EDX openings, when practically every beam in the country is eastward looking, the chance of causing QRM to an inter-G QSO is pretty remote. The same considerations apply to rarer DX such as GC. A number of times over the past few years I've heard GC stations and called them till I'm blue in the face on my own zone frequency, only to hear them going back time and time again to South Coast stations apparently blissfully unaware that their signals were getting further afield. Is any real harm done on such occasions in going into the South Coast Zones and risking QRM to one's own signal? I did just that recently, one Sunday forenoon, and immediate contact resulted but had I stayed in Zone I would have still been waiting for a GC QSO maybe for another few years.

Now for Field Days: whereas under everyday conditions the 200 kc/s allocated to Staffordshire, Shropshire, and North Wales is adequate for the normal occupancy of the band, come a field-day and every accessible hill top in North Wales is occupied by a powerful station, some immigrating into the Zone from home QTH'S 50 miles or more away. The noise which they and the normal fixed stations make, all cluttered up in one small part of the band, has to be heard to be believed, and thrown in for good measure, we have the Cheshire and Derbyshire stations on their own hill tops, at quasi-optical distances adding to the QRM above 145 Mc/s. No wonder then that some of us move out to quieter sections where only a few stations are working. On May 5 the first 100 kc/s of the band was occupied seemingly only by G3XC/P, G5ZT/P, and two Somerset fixed stations. If there were a few more stations on, not heard up here, it still doesn't make fair shares for all and under such circumstances the present arrangement for field days isn't planning but a farce which aids some stations and hinders others if they conform. But what is Mr. Colclough's real complaint? Is it just a dog-in-the-manger attitude that we shared some of his available frequencies, or that we QRMed some of his comparatively local stations when he was in QSO with them (not likely) or is it that when we were working stations that were DX to both of us we were competing equally?

Frankly I can see no single solution which will meet with everyone's approval. There's barely room on the band for all the

portable stations during a field-day let alone the fixed stations as well. It's no use talking in terms of s.s.b. and tins of Vim on a contest site because the QRM position cannot be forecast in detail beforehand. All we know is that we shall get it from either stations in our own zone or another, unless by prior arrangement stations could be spaced more fairly through the band. Yet even if this were tried some stations would still enter the contest with the dice loaded in their favour. Single operator stations would still have to compete with clubs and groups with multiple receivers, and plenty of ancillary workers, cooks and bottle-washers to look after their needs. Others would be perched on a mountain top and others would be in a quiet part of the country with the nearest station miles away. None of us has every advantage and I suggest it is not a sufficient reason to ask for the imposition of the Band Plan on field days just because it would favour some in their particular position and be a decided disadvantage to others. There is just as good a case for dispensing with it completely for contests so that skilful operating alone becomes the deciding factor. Let's have no more regulations and keep the fun in field days.

Your faithfully,

S. F. BROWN, G4LU

Pant, Oswestry.

### QSL'ing

DEAR SIR,—I should like to endorse the views of Ham Whyte (VE3BWY, ex-G6WY) regarding QSL'ing published in the June issue of the BULLETIN.

Although I have been interested in Amateur Radio since the early 1920's, and at that time holding an Artificial Aerial licence, I still derive very much pleasure in both sending and receiving QSL cards. In those early days of 100 per cent home construction, to receive a QSL card confirming one's "building" capabilities was a wonderful achievement.

To my mind a wall filled with these colourful objects is both very pleasing and a wonderful morale "booster" in the field of Amateur Radio activity and world wide friendship. I have a great respect for the QSL Bureau and its very capable volunteers and my only regret is that cards are not returned more quickly.

In conclusion may I wish the best of luck to those who are agreeable to spend a few shillings (after all how much money is spent on stamp collecting, photography etc.) on such an interesting and worth-while hobby.

Yours faithfully,

IVOR A. G. COLE, B.R.S.24514, ex-2ACO

Wallington, Surrey.

### Can You Help?

- G. Breed, B.R.S.22422, The Oaks, The Chase, Wickford, Essex, who requires information on the CR300/2 receiver?
- F. Bending, B.R.S.19313, "Seychelles," 108 St. Katherine's Road, Exeter, Devon, who requires the service manual for the Air Ministry R.1224A battery receiver?
- D. J. Quigley, G3PRI, 142 Belle Vue Road, Cowes, Isle of Wight, who requires the manuals and/or circuit diagrams for the BC433, SCR522, BC610, AN/APN1, AN/APS13, AN/APQ9 and the TBY transceiver?
- C. J. M. Wozencroft, GW3GIN, 50 Romilly Road, Cardiff, who requires information on the C11 transmitter?

### Clubroom (Continued from page 198)

centre. The list of Honorary Members shows that many prominent notabilities in the field of radio are proud to be associated with this flourishing society.

\* \* \*

That concludes the round of reports for this month: please send in notes for the October issue not later than September 6, and for November by October 11. "How is the 'Club of the Month' picked?" asks a contributor. The answer—you tell us!

Reporting secretaries are asked to remember that forthcoming events must be notified for dates which follow BULLETIN publication, otherwise they will be omitted.



# Forthcoming Events

Details for inclusion in this feature should be sent to the appropriate Regional Representatives by the first of the month preceding publication. A.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.

## REGION 1

**Ainsdale (ARS)**—September 11, 25, Methodist Church Hall, Russell Road, Southport.  
**Blackburn**—Fridays, 8 p.m., West View Hotel, Revdgate Road.  
**Blackpool (B & FARS)**—Mondays, 8 p.m., Pontins Holiday Camp, Squires Gate.  
**Bury (BRS)**—September 10, 8 p.m., Knowsley Hotel, Kay Gardens.  
**Chester**—Tuesdays, 8 p.m., YMCA.  
**Eccles (E & DRC)**—Tuesdays, 8 p.m., The Congregational Mission Church, King Street.  
**Liverpool (L & DARS)**—Tuesdays, 8 p.m., Gladstone Mission Hall, Queens Drive, Stoneycroft.  
**Macclesfield**—September 17, October 1, 42 Jordongate.  
**Manchester (M & DARS)**—Wednesdays, 7.30 p.m., 203 Droydsden Road, Newton Heath, Manchester 10.  
**Manchester (SMRC)**—Fridays, 7.45 p.m., Rackhouse Community Centre, Rackhouse, Daine Avenue, Northenden.  
**Morecambe**—September 4, October 2, 125 Regent Road.  
**Preston**—September 10 (Visit from Region 1 Representative), September 24, St. Paul's School, Pole Street. (All meetings start with a Morse practice at 7.30 p.m.)  
**Southport (SRS)**—Wednesdays, 8.30 p.m., Sea Cadets Camp, The Esplanade.  
**Stockport**—September 11, 25, October 9, 8 p.m., The Blossoms Hotel, Buxton Road.  
**Wirral**—September 4, 18, October 2, 7.45 p.m., Harding House, Park Road West, Cloughton.

## REGION 3

**Birmingham (MARS)**—September 17, 7.30 p.m., Birmingham and Midland Institute, Paradise Street, Birmingham. (Slade)—September 13, 27, 7.45 p.m., The Church House, High Street, Edlington. (MRCC)—September 6, 7.30 p.m., Windmill House, Weatherbrook, Wythall.  
**Cannock (CCARS)**—September 5, October 4, 7.30 p.m., "The Tavern", Bridgetown.  
**Coventry (CARS)**—Mondays, 8 p.m., Willenhall Scout HQ, Little Farm Buildings, Littlethorpe, St. James's Lane, Willenhall.  
**Lichfield (ARS)**—October 7, 7.30 p.m., Swann Inn, Lichfield.  
**Stourbridge (STARS)**—September 10, 7.45 p.m., Foley College, Stourbridge.  
**Sutton Coldfield (ARS)**—September 13, 27, 7.30 p.m., 92 The Parade, Sutton Coldfield.

## REGION 4

**Burton-on-Trent (ARS)**—Wednesdays, 7.30 p.m., Club Rooms, Stapenhill Institute, Burton-on-Trent.  
**Chesterfield (C & DARS)**—September 11, October 9, 7.30 p.m., Newbold Observatory, Newbold Road, Chesterfield.  
**Derby (D & DARS)**—September 4 (Surplus Sale), September 11 ("Plastic Foam—Manufacture and

Uses," by P. G. Skilton), September 18 (Open Evening), September 25 (D/F Practice Run), October 2 (Surplus Sale), October 6 (D/F Contest for President's Trophy), 7.30 p.m., Room No. 4, 119 Green Lane, Derby.  
**(DSW Exp. Soc.)**—Fridays, 7.30 p.m., Sundays, 10.30 a.m., Club Room, Nunsfield House, Boulton Lane, Alvaston, Derby.

**Grantham (G & DARS)**—Mondays, 7.30 p.m., Club Room, rear of Manners Arms Hotel, London Road, Grantham.

**Grimby (G & DARS)**—September 12 (Holiday Slides by F. R. Peterson, G3ELZ), September 26 (Film—"70 Degrees North," by H. Watson G3HTI), October 10 (AGM), 8 p.m., Grimby Model Engineers Club Room, Fletchers Yard, Wellowgate, Grimby.

**Leicester (LRS)**—Mondays, 7.30 p.m., Club Rooms, Old Hall Farm, Braunstone Lane, Leicester.

**Loughborough (RCL)**—Fridays, 7.30 p.m., Corporation Hotel, Wharfedale Road, Loughborough.

**Lincoln (LSWC)**—First Wednesday in each month, 7.30 p.m., Lincoln Technical College, Cathedral Street, Lincoln. September 15, Mobile Rally and Hamfest—see *Mobile Column*.

**Mansfield (MRC)**—Fridays, 7.30 p.m., Hope and Anchor, Union Street, Mansfield.

**Melton Mowbray (ARC)**—September 19 (AGM), 7.30 p.m., St. John Ambulance Hall, Asfordby Hill, Melton Mowbray.

**Nottingham (ARN)**—Thursdays, Thursdays, Room No. 3, Sherwood Community Centre, Woodthorpe House, Mansfield Road, Sherwood, Nottingham.

**Northampton (NSWC)**—Thursdays, 7 p.m., Allen's Pram Works, 8 Duke Street, Northampton.

**Peterborough (P & DARS)**—September 6, 7.30 p.m., Riverside Site, Alwalton. October 4, 7.30 p.m., Room No. 14, Peterborough Technical College.

**Workshop (NNARS)**—Tuesdays (Beginners), Thursdays (Informal), September 26 ("Fifty Years of Radio," by F. C. Ward, G2CVV), 7.30 p.m., Club Room, Victoria Institute, Eastgate, Workshop, Notts.

## REGION 6

**Cheltenham**—First Thursday in each month, 8 p.m., Great Western Hotel, Clarence Street.

## REGION 7

**Acton, Brentford & Chiswick (ABCRC)**—September 17, 7.30 p.m., AEU Club, 66 High Road, Chiswick.

**Barnet (BRC)**—September 24, 8 p.m., Red Lion Hotel, Barnet.

**Bexleyheath (NKRS)**—September 5, 19 (Informal), 7.30 p.m., Congregational Hall, Chapel Road, Bexleyheath.

**Chingford (SC)**—Fridays, except first in month, 8 p.m., Chingford Community Centre, Friday Hill House, Simons Lane.

**Dorking (D & DRS)**—September 10 (Informal), 8 p.m., September 24 ("Electronics," by G2FTB), 8 p.m., Wheatheaf, Dorking.

**East Ham**—Tuesdays, fortnightly, 8 p.m., 12 Leigh Road, East Ham.

**East London**—September 15, 2.30 p.m., Ilford Town Hall, High Road, Ilford.

**East Moseley (TVARTS)**—September 4 ("Nuclear Power," by A. Taylor), 8 p.m., Carnarvon Castle Hotel, Hampton Court.

**Edgware & Hendon (EADRS)**—September 9, 23, 8 p.m., John Keble Hall, Church Close, Deans Lane, Edgware.

**Enfield**—September 17 ("History of Cathode Ray Tubes," by Mr. Eastwood of Thorn-AEI), 7.30 p.m., George Spicer School, Southbury Road, Enfield. September 20-31, Enfield Show, GB3ENF on all h.f. bands and 2m.

**Gravesend (GRS)**—September 18, 7.30 p.m., RAFA Club, 17 Overcliffe, Gravesend.

**Guildford (G & DRS)**—Second and fourth Fridays in each month, 8 p.m., City Cafe, Onslow Street, Guildford.

**Harlow**—Tuesdays, 7.30 p.m., rear of G3ERN (G. E. Read), High Street, Harlow. (SRC)—Wednesdays, 7 p.m., Edinburgh Way, Harlow.

**Harrow (RSH)**—Fridays, 8 p.m., Roxeth Manor County School, Eastcote Lane, Harrow.

**Holloway (GRS)**—Mondays, (RAE and Morse), 7 p.m., Fridays (Club), 7.30 p.m., Montem School, Hornsey Road, N.7.

**Hounslow (HADRS)**—Mondays, 7.30 p.m., Canteen, Mogden Main Drainage Dept., Mogden Works, Isleworth.

**Ilford**—Thursdays, 8 p.m., 579 High Road, Ilford (near Seven Kings Station).

**Kingston**—Alternate Thursdays (Lectures), 8 p.m., YMCA, Eden Street, Kingston. Morse classes weekly at 2 Sunray Avenue, Tolworth.

**Loughton**—September 13, 7.30 p.m., Loughton Hall, near Debden Station.

## LONDON MEMBERS' LUNCHEON CLUB

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

at 12.30 p.m. on Fridays, September 20, October 18, and November 15, 1963

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

**Mitcham (M & DRS)**—September 21, 7 p.m., "The Canons," Madeira Road, Mitcham.

**New Cross (CARS)**—Every Friday, 8 p.m., 225 New Cross Road, S.E.14.

**Norwood & South London (CP & DRC)**—September 21, CD Training Centre, Bromley Road, Catford.

**Paddington (P & DARS)**—Wednesdays, 7.30 p.m., Beauchamp Lodge, 2 Warwick Crescent, London, W.2.

**Purley (P & DRC)**—September 6, 8 p.m., ("You and V.H.F. N.F.D."), September 20 (recorded lecture), Railwaymen's Hall (side entrance), Whytecliffe Road, Purley.

**Reigate (RATS)**—September 21, 7.30 p.m., (G3FZL on "V.H.F."), The Tower, High Street, Reigate.

**Romford (R & DRS)**—Tuesdays, 8.15 p.m., RAFA House, 18 Carlton Road, Romford.

**Science Museum (CSRS)**—September 16 (Informal), Science Museum, South Kensington.

**Sidcup (CVRS)**—September 5 ("The Art of Short Wave Listening"), 7.30 p.m., Congregational Church Hall, Court Road, Eltham.

**Slough (SARS)**—First Wednesday in each month, 8 p.m., United Services Club, Wellington Street, Slough.

**Southgate & District**—September 12 (G3DZW on "S.B.S."), 8 p.m., Atlasia School, Tottenham Road, London, N.13.

**St. Albans (Verulam ARC)**—September 18, 7.30 p.m., Headley Road, St. Albans.

**Sutton & Cheam (SCRS)**—September 17, 8 p.m., The Harrow, High Street, Cheam.

**Uxbridge (UDRS)**—September 16, 30 ("Construction Practice and Tools"), 7.30 p.m., St. Andrews Church Scout Hut, Uxbridge Road.

**Welwyn Garden City**—September 12 ("Getting Started," with GPO represented), 8 p.m., Conference Room, Murphy Radio, Bessemer Road, Welwyn Garden City.

## REGION 8

**Crawley (CARC)**—September 11 (informal meeting; for details contact G3FRV), September 25 ("TW Equipment," by T. Withers, G3HGE), 7.30 p.m., West Green Centre, Crawley.

**Folkestone**—October 20 (ORM), 2 p.m., Sun Lounge, Leas Cliff Hall, Folkestone. Tickets from Area Regional or Affiliated Society Representatives.

## LOOKING AHEAD

September 8.—G6UT's Ham Party.  
 September 15.—Region 10 Regional Meeting, Cardiff.  
 September 22.—Region 1 Field Day.  
 September 22.—Woburn Abbey National Mobile Rally.  
 September 22.—Surrey Radio Contact Club 144 Mc/s D/F Hunt.  
 October 30.—November 2.—RSGB Radio Communications Exhibition.  
 December 20.—RSGB Annual General Meeting.  
 June 21, 1964.—Longleat Mobile Rally.  
 The dates of mobile rallies in 1963 are given in *Mobile Column*.



**Tunbridge Wells (WKARS).**—September 7-8 (2m station during V.H.F. Field Day). September 13 ("100 Years of Wireless," the first of a series of talks). 7.30 p.m., KCC Adult Centre, Culverden House, Culverden Park Road, St. John's, Tunbridge Wells.

#### REGION 9

**Bath.**—No meeting in September.  
**Bristol.**—September 27, 7.15 p.m., Royal Fort, Bristol University, Woodland Road, Bristol 8.  
**Burnham-on-Sea.**—Second Tuesday in each month, 8 p.m., Crown Hotel, Oxford Street, Burnham-on-Sea.  
**Camborne (CR & TC).**—First Thursday in each month, Staff Recreation Hall, SWEB Headquarters, Poole, near Camborne.  
**Exeter.**—First Tuesday in each month, 7.30 p.m., George and Dragon Inn, Black Boy Road, Exeter.  
**Plymouth (PRC).**—First Tuesday in each month, 7.30 p.m., Guild of Social Service Building, Plymouth. Other Tuesdays, Virginia House Settlement, St. Andrew's Cross, Plymouth.  
**South Dorset (SDRS).**—First Friday in each month, 7.30 p.m., alternately at Waverley

Hotel, Westham, Weymouth, and Labour Rooms, West Walks, Dorchester. September meeting at Dorchester.

**Torquay.**—September 14 ("Capacitors," by D. Symonds), Club HQ, Belgrave Road, Torquay.  
**Weston-super-Mare.**—First Tuesday in each month, 7.15 p.m., Technical College, Lower Church Road.

**Yeovil (YARC).**—Wednesdays, 7.30 p.m., Park Lodge, The Park, Yeovil.

#### REGION 10

**Cardiff.**—September 9, 7.30 p.m., TA Centre, Park Street, Cardiff.

#### REGION 11

**Prestatyn (FRS).**—September 30 (7.30 p.m.—Slow Morse, 8 p.m.—constructional competition judging), Clubroom, Railway Hotel, Prestatyn.

#### REGION 13

**Edinburgh (LRS).**—September 12 (President's Night), September 26 ("Transistors in Transmitters and Receivers"), 7.30 p.m., YMCA, 14 South St. Andrew Street, Edinburgh 2.

#### REGION 14

**Glasgow.**—September 6, 20, 7.30 p.m., The Christian Institute, 70 Bothwell Street, Glasgow.

#### REGION 15

**Belfast.**—Third Friday in each month, 8 p.m., Toc H "Joe Frame" Room, 73 Lisburn Road, Belfast. September 20—AGM. October 25—Junk Auction.

#### REGION 16

**Basildon (BDARS).**—October 3, 7.30 p.m., at Wickford. Further details from G3RQT, 472 Long Riding, Basildon.  
**Chelmsford (CARC).**—October 1 (Regional Lecture by Frank Hyde on "Radio Astronomy"), 7.30 p.m., Marconi College, Harbour Lane, Chelmsford.  
**Southend (SDARS).**—Alternate Fridays, 7.30 p.m., in the canteen of E. K. Cole Ltd., Priory Road, Prittlewell, Southend. Further details from G3NPF, 2 Edith Road, Prittlewell.  
**Great Yarmouth (GYRC).**—Fridays, 7.30 p.m., Electric Social Club (opposite Steward and Pattersons), North Quay, Great Yarmouth.

Closing date for October issue  
**September 5**

Closing date for the November issue  
**October 10**

#### REGION 8 MEETING

Sun Lounge, Leas Cliff Hall,  
 Folkestone

Sunday, October 20, 1963

For details, see page 190

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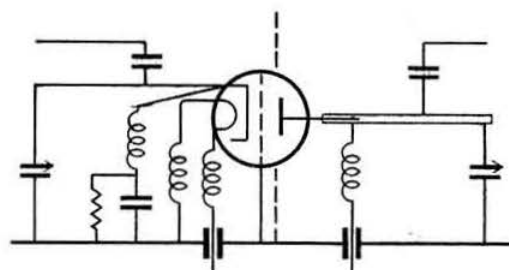
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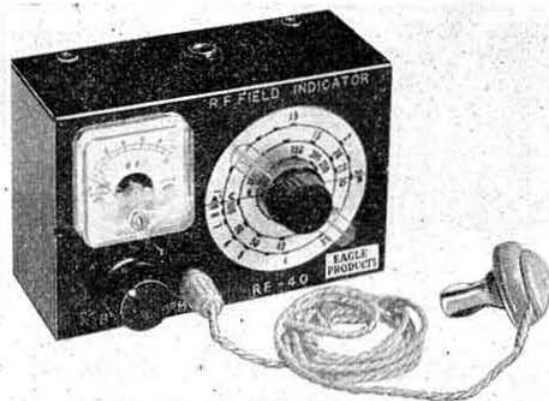
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B84	10/	E1524	12/6	EL32	3/9	KTW61	5/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
B884	47/6	E2134	16/	EL34	12/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
BT19	25/	E2134	16/	EL34	12/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
BT35	25/	E2134	16/	EL34	12/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
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BT93	35/	EAF42	8/	EL84	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
CC3L	2/	EB34	1/6	EL85	9/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
CIC	5/	EB91	3/	EL91	4/6	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
CIC	6/	EB33	6/	EL93	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
CL33	9/	EB34	7/9	EL93	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
CV71	3/	EB34	7/9	EL93	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
CV77	6/	EB34	7/9	EL93	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
CV102	1/	EB34	7/9	EL93	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
CV103	4/	EB34	7/9	EL93	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
CV264	12/6	EB34	7/9	EL93	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
CV4014	7/	EB34	7/9	EL93	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
CV4015	5/	EB34	7/9	EL93	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
CV4025	10/	EB34	7/9	EL93	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
CV4046	40/	EB34	7/9	EL93	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
CY31	6/	EB34	7/9	EL93	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
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DB1	3/	EB34	7/9	EL93	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
D77	4/3	EB34	7/9	EL93	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
DA30	12/6	EB34	7/9	EL93	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
DAF70	7/	EB34	7/9	EL93	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
DAF96	7/	EB34	7/9	EL93	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
DB41	4/	EB34	7/9	EL93	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
DETS	8/	EB34	7/9	EL93	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
DET20	2/	EB34	7/9	EL93	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
DF72	5/	EB34	7/9	EL93	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/
DF91	3/	EB34	7/9	EL93	6/	KTW62	6/6	Q81202	5/6	VR165/30	5/6	5A/174G	5/	6F13	5/	7B7	7/	30F5	8/6	832	15/

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2CW4	14/-	7C5	12/-	30F9	8/6	EB831	7/-	ECH83	8/-	EL41	8/-	EZ89	10/-	PL580	6/6	UCC89	11/-	
3A4	4/-	7C6	7/-	30FL1	9/6	EBF80	7/6	ECL80	7/6	EL42	8/-	GZ32	12/-	PL581	6/6	UCH21	9/6	
3A5	7/-	10C2	13/-	30L15	12/-	EBF83	10/-	ECL82	8/6	EL43	9/-	GZ34	12/-	PL582	6/6	UCH42	8/6	
3Q4	7/-	10F1	14/-	30P12	10/-							KT66	15/-	PL583	7/-	UCH81	9/-	
3Q5GT	7/6	10P13	12/6	30P19	14/-							PL588	9/-	PL588	9/-	UCH82	9/-	
3V4	6/-	10P14	12/6	30P14	10/6							PL589	10/-	PL589	10/-	UCH83	12/6	
3R4G5	9/-	12A18	11/-	30PL13	10/6							PL591	10/-	PL591	10/-	UF41	9/-	
3U4GB	6/-	12AT6	5/-	35L6GT	8/-							PL594	6/6	PL594	6/6	UQ02-6	UF42	9/-
3Z4G	7/-	12A7	5/-	35W4	6/-							PL595	8/-	PL595	8/-	UF80	7/-	
6AQ5	6/-	12A17	5/-	35Z4GT	6/-							PL596	8/-	PL596	8/-	UF85	7/-	
6AT6	5/-	12A17	5/-	35Z4GT	6/-	DAF96	7/6	ECC84	8/-	EP94	7/-	EP98	11/-	PL597	11/-	UF86	12/-	
6AV6	6/-	12A17	10/-	50B5	8/-	EBF89	8/-	ECL83	14/-	EL83	7/6	EP98	7/-	PL598	12/-	UF87	7/-	
6BA6	5/6	12BA4	9/-	50C5	7/-	EBL1	11/-	ECL86	11/-	EL84	7/-	EP98	7/-	PL599	12/-	UF88	7/-	
6BA6G	10/-	12BA6	8/-	50C6D625	8/-	EBL21	12/6	EP40	10/-	EL85	10/-	EP98	13/-	PL599	12/6	UF89	7/-	
6BE6	6/-	12BE6	5/-	50L6GT	7/-	EC92	6/6	EP41	8/-	EL86	8/6	EP98	11/-	PL599	12/6	UF90	7/-	
6BH6	5/6	12B17	8/-	7586	22/6	ECC40	9/-	EP42	7/6	EL86	6/6	EP98	11/-	PL599	12/6	UF91	7/-	
6BJ6	8/-	12B17	7/6	7859	22/6	ECX70	15/-	EP80	6/-	EL86	6/6	EP98	11/-	PL599	12/6	UF92	7/-	
6BQ7A	12/-	12BQ6G13	8/-			ECC81	5/-	EP85	6/6	EL86	6/6	EP98	11/-	PL599	12/6	UF93	7/-	
6BR8	5/-	20P2	15/-	AZ1	9/-	ECC82	5/-	EP86	6/6	EL86	6/6	EP98	11/-	PL599	12/6	UF94	7/-	
6BW6	9/-	20L1	14/-	AZ11	9/-	ECC83	6/-	EP89	6/6	EL86	8/-	EP98	11/-	PL599	12/6	UF95	6/6	

Quality discount of 10% (2/- in £) on orders value of £1 or more for valves in this section only.

### SEMICONDUCTOR RECTIFIERS

Germanium GJ5M, 300 p.d.v., 400-800 mA. DC, 3/6.  
GJ7M, 80 p.d.v., 300-1000 mA. DC, 3/6.  
NOTE: Higher figure of DC current is given for heat sink mounting.

Silicon: MULLARD by 100, 700 p.d.v., 450 mA. DC, 8/-.  
LUCAS DDO 85, 800 p.d.v., 500 mA. DC this is a subminiature diode with a surge resistance up 30 amps, 12/6. Postage and packing 6d. per rectifier.

### PLATE TRANSFORMERS

Input 210 to 230V; Output 1600-1500-0-1500-1600V at 350mA. Dimensions 6 1/2 in. x 6 1/2 in. x 6 in. Weight 35 lbs. PRICE 80/- Packing and carriage 10/-.

### HEADPHONES

DLR3 low impedance, balanced armature type, 10/-.  
CHR, high impedance, 15/-, P. & P. 3/6.

### TRANSISTORS

MULLARD: OC28, 17/6; OC35, 15/-; OC44, 6/-; OC45, 6/-; OC70, 5/-; OC71, 5/-; OC75, 6/-; OC76, 6/-; OC78, 7/-; OC79, 7/-; OC81, 7/-; OC81D, 7/-; OC170, 8/-.  
EDISMAN: XC101A, equivalent to OC72, 8/-.  
RCA: 2N410 (OC45), 4/3; 2N412 (OC44), 4/3.  
MICRO-ALLOY: MAT101 (60 Mc/s), 8/6. MAT121 (120 Mc/s), 8/6.  
B.T.H. Germanium Power transistors: JTX4A (15V) and JTX4B (30V), 5/6.  
SUDALUS TRANSISTORS: Substandard OC44 and OC45, each at 2/3.  
SPOT MARKED: RED, 2/8; WHITE, 2/8; GREEN, 1/6; YELLOW, 1/10.

IF UNDELIVERED

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

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