JULY, 1960

RSGB BULLETIN

VOL. 36, No. 1

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Volume 36 No. 1

July 1960

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R.S.G.B. BULLETIN

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Current Comment

discusses topics of the day

This is Your Life

TO most of us, Amateur Radio is the greatest hobby in the world; indeed for many it has grown to be a way of life. For years, Amateur Radio has been fitted into their everyday lives by dyed-in-the-wool amateurs more firmly than any other hobby. Life-long business association and even marriage have been formed through Amateur Radio contact and acquaintance.

In years past, just to be a licensed amateur was enough to merit a welcome in any group of other amateurs anywhere. Today, the advanced state of the art has divided our interests so that there are many specialist groups, each ardently pursuing their particular phase of the hobby. It is unfortunate that this also tends to loosen the over-all bond that the operational and technical sides of Amateur Radio once enhanced.

Many pleas are made for tolerance but it is easier asked for than obtained; for example, an amateur vitally interested, qualified and active on the v.h.f. bands sometimes finds it difficult to understand the motives behind the one-band operation of a confirmed 20m c.w. DX-er or the 80m phone man. Amateur Radio in fact presents a different facet to each licensee but we do have one common bond—the so-called Amateur Spirit.

There has never been a time when it was so necessary that we, the members of the Radio Society of Great Britain "stand up and be counted." The complexity of modern life, the constant distraction of other endeavours, the not-inconsiderable effect of spreading Amateur Radio over a too-wide area of interest and activity have all combined to reduce the cohesive qualities of our common bond.

One guiding element is always necessary in any endeavour—the type of organization. Amateur Radio within the British Isles has long had its very own organization—the Radio Society of Great Britain—the greatest contributing factor in the development of the hobby, with possibly the exception of those most indispensable elements—the rugged individualism, persistence and the indefatigable efforts of the amateur himself.

It is the obligation of every amateur to be a member of the Society regardless of his personal belief concerning any individual or any group within the structure of the R.S.G.B. organization. Furthermore, it is vitally important that the future of Amateur Radio be ensured by a strong voting membership in R.S.G.B. plus intelligent action on the part of R.S.G.B. officials on behalf of all British Isles amateurs. Thus, the power of the Society will increase in proportion to its numerical strength.

For some years after the last war R.S.G.B. membership declined and although more recently the decline has been arrested and membership now shows a slow but steady increase each month, the total membership should be very much higher than it is. The reason is that many radio amateurs are not meeting their responsibility of supporting the R.S.G.B.

Membership does not imply complete agreement with all actions taken by the Council but it does qualify a person and give him a voice in the conduct of the organization. In Amateur Radio circles the R.S.G.B. is the one organisation in this country to carry official weight and prestige gained by the efforts of its members through long years of struggle. R.S.G.B. is fighting *your* battle, members and non-members alike. R.S.G.B. needs and must have the actual support—through membership—of all U.K. amateurs.

Current Comment in the January 1960 BULLETIN stated that "... *status quo* (at Geneva) having been achieved, cynics, of which there are many, may ask 'Why was it necessary for the R.S.G.B., the A.R.R.L., the W.I.A. and the I.A.R.U. to spend large sums of money in sending representatives to Geneva?' The simple answer is that if the Amateur Radio movement had not been fully represented at the conference by experienced amateurs, many of the privileges we now enjoy might well have been lost for ever."

If you are not a member of the R.S.G.B. read the above *Comment* again and make up your mind to become one; if you are a member and know of an amateur who has not yet joined urge him to do so right away; thus helping to preserve, to continue and to enhance Amateur Radio.

D. R. M.

Communication Receiver Design Considerations

Part 1.–General Considerations

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

RADIO communication has always encouraged the competitive spirit: to work that rare DX station, to own a coveted trophy, or to do better in a contest than the other man at the club, has always been part and parcel of Amateur Radio but there is an old saying " If you can't hear them, you can't work them! " That is still as true as it ever was!

It is therefore rather surprising that there is a scarcity of information on receiver construction in Amateur Radio journals published during the past 10 or 12 years. Add on units, adaptors, modifications and gadgets have been described repeatedly but there have been very few articles dealing with the construction of complete receivers.

The writer does not hold the view that the average amateur is either not interested or afraid of receiver construction. After all, there is little more involved in building a receiver than there is in the construction of a modern " all band " transmitter. Perhaps the answer is that after the Second World War almost all amateurs were able to purchase an ex-service receiver and as this was so materially superior to the one they had previously owned, they were for a time well content. However, band conditions, operating techniques and receiving requirements do not stand still. What was perfectly satisfactory in 1947 and 1948 is not so satisfactory now.

There are many amateurs with sufficient constructional experience to build successfully a modern communication receiver and who will actually do so provided they have some initial guidance in regard to design considerations and are then given—not necessarily to copy exactly—the full constructional details of the type of receiver that has been under consideration. This series of articles has been written in the belief that this is true.

Basic Requirements

Any communication receiver, to be of use at all on the crowded amateur bands, must have three basic qualities.

(i) It must amplify the signal it is desired to copy to the required level at which the information can be extracted.
(ii) It must reject unwanted interference to the greatest possible extent without impairing the intelligibility of the wanted signal.
(iii) It must be possible accurately to tune the receiver and hold the signal for the required period. All necessary controls must be positive and stable.

The use of single sideband by amateurs and the experience gained during the last 10 years has brought the limitations of the average station receiver into sharper focus. In fact, a new technique of reception has been evolved in which the receiver is made so selective it can be tuned to one sideband and made to reject both the other sideband and the carrier. For the purpose of de-modulation the carrier is re-inserted at the detector and the resultant audio spectrum amplified to the required level in the conventional way.

This technique is of course normal practice for s.s.b. reception but it is equally effective for a.m. double sideband with carrier transmissions. Its effect is threefold. It reduces the effect of phase distortion and selective fading and last but not least, it enables the receiver bandwidth to be reduced—with its attendant advantages of a better signal-to-noise ratio and much greater selectivity—without in any way reducing the necessary audio spectrum required for effective voice communication. It will also give the c.w. enthusiast the great advantage of a very high degree of frequency stability for break-in operation, a T9X note, the ability to dodge adjacent channel heterodyne interference by changing sidebands with the flick of a switch and in addition the very great advantage of true " single signal " c.w. reception.

Second channel rejection that would have been considered very good in 1939 is now looked upon as very poor indeed; in fact, with the great increase in transmitter power and the continuous use, day and night, of all available channels from the medium wave broadcast band up, the risk of second channel and breakthrough is very much greater than it was twenty years ago.

There have also been considerable improvements in such things as the maximum usable sensitivity and the frequency stability of the receiver as a whole. A modern a.g.c. system is expected to hold the gain constant within 6db for a change in signal input from 10 μV to 10 mV. The receiver is expected to incorporate facilities for attenuating an interfering heterodyne by as much as 50/60db (i.e., from S9 to S1) and in addition an effective noise limiter that can be used on any kind of signal input.

Finally, the amateur attempting communication on the present crowded bands requires the highest possible selectivity consistent with the receiving requirements (i.e., for phone operation this is 2·5 kc/s). This order of selectivity cannot be used without a slow tuning rate and a high degree of bandspread but these two requirements are not compatible with a general coverage receiver. It is therefore necessary to face the fact that the receiver must be designed with a restricted tuning range covering amateur bands only. If general coverage is required the only satisfactory solution (from the point of view of home construction) is to have a second receiver for this purpose only.

A modern communication receiver therefore would be expected to have a specification on the following lines.

Required Specification

(i) A high degree of bandspread, constant on all bands, and a slow tuning rate.
(ii) High stability and dial setting accuracy. (This includes freedom from slow drift and freedom from frequency shift due to a.g.c. action.)
(iii) The maximum sensitivity and signal-to-noise ratio possible.
(iv) The maximum possible selectivity with a passband as near as possible to the ideal flat top with vertical sides.
(v) Freedom from spurious responses. This includes image interference, i.f. breakthrough and self-generated whistles.
(vi) Sideband switching.
(vii) Two-speed a.g.c. system suitable for a.m., c.w. or s.s.b. reception. (This means fast attack—fast release

* *5 Janice Drive, Fulwood, Preston, Lancashire.*

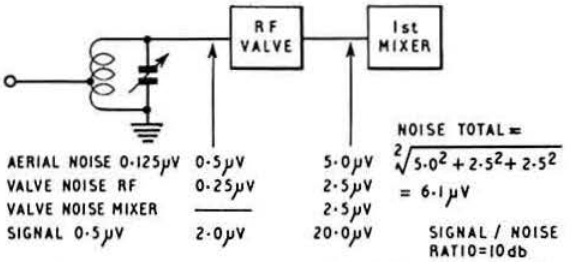


Fig. 1. Receiver front-end signal-to-noise relationships for receiver bandwidth of 2·5 kc/s.

for a.m. and c.w. and fast attack—slow release for s.s.b.)

(viii) Correctly calibrated S meter in terms of db and S points above the threshold noise level. (In addition to the normal use, this enables accurate sideband suppression measurements to be made.)

(ix) Effective noise limiter usuable on a.m., c.w. and s.s.b.

(x) Q multiplier heterodyne rejection filter.

(xi) Built-in 100 kc/s calibration oscillator.

(xii) Professional appearance with convenient layout of controls.

Performance Targets

It is rather important before considering any aspects of communication receiver design to decide clearly on what is wanted and what the final requirements are to be. If the answer is the maximum possible performance, the targets will be as follows:

Sensitivity: One microvolt input to give not less than 10db signal-to-noise ratio.

Selectivity: 2·5 kc/s wide at 6db down; not more than 4 kc/s wide 60db down.

Second Channel Rejection: Not less than 50db down.

I.F. Breakthrough Rejection: Not less than 50db down.

Spurious Responses: Self-generated spurious responses below threshold noise level on all bands.

Automatic Gain Control: Audio rise less than 6db for 60db change in signal input.

A.G.C. Time Constants: Rise time 0·01 second; release time, fast 0·1 second, slow 1·0 second.

Noise Limiter: Fully adjustable, negative and positive peak clipping.

Stability: Under conditions of constant ambient temperature and constant mains voltage—after 30 minutes' warm up; drift not to exceed 100 c/s per hour.

Usable Gain and Signal-to-Noise Ratio

The maximum required gain in a communication receiver is that which will convert the smallest usable input at the aerial terminal to the required audio output at the loudspeaker terminals.

Small random voltages are set up in any receiving aerial by solar radiations and these produce noise in a sensitive receiver very like valve noise or hiss. In the amateur bands up to 30 Mc/s the noise tends to be greater the higher the frequency. *The gain requirement will therefore be set by the aerial noise received at the highest frequency range of the receiver.* Any signal producing less voltage than this at the aerial input will be unreadable.

It is generally agreed that the aerial noise at 30 Mc/s (for a receiver bandwidth of 10 kc/s) will appear at the end of a 75 ohm feeder as a voltage of approximately 0·25 microvolt. A usable signal input will have to be at least 6db better than this to be readable. Therefore the smallest signal input that can be resolved is 0·5 microvolt. The receiver r.f. and audio stages are required to amplify this signal up to the level required at the grid of the output valve without introducing too much noise of their own in the process. A gain requirement of 0·5 microvolt to 5·0 volts or 140db will be necessary. In the interest of reduced cross modulation, as much of this gain as possible should come *after* the selective circuits. It is, however, necessary to provide sufficient gain in front of the first mixer valve to overcome the effect of mixer noise.

The noise voltage—referred to the grid—of modern miniature r.f. pentode and mixer valves is of the order of 0·5 microvolt and 5·0 microvolts respectively. The figures given are for a receiver bandwidth of 10 kc/s. As the noise is evenly distributed over a wide range of frequencies it can be reduced by restricting the receiver bandwidth. Noise is in fact additive on a power basis so that if the bandwidth is reduced from 10 kc/s to 2·5 kc/s (a ratio of one-quarter) the noise voltage will be reduced by half. (The square root of $\frac{1}{4} = \frac{1}{2}$.)

If correctly designed and accurately matched the aerial input coil will give a voltage step up of approximately 10 to 12db. There should also be no difficulty in getting 20db gain from the r.f. stage. Fig. 1 is a block diagram of a typical front-end showing the aerial and valve noise voltages, together with the wanted signal input voltage, as they would appear at the valve grids.

The total at the mixer grid will appear as a noise input of approximately 6·1 microvolts. The wanted signal of 0·5 microvolt after amplification by the gain of the input circuit and the r.f. valve will appear as an input of 20 microvolts and the signal-to-noise ratio will be 10db. It will be noted that the r.f. valve contributed 2·5 μV of noise or less than half of the total.

A grounded grid triode or a cascode amplifier has a noise factor at 30 Mc/s about 3db better than an r.f. pentode so with this type of r.f. stage the noise input at the mixer grid would be 1·8 μV instead of 2·5 μV and the total would then become 5·9 μV. In terms of signal-to-noise ratio this would be 11·0db, or a gain of 1·0db—hardly enough to turn that weak DX signal into an R5 one!

In practice a gain of 1·0db in signal-to-noise ratio is so small it could not make any noticeable difference and the substitution of a modern miniature r.f. pentode by a grounded grid or cascode amplifier—from the point of view of receiver noise at 30 Mc/s and below—cannot be justified. Where substitution has been tried and has shown an improvement, this does not prove that the new valve is superior. It indicates that the original stage was regenerative, possibly due to bad layout or faulty r.f. by-passing, and that it was contributing far more noise than it should have done.

Valve noise is important and triodes have a lower noise output than r.f. pentodes or pentagrid mixers. However, noise alone is not the decisive factor governing choice. The variable mu r.f. pentode has characteristics that are desirable where the receiver gain is to be automatically controlled, and the pentagrid mixer requires less oscillator input voltage, gives high conversion gain and—very important—a high degree of isolation between the signal input and oscillator circuits.

As 30db gain is required before the first mixer to give a satisfactory signal-to-noise ratio with a 0·5 μV input signal, the following stages up to the output valve will be required to contribute the remaining 110db and this can best be subdivided as shown in Fig. 2.

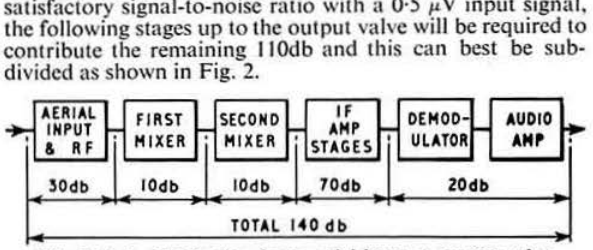


Fig. 2. Gain distribution from aerial input to output valve.

Stability

It is now accepted that modern requirements in regard to image rejection and adjacent channel selectivity cannot be obtained other than by using the double superhet principle. The necessary stability cannot be obtained with a tunable first oscillator. If this oscillator is made crystal controlled and tuning confined to the first i.f. the v.f.o. can be on a relatively low frequency where the stability is higher and band change switching is not required. This has the additional advantage of making the bandspread, the dial calibration and the tuning rate constant on all bands. To the amateur constructor the simplification of using a tunable first i.f. instead of front-end coils—which would require tedious adjustment to get the required bandspread and accurate tracking on each of the required bands—is very great. The first i.f. should be high enough in frequency effectively to reduce image interference but must not be so high as to transfer this problem to the second mixing chain.

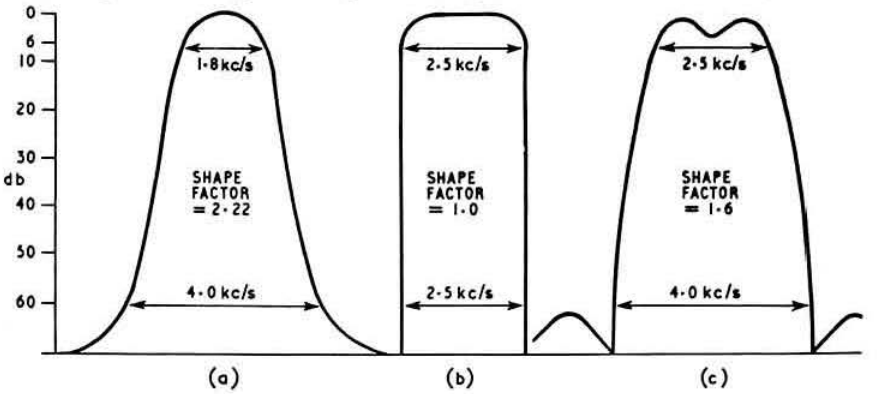


Fig. 3. (a) 85 kc/s i.f. amplifier (six tuned circuits); (b) Ideal passband response; (c) Practical passband response using three 460 kc/s half lattice filters.

If the S meter calibration and the receiver performance is to hold constant on all bands, all valves in the receiver must be in use without change of function (i.e., the receiver must not be a double superhet on some bands and a single superhet on others). This requirement can only be met if the front end conversion section is in use the whole of the time and the tunable i.f. is placed on a neutral frequency clear of the amateur bands required.

Required Bandspread

At this stage it would be advisable to determine the actual tuning range needed. The choice is made more difficult by the fact that the width of the six h.f. amateur bands required is not constant. A tuning range of 2000 kc/s would cover the 10m band but would be rather ridiculous for the other bands. For instance the whole of the 20m band would only occupy one-sixth of the dial traverse. A coverage of 200 kc/s would give the maximum bandspread and be ideal for 160 and 40m—unfortunately the other bands would have to be covered in sections of 200 kc/s and this would require two heterodyning crystals for 80m; two for 20m, three for 15m and at least five for 10m (assuming a 10m coverage from 28 to 29 Mc/s)—a total of 14 crystals for six bands. Across the Atlantic, 14 h.f. crystals in a receiver would not be considered out of the way but in this country crystals are expensive items. It is therefore necessary to arrive at some compromise in terms of a reasonable amount of bandspread and a reasonable number of crystals. A tuning range of 500 kc/s seems the obvious choice. This enables the major portion of 10m to be covered with two crystals, makes use of the full tuning range on 15m; 70 per cent on 20m; 60 per cent on 80m and only on the two remaining bands 160 and 40m is the required bandwidth less than 50 per cent of the tuning range available.

Allowing for a small overlap at each end of the scale and the use of a modern slow motion dial such as the Eddystone 898 with a 110 : 1 reduction ratio this represents a tuning rate of approximately 10 kc/s for one turn of the tuning knob. A tuning rate such as this is very satisfactory indeed. It is slow enough to allow easy and accurate tuning and not too tedious when it is desired to move quickly across the band.

Second Intermediate Frequency

I.f. transformers on non-standard frequencies are difficult and exacting to wind. The choice is therefore practically confined to frequencies normally available. These are 85 kc/s and 465 kc/s, plus or minus 15 kc/s. With 85 kc/s the required selectivity can be obtained by the use of three or four transformers (six or eight tuned circuits) without the need for crystal bandpass filters. At first sight this looks attractive, but the response curve does not have the required characteristics. For example, the response of an experimental receiver using three Command receiver i.f. transformers and two i.f. stages with the coil spacing adjusted for the maximum selectivity is shown in Fig. 3 (a). The bandwidth is satisfactory at 4 kc/s wide (60db down) but the shape factor (ratio of bandwidth at the 6 and 60db points) is not satisfactory at 2·22, and the bandwidth at the 6db points is too narrow at 1·8 kc/s; the rounded top is also unsatisfactory. If the transformer cores are adjusted for a greater bandwidth at the 6db points the response opens out considerably at the base and the shape factor worsens rapidly.

The use of 85 kc/s is also unsuitable for another important reason. This is the effective suppression of the second channel or image interference which will be only 170 kc/s away from the signal input to the mixer. If the tunable first i.f. section is to use the usual three-gang capacitor with one section tuning the v.f.o., there cannot be more than two tuned circuits resonant at the first intermediate frequency input to the second mixer as is shown in Fig. 4.

If the tunable i.f. is made high enough to eliminate second channel interference in the front-end conversion section it will not be possible to eliminate this interference in the second i.f. section. Suppose for instance this first i.f. covered a range of 2·5 to 3 Mc/s and was tuned to 2·715 Mc/s with the v.f.o. on 2·8 Mc/s to give the second i.f. output of 85 kc/s; the v.f.o. would also beat with an incoming signal

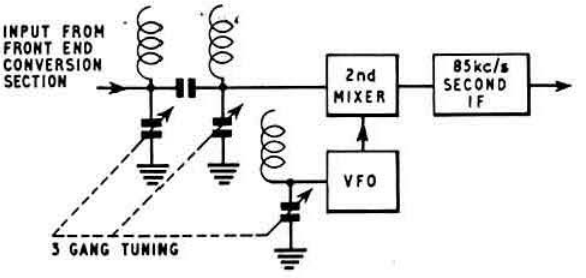


Fig. 4. Tunable i.f. stage followed by 85 kc/s second i.f. amplifier.

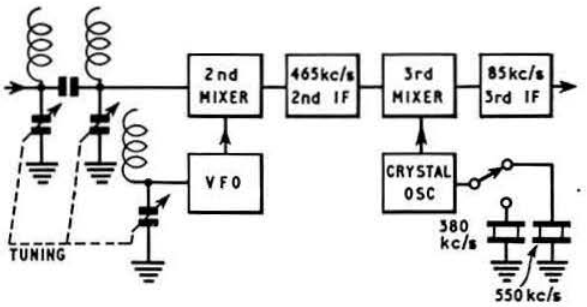


Fig. 5. Tunable i.f. stage followed by intermediate frequency stage and crystal oscillator with sideband switch.

170 kc/s away on 2·885 Mc/s to give an output of 85 kc/s. Assuming normal Q values, the maximum attenuation of a signal 170 kc/s removed, using two tuned circuits centred on 2·715 Mc/s, would be little more than 20db. The multiplying ratio of the mixing process, 85/2750 kc/s, is more than 35 : 1 and is too high. Sufficient attenuation will only be obtained by lowering this ratio, either by reducing the frequency band of the tunable i.f. or increasing the operating frequency of the second i.f., or using the third alternative of an additional intermediate stage of mixing as shown in Fig. 5.

This arrangement looks rather attractive and if the low frequency oscillator were made switchable with one crystal 465 less 85 kc/s and the other crystal 465 plus 85 kc/s, selection of the appropriate crystal would give sideband switching without having to correct the v.f.o. tuning. It has, however, one serious difficulty—that of spurious responses or birdies. Some v.f.o. output will almost certainly leak through the 465 kc/s second i.f. stage into the third mixer and at some point in its tuning range this will beat with the sixth harmonic of the 550 kc/s crystal on 3300 kc/s and the eighth and ninth harmonics of the 380 kc/s crystal on 3040 kc/s and 3420 kc/s to produce four 85 kc/s outputs at the third mixer anode. These will be amplified by the 85 kc/s i.f. chain as spurious responses or heterodynes that may well be above the threshold noise level of the receiver. These birdies will appear at four points on the main tuning dial and as they are generated after the front-end conversion, will appear on all six of the required bands.

If spurious responses are to be kept below the threshold noise level (that is below a level of 1·0 μV) they must be attenuated at least 80db below peak signal level. While this might be possible commercially it would be extremely difficult with normal amateur construction. The better method is to get rid of the birdies by eliminating their origin, that is by reducing the number of oscillators to the minimum possible and making a choice of operating frequencies, such that at any setting of the main tuning the v.f.o. cannot produce harmonics within the amateur bands or beat with the front end conversion crystals to produce spurious heterodynes.

It is also seen that in addition to the risk of spurious responses the layout of Fig. 5 entails an additional mixing process and one more valve in front of the selective third i.f. amplifier chain and effectively moves the selectivity further away from the aerial terminal.

Crystal Band Pass Filter

Ideally, the receiver should be designed with the front-end gain low in order to reduce the possibility of cross modulation caused by a strong adjacent signal which will be accepted by the unselective front-end stages and overload the first r.f. and/or the first mixer stage and effectively modulate the wanted signal. The major signal amplification should be in those stages following the selectivity and the perfect receiver design would have the bandpass filter right at the front-end—preferably immediately after the aerial terminal. This is not possible in practice but an effort should be made in the design to keep the selective stages as near to the aerial as possible.

In view of the considerations just discussed, it is felt that the use of a low i.f. such as 85 kc/s is not desirable and that the better method is to eliminate the third i.f. chain and its associated mixer and heterodyning oscillator and incorporate the required 2·5 kc/s selectivity in the 460 kc/s amplifier. Fortunately this is possible and the ideal flat top steep slope passband response can be obtained by the use of crystal filters as shown in Fig. 3 (c).

First Intermediate Frequency Tuning

The tunable first i.f. section is the most important part of the receiver and the positioning of the frequency band over which it will tune will affect the final receiver performance in regard to the following important factors: (a) Freedom from spurious responses or birdies; (b) Second channel rejection; (c) I.f. breakthrough rejection.

Tables 1 and 2 have been compiled to show the required heterodyning frequencies and the situation in regard to spurious responses on all suitable channels between 1·5 Mc/s and 6·5 Mc/s.

A spurious response will occur whenever the v.f.o. fundamental or one of its harmonics up to about the fifth (beyond this the power is so small the spurious response should be below the receiver threshold noise level) comes within 460 kc/s (or whatever second intermediate frequency is used) of the fundamental or the harmonics of the front-end heterodyning crystal in use on that particular band. To give an example from the first column of the table, it will be seen that for an i.f. of 1·5-2 Mc/s, a 5·5 Mc/s heterodyning crystal will be required for 80m and this will cause a spurious response when the v.f.o. third harmonic reaches 5960 kc/s (5,500 plus 460 kc/s). The v.f.o. fundamental frequency will be one third of 5960, that is 1987 kc/s approximately; as it is running on the high side, the i.f. tuning will be 1987 minus 460 = 1527 kc/s. The dial frequency will therefore be 5,500 minus 1527 kc/s = 3973 kc/s and the spurious heterodyne will always be on this frequency. It will be noted that 5·5 Mc/s *less* 460 kc/s (= 5040 kc/s) is outside the range of the v.f.o. so there is only *one* beat. In the second example, the harmonic of this same 5·5 Mc/s crystal on 11 Mc/s, both the sum and the difference frequencies (i.e., 11,000 plus 460 and 11,000 minus 460 kc/s at 11,460 and 10,540) are within the range of the v.f.o. fifth harmonic and there will be *two* beats.

At this point it must be emphasized that it is very necessary in order effectively to reduce spurious responses caused by harmonics to make the two oscillator outputs pure sine waves without any appreciable harmonic content. Additionally the oscillator and v.f.o. outputs should be at a low level and the drive to the following mixer grid should be kept at the lowest level consistent with satisfactory operation.

In this respect it is interesting to note that in the Collins 75A4 receiver using a tunable i.f. of 1·5 to 2·5 Mc/s and a 5·7 Mc/s crystal for the 80m band the Collins Company has had to incorporate a 5·7 Mc/s " tweet trap " in series with the input to the second mixer. The two 40m beats are avoided by using a 9·3 Mc/s heterodyning crystal. (This is possible because the first i.f. tuning range is 1000 kc/s wide.)

The tables have been compiled for even bands—every half megacycle—for the sake of clarity. It is, however, quite possible to move the chosen channel a few hundred kc/s higher or lower and alter the heterodyning crystals accordingly and this expedient can sometimes be used to clear an unwanted spurious response. Additionally where the required band is less than 500 kc/s such as occurs on 160,

TABLE 1
HETERODYNING FREQUENCY REQUIRED FOR I.F.
INDICATED (Second I.F. = 460 kc/s)

BAND	TUNABLE FIRST I.F. Mc/s					
	1·5 to 2·0	2·0 to 2·5	2·5 to 3·0	3·0 to 3·5	3·5 to 4·0	REMARKS
160m	Nil*	Not suitable i.f.	4·5	5·0	5·5	* Single superhet on this band.
80m	5·5	6·0	6·5	7·0	Nil*	* Single superhet on this band.
40m	9·0	9·5	10·0	10·5	11·0	
20m	16·0	16·5	17·0	17·5	18·0	
15m	23·0	23·5	24·0	24·5	25·0	
10m	30·0	30·5	31·0	31·5	32·0	
10m	30·5	31·0	31·5	32·0	32·5	
V.F.O. Tuning (kc/s)	1960 to 2460	2460 to 2960	2960 to 3460	3460 to 3960	3960 to 4460	Fundamental
	3920 to 4920	4920 to 5920	5920 to 6920	6950 to 7920	7920 to 8920	2nd harmonic
	5880 to 7380	7380 to 8880	8880 to 10,380	10,380 to 11,880	11,880 to 13,380	3rd harmonic
	7840 to 9840	9840 to 11,840	11,840 to 13,840	13,840 to 15,840	15,840 to 17,840	4th harmonic
	9800 to 12,300	12,300 to 14,800	14,800 to 17,300	17,300 to 19,800	19,800 to 22,300	5th harmonic

BAND	V.F.O. FREQUENCY PRODUCING SPURIOUS RESPONSE (kc/s)					
160m	Single superhet on this band	Not suitable i.f.	9460*	10,460	Nil	* This is at 1807 kc/s and could be cleared with a lower i.f. of 450 kc/s
80m	5960 10,540 11,460	5540 11,540 12,460	6040† 12,540* 13,460	Not suitable i.f.	single superhet	† This is at 3960 kc/s and outside band. *This is at 3825 kc/s and outside band.
40m	8540 9460	9960	9540	10,960	21,540†	†This is at 7152 kc/s and outside band.
20m	Nil	Nil	16,540	17,960	17,540	
15m	Nil	Nil	Nil	Nil	21,214 to 21,219*	* This is direct pick up of VFO harmonic by signal freq. circuits over range 21,216.2 to 21,217.2 kc/s.
10m	Nil	Nil	Nil	Nil	Nil	

To check any conversion crystal not listed, let crystal frequency plus i.f. = W; crystal frequency minus i.f. = X; twice crystal frequency plus i.f. = Y; twice crystal frequency minus i.f. = Z. Select column for tunable i.f. range it is desired to use. Follow column down to v.f.o. section. If W, X, Y or Z are wthin the five v.f.o. ranges given, a spurious response will be generated. *Example.*—The choice of the tunable i.f. is 3·5 to 4 Mc/s. It is proposed to use a 9 Mc/s crystal in a harmonic oscillator because this is available. In this case W = 9460 kc/s, X = 8540 kc/s, Y = 18,460 kc/s and Z = 17,540 kc/s. It will be seen that W and Y are clear but X and Z are within the v.f.o. tuning range. There will therefore be two spurious responses.

80, 40 and 20m its position can be moved in relation to the tuning scale by alteration of the heterodyning crystal and this facility can also be used possibly to clear or move an annoying spurious response.

TABLE 2
HETERODYNING FREQUENCY REQUIRED FOR I.F.
INDICATED (Second i.f. = 460 kc/s)

BAND	TUNABLE FIRST I.F. Mc/s.					
	4·0 to 4·5	4·5 to 5·0	5·0 to 5·5	5·5 to 6·0	6·0 to 6·5	Remarks
160m	6·0	6·5	7·0	7·5	8·0	
80m	Not* suitable i.f.	8·5	9·0	9·5	10·0	* This i.f. is too near to the 80m band to prevent i.f. break-through
40m	11·5	12·0	12·5	13·0	Not* suitable i.f.	* This i.f. is too near to the 40m band to prevent i.f. break-through
20m	18·5	19·0*	19·5	20·0	20·5	* With a 9·5 Mc/s crystal both fundamental *and* second harmonic will convert to tunable i.f.
15m	25·5	26·0	26·5	27·0	27·5	
10m	32·5	33·0	33·5	34·0	34·5...	
10m	33·0	33·5	34·0	34·5	35·0	
V.F.O. Tuning kc/s	4460 to 4960	4960 to 5460	5460 to 5960	5960 to 6460	6460 to 6960	Fundamental
	8920 to 9920	9920 to 10,920	10,920 to 11,920	11,920 to 12,920	12,920 to 13,920	2nd harmonic
	13,380 to 14,880	14,880 to 16,380	16,380 to 17,880	17,880 to 19,380	19,380 to 20,880	3rd harmonic
	17,840 to 19,840	19,840 to 21,840	21,840 to 23,840	23,840 to 25,840	25,840 to 27,840	4th harmonic
	22,300 to 24,800	24,800 to 27,300	27,300 to 29,800	29,800 to 32,300	32,300 to 34,800	5th harmonic

BAND	V.F.O. FREOUENCY PRODUCING SPURIOUS RESPONSE (kc/s)					
160m	Nil	Nil	Nil	Nil	Nil	
80m	Not suitable i.f.	Nil	17,540	18,540	19,540 20,460	
40m	22,504 23,460	Nil	Nil	12,540	13,040*	* Not suitable i.f.
20m	18,040 18,960	Nil*	Nil	Nil	Nil	* A 9·5 Mc/s crystal must not be used
15m	Nil	25,540 26,460	Nil	Nil	27,040	
10m	Nil	Nil	Nil	Nil	Nil	
10m	Nil	Nil	Nil	Nil	Nil	

To check any conversion crystal not listed, use the method indicated in the footnote to Table 1.

If 160m is required the band 2·0 to 2·5 Mc/s cannot be used. If 80m is required the band 3·0 to 3·5 Mc/s cannot be used. This leaves 1·5 to 2·0 Mc/s 2·5 to 3·0 and 3·5 to 4·0 Mc/s in the lower frequencies. From the point of view of spurious responses the band 3·5 to 4·0 Mc/s is satisfactory with one birdie in the 20m band. This does, however, mean that on 80m the receiver becomes a single superhet with a reversal of scale and sideband switching and a change in sensitivity.

(*Continued on page 18*)

Design for a High Stability DX Transmitter

Full Break-in Operation on 14, 21 and 28 Mc/s

By G. F. GEARING (G3JJG) *

THE main interest at G3JJG is in c.w. operation on the 14, 21 and 28 Mc/s bands and the transmitter to be described was built with these activities particularly in mind. However, many other amateurs are believed to require similar performance from their transmitters and a detailed description is therefore considered to be justified.

For example, the signal produced should be beyond reproach both over the air and from the point of view of listening and viewing neighbours, while the transmitter should be capable of consistent operation and, in association with a suitable receiver, provide full break-in facilities on c.w. Physically, the rig should be of reasonable size.

Circuit Arrangement

After considerable thought, it was decided to employ a crystal-mixer type v.f.o. By using this technique, the problem of v.f.o. stability is simplified and, as both oscillators have to be run at low level (with consequently low harmonic content), the possibility of interference to other services is reduced.

The v.f.o. output frequency range is from 7·0 Mc/s to 7·15 Mc/s. The variable low frequency oscillator covers 1·5 Mc/s to 1·65 Mc/s and is mixed with the output of a crystal oscillator on 5·5 Mc/s. When operating on 28 Mc/s the frequency multiplication is only four times so the effects of drift are kept to a minimum. If the v.f.o. were on 1·75 Mc/s, as in conventional designs, the multiplication factor would be 16 times, i.e. a drift of 100 c/s at the fundamental would be 1600 c/s at 28 Mc/s.

The mixer stage may be keyed for break-in operation, effectively keying the v.f.o. output but without the transient responses which may occur when an oscillator is keyed. Some residual signal is detectable but by simultaneously keying the following stage this problem has been overcome. A netting facility is provided which brings the mixer into operation but not the buffer amplifier.

Nearly everything has drawbacks and this arrangement is no exception. The v.f.o. output is of low amplitude being in the region of 2 volts r.f. However, sufficient drive is obtained without any intermediate tuning of the exciter becoming necessary after initial alignment.

The multiplier chain uses the popular 5763 in conventional circuitry, followed by the power amplifier which uses a v.h.f. double tetrode (Mullard QQV06-40) with the sections in parallel. At the frequencies in question, good r.f. efficiency is obtained. A pi-network tank is utilized, output being taken through an electronic aerial relay to the 70 ohm load.

The complete circuit of the transmitter is shown in Fig. 1 on the next page.

* *21 Rastell Avenue, London, S.W.2.*

The Low Frequency Oscillator (V1)

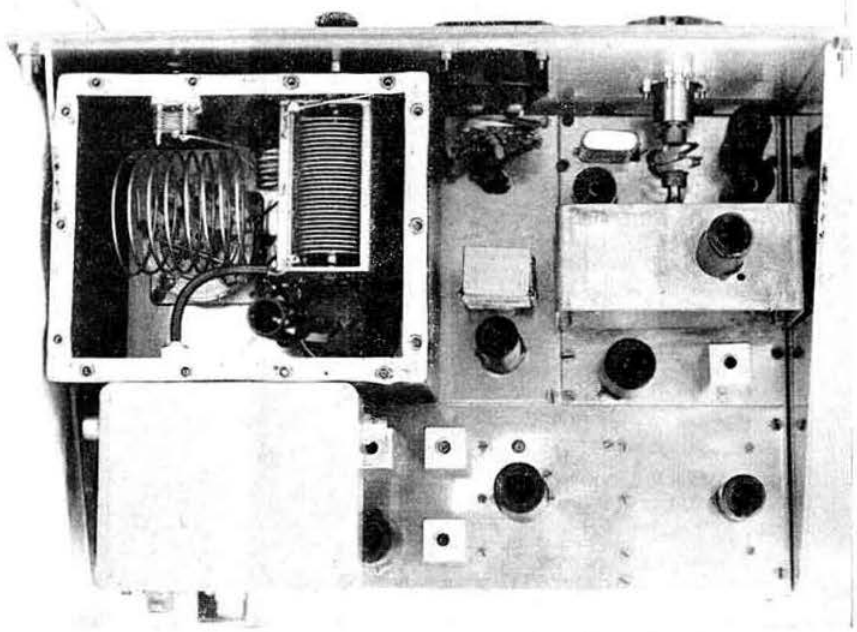
The circuit chosen for the low frequency oscillator (V1) has become known as the low-capacity Colpitts. In the grid-cathode Colpitts oscillator, the tuning capacity is in parallel with the large capacitors from grid to cathode and from cathode to earth. These are normally 1000 pF each, so 500 pF appears across the oscillator coil. The inductance must therefore be low and the capacity swing for a given frequency range must be large.

As may be seen from Fig. 1, the grid blocking capacitor C1 has been placed in series with C4 and C5, so that the shunt capacitance is effectively reduced to approximately 60 pF, permitting L1 to be large and C2 small. Random variations in the input capacity of V1 are accordingly swamped by C4.

Coupling to the oscillator tank circuit is controlled by the value of C1, which is dependent on the *Q* of L1. As the stability of an oscillator is improved if the power dissipated by the tuned circuit is reduced, C1 should be as small as possible consistent with steady oscillation. Drift which occurs whilst warming-up is counteracted by the negative temperature co-efficient capacitor C3. A stability exceeding 0·005 per cent is possible with the circuit values given.

The tuning range is from 1500 kc/s to 1650 kc/s with a small overlap either side. This may be reduced by removing one rotor plate from the specified tuning capacitor, C2.

Harmonic relationships of the frequencies in the circuitry associated with V1 have been considered carefully as all following stages are broad-banded and hence will accept any spurious signals in the pass band. The nearest unwanted signals in the output due to V1 are at 15 Mc/s and 12·3 Mc/s.



The above-chassis layout showing the p.a. box at the top left and the l.f.o. and crystal oscillator components to the right. The large transformer at the lower left is the heater transformer.

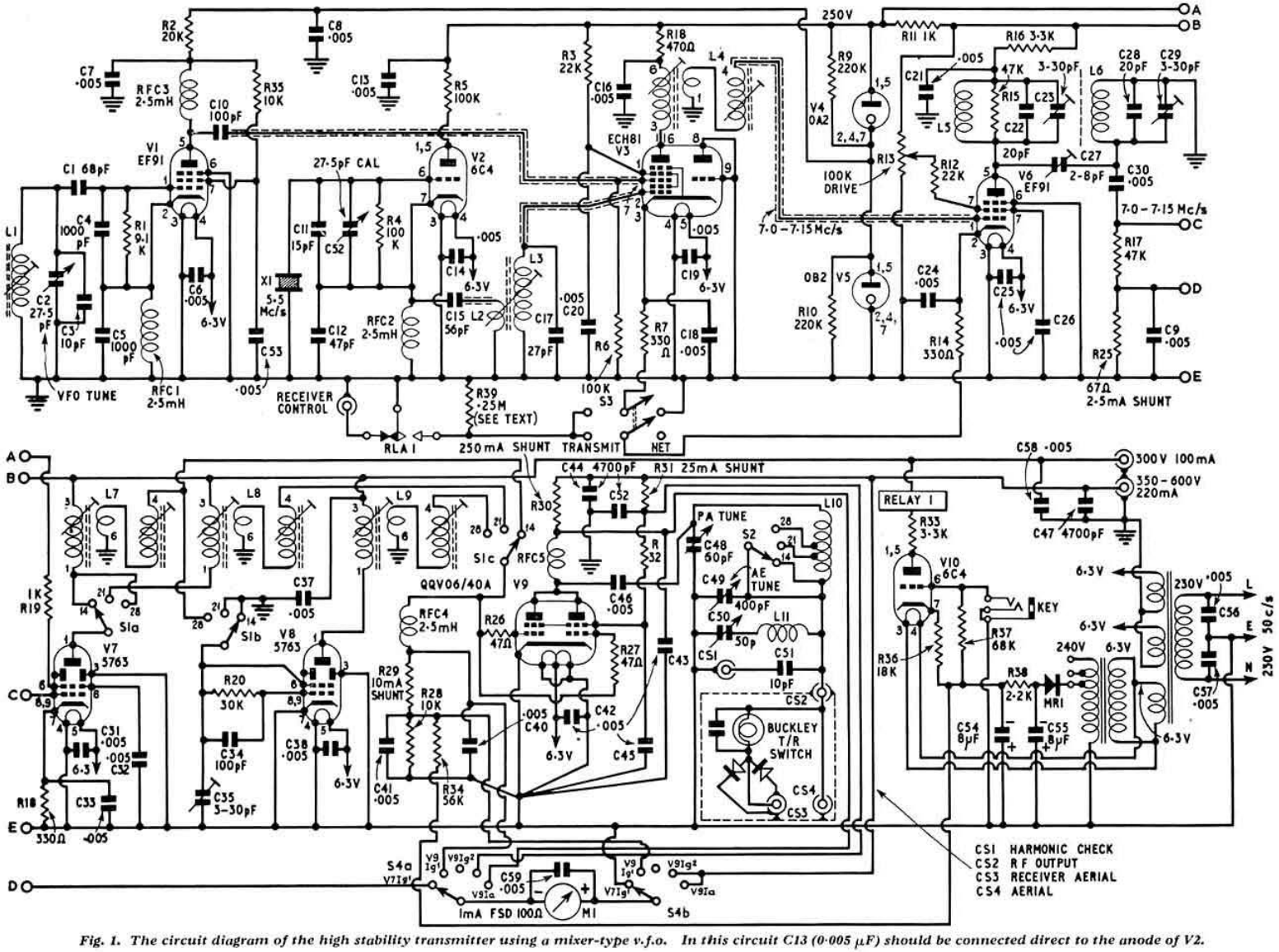


Fig. 1. The circuit diagram of the high stability transmitter using a mixer-type v.f.o. In this circuit C13 (0·005 μF) should be connected direct to the anode of V2.

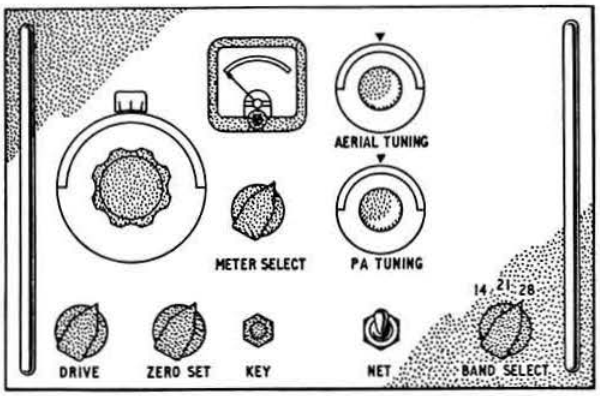


Fig. 2. Layout of the front panel showing the position of the various controls.

At the p.a. grid, they are more than 40db down with respect to the wanted signal.

Crystal Oscillator (V2)

The circuit of the crystal oscillator (V2) is similar to that of V1, L1/C2 being represented by the crystal. To produce the required v.f.o. output of 7-7·15 Mc/s, the crystal frequency is 5·5 Mc/s.

V.f.o. calibration may be set by C52, which varies the crystal frequency by about ± 500 c/s at the fundamental. For initial calibration of the complete v.f.o., C52 is set to mid-capacity.

R.f. output is taken from the cathode of V2, through the impedance transformer to the control grid of V3. L3 and C17 resonate at 5·5 Mc/s, attenuating harmonics which may cause spurious outputs to be generated.

The Mixer Stage (V3)

The output of the two oscillators appear at the mixer (V3) anode together with their sum and difference frequencies. When the l.f.o. is tuned to 1500 kc/s, these frequencies are 1500 kc/s, 5500 kc/s, 7000 kc/s and 4000 kc/s. The wanted signal, 7000 kc/s, is selected by the broad-band transformer L4, which has a pass band extending from 7·0 Mc/s to 7·15 Mc/s, other signals being attenuated. The input of L4 from V3a and the output to the control grid of V6 are run in co-ax right into the screening can to avoid instability and direct pick up of unwanted signals.

The injection voltages to the mixer are low. If they are increased, spurious signals will result with, however, no increase in the 7 Mc/s drive to V6.

Broad Banded Amplifier (V6)

R.f. input to V6 is taken from the secondary of L4. This valve, due to its cathode bias, will never run into grid current, and requires only voltage output from the mixer stage.

Owing to the low r.f. voltage from the v.f.o. the maximum possible gain consistent with bandwidth is needed to give sufficient drive to the following valve. In fact, this stage has a measured gain of 34db with a flat response within 1db from 7·0 Mc/s to 7·15 Mc/s. It is 20db down at 400 kc/s from the centre frequency.

The anode circuit consists of two identical tuned circuits, L5-C22-C23 and L6-C28-C29, which are tuned to resonate at 7·075 Mc/s. R15 and R17 are primary and secondary damping resistors. R17 is also the grid resistor of V7. C27 controls the amount of overcoupling between the primary and secondary, producing the characteristic double humped response. All circuits up to the grid of V7 are tuned for flat response as measured across R25 (2·5 mA shunt) on the meter. Grid current should be greater than 1·5 mA over the entire range.

Drive to the power amplifier is controlled by R13 which acts as a potential divider across the h.t. rail, carrying the screen voltage of V6. R12 is necessary to prevent the screen rising to h.t. potential when at maximum drive.

The 14 Mc/s Doubler and 21 Mc/s Tripler (V7)

V7, a 5763 beam tetrode, is run in class C, its screen potential being held at 250 volts from the stabilized h.t. line. Its anode has the full h.t. voltage applied to it through the primary of L7 or L8. On 14 Mc/s r.f. is taken from the secondary of L7 to S1c while on 21 Mc/s, output is from L8 to S1c. Under key-up conditions, the 390 ohm cathode resistor prevents the rated anode dissipation of V7 being exceeded.

The 28 Mc/s Doubler (V8)

Originally, it was intended to use a conventional circuit for this stage with the 5763 running as a beam tetrode. However, it has been found that by running it as a high-mu triode, five components can be saved with no loss of drive and a consequent saving in space. Under key-up conditions, the valve draws little anode current and the cathode may be earthed.

As the stray capacities of the grid circuit are less than the p.a. valve C35 is necessary to equalize these capacities to avoid the secondary of L7 being mis-tuned when on 28 Mc/s.

The anode circuit comprises L9, decoupled at the pins by C37. R.F. is taken from the secondary to S1c. The wideband couplers L4, L7, L8 and L9 are based on an article by G3JAM in the June 1953 issue of the *Short Wave Magazine* and have been tailored to suit this design.

The Power Amplifier

The p.a. valve, a QQV06-40A, is a v.h.f. double tetrode of 40 watts total anode dissipation with both sections connected in parallel. It may seem extravagant to use such a valve at these frequencies but its high plate efficiency and small size justify the choice. An input of 120 watts may be run with suitable adjustment of the screen and bias resistors.

The application report on the valve states that the screen current should be 17 mA at 250 volts. The required series resistance may be calculated by Ohm's Law—

$$\frac{\text{Required voltage drop}}{\text{Screen current in amps}} = \text{Resistance in ohms.}$$

and should be of adequate size to dissipate the power passing through it. If anode and screen modulation is not envisaged, the p.a. screen could be fed from the exciter h.t. supply through a suitable resistor.

Drive voltage is developed across R28. Grid current is read on the service meter across R29 (10 mA shunt), C40 and C41 decoupling r.f. from the meter. A standing d.c. bias is applied to the grid from the potential divider, R28 and R34. This holds the anode dissipation within the manufacturers' rating when the key is up.

Parasitic stoppers R26 and R27 are wired very close to the grid pins of the valveholders. Furthermore, to avoid instability, close attention has been paid to stage earthing. A copper strap, $\frac{1}{2}$ in. × $\frac{1}{16}$ in., runs across the base, earthing the cathode and one side of the heater. C42 and C45 are wired direct to this strap with short leads. The junction of C41, R28 and C40 is also taken to this point.

The pi-network r.f. choke, RFC5, has been designed to avoid resonances within the required frequency bands. One third of a wavelength of wire at the lowest operating frequency is wound on a paxolin or ceramic former, the winding length being four times the diameter. The self-capacity is reduced by winding in three sections. Full details given in the Coil Data. The end of the choke farthest from the anode is decoupled to the cathode by C43. Anode current is moni-

tored across R30 (250 mA shunt) which is decoupled by C44. C47 is mounted at the input socket.

The tank circuit has been designed to "look into" an impedance of 70 ohms with a loaded *Q* of 12. S2, the band change switch, is ganged to S1, which controls the exciter. L10 is mounted directly on the switch and taps are selected for 21 Mc/s and 28 Mc/s. C48 is the p.a. tuning capacitor and C49 the output loading capacitor. L11 and C50 form a series circuit which is tuned to the local Band I television channel, presenting a low impedance to these frequencies.

The r.f. output is run in co-ax from C49 into the Buckley T/R switch, a manufactured item obtainable from Home Radio (Mitcham) Ltd.

Metering, Control and Heater Circuits

A choice of four electrode currents may be monitored by M1, the service meter. This has a basic full scale deflection of 1 mA, with an internal resistance of 100 ohms and is made by Ernest Turner Electrical Instruments Ltd. S4 selects the grid current of V7 for an intermediate check and the grid, screen and anode of the QQV06-40A. The meter is calibrated for a f.s.d. of 10 mA, 250 mA and 500 volts; if required the fifth position of S4 may be used to monitor p.a. h.t. voltage.

To provide for full break-in operation it is necessary to key the transmitter and simultaneously provide a control circuit for the receiver. On a straight key this may be accomplished on the back contacts but with any other key a double throw relay is required.

Provision for transmitter keying and control of the receiver is therefore accomplished by RLA1, a s.p.d.t. contact on the keying relay. With the relay de-energized, the receiver control circuit is closed and the receiver is operative. Due to their grids being much more negative than their cathodes, V3 and V6 are cut off and although V1 and V2 run continuously, their outputs are not combined and there is no output at 7 Mc/s.

When RLA is energized, the receiver control circuit opens, muting the receiver and, in sequence, the transmitter is keyed by earthing R7 and R14. By using this system, full break-in is possible with no clicks or chirps which may occur due to the transients produced by keying an oscillator. A 0·25 Megohm resistor is wired across the contacts of the relay to prevent the h.t. voltage appearing across the heater cathode insulation of V3 and V6 in the key up condition.

As a negative voltage is available from the bias pack, V10 has been incorporated to avoid a separate relay supply. RLA1 is in series with V10 and operates when anode current flows.

Negative voltage is derived from T2, which is a heater transformer connected in reverse, its output rectified by MR1 and smoothed by R38, C54 and C55. T2 and all valve heaters are supplied from the heater transformer, T1.

All wiring cold to r.f. is run in screened cable, adequately decoupled. The a.c. input is decoupled at the input socket.

A stabilized h.t. line of 255 volts is provided by V4 (0A2 or VR150/30) and V5 (0B2 or VR105/30), feeding V2, V3 and the screen grid of V7. V1 is fed from the junction of V4 and V5 with 105 volts.

Mechanical Details

The transmitter is built on the unit construction principle which affords good rigidity while being easier to construct than a conventional chassis. Aluminium channel sections are used for the sides and main screens, each 2 in. deep with a lip top and bottom. Three sections 14 in. long, two 10 in. long and one 6 in. long sections are used and are obtainable from Home Radio (Mitcham) Ltd.

The top plates of the chassis are $\frac{1}{8}$ in. thick aluminium as are the front panel and the side members. The complete v.f.o. is on a plate 6 in. by $4\frac{1}{2}$ in., with the l.f.o. in an Eddystone diecast box, $4\frac{1}{2}$ by $3\frac{1}{2}$ in. by 2 in., mounted above the plate. V2, V4, V5 and the crystal are between the panel and l.f.o., with V3 and L4 behind the diecast box. L2/3 is below the chassis between V2 and V3. The front panel controls, C52 and R13, are mounted on the 14 in. channel, R13 nearest to the side member and C52 above the crystal holder. All r.f. wiring to V3 and L4 is in co-axial cable. The 6 in. channel and the third 14 in. channel screen the v.f.o. from all other sections.

The multiplier sub-chassis measures 14 in. by $3\frac{3}{4}$ in. and occupies the rear of the unit. V6 is directly behind L4, connected by a short length of co-ax which passes through the screen.

Three small screens, each $2\frac{3}{4}$ in. by 2 in., partition the rear

COMPONENTS LIST

C1	68 pF, 2 per cent silver mica.
C2, 52	27·5 pF, Eddystone Type 588.
C3	10 pF, N.T.C. ceramic type N750L.
C4, 5	1000 pF, 5 per cent silver mica.
C6, 7, 8, 9, 13, 14, 16, 18, 19, 20, 21, 24, 25, 26, 31, 32, 33, 37, 38, 40, 41, 42, 45, 53, 56, 57, 58, 59	0·005 µF Plessey Cascap.
C10, 34	100 pF, 10 per cent silver mica.
C11	15 pF, 2 per cent silver mica.
C12	47 pF, 2 per cent silver mica.
C15, 39	56 pF, 5 per cent silver mica.
C17	27 pF, 2 per cent silver mica.
C22, 28	20 pF, 2 per cent silver mica.
C23, 29, 35	3/30 pF, Philips concentric trimmer.
C27	2/8 pF, Philips concentric trimmer.
C30	5000 pF, mica.
C43, 46	0·005 µF mica, T.C.C. Type M4GO, 1,500 V. wkg.
C44, 47	4700 pF, disc ceramic, Erie Hi-K. type, 3000 V. wkg.
C48	60 pF, Eddystone type 815.
C49	400 pF, variable.
C50	50 pF, Eddystone type 581.
C51	10 pF, 5 per cent silver mica.
C54, 55	8 µF, 350 V. electrolytic.
M1	1 mA f.s.d. movement, 100 ohms internal resistance. (Ernest Turner Electrical Instruments Ltd. Model 225.)
MR1	Contact cooled half wave metal rectifier, 250 V., 60 mA.
R1	9·1 K ohms.
R2	20 K ohms.
R3, 12	22 K ohms.
R4, 5, 6	100 K ohms.
R7, 14, 18	330 ohms.
R8	470 ohms.
R9, 10	220 K ohms.
R11	1000 ohms 10 watt.
R13	100 K ohms carbon potentiometer.
R15, 17	47 K ohms.
R16	3·3 K ohms.
R19	1000 ohms.
R20	30 K ohms 1 watt.
R25	2·5 mA shunt.
R26, 27	47 ohms.
R28	10 K ohms, 1 watt.
R29	10 mA shunt (E.T.E.I. Ltd.).
R30	250 mA shunt (E.T.E.I. Ltd.).
R31	20 mA shunt (E.T.E.I. Ltd.).
R32	8 K 5 watt (for 350 V h.t.).
R33	3·3 K ohms 1 watt.
R34	56 K ohms.
R35	10 K ohms.
R36	18 K ohms.
R37	68 K ohms.
R38	2·2 K ohms 5 watt.
	All resistors are ½ watt unless otherwise stated.
RLA/1	Siemens high speed keying relay (1000 ohms + 1000 ohms coil).
X1	5·5 Mc/s crystal, 50 pF input capacity.
S1	Yaxley ceramic 3 bank 1 pole 3 way (make before break).
S2	1 bank 6 way, heavy duty ceramic (ex. TU5B unit).
S3	D.P.D.T. toggle.
S4	Yaxley ceramic 1 bank 2 pole 5 way (break before make).
T1	6·3 V 3 A three times.
T2	200-250 V primary, 6·3 V 1·5 A (see text).
V1, 6	EF91 or 6AM6.
V2, 10	6C4.
V3	ECH81.
V4	0A2.
V5	0B2.
V7, 8	QV03/12 or 5763.
V9	QQV06/40A.

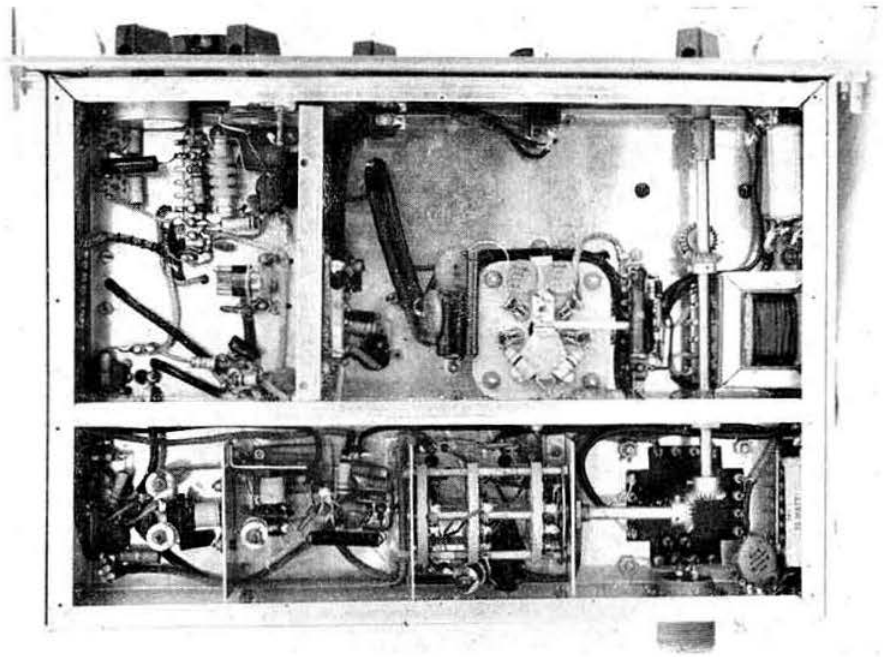
of the chassis into four compartments. The first houses V6, C27, L5 and associated components. L5 is mounted on the dividing screen, parallel to the chassis with L6 on the other side at right angles to L5 to avoid stray coupling.

The exciter band selector switch S1 is parallel to the front panel, held between the second and third small screens. The second compartment contains L6, C28, C29, V7 and components and the third, L7, L8, L9 above chassis, V8, R20, C34, C35, C37, C38 and C39. The fourth is for the heater transformer T1, above chassis and R11, C47, C56, C57 and C58 below. On the rear channel are the four input sockets, exciter h.t., p.a. h.t., receiver control and mains input.

S1 is driven at right angles from the front panel by a simple linkage system. A spindle, 9 in. long, is held by two $\frac{1}{4}$ in. diameter bushes at either end. Bevel gears on the spindle and on S1 are held enmeshed by a collar tight against the front panel bush. S2, the p.a. band selector switch, is mounted on the chassis above the long spindle. Once again, two bevel gears operate S2, giving single knob band selection. Care is required with the initial alignment of these gears to ensure reliable operation.

Under the p.a. chassis, which measures $9\frac{1}{2} \times 6$ in., are all the grid and screen components of V9 grouped around the valveholder as shown in the photograph. The bias pack is on the side channel and V10 is to the side of the p.a. screening box alongside RLA1.

The pi-network tank circuit is enclosed in a box measuring 7 in. by $5\frac{3}{4}$ in. by 6 in. sprayed matt black inside and out with a detachable lid and is made by Philpotts Metalworks Ltd. If an input of over 100 watts is envisaged, it may be wise to make the lid in copper mesh to aid ventilation. Furthermore,



A view under the chassis of the transmitter described in the text.

the anode connectors should be of large diameter to conduct heat away from the anode seals.

RFC5, the pi-network r.f. choke, is mounted vertically and to the side of the valve. H.t. feed is to the base, decoupled by C43. The p.a. tuning and loading capacitors are mounted on the front of the box with C49 above C48. L10 is self supporting, soldered direct on to S2. The p.a. switch was obtained from one of TU series of units. C50 is level and to the side of C49 with L11 at right angles to L10 to reduce stray coupling. Above T1, on the rear of the p.a. box, is the Buckley T/R switch. This is modified by the inclusion of a fourth co-ax socket, flush mounting.

It will be seen that ceramic tag strips (manufactured by Wingrove and Rogers Ltd.) are used throughout the transmitter. If these are not available, paxolin strips may be used.

The layout of the front panel, which is sprayed dark grey and measures 16 in. by 10 in., is shown in Fig. 2. It is fitted with 9 in. instrument handles and white panel transfers for identification of the various controls.

Alignment of the Exciter

During the initial alignment of the exciter section, no h.t. should be applied to the p.a. valve. C52 should be set to mid-capacity and the key should be down.

The procedure is as follows:

(a) Set C2 (v.f.o. tuning) to maximum capacity.
(b) Adjust the core of L1 until V1 is oscillating at 1·48 Mc/s.
(c) With C2 at minimum capacity, V1 should be oscillating slightly above 1·65 Mc/s, giving the required coverage of 1·5 Mc/s to 1·65 Mc/s with a slight overlap.
(d) If a valve voltmeter with low input capacity is available, tune L2/3 for maximum indication with the voltmeter connected between the control grid of V3 and earth. Alternatively the core should be temporarily placed in the centre of its travel.
(e) Check that V2 is oscillating at 5·5 Mc/s.

(*Continued on next page*)

COIL DATA

L1	100 turns, 40 s.w.g. enam. close wound on Aladdin type F804, 13/32 in. diameter former with core.
L2	$3\frac{1}{2}$ turns, 34 s.w.g. d.s.c. on cold end of L3.
L3	33 turns, 34 s.w.g. d.s.c. on Eddystone type 847 former with core.
L4	Primary 25 turns + 25 turns, link 4 turns, secondary 25 turns + 21 turns 32 s.w.g. enam. on Aladdin type PP5937/4 $\frac{5}{16}$ in. diameter former with two cores.
L5, 6	38 turns, 34 s.w.g. d.s.c. on Aladdin type F804 13/32 in. former. No core.
L7	Primary 24 turns, Link 2 turns, Secondary 24 turns, 32 s.w.g. enam. (Former as for L4).
L8	Primary 18 turns, Link 1 turn, Secondary $16\frac{1}{2}$ turns, 28 s.w.g. d.s.c. (Former as for L4).
L9	Primary 14 turns, Link $1\frac{3}{4}$ turns, Secondary $10\frac{3}{4}$ turns, 28 s.w.g. d.s.c. (Former as for L4).
	(The 7, 14 and 21 Mc/s coupling windings are wound over the centre of the primary but on 28 Mc/s the coupling winding is at the h.t. end of the primary.)
L10	8 turns, 14 s.w.g. tinned copper wire, air spaced, 2·35 in. i.d., 2·5 in. long, tapped at 6 turns (21 Mc/s) and at 4 turns (28 Mc/s).
L11	7 turns, 14 s.w.g. tinned copper, $\frac{1}{2}$ in. i.d. $\frac{3}{4}$ in. long.
RFC1, 2, 3, 4	2·5 mH, Eddystone type 737.
RFC5	108 turns, 28 s.w.g. enam. copper wire on $\frac{3}{4}$ in. diameter paxolin or ceramic former. Winding length 3 in. Wound in three 36 turn sections.

(f) Set the cores of L4 about ¼ in. from the top and bottom of the former, C23 and C29 to mid capacity and C27 to minimum.
(g) Set the l.f.o. to 1·575 Mc/s. A signal should now be available from the mixer at 7·075 Mc/s.
(h) Tune the primary and secondary of L4, C23 and C29 for maximum drive. Tune to 7·0 Mc/s and adjust the top slug of L4. Adjust the bottom slug at 7·15 Mc/s. Drive will be at a maximum at 7·075 Mc/s. C27 is increased till the drive is at maximum at the band edges with a small drop towards band centre. C27 must be as low capacity as is possible. L2/3 may now be adjusted for a final peak in drive. The grid current in V7 should be greater than 1·5 mA at all frequencies.
(i) Monitor V9 grid and select 14 Mc/s on S1/S2.
(j) Adjust the top slug of L7 at 14 Mc/s and the bottom slug at 14·3 Mc/s. Continue these adjustments alternately until a level response is obtained.
(k) On 21 Mc/s, tune L8 at 21 Mc/s and at 21·45 Mc/s.
(l) On 28 Mc/s tune L9 at 28 Mc/s and adjust C35 at 28·6 Mc/s.
(m) With the 5·5 Mc/s crystal removed, the residual drive should be less than 100 microamps at all settings of the l.f.o.
(n) H.T. may now be applied to the p.a., and the transmitter loaded into a 70 ohm resistive load. The spacing of the turns of L10 may be varied if the p.a. will not tune to all frequencies in the three bands.

Results

The transmitter has only been used in a flat with a poor indoor aerial. However, many enjoyable contacts have resulted with operators who were surprised when told the rig is v.f.o. controlled. The note is truly T9 on all bands and drift is negligible making the transmitter a pleasure to use. If break-in is employed complete control of the station is by the key.

Power output has been measured and shows that the anode efficiency is greater than 75 per cent. Adequate but not excessive drive is available. Spurious signals are very weak and no key clicks are radiated. Last but not least, TVI seems to be non-existent with Faraday link coupling to the aerial tuning unit but no low pass filter. Should harmonic type TVI be encountered in fringe areas, no doubt a l.p.f. would clear it up.

Amateur Radio at Castle Bromwich Show

ON July 31 and August 1 GB2CHS will be in operation on all bands from the Castle Bromwich Horticultural Show, Castle Bromwich, near Birmingham. C.w., a.m. and s.s.b. will be used. Local operators taking part include G2FLY, G3PR, G3LGW and G3KKB. Arrangements are in the hands of Tom Part (G2AGK) who also carries out the electrical and p.a. work for the Show.

New Amateur Radio Catalogue

SOUTHERN Radio and Electrical Supplies of Sorad Works, Redlynch, near Salisbury, have recently published the 12th edition of their catalogue of radio components and instruments for the radio amateur and home constructor. Produced on art paper and well illustrated with many photographs, the catalogue costs 9d. post free. An interesting new item described in a separate leaflet is "Radstrip" prepunched metal plates for the easy construction of chassis.

Another Pirate Fined

AT the Magistrates' Court, Whitley Bay, Northumberland, on May 19, 1960, J. H. S. Newton, 34 Woodleigh Road, Whitley Bay, pleaded guilty to using radio transmitting apparatus without a licence. He was fined £5, ordered to pay £3 3s. costs and to forfeit his apparatus.

Communication Receiver Design Considerations

(Continued from page 12)

Crystals are not normally available to oscillate fundamentally at frequencies above about 12 Mc/s. The conversion frequencies for each of the higher ranges therefore have to be obtained from lower frequency crystals. It is important to remember that where the final conversion output is obtained from a lower frequency crystal the spurious responses shown in the two tables are for the given *final* conversion frequency only (that is the output from an overtone oscillator). If the crystal is used in the usual harmonic oscillator circuit there will be many more beats than those shown, and it will be necessary to check carefully the possibility of birdies for both the fundamental, second, third, fourth and higher order harmonics of the crystal.

An overtone oscillator can be tuned to the fundamental or to any of the odd harmonics (it will not operate on even harmonics) and as the crystal is actually oscillating on the overtone it will not give output on any lower frequency than the one to which the anode circuit is resonant.

In the case of a receiver using a tunable i.f. covering the range 3·5 to 4·0 Mc/s the 18 Mc/s output for 20m would be obtained from a 6 Mc/s crystal, the 25 Mc/s ouput from an 8·333 Mc/s crystal and the 32 Mc/s ouput from a 10,666 Mc/s crystal in a third overtone oscillator arrangement. Inspection of the tables will show quite clearly that if these crystals had been used in an harmonic oscillator that the 12 Mc/s ouput would beat with the third harmonic of the v.f.o. and produce an additional spurious response on 20m; that the 8·333 Mc/s and 16·666 Mc/s ouputs would beat with the second harmonic and the fourth harmonic of the v.f.o. to produce three spurious outputs on 15m. The third order product at 8793 kc/s (8333 plus 460) would be particularly strong, equivalent to a S8/S9 signal. If a 9 Mc/s crystal had been used on its second harmonic for 20m this would also beat with the v.f.o. harmonic to produce a strong third order product.

In general, all bands (except where indicated) from 1·5 to 6·5 Mc/s can be used—without too much trouble from spurious responses—provided the oscillator uses the overtone circuit and the heterodyning frequency is on the *high* side of the required band.

Certainly, it is possible to use an harmonic oscillator but this will require very careful selection of the tunable i.f. range and the conversion crystals necessary and will considerably narrow the possible choice.

(*To be Continued*)

Schoolboy Radio Amateurs

APROPOS the paragraph in the May BULLETIN, several members have written to Headquarters.

G3RZ states that when he attended King Edward VII School, Sheffield, before the Second World War, G3MY and G3RP were also students, all having obtained their full transmitting licences at the age of 16. Earlier, they had held artificial aerial licences with the call-signs 2CVU, 2CXN and 2APF.

G3NGU, G3NMZ, G3NNA and G3NQC all attend Luton Grammar School and have been licensed since they were 16.

Bradford Grammar School now has only five licensees—G3LXF, G3LZZ, G3MAL, G3MAW and G3NEK—amongst its pupils but in 1957 there were no less than seven—G3LXF, G3LZW, G3LZZ, G3MAB, G3MAL, G3MAW and G3MFJ. At the same time, G3LQJ was the master in charge of the School Radio Club. From 1955-56, the club was active under the call-sign G3KEP/A while G3LQJ/A was used in 1957. At present the club station call-sign is G3MHB.

The Folkestone I.A.R.U. Region I Conference

PART I

By JOHN CLARRICOATS, O.B.E. (G6CL)*

HISTORY was made last month when an I.A.R.U. Region I Division Conference was held at the Grand Hotel, Folkestone, Kent. This was the first Conference of its kind to take place in the United Kingdom, previous conferences having been held in Switzerland (Lausanne, 1953), Italy (Stresa, 1956) and Germany (Bad Godesberg, 1958).

Fifteen of the 18 I.A.R.U. Member Societies in Europe were represented at the Conference. The countries and societies represented were : Belgium (U.B.A.), Eire (I.R.T.S.), Finland (S.R.A.L.), France (R.E.F.), Germany (D.A.R.C.), Italy (A.R.I.), Luxembourg (R.L.), The Netherlands (V.E.R.O.N.), Norway (N.R.R.L.), Poland (P.Z.K.), Spain (U.R.E.), Sweden (S.S.A.), Switzerland (U.S.K.A.), United Kingdom (R.S.G.B.) and Yugoslavia (S.R.J.). The other three societies, Austria (O.V.S.V.), Denmark (E.D.R.) and Portugal (E.D.R.) were represented by D.A.R.C., S.S.A. and R.S.G.B. respectively, all of whom held the power of proxy.

Mr. Arthur L. Budlong, W1BUD (General Manager, A.R.R.L.) attended as Secretary of the I.A.R.U.

Opening Ceremony

The Conference was opened by the Mayor of Folkestone (Alderman F. W. Archer, J.P.) at 2.30 p.m. on Monday, June 13, 1960, in the presence of the President of the R.S.G.B. (Mr. W. R. Metcalfe, G3DQ), the Immediate Past President (Dr. R. L. Smith-Rose, C.B.E.), the Executive Vice-President (Mr. H. A. Bartlett, G5QA), all members of the Executive Committee and about 50 other delegates, observers and ladies.

The Chair at the opening session was taken by Mr. Harry A. Laett (HB9GA) in his capacity as Chairman of the Executive Committee. Mr. Laett extended a warm welcome to the delegates and their ladies and before introducing the Mayor presented him with a specially-made Bernese cake (Mr. Laett's home is in Berne).

* *Conference Secretary, Secretary I.A.R.U. Region I Division. General Secretary, R.S.G.B.*

Before the Conference began its formal business this group photograph was taken outside the Grand Hotel, Folkestone. Front row (left to right), Mrs. G2MI, Mrs. G2AIW, Mrs. Smith-Rose, Mrs. SM5ZD, Mrs. G6CL, SM5ZD (Vice-Chairman), G3DQ (President, R.S.G.B.), HB9GA (Chairman and later Conference President), G6CL (General Secretary, R.S.G.B. and Conference Secretary), Dr. R. L. Smith-Rose (Immediate Past President, R.S.G.B.), F9DW (Hon. Treasurer), Mrs. G4QU, Mrs. G3DQ, Mrs. G3BVG, and Miss May Gadsden (Conference Secretariat). Second row: G2MI, OH2TK, G8TL, Mrs. SM5CR, SM5CR, Mrs. G2DFG, W1BUD, EA4BF, G2UK, PA0DD, DL1XJ, SM5BMN, Mrs. G8TL, Mrs. G5QA. Third row: SM5KV, G2DFG, G5QA, LA4ZA, G3BVG, LX1JW. Fourth row: G5MR, F8MX, G4QU, SM5MN, HB9PS, I1BBE, EI2W, G2AIW, SP5FM, G3HRH, PA0QC, About 20 delegates and several ladies were not present when the group photograph was taken. (Photo by Jack C. Adams, Hythe.)

I'VE GOT A CAKE

After the Mayor of Folkestone (Alderman F. W. Archer, J.P.) had opened the Conference, Mr. Harry Laett (Chairman of the Executive Committee) "invested" the Mayor with a specially-made Bernese cake which had been adorned with the Conference Badge. Also in the photograph (left to right seated) SM5ZD, G6CL, Dr. Smith-Rose, F9DW and YU1AA. G3DQ was screened by HB9GA.
(Photo by Jack C. Adams, Hythe.

Alderman Archer expressed his pleasure that Folkestone—spacious and gracious—should have been chosen as the venue for the first I.A.R.U. Region I Division Conference to be held in the United Kingdom. He hoped the delegates and their ladies would find time to enjoy some of the unique amenities Folkestone has to offer. Mr. Metcalfe on behalf of all delegates thanked the Mayor for opening the Conference.

First Plenary Meeting

At the first Plenary Meeting, held immediately after the opening ceremony, Mr. Laett was elected Conference President. Before Mr. Laett took his chair the Conference Secretary announced that Mr. Wilfred Butler (G5LJ), in addition to donating lapel and brooch badges to the delegates and their ladies, had presented to the Division a perpetual Chain of Office to be worn by each succeeding Conference President. Mr. Clarricoats then formally invested Mr. Laett and congratulated him on behalf of all delegates on his election.

I'VE GOT A HORSE

During the reception Major Per-Anders Kinnman, SM5ZD, on behalf of the Swedish delegation, presented a wooden horse of traditional Swedish design to the Conference Secretary together with a decorated map on linen of Sweden showing the SM call-sign areas. The Mayor and Mayoress of Folkestone with Norman Mattock, G2DFG, appear in this happy picture. Dr. Smith-Rose keeps in the background.
(Photo by Jack C. Adams, Hythe

The Mayor of Folkestone (Alderman F. W. Archer, J.P.), the Mayoress (Councillor Mrs. M. Painting) with Major Per-Anders Kinnman, SM5ZD, Mr. Jean Wolff, LX1JW, and Mrs. Clarricoats at the Reception given by the R.S.G.B. to delegates and their ladies on the opening day of the Conference.
(Photo by Jack C. Adams, Hythe.)

Mr. Laett made a suitable reply and then called for nominations for the offices of Chairman and Secretary of the various Committees of the Conference. The following were elected:

Credentials and Finance
Chairman — Mr. H. L. Wilson, P.C. (EI2W)
Secretary — Mr. John Clarricoats, O.B.E. (G6CL)

Administrative and Operational
Chairman — Major P.-A. Kinnman (SM5ZD)
Secretary — Mr. O. Wiio (OH2TK)

Technical
Chairman — Mr. J.-C. Fouret (F8GB)
Secretary — Mr. O. Ekblom (SM5KV)

V.H.F.
Chairman — Dr. Karl Lickfeld (DL3FM)
Secretary — Mr. F. G. Lambeth (G2AIW)

Reception and Film Show

During the early evening of June 13 the President and Council of the R.S.G.B. gave a reception to the delegates and their ladies. Among the guests were the Mayor and Mayoress of Folkestone (Ald. F. W. Archer, J.P. and Cllr. Mrs. M. Painting) who took the opportunity of speaking personally to all visitors from abroad. In the opinion of many of those who attended, the reception paved the way for the happiest and most friendly of all Conferences so far organized by the Division.

Later the same evening Major Per-Anders Kinnman, SM5ZD (Vice-Chairman of the Executive Committee and a member of the I.A.R.U. Region I observer team to Geneva) displayed films taken at previous conferences and in Geneva during the Radio Conference.

Committee Meetings

Meetings of the Administrative and Operational, Technical and V.H.F. Committees were held during the afternoon of Monday, June 13 and throughout the mornings and afternoons of the next two days.

The deliberations of the three Committees were recorded in Conference Documents which were later presented to the final Plenary Meeting for consideration. A detailed account of the views, opinions and recommendations of the Committees will be given in the August issue of the R.S.G.B. BULLETIN.

Colour Transparencies

During the evening of June 14 Mr. Arthur Milne, G2MI (Past President R.S.G.B. and leader of the R.S.G.B. delegation) put on a display of colour transparencies of scenes in Bad Godesberg, Geneva and other conference venues.

Credentials and Finance Committee

A meeting of the Credentials and Finance Committee was held during the evening of Monday, June 13, when a number of important decisions were reached. These decisions finally became recommendations to the final Plenary Meeting and all of them were adopted.

The Finance Committee recommended that the basis of contributions from January 1, 1961, until December 31 of the year in which the next conference is held, shall continue to be at the rate of 50 Swiss centimes per licensed member. (The total number of licensed members in the 18 subscribing member societies in Region 1 as at January 1, 1960, was 22,700.)

I'VE GOT A STORY

Dr. R. L. Smith-Rose (Immediate Past President, R.S G.B.) in earnest conversation with Arthur Budlong, W1BUD (Secretary, I.A.R.U. and General Manager, A.R.R.L.). In the background, Julian Jarzombek, SP3PL. (Photo by Jack C. Adams, Hythe.

The Committee recommended that a financial statement and auditor's report shall be sent to all subscribing member societies as soon as possible after the end of each financial year (December 31).

At the final Plenary Meeting the R.S.G.B. proposed and it was agreed to authorize the Executive Committee to make an allowance at their discretion to any observer at a future I.T.U. Conference who might have to forego his salary during the period of his absence at the Conference.

The Plenary Meeting also agreed that a sum of 1,600 Sw.Fr. shall be available at the discretion of the Executive Committee for the purpose of assisting subscribing member societies who shall apply to the Committee for financial assistance at least two months prior to any particular Region 1 Conference to send a delegate to that Conference.

Final Plenary Meeting

Consideration having been given to the views, opinions and recommendations of the various Committees the Conference dealt with the election of a new Executive Committee. The Conference Secretary reported that all officers of the Division had been nominated for a further period of office.

After formal proposals had been made and seconded it was announced that the following had been re-elected:

Chairman	Mr. H. A. Laett (HB9GA)
Vice-Chairman	Major P.-A. Kinnman (SM5ZD)
Secretary	Mr. John Clarricoats O.B.E. (G6CL)
Treasurer	Dr. J. Simonnet (F9DW)

It was reported that Mr. A. Schädlich (DL1XJ), Mr. O. Wiio (OH2TK) and Mr. J. Znidarsic (YU1AA) had been nominated to fill the two vacant places on the Committee.

Following a secret ballot it was announced that Mr. Schädlich had been elected and Mr. Znidarsic re-elected to serve on the Committee.

Next Conference

The delegations of S.R.J., S.S.A. and V.E.R.O.N. having offered the hospitality of their respective societies in connection with the next Conference a vote was taken.

By a substantial majority it was agreed to accept the offer of S.S.A. to arrange the next Conference in Stockholm, probably during the early summer of 1963.

Presentation to Miss May Gadsden

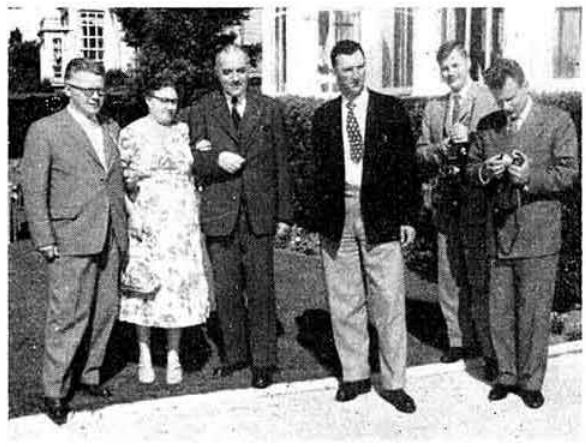
During the closing stages of the last Plenary Meeting Mr. Harry Wilson (EI2W), on behalf of all delegations, presented to Miss May Gadsden (Assistant Secretary, R.S.G.B. since 1929) a travelling wardrobe case in appreciation of her services to the Conference in connection with the Conference Secretariat. Mr. Wilson mentioned that Miss Gadsden had given up a week of her vacation in order to undertake Conference duties.

Conference Dinner

An outstanding feature of the Conference was a dinner at the Grand Hotel during the evening of Friday, June 17, 1960. The Chair was taken by the President of the R.S.G.B. (Mr. W. R. Metcalfe) and the Conference Secretary acted as Toast Master. Chief guests were the Mayor and Mayoress of Folkestone and the Folkestone Publicity Manager (Mr. H. W. King) and Mrs. King.

During the evening the Conference Secretary and Miss Gadsden handed to all delegates and their ladies valuable souvenir gifts which had been donated by Mullard Ltd. (pocket wallets for the gentlemen and note cases for the ladies) and Stratton & Co. Ltd. (cuff links for the gentlemen and powder compacts for the ladies). In addition Platignum ball-point pens were given to all delegates and their ladies. Cigarettes were provided by Player's, whilst Avo Ltd. donated exposure meters to the members of the Executive Committee. Floral sprays were provided for all the ladies and a bouquet for the Mayoress.

At the conclusion of the Dinner proper, Mr. H. A. Laett (Conference President) thanked the Mayor and Corporation of Folkestone for the many kindnesses shown to, and facilities provided for, the Conference delegates, mentioning



CONFERENCE PERSONALITIES

Alfred Schädlich, DL1XJ (newly-elected member of the Executive Committee), May Gadsden (Conference Secretariat), Dr. Jacques Simonnet, F9DW (Hon. Treasurer, I.A.R.U. Region 1 Division), Harry Laett, HB9GA (Conference President and Chairman, Executive Committee), Osmo Wiio, OH2TK (Secretary, Folkestone Administrative and Operational Committee) and Janez Znidarsic, YU1AA (member of the Executive Committee) on the lawn of the Grand Hotel.

in particular the visit to Canterbury, arranged by the Corporation, during the afternoon of June 16. Alderman Archer, in his reply, congratulated the Conference Secretariat on the high degree of organization which had been apparent before and during the Conference. He expressed the hope that many of the visitors from abroad would return to Folkestone for a quiet and happy vacation.

Mr. Arthur Milne, G2MI (Past President, R.S.G.B.) thanked the visiting delegates for their attendance at the Conference and spoke of the ties of friendship which each succeeding Conference establishes. He and his colleagues from the R.S.G.B. were especially pleased to meet for the first time a delegation from Poland (P.Z.K.). Mr. Milne joined with the Mayor in expressing the hope that many of those who were visiting Folkestone for the first time would return to enjoy to the full the beauty of Kent—the Garden of England. Mr. Alfred Schädlich (DL1XJ) and Mr. Osmo Wiio (OH2TK) made excellent and much-appreciated responses in English.

Mr. Harry Wilson (EI2W) on behalf of the male delegates proposed a toast to the ladies, to which Mrs. Britta Kinnman (wife of SM5ZD) made a most charming reply—also in English.

Mr. A. L. Budlong (W1BUD) in proposing a toast to I.A.R.U. Region I Division offered his congratulations to those who had succeeded in making a dream come true. He, and many others had been sceptical when Mr. Clarricoats had first suggested that the I.A.R.U. member societies in Region I should get together to discuss matters of mutual concern and interest but with the passing of the years it had become apparent that the idea had been well conceived and happily developed. Mr. Budlong remarked that as he would be retiring from the office of General Manager of the A.R.R.L. at the end of 1960 this Conference could well be the last he would attend as Secretary, I.A.R.U.

The Conference Secretary replying on behalf of the whole Division made reference to those who had helped to make the Conference a success. He spoke of the work done by Mr. C. S. Bradley, G2AX (R.S.G.B. T.R. for Folkestone and Hythe) and his colleagues Messrs. B. W. F. Mainprise, B.Sc. (G5MP), V. G. Mellor, M.A. (G5MR), Norman Mattock (G2DFG) and Fred Richardson (G3MZX) and he asked the Mayor to convey to all concerned the thanks of the Conference for providing floral displays throughout the week, and for arranging the display of flags outside the hotel. Mr. Clarricoats also referred to the generosity of Mr. Wilfred Butler in providing the Conference badges, and to gifts donated by Mullard Ltd., Stratton & Co. Ltd., Avo Ltd. and many others. He ended by thanking Miss Gadsden for all the help she had given to him prior to and during the Conference.

THANK YOU, MR. MAYOR

Cliffe Metcalfe, G3DQ (President, R.S.G.B.) bidding farewell to the Mayor of Folkestone (Ald. F. W. Archer, J.P.) at the end of the visit to Canterbury arranged by the Folkestone Corporation. Arthur Budlong, W1BUD (Secretary, I.A.R.U., General Manager, A.R.R.L.) and Harry Laett, HB9GA (Conference President) complete the picture.

I'VE GOT A CASE

During the closing stages of the final Plenary Assembly Harry Wilson, EI2W (left) on behalf of all the delegates presented to May Gadsden a travelling case in appreciation of her valuable services in connection with the Conference Secretariat. In this picture, taken outside the Grand Hotel immediately after the presentation, Miss Gadsden is showing the travelling case to the Conference Secretary (John Clarricoats, G6CL).

Radio Club of Argentina Trophy

During the early stages of the Dinner, Mr. Budlong, in his capacity as Secretary, I.A.R.U., made a token presentation to Mr. W. R. Metcalfe of the Radio Club of Argentina Trophy which had been awarded to the Radio Society of Great Britain, as being the Member Society in the I.A.R.U. adjudged to have contributed most to the advancement of the amateur communications art and to international understanding among amateurs during the past 10 years. The token presentation took the form of a photograph of the Trophy (a 65 lb. bronze statuette) and an illuminated scroll.

Mr. Metcalfe in acknowledging the token presentation assured Mr. Budlong that the R.S.G.B. greatly appreciated the decision on the part of I.A.R.U. Member Societies that the Trophy should be awarded to the R.S.G.B. The Trophy itself would be displayed at Society Headquarters.

To be continued)

The Earlybirds

A REUNION of the W.I.S. Earlybirds is to be held at the Horseshoe Hotel, Tottenham Court Road, London, on September 3, 1960. All members have already been contacted by the organizer, Mr. E. Dolman (G2DCG), with the exception of the following: J. A. Easterbrook (G2FNY), B. L. Radcliffe (G2ZY), J. E. P. Raven (G3HG), F. J. Rutter (G2FMF), G. T. Stoddard (G2MB), C. S. Goode (G2OH), V. C. Raynor (G6FZ), D. Robertson (GM6GQ), F. J. Starkey (GW6KY) and V. F. West (GW2DYW).

Members who have knowledge of the whereabouts of any of those listed are asked to inform Mr. Dolman at 20 Canterbury Road, Margate, Kent.

LONDON U.H.F. GROUP

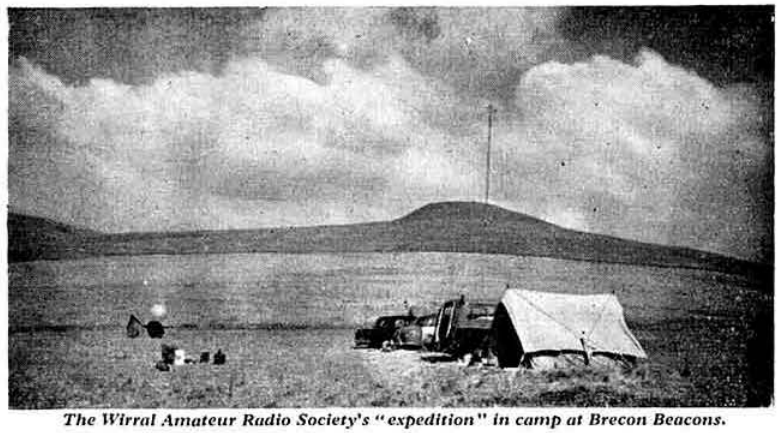
will meet at the Bedford Corner Hotel, Bayley Street, Tottenham Court Road,

at 7.30 p.m. on Thursday, August 4, 1960

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

Expedition to Radnor and Brecon

By F. N. KENDRICK (G3CSG)*



The Wirral Amateur Radio Society's "expedition" in camp at Brecon Beacons.

AN EXCELLENT spell of good weather encouraged nine members of the Wirral Amateur Radio Society to venture forth on another " Expedition " during the weekend of April 22-24. Using a Bedford " Work-o-Bus " as their main transport, equipment for 160m and 2m was loaded early on the Friday morning together with the petrol, electric generator, tents and a 40 ft. sectional mast. Additional transport for more gear and personnel was provided by G2AMV and G3EGX.

In order to make the 120 mile journey more interesting, mobile facilities were fitted to all vehicles and though both cars were putting in fine signals, the interference from the van's diesel engine precluded the use of the mobile equipment in that vehicle. Since the van was loaned by a non-club member, this fact was not discovered until the evening prior to the trip.

The party arrived in Llandrindrod Wells at lunch time, and once the curiosity of the people of that town was satisfied regarding the loaded whips, etc., we were made most welcome. Indeed, one worthy gentleman led the convoy to a wonderful site overlooking the town. No difficulty was experienced in erecting the two stations and one hour after arrival on site signals were being radiated on the 160m and 2m bands. Kite- or balloon-borne aerials were used on Top Band and a five-element Yagi atop a 40 ft. mast on 144 Mc/s.

Among the many worked during the first night from Radnor were stations from the North of Scotland and from the Channel Isles. Signal reports were excellent at all times and it is obvious that the choice of site coupled with a 300 ft. aerial, some 200 ft. high at the far end, had a great deal to do with it.

Two events of unusual interest were the contacting of G3CSZ who put in a 579 signal from the Wirral using a transistor transmitter running only 3 watts input, and the " talking in " of G3IGG/M who joined the party late on the Friday evening. In connection with the latter operation members of the expedition would like to thank all those keen operators who showed admirable patience in keeping the frequency clear until the late arrivals were guided into camp.

Typical of the Welsh hospitality was an offer of " liquid refreshment " arranged during a 2m contact with GW3LJP. This was readily accepted and the members had the pleasure of welcoming GW3LJP and his friend to the site later in the evening. Many willing hands helped him to unload his precious cargo.

An invitation by GW3MOP of Swansea to meet the party and guide them to their next site on the following day was much appeciated The convoy formed up behind GW3MOP who led them to the high hills of Brecon. Here again the stations were soon on the air and though conditions on Top Band were not as good as the previous evening, many more contacts were made on both bands. Top Band was extremely busy all weekend, 160 contacts being made. Two-metre activity was not hectic though even on that band many contacts were made.

The task of feeding nine operators for the three-day event was in the capable hands of G3NMT who went to a great deal of trouble to prepare three-course meals and to serve them to a very high standard.

Special QSL cards were printed for the occasion and these have long since been sent, either direct or via the R.S.G.B. QSL Bureau. Many letters of thanks have been received by the Wirral A.R., G3CSG, and on each occasion mention has been made of the " rare " counties that were put on the map for the weekend. All these letters were acknowledged after the Group had read them.

Although the trip was only intended as another activity in the Wirral society's radio calendar, it is felt, on looking back, that it has served a useful purpose. It encouraged members to make their cars available for /M working, it proved that the group could travel 120 miles to another district and establish reliable portable phone stations on two bands and it tested certain units of N.F.D. equipment. Finally the group feel they have made many new friends, particularly among the people of Wales.

Another trip is planned for late summer and though no plans have been finalized as yet, it seems pretty certain that it will be to Wales once more, probably Cardigan.

* *25 Cook Road, Leasowe, Moreton, Wirral, Cheshire.*

Headquarters' Lift

FOR a period of seven weeks commencing July 16, 1960, the passenger lift at New Ruskin House will be out of order while a new lift is installed. As the Society's offices are on the fifth floor of the building, members would be well advised to avoid visiting Headquarters during the aforementioned unless they have plenty of reserve energy! There are nearly 100 steps to the fifth floor.

92nd Signal Regiment

MEMBERS interested in joining the Army Emergency Reserve may obtain details of the 92nd Signal Regiment, Royal Signals, from W. Robertson (GM6RI), Schoolhouse, Tannadice, Forfar, or from J. A. Clark (GM2HIK), The Boal, Reswallie, by Forfar.

RADIO SOCIETY OF GREAT BRITAIN
National Convention, Cambridge 1960

Programme of Events

The full programme of events for the Convention is set out below An application form for tickets is enclosed in this issue.

In order to give the Convention Committee as much time as possible to complete their arrangements, members are requested to complete and return their forms as soon as possible, with the necessary remittances, to The Secretary, R.S.G.B. Convention Committee, 37 Metcalfe Road, Cambridge.

Thursday, September 15

10.15 a.m. Reception Desk opens
12.00 noon OFFICIAL OPENING by The Rt. Worshipful the Mayor of Cambridge (Councillor Cecil A. Mole, J.P.). Display will be opened at the same time
3.30 p.m. " Cambridge," an introductory talk by F. A. E. Porter. This will be followed by a tour of the city
8.00 p.m. " Cambridge—City and University," by Alderman G. E. Hickson, M.A. An illustrated talk
10.00 p.m. Reception Desk and Display close

Friday, September 16

8.30 a.m. Reception Desk opens
9.15 a.m. Display opens
9.15 a.m. Visit to Engineering Laboratory (1½ hours)
9.30 a.m. " Fundamental Research and Practical Telecommunications." The Opening Lecture by Mr. J. A. Ratcliffe, F.R.S.
10.00 a.m. Visit to Chivers Jam Factory, Histon (approx. 1½ hours)
10.30 a.m. Visit to The American Military Memorial, Madingley .. .. .. (1½ hours)
11.00 a.m. Visit to EDSAC II, Mathematical Laboratory (1¼ hours)
11.15 a.m. " Micro-wave Radio Link Equipment," by T. P. Blott
11.15 a.m. " Telecommunications in the Body," by P. E. K. Donaldson, M.A.
12.30-2.15 *LUNCH BREAK*
2.10 p.m. Visit to I.T.A. 7000 Mc/s Link, Barkway (3-3½ hours)
2.15 p.m. " Recent Developments in Micro-wave Valves," by A. H. Beck, M.A., B.Sc.
2.15 p.m. " Recent Developments in Semi-conductors," by T. D. Towers, M.B.E., M.A., B.Sc. (ex-VP2GM)
2.20 p.m. Visit to Little Barford Power Station (3-3½ hours)
2.30 p.m. Visit to the Guildhall, Cambridge, to inspect the Civic Regalia and enjoy the view from the roof (1 hour)
4.00 p.m. " Low-noise Receivers, using Masers and Parametric Amplifiers," by F. G. Smith, M.A., Ph.D.
4.00 p.m. " Whistling Atmospherics," by B. H. Briggs, M.A., Ph.D. (G2FJD)
7.30 p.m. Conversazione and Buffet Supper
10.00 p.m. Reception Desk and Display close

Saturday, September 17

8.30 a.m. Reception Desk opens
9.15 a.m. Display opens
9.30 a.m. " The Mullard Radio Observatory," by Professor M. Ryle, F.R.S. (G3CY)
9.30 a.m. Visit to Ely Cathedral and Tour of the Fens (3 hours)
9.45 a.m. Visit to Pye Telecommunications Factory, Cambridge .. .. .. (2 hours)
11.15 a.m. " Single Sideband," by G. C. Bagley (G3FHL)
11.15 a.m. " Industrial Television," by I. Waters (G3KKD/T)
12.30-2.15 *LUNCH BREAK*
2.15 p.m. " The Electronic Telephone Exchange," by D. Delanoy (G3FOQ)
2.15 p.m. Visit to the Mullard Radio Observatory, Lords Bridge .. .. .. (1¾ hours)
2.15 p.m. Film Show by The Eastern Electricity Board
2.30 p.m. Visit to Sawston Hall, Sawston (1½ hours)
4.00 p.m. Group Discussions and Demonstrations: DX; V.h.f.; S.s.b.; RTTY; Mobile; Amateur Television
4.00 p.m. " Catering for Numbers and its Problems," by H. M. Littlechild, F.C.F.A. (Sidney Sussex College) and D. N. Lambert, F.C.F.A. (Addenbrokes Hospital, Cambridge)
7.00 for 7.30 CONVENTION DINNER
7.30 p.m. Reception Desk and Display close

All events, except for Visits and the Convention Dinner, will be held in the Arts School, Bene't Street, Cambridge
Members attending the Convention are asked to register at the Reception Desk in the Examination Hall at the Arts School on arrival.

Prelude to Convention

"Why Cambridge?"

By "GEMINI"

WHEN the decision to hold another National Convention was taken the question of "Where?" was an important point. As members now know Cambridge was selected.

The presence of the University and its great wealth of research, both past and present, made the Convention Committee decide that the theme should be "The influence that fundamental research has had on practical telecommunications." Therefore some of the lectures have unfamiliar titles but the substance of a lecture cannot be compressed into its title. Many of the lecturers hold or have held amateur call-signs and it is certain that their material will be presented in a manner that can be understood by radio amateurs.

Who, at a pre-war Convention, would have been interested in a lecture on germanium or silicon? How many now accept the use of germanium diodes without a second thought?

It is considered that amateurs in other parts of the country would welcome the opportunity to hear these talks which, with their inspiration, may stimulate activity along unexpected lines.

Those who do not wish to be closeted in the Lecture Rooms, can accept the excuse offered and come to Cambridge to see the University City. There is much of great architectural and historic interest. The visitor can be promised a pleasant surprise. Guide books cannot take the place of first-hand acquaintance. The "Backs" of the Colleges are world-renowned and their praise has not been sung in vain. There are the college courts with their immaculate lawns and sheltering walls. Visitors are permitted to wander through the colleges and visit their chapels and halls. King's College with its Chapel will no doubt be on every ones' list of places to visit. In the midst of all this is the City proper with the market and thriving shopping centre.

The Convention is being held in the University Examination Halls where many now-eminent men struggled with pen and paper. This impressive building will house the reception desk, the Convention station (operating on all bands from 160 to 2m), the lecture theatres, a lounge for the inevitable chinwag and a display of electronic equipment used in development and research. All this is in the very heart of the City and is adjacent to the Guildhall where the Convention Dinner will be held on the Saturday.

Every effort is being made to entertain the ladies, as may be seen from the programme. Tours of the colleges and the Botanic Gardens will be arranged as required. For those so minded, visits to the Fitzwilliam Museum and the Museum of the Scott Institute of Polar Research, among many others, are suggested.

Some Notes on the Visits at the Cambridge National Convention

Technical Visits

Friday

The University Engineering Laboratory
Work on a very wide variety of topics including hydraulics, theory of structures, an electronic group as well as mechanical engineering in all its aspects. Work is now in progress on several topical items, e.g. flexible fuel tankers.

The University Mathematical Laboratory
EDSAC II. Successor to EDSAC I which was one of the earliest of the large high speed computors in this country. An impressive example of theoretical and constructional practice.

The TV Micro-wave Link at Barkway
Installed and operated by Pye, this 7000 Mc/s link is the only one privately owned and operated in this country. It is also the highest in frequency.

Little Barford Generating Station
Not an atomic power station, not even the newest conventional type, but it has just been fitted with a most comprehensive system of remote-indicating electronic control equipment.

Saturday

Pye Telecommunication Factory
Part of the Pye Group known the world over for radio and line communications equipment; the largest manufacturers of mobile v.h.f. equipment in the world. Several of the research staff are contributing to the lecture programme.

The Mullard Radio Observatory
Devoted to a branch of radio science which has only sprung into prominence in the last 15 years, this radio observatory was endowed by Mullard Ltd. for research into radio emission from outer space. The station is administered by the University and offers much to those interested in aerials and sensitive low-noise receivers.

Visits of Interest to the Ladies

Friday

Chivers Factory
The works at Histon is three miles north of Cambridge. There has been a Chivers factory on this site since 1874, primarily for the manufacture of jam and other preserves. Canned and frozen foods are now included. The firm has very extensive agricultural interests in this area.

The American Military Memorial, Madingley
Three miles west of Cambridge, this 30 acre site was donated by the University for the building of a memorial to the American Armed Forces of 1939-45. It is the only one in Britain. As an example of modern landscaping in a natural setting, it is well worth a visit.

The Guildhall, Cambridge
Three charters dating from the 13th century to the 20th, five silver maces and several seals of the city form part of the civic treasures. The view from the roof of the building comprises most of Cambridge—old and new. Indeed, it is the only practical way to appreciate the real extent and composition of the city.

Saturday

The Cathedral City of Ely and the Fens
A coach ride to Ely, which is dominated by the two towers and lead-roofed nave of one of Britain's finest cathedrals. Set on the highest point for miles around, the city and cathedral lend contrast to the flat black Fenlands which nevertheless have a beauty of their own, as well as being "the granary of England."

Sawston Hall
For over 400 years the home of the Huddlestone family, the Hall is filled with much fine furniture and fittings. It boasts two "Priest Holes." This, one of the few great manor houses of Cambridgeshire, is set in grounds of several acres, six miles south of Cambridge.

Eastern Electricity Board
There is a semi-technical fim show, depicting various aspects of the generation, distribution and uses—besides Amateur Radio—of electricity.

* * *

In addition to the programme mentioned above there will be conducted tours of the colleges and visits to the Cambridge University Botanic Gardens which provide an oasis of quiet and peace within the bounds of the city. A centre of research, it is of great scenic beauty and interest to all who appreciate plants in their natural setting.

Crystal Erosion Made Easy

By JACK HUM (G5UM)*

PROMPTED by experiments in crystal etching made by Erle Sparry (G3BJC), members of the Welwyn Garden City Group have successfully increased the frequency of many piezo crystals of hitherto useless frequency which have been in their cupboards for years. While the method used by Mr. Sparry is not original the practical details will enable members to increase the frequencies of crystals in a much less laborious manner than the common one of grinding them down. The eroding agent used is ammonium bifluoride crystals, obtainable for 3s. 6d. per pound from most chemists. G3BJC bought a bottle at Boots and distributed quantities to members of the Group.

One of the first to go in for crystal eroding (it can hardly be called etching) in a big way was Reg Wade (G3IRW) and the following details are culled from his experiments:

Obtain a few of the small plastic caps which are to be found on toothpaste tubes (" We used Gleem," reports G3IRW). Prepare the solution using two capsful of crystals to five of water. The solution should be mixed together in one of the plastic bottles obtainable for 6d. from Woolworths. Remember that the acid so formed is one of the strongest there is and will affect glass. It is, therefore, essential to use a container which is resistant to acid such as one made from polythene or rubber.

Using the two-to-five proportion referred to above G3IRW found that the rate of erosion was 13·5 kc/s per hour for a typical FT243 crystal. His usual technique when desiring to increase the frequency of a crystal by a large amount is to allow the crystal to soak all night. For instance, he recently purchased some 8550 kc/s crystals for shifting up to 9 Mc/s, so that they would treble up in the 10m band. Leaving these FT243 crystals in soak over night he found that they had moved up in frequency by 180 kc/s.

The erosion rate of 13·5 kc/s per hour can be slightly increased by using a stronger solution, although the proportion of two ammonium bifluoride to five water represents a reasonable optimum. The solution is almost a saturated one at these proportions. Increasing the proportion to, say, three-to-five, would probably result in undissolved crystals remaining at the bottom of the plastic container and being wasted.

As the erosion proceeds the crystal should be removed from the solution at calculated intervals. The crystal must be removed from the solution with special tweezers—*not* made of metal. These can easily be made by snipping off four or five inches of the polythene insulant from a length of coaxial cable, and cutting a little groove in the end just large enough to grip the crystal.

The procedure is to remove the crystal from the solution, plunge it in clean water, dry it, and then replace it in its holder and try it out in a suitable oscillator, preferably of the Colpitts type so that no tuning is needed.

Experience has shown that no lack of activity occurs as a result of using this method.

Finally, don't in future throw away those empty containers of liquid soap: their plastic caps may be very useful containers for your crystal eroding fluid!

* " *Wyldes*," *Bulls Green, Knebworth, Herts.*

CQ Serenade

CQ Serenade is the title of a new song for radio amateurs composed and published by Maurice Durieux (VE2QS) of Montreal, Canada. George Brewer (VE2BR) has been responsible for the English and Jean Hascher (F9KT) for the French lyrics. Recordings at 45 r.p.m. by Joyce Hahn in English and by Raymond Girerd in French have been made with the help of a 12-piece orchestra under the direction of VE2QS.

The theme of the song is based on the rhythm of the CQ call.

All enquiries concerning the song should be sent direct to Maurice Durieux, 130 Elizabeth Street, St. Laurent, Montreal.

Intermediate Frequency List

Compiled by PAT HAWKER (G3VA)*

VERY little work can be done on a receiver unless its i.f. alignment peak is known. This frequency has always been needed to keep a receiver in optimum condition but with so many amateurs carrying out modifications to older models, including the fitting of Q-multipliers and crystal bandpass filters, a knowledge of the nominal alignment frequencies of a wide range of receivers is more essential than ever. Surprisingly, as far as can be traced, no general list covering modern communications receivers has ever been published. To put this situation right a reasonably comprehensive list has been compiled and is shown on the opposite page. It covers the majority of receivers likely to be encountered in amateur stations but members knowing the i.f. of any popular receivers omitted are invited to send them to the writer for possible inclusion in a supplementary list. A few of the equipments listed in the " Surplus and Miscellaneous " section are not communications receivers but have been included as being of general interest. The listing of a model does not mean that the author has access to other data on it. Acknowledgement must be made to Hallicrafters, Collins, Hammarlund, National and R.M.E. for their valuable assistance, though many of the i.f.'s listed in their sections are from other sources.

Where single crystal filters are fitted the receiver should be aligned to the series resonant frequency of the crystal rather than to the nominal i.f.; this should, however, seldom be more than about ± 2 kc/s or so from the figure given. Where there is no crystal filter, the tolerance is usually of the order of ± 5 kc/s. It will be noticed that many pre-war American sets used 465 kc/s (though with some important exceptions). Since the war, standard American practice has been to use 455 kc/s. There is no standard figure applicable to British communications receivers, although 470 kc/s is now being widely used for broadcast receivers.

The usual warning must be given against making haphazard adjustments to an i.f. strip—remember that if the i.f. is inadvertently changed it will spoil completely the effectiveness of a crystal filter and will make a complete i.f./r.f. re-alignment necessary. That having been said, it is worth pointing out that one of the main causes of poor performance of older receivers is the gradual drifting out of correct alignment which occurs with the passing of years.

* *37 Dovercourt Road, London, S.E.22.*

BRITISH RECEIVERS

Airmec
C864 800 kc/s (above 1 Mc/s) 85 kc/s

Eddystone
ECR 465 kc/s
358 450 kc/s
504 450 kc/s
556 450 kc/s
640 1600 kc/s
659 450 kc/s
670 450 kc/s
680 450 kc/s
710 450 kc/s
740 450 kc/s
750 1620 kc/s 85 kc/s
840 450 kc/s
888 1620 kc/s 85 kc/s

Denco (Clacton) Ltd.
DCR19 1600 kc/s

G.E.C.
BRT400 455 kc/s

Minimitter
MR37 1·5 Mc/s 460 kc/s
MR38 1·5 Mc/s 460 kc/s
MR44 2·1 Mc/s, 460 kc/s

Marconi
CR100 465 kc/s
HR100 1620 kc/s 85 kc/s
HR110 3·1 Mc/s 465 kc/s

Peto Scott
Trophy series 465 kc/s

Pye
CAT 1400 kc/s (h.f. bands only), 460 kc/s

Q-Max
Q5/10 460 kc/s
Q5/10X 5 Mc/s, 455 kc/s

Racal
RA17 40 Mc/s (bandpass ± 650 kc/s), 2—3 Mc/s (tunable), 100 kc/s

Radiovision
Commander 1600 kc/s, 100 kc/s
Hambander 1600 kc/s

CONTINENTAL RECEIVERS

Geloso
G207DR 4·6 Mc/s, 467 kc/s
G209R 4·6 Mc/s, 467 kc/s

AMERICAN RECEIVERS

Collins
75A1 1·5—2·5 Mc/s tunable, 500 kc/s
75A2 1·5—2·5 Mc/s tunable, 455 kc/s
75A3 1·5—2·5 Mc/s tunable, 455 kc/s
75A4 1·5—2·5 Mc/s tunable, 455 kc/s
75S1 2·955—3·155 Mc/s tunable, 455 kc/s
KWM-1 3·9—4·0 Mc/s tunable, 455 kc/s
KWM-2 2·955—3·155 Mc/s tunable, 455 kc/s

Cosmos
35 Bilateral 2·2—2·8 Mc/s (tunable), 455 kc/s
Cosmophone 1000 2·2—2·8 Mc/s (tunable), 455 kc/s

Drake
1-A 2900—3500 kc/s (tunable), 1100 kc/s, 50 kc/s
2-A 3500—4100 kc/s (tunable), 455 kc/s, 50 kc/s

Gonset
Communicator 6 Mc/s
G63 2065 kc/s, 263 kc/s
G66 2050 kc/s, 265 kc/s

Hallicrafters
Sky Buddy (early) 465 kc/s
Sky Buddy (S19R) 455 kc/s
Sky Champion (early) 465 kc/s
Sky Champion (S20R) 455 kc/s
Sky Challenger (S(X)15) 465 kc/s
Sky Challenger II (S(X)18) 465 kc/s
Super Skyrider (S(X)16) 465 kc/s
Skyrider (SX23) 455 kc/s
Skyrider Defiant (SX24) 455 kc/s
S10 1600 kc/s
S11 465 kc/s
S12 1600 kc/s
S17 465 kc/s
S21 1600 kc/s
S22 1600 kc/s
S27 5·25 Mc/s
SX28 455 kc/s
S36 5·25 Mc/s
S37 18 Mc/s
S38 455 kc/s
S40 455 kc/s
SX42 455 kc/s (10·7 Mc/s, f.m.)
SX43 455 kc/s (10·7 Mc/s above 44 Mc/s)
S52 455 kc/s
S53 2075 kc/s
SX62A 455 kc/s (10·7 Mc/s on v.h.f.)
SX71 2075 kc/s, 455 kc/s
S72 455 kc/s
SX73 6 * Mc/s (above 7 Mc/s), 455 kc/s
S76 1650 kc/s, 50 kc/s
S77 455 kc/s
S85 455 kc/s
S86 455 kc/s
S94 10·7 Mc/s
S95 10·7 Mc/s
SX99 455 kc/s
SX100 1650 kc/s, 50 kc/s
SX101 1650 kc/s, 50·5 kc/s
SX101 Mk. IIIA 1650 kc/s, 50·75 kc/s
SR34 23·25 Mc/s, 1·65 Mc/s

Hammarlund
Super Pro (early models) 465 kc/s
Super Pro (400-series onwards) 455 kc/s
Super Pro (600-series) 3995 kc/s, 455 kc/s
Comet Pro 465 kc/s
HC10 (converter) 60 kc/s
HQ110 3045 kc/s, 455 kc/s
HQ120 455 kc/s
HQ129X 455 kc/s
HQ140 455 kc/s
HQ145 3035 kc/s (above 10 Mc/s), 455 kc/s
HQ160 3035 kc/s, 455 kc/s
HQ170 3035 kc/s, 455 kc/s, 60 kc/s

Heath
Comanche 3 Mc/s
Mohawk 1682 kc/s, 50 kc/s
Mohican 455 kc/s

National
HRO Junior 456 kc/s
HRO Senior 456 kc/s
HRO-50 455 kc/s
HRO-60 1720 kc/s, 455 kc/s
NC33 455 kc/s
NC57 455 kc/s
NC66 455 kc/s
NC80X 1560 kc/s
NC81X 1560 kc/s
NC88 455 kc/s
NC98 455 kc/s
NC100X 456 kc/s
NC101X 456 kc/s
NC109 455 kc/s
NC125 455 kc/s
NC173 455 kc/s
NC183 1990 kc/s, 455 kc/s
NC188 455 kc/s
NC200 455 kc/s
NC300 2215 kc/s, 80 kc/s
NC303 2215 kc/s, 80 kc/s
NC400 1720 kc/s (above 7 Mc/s), 455 kc/s
NC2-40C 455 kc/s
NC2-40D 455 kc/s
FB series 495 kc/s
HFS 10·7 Mc/s
SW54 455 kc/s

R.C.A.
ACR111 460 kc/s
AR77 455 kc/s
AR88 455 kc/s
AR88D 455 kc/s
AR88LF 735 kc/s

R.M.E.
RME45 455 kc/s
RME69 465 kc/s
RME84 455 kc/s
RME4350 2195 kc/s, 455 kc/s
HF-30 1550 kc/s

Technical Materiel Corp.
GPR-90 3955 kc/s, 455 kc/s

Tobe
Communication series 456 kc/s

SURPLUS and MISCELLANEOUS

ARB 915 kc/s (high bands), 135 kc/s (low bands)
ASB 55 Mc/s, 16 Mc/s
B2 470 kc/s
B28 (CR100) 465 kc/s
B34 (358X) 450 kc/s
B36 600 kc/s
BC224 915 kc/s
BC312 470 kc/s
BC342 470 kc/s
BC448 915 kc/s
BC406 19·5 Mc/s
BC433 142 kc/s
BC453 85 kc/s
BC454 1415 kc/s
BC455 2830 kc/s
BC620 2·88 Mc/s
BC624 12 Mc/s
BC645 40 Mc/s
BC659 4·3 Mc/s
BC701 30·5 Mc/s
BC733 6·9 Mc/s
BC779 (Super Pro) 465 kc/s
BC788 30 Mc/s
BC794 (Super Pro) 465 kc/s
BC946 (BC453A) 85 kc/s
BC1004 (Super Pro) 465 kc/s
BC1147 455 kc/s
BC1206 135 kc/s
BC1335 4·3 Mc/s
CBY46129 (BC453) 85 kc/s
MN26 110 kc/s
P40 2·9 Mc/s
R23/ARC5 (BC453) 85 kc/s
R25/ARC5 705 kc/s
R26/ARC5 (BC454) 1415 kc/s
R28/ARC5 6·9 Mc/s (6·8—7·2 Mc/s)
R44/ARR-5 (S36A) 5·25 Mc/s
R44/ARR-7 (SX28A) 455 kc/s
R100/URR 455 kc/s
R107 465 kc/s
R129/U Super Pro
R208 2 Mc/s
R210 460 kc/s
R1116 1700 kc/s 100 kc/s
R1124A 470 kc/s
R1132A 12 Mc/s
R1143 10 Mc/s
R1147A 25 Mc/s
R1155 560 kc/s (b.f.o. 280 kc/s)
R1224A 465 kc/s
R1225 9·72 Mc/s
R1355 7·5 Mc/s
R3084 30 Mc/s
R3515 13·5 Mc/s
R3547 45 Mc/s
RA10 1630 kc/s
RAO 455 kc/s (modified NC-100)
RAS 175 kc/s (modified HRO)
RAW (HRO) 455 kc/s
RAX-2 915 kc/s
RAX-3 2·275 Mc/s
RBG (HQ-120) 455 kc/s
RBK (S27D) 5.25 Mc/s
RBJ (HRO) 455 kc/s
RCE (HRO) 456 kc/s
RC103-A (BC733) 6·9 Mc/s
RT34/APS13 30 Mc/s
TBS 5·3 Mc/s
TR1143 (" 19 ") 9·72 Mc/s
TR1196 (" 25 ") 465 kc/s
TR1196 (" 73 ") 460 kc/s
TR1462 9·72 Mc/s
VRL 1·5 Mc/s 465 kc/s
W/S No. 18 465 kc/s
W/S No. 19 465 kc/s
W/S No. 48 455 kc/s
ZC1 465 kc/s

* *This figure doubtful, may be 1·6 Mc/s*

Single Sideband

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

A RECENT letter from a transmitting member has asked for help and information on converting a Marconi CR100 for the reception of s.s.b. The correspondent has been sent a personal reply but it is felt that the subject is of general interest and merits inclusion in this feature.

S.S.B. Reception With Older Receivers

There is a great deal of wrong thinking in regard to receiver modifications necessary for the reception of single sideband. Unfortunately there is a widely held belief that the inability to resolve speech satisfactorily is due to the diode detector and that the first essential is to remove this and replace it with a product detector. This is a complete fallacy—a product detector will not make a poor sideband receiver into a good sideband receiver—and the effort involved can be put to much better use elsewhere.†

The normal diode detector gives harmonic distortion of the signal at low input levels due to the curvature of the anode voltage/anode current characteristic at the foot of the curve. At the higher input level of 5 to 10 volts or more, the operating point is on the straight portion of the characteristic curve and the distortion is low. Because of this the balance of gain—before and after the detector—in the normal a.m. communication receiver of the CR100, AR88 and BC348 class is designed to give a signal input to the detector of between 5 and 10 volts peak on an average received signal input. The following audio amplification is therefore only sufficient to bring this up to the required grid drive for the output valve and there is usually only one relatively low gain audio stage. For c.w. reception the designer was not concerned with any problems of maintaining detector linearity and the b.f.o. is therefore designed to provide only enough carrier injection to produce an audible note. The b.f.o. output is usually only of the same or less than the signal input magnitude—that is about 3 to 5 volts peak.

This signal input/heterodyning input ratio of 1 : 1 is quite satisfactory for the requirements of normal c.w. reception. It is, however, quite unsatisfactory for the reception of a single sideband signal which contains all the complex frequencies of the human voice. Any limiting in the detector would clip the peak of the speech waveforms and produce severe distortion. It is therefore necessary for the amplitude of the output of the detector faithfully to follow (to be in linear relationship with) the varying amplitude of the signal input to the detector. In order to accomplish this, the heterodyning input must be between five and ten times as strong as the peak signal input. This means that the ratio b.f.o. input/signal input must be not less that 5 : 1. If therefore the communication receiver had been designed in the first place for s.s.b. reception a b.f.o. would have been incorporated with a peak output of between 25 and 50 volts, or alternatively the b.f.o. would have been left as it was and the signal input to the detector would have been reduced so that it could not exceed say 0·5 to 1·0 volt peak. Either of these two methods would maintain the required 5 : 1 (or better) heterodyning ratio.

The " product " detector is so called because the audio output is a mathematical product of the two separate inputs which are fed to the valve grids in the detector circuit. These grids are biased for operation over the linear portions of their characteristics so that individually they each act as amplifiers and do not detect. The claimed advantage of the product

* *5 Janice Drive, Fulwood, Preston, Lancashire.*

† See *Single Sideband*, December 1959 R.S.G.B. BULLETIN.

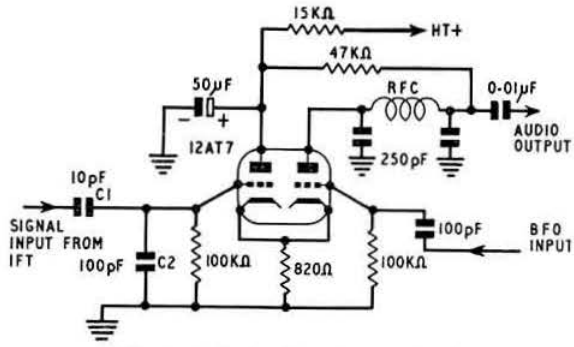


Fig. 1.—Typical product detector circuit.

detector—lower intermodulation distortion—can only be obtained at low input levels of not more than about 3 volts peak for the b.f.o. and 0·5 volts for the signal. Because of this, an essential part of the circuitry is a capacitive potential divider made up of a series value, usually 10 pF to the grid, and a shunt value usually of 100 pF from the grid to earth. A typical product detector circuit is shown in Fig. 1 and the two capacitors C1 and C2 form a potential divider so that one-eleventh of the signal from the secondary of the i.f. transformer reaches the product detector grid. It should now be obvious that if the wanted signal input has been artificially reduced to about one-tenth of its former value—that is from 5 volts or more to about 0·5 volt, the existing b.f.o. output of 3 to 5 volts will be adequate to maintain the required signal/heterodyning input ratio of 5 : 1 or better. In other words the apparent improvement with the product detector (and the fact that the receiver can now be used with the r.f. gain turned full on) is not a function of the product detector as such but is due to the fact that the signal input has been artificially reduced. This artificial input reduction can be applied to an existing receiver by alteration to the balance of gain with exactly the same results (i.e., by turning the r.f. gain down and the audio gain up). A further consideration is the fact that the product detector conversion efficiency is low; in fact the gain is likely to be unity or less. As the input must be restricted to about 0·5 volt to avoid overload and distortion, there cannot be more than 0·5 volt of audio (0·35 volt RMS) at the output. This is less than one-tenth of the output from the original diode detector on an average signal input and about one-hundredth of the output on a strong local signal. It will therefore be necessary to fit an additional stage of audio amplification if the former volume level is to be retained.

In practice the substitution of a product detector for a diode will give no more improvement than the expedient of restricting the signal input into the diode detector, either by reduction of r.f. gain with the manual control or by including r.f. negative feed back (400 or 500 ohm *un-by-passed* cathode resistors on two i.f. stages are suggested) or by the use of a capacitive potential divider as shown in Fig. 2. The existing cathode connections are broken at the valveholder pin and a 100 K ohm resistor placed in series and the b.f.o. output taken through a blocking capacitor direct to the cathode.

The CR100 receiver can be used successfully for the reception of single sideband without any modification whatsoever. In fact the writer used a standard CR100 for reception of s.s.b. for more than six months and many other sideband operators are using similar standard receivers now. In the AR88, the b.f.o. coupling relies on the capacity between pin 3 (anode) and pin 4 (blank) on the 6J5 valveholder for coupling but this is insufficient for sideband

(*Continued on page 30*)

Mobile Column

By JOHN A. ROUSE (G2AHL/M) *

NOISE suppression is most important in all mobile installations but however good it may be, an efficient noise limiter in the receiver is essential. A very satisfactory arrangement was described by George Storey (G3HTC) in the September 1959 issue of *Mobile News*, journal of the Amateur Radio Mobile Society. Since then, the circuit has been further improved and is shown in Fig. 1 together with suitable a.f. stages and an audio filter.

An EB91 is used as the combined detector and delayed a.g.c. rectifier. The delay can be varied by using other values of resistor in place of the 22K ohms shown. Full a.g.c. voltage is available for the i.f. stages in the receiver while the potential divider comprising the 820K and 180K ohm resistors reduces the voltage to about one-fifth for application to the r.f. stages, in the interests of best signal to noise ratio.

The noise limiter, another EB91 valve, is of the shunt series type in which the series diode becomes non-conductive when a noise pulse is applied to it. Any pulses which then pass the series diode are shorted out by the shunt diode. The output from this noise limiter is somewhat low and it is therefore followed by an EF91 pentode a.f. amplifier, the output of which is fed to the grid of the EL91 output stage via an audio filter which cuts off sharply above 3 kc/s. The use of this filter reduces the random noise output very considerably and improves the intelligibility of signals without adversely affecting voice reproduction.

Although the circuit described was evolved by G3HTC with mobile operation particularly in mind, it has equal application in home station and portable receivers.

Members who have difficulty in buying suitable 6H chokes may obtain them price 10/- from Mr. Storey, 10 Avon Road, Sunbury-on-Thames, Middlesex.

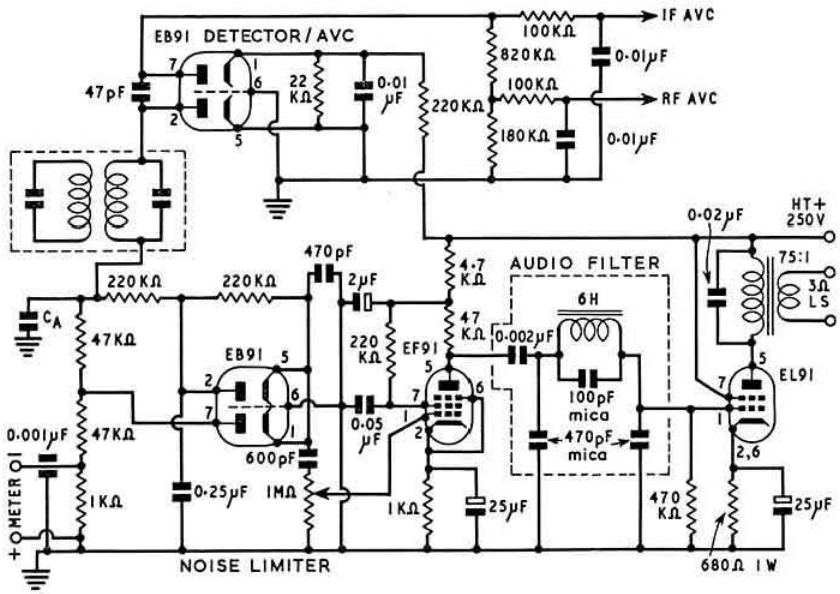


Fig. 1. Circuit diagram of the improved noise limiter and a.f. stages designed by G3HTC for a mobile receiver. For intermediate frequencies between 450 kc/s and 2 Mc/s, the capacitor CA should be 100 pF; above 10 Mc/s the capacity should be 47 pF. The two 470 pF and 100 pF capacitors in the audio filter should ± 2 per cent tolerance type. Variations in these values will alter the cut off frequency as will different inductance values for the choke. The meter test point is for use when aligning the receiver.

Out and About

The third Northern Mobile Rally, briefly mentioned last month, was held at Harewood House, by gracious permission of H.R.H. The Princess Royal, on May 22 and helped by glorious weather attracted a record attendance of more than 800. The event was organized by G3IJC and the Spen Valley Amateur Radio Society. Of the hundred or so mobiles present the vast majority were equipped for Top Band. Prominent among them was G3LDJ/M on a scooter equipped with a 19 Set, a rotary power supply, variometer, 16 ft. whip and 12 volt aircraft battery. The long distance prize was won by G3LZR/M of Romford who made the double journey on a well-equipped motor cycle combination.

A radio crossword competition devised by G3KNA was won by G3DTA/M, G3FWL and G2HAP/M. A mobile competition, won by G3ESP/M, G3GWR/M and G3MMK/M, caused great amusement. On the word " go " each competitor had to find his own QSL card amongst the rest spread face downwards on the ground, then return to his car, switch on his equipment and transmit his call-sign and code number. The first three identified by the rally station were adjudged the winners.

The Amateur Radio Mobile Society's rally at the U.S.A.F. station at R.A.F. Barford St. John, near Banbury, on June 19 was a great success, with an attendance of nearly 600 including more than 30 U.S. amateurs and their families at present stationed in the U.K. Of the 150 cars, 92 were equipped for mobile operation. The Top Band rally station, G3NMS/P, came on the air on the previous day and by the end of the rally had had more than 500 contacts.

The programme included a display of precision marching by a U.S.A.F. team, a baseball match, model flying displays, go-cart demonstrations and visits to the Transmitter Hall. Exceptionally good weather helped the two mobile refreshment vans to do a roaring trade in ice-cold canned American beer, Coca-Cola and other soft drinks. Much of the success of the event was due to the unstinting co-operation of Major Peter Kravchonok, U.S.A.F. (KL7LKS) and his personnel.

After a week most noteworthy for great thunderstorms and almost tropical rain, June 26 produced the usual perfect Longleat weather for the Bristol R.S.G.B. Group's Mobile Rally. The attendance of more than 500 was considerably up on last year, and, as at most of this year's rallies, a very high proportion of the 120 cars were equipped for mobile operation.

The sideshows included a DX balloon race, free draws and a treasure hunt. A popular innovation in the junior event was that entrants automatically received a bar of chocolate! Three of the winners in the principal draw (white 057, pink 24 and pink 171) failed to claim their prizes which may be obtained from F. H. Chambers (G2FYT), 25 The Crescent,

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

Henleaze, Bristol, on submission of the necessary counterfoils. Prizes in the various competitions and the *concours d'elegance* were presented by Lord Bath.

New Call-sign Procedure

For some time there has been doubt in many operator's minds as to the form of call-sign to be adopted when operating away from home in another country in the United Kingdom. The announcement in this issue that the call-sign given in the licence may be modified to include the correct prefix for the country in which operation is taking place will therefore be particularly welcomed by mobile operators. The new arrangement is certainly the logical one.

Mobile Briefs

GW8UH/M is now active on 144 Mc/s in his Wolseley 6/80 (KTG910). The transmitter comprises an EF91 and 6F17 driving a 12AU7 to 8 watts input, modulated by a 6BR7, 12BH7 and a 12AX7 in zero bias class B, and feeding a halo aerial. The double superhet receiver uses a G2IQ type front end and a 1·6 Mc/s i.f. Power is provided by a transistor supply. The transmitter can be keyed and a b.f.o. is fitted to the receiver. G2DHV/M, another 144 Mc/s operator, is using a Hamobile transmitter-receiver and a halo with a 4 element Yagi for portable operation.

An interesting article on transistor power supplies, together with practical details of a 100 watt design, appears in *Mullard Technical Communications*, Volume 5, Number 43.

The new, inexpensive silicon diodes manufactured by Joseph Lucas Ltd. seem likely to find many applications in amateur mobile equipment. The type DD006 (400 volt p.i.v., 0·25 amp.) looks most promising for use in transistorized supplies. It may be obtained, price 7s. 10d., from G. & E. Bradley Ltd., Electral House, Neasden Lane, London, N.W.10.

G3DMK/M arriving at the Northern Mobile Rally at Harewood House near Harrogate, on May 22, 1960.
(Photo by courtesy of the *Yorkshire Post*.)

SOUTHERN COUNTIES MOBILE RALLY

Beaulieu Abbey, near Lymington, Hampshire

Sunday, July 17, 1960

RALLY STATIONS

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

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

DERBY MOBILE RALLY

Rykneld School, St. Albans Road, Derby

Sunday, August 14, 1960

RALLY STATIONS

Top Band—G3ERD/P Two Metres—G3EEO/A

will be on the air from 10 a.m. until 2.45 p.m. Admission and parking free. Programme will include sideshows, film show, children's games, monster junk sale, demonstration of radio controlled model aircraft and a judo exhibition. An electric washing machine will be one of the prizes in the mobile competition.

(St. Albans Road is off the ring road, Manor Road section of the A5111.)

Organized jointly by the Derby and District Amateur Radio Society and the Derby Short Wave Experimental Society.

SOUTH MANCHESTER & STOCKPORT RADIO RALLY

Sunday, August 28, 1960

The first assembly point will be Davenport Cinema Car Park, Stockport, for those wishing to take part in or to follow the treasure hunts (one for those equipped with mobile gear, one for those without radio).

The final assembly point will be the Pavilion Gardens, Buxton, where meals and snacks will be available.

Top Band and 2m stations will be in operation at both assembly points.

Further details from C. M. Denny, G6DN, 18 Willoughby Avenue, Didsbury, Manchester 20.

Organized by the South Manchester Radio Club and Stockport Radio Society.

Index to Volume 35

THE Index to Volume 35 (July 1959 to June 1960) is enclosed in this issue of the BULLETIN.

Single Sideband

(Continued from page 28)

requirements. It is therefore recommended that a Philips 3—30 pF trimmer should be mounted directly on the b.f.o. valveholder across pins 3 and 4. It can then be adjusted during actual sideband reception for the most satisfactory results. This will give sufficient b.f.o. injection to accommodate all but the very strong local signals without any need to back off the r.f. gain control at all.

Next month, the operational aspects of s.s.b. reception will be discussed and some information given on the addition of half-lattice filters to receivers such as the AR88, AR88LF and CR100.

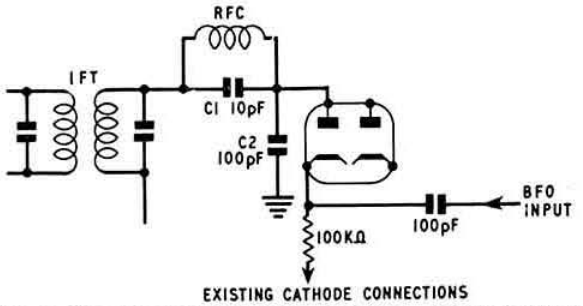
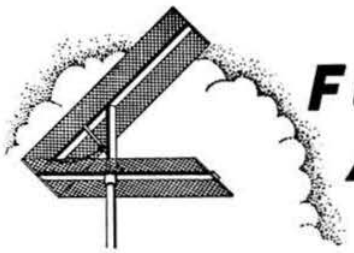
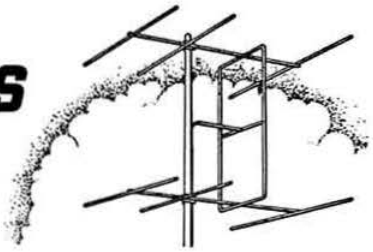


Fig. 2. Capacitive potential divider applied to an existing diode detector. The r.f. choke is necessary to complete the diode d.c. return path.



FOUR METRES AND DOWN



First OD5-ZC4 Contact on 144 Mc/s

By F. G. LAMBETH (G2AIW)*

MOST of the business discussed by the V.H.F. Committee at the Region I I.A.R.U. Conference in Folkestone was connected with contests but other items were also considered,

An early decision was to retain the present contest-scoring system of 1 point per kilometre. Poland and France supported by Ireland and Finland had suggested progressive scoring as an incentive, on the ground that countries near the perimeter of the area are always at a disadvantage compared with those near the hub but the majority felt that the point per kilometre system was the best compromise at present. Contests recognized by Region I are to be phone *and* c.w. events in the future because some countries issue phone-only licences. Another change is that contests are to last only 18 hours, i.e., from 18.00 G.M.T. on the Saturday until 12.00 on the Sunday.

The main contest of the year, hitherto known as the European V.H.F. Contest, will in future be called the I.A.R.U. Region I V.H.F. Contest, as the previous title appeared to preclude the participation of amateurs in extra-European countries, e.g., Algeria and other North African areas.

French amateurs are to give an extended trial to their calling system (R.S.G.B. BULLETIN, February 1960) and ask for co-operation and publicity. If it works, it may be adopted by other countries.

The QRA Locator system has been accepted in principle by all societies. EI2W announced that I.R.T.S. has offered to organize Transatlantic 144 Mc/s Tests in 1962 from the West Coast of Ireland. Special facilities for clearance of imported gear are being arranged.

As the width of the 420 Mc/s band will be materially reduced after May 1961, and as a large proportion of the truncated band may be occupied by Amateur TV, it was agreed that the 432-434 Mc/s section was the most suitable for DX operation. (The band will not be reduced in width in the U.K. except perhaps from 420-460 Mc/s to 420-450 Mc/s.—Editor.)

The Chairman and Honorary Secretary of the Committee (DL3FM and G2AIW) were confirmed in their respective offices. The next meeting of the Committee will be in Turin during the weekend of October 14/15, 1961.

First OD5-ZC4 Contact on 144 Mc/s

ZC4WR (Limassol) writes a very interesting letter about happenings between Cyprus and Lebanon. On June 16 between 15.00/16.00 G.M.T. OD5AB (144·503 Mc/s) was worked by ZC4SC, ZC4MO and ZC4WR, in that order—a four-way QSO. This is believed to be the first OD5/ZC4 contact. The distance is 210 miles largely over the sea.

ZC4SC (144·040 Mc/s) uses an SCR522 and indoor four-element Yagi. He is located at Episcopi, on the south coast of Cyprus. ZC4MO (144·010 Mc/s) at Mt. Olympus, 6,000 ft. a.s.l. and 15 miles inland, runs five watts to a dipole. ZC4WR (144.177 Mc/s) is at Limassol, about 15 miles east of ZC4SC and runs 25 watts input and has a six-element Yagi. On June 17 OD5CO (145·2) appeared on A1 and at 15.40 G.M.T. was worked by ZC4PW (144.506) at Nicosia, behind a 4,600 ft. mountain range. Signals were 459 both ways.

OD5CO heard ZC4 signals on June 8 but had no transmitter ready. The opening appeared to be tropospheric ducting and further skeds have been arranged for earlier hours. OD5AB is situated on the mountains behind the city of Beirut and looks out over the Mediterranean—a perfect location.

G4LX's Auroral Report for May 1960

In the United Kingdom it seems as if the only opening in May was during the 144 Mc/s Contest on May 8 and not much more is to be gleaned from reports received from Scandinavia.

SM6PU was able to make auroral QSOs on May 6 and on May 29 in addition to the major disturbances of May 8. He also observed auroral propagation on 88 Mc/s on eight other days during the month. It is interesting to note that SM6PU was able to make one auroral QSO on May 29 as this might link up with the 29-day cycle of disturbances noted by G3HBW and which now read as follows: February 2, March 2, March 31, April 30 and May 29.

During the 144 Mc/s contest on May 8, SM6PU worked via the aurora SP2BO, OK1KVR/P, OK1KKL/P, DM3ZFI/P, DL6WU/P, DL7HM, DL7FU, DL3SPA, DL1EY and sundry SM stations. Olof did not log any G stations, which is a pity since he was heard in north-east England for at least 40 minutes at good strength.

Two Metre News

A.1657 (nr. Cleckheaton) has had a v.h.f. receiver for about nine months (a very noisy R.1392) on which G2HCJ and G6XM have been heard, but a VQ4EV type converter is now complete and after alignment better results are confidently expected, especially as a G3EKX five-element beam is also to be used.

G3JR (Barnes) worked G3ILX (Barrow) at 549 on June 16—his first QSO with Lancashire and G3JR's longest contact in these Islands at 225 miles. Later, at about midnight he was amazed to hear GW2HIY (Anglesey) working G3JMA (Harlow) on phone, every word being heard at about S4. G3JR tried unsuccessfully to raise GW2HIY on c.w.

G2XV (Cambridge) has little to report but he was very pleased to work G3FYR (St. Ives, Cornwall) on June 17, the Cornish station's best DX so far. **G5ZT** (nr. Plymouth) has a new crystal and is now on 144·015 Mc/s. Power has been raised to 150 watts to a p.p. pair of DET12s. We are glad to welcome this additional incentive from the south-west!

G3HAZ (Birmingham 31) found the last few days to mid-June very good on 2m with G3ILD (Darlington) in one direction, and G3FYR (Cornwall) for a new county

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

in the other. Inter-G working was quite good, but surprisingly enough there does not appear to have been a trace of EDX in the Midlands! There is still no shortage of newcomers on the band and G3HAZ thinks the " d.c." bands must be in pretty terrible shape!

G3NRO (Ashford, Kent) wishes to make it clear to all concerned that his 2m rig is not and never has been run at excessive power. The station is not capable of running at 150 watts or more and never has been. It has been frequently checked, as G3NRO, a member of H.M. Forces, moves about quite a bit.

G3LTF (Danbury) found a coastal PA opening on May 16, with weak signals from G3JGJ on the 17th. On the 18th the coastal PAs were there again and six were worked. May 26 brought a QSO (" at last! ") with G3JGJ (549) and conditions were good to the west and north-west. On May 28 contact was made with GW2HIY and on May 30 G3ILD (Darlington) was heard. The coastal PAs again showed up on May 31 and G3IOE was worked for the first contact with Northumberland. June 1 found the PAs all 59+ signals with fading, but none very far inland. June 3 brought a very fine signal on phone and c.w. from GW3GWA but no contact. G3LTF has noted raw notes on several stations lately, in most cases when an aurora appeared due. These raw notes, which seem to be some form of " back scatter," have been noted between the north-east, north and north-west direction. Correct beam direction gave T9X notes in all cases. This occurred on several dates between May 17 and June 4. Has any one else noticed this phenomenon?

G2DHV/M (Sidcup, Kent) is active on 144·7 and 145·25 Mc/s using a Hamobile and halo aerial. For portable operation a four-element Yagi is available.

Two Metre News from Wales

GW3MFY (Bridgend) considers things are looking up on 2m. On June 16 G3FYR (St. Ives, Cornwall) was worked 59 on phone, and G3CZZ/A, also in Cornwall, was heard at 57/8. Later in the evening, after chats with GW8NP and GW8SU, a CQ to the north brought a QSO with G3CCH (Scunthorpe), his signals being 58/69. Others called without success were G3EGK and G3ENY, both heard for the first time in three years in the most difficult directions! At the beginning of the period G3KMP (Hastings) was worked on May 23 after arranging a sked at the Convention—at the first try! There was plenty of activity on the 26th with G3NZF and G3KDG heard on phone. May26/June 4 (a fine warm spell) also brought a run of above-average conditions. G3GTN (Wolverhampton) was a new one on the 28th, G3CGE, G3GOP (Southampton) and G3OBD (Poole) on May 29. GC2FZC was heard on the 31st. G3HWR (London) was worked on June 1 as was G6OX; G3LHA (Coventry) on the 2nd, G3KPT and G2CIW (" at last! ") on June 3, with G3JHM (Worthing) on June 6.

BRITISH ISLES TWO METRE BAND PLAN

Zone	Mc/s	Area
1	144.0 -144.1	Cornwall, Devonshire, Somerset.
2	144.1 -144.25	Berkshire, Dorset, Hampshire, Wiltshire, Channel Islands.
3	144.25-144.5	Brecknockshire, Cardiganshire, Carmarthenshire, Glamorgan, Gloucestershire, Herefordshire, Monmouthshire, Pembrokeshire, Radnorshire, Worcestershire.
4	144.5 -144.7	Kent, Surrey and Sussex.
5	144.7 -145.1	Bedfordshire, Buckinghamshire, Essex, Hertfordshire, London, Middlesex.
6	145.1 -145.3	Cambridgeshire, Huntingdonshire, Leicestershire, Norfolk, Northamptonshire, Oxfordshire, Rutland, Suffolk, Warwickshire.
7	145.3 -145.5	Anglesey, Caernarvonshire, Cheshire, Denbighshire, Flintshire, Merionethshire, Montgomeryshire, Shropshire, Staffordshire.
8	145.5 -145.8	Derbyshire, Lancashire, Lincolnshire, Nottinghamshire, Yorkshire.
9	145.8 -146	All Scotland, Northern Ireland, Isle of Man, Cumberland, Co. Durham, Northumberland, Westmorland.

Two Metre News from Scotland

GM2FHH (Aberdeen) reports that the North-east of Scotland has been fairly dead recently with somewhat low activity, the only station heard regularly being GM3LAV. **GM2CHN** (Glasgow, S.1) says there is usually someone on around 22.30 B.S.T. and on one evening recently more than 10 GM stations showed up. G2CNK (Doncaster) was a welcome visitor at the May meeting of the local V.H.F. Group. GM3LDU, home on leave, displayed a neat 2m converter using the G.E.C. A.2521.

Seventy Centimetres

G3HAZ (Birmingham 31) had a good time in the 420 Mc/s Contest on May 22 and operating from Lickey Hill Beacon managed to make 25 QSOs and one more from home. Conditions were by no means good and luckily all the locals turned up trumps by putting in an appearance—including some who had been to the International V.H.F. Convention in London—stout fellows! The equipment used by G3HAZ/P included a 24-element wide-spaced stack about 40 ft. up, the home station receiver and the 2m portable transmitter driving a DET24 h.t.-less tripler in a coaxial line. Just at the moment appearances are being maintained by G3ENY, G2AFD, G6XA, G3KQJ/T, G3LAY, G3BA and G3EJO, indicating that activity is quite brisk. G3HAZ's plea for a 2 Mc/s band width was supported at the Folkestone Conference but at a somewhat different frequency. Some local frequencies are: G2CIW (435·45), G3BA (435·1), G3XA (435·37), G3KPT (435·48), G3HAZ (435·28), G3LAY (435·1), G2AFD (434·17), G3EJO (435·49).

G3LTF (Danbury) considers that there was nothing like enough activity during the 420 Mc/s Contest and says conditions were poor until 21.00 G.M.T. when G2CIW and G3LHA were worked and G3JWQ and G3HAZ/P heard. In all, 18 stations were worked, the average miles per QSO being 47. On the 25th G3JWQ, G2CIW and G3BA were all worked, conditions then being quite good to the north-west.

Four Metre Activities

A.1657 (Cleckheaton) has a major interest in this band and an RF27 and dipole feeding into an HRO have brought S9 signals from G3CXP and G6BX (Bradford), G3NAO (Dewsbury), G3NIH (Rotherham), G5YV (Morley, Leeds) and G3GCX (York). Most of the local stations use S440B transmitters. Two other locals, G3KNA and G8BL, are also listening on the band. Incidentally it is good to know that this local interest is so well maintained and we await further reports with pleasure.

GW3MFY (Bridgend) has a crystal-controlled cascode converter and an 832A at about 15 watts input feeding a three-element Yagi. Operation is mostly restricted until outside TV hours at the moment. The frequency is approximately 70·26 Mc/s on phone and c.w. Sundays is suggested as activity day for 4m as this already seems to be a popular day and gives the Channel 5 boys a chance! **GW8SU** (Porthcawl) will be on 4m shortly.

(*Continued on page 36*)

The MONTH ON THE AIR

A CHRONICLE OF EVENTS ON THE HF AMATEUR BANDS

By R. F. STEVENS (G2BVN)*

THE appearance of a number of very interesting DX signals on the bands during the last month has attracted the attention of many stations but the listener to the ensuing " pile-ups " is often left with the impression that the operating habits of some of the calling operators leave much to be desired. The swish of a carrier being placed on the frequency of the wanted station, followed by the inevitable whistlings and mutterings of the subsequent tune-up often completely blot out the DX station. Others who cannot hear the DX station but only those calling, will often call " blind " and thus cause severe interference and chaos on the frequency. And, having worked a DX station, it is surely only basic good manners to move away from the channel before commencing a QSO with a local. Many other undesirable practices with which we are all too familiar today could be mentioned but suffice to say that observance of the accepted code would make contacts much more pleasant for all concerned.

A malpractice which is gaining ground is the omission of call-signs for long periods amongst stations participating in " round tables " particularly when using s.s.b. Insofar as U.K. stations are concerned this omission contravenes the licence conditions. Lest it should be thought that this comment concerns only stations on the h.f. bands it must be added that operators on the lower frequencies (and on v.h.f., too.—EDITOR) have been heard to be equally guilty. Again, compliance with correct practice will avoid any official reprimand and ease the frustration of listening stations. The strangest part of this business of omitting call-signs is that amateurs generally are intensely proud of their calls!

With the deterioration in operating manners which has taken place during the last few years the opportunity is now present for all U.K. operators to show that their conduct on the air, both in domestic and DX contacts, is beyond reproach.

Despite the large number of stations now active and chasing DX a goodly amount has been heard and worked and, according to reports, further exotic calls will be activated in the near future.

News from Overseas

The following stations are reported active in **Australian Antarctica**: VK0s BH and GE at Mawson Base; AB at Wilkes Base; ED at Davis Base, and WH at Macquarie Is.

Joe Poole (G3MRC) is returning to **Singapore** in August and it has been confirmed that the call-sign he previously held there (VS1FW) will be re-allocated. He promises all band operation (3·5 to 28 Mc/s) with a K.W. Vanguard and various aerials. There will be good opportunities for operation from 9M2, VS4, VS5 and ZC5, on which further information later.

Bob Milton, formerly **ZB2N**, is now active from Kinloss under the call GM3OEV. His address is in *QTH Corner*.

The editorship of *The DX Bulletin* published by the **West Gulf DX Club** has now passed to W5KBU and W5GNG. A sample copy of this excellent bulletin may be obtained by sending I.R.C.s to Box 450, Odessa, Texas, U.S.A.

The following stations are reported active in **Zone 19:** UA0s, CA, CD, CK, CG, FA, FB, GA, GB, GE, GF, IN, KCA, KCO, KDA, KG, KGA, KID, KKB, KKD, KQB, KQC, LA, LO, RE.

DXpeditions

DL9PF and DL7AH were due to commence operation as **PX1PF** for 14 days from July 9 using s.s.b. and c.w. **PX1RC** will be operated by ON4RC and F9XM during the period August 10-14. At the moment it is proposed to operate on a.m. and c.w. only.

HB9TU/FL will be operating from **Liechtenstein** for a short period from July 15 using s.s.b.

VK5BP will be located in the **Northern Territory** at Alice Springs during September. This division is seldom heard, nearly all the VK5 calls emanating from South Australia. The prefix for N.T. may shortly become VK8.

St. Pierre (FP8) will be represented by K2LSU and others during the first two weeks in August. Operation will be on the four bands from 7 to 28 Mc/s and QSLs should go to K2VZJ.

Latest reports say that VQ9TED will be active from the **Seychelles** during July and, according to MP4BBW, expects to operate from **VQ7** during August.

OD5CT will probably return to Teheran for a further period as **W3ZA/EP**, and July 20 to August 5 seems to be the likely period. A trip to the **Kamaran Is.** with VS9ARF is contemplated during September or October.

The Cabinda trip by CR6CA has not materialized but operation is promised from **EA0** and **CR5** in the near future.

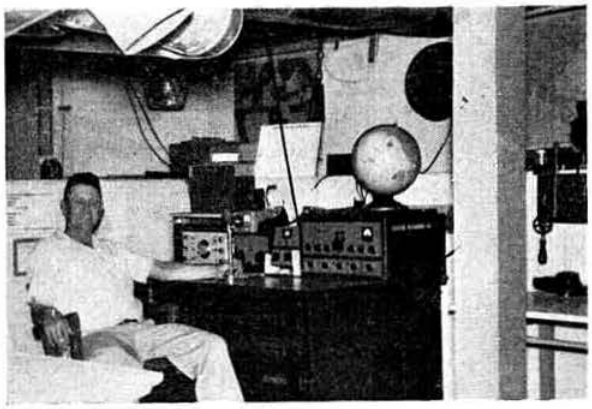
The **Baja Neuvo** sojourn by the party from *Yasme III* went off successfully until heavy seas threatened to submerge this new " country." The operating from HK0AA was first-class but this " country " business seems to be getting out of hand.

The trip organized by 9G1CX is said to be calling at

DXotic Showcase

Call-sign	k/cs	Mode	G.M.T.	Country
OY1AA	7,005	c.w.	22.55	Faroes Is.
W2AIS/KV4	7,005	c.w.	22.50	Virgin Is.
YA1BW	7,032	c.w.	20.35	Afghanistan.
ZL4JF	14.152	a.m.	06.00	Campbell Is.
FG7XG	14,005	c.w.	23.15	Guadeloupe
HK0AA	14,075	c.w.	23.30	Baja Neuvo Is.
JT1KAB	14,060	c.w.	22.40	Mongolia
UA0FF	14,090	c.w.	20.30	Sakhalin Is.
UJ8AC	14,080	c.w.	17.58	Tadzhik
UM8KAB	14,005	c.w.	22.40	Kirghiz
VK0AB	14,072	c.w.	07.00	Antarctica
ZK1AK	14,010	c.w.	07.30	Cook Is.
HB1TL/FL	14,313	s.s.b.	19.09	Liechtenstein
MP4MAB/P	14,296	s.s.b.	16.50	Yemen
UA9CM	14,315	s.s.b.	18.23	U.S.S.R. Zone 17
W3ZA/EP	14,330	s.s.b.	17.40	Iran
7G1A	14,315	s.s.b.	18.47	Rep. of Guinea
9N1GW	14,310	s.s.b.	17.20	Nepal
KJ6BV	21,335	a.m.	06.55	Johnston Is.
KW6DA/KM6	21,270	a.m.	08.10	Midway Is.
VK0BH	21,118	a.m.	11.45	Antarctica
VR2DE	21,200	a.m.	08.15	Fiji
9N1MM	21,120	a.m.	15.50	Nepal
HK0AA	21,075	c.w.	21.25	Baja Neuvo Is.
KM6BT	21,030	c.w.	08.50	Midway Is.
VS9MB	21,030	c.w.	12.30	Maldive Is.
ZK1AU	21,020	c.w.	07.35	Cook Is.

* *Please send all reports to R.S.G.B. Headquarters to arrive not later than July 18.*



Johnny Miller, W0AMR, of Pueblo, Colorado, uses a Viking I transmitter and a National NC300 receiver. His wife's call is W0LNH. (Photo via G3MVV)

ZD2, ZD3 and FD8. The transmitter will be a KWM-1 and QSLs should go to W2FXN. Later this year **VU2NR** hopes to make a trip to the **Laccadive Islands.**

Awards and Contests

Following the note last month regarding the *Directory of Certificates*, a note from W3RPG states that, due to removal to W8, he has been obliged to hand over to **K6BX** at Box 385, Bonita, Calif., from whom the *Directories* will be available as before.

The *Bulletin* of the **Award Hunters' Club** contains much information on new awards, and, for those interested in certificates from the U.S.S.R., a complete list of the Russian Oblasts with call areas. The Honorary Secretary of the A.H.C. is OH2YV.

Details of the contests due to take place during the autumn are coming in. The **Scandinavian Activity Contest,** sponsored this year by the Swedish national society, S.S.A., will take place between 15.00 G.M.T. on September 17 and 18.00 on September 18 (c.w.) and between 15.00 on September 24 and 18.00 on September 25 (telephony).

October 1 and 2 are the dates set for the phone section of the **VK/ZL contest**, with the following weekend for the c.w. section.

G2BQC and VK5NO were placed fifth highest in the world in the Multi Operator, Single Transmitter, category of the *CQ* World Wide C.W. DX Contest with a score of 274,670 points.

DX Briefs

ZA1KC, worked on 7 Mc/s, seems to be genuine and his QSL has been received in PA0.

9Q5 replaced the OQ5 prefix as from July 1. At the same time, OQ0 became 9U5. The prefix for the new Somali Republic (formerly I5 and VQ6) is 60Z.

Fernando de Noronha, which has not been heard recently, is now represented by **PY7LJ** who is active on 21 Mc/s during the early evening hours. The address is in *QTH Corner*.

R. F. Oxley, ex-**ZD1RO**, writes to say that all contacts have been confirmed through the Bureau.

VE2BFS is now the call of G3MXF who is looking for G contacts on the h.f. bands. See *QTH Corner* for his address.

Contrary to previous reports **VS5GS** does, and will, QSL upon receipt of a card with one or more I.R.C. He is not interested in receiving cards but will reply to incoming requests.

VQ4AQ is awaiting his *301st* confirmation and will then submit his *first* claim for DXCC. It is very pleasing

QTH Corner

AC5PN	N. Chuawna, Dechen-Choling, Thimphu, via Kalimpong, India.
CP5EL	Box 1088, Cochabamba, Bolivia.
FO8AC	W4KWC, Route 1, Hampton, Georgia, U.S.A.
GM3OEV	M/Sig. R. Milton, 5 Salmond St., R.A.F. Kinloss, Morayshire, Scotland.
HB1EO/FL	R. Graeup, Zofingen, Unt. Graben 16, Switzerland.
HB1TL/FL	via HB9TL.
HK0AA	via KV4AA.
KG6ICD	via W7PHO.
KV4CI	Box 701, St. Thomas, Virgin Is.
LX3EQ	via DL6EQ.
LX3JW	via DL1JW.
PY7LJ	P.O. Box 1043, Recife, Brazil.
PZ1AR	Box 431, Paramaribo, Surinam.
PZ1BE	Box 981, Paramaribo, Surinam.
VE2BFS	P. J. Cutler, 2155 St. Germain Blvd., St. Laurent, Montreal, Quebec Province.
VK0AB	via VK3APV.
VP1BS	P.O. Box 198, Belize.
VP2DA	via W8VDJ.
VP3RW	P.O. Box 239, Georgetown.
VP5VB	via KV4AA.
VS5PM	P. K. I. Mohamed, Telecoms Dept., Brunei.
ZA1KC	P.O. Box 42, Tirana.
ZD7SA	via W9FJY.
ZK1KS	via W7ZAS.
ZS3FF	Box 1601, Windhoek, S.W. Africa.
9G1DN	Box 128, Dunkwa.
9N1MM	M. D. Moran, St. Xaviers College, Kathmandu, Nepal.

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

that the first to attain this coveted figure is a Commonwealth operator.

HC1KA of Quito is reported by Bob Kemp as asking for help for the earthquake victims in the form of donations to the Chilean Red Cross to be sent to the Cuenca Radio Club. There has apparently already been a generous response.

28 Mc/s

G3IPV/MM in *H.M.S. Hermes* reports the following worked whilst off South Wales: ZD2IHP (16.45), OA4FM (18.50), EA7CP (18.24) and RA6LAB (17.40), in addition to many European QSOs. Whilst /**MA** at Portsmouth contacts were made with CX2BT (12.20), YV5ACN (18.55), ZD2ATU (21.05), PY2HT (19.49) and UA2AG (18.40). All these QSOs were on c.w. **G3NBC** (Romford) used a new quad to talk with CN2BN (10.05), CR7AG (17.10), IS1DKL (14.55) and VQ3PBD (16.35).

A.1902 (Reading) submits a good list from which we choose ZS7L (16.04), CR7OU (15.50) and ZE5JA (14.50). **A.1859** (New Barnet) reports phone from FE8AH (10.18), VS9AZ (15.15), OR4TX (13.34), KZ5BS (21.47), OA4IGY (21.42) and ZS3RO (17.58). JA1CEY, JA2XW, JA7IL and JA9GX form the staple diet of **B.R.S.22795** (Kingston) around 10.30, who also reports VQ5JF (15.33) and YN1LC (20.55). From Virginia, **F.R.S.309** reports VP1BS (11.43), TG9T1 (11.03), ZL2MQ (10.24) and VP6PV (10.26).

21 Mc/s

Some very worth while DX has been worked on this band which, this month, vies for top honours with 14 Mc/s.

G3FPQ (Elstead) completed A3 contacts with KJ6BV (06.55), KW6DA/KM6 (08.10, '270), VR2DE (08.15), VS5GS (17.35), VP8CX (20.23), VQ1HX (20.20), YA1BW (20.10) and no less than seven KH6s between 07.15 and 09.40 on frequencies between '270 and '350. C.w. from the same QTH raised HK0AA (21.25) and KM6BT (08.50). From Farnborough, Kent, **G8KS** conversed with VK0BH (11.45, '118), 9N1MM (15.50, '120), VS5GS (15.58, '120) and VS9MB (16.30, '120); c.w. accounted for VS5PM (16.15). Using s.s.b. **MP4BBW** (Bahrain) exchanged reports with 9N1TB (13.51, '290), 9N1CJ and 9N1MD (15.15, '235), XW8AL (15.27), UA9KOG (16.54), VS1KF (14.27) and CR6CA (16.05). C.w. contacts made by **G3AAE** (Coulsdon)

include VS9MB (12.30), VS5PM (14.30), VP3MC (21.54) and DXpedition HK0AA (20.40), with HI8JBD (19.20), VP8DQ (20.04), PZ1BE (21.45) and PZ1AR (21.50) on phone.

Activity from **G3BHJ** (Norwich) produced on phone HV1CN (12.40), K6JMG/KG6 (14.20), UA9DN (13.40), VS9AE (11.00) W2AYN/EP (17.40) and 9M2EB (18.25). **G6XL** (Leeds) keyed with ZK1AU (07.35), 7G1A (18.50), VS5GS (17.40), YA1BW (16.56), HK0AA (21.00) and CP3CN (22.00) plus VR2DE (07.40) on phone. Contacts made on a.m. from **G2JB** (Grimsby) include VQ1HX, VR2DE, VU2BK, VS9MB and 9N1MM together with several VS1 and 9M2 stations. **G3NBC** received reports from VP3RW (00.08), HI8DGC (23.30), HP1SB (00.40) and CP5EA (21.15).

B.R.S.20317 (Bromley) offers much DX from which samples are VP5VB (19.10), 9M2GA (00.10), ZD1AW (16.30), XZ2TH (16.00), WG6AGI (12.40), I5TUF (19.55), VP9WB (23.50) and FB8CO (15.50). **A.1902** logged VP3MC (21.55), HC5TI (21.40), good for WPX, HR1BE (19.55), EL1D (20.26) and PZ1AR (22.04). **B.R.S.18876** (Birkenhead) received KH6AKE (19.55), KH6CVM (09.45), TG9AZ (20.25), HB1EO/FL (18.25), 4S7NO (19.15) and many others. From Hereford, **B.R.S.22013** reports VP2AB (22.05), VP2LS (22.15), VP3VN (21.29), VQ3GC (17.26) with c.w. from ST2AR (20.59) and ZD2AM (17.16). **A.2099** (Barrow) has heard CR7CK (17.30), ZD1AC (11.30), HH2V (21.10) KP4AUQ (22.00) and VP5ES (20.10). A list sent in by **A.2065** (Hornchurch), includes M1AG (17.34), KR6KM (17.00), HZ1AB (16.55), VE6AAE/SU (16.58), and XZ2SY (17.00). EL1D (16.54), VP5AR (20.25), YV5ANQ (19.17) and UA9KOG (17.20) appear in the phone log of **A.1543** (Leiston). A long report from **A.2273** (Dudley) includes VP7NB (20.56), VP4TO (22.26), VP2GW (22.26), KZ5LO (23.02), VQ5EK (16.47), KG4AO (20.37), FQ8AW (20.50), KH6GF (08.06) and KH6BPF (08.09). A3 DX intercepted by **F.R.S.309** includes KH6HQ (14.05), XE1KQ (12.26), KL7DHP (15.12), HR1CH (14.47), ZP5LZ (12.55), VP2AR (14.39), VP1BS (11.25), VP4JO (14.23) and OA1D (15.10).

Commonwealth Competition

	28 Mc/s	21 Mc/s	14 Mc/s	7 Mc/s	3·5 Mc/s	Total
G3BHW	41	53	48	4	—	146
VE7KX	14	38	29	32	27	140
G3AAE	46	38	42	14	—	140
G8KP	18	32	35	26	18	129
ZD2JKO	27	39	30	22	6	124
G4CP	15	29	41	18	15	118
G5VU	20	27	38	10	9	104
MP4BBW	—	18	54	—	—	72
G8DI	12	11	18	12	18	71
GM2DBX	37	21	8	—	—	66
VO2NA	7	10	24	14	6	61
G2BLA...	14	14	10	10	6	54
G3JSN	14	8	9	10	6	47
G3KHA	13	—	27	—	—	40
G3BRE	—	2	8	8	18	36
G2DCG	7	21	3	—	—	31
G3KSH	7	9	6	4	3	29
G3GMY	12	12	3	—	—	27
G3MCN	10	12	1	—	—	23
G3MGL	8	2	6	4	—	20

Band Leaders

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

	28 Mc/s	21 Mc/s	14 Mc/s	7 Mc/s	3·5 Mc/s	Total
B.R.S.20317	39	58	60	46	30	233
B.R.S.15844	32	45	49	51	28	205
B.R.S.22013	26	54	62	18	6	166
A.1859	40	57	43	4	3	147
B.R.S.21008	36	53	34	4	—	127
B.R.S.22249	31	38	23	14	3	109
B.R.S.2292	25	29	26	18	—	98
A.1902	32	42	19	—	—	93
A.2065	26	30	29	2	3	90
A.1583	23	44	18	—	—	85
A.1792	20	34	24	—	—	78
A.1980	24	31	6	—	—	61
A.1965	12	30	11	2	3	58
B.R.S.18876	4	42	10	—	—	56
B.R.S.21457	—	—	51	—	—	51
A.1946	7	9	12	2	3	33

Band Leaders

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

14 Mc/s

C.W.

G3FPQ keyed with ZK1AK (07.15), XZ2TH (18.00), W3ZA/EP (20.55), HV1CN (09.00) and HK0AA (23.30). **GM3KTZ** (Cambuslang) reports contacts with FG7XG (23.15), UM8KAB (22.40), JT1KAB (22.40), VP5VB (23.00), FQ8HD (20.12), and 7G1A (21.45). **G6XL** (Leeds) raised unusual UA0FF (20.30) and FM7WU (22.00). The 20 watts of **G8LZ** were heard by UD6AP (20.00), UJ8AC (17.58), OY1R (19.30) and UA1KGC (Archangel, 18.10). **G3AAE** gave RST reports to VK0AB (07.00), ZK1AK (07.30), UM8KAA (16.50) and KV4CI (22.00). From the long list of **B.R.S.20317** UL7LA (17.50), VP7NE (00.50), JT1AB (19.24), UPOL8 (13.00) and KR6ZG (17.23) are selected. (All the above are on frequencies between 14,000 and 14,100 kc/s.)

S.S.B.

Obviously this mode is proving popular and the more consistent DX stations have been worked or heard by a number of reporters. Frequencies lie between 14,280 and 14,350 kc/s.

MP4BBW shows the way with CR9AH (14.45), FB8CP (17.31), ZS3ES (17.48), W4HIM/KL7 (18.30), VS4JT/VS5 (17.08), UP2CG (16.24), and UA9CM (18.23). **G8KS** raised several of the above and HB1TL/FL (19.09), 9G1BF (18.53), TF2WAZ (12.50) and VQ4ERR (20.00) whilst **G3FPQ** spoke to W3ZA/EP (17.40) and PZ1AG (21.20).

Amongst the many listener reports several rate highly

This compact layout is the station of Peter Odell, G3MUM, of Redcar, Yorkshire. The equipment includes a Panda Cub transmitter, AR88 and R1155 receivers, a modulation indicator and a Panda aerial tuning unit. Aerials available are dipoles for 7 and 28 Mc/s, a 132 ft. end fed and a vertical whip. Since being licensed in May 1958, G3MUM has had nearly 5,000 QSOs with more than 1,400 different stations.

CONTESTS DIARY

August 27-28	All Asia DX Contest (See page 556, June, 1960)
September 3-4	- European V.H.F. Contest
September 3-4	- National 144 and 420 Mc/s Contests *
September 4	- D/F National Final
September 17-18	- Scandinavian Activity Contest (C.W. Section)
September 24-25	- Scandinavian Activity Contest (Phone Section)
September 25	- Low Power Field Day
October 2	- R.A.E.N. Rally
November 6	- Second 1·8 Mc/s Contest
December 3-4	- R.S.G.B. Telephony Contest R.S.G.B. Telephony Receiving Contest

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

commended, and these include a long list from **A.2273** (Dudley) who mentions WA6GMM/KG6 (16.35), BV1USC (18.30), KH6AW (06.50), HS1B (18.26), VS1JO (16.06), ET2US (18.35) with several from KR6 and KG1. **A.1930** (Thorpe-le-Soken) heard KZ5KQ (22.45), ZS7P (20.45), KH6AWS (07.05) and PJ2AF (21.25). Not previously mentioned, and logged by **A.1918** (Eccles), are KL7CDF (07.11), VQ3GX (18.15), HC1FG (21.45), VQ9TED/MM (19.35), and TI2RC (16.45), whilst **A.1859** adds OD5CT (22.15) and VU2CQ (17.12). **B.R.S.22013** reports 9K2AM (17.33), MP4BDA (ex-MP4QAO) (17.21) and KG6NAB (18.44). **A.2111** (Ilford) found, amongst others, DXpedition LX3EQ, KA5MC (17.40), KH6JEM (06.10), and VE8NA (16.55), with **A.2065** hearing Martin, OY7ML (07.14), and **A.1736** (Corby) logging little reported VS9OA (21.00).

A.M.

To complete the picture on this band **a.m.** reports come from **A.2065**, YN1NJR (06.15), VS1ED (17.00), HI8DGC (07.05) and 3A2CN (18.12); **B.R.S.22795**, HP2JS (05.22), VK0WH (06.00), 3A2BF (05.49), and KL7BJW (21.28). Even **B.R.S.20317** found only KG4AA (22.55), 3A2CA (DL9IJ, 11.35) and TG9TI (22.50) to interest him. However, **G6XL** raised ZL4JF (06.00, '152) for a new one, and heard VR5AS being called.

The Lower Frequencies

Reports are few but **G3FPQ** dug into the third layer to work OX3RH (21.55), OY1AA (22.55), TF5TP (22.25) W2AIS/KV4 (22.50), and YA1BW (20.35), all on c.w. between 7005 and 7035 kc/s. **B.R.S.20317** logged LU7AS (23.10), VP5VB (01.15), the only report of Danny Weil on this band, KP4AQY (23.00), and CO2WU (00.10), whilst **A.1543** offers UA1HH (20.15), LX1DC (10.32), UA3HF (20.42) and other Europeans. **3·5 Mc/s** brings one mention only with **G2BLA** working ZB1FA on 3520 at 22.59 on c.w.

RTTY

From the Newsletter of the **British Amateur Radio Teleprinter Group** we note increasing activity on this mode. G3CQE, G2UK, G3BST, G3KOY and G3IAO are active on 3·5 and 7 Mc/s with G3CQE making DX contacts on 14 Mc/s. VQ6GM may be on RTTY shortly. The newsletter is obtainable from G2UK.

* * *

Acknowledgement is given to the W.G.DX.C. *Bulletin*, the *DX'press* (PA0FX) and MP4BBW for some news items, while A.1792, A.2230, B.R.S.22299 and A.1883 are thanked for reports not previously mentioned. Only a very small proportion of the active transmitting membership is represented in this month's offering. Additional reports will be welcomed, particularly those giving news and information of interest to the DX fraternity. Items should reach R.S.G.B. Headquarters by July 18.

Belgian QSL Bureau

THE address of the U.B.A. QSL Manager (Mr. Robert Empain, ON4QZ) is now, 39 Avenue Legrand, Brussels 5.

Four Metres and Down

Continued from page 32

G3CLW (Bromley, Kent) carried out tests during May with G5YV and it was found that a QSO could be held most evenings with signals varying from 559 to 589. On May 6, a solid contact was made on phone (57). On May 28 G3EHY was worked 579 both ways. G2JF was worked on the same day. On May 28, an opening on the 72 Mc/s band brought a QSO with FA9VN at 55/99 both ways. Another opening was observed on June 6 when FA3JR was worked at 59 on phone. At the same time CN8AM was heard calling CQ and in QSO with other stations on and off for an hour; his signals had to be heard to be believed (59 + 20db)—just like a local. G3EHY was worked again on June 5 at 59 both ways. The latest station worked (No. 34) was G3KZH on June 12, when G5MR and G2JF were again contacted.

G3LTF (Danbury) heard G3EHY (549) on May 29 and later worked G2JF. On June 5 G3EHY was heard at 58/39 and G3CLW and G2JF worked. G3EHY heard G3LTF on June 6 but couldn't make it two-way because of TVI. At 21.00 CN8AM on 72·07 Mc/s and at 21·20 FA9VN (72·48 Mc/s) were heard via sporadic *E* but could not be raised. There were quite a few other sporadic *E* signals on the band at that time. CN8AM was a terrific signal on peaks. However, on June 12 FA9VN was worked (48/3-5/9) at 12.40 G.M.T.

G5MR (Hythe) experienced a good opening on the early evening of June 4 when CN8CK and CN8DO were raised for new ones; CN8MG and FA3JR were worked again and FA8HS and FA9VN were heard. All were on phone and very strong. There have been further openings since but G5MR has been unable to participate.

G3COJ informs us that the Ariel Radio Club (Langham) is now active on 4m under the call-sign G3AYC running 50 watts to an 829B and a rotary dipole. During the contest on June 19, the following were worked: G2AIH, G2DD, G2JF, G3DOR, G3EHY, G3FEX, G3FQS, G3GZM, G3IUL, G3LTF, G5MR, G6NB. G5YV was heard.

PA0GG has been specially licensed to use 70·3-70·4 Mc/s until January 31, 1961, and is looking for contacts with a beam fixed on the U.K. He is located 14 miles west of Amsterdam.

Four Metres

RADIO amateurs living north-west of the line Firth of Lorne to the Moray Firth may now only use the 70·3-70·4 Mc/s portion of the 70·2-70·4 Mc/s band.

Call Book Gifts

CLIF EVANS (K6BX), Box 385, Bonita, California, U.S.A., is arranging a scheme whereby copies of the *Radio Amateur Call Book Magazine* less than two years old will be sent to amateurs in other countries by U.S. amateurs. Names and addresses should be sent direct to K6BX.

V.H.F. QSY

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

Crystals Offered

By G2JM, Baymead, North Petherton, Bridgwater, Somerset. 7473·3 and 9000 kc/s (½ in. pins).

By GW3KYT, 101 Penrhyn Avenue, Rhos-on-Sea, Denbighshire. 12,025 kc/s (B7G) and 12,050 k/cs (miniature 2 pin).

Crystals Required

By G2JM, as above. Crystal for Zone 1 (144–144·1 Mc/s).

By GW3KYT, as above. 12 Mc/s crystal suitable for Zone 7 (12,108 to 12,125 kc/s).

CONTEST NEWS

RESULTS — REPORTS — RULES

D/F Events

THE Rugby Qualifying Event on May 15, 1960, attracted an entry of 21. First to arrive at the transmitter was O. L. Harding (A.E.I. Rugby) at 14.37, followed by E. L. Mollart (B.R.S.10977) of the Oxford society at 14.40 and G. T. Peck (B.R.S.15402) of High Wycombe at 14.41. Several competitors arrived together at 14.46 with more six minutes later. The last competitor found the transmitter at 15.58. The weather was good apart from a few showers.

After tea at the A.E.I. Clubhouse prizes were presented to Messrs. Harding and Mollart by Mr. J. J. Grant, chairman of the Amateur Radio Section of the A.E.I. Rugby Recreation Club. Mr. D. A. Findlay, D.F.C. (G3BZG), representing the R.S.G.B. Contests Committee, and Mr. Peck congratulated the organizers on the success of the event.

There were seven competitors in the South Manchester event held on May 22 when T. C. Reynolds (A.E.I. Rugby) and D. H. Simmonds (Slade Radio) found the hidden transmitter in the remarkable times of 40 and 40·25 minutes respectively. They were followed only five minutes later by P. M. Williams, also of Slade Radio Society. Other competitors took from 70 to 115 minutes to find the station which was 9½ miles by road from the start over a somewhat difficult route. After the event, a party of 25 assembled for tea.

In the fourth D/F Qualifying Event of the season held in the High Wycombe area on May 29, 13 competing parties started from North End Common near Watlington in perfect summer weather. Despite a network of lanes which led in all directions except that in which the entrants wished to go, every competitor successfully located the transmitter well hidden 8½ miles away in a wood near Speen before the end of the afternoon. First to arrive was E. L. Mollart (Oxford) at 14.52, shortly followed by O. L. Harding (Rugby) at 14.59 and J. K. Finch (High Wycombe) at 15.00.

Mr. R. C. Hills (G3HRH), Chairman of the R.S.G.B. Contests Committee was a welcome visitor and in a brief survey of the contest remarked on the encouraging increase this year in the number of competitors who successfully reached the hidden transmitter and congratulated those who took part on their increasing skill.

At the conclusion of the event a party of 45 took tea at the Little Abbey Hotel, Great Missenden when the High Wycombe Challenge Trophy and other prizes kindly donated by Mr. Norman Turner (G4NT) were presented to the winners by Mrs. Hills.

Low Power Contest 1960

THE results of the Low Power Contest held on April 9-10, 1960, were as follows.

Posn.	Call-sign	Points	Contacts	County Areas	Power
1	G6VC	1920	69	27	0·5 watt
2	G5LQ	1520	52	24	0·5 watt
3	G4JW	1129	38	21	0·48 watt & 2·75 watts
4	G3NEO	980	33	16	0·5 watt
5	GW3CBY	840	25	17	0·495 watt
6	G2BLA	740	22	15	0·5 watt
7	G3HFG	618	49	26	4 watts
8	G3EUE	584	34	24	4·7 watts & 0·5 watt
9	G3CGD/P	440	12	10	0·5 watt
10	G2CIL	419	30	18	3·8 watts
11	G2VV	172	12	8	5 watts

A check log from G3BMY is gratefully acknowledged.

R.A.E.N. Notes and News

By E. ARNOLD MATTHEWS (G3FZW) *

TWICE daily at peak high tide periods for several years, selected R.A.E.N. stations between Bridlington and Broadstairs have stood to in readiness for action. At the end of 1959 the route was formally stood down, the original purpose having been superseded in the south-eastern counties.

The route operated very successfully and G2ACD is now to develop it for use as a normal trunk route, and will be contacting controllers to arrange further links. As a future development the existing 160m links will be paralleled by a 2m route covering the same ground.

Some members of the route hold an informal schedule nightly at 17.30 G.M.T. and have been joined on many occasions by R.A.E.N. Committee Chairman, G2UK.

Procedure Booklet

A further supply of the R.A.E.N. Procedure booklet is now available. Members requiring a copy should apply to the Hon. Secretary, R.A.E.N. Committee, enclosing an addressed envelope, size 10 in. × 8 in., with 4½d. stamp.

Around the Groups

Despite the difficulty of running an isolated group, the **Northern Ireland** C.C., GI3BHX continues to enjoy a good response to his activities, and comments that the cessation of exercises at race meetings has, in the long run, done no harm.

The newly-appointed **Lincolnshire** C.C., G2ATS, has introduced himself to the user services and was to meet representatives of various police forces in the county at the end of June. The regular net schedule has been re-established on a county basis, Grimsby group net having continued uninterrupted for some considerable time. It is understood that a preliminary exercise is being organized and an expansion of activity in " the birthplace of R.A.E.N." is confidently expected.

Dorset group, having proved the effectiveness of their net, have reduced schedules to one per week and are now considering a call-out system. G6SV has had some success with 10m portables and G3LSC/P is active on 160m. The C.C., G2HCD, and G3NUN are building mobile rigs. Links with surrounding counties are being set up.

Hampshire group, possibly the most active in the country at the moment, are busy building equipment for use at county police H.Q. The C.C., G3ION, met the Ringwood District Commissioner of St.J.A.B. in mid-June to discuss details of liaison. G3LOK has developed a most interesting 2m receiver, details of which have been circulated in the group.

The formation of a group in **Leeds** is being actively considered. Prospective members are asked to contact M. T. Powell (G3NNO), 28 Gledhow Avenue, Leeds, 8.

Personnel

The following have been appointed acting Area Controllers: A. Roberts (G4OF), " Radiohm," Morton, Gainsborough, Lincs.; M. Savage (G6SV), " Thrae," Compton Valence, near Dorchester, Dorset; D. T. Wyatt (G3LSC), 4 Norman Avenue, Branksome, Poole, Dorset; F. D. Shirreff (G3BGM), Milton Abbey School, Milton Abbas, Blandford, Dorset; F. A. Mayer (G2LZ), Yacht *Rona*, Weymouth Quay, Weymouth, Dorset; J. C. Runge (G2RJ), Bow House, Sherbourne, Dorset; G. S. Cooke (G3BIE), 35 Victoria Grove, Bridport, Dorset; R. H. Jones (G3BRE), No. 1, Coronation Villa, Magdalene Lane, Shaftesbury, Dorset.

* *1 Shortbutts Lane, Lichfield, Staffs.*

Society News

Alternative Address and Mobile Operation New Call-sign Procedure Agreed

AS the outcome of discussions between representatives of the Society and officers of the Radio Services Department of the G.P.O., the Post Office has agreed that U.K. radio amateurs may vary the prefix letters of their call-signs during alternative address and mobile operation to indicate the country or place in which the station is being operated.

The following are examples of how call-signs can be changed, if required, when a station is operated under the " alternative address " provisions of clause 1(1)(a)(iii) of the Amateur (Sound) Licence.

G3XYZ could use GW3XYZ when operating in Wales (including Monmouthshire).

GM3YZX could use GD3YZX when operating in the Isle of Man.

GI3ZXY could use G3ZXY when operating in England.

When a station is being operated at a " temporary alternative address or location " under the provisions of clause 1(1)(a)(ii) of the Amateur (Sound) Licence the suffix /A must be added to the call-sign in accordance with clause 9(1). During transmissions from a temporary alternative address or location particulars of the address or location must be sent as laid down in clause 9(4) of that licence.

The prefix letters of call-signs allotted to mobile stations may be altered if required in the same way as described in the foregoing examples.

Radio Amateurs' Examination and Morse Tests

THE G.P.O. is again arranging to conduct technical examinations and Morse tests for the Amateur (Sound) Licence this year, provided sufficient applications are forthcoming.

The technical examination will take place on Saturday, October 1, 1960, from 2 to 5 p.m., at the following centres:

Armour House, St. Martin's-le-Grand, London, E.C.1.

Radio Surveyor's Office, Ministry of Transport, 2 Bute Place, Cardiff.

Radio Surveyor's Office, Customs House, Dock Place, Leith, Edinburgh 6.

Written applications (no special form is required) to sit the examination accompanied by a remittance for the entrance fee of 25s., must reach the Radio Services Dept., Wireless Telegraphy Section, Union House, St. Martin's-le-Grand, London, E.C.1, ***not later than September 3, 1960.***

Morse Tests will be held at the Head Post Offices in Birmingham, Cambridge, Derby, Leeds and Manchester during the first week in September, provided there are sufficient candidates. Application forms may be obtained from the Radio Services Dept., Radio Branch, Post Office Headquarters Building, St. Martin's-le-Grand, London, E.C.1. Completed application forms, to which the entrance fee of 10s. must be affixed in stamps, must be posted to the Radio Services Dept., Wireless Telegraphy Section, Union House, St. Martin's-le-Grand, London, E.C.1, ***to arrive not later than August 20, 1960.***

CURRENT COMMENT

Current Comment for this issue was contributed by David Ross Macadie, GM6MD. Mr. Macadie has been the Society's Representative for Region 14 (South West Scotland) since 1948. In addition he is the Society's QSL Sub-Manager for Scotland.

Aerial Masts

MEMBERS are advised that the Society is prepared to consider giving assistance to any member whose application for permission to erect an aerial mast has been refused by his local authority. A full record of each case should be sent to Headquarters as soon as the application has been refused.

North of Scotland O.R.M.

THE North of Scotland Official Regional Meeting held in Aberdeen on May 21-22, 1960—the first two-day event held in the city—attracted members from Aberdeen, Banff, Dundee, Edinburgh, Fife, Forfar, Glasgow, Stirling, Thurso and Wick. The Council was represented by Dr. R. L. Smith-Rose, C.B.E., Immediate Past President, Mr. E. G. Ingram (GM6IZ), Zonal Representative, and the General Secretary, Mr. John Clarricoats, O.B.E. (G6CL). Mr. D. A. Findlay, D.F.C. (G3BZG) a Past President, was also present.

The programme included a visit to the Town House, Aberdeen, for a civic welcome by Baillie Burns, representing the Lord Provost and Magistrates, after which members were shown over the Council Chamber and the Town and County Hall with its many art treasures and historic furnishings. Members also visited Robert Gordon's Technical College where Dr. A. M. Hardie (ex-GM5FP) conducted the party on a tour of the new Electrical Engineering building.

At the business meeting held at the Royal Athenaeum Restaurant in the afternoon, Mr. Clarricoats surveyed the Society's activities and described the procedure at international conferences such as that recently held in Geneva. Mr. Clarricoats went on to stress the need for increased membership if the Society is to carry out its work without financial difficulty. (Four new members were enrolled at the meeting.)

Mr. Ingram gave a résumé of activities in Scotland and suggested the revival of inter-city meetings between Aberdeen and Dundee and other centres of activity.

After tea, Mr. R. G. Shears (G8KW) gave a talk on s.s.b. and demonstrated the K. W. Electronics' " Viceroy " transmitter. From the interest shown in the talk, it appears that many Scottish amateurs are keenly interested in this mode of transmission.

Seventy members and friends attended the Dinner in the evening at which the guests included Dr. and Mrs. A. M. Hardie (ex-GM5FP), Mr. and Mrs. J. C. Schlobohm (ex-K6CUM), Mr. D. R. Macadie (GM6MD) and Mr. G. Miller (GM3UM). The toast of " Our Guests " was proposed by Mr. L. Hardie (GM2FHH) to which Mr. D. A. Findlay (G3BZG) replied. Dr. A. M. Hardie proposed a toast to " The Society " and in so doing had his listeners swaying from nostalgia to uproarious laughter at his pithy references to Amateur Radio in days gone by. In his reply, Dr. Smith-Rose recalled some of his own early radio experiments in Aberdeen.

Entertainment was provided by Mr. Skene and his partner with the help of GM3DWX, GM3NFR and GM3NOV. Due to the exceptional generosity of manufacturers all the men present received a gift in the free raffle while every lady was presented with an orchid spray.

On the Sunday, Mr. Schlobohm, Dr. Dyce (K6DSL) and Mr. Dick Winkelman (W6WZD) showed members round the Stanford Research Institute's Auroral Research Station at Fraserburgh.

The meeting was organized by GM3BCL and GM3HTL with the enthusiastic assistance of GM2FHH, GM3EOJ, GM3NXO and GM6IZ.

Top table personalities at the dinner which followed the Aberdeen O.R.M. on May 21, 1960. Left to right, Mrs. GM3BCL, Dr. R. L. Smith-Rose, GM3BCL (R.R. No. 12). G6CL, Mrs. Hardie, GM6IZ, K6CUM, G3BZG, Mrs. GM2FHH.

R.S.G.B. Emblem Car Plaques

DUE to a change of supplier the price of the R.S.G.B. emblem type of car plaque ***with call-sign*** has been increased to 10/6 (post free).

Whilst present stocks last the R.S.G.B. emblem type of car plaque ***without call-sign*** will be offered at 5/–(post free). When new supplies are obtained the price will be increased to 7/6 (post free).

Forces' Licences in Western Germany

MEMBERS of the U.K. and Canadian Forces stationed in Western Germany who wish to obtain transmitting licences should apply to the Secretary, Joint Communications—Electronics Board, British Forces Germany, c/o H.Q., B.A.O.R., B.F.P.O. 40. The Board is empowered to conduct the Morse test for candidates who have passed the Radio Amateurs' Examination.

Congratulations

TO Major-General Eric S. Cole, C.B.E., Director of Telecommunications, War Office, who was created a Commander of the Bath in the recent Birthday Honours List. Eric Cole held the call G2EC after the war, having operated for many years previously as SU1EC. He is a past winner of the B.E.R.U. Senior Contest.

Held Over

DUE to pressure on space, *Letters to the Editor* and a number of other technical and topical features have been held over.

Silent Keys

MISS NINA BARRETT (G3GYL)

We deeply regret to report that Miss Nina Barrett (G3GYL) passed away on June 1, 1960. She had been ill for some time and seemed to be making a satisfactory recovery when suddenly she became much worse and died unexpectedly. Nina was one of our sightless friends and was inspiringly cheerful company; she had an infectious sense of humour and could make excellent conversation on a wide variety of subjects.

At one time Nina had been a telephonist in London, where she was a well-known figure making her way through the busy streets with her guide-dog. In recent years she had taken to a country life where she took up farming and latterly ran her own smallholding and chicken farm. At the time of her death she had given up most of this activity and was living in a small cottage at Sandhurst, Kent. She will be sadly missed by the many friends she had made on the 80m band, and by the members of the radio club to which she belonged. To her relatives our deepest sympathy is extended in their bereavement.

W. E. T.

B. A. BARTON (G2HFB)

It is with deep regret that we record the sudden death of Mr. B. A. Barton (G2HFB) of Boston, Lincolnshire, on June 10, 1960. Mr. Barton's interests in Amateur Radio dated from 1920 and he was a very keen operator especially on 7 Mc/s. He will be particularly missed at local meetings which he had attended since the end of the last war.

Sympathy is extended to his sister at this time.

L. J. C.

Lt-Comdr. MAURICE FITZGERALD, R.N. (G3GUH)

It is with deep regret that we record the death on April 28, 1960, of Lt-Comdr. Maurice Fitzgerald, R.N. (G3GUH), at the early age of 39. He was licensed as G3GUH in 1950 and in 1957 operated as ZB1GUH from Sliema, Malta. A member of the TOPS C.W. Club, he was very active on 7 and 21 Mc/s.

To his widow and two young sons we extend our sympathy in their tragic loss.

D. R. P.

NEILSON J. HANCOCK (G3JNH)

It is with deep regret we have to record the passing in his sleep on June 18, 1960, of N. J. Hancock (G3JNH). Digger, Jack, John or Hank as he was variously known to his very many friends, was only heard on Top Band, as far as his famous whip aerial would get him. A staunch member of R.S.G.B., he was licensed in 1952.

Born in Perth, Western Australia Mr. Hancock was interested in aeronautics from an early age and was associated with Kingsford Smith and others in the formation of Western Australian Airways. He came to England in 1923 to take up an apprenticeship with Bristol Aeroplane Co. He served on the Council of the Royal Aeronautical Society and was chief of A.U.D. of Vickers-Armstrong Ltd., Weybridge, and was looking forward to retiring in 18 months' time.

Digger was always pleased to see anyone in his shack, of which he was so proud, the younger the visitor the better, for he loved young children and was only too pleased to introduce the very junior into the mysteries of radio. He will be sorely and sadly missed by the members of the Guildford and Kingston Radio Societies.

Heartfelt sympathies go out to Mrs. Hancock and his younger daughter Mary at Byfleet, and to his son Bill and daughter Jean, who now live in his homeland of Australia, on their tragic loss.

J. H. R. R.

G. O. D. HARRIS (B.R.S.20239)

We record with sorrow the death on April 12, 1960, of G. O. D. Harris (B.R.S.20239) of Shortlands, Kent, after a long illness, bravely borne. In addition to his interest in radio, Mr. Harris was a keen Territorial and had served in the Artists' Rifles and 3-4th County of London Yeomanry.

To his family, we express our heartfelt sympathy in their bereavement.

JOHN P. O'DONNELL (GM3KRO)

The sudden death on June 7, 1960, of John P. O'Donnell (GM3KRO) at Machrihanish, Argyll, while on a business journey will shock his many friends. An active and much-travelled amateur " Don " was well known in Scotland, England and Ireland by an ever-widening circle of acquaintances. His kindliness, ready wit and helpful actions will be remembered by all of us who mourn his passing.

W. T. S.

STANLEY THAW (G8CD)

The death occurred recently of Stanley Thaw (G8CD) of Huddersfield at the age of 59 years

Sympathies are extended to his relatives and friends. N. P.

WALTER WARNE (G3IHF)

It is with sorrow that we record the death of Walter Warne (G3IHF) of Sandown, Isle of Wight, after a long and painful illness.

To his widow and daughter we express our heartfelt sympathy in their tragic loss. C. H. N.

Forthcoming Events

Details for inclusion in this feature should be sent to the appropriate Regional Representatives. T.R.s and club secretaries are reminded that the information submitted must include the date, time and venue of the meeting and, whenever possible, details of the lecture or other event being arranged. Regional Representatives are requested to set out copy in the style used below.

DATES FOR YOUR DIARY

July 17.—Southern Counties Mobile Rally at the Vintage Car Museum, Beaulieu Abbey, near Southampton.
August 14.—Derby Mobile Rally.
August 24-September 3.—National Radio and Television Show, Earls Court, London.
August 28.—South Manchester Radio Club and Stockport Radio Society Joint Rally.
August 28.—G6UT's "Ham Party."
September 10.—British Amateur Television Club Convention.
September 11.—Region 1 Field Day.
September 15-17.—R.S.G.B. National Convention, Cambridge.
September 18. — Lincoln Hamfest and Mobile Rally.
October 2.—Region 9 O.R.M. at Weymouth.
November 23-26.—R.S.G.B. International Radio Hobbies Exhibition.
December 16.—Annual General Meeting at Over-Seas House, London, S.W.1.

REGION 1

Ainsdale.—Wednesdays, 8 p.m., 37 Hawthorne Grove, Southport.
Blackburn.—Fridays, 8 p.m., West View Hotel, Revidge Road.
Blackpool (B. & F.A.R.S.).—Tuesdays, 8 p.m., Squires Gate Holiday Camp.
Bury (B.R.S.).—August 9 (Brains Trust), 8 p.m., George Hotel, Kay Gardens.
Chester.—Tuesdays, 8 p.m., Y.M.C.A.
Crosby (C.A.R.S.).—Tuesdays, 8.30 p.m., Colonsay, Crosby Road South, Waterloo.
Liverpool (L. & D.A.R.S.).—Tuesdays, 8 p.m., Gladstone Mission Hall, Queens Drive, Stoneycroft.
Macclesfield (M. & D.R.S.).—July 26, August 9, 23, 42 Jordan Gate.
Manchester (M. & D.R.S.).—August 8, September 12, Wellington Hotel, Nicholas Croft, High Street, off Market Street.
Manchester (S.M.R.C.).—Fridays, 7.30 p.m., Ladybarn House, Mauldeth Road, Fallowfield.
Morecambe (M.A.R.S.).—August 3, September 7, 125 Regent Road.
Preston (P.A.R.S.).—August 9, 23, St. Paul's School, Pole Street.
Southport.—Thursdays, 8 p.m., The Esplanade.
Stockport (S.R.S.).—July 20, August 3, 17, 31, The Blossoms Hotel, Buxton Road.
Wirral (W.A.R.S.).—July 15 (Lecture and Demonstration of /M /P Rig, by G2AMV), July 17 (D/F Contest), August 5 (Lecture on 2m by G3BOC), August 19, 7.45 p.m., 4 Hamilton Square, Birkenhead.

REGION 2

Barnsley.—Summer Recess until September 9 (A.G.M.), King George Hotel, Peel Street.
Bradford (B.A.R.S.).—July 26, August 15, 7.30 p.m., Cambridge House, 66 Little Horton Lane, Bradford 5.
Halifax (H. & D.A.R.S.).—July 19, August 2 ("Receivers," by G3NBI), 7.30 p.m., Sportsman Inn, Ogden. August 13, Amateur Radio Demonstration at Halifax Agricultural Show.
Scarborough (S.A.R.S.).—Thursdays, 7.30 p.m., Chapman's Yard, North Street, Scarborough.

REGION 3

Stourbridge.—August 9, 8 p.m., Brotherhood Hall, Scotts Road, Stourbridge. August 12/13, Floral Fête at Mary Stevens Park, Stourbridge.

REGION 4

Derby (D. & D.A.R.S.).—July 20, July 24 (Direction Finding Contest), July 27 (Open Night), August 3 (Surplus Sale), August 10 (Open Night), 7.30 p.m., Room No. 4, 119 Green Lane, Derby, August 16 (Mobile Rally), Rykneld Schools, Derby.
Derby (D.S.W. Exp. S.).—Thursdays, 7.30 p.m., Sundays, 10.30 a.m., Nunsfield House, Boulton Lane, Alvaston, Derby.
Grimsby (A.R.C.).—July 21, August 4, 8 p.m., R.A.F.A. Headquarters, Abbey Drive West, Grimsby.
Leicester (L.R.S.).—Mondays, 7.30 p.m., Club Rooms, Old Hall Farm, Braunstone Lane, Leicester.
Lincoln (L.S.W.C.).—July 27, August 10, 7.30 p.m., Room 19, Technical College, Cathedral Street, Lincoln.
Melton Mowbray (A.R.C.).—Next meeting in September.
Newark (N. & D.A.R.S.).—August 2, 7.15 p.m., Northgate House, Newark, Notts.
Nottingham (A.R.C.).—Tuesdays and Thursdays, 7.30 p.m., Community Centre, Woodthorpe House, Mansfield Road, Sherwood, Nottingham.
Peterborough (P. & D.A.R.S.).—August 5, 7.30 p.m., Peterborough Technical College.
Retford & Worksop (N.N.R.C.).—Tuesdays, Thursdays and Fridays, 7.30 p.m., Victoria Hall, Eastgate, Worksop, Notts.

REGION 6

Cheltenham.—First Thursday in each month, 8 p.m., Great Western Hotel, Clarence Street.
High Wycombe (C.A.R.C.).—July 28 (Talk and Demonstration of High Fidelity Sound Reproduction by D. Chadbourne and F. Carter), 7.30 p.m., British Legion Hall, St. Mary Street, High Wycombe.
Stroud.—Wednesdays, 8 p.m., Subscription Rooms, Stroud.

REGION 7

Acton, Brentford and Chiswick.—July 19 ("S.S.B.," by G6RC), August 16 ("Problem Night"), 7.30 p.m., A.E.U. Rooms, 66 High Road, Chiswick.
Barnet.—July 26 ("Receivers" and the "Ham Vet," by G3KRC), 7.30 p.m., Red Lion Hotel, Barnet.
Bexleyheath (N.K.R.S.).—July 28, August 11, 8 p.m., Congregational Hall, Bexleyheath (nr. Clock Tower).
Croydon (S.R.C.C.).—August 9, 7.30 p.m., "Blacksmiths Arms," South End, Croydon.
Dorking (D. & D.R.S.).—Second and fourth Tuesday each month, 8 p.m., Star and Garter Hotel, Dorking.
Ealing.—Sundays, 11 a.m., ABC Restaurant, Ealing Broadway, W.5.
East Molesey (T.V.A.R.T.S.).—August 3 ("Mystery Evening"), Carnarvon Castle Hotel, Hampton Court.
Enfield and District.—August 25 ("S.S.B., by J. Smith, G3HJF), 7.30 p.m., George Spicer School, Southbury Road, Enfield. (No Meeting in July.)
Guildford (G. & D.R.S.).—Fourth Friday in each month, 7.30 p.m., "The Cannons," Portsmouth Road, Guildford.
Harlow.—Thursdays, 7.30 p.m., rear of G3ERN (G. E. Read), High Street, Harlow.

LONDON MEMBERS' LUNCHEON CLUB

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

at 12.30 p.m. on Fridays, July 15, August 19, September 16 and October 21, 1960.

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

Holloway (G.R.S.).—Closed until September 2.
Ilford.—Thursdays, 8 p.m., 579 High Road, Ilford (nr. Seven Kings Station).
Kingston.—Lectures alternate Thursdays, Theory and Morse Classes weekly, 7.45 p.m., Y.M.C.A. Eden Street, Kingston (Morse at 2, Sunray Avenue, Tolworth).
Mitcham (M. & D.R.S.).—Fridays, 8 p.m., "The Cannons," Madeira Road, Mitcham.
New Cross (C.A.R.S.).—Fridays, 7.30 p.m., Sundays 11.30 a.m. (Audio Section last Tuesday in each month, 7.30 p.m.), 225 New Cross Road, London, S.E.14.
Norwood and South London.—July 26 (Morse Class and Practical Work), August 13 ("Crystal Oscillators," by C. E. Newton, G2FKZ), 8 p.m. Second Saturday and last Tuesday each month, 8 p.m., Windermere House, Westow Street, Crystal Palace.
Romford (R. & D.R.S.).—Tuesdays, 8.15 p.m., R.A.F.A. House, 18 Charlton Road, Romford.
South Kensington (C.S.R.S.).—July 19, August 16, 6 p.m., Science Museum, South Kensington.

REGION 8

Crawley (C.A.R.C.).—July 28 (N.F.D. Inquest), August 11 (Informal), "The Brewery Shades," High Street, Crawley.

REGION 9

Bideford.—First Thursday in each month 7.30 p.m., alternately at G2FKO (T. G. Ward), 38 Clovelly Road (Phone Bideford 964) and G3BO (D. H. Jones), Rosebank, Westcombe (Phone Bideford 550).
Bristol.—July 15 ("Heathkits"—Demonstration by D. V. Newport G3CHW of the latest Heathkits loaned by Daystrom Ltd.), 7.15 p.m., Carwardines Restaurant, Baldwin Street, Bristol 1.
Exeter.—Second Thursday in each month, 8 p.m., Y.M.C.A., St. David's Hill, Exeter.
Falmouth (F.R.C.).—First Wednesday in each month, Y.M.C.A., Falmouth.
Torquay.—Second Saturday in each month, 7.30 p.m., Y.M.C.A., The Castle, Torquay.
Weston-super-Mare.—Second Wednesday in each month, 7.15 p.m., Technical College, Lower Church Road, Weston-super-Mare.
Yeovil (Y.A.R.C.).—Wednesdays, 7.30 p.m., Grove House, Preston Road, Yeovil.

REGION 10

Cardiff.—August 8 ("Use of the DX Bands," by T. Higginson, GW3AHN), 7.30 p.m., Sgts. Mess, T.A. Centre, Cardiff.
Penarth.—July 25 (Debate: Home-built v. Commercial Equipment), 7.30 p.m., R.A.F.A. Club, Windsor Road, Penarth.

REGION 11

Prestatyn (F.R.S.).—July 25 (Top Band D/F Hunt), September 5 ("Co-axial Cable," by J. Goldberg, G3ETH), 7.30 p.m., Ffrith Hotel, Ffrith, Prestatyn. August 14 (Picnic), 2.30 p.m., Central Beach, Prestatyn.

REGION 14

Glasgow.—Second Friday in each month, 7.30 p.m., Woodside Halls, Clarendon Street, N.W. (nr. St. George's Cross Underground).
Prestwick.—Third Sunday in each month, 7.15 p.m., Royal Hotel, Prestwick.

REGION 17

Portsmouth.—Tuesdays, 7.30 p.m., Scarrs, 183A Albert Road.
Southampton.—First Saturday in each month, 7 p.m., Prospect House (back of Gas Board showrooms), Above Bar.

Regional and Club News

Amateur Radio Mobile Society.—At the first A.G.M. held in London on June 18, excellent progress during the society's first year was reported. Membership totals almost 150 in the United Kingdom and several countries overseas. Plans are being made to form a Northern England section. A monthly *Newsletter* is published dealing with mobile operation. The following were elected to the Committee for the year 1960-61: F. J. Barns (G3AGP), N. A. S. Fitch (G3FPK), G. E. Storey (G3HTC), V. A. W. Frisbee (G3KVF), J. A. Steele (G3KZI), E. W. Wardrop (G3MOW), M. Margolis (G3NMR), F. Hooson (G3YF), J. J. Hollington (G4GA) and R. G. Shears (G8KW). *Hon. Secretary:* George Storey (G3HTC), 10 Avon Road, Sunbury-on-Thames, Middlesex.

B.B.C. (Daventry) Club Radio Section.—The club station G5XX is to be opened at 7.30 p.m. on July 27 and will be active on 3·5, 7, 14, 21, 28 and 144 Mc/s. All contacts will be confirmed.

Bradford Amateur Radio Society.—Recent activities have included a lecture on transistors by E. C. Bell, B.Sc., and visits to the Holme Moss TV station and to Broadcasting House, Leeds. Meetings will be held at Cambridge House, 66 Little Horton Lane, Bradford 5, at 7.45 p.m. on July 26, August 16 and September 6. *Hon. Secretary:* M. T. Powell (G3NNO), 28 Gledhow Avenue, Roundhay, Leeds 8.

Bristol.—More than 70 members and visitors were present at the June meeting when the following members gave a description of some of the equipment they have been building recently: B.R.S.19985, B.R.S.21806, G2HFG, G3CHW, G3IFV, G3MTG, G6GN and G6YA. Coloured slides taken by G6YA at last year's Longleat Mobile Rally were screened with an amusing commentary by Vic Newport (G3CHW). The handsome Trophy presented by T. P. Douglas (G3BA) for the annual contest between the Bristol Group and the Midland Amateur Radio Society was on display, having been won by the Bristol Group in the first contest of the series last year. A visit to Burnham Radio has been arranged for Sunday, September 4. *Hon Secretary:* D. F. Davies (G3RQ), 51 Theresa Avenue, Bishopston, Bristol, 7.

Cornish Radio and Television Club.—There was a varied programme at the June meeting including a discussion on aerial masts and rotatable beams, a talk by G3LIS/M and a demonstration of a home-built insulation tester by G3HZV. *Hon. Secretary:* W. J. Gilbert, 7 Poltair Road, Penryn, Cornwall.

Crawley Amateur Radio Club.—On July 28 there will be an inquest on N.F.D. in which the club made a first appearance using the call-signs G3FRV/P and G8FR/P. Plans for next year's event are already being considered. Visitors and prospective members are invited to contact the *Hon. Secretary*: R. G. B. Vaughan (G3FRV), 9 Hawkins Road, Tilgate, Crawley, Sussex. (Crawley 3359.)

Cray Valley Radio Club.—At the June meeting Cliff Leal (G3ISX) was due to lecture on "Aerials for the Amateur."

GB2RS SCHEDULE

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

Frequency	Time	Location of Station
3600 kc/s	9.30 a.m.	South East England
	10 a.m.	Severn Area
	10.30 a.m.	North Midlands
	11 a.m.	North East England
	11.30 a.m.	South West Scotland
145·55 Mc/s	11.15 a.m.	Beaming south-east from Leeds
	11.30 a.m.	Beaming south-west from Leeds
	11.45 a.m.	Beaming north from Leeds
145·3—145·4 Mc/s	12 noon	Beaming north from South East England
	12.15 p.m.	Beaming west from South East England

News items for inclusion in the bulletins should reach Headquarters not later than first post on the Thursday preceding transmission.

Details of future activities may be obtained from Bob Miles (G2NK), 59 Amherst Drive, St. Mary Cray, Kent. (Orpington 27871.)

Enfield and District.—There will be no meeting during July but on August 25 Jim Smith (G3HJF) is to give a talk on single sideband operation. Meetings are held at the George Spicer School, Southbury Road, Enfield. *Area Representative:* John R. Gazeley (B.R.S.20533), 192 Haselbury Road, Edmonton, London, N.9.

Falkirk.—At the meeting in the Temperance Café on July 28 at 7.30 p.m. details of a forthcoming field day will be discussed. Visitors will be most welcome. *Town Representative:* A. A. Grassam (GM3NVT), 5 Bantaskine Gardens, Falkirk.

Grafton Radio Society.—Another successful field day was held on June 18-19 when the club station G3AFT/P had many fine contacts on the h.f. bands while G2CJN/P used phone on the l.f. bands. The weather was excellent and it was pleasing to see all the local amateurs including many mobiles. The society will be closed for the summer recess until September 2. *Hon. Secretary:* A. W. H. Wennell (G2CJN), 145 Uxendon Hill, Wembley Park, Middlesex.

Harrow, Radio Society of.—The society is arranging a display of Amateur Radio gear at the Gayton Fair, Harrow, on July 23. The exhibit will include a fully operational station under the club call G3EFX. A Junk Sale is being held on July 15 and a talk on portable and field day operation will be given by B. Hummerstone (G3HBR) on the 29th. Meetings take place on Fridays at 8 p.m. at Roxeth Manor Secondary School, Eastcote Lane, South Harrow. *Hon. Secretary:* S. C. J. Phillips, 131 Belmont Road, Harrow Weald. (Harrow 3909.)

Liverpool and District Amateur Radio Society.—" Electronics in Hospitals " will be the title of a talk by Stan Hames at the meeting in the Gladstone Hall, Queen's Drive, Liverpool, on July 26. At the Liverpool Show from July 14-16 the society is operating GB2LS on all bands. *Hon. Secretary:* H. James (G3MCN), 448 East Prescot Road, Knotty Ash, Liverpool 14.

Purley and District Radio Club.—At the A.G.M. the following were elected: *Chairman:* F. Jones (G3MWY); *Hon. Treasurer:* R. Knight (G3DPW); *Hon. Secretary:* E. R. Honeywood (G3GKF), 105 Whytecliffe Road, Purley, Surrey; *Committee Members:* J. Buckland (G3JSQ), S. Clarke (G3ODX) and A. Frost (G3FTQ). A club net is held on Sundays at 8 p.m. on 1930 kc/s. On August 12 R. Kennedy will give a talk on radio control.

Royal Air Force Amateur Radio Society.—Wing Commander Alec Gilding (G3KSH) has relinquished the appointment of Vice-President upon his retirement from the R.A.F. and has been succeeded by Wing Commander H. E. Bennett, M.B.E. (G8PF) who is a member of the staff of H.Q. Fighter Command, R.A.F., Bentley Priory. Active Service members who could be available to assist on the R.A.F. stand at the National Radio and Television Show at Earls Court, London, between August 24 and September 3 are asked to contact the *Hon. Secretary* at R.A.F.A.R.S. H.Q. (G8FC), R.A.F., Locking, as soon as possible. The summer 1960 issue of the society's magazine *QRV* has now been sent to all members.

Reading Amateur Radio Club.—At the meeting at the Palmers Hall, West Street, Reading, at 7 p.m. on August 25, the usual Morse practice will be followed by a talk by G3GHE on transmission lines and terminations. *Hon Secretary:* R. J. Nash (G3EJA), " Peacehaven," 9 Holybrook Road, Reading.

Reigate Amateur Transmitting Society.—The society's best score ever was made in the 1960 N.F.D. and at the inquest on June 18 it was decided that effort for the 1961 event should be directed towards better aerial design and improved operating. An informal meeting will be held at " The Tower," Redhill, on July 18 at 7.30 p.m. *Hon. Secretary:* F. D. Thom (G3NKT), 12 Willow Road, Redhill.

Shefford and District Radio Club.—At the meeting in Digswell House at 7.30 p.m. on July 21, Tom Hill will give a lecture entitled " Valve Practice." There will be no meeting on July 29 but on August 4 there will be a talk on the " Gramdec " by P. West. A Morse class will be held on August 11.

Can You Help?

● J. S. Alderton (A.2230), Bank House, 80 Preston Street, Faversham, Kent, who requires details of the conversion of the R107 receiver for 10m and 15m?

Courses of Instruction for the Radio Amateurs' Examination

COURSES of instruction in preparation for the Radio Amateurs' Examination in May 1961 and for those who wish to study radio are being arranged at the undermentioned centres.

Battersea Men's Institute, Latchmere Road, Lavender Hill, Battersea. London, S.W.11. A course for the R.A.E. will be held at the Spencers Park section of the Institute on Wednesdays from 7.30 to 9.30 p.m., commencing September 28. The instructor will be K. R. Piper. The fee for the session will be £1 for students over 21 years of age. Reduced fees are available for pensioners and those under 21.

Carshalton Technical College. A course of instruction for the R.A.E. will be held provided there is sufficient interest. Prospective students should write initially to Mr. R. Jones, 2 Morden Park Cottages, London Road, Morden, Surrey.

Jersey Evening Institute, Jersey, C.I. The States of Jersey Education Committee is arranging a course in preparation for the R.A.E. to commence in late September. The instructor will be E. Banks (GC2CNC). Those wishing to attend should write to the Organizer of Evening Classes, c/o The Director of Education, Education Committee, Library Place, Jersey, C.I.

Northwood Evening Institute, Potter Street, Northwood, Middlesex. The following classes will be held during the session commencing September 19: (i) Radio Amateurs' Examination; (ii) G.P.O. Morse Test; (iii) Elementary Radio Theory and (iv) a more advanced course in Radio Theory. Enrolments will take place on Monday, Tuesday and Wednesday, September 12-14, from 6.30 to 8.30 p.m. Further information may be obtained from G. P. Anderson (G2QY), 16 Warrender Way, Ruislip, Middlesex.

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

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

G2 and DL2 calls:	**G. Verrill (G3IEC), 10 Seahorse Street, Gosport, Hants. (Certificates Manager.)**
G3, 4 and 5 two-letter calls & GC	**E. G. Allen (G3DRN), 65a Melbury Gardens, London, S.W.20.**
G6 calls:	**A. J. Mathews (G6QM), 62 Ashlands Road, Hesters Way Estate, Cheltenham.**
G8 calls:	**A. W. Gover (G4AU), 20A Cambridge Road, Bromley, Kent.**
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	**C. Usher (G2CCD), 24 Carlisle Road, Dartford, Kent.**
G3LAA-MZZ:	**G. C. Voller (G3JUL), 13 Marlborough Road, Ashford, Middlesex.**
G3NAA-OZZ:	**G. Verrill (G3IEC), 10 Seahorse Street, Gosport, Hants.**
GD calls:	**T. R. Moore (GD3ENK), "Glyn Moar," St. John's, Isle of Man.**
GI calls:	**W. H. Martin (GI5HV), "Swallow Lodge," Greenisland, Co. Antrim, Northern Ireland.**
GM calls:	**D. Macadie (GM6MD), 154 Kingsacre Road, Glasgow, S.4.**
GW calls:	**J. L. Reid (GW3ANU), 28 Waterston Road, Gabalfa, Cardiff.**

Envelopes for the *collection* of cards may be sent direct to the Sub-Manager concerned or to the QSL Manager (Mr. A. O. Milne). Outgoing cards should NOT be sent to the Sub-Manager unless they are in the call-sign group for which he holds envelopes. For example, the holder of a G3J- call may send cards for calls in the series G3IAA-G3KZZ to his own Sub-Manager, together with envelopes for the collection of cards, but he should not send to him cards in any other call-sign series. Sending cards for general distribution to the Sub-Managers only involves the cards in delay and the Society in needless expense.

Mr. Milne's address is 29 Kechill Gardens, Bromley, Kent.

The EW97/1, a variable capacitance diode designed for use in parametric amplifiers at frequencies up to S-Band, is now in production by the General Electric Co. Ltd. (Semiconductor Division). The company claims that at £12 10s. 0d., the price is considerably lower than that of imported units. The diode is suitable for use in radar and other communications systems. Designed for high power dissipation, it needs no elaborate precautions against surges. It is mounted in a coaxial structure for direct insertion into coaxial and waveguide circuits and it has the very low series inductance of 0·5 μH. Because of its very low forward impedance and very high reverse impedance, the device can be used as a microwave switch.

The new Signal Generator Model 61A manufactured by Taylor Electrical Instruments Ltd., Montrose Avenue, Slough, is intended mainly for the servicing of a.m. and f.m. high frequency receivers and the intercarrier i.f. stages of television receivers. In conjunction with an oscilloscope, provision is made for the sweep alignment of the r.f., i.f. and discriminator or ratio detector stages of a.m. and f.m. receivers.

A compact display unit showing a representative selection of the firm's products is available on loan to R.S.G.B. Groups and Affiliated Societies from the Sales Promotion Service, Mullard Ltd., Mullard House, Torrington Place, London, W.C.1.

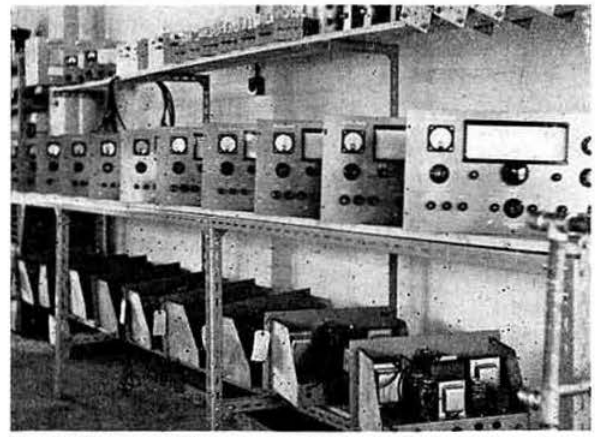
Miniature magnetic earphones and insets are described in a new pamphlet available from Amplivox Ltd., Beresford Avenue, Wembley, Middlesex.

Details of a new range of **miniature jack plugs**, sockets and cable connectors are given in a leaflet issued by Rendar Instruments Ltd., Victoria Road, Burgess Hill, Sussex.

R.C.A. Great Britain Ltd. of Sunbury-on-Thames has recently announced the **6L6GC, a high perveance beam power valve**, a pair of which will deliver 55 watts output under class AB1 conditions.

The CR144D is a **13-valve double-conversion superhet** communications receiver for the reception of a.m. and c.w. signals in the 2m band. Special versions are available for other frequency bands in the 100 to 200 Mc/s range. Full details are obtainable from R.E.E. Telecommunications Ltd., Telecomm Works, Market Square, Crewkerne, Somerset.

A **three-band quad aerial kit** for 14, 21 and 28 Mc/s is now being marketed by Labgear Ltd., Willow Place, Cambridge. When assembled, the aerial comprises three separate quad arrays mounted concentrically on one assembly. Each driven element is fed with a separate 75 ohm coaxial cable. A forward gain of 9db and 30db back-to-front ratio on each band is claimed.



"Viceroy" s.s.b. transmitters awaiting final alignment and test at the Dartford factory of K.W. Electronics Ltd.

For Your Bookshelf and Shack

R.S.G.B. PUBLICATIONS

A Guide to Amateur Radio (Eighth Edition)
Price 3/6 (by post 4/-)

R.S.G.B. Amateur Radio Call Book (1960 Edition)
Price 3/6 (by post 4/-)

The Morse Code for Radio Amateurs
Price 1/- (by post 1/4)

★ ★ ★

Valve Technique - **Price 1/6 (by post 1/10)**
V.H.F. Technique - **Price 1/- (by post 1/3)**

The two booklets may be purchased for 2/6 (post paid)

AMERICAN PUBLICATIONS

Orders for the following American publications which are usually available from stock can only be accepted from residents in the United Kingdom and British Commonwealth. Prices quoted include cost of postage and packing.

Radio Amateur's Handbook, 1960 (*A.R.R.L.*)	34/-
CQ Sideband Handbook (*Cowan*)	25/-
Mobile Manual for Radio Amateurs (*A.R.R.L.*)	24/6
CQ Mobile Handbook (*Cowan*)	24/-
Antenna Book, 8th Edition (*A.R.R.L.*)	19/-
Television Interference—Its Causes and Cures (*Nelson Publishing Co.*)	16/-
CQ Anthology (*Cowan*)	16/-
Single Sideband for the Amateur (*A.R.R.L.*)	14/-
Hints and Kinks, Volume V (*A.R.R.L.*)	10/-
Course in Radio Fundamentals	10/-
How to Become a Radio Amateur (*A.R.R.L.*)	4/6
Learning the Radiotelegraph Code (*A.R.R.L.*)	4/6
QST (*A.R.R.L.*) Published monthly - (p.a.)	43/6
CQ (*Cowan*) Published monthly - (p.a.)	44/-

Prices for American publications are subject to alteration without notice.

R.S.G.B. MEMBERS ONLY

Society Tie (all silk)	16/6
Blazer Badge	7/-
Car Badge (R.S.G.B. Emblem)	5/-
Car Badge (R.S.G.B. Emblem with call-sign) (5 characters)†	10/6
Car Badge (De Luxe type with call-sign)†	17/6
(Postage on overseas orders 5/6 extra)	
Call-sign Lapel Badges (5 characters)†	6/-
Rubber Stamp (R.S.G.B. Emblem)	11/-
Stereo Block (R.S.G.B. Emblem)	8/-
Miniature Pennants (R.S.G.B.) 12" long for car	7/9
Headed Notepaper (R.S.G.B.) per 100 sheets (Large)	7/9
(Small)	6/-

† *Delivery 3-5 weeks.*

MISCELLANEOUS ITEMS

Aveley Radio Tape Measure	6/-
Short Wave Receivers for the Beginner (*Data Publications*)	6/-
Wireless World Valve Data (*Iliffe*)	6/-
Webbs' Log Book	5/-
Quality Amplifiers (*Data Publications*)	5/-
Radio Amateur Operator's Handbook (*Data Publications*)	4/-
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