THE T. & R.

BULLETIN

THE INC. RADIO SOCIETY OF GT. BRITAIN

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Vol. 11 No. 3 SEPTEMBER, 1935 (Copyright) Price 1/6

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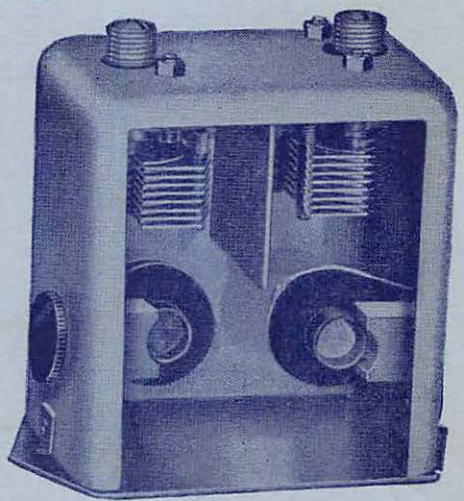

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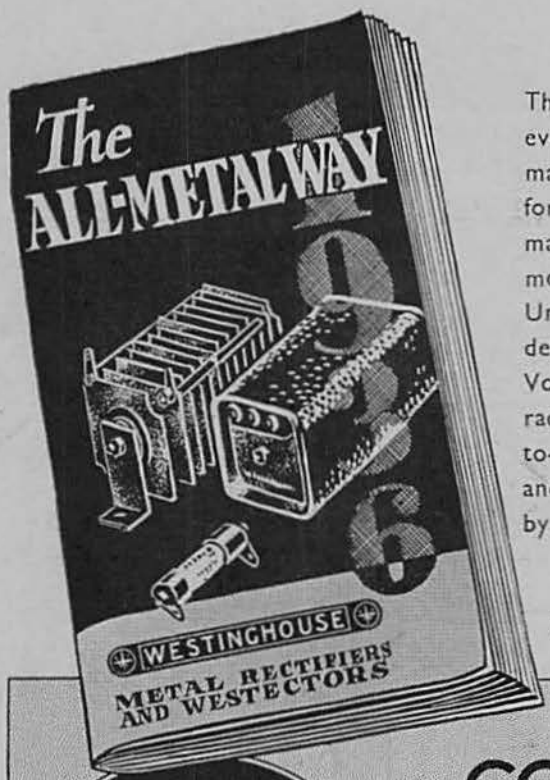

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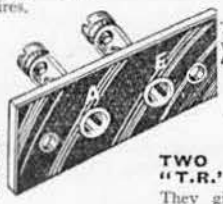

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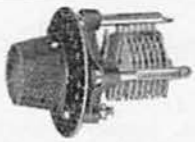

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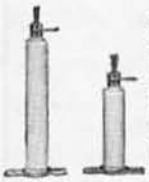

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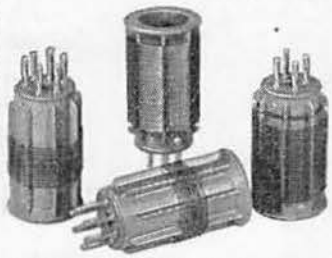

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Vol. 11

No. 3

COMMERCIAL ACTIVITY CHECKS

THOSE who were present at the Convention business meeting were informed of the plans being made by the I.A.R.U. to check the amount of commercial activity which is taking place in the frequency channels adjacent to our 7 mc. band.

It will, perhaps, be remembered that the original suggestion in this connection was made by the R.S.G.B. last November, and since then it has been followed up by the I.A.R.U., who have now appealed to all Member Societies of the Union to begin checks.

The purpose of the checks will be to provide the I.A.R.U. delegation to Cairo with authentic information regarding the number of commercial stations which are being operated in the frequency channels between 6,700-7,000 and 7,300-7,600 kilocycles. The I.A.R.U. Headquarters have prepared from the Berne List a complete list of registered commercial stations authorised to work in the above channels. From this list, which runs to many pages of typescript, it is noted that no less than 410 commercials are registered between 6,700 and 7,000 kc/s. It is our firm belief that only a small percentage of these stations are actually operating in this 300 kc/s channel, whereas we know from our own Band Occupancy figures that over 500 *British amateurs* alone are making good use of the next 300 kc/s in the upward frequency direction.

The condition mentioned above applies equally well to the high frequency side of 7 mc/s, and in view of this it is our intention to endeavour to prove that our allocations are insufficient for our growing needs. Authentic figures based on a world check seem to us to be the only logical way of proving our case.

A further point of interest is to be found in comparing the percentage of amateur allocations (measured in frequency) against the total frequency coverage between 1.5 and 60 mc/s. The amateurs of the world have 285 kc/s around 1.7 mc/s, 500 kc/s around 3.5 mc/s, 300 kc/s around 7 mc/s, 400 kc/s around 14 mc/s, 2,000 kc/s around 28 mc/s, and 4,000 kc/s around 56 mc/s—a grand total of 7,485 kilocycles out of 58,500 kilocycles, or roughly 14 per cent. In our six bands it is safe to assume that at least 10,000 amateurs are regularly active. On this basis there should be 60,000 commercials active in the remaining 86 per cent. of the spectrum. If there are 6,000 we shall be surprised.

The primary purpose of this Editorial is to appeal to our members to assist us in the task of compiling data in preparation for Cairo. We require a group of checking stations who will co-operate with an honorary organiser. These members will be required to take observations at defined intervals, and to forward to the organiser a summary of their results once a month or more frequently as requested. Already we have received offers of help from several members

(*Continued on page* 120.)

A STUDY OF AMATEUR RECEIVER REQUIREMENTS

By G. G. Samson, B.E. (ZL4AI).

THIS article will appear in two parts, the first covering a short study of the band congestion problem followed by a theoretical discussion on the types of selectivity curves obtainable with modern receiving equipment.

Part 2 will contain a complete analysis of the modern superheterodyne receiver, with suggested solutions for overcoming the problems introduced by the use of such receivers.

PART 1

Every amateur will agree that our present bands are very crowded. This is especially the case with 7 mc. and, as it is upon this band that the widest range of signal intensities is met, this article will concentrate on solving the problem of 7 mc. operation. If this is obtained, then satisfactory operating conditions will be obtained on the other amateur bands by using the same type of apparatus.

In order to minimise overcrowding in this band, it is necessary to obtain as large a number of useful channels as possible. The type of transmitter used by the majority of R.S.G.B. members is a multi-stage affair the frequency of which is controlled by a quartz crystal. Such a transmitter, if unmodulated, emits what is comparatively a pure signal of one frequency only at any instant, but, over an interval of time, the frequency varies slightly and such a station requires, on the average, a channel of about 500 cycles for satisfactory operation. This gives a possibility of 600 channels in the 7 mc. band. If the transmitter's stability can be increased, then obviously more channels will be available. Many high-class commercial stations maintain a stability of 15 parts in 1,000,000, which is equivalent to a channel of 100 cycles on 7 mc.

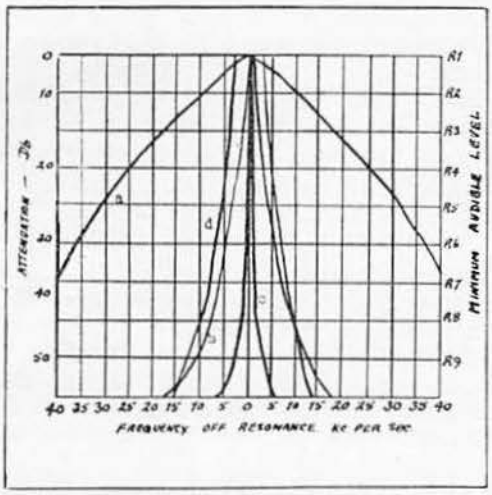

Fig. 1.—R.F. Selectivity Curves. Curve (a) shows the performance of a 1-v-1 receiver. Curve (b) shows a modern broadcast superheterodyne receiver. Curve (c) shows a modern amateur superheterodyne receiver fitted with a crystal I.F. filter. Curve (d) shows a broadcast receiver fitted with a good I.F. "band pass" filter —note the comparatively uniform selectivity for varying signal intensities.

Now that crystals having a zero temperature coefficient are procurable, it is highly probable that the high-grade amateur transmitter of the future will reach this figure. This means that, as far as the transmitter is concerned, the 7 mc. band contains a possible 3,000 channels.

At the present time there are approximately 20,000 amateurs who, at some time, use the 7 mc. band. Except during contests, however, more than 600 stations are rarely heard in one country at any instant, and so fairly satisfactory operating conditions will be obtained, if a receiver having a total signal coverage of 500 cycles for any strength of pure signal can be constructed. Of course, QRM will still be experienced if more than one station is occupying the same channel at the same time, and, what is worse, many amateur signals at present occupy more than one channel.

Receiver Selectivity.

Receiver selectivity may be divided into three classes: (1) Radio frequency selectivity; (2) audio frequency selectivity; and (3) aural selectivity, *i.e.*, the ability of the ear to separate notes of different frequency even though they may be of the same intensity. In this discussion no allowance will be made for aural selectivity.

Audio frequency selectivity can be used to improve the slope of the radio frequency selectivity curve of a receiver; but a high degree of selectivity cannot be obtained by the use of audio frequency selectivity, unless it is preceded by high radio frequency selectivity. Audio frequency selectivity will not be dealt with until the full possibilities of radio frequency are exhausted.

Radio Frequency Selectivity.

In attaining a high degree of R.F. selectivity, the superheterodyne type of receiver stands alone.

All amateurs will be familiar with the explanation of the superheterodyne's superior selectivity. For amateur work, however, the greatest advantage of this type of receiver is that the majority of the R.F. gain takes place in the I.F. amplifier.

It is therefore possible, by the use of suitable filter circuits in the I.F. input, to obtain the bulk of the R.F. selectivity before R.F. amplification takes place. This means that, even if the I.F. or second detector valves do overload on local signals, very little loss of selectivity results.

The 1-v-1 type of receiver, however, had most of its R.F. gain before maximum selectivity was attained. The regenerative detector in which most of the selectivity was obtained was therefore easily overloaded by even moderately bad signals, and the receiver's selectivity ruined.

In Fig. 1 the R.F. selectivity curves are shown for four different receivers: (a) shows the performance of a 1-v-1 receiver, (b) a superheterodyne receiver with two stages of I.F. amplification, (c) receiver (b) fitted with a quartz crystal filter to the I.F. input, and (d) a broadcast superheterodyne with three I.F. stages fitted with "band-pass" filters.

One glance at these curves should be sufficient to convince even the "diehards" that the proper place for the 1-v-1 receiver is the Science Museum!

The curves in Fig. 1 show " attenuation in db/s " plotted against " Frequency off Resonance." The R divisions at the right do not indicate signal intensity but represent the minimum audible level for signals of different signal intensities. Thus, the selectivity curve of any of the illustrated receivers for, say, an R3 signal would consist of the part of the curve above the R3 line.

A comparison of the selectivity of these receivers for different signal intensities is interesting.

With receiver (b) the total signal coverage for an R2 signal is 4 kc., while for an R9 signal it is 18 kc.

Now consider curve (d). On an R2 signal the total coverage is 10 kc., while on an R9 signal it is 20 kc.

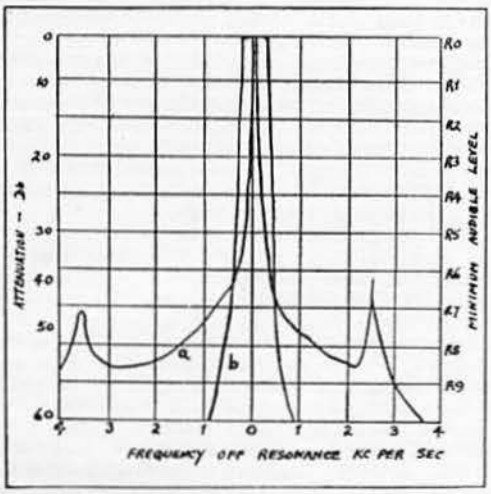

Fig. 2.—R.F. Selectivity Curves. Curve (a) shows the maximum selectivity obtainable with a quartz crystal filter. Curve (b) shows the theoretical curve for a super-heterodyne receiver using the 500 cycle " band pass " I.F. system suggested in the text. Note the practically uniform selectivity for all strengths of signals. This is the ideal towards which amateur receiver design should always aim.

That is to say, with a sharply-peaked curve as per (b) the selectivity on an R2 signal is 4½ times the selectivity on an R9 signal, while for a flat-topped curve such as (d) the selectivity on an R2 signal is only twice that on an R9 signal.

Although curve (d) gives a more uniform selectivity for different signal intensities, a study of Fig. 1 seems to indicate that the peaked curve (b) is of more use for C.W. reception, since the average selectivity is higher than curve (d). These curves, however, were obtained from broadcast receivers. In such receivers the problem is to receive a band of frequencies (about 20 kc. wide) with as little attenuation as possible, and at the same time eliminate interference from powerful stations in the neighbouring channels. Curves (b) and (d) give approximately the same selectivity for loud signals, but curve (b) causes considerable attenuation of the higher audio frequencies. For broadcast reception, therefore, curve (d) is greatly superior to curve (b).

The amateur problem is similar to the broadcast problem ; but the amateur channel is only 500 cycles instead of 20 kc. The ideal amateur receiver should, therefore, have a uniform response 250 cycles each side of signal mean frequency with as sharp a cut-off as possible after this value is reached.

The most selective amateur receivers of the present day obtain the majority of their selectivity by means of a crystal filter in the I.F. input. The addition of such a filter to a receiver having a curve like (b) in Fig. 1, gives a receiver with a selectivity curve similar to (c) (Fig. 1). This curve is drawn to a larger scale in Fig. 2, curve (a). It will be noticed that the R divisions in Fig. 2 differ from those of Fig 1. The reason for this is that the introduction of the crystal filter increases the signal to background ratio, so that a lower minimum signal audibility is obtained, *e.g.*, for the " straight " superheterodyne (curve (b), Fig. 1) an R9 signal requires a drop of 50 db/s to bring it to minimum audibility, whereas with the crystal filter an R9 signal requires a drop of approximately 56 db/s to reach minimum level. The R scale for such a receiver is therefore R0 to R9 instead of R1 to R9.

A study of (a) (Fig. 2) shows that an R9 signal occupies 6½ kc., while an R2 signal occupies only approximately 200 cycles. The selectivity of this receiver is therefor 37 times greater for an R2 signal than it is for an R9 signal. The reason for the comparatively poor selectivity on loud signals is clearly shown in the figure. All quartz crystals have small subsidiary peaks on each side of the main resonance peak. For all signals weaker than about R7 this effect may be disregarded, but on loud local signals it is very pronounced and consequently, although the use of a crystal filter gives a large increase in selectivity for weak signals (20 times greater than a superheterodyne without filter) the gain in selectivity on loud signals due to the filter is comparatively small (about three times).

Curve (a) (Fig. 2) shows the greatest selectivity it is possible to obtain with a quartz filter. To obtain this curve the resistance in the crystal circuit must be reduced to a minimum. This produces very little damping in the circuit, so that, if the circuit is set in oscillation by an incoming signal, after the exciting impulse ceases, the oscillations will take an appreciable time to be damped out. For C.W. work this means that a " tail " appears on every dot and dash, and the signal is readable only at very slow speeds.

To overcome this difficulty the resistance of the crystal circuit must be increased. This, of course, decreases the selectivity of the receiver. Fig. 3 shows the selectivity curve published by Lamb (*Q.S.T.*, August, 1932) for his " Single-Signal " receiver. This curve shows the practical selectivity limit of a crystal-filter superheterodyne receiver, if clean high-speed keying is to be received. With this curve an R2 signal occupies 400 cycles, compared with 200 cycles for (a) (Fig. 2). Now it has been stated previously that a *good* amateur station requires a channel of about 500 cycles. The selectivity of curve 3 is therefore slightly greater than desirable for the reception of R2 signals, but, with such selectivity, such a signal can be received with difficulty. With the selectivity curve of Fig. 2 (a), however, the reception of R2 signals is practically impossible. The amateur selectivity problem is usually that of separating a weak signal from a loud interfering signal. Figs. 2 (a) and 3 show approximately the same signal coverage for R9 signals, and in each case an R2 signal must be

2 kc. from an R9 signal to avoid interference. Thus, as far as operating conditions are concerned, the necessity of reducing the selectivity has been a blessing in disguise.

Audio Selectivity.

While the R.F. selectivity obtainable with a quartz crystal filter is quite satisfactory for signals up to about R4 or R5, for R9 signals it is comparatively poor, largely due to the secondary peaks of the crystal. The selectivity on loud signals, however, may be increased considerably by the use of audio frequency filters. As no further selectivity is desired on weak signals, the use of 1,000-cycle rejector circuits is not satisfactory, since such systems give a sharply peaked audio response. A suitable audio filter would be a " low-pass " filter with a sharp cut-off at, say, 1,250 cycles. The dotted curve (b) in Fig. 3 shows the improved selectivity obtained with such a filter. It will be noticed that the effect of the secondary crystal peaks has been eliminated and the signal coverage for an R9 signal is now 3 kc. instead of 6½ kc.—a decided improvement. Half of this 3 kc. is occupied by the audio frequency image. The interference caused by this image, to signals R3 or louder, is negligible, and so for average operating conditions an R9 signal may be considered as occupying about 1,300 cycles. This is quite a satisfactory degree of selectivity, and for signals up to R9 in strength a receiver of this type would give excellent results.

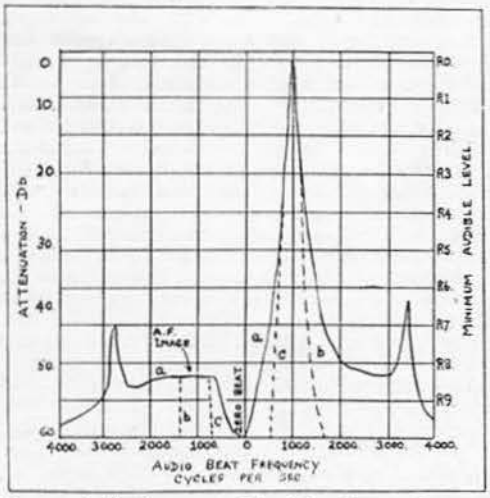

Fig. 3.—Audio-frequency Selectivity Curve of average single-signal receiver. Curve (b) shows the effect of adding " low pass " A.F. filter with a sharp cut off at 1,250 cycles per second. Curve (c) shows the effect of adding a " high pass " A.F. filter with a sharp cut-off at 750 cycles per second. A " band pass " A.F. filter will give the combined effects of curves (b) and (c).

Selectivity with Overloading Signals.

Unfortunately, however, the amateur's main problem is not separating R3 signals from R9 signals, but avoiding interference from powerful local signals. It has been shown that an R9 signal requires a drop of about 56 dbs to bring it to minimum audible level with a modern crystal-filter superheterodyne receiver. A signal of slightly greater intensity, requiring a drop of, say, 60 db/s to bring it to minimum level, will overload the receiver (either the second I.F. valve or the second detector will overload)

An R9 signal may be received from a station 300 odd miles away. What then will be the intensity of the signal received from a local station a quarter of a mile away? Roughly, one million times greater than an R9 signal, i.e., 60 db/s up on R9. Fig. 4 shows the curve of Fig. 3 reproduced with an extended attenuation scale to show the receiver selectivity for neighbouring local signals. In this case minimum audible level is shown as 116 db/s down. For such a signal a drop of 56 db/s (R9 line) is sufficient only to bring the receiver to the point of overloading, another drop of 60 db/s being necessary to bring the signal to minimum audible level. That is to say, the receiver overloads over a band of 7.5 kc. (the intercept on line R9). The dotted curve (b), as before, shows the curve for a good audio frequency filter. During the period the receiver is overloaded, the audio filter can serve no useful purpose; but immediately overloading ceases its effect is noticed, the selectivity curve dropping vertically from this point until the audio filter curve (b) is met. This is clearly shown in Fig. 4, the shaded area representing the performance of the receiver with such a filter.

If no audio filter is used the selectivity curve will be (a) (Fig. 4). At first sight this does not seem a reasonable continuation of curve (a), Fig. 3, but in drawing this curve aural selectivity was taken into account. That is to say, the average human ear does not respond to frequencies above about 15,000 cycles per second, and so the curve was drawn giving minimum audibility 15 kc. each side of zero beat. The actual R.F. selectivity curve covers a much wider band, as shown by the dotted curve (c); but to the ear the signal occupies only 30 kc. Thus, the use of an audio filter reduces the signal coverage of such local signals by 20 kc.—a saving of 40 valuable channels.

Powerful local signals, however, introduce another problem. The foregoing has assumed reception of signals entirely free from modulation of any description. Most amateur signals, however, have a slight amount of modulation (usually 100 or 120 cycles per second). If the signal is R9 in strength, this modulation is not very noticeable. A quartz crystal filter has also the property of " ironing out " any such modulation so that for an R9 signal even a moderate amount of such low-frequency modulation causes no trouble. With a powerful local station, however, this modulation, even after passing through the crystal filter, is appreciable, and may even be of strength R9. Under such conditions, while the selectivity curve for the audio beat will still be curve (a) or curve (b) (Fig. 4), the modulation will follow curve (c) (the true R.F. selectivity curve). There will therefore be a fringe of modulation as shown by curve (d). As the audio frequency filter is a " low-pass " filter, it cannot reduce this effect, and so the presence of such modulation greatly reduces the advantage obtained by the use of an audio filter of the type described.

If, however, a " band-pass " audio filter is used, this modulation may be eliminated, and in addition a gain in selectivity on R9 signals obtained. A suitable filter could have a " band-pass " of 500 cycles per second, with sharp cut-offs at 750 and 1,250 cycles per second. The gain in selectivity on R9 signals is shown by curve (c) (Fig. 3). With

such an audio filter minimum signal coverages of 0.4 kc. for R2 signals, 1 kc. for R8 signals and 10 kc. for a neighbouring local signal are obtained.

These figures give the maximum performance of a good " Single-Signal " receiver of the crystal filter type. It is interesting to consider how many channels such a receiver makes available to the amateur.

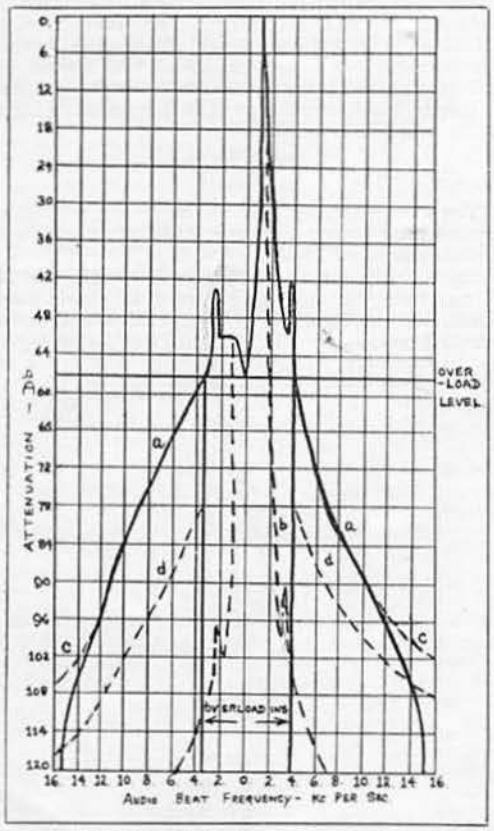

Fig. 4.—A.F. Selectivity Curve for loud overloading local signals. Curve (a) shows the aural selectivity curve without audio filter. Curve (b) shows the curve for a " low pass " A.F. filter with a sharp cut-off at 1,250 cycles per second. The shaded area shows the actual performance of the receiver when fitted with such a filter. Curve (c) shows the actual A.F. curve of the receiver (not audible because the ear cannot respond to such frequencies). Curve (d) shows the effect of low frequency modulation on the signal being received. When a " band pass " A.F. filter is used, this modulation fringe is eliminated.

The following is a typical example of what may be expected, although the figures will vary widely for different locations :—

SUMMER CONDITIONS : 7 MC. BAND.

Four local stations within ½ mile (10 kc. each), 40 kc. ;
Four local stations within 3 miles (5 kc. each), 20 kc. ;
Thirty stations within 2,000 miles (R9) (2 kc. each), 60 kc. ;
Five unstable self-excited stations (10 to 20 kc. each), 75 kc. ;
Giving 43 loud stations occupying 195 kc.

This leaves 105 kc. for all other stations, the average occupancy of which is .75 kc., thus giving 140 channels for such stations, and a grand total of 183 channels for the 7 mc. band.

It will be immediately noticed that five amateurs use unstable transmissions occupying a total of 75 kc. If these signals were crystal controlled, they would occupy **only** 10 kc. By the use of such transmissions they therefore deprive their fellow-amateurs of the use of 87 valuable channels (.75 kc. wide).

A large part of the remainder of the band is occupied by local and semi-local signals. In many parts of the world local interference will not be as bad as that shown by the above figures. These figures were taken in New Zealand, which has probably the highest amateur activity of any country in the world, being five amateurs per 10,000 head of population, compared with two for the U.S.A., 1½ for Australia and 0.3 for the British Isles. It is hardly likely, therefore, that local interference in any part of the northern hemisphere will equal that in New Zealand cities. In some countries, however, semi-local activity will be much higher than in New Zealand and Australia, but it should be remembered that in the northern hemisphere 7 mc. activity is confined mostly to the winter months, and consequently, due to " skip," most of these stations are inaudible, while in the southern hemisphere, where greatest activity takes place during the summer months, practically all such stations are of strength R9.

A receiver that solves the New Zealand (and Australian) problem should, therefore, be suitable for all parts of the amateur world.

It has been shown that the selectivity of a receiver on local signals is limited by the band of frequencies over which it overloads. A gain in local selectivity can be obtained only by increasing the R.F. selectivity so that this overloading band is reduced.

This, however, cannot be done by the use of a quartz crystal filter, or any other method giving a sharply-peaked resonance curve, without increasing the selectivity on weak signals to such an extent that such signals cannot be received.

This seems to indicate that the quartz crystal filter is by no means the ideal method of obtaining satisfactory R.F. selectivity.

I.F. " Band-Pass " Filters.

In order to overcome side-band cutting and at the same time obtain a high degree of selectivity, designers of broadcast receivers have turned to the I.F. " Band-Pass " filter for a solution of their problems.

Owing to the relatively uniform selectivity of these filters, it seems reasonable that a satisfactory solution of the amateur problem may be obtained by similar means.

Curve (b), Fig. 2, shows a suggested theoretical curve for such a receiver. On this (theoretical) receiver an R2 signal occupies 500 cycles, and an R9 signal occupies only 1 kc. This receiver would then overload for only 1 kc., and so, by the use of a satisfactory audio " Band-Pass " filter, an overloading local signal would occupy only a little over 1 kc., a considerable improvement over the 10 kc. of the crystal-filter receiver.

The designers of the present-day amateur " Single-Signal " receiver started with the most

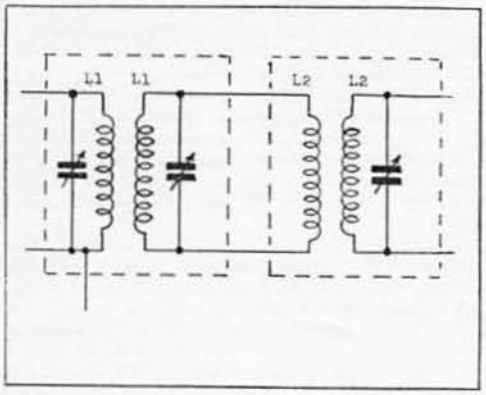

Fig. 5.—Band-pass I.F. Coupler.

selective type of broadcast receiver (curve (b), Fig. 1), and obtained further selectivity by the simple process of adding a crystal filter.

The design of an amateur " Band-Pass " receiver is not so simple ; but the above example may be taken and a start made with the present " Band-Pass " broadcast receiver. If the " Band-Pass " of the receiver giving curve (d), Fig. 1, is changed to 500 cycles, an R9 signal will occupy approximately 10 kc., a figure very nearly as good as that obtained with the crystal filter. In this receiver the " Band-Pass " is obtained by the use of special I.F. inter-valve coupling devices, as shown in Fig. 5. As the receiver uses three stages of I.F. amplification, there are four of these units. In order to obtain the selectivity required by the amateur, it would be necessary to add a " Band-Pass " filter consisting of three or four more such units. This would mean an I.F. system consisting of 28 or 32 tuned inductances, which would be very unwieldy and exceedingly difficult to adjust.

The Combined " Band-Pass " and Crystal I.F. Filter.

A compromise can be effected by obtaining the majority of the R.F. selectivity by means of a crystal filter, and then obtain further selectivity on local signals by means of the " Band-Pass " I.F. amplifier. In Fig. 3 it was shown how the selectivity curve of a receiver could be improved by the use of an audio " Band-Pass " filter. Unfortunately, such a filter is of little use, if the receiver overloads before detection takes place. If, however, an I.F. " Band-Pass " filter is used, this selectivity is obtained before overloading takes place, and so the selectivity will be greatly increased on overloading local signals. Fig. 6 shows the curve for a receiver using a quartz crystal filter, followed by a three-stage " Band-Pass " I.F. amplifier.

This is similar to Fig. 3, but it will be noticed that the attenuation on loud signals is increased considerably without, however, altering the attenuation on weak signals. Comparing this curve with Fig. 4, it is found that the receiver now overloads for only $1\frac{1}{2}$ kc., compared with the previous $6\frac{3}{4}$ kc. for powerful local signals. This means that full use can now be made of audio frequency filtering. With such a filter (as used in Fig. 4) a loud local signal may be reduced to an occupancy of $4\frac{1}{2}$ to 5 kc.

The above receiver, however, has one great disadvantage : it is very hard to keep the I.F. amplifier lined to the crystal frequency. To a certain extent this is a disadvantage of all receivers using crystal filters, for the reason that the majority of crystals are affected considerably by changes in temperature and humidity. For best results, therefore, the crystal should have the lowest procurable temperature coefficient and should be mounted preferably in a vacuum (as in the original "Stenode") or in some type of holder maintaining a fairly constant humidity.

Summary.

The above discussion has shown that, while the crystal filter gives a simple method of obtaining a high degree of selectivity on weak signals, it gives a comparatively poor selectivity on loud signals. It has been shown that, in order to obtain high selectivity on loud signals, expensive and complicated audio and I.F. " Band-Pass " filtering is

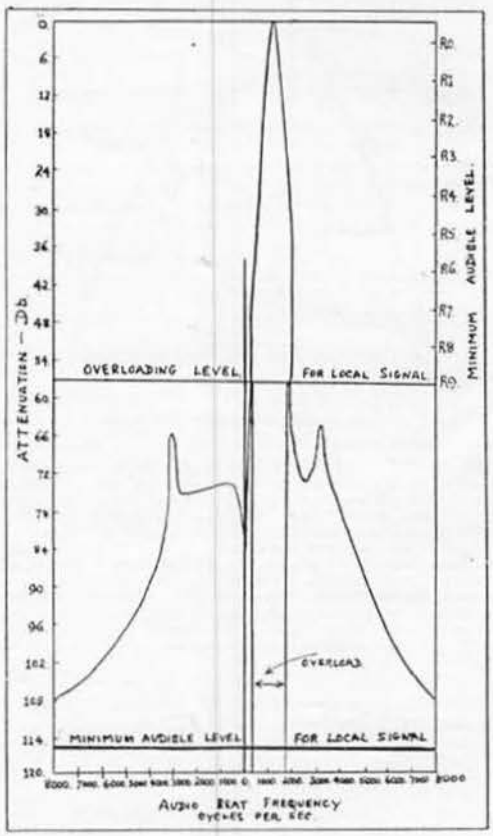

Fig. 6.—A.F. Selectivity Curve of super-heterodyne receiver fitted with crystal filter and " band pass " I.F. amplifier. It should be noted that for signals up to slight over-loading strength there is no A.F. image ; for average amateur signals such a receiver is therefore a true single-signal receiver.

necessary. This leads one to the conclusion that the present crystal filter is by no means ideal. The chief reason for the poor selectivity on loud signals is to be found in the secondary resonant peaks of the crystal. If crystals could be ground without these secondary peaks, the selectivity on local signals would be increased considerably, and the present " single-signal " receiver fitted with an audio frequency " Band-Pass " filter would give ample selectivity for amateur purposes. It does not seem probable that quartz crystals without secondary peaks will be produced, but tourmaline may offer possibilities. The writer suggests that amateurs interested in piezo-electric experiments should endeavour to produce such a crystal. (Note.—It should be remembered that these secondary peaks are noticed only when the crystal is used as a resonator, and are not noticed when the crystal is used as an oscillator. Fig. 7 shows a suggested circuit for testing crystals.)

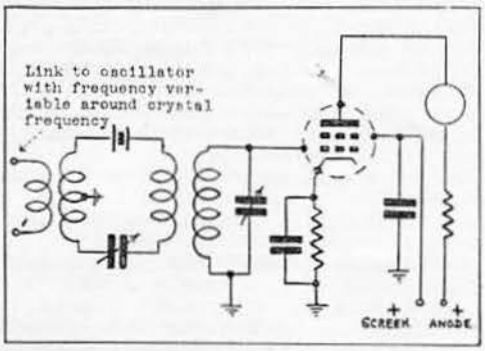

Fig. 7.—Circuit for measuring crystal resonance curves. The valve is calibrated as a vacuum tube voltmeter and the attenuation measured as the frequency of the driver is altered. An oscillator may be coupled to the output in order to produce an audible beat note, which may then be checked against the notes of a piano, and so give an easy means of measuring the frequency changes of the oscillator.

The I.F. " Band-Pass " filter, if developed along lines suitable for amateur receivers, should give a much better selectivity curve than the crystal filter. Unfortunately, however, such a filter is rather complicated, and it would be impossible for the average amateur to build and line-up the " band-pass " units shown in Fig. 5, and probably seven or eight such units would be required to give the desired selectivity. It is possible that the number of units required could be reduced by using iron-core inductances, and so experimenters interested in this type of receiver would do well to consult **Messrs. Varley** on this point. To the C.W. experimenter this type of receiver may not appeal, but for the 'phone man it is ideal. For 'phone reception the crystal filter is practically useless. Good intelligible 'phone may be received as long as audio frequencies up to 2,500 cycles can be received. The 'phone experimenter can therefore build a receiver having an I.F. " Band-Pass " of 5 kc. and as sharp a cut-off as possible. This is comparatively easy to obtain, since present-day broadcast receivers use a " Band-Pass " of 10 kc., and so very little alteration would be needed. An improved cut-off could be obtained by using a simple audio filter with a sharp cut-off at 2,500 cycles. A suitable 'phone receiver could therefore consist of three stages of I.F. amplification (using four " Band-Pass " units) and a simple " Low-Pass " audio filter. Such a receiver would give 50 'phone channels in the 7 mc. band.

The requirements of amateurs in different localities vary considerably, and so the following typical cases may be of interest :—

(1) The amateur 10 or more miles from the nearest fellow-amateur. In this case a quartz crystal filter will give excellent results.

(2) The amateur three or more miles from the nearest fellow-amateur. A crystal filter followed by a " Low-Pass " audio filter will suffice.

(3) The amateur closely surrounded by other amateurs.

(*a*) Where the noise level is normal a " Band-Pass " I.F. filter, followed by a " Band-Pass " audio filter, will give good results.

(*b*) Where the noise level is high a crystal filter, in conjunction with a " Band-Pass " I.F. amplifier followed by a " Band-Pass " audio filter, will be required to give best results.

(4) For 'phone reception an I.F. " Band-Pass " filter followed (if desired) by a " Low-Pass " audio filter will give best results.

The average amateur may object that the receivers described in the above article are all expensive to construct. In Part 2, therefore, an endeavour will be made to describe the different units of which these receivers consist in such a manner that the amateur may start by building a simple receiver, and then add to it extra units, when the time and money are available, so that eventually, after months or even years, he will have a really first-class receiver.

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NORTH-WESTERN ACTIVITIES ON 56 MC.

By David Mitchell (G2II).

A SHORT account of the 56 mc. work which has been taking place recently in the North Wales, West Lancashire and Cheshire districts may be of interest to members in other parts of the country.

Our group consists of G6DO, 6GL, 6YQ, 5FU, 5MQ, 2DC, 2IN, 2II, and 2KZ, also a fair number of A.A. and B.R.S. men, who have proved of great assistance in furnishing reports.

From G2II the following have been worked during June and July:—5FU (12 miles), 6YQ (15 miles), 5CVP (21 miles), 6GL (24 miles), 6DO (30 miles), 5MQ (36 miles), 2INP (45 miles), 2DCP (73 miles), QSA5 reports being received from all these stations.

G2DC at 73 miles reported the I.C.W. from G2II R7 and phone R6 QSA5 on an 8-ft. aerial, while G2DC was R4-5 on phone at G2II. This contact with 2DC, who was using portable apparatus in the Derbyshire Heights, is believed to be the British amateur long-distance record for two-way 56 mc. communication. The output used at G2DC was 2.6 watts. The previous record of 65¼ miles was held by G2IN and G5CV, who established contact when the former was using a transmitter on Ashurst Beacon, Lancs, and G5CV was on Snowdon Summit.

While in the Derbyshire heights, G2DC also worked G6GL (50 miles) and G2OI, portable, near Bury (about 28 miles), and heard G5MQ (38 miles), all being received at good strength.

G5MQ and G2II have been keeping regular skeds, and signals average R7-8 over the 36-mile path between the two stations. This is considered good DX for regular house-to-house working on 56 mc., these skeds never having failed over a period of several weeks; in fact communication, with an input of 8 watts, has been found more reliable than on the 1.75 mc. band!

Distances obtained by the formula $D=1.32\sqrt{H}$, which is normally used to ascertain whether 56 mc. contact is possible between two points, have been considerably exceeded during our tests, and after further tests it is hoped to evolve a new and more practical formula.

It has been noticed consistently that there is a diminution in the signal strength of stations over 20 miles distant when the atmosphere is very damp or when low-lying clouds are between the transmitter and receiver. A striking instance of this was observed during the recent tests from Snowdon made by Mr. Douglas Walters (G5CV). On the Saturday evening, when the atmosphere was dry and clear, signals from the writer's station were reported R9, while on the Sunday morning, when a thick mountain mist was covering almost the whole distance, a report of only R4 was received, no alteration having been made in transmitter or aerial. It would be interesting to know if amateurs in other parts of the country have noticed similar effects.

The transmitters at present used by most of the members of our group are conventional, so no details will be given here. G6DO, however, has an MO-PA transmitter using push-pull in both stages. This is a step in the right direction, and all hearing 6DO's transmissions will agree that the extra stabilisation obtained is well worth while.

Some of the aerial systems used may be of interest. G5MO originally used a 99-ft. aerial tapped directly on the tank coil, which proved quite satisfactory, a report of R7 being obtained from G5CVP (55 miles) while using this system. A 99-ft. aerial, with a 66-ft. counterpoise directly underneath it, is now used and the whole loosely coupled to the tank coil. The new system gives greatly improved results, distant reports going up by 2 points on the R scale.

It is suggested that other members should investigate the possibilities of aerial-counterpoise systems on 56 mc.

Standard 66-ft. Zeppelin type aerials are used at 6GL, 6DO, 5FU, and 2II. The writer has recently carried out tests comparing the efficiency of a 16-ft. vertical 56 mc. Zepp. and a 66-ft. horizontal Zepp., the latter proving vastly better in all directions. 5FU has carried out a similar experiment with the same results, so at present short vertical aerials are not finding much favour in this area, but this may be due to the greater average height obtainable with the longer systems.

This article must not lead others to think that our sole object is the breaking of "records," as this is not so, the DX contacts being made during the normal course of our experiments.

Most stations are now working on frequency stabilisation, and at G2II experiments with "High A" tank circuits are being made, resulting in a great improvement in frequency stability during modulation. An MO-PA transmitter utilising this system with 3-in. tubes in the master oscillator is in the course of construction, and if it is a success an article describing it will be submitted for publication.

Many times a report is required from a direction in which there are no transmitting stations, and it is in such cases that the B.R.S. man can prove his worth, either by taking out portable apparatus or reporting from his fixed location. Therefore, in conclusion, an appeal is made for more of our many B.R.S. and A.A. members to offer their co-operation to transmitting amateurs on 56 mc., as in the majority of cases this would be greatly appreciated.

The Association of Scientific Workers

In a letter to the Society, the Secretary of the above organisation informs us that a Joint Committee, consisting of members of his Association, the Institute of British Executives and the Engineers Study Group on Economics, has undertaken an investigation into the problem of unemployed scientific, technical and executive workers.

Technical members who are unemployed are invited to send a letter to Mr. Evans, Institute of British Executives, Swan House, 133, Oxford Street, W.1, giving name, address, age, qualifications, field of work, and date last employed.

There is reason to believe that various schemes of national development will be created, and it is therefore important to know of available scientific and technical ability.

THE VK-ZL INTERNATIONAL DX CONTEST.

WE publish below a letter from Mr. R. H. Cunningham, Manager of the VK-ZL Contest Committee, which explains the arrangements being made for the above event.

The rules of the Contest are also appended.

Copies of the official announcement, which contains a specimen entry form, can be obtained from Headquarters.

"As an outcome of the great success and world-wide popularity of the recent Melbourne Centenary Contest, the W.I.A. and N.Z.A.R.T. have joined together in offering to all amateurs of the world another contest for October, 1935—a bigger and better contest.

It will be observed that the total number of districts workable is 12, thus offering a greater attraction to those international stations desiring, by multipliers, to produce large scores.

An added feature is the special bonus of 500 points for any contact established with VK or ZL on 28 mc. With the present favourable conditions on this band we expect some remarkable performances.

The hours of operating have been so balanced that the contest will not be arduous to any participant, thus lessening the risk of physical breakdown; a distinct possibility in a contest run over long periods. At the same time, these hours correspond to international DX periods for both VK and ZL.

Rule 13 was brought into being with a view to putting a stop to those who "favour" that selfish, broad and modulated note, generally used especially for contests. It is hoped that this rule will be looked upon as a step in the right direction in an endeavour to clear the air of this type of signal during contest periods.

Awards will be made in the form of attractive certificates to the leading scorers in each country, to the winners of each district of U.S.A. and Canada, as well as to each in the British Isles.*

It hardly seems necessary to have to explain the formulation of serial numbers, but, without this knowledge, some might miss the enjoyment of the contest, so here is a brief résumé of the method. Each participating station allots himself three figures, anything between 111 and 999. These figures form half the six-figure serial number that he hands over to the station he contacts. The other half, at the first QSO, consists of three noughts, 000. Therefore, for example, 453,000 may be a station's number that he passes on to his first contact. In exchange, he will receive a similar number, say, 687,989, which shows that that station has worked another station before, because the three 0's have been substituted by 989. The second half of the six-figure serial number is taken from the *first* three figures of the number received at the previous QSO, and is added on to a station's own three figures. Then this combination is given to the next contact, and so on throughout the test. Always retaining the first three figures, adding the second and transmitting them in that order.

The executives of the N.Z.A.R.T. and W.I.A. (Victorian Division) invite all amateurs to participate in this contest, and they would very sincerely appreciate the co-operation of your Society in giving the test as much publicity as possible.

Yours fraternally,

R. H. CUNNINGHAM,

Manager, VK-ZL Contest Committee.

Rules and Conditions.

Transmitting.

1. There shall be two contests:
   (*a*) Transmitting;
   (*b*) Receiving.

2. The Wireless Institute of Australia Contest Committee shall be the sole adjudicators, and their rulings will be binding in the case of dispute.

3. The nature of the contest requires the world to contact ZL and VK.

4. The contest is to be held from 17.00 GMT, Saturday, October 5, till 17.00 GMT, Sunday, October 6, 1935, and will be continued over the same periods on each of the following three week-ends. The dates of the other week-ends are October 12-13, October 19-20, and October 26-27, 1935.

5. The contest is open to all licensed transmitting amateurs and receiving stations in any part of the world. Unlicensed ship and expedition stations are not permitted to enter the contest. Financial members of the W.I.A. and its affiliated societies and members of the N.Z.A.R.T. only will be eligible for awards in VK and ZL.

6. Only one licensed operator is permitted to operate any one station under the owner's call-sign. Should two or more operators operate any particular station, each will be considered a competitor, and must enter under his own call-sign and submit, in his log, the contacts established by him. This debars persons from entering who have not an amateur licence.

7. Each entry must be signed by each competitor as a declaration of the above statement.

8. Each participant will assign himself a serial number of three figures, as detailed in the contest description. When two or more operators work the one station, each will assign himself a separate number.

9. All amateur frequency bands may be used.

10. Only one contact with a specific station on each of the bands during each week-end will be permitted.

11. Contacts may be repeated on each of the succeeding week-ends with the same stations in accordance with Rule 10.

12. Each contact must be accompanied with an exchange of serial numbers and signal strength reports, including readability, strength and tone.

13. *Highly Important.*—The judges reserve the right to disqualify any station whose tone report is consistently given less than T8.

14. Scoring: Three points will be allowed for every contact completed with an exchange of serial numbers and signal reports. A special bonus of 500 points will be given for a 28 mc. contact; this is to be added on to the final score after multiplying as in Rule 15.

15. Australian and New Zealand stations will multiply their total score by the number of

countries worked and the stations outside VK and ZL by the number of Districts worked in both countries; there being 12 in all, VK2, 3, 4, 5, 6, 7, 8, 9, ZL1, 2, 3, and 4.

16. No prior entry need be made for this contest, but each contestant is to submit a log at the conclusion of the test showing: Date, time (in G.M.T.), band, station worked, in and out serial numbers, in and out signal reports, and points claimed for each QSO.

17. Entries from VK stations must reach the W.I.A., 191, Queen Street, Melbourne, C.1, not later than December 1, 1935, and the foreign logs no later than December 31, 1935. ZL entries must reach the headquarters of the N.Z.A.R.T., Box 489, G.P.O., Wellington, before November 25, 1935.

18. Awards: Attractive certificates will be awarded to the station returning the highest total in each country; to the highest scorers in each of the British Isles; and to the winners of each State of U.S.A., Canada, Australia and New Zealand. There will be no world winner.

19. Foreign stations should call CQ VK/ZL and the VK and ZL stations, CQ DX TEST.

RECEIVING.

1. The rules for the receiving contest are the same as for the transmitting contest, but is open to members of any Short-wave Listeners' Society in the world; but only to members of the N.Z.A.R.T. in New Zealand. No transmitting station is allowed to compete in the receiving contest too.

2. Only one operator is permitted to operate only one receiver.

3. The dates, scoring of points, and logging of stations once on each band per week-end are subject to the same rules as for the transmitting contest.

4. To count for points, the call-sign of the station being called and the strength and tone of the calling station, together with the serial number and signal strength report sent by the calling station, must be entered on the log.

5. The above items must be filled in before points can be claimed, that is, it is not sufficient to log a station calling CQ or TEST. Verification of reception must be made in accordance with the conditions in Rule 3, above.

6. VK and ZL receiving stations cannot log any VK or ZL stations—only foreign stations.† Foreign stations will enter up VK and ZL stations heard only.

7. The awards for the receiving contest will be similar as for the winners in the transmitting test.

8. Receiving logs are to be similar to transmitting logs.

**Editorial Notes.*—Mr. Cunningham seems to be under the impression that Great Britain is divided into three licensing Districts; this is not the case. We suggest that the decision to award a certificate to the "leading scorers in each British Isles district" be amended to read "leading scorers in England, Scotland, Wales and Northern Ireland."

† We are not clear whether "foreign" includes British Empire stations.

The 28 mc. Band

The first part of August showed great promise, but unfortunately the good conditions did not last, and after the 25th the band became dead, although commercial harmonics were still audible at intervals.

G5LA raised great hopes by hearing W1CCZ calling CQ TEN on the 1st at 2040 B.S.T.

On the 11th G2YL worked LU9BV at 2025 B.S.T., whilst G6RH believes he heard VK2OC at 1100 B.S.T., but unfortunately car QRM prevented him from being certain.

A second district American (W2J ?) was heard by G2HG on the 13th, at 2055 B.S.T., calling CQ with a QRK of R5, with a rapid fade to zero.

On the 14th G5OJ heard PY1AW calling a German station at 2100 B.S.T.

On the 17th G2HG worked LU1EP at 2145 B.S.T., and heard LU9BV. On this evening LU1EP was audible from 1940 B.S.T. and finally faded out just before 2200 B.S.T.

Conditions, as regards European and North African working, have shown a tendency to fall off, several evenings yielding no results, and only unreliable communication on many of the others.

SM6WL is very active on 28 mc., and will be pleased to keep skeds with amateurs in any country after 1630 G.M.T. He is using a CO, FD, FD, P-P PA with an input of 130 watts to RK20s. in the final stage.

SM6WL mentions in his letter that conditions were good last month except between July 14 and 24, and that the best DX heard is a W2 calling CQ TEN DX. Conditions seem to be falling off in Sweden in a similar manner to our own, for he has heard no signals on the band between August 10 and 22.

ON4AU was heard by ZS1H/ZT1H on July 21, and heard W4AGP at R5-6 working another American station at 1608 B.S.T. on June 30, and at 1852 he heard PY5AA at R5.

G6YL has kindly forwarded the following information about ZS1H. ZS1H has altered his 14 mc. beam aerial into a tiered 28 mc. 54 ft. high. He is using an input of 50 watts, and a frequency of 28160 kcs. He transmits and listens every evening from 1545 to 1630 G.M.T., and nearly every Saturday afternoon. On Sundays he is active from 0600-1000 and from 1200-1600 G.M.T. He would like skeds with any G station on this band.

FA8IH heard him at R8 on August 9.

ZT1H is also active on 28 mc. during the week-ends on 28204 kcs.

ZB1I and BERS201 are active on 28 mc. in Malta, the former using a Hartley with an input of 20 watts.

ZB1I mentions that the best days for 28 mc. were June 30, and 1st, 3rd, 8th and 11th July, these being damp nights with an overcast moon.

G6RH has been heard by LU1EP, but owing to the almost incessant car QRM with which he is inflicted, he was unable to make satisfactory contact. RH heard a station calling him, but was unable to get the call sign with the exception of the 1EP. Except for this QRM he would have made the first English QSO with LU on 28 mc.

G2HG.

HIGH DEFINITION TELEVISION

By R. Pollock (G5KU).

With a High-definition Television Service promised shortly, the interested radio amateur will be desirous of carrying out original experiments. This contribution from the pen of one of the leading Television engineers in the country gives much new and practical information on the subject.

THE introduction of high-definition television into this country has led to varied statements which may confuse those interested in obtaining entertainment from the various features of the service, apart from the subject-matter of the transmissions. These notes are intended to bring together the various aspects of the subject for the technical experimenter.

The first consideration in a communication system is the frequency range covered by the transmission, and this is usually sufficiently met by the value of the highest frequency involved.

Suppose a system of 240 horizontal lines per picture is transmitted at the rate of 25 pictures per second and a test pattern is used consisting of 240 vertical white lines.

On a square picture frame this pattern will give the limit of definition of the system as each element will be the same size, admittedly square shaped, as the light spot tracing the raster. It will give: f max.$=240\times25\times240=1.44$ mc. or, on the more usual 4×3 frame, 1.92 mc. This being the case from a consideration of vertical definition only.

If the test pattern is rotated so that the white lines coincide with the scanning lines, the definition will be 100 per cent., and will not involve more than the transmission of the scanning frequencies. However, if the pattern is shifted slightly up or down the definition is now zero, and could not be improved by any variation in transmission band-width if this unfortunate condition exists where the white lines fall in the spaces between scanning lines. To accommodate equal degrees of definition in either direction the test pattern must be made half as intricate, and the maximum frequency then becomes 960 kc.

If we work along the empirical lines of the R.C.A. and ask: What is the optimum number of lines for a given maximum frequency? the factor .32 is arrived at, giving f max.$=614$ kc.

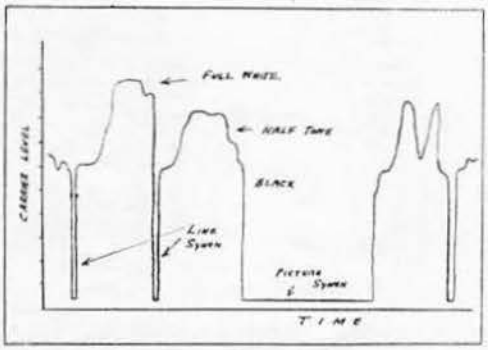

Fig. 1.—Shows the end and beginning of two frames

Other considerations may allow a still lower value, being finally dependent on how the scene is presented to the observer.

An example of this is found with the interlaced scanning system. Interlacing is used on account of the flicker effect found when a good brilliancy is used on the usual 25 per second picture, and is not so drastic as increasing the complete frame frequency to 50 per second.

Each 25-cycle frame is transmitted as two scannings of 120 lines, the lines of the second scanning falling into the spaces between lines of the previous scan so that the effective raster is one of 240 lines without the flicker effect of the 25-cycle framing.

Viewed from too close a range a troublesome stroboscopic effect may arise, and although the flicker effect is overcome, the viewing distance must be increased, allowing a reduction in definition to be made to the extent of .21, so that f max. now becomes 403 kc.

The problem can therefore be examined with the formula f max.$=Ka^2Rn$.

Where a = number of lines,
R = the aspect ratio (1.33),
n = the picture repetition frequency, and
K = .5 (progressive) or .21 (interlaced),

e.g.: 240 lines, progressive 25 sec.: .96 mc.
405 lines, interlaced 25 sec.: 1.3 mc.

Signal Shape.

As with the present 30-line system, the receiver is concerned with the simultaneous variation in position and intensity of a spot of light. The transmitter, however, will only transmit the intensity variations directly, the line and picture scanning being in the form of an impulse at the junction of lines and picture frames. The modulation of the carrier will therefore appear as in Fig. 1, which shows the end and beginning of two frames. The normal carrier level represents "black," various degrees of white by increased carrier and synchronising pulses by decreases of carrier. The usual method of reception with cathode ray tube enables the synchronising pulses to black out the return stroke of the line and picture time base movement, and thus a definite picture synchronising trough is useful, although actually a fairly intelligent scanning system could be made to synchronise its picture traverse by merely a cessation of line scanning over this period. The form of signal has the further advantage in giving freedom from interference causing loss of synchronism.

The apparatus used to delineate the picture sets the phase of the signal at the anode of the ultimate stage of the receiver, and in the case of the cathode ray tube, this must be as in Fig. 1, i.e., positive

increments in carrier giving positive increments in final anode voltage, so that the shield of the oscillograph tube swings positive. Hence the detector of the receiver, if a diode, should be followed by one, three or five stages to retain correct phase. The usual 1 mc. frequency range will limit the diode load to a few thousand ohms, and as most cathode ray tubes modulate fully on a swing of 20 volts, this will only require one stage, with a voltage gain of 8 to 10 to give full effect, with a diode current of less than 1 milliamp—a good level, but not abnormal. The whole of the signal is passed on to the shield, as, although positive increments are the only effective signal required for intensity variations, the blacking-out during the synchronising pulse is also of use.

To synchronise the time base circuits the downward pulses of Fig. 1 must also be correctly phased as regards the point where they are injected into the time base circuit. Owing to the wide frequency difference between line and picture pulses, their separation is a simple matter and can be dealt with in a single stage having its input paralleled with the picture signal amplifier. Large numbers of circuits have been devised for this link between detector and line and picture scanning circuits. A simple arrangement is that of Fig. 2, with suggested constants for the stages, following the detector by which the signal components are distributed to the viewing system. A certain amount of deformation in synchronising pulse waveform occurs in the anode circuit of V_2, but this will not affect the pulses supplied to the shield as they are handled by V_2. In practice it is not found necessary to have anything like the gain of V_2 for the "synch" pulse stage V_3, so that a good deal of latitude exists.

It would be usual to conclude such notes as these with a description of the various time-base and tube-voltage supply arrangements, but as this is a subject greatly controlled by the type of tube, etc., it would perhaps be better to diverge here and touch upon the radio side of the subject. For those interested in scanning arrangements help may be found in the technical literature of various tube manufacturers and in the pages of those periodicals dealing with high-definition systems.

Amplification of Wide Frequency Bands.

On 6.6 metres it is possible to obtain voltage gains of 8 per stage with normal screened pentodes and tuned transformer coupling. The limit being set by dielectric loss only.

With such a gain the tuning is usually too sharp, and when flattened by resistance damping and tight coupling, the gain will not exceed 4 per stage.

In turning to signal frequency amplification the limitation is found to be G-earth and A-earth valve capacity, together with strays, and the criterion for the choice of valves is one of finding the greatest ratio of slope to these capacities.

(*Continued on page* 122)

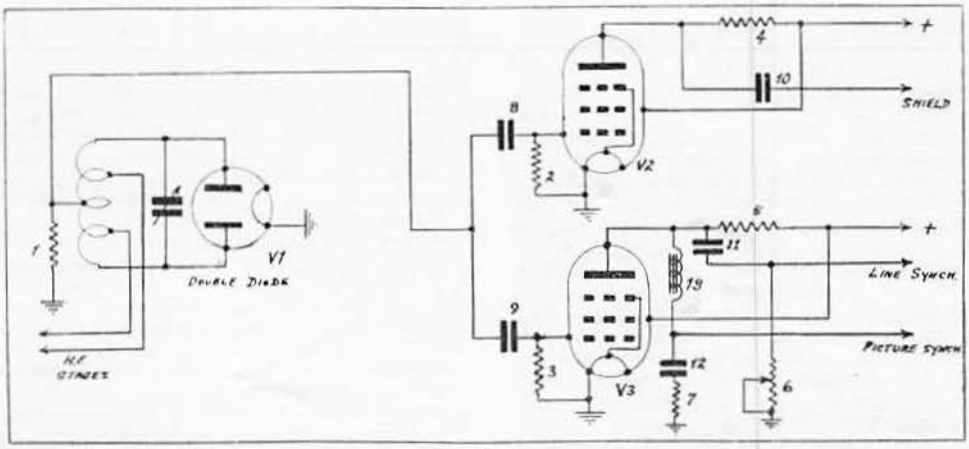

Fig. 2.—A circuit designed as a link between the detector and the line and picture-scanning circuits.

Key to Components:—

Resistances—
1 and 5, 5,000 ohms. 2 and 3, 3 megohms.
4, 3,000 ohms. 6, 10,000 ohms.
7, 20 ohms.

Condensers—
8, 9 and 10, .1 mf.
11, .01 mf. 12, 4 mf.

Valves—
V1, Double Diode.
V2, H.F. Pentode.
Choke—13, 10 henrys.

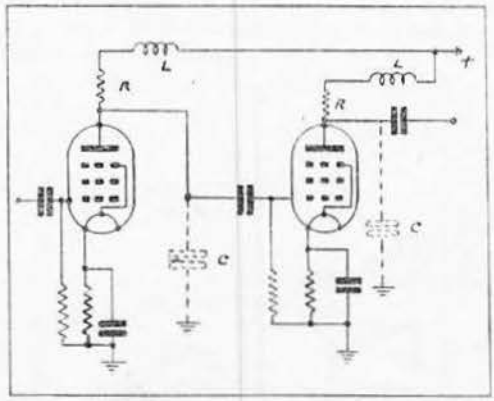

Fig. 3.—A resistive-inductive coupling which gives the best response curve.

INGANG!

A Record of a Memorable Week-end

THE Grey Beards among us recall with pleasure a certain week-end spent in Paris during 1925, when the I.A.R.U. was formed. Since then International Amateur Radio has made much progress and many meetings have been recorded, but those who were fortunate enough to visit Belgium with Mr. Max Buckwell's party during the August Bank Holiday week-end, will be ready to challenge all comers that no previous amateur gathering has been so successful.

The title of this article will convey little or nothing to most readers, but to those who were of the party, it will bring back memories for many years to come of "Reseau Belge," Antwerp, Brussels, Harvengt, and above all that very wonderful "ham spirit" which was in evidence from the start to the finish of our trip. "Ingang" we are assured, means "Entrance" in the Flemish language, but to us it became a catch word, coined after G5UK had lined us up outside an entrance to the Brussels Exhibition.

The Organiser. Mr. Max Buckwell, G5UK, organiser of the trip, with his wife in Brussels.

But we are going too fast, for much of interest had occurred before the loud speakers above the Television Pavilion bade us welcome as we entered the Exhibition.

En Route to Antwerp.

Friday evening, August 2, saw the main R.S.G.B. contingent at Liverpool Street Station in readiness for their departure on the Harwich boat train. Included in the party were our Secretary (G6CL), "Dud" Charman (G6CJ), with a pocket full of formulæ; Arthur Milne (G2MI), complete with YF and Indian ink; Eric Martin (G6MN), of QSL and bow and arrow fame; Jack Lees (G2IO), representing the Notting-hams; Max Buckwell (G5UK), with YF and French dictionary, just in case!; Norman Blackburn (G2AX), sometime parachutist; Len Jones (G2JO), *sans* handbag; Gilbert Vickers (G6GV), with a photograph of Droitwich in his pocket; Cyril Greenaway (2BWP); and Jimmy Watson (G6CT).

A warm calm evening was enjoyed for the sea crossing made in the S.S. *Antwerp*. The special box of sea-sick tablets purchased by our Secretary were thus wasted, much to his annoyance.

Arrival in Antwerp.

The port of Antwerp was reached at 8 a.m., August 3, when the party were met by M. Renee Kerse (ON4GW), Vice-President, R.B.; M. Vestrepen (ON4AA), Antwerp District Manager; M. Embrecht (ON4AC), General Secretary, R.B.; M. Dierckxsens (ON4CZ); and M. de Smet (ON4CC). After cordial greetings the main party proceeded by train to Brussels, whilst G6CL, 2AX and 2JO accompanied the R.B. members by car. During the morning this party were taken to Bercham Sports Stadium, where the Antwerp Group Station is installed. At ON4AC, which was also visited, an opportunity was given of examining the gear used by M. Embrecht in obtaining his W.A.C. telephony award.

Waterloo, the scene of a scrap which took place in the days before DX yarns replaced fisherman's tales, was the next port of call.

At Harvengt

During these peregrinations the train party had passed through Brussels and was *en route* to Mons in readiness for a journey by tramcar (?) to the Chateau de Machiennes, Harvengt, the beautiful country house of Baron Louis Boneart de la Roche (ON4HM).

It is doubtful whether a more representative group of European amateurs has been gathered at one spot, since 1925, than was the case that day, for not only were the R.S.G.B. and Reseau Belge there in force, but representatives were present from Switzerland, Germany, Luxembourg, U.S.A., Holland and France. We were especially pleased to meet once again our very old and esteemed friends, Paul de Neck (ON4UU), President, R.B., and Rudolf Stuber, Secretary, U.S.K.A.

The British party at this stage was augmented by two of our three active lady transmitting members, Miss Nelly Corry (G2YL), who had flown over the previous day, and Miss J. Burns (G2IA). Dr. Fereday (G6FY) had also joined us with a party of Dutch friends.

An alfresco lunch was followed by a visit to the station ON4HM, special interest being shown in a commercially built Collins transmitter. During the visit our Secretary checked over the Baron's claim to a W.B.E. Telephony award, only to find that no European phone contact had been established. Frantic efforts on the part of G6CJ, however, failed to produce an OK from the only G heard during the visit.

A "wild" boar, which had been tamed by ON4HM, provided amusement and interest to the

Our Hosts in Belgium. A Group taken at the Bercham Sports Stadium, Antwerp. Back row, L to R, ON4NDB, 4AA, 4UU, 4CC, 4AC, 4GW; Centre row, 4CD, Mrs. 4AA, Mrs. 4UU, Mrs. 4CC, Mrs. 4AC. Front row, 4FE, Miss 4AC, 4GK.

visitors, and a source of revenue to the cinematograph film trade. A bevy (or is it a flock?) of peacocks were a further attraction. Wild boars, peacocks and ham radio, all under one roof, visualise it, ye town dwellers!

Brussels

At the conclusion of this most interesting visit, which was attended by some 50 persons, the R.S.G.B. party returned to Brussels by rail or car, where De Boerks Hotel, in the Rue Veydt, became the headquarters for the week-end. A very charming hostess, in the person of Mde. Teller, saw that we returned with a good impression of Belgian hospitality.

The Saturday evening was left free for either sight-seeing or a perfunctory examination of the Exhibition. Our private record book shows that the first man home arrived at 10.30 p.m. and the last at 3.30 a.m. There were vague rumours at breakfast on the following morning that Ali Baba's Cave and the Palais de Rire had been well patronised, but no confirmation was forthcoming.

An International Gathering.
No less than seven amateur organisations were represented at the alfresco luncheon party given by Baron Louis de la Roche, ON4HM, at his Chateau near Mons.

Visit to Brussels Exhibition.

Mr. Jackson (G6ZU), in a short article published in our last issue, broke us in to what to expect at the Exhibiton, but no printed words can adequately convey an account of the wonders it holds; modern buildings go hand-in-hand with replicas of centuries-old architecture, whilst a city of the future rubs shoulders with old Brussels—in the opinion of the writer, the most delightful section of the Exhibition.

The Reseau Belge amateur station, ON4WS, which is located in the Television Pavilion, deserves an article unto itself, and if promises are fulfilled, this will be a feature in our next issue. Suffice it is to say that the transmitter is one of the most business-like amateur-built jobs, it has been our lot to examine.

In the Television Section the Barthelmy system is employed, using 60 lines with horizontal scanning, and for the first time in amateur radio history the President of a National Society addressed his guests by means of this new science. M. Paul de Neck, in well-chosen words, expressed his great pleasure at meeting so many foreign amateurs at the Reseau Belge Headquarter's station. The actual television results were moderately good, but inferior to the high-definition systems which are being developed in Great Britain. An improvement would undoubtedly have been obtained if a longer time had been allowed to elapse before the demonstration commenced, for the valves, etc., had been switched on only a short while before our arrival. During the visit to the station a cordial message of greeting was broadcast in English over the loud speaker system by Mr. L. V. Rubeck (ON4ZQ).

The rest of the day was spent in sight-seeing, a task which became increasingly difficult as the enormous area of the Exhibition became more apparent.

The philatelists amongst us spent an exciting half-hour endeavouring to augment their collections, whilst one enthusiast at least discovered how easy it is to lose 10 francs when on a quest of this sort!

Lunchwas taken in the Spanish Court of Old Brussels. To most of us it seemed incredible that the exquisite buildings which go to make up this reproduction of the old capital of Belgium, are nothing more than shams.

The party broke up into smaller groups during the afternoon, visiting those buildings which appealed to their taste.

A return was made to the Television Pavilion for tea (we saw little consumed incidentally), and from then until 8.30 p.m. the writer and his party endeavoured rather unsuccessfully to investigate the enormous Fun Fair.

Dinner in the Pergola followed, after which G2AX, greatly daring, and Miss Burns, made perfectly timed parachute jumps from a contrivance some 100 ft. above ground level.

The whole party stayed on until dusk in order to see the illuminations which are unrivalled in their beauty.

Visit to Ruysselede.

An early start, too early for the late-comers of the previous evening, was made on the morrow. Taking train from Brussels, the party arrived at Ghent shortly after 8.30 a.m., where they were met by M. Antheriens (ON4PA), the local District Manager. Coaches were awaiting us for the 20 miles journey to Ruysselede, the village in which is located the "Rugby of Belgium." During the outward coach journey we experienced the unusual sight of a Buick car on fire with no one on hand to subdue the flames. After nearly 20 minutes a brigade *did* arrive from a nearby town, but by

In Ghent.
The party ready to embark by coach to Ruysselede\Radio

this time the car was completely destroyed. Some interesting ciné shots and innumerable photographs were taken of this incident. On arrival at the station, especial interest was shown in the short-wave matched impedance aerials and beam arrays. The long wave masts vie with Rugby, being just over 800 ft. high.

The wreckage of the machine and the pylon into which it crashed in fog, remain as reminders of the tragedy which occurred at the station last year.

Back to Antwerp

A picnic lunch followed the visit. The party entrained again at Ghent shortly after 2 p.m. and reached Antwerp at 3.25, where they were met by the local group under ON4AA, 4AC and 4GW. American hustle best describes the next few hours of our stay. Coaches awaited us on our arrival and within a few minutes Bercham Stadium was reached, where an excellent tea was served by Mesdames

Fire!
An incident which occurred at Dienz on the way to Ruysselede Radio.

Vestrepen, Embrecht and other ladies. As the party arrived at the Stadium the Union Jack was run up the flag staff, a very gracious compliment much appreciated. The station previously mentioned was inspected and just before leaving the whole party provided Max Buckwell with some action shots for his camera. Who knows but that one day an R.S.G.B. soccer team will do battle against a Reseau Belge team on this ground? We are confident that such a match, if arranged, would prove an unqualified success.

Leaving the Stadium at 5 p.m., the party returned to Antwerp for an intensive round of sight-seeing. The first stop was made at the new skyscraper building close to Antwerp Cathedral. This very modern building is over 300 ft. high and has 24 floors. By dint of close packing in the lift we arrived at the top in good order to see a panorama which would be difficult to describe, even if one possessed the literary genius of an H. V. Morton. Fortunately the atmosphere was clear and bright, with the result that we obtained a perfect impression of the town and port of Antwerp, together with its neighbouring suburbs. The Scheldt stretched as a silver ribbon into the distance, giving a lasting memory of its importance as a main waterway of Europe.

A year or so back an underground tunnel was bored beneath the bed of the Scheldt and a trip through this tunnel with its ultra modern lighting, provided our next experience. The weird effect produced by the sodium lights has to be seen to be believed.

After a short journey along the south bank of the Scheldt, the party were then summarily dismissed from their coach and whisked (no other word describes it) down escalators into a new pedestrian tunnel. On arrival at the other side the coach was again met and a hurried journey made to the South Quay, where the good ship *Malines* awaited us.

Then occurred three incidents which will remain fixed in our minds for all time. As the boat pulled away the British party sang " For they are jolly good fellows," an " au revoir," which was made the more impressive as the cheers of our hosts came back to us across the gradually widening gap of water.

Incident two occurred as the boat passed Antwerp Cathedral, when the skipper permitted G2MI to go on the bridge and send " G.B." in morse by means of the ship's siren.

The final incident was staged some ten miles down the river. Suddenly out of the gathering gloom the roar of an aeroplane engine was heard, and in a few seconds ON4NDB and ON4AC flashed past us in salute only a few feet above the water! Three times was this repeated, and then finally the plane dipped directly beneath the bows of the ship and zoomed back to Bercham.

A radiogram of thanks was immediately sent from the ship to ON4AC.

The homeward journey was made without incident. A perfect night on a millpond sea. Harwich at 5.30 a.m., Liverpool Street at 7.30 a.m.—then back to work.

Finale

The writer is mindful of his many shortcomings in endeavouring to describe this memorable week-end, but it is hoped that its publication will prove to our friends in Belgium that we regard our visit

Ruysselede Radio.
A view of the short wave matched impedance aerial system at the " Rugby of Belgium."

as a most important step in the direction of becoming more closely acquainted with the European amateur situation. It is manifestly impossible to describe all of the incidents which went to make the week-end so enjoyable, but we should be lacking in vision if we failed to record that a most valuable " tête-a-tête," which was attended by representatives of seven National Societies, took place during the visit to ON4HM. As a result our Secretary and his confrere, G2MI, were able to give voice to several matters of international importance.

In concluding this account, the writer, on behalf of the British party, desires to record his thanks

(*Continued on page* 120).

SOLILOQUIES FROM THE SHACK.

By Uncle Tom.

(Returning from his hard-earned holiday in Pentonville, the Old 'Un still finds something grouse-worthy in the world.)

Oo-er, nieces and nephews—such a batch of fan-mail as you never did see! And not one single, solitary letter bewailing the absence of this page from last month's "Bull." on account of my enforced holiday of one month (without the option). However, that's *one* spitch-merchant less, and if I only get a month for the second offence I shall look round for another one to assault and batterise, so to speak, as you might say.

Now that I know that my absence for one month occasions no regrets (either to the Editor or to readers) I shan't have the slightest hesitation in taking another one off.

Little Edward writes from Oswestry as follows: "Surprised to find that you have not said anything about RST yet; of all the bally ideas, but perhaps you like it." No, Ed., I don't. I hate the beastly thing, but I'm only employed to squash things that are definitely harmful to amateur radio, and RST may prove to be right after all. But I *don't* like it.

Another nephew from G——g, Surrey, suggests that if my tub is vacant for another thump by now, I might put out an exhortation to some hams to use an artificial aerial occasionally instead of making the ether hideous by adjusting their gear for hours on end.

And then he goes on to tear up a certain G station who uses enough kilowatts and gramophone records to run the entire B.B.C. After 30 minutes or so he asked stations to tell him if he was causing QRM, but as he didn't change over to listen for any such stations, he probably only wanted the cards, even if they merely served to convey rude remarks.

In passing, here's the Poetry Department, 1st Spasm, from same nephew:

"A young wireless expert from Bristol
In error once swallowed a crystal.
It set up oscillation,
And in desperation
He earthed himself, using a pistol."

That will be plenty, thank you.

And now comes nephew Paul, writing from North London, where they seem to suffer from a certain plague just as much as the Southerners do. His grouse is a gentleman (?) putting out speech (?) on a beautiful R.A.C. carrier-wave. This nephew explains that there are two kinds of "spitch"—over-modulation on a properly stabilised transmitter, which can be tolerated as long as it only occurs during tests and is promptly put right; and *any* kind or degree of modulation on an unstable carrier-wave, which can *not* be tolerated anywhere or anywhen.

"No, no, a thousand times no; Oh, how my right fist does itch!
No, no, a thousand times no—I'd rather die than use spitch," etc., etc.

Same nephew then makes a few choice remarks about commercially-built, mass-produced transmitters, such as quite a few of the lads are using nowadays. The grand joke, he says, is that they can't possibly be as efficient as a home-made job on which a little experimental work has been put in—but the owner will never know it, probably.

And finally, a nephew from Kenya comments on my report of the dear little soul who has a commercial receiver on which he boasts of having heard "24 countries, including VE1 and W1 and 2." He asks: "But what of the countless host who likewise use such contraptions, but whose DX is 'All Europe'? And reverting to QSL cards—why has no one as yet specialised in First Day Covers in that line?"

And now, having exhausted fan-mail, I have to fall back on my own ideas, which, as a well-known humorist would say, is rather like falling back on a cucumber frame. My trouble is that I have lots of ideas, but so very few of them are fit for publication in an august (small A, please) journal like this.

Take Convention, for instance; but bring it back again when you've finished with it—we want it again next year. That "Business Meeting"! It's all right—it's great fun. But "Business"—my foot! It's just a safety-valve for members who feel that they have a grouse, or who like to hear their own voices echoing round the impressive confines of the I.E.E. lecture-hall.

All the society's Business is done round the Council Table, and I hope some of you guys realise it. If it weren't for Council (Council, with all thy faults I love thee still, etc.) there wouldn't be an R.S.G.B. That's more than any ten individual members can say for themselves, anyway.

Suppose all the Council members were allowed to get up and let loose *their* grouses against the members, for a change! Old Man QSL, and Old Man Calibration, not to mention Old Man Secretary, could let fly to some effect, I know.

Personally, I think the high spot of Convention, as always, was the Friday night gathering. It *is* a social gathering, anyway. At the Saturday Dinner the gang sit around in little cliques and there's not enough mixing up with the fellows you *don't* know.

It's my belief that Ham Radio is getting an unsociable business, what with all this DX craze and all the little 56 mc. gangs who never hear anyone outside their own localities. What we want in this country is even more 1.7 mc. activity. Look at the N.F.D. scores and see what a poor show most districts put up on 1.7 mc. Why, I wonder? Just because many of the stations were largely run by DX men who just don't consider 1.7 worth while.

Some of these 20-metre phones would be a little better if their owners had had a little preliminary training on the top band. What about it, brother hams? There's still time to make this season a bumper one for real sociable inter-G work on 1.7 and 3.5 mc. Get down to it, everybody.

Guide to Amateur Radio

Members who have facilities for disposing of the new edition of the Guide in bulk quantities, are invited to apply to Headquarters for trade terms.

This edition contains 100 pages of information, and has been very fully revised.

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No. 5 : TELEVISION
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No. 6 : CONTEMPORARY LITERATURE
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No. 11 : 28 MC. WORK
W. A. Clark (G5FV), "Lynton," Hull Road, Keyingham, Hull.

No. 12 : AUXILIARY EQUIPMENT
A. O. Milne (G2MI), "Southcot," Larkfield, Kent.

Assistant R.E.S. Manager

IT is with regret that we have to announce the resignation of Dr. G. F. Bloomfield (G5MG) as Assistant Manager. For some time Dr. Bloomfield has been responsible for the records and much of the administrative work of the section, no small task. Owing to business reasons, Dr. Bloomfield feels that he can no longer give the section the requisite amount of attention, and has asked to be relieved of his post.

A new Assistant Manager will take over his duties in the person of Mr. J. C. Elmer (G2GD), of Hythe. Mr. Elmer is the Group Manager of the Atmosphere and Fading Groups, and he will undertake the dual capacity of Assistant R.E.S. Manager and Group Manager for the time being. His address is at the top of this page.

* * *

56 mc. Technique

During the last few months it has become increasingly apparent that if we are to attain anything in the way of useful results on the 56 mc. band, our apparatus will have to be improved considerably.

Perhaps a brief outline of the problems which beset us will be helpful. At the present time the only generally successful method of reception employs a super regenerative receiver, which is one of the greatest obstacles in the way of rational development. Time and time again a signal has been heard on these receivers just too weak to read through the mush produced by the quenching circuit.

Most operators will agree that an R6 signal is necessary to overcome the noise of the receiver quenching circuit. There must be many weak signals, which, if they were stable enough, could be received on a receiver of better design. Straightforward super heterodynes are not too difficult to operate on 56 mc. ; the trouble seems to lie with the transmitter.

Our present-day 56 mc. transmitters are hopelessly unstable, and until we can produce really stable transmitters we shall be tied down to the super regenerative receiver for the simple reason that only a very unselective receiver such as this is capable of receiving our transmissions, and translating them into intelligible speech. If proof of this statement is required, one has only to switch off the quenching circuit when receiving a strong signal, and listen to the bubbling noise which results. The fact that super regeneration adds considerably to the sensitivity of the receiver is not so important as the fact that it can turn these noises into speech, which a straight receiver, with its quiet background cannot begin to do, owing to its far greater selectivity.

Let us pause for a few moments to consider the cause of this state of affairs. The chief trouble probably lies in the fact that the self excited transmitter in use is being badly over modulated. It appears to be the general practice to over-modulate a 56-mc. transmitter by at least 50 per cent. There is always a tendency to do this, as the effect on the super regenerative receiver is merely to give a louder signal, although this signal is almost entirely a result of frequency modulation. When the usual plate modulation system is employed, as it generally is for 56 mc., the result of over modulation on a self excited transmitter is merely bad frequency modulation, which cuts the wave to pieces.

The other cause of instability is the natural result of employing valves which are not designed to work on such high frequencies. This, unfortunately, is the general practice to-day, owing to the difficulty of obtaining valves of a more suitable type. The results are heating of the electrodes, and a consequent creeping of frequency.

The remedy for all this appears to be quite obvious—stabilised transmitters.

Very few people to-day would consider it good practice to use a self excited transmitter on even the 14-mc. band. Why, then, do so at four times

the frequency, with valves which are not designed for the purpose ? The answer seems to be that the majority of amateurs are either too lazy, or too indifferent to take the trouble to conduct any experimental work on the design and operation of more advanced apparatus. Neither of these reasons are good or sufficient for the holding of an experimental transmitting licence as issued by the Postmaster-General !

The question of frequency stability, which is the crux of the trouble, is one which we must apply all our energies and skill to in the coming season. The use of self excited transmitters of any kind whatever should be discontinued forthwith. It is long past the time when they should have been relegated to the scrap heap, or the museum. In their place we must have driven sets, just as we have them on the lower frequency bands. At first these will necessarily be inefficient, as they were when we first made use of them on the lower frequencies, but with use and experience we shall learn how to improve them. The use of frequency doubling stages will no doubt be necessary, and much time will have to be spent in improving their efficiency. Possibly the employment of a self excited driver stage, followed by a buffer stage, and then a power amplifier, all working on the same frequency may be a solution. There are all sorts of possibilities which come to mind. They must be given a trial. The great thing is to leave the rut we have settled in, and break fresh ground. We have amply proved that 56 mc. communication over considerable distances is a practical proposition, now let us improve our methods, as we have done in other directions. Once there are some stabilised transmissions to listen to, the receiver design experts will show us the way to proceed, but until that happens they have nothing to test their ideas on.

We make no apology for this somewhat lengthy editorial, but can only promise you more on the same lines if no improvement is brought to our notice.

G6PA.

Modulating the Crystal Oscillator

Members who have tried modulating the C.O. stage of a COPA transmitter often find that the C.O. jumps out of oscillation. The remedy is to use correctly adjusted Heising modulation, with under-modulation. The C.O. anode current will then be perfectly steady. At G5WW the modulation percentage on the C.O. is about 60 to 70 per cent., and by careful adjustment of the P.A. it is possible to get as much as 150 per cent.

From these remarks it is obvious that correct adjustment of the P.A. is essential. Three methods are available.

First, one can use a straightforward Class B linear P.A., but although this is the simplest method it is the least efficient in terms of radiation for anode input.

Second, a method can be used similar to that adopted for high quality grid control, *i.e.*, the P.A. is adjusted for Class C operation, and then the drive from the C.O. is reduced until grid current ceases to flow. Modulation can then be applied until grid current appears again, indicating a state of over-modulation. This system has the advantage that a very small amount of modulation on the C.O. will give a large percentage on the P.A., but on the other hand it may be classed as inefficient in that a large P.A. valve is required (say a 4211 for a 10-watt carrier).

The last method is by far the most efficient in terms of output for input, but requires rather a large amount of bias on the P.A. and higher anode voltages than are normal in a 10-watt station. The transmitter is adjusted for Class C operation with an input of about 20 watts to the P.A. It will be found that the P.A. is taking a fairly heavy grid current at this power, and any attempt to modulate the C.O. will give poor quality. The grid bias is then increased until the P.A. dissipation is only 10 watts. It will now be found that no grid current is flowing and the P.A., although working at Class C efficiency, will operate as a linear amplifier.

The following facts may be useful as a guide. The P.A. valve at G5WW is a 210 driven by a valve similar to the 47 with an anode voltage of 500 on both valves. The C.O. input is about 9 watts, and the bias required on the P.A. to hold the power down to 10 watts is 280 volts.

When a transmitter is adjusted in this manner there is no appreciable step-up between stages, but this is of little consequence in low power work. Furthermore, if straightforward choke control of the P.A. is used it is necessary to have almost as many watts on the C.O. and P.A. in order to supply ample excitation during modulation peaks.

G5WW.

Progress of Duplex Work

It is thought that one or two notes on the duplex work being done by Group 1F will interest other members unacquainted with this line of research.

1. *Aerials.* Members generally use separate aerials for transmitter and receiver, about 45 degrees or more apart. Parallel aerials are not recommended. At one station a frame aerial for reception is employed.

2. *Keying.* Duplex C.W., or "break in," is much easier to use than phone. Key clicks are usually not troublesome. It is best to key in the buffer or F.D. stage, and a point of interest here is that the P.A. must have battery or some other type of fixed bias and also loose aerial coupling, to prevent spacer waves.

3. *Feedback.* With straight battery receivers it has not been found necessary to take special precautions to prevent R.F. getting back into the mains, but with battery superhets and mains receivers a filter is required. A double choke and condenser filter in the mains leads of both transmitter and receiver can be easily built. Chokes of 100 mH each with two .01 mf. condensers will be suitable for 1.7 and 3.5 mcs. The condensers are connected in series across the mains and their junctions earthed. It should be noted, however, that in the receiver, chokes are required on the output side of the power pack, while in the transmitter they should be placed directly across the supply mains.

4. "*Break-in*" is much easier to operate than phone, and does not call for so many elaborate filters, provided the transmitter is correctly neutralised, loaded and loose coupled. The Collins

(*Continued on page* 120)

NEWS AND VIEWS FROM 53.

EDITORIAL NOTICES

As from the October issue, the closing date for all contributions, including District Notes and E.L.S. reports, will be the last day in the month preceding publication. Under no circumstances can this date be extended.

* * *

Members forwarding articles for publication should in all cases submit diagrams on a separate sheet.

* * *

In the event of a member failing to receive a particular issue, he should notify Headquarters *within one* week of the normal time of receipt. In future we cannot guarantee to supply back issues of this Journal.

Technical Programme, 1935-1936

The Editor will be pleased to consider, with a view to publication, articles dealing with the following subjects :—

Constructional.

(*a*) Equipment for 112 and 224 mc. work.
(*b*) A portable c.c. transmitter for 7 and 14 mc. operation.
(*c*) A crystal controlled transmitter for 28 mc. operation.
(*d*) A mains short wave convertor.
(*e*) A transverse current microphone.
(*f*) A stable frequency 56 mc. transmitter.

Theoretical.

(*a*) Results of field strength measurements.
(*b*) Results of experiments carried out with cathode ray tubes.
(*c*) A summary of radio conditions covering the years 1925-1935.
(*d*) An account of experiments conducted with various forms of antenna systems used for DX work.

Members willing to undertake the preparation of articles dealing with any of these subjects are requested to notify Headquarters prior to their commencement.

National Mountain Field Day

Our Swiss friends who have supported N.F.D. so well in the past advise us that their Second Mountain Field Day Contest will take place on September 22, from 06.00 to 12.00 B.S.T. The Swiss stations must be portable, and must be at least 1,000 metres above sea level. There will be no input restriction, but the weight of the complete station must not exceed 12 kilogrammes. British amateurs are invited to contact these stations, which will be working on 3.5 and 7 mc.

London Meeting

The first London meeting of the season will be held on Friday, September 27, at the Institution of Electrical Engineers, when Dr. C. G. Lemon (G2GL) will lecture on the subject of " Micro-Wave Transmission."

Tea will be served from 5.30 p.m. and the lecture will commence at 6.15 p.m.

Another W.B.E. Phone Award

Congratulations to Baron Louis Boneart de la Roche (ON4HM), the latest claimant to a W.B.E. Telephony Award. As recorded in the article dealing with the Belgium visit, our Secretary discovered, when at ON4HM, that although he had proof of numerous telephony contacts with other continents, no report had been received from Europe. Immediately after the visit Miss Nelly Corry (G2YL) established contact and R9 telephony signals were received by her from ON4HM.

Convention Photographs

Members desiring copies of the Convention group photographs are requested to communicate with the photographer, Mr. Green, 25, Kenton Lane, Kenton, Middlesex.

Copies can be obtained at a price of 3s. each, post free. The size is 12 ins. by 7½ ins. on " Cardette."

Empire Calls Heard.

By J. Alexander (2AXX), 63, Tennyson Road, Birmingham, 10.

From July 17 to August 18.

14 mc.; su1kg (5.6 fone). 1ss (5.6.9), ve1bh (5.6.9), 1br (5.7.8), 1ci (5.6.8), 1cr (5.7 fone), 1dc (5.6.7), 1do (5.7.9), 1dz (5.6.8), 1ea (5.5.9), 1ev (4.6.6), 1ex (5.7.9), 1fn (4.6.8), 1in (5.8.9), 2br (5.6.8), 2hm (5.7.9), 2vg (5.6 fone), vk5wk (5.5.9), vo1i (5.6.6), vp2bx (5.6.8), vq4kta (5.7.9), vs2ag (5.6.9), ze1jr (5.6.9).

O.V.2 receiver used. Figures in brackets denote signal strength and tone.

W6GAL (California), 1934-5.

g2ak, 2bk, 2bm, 2hx, 2ic, 2ki, 2mr, 2nh, 2nu, 2pl, 2sx, 2yl, 2zq, 5bd, 5bj, 5by, 5cw, 5cy, 5fa, 5gq, 5kf, 5kg, 5qa, 5sr, 5vb, 5vl, 5yg, 5yh, 5yv, 6cj, 6dh, 6dl, 6ir, 6lk, 6nd, 6nj, 6oy, 6qb, 6qs, 6qv, 6qx, 6rb, 6sr, 6uf, 6vk, 6vp, 6wy, 6xn, 6yu, 6zx.

Two well-known Belgian Amateurs.
Left ON4CC, Right ON4AC, both stations have worked all continents, the latter on telephony.

NEW MEMBERS.

HOME CORPORATES.

A. Edwards, B.Sc. (G2DJ), 5, Castlewood Road, Fulwood, Sheffield, 10.
A. Cogdon (G5AC), 93, Mount Road South, Sunderland, Co. Durham.
F. D. Clough (G5FD), 42, Roxburgh Terrace, Whitley Bay, Northumberland.
F. A. George (G5FG), 35, Wolsey Grove, Burnt Oak, Edgware, Middlesex.
T. L. Franklin (G5HO), Station Road, Broxbourne, Herts.
R. P. Heatley (G5OH), The Shiel, Church Road, Broadstone, Dorset.
J. F. Smith (G5ZS), "Kittiwake," 31, Sandy Lodge Way, Northwood, Middlesex.
L. Harget (2BBJ), 28, Highwoods Road, Roman Terrace, Mexboro', near Rotherham, Yorks.

NEW MEMBERS

E. H. Pawson (BRS1951), 66, Mill Lane, Brigg, Lincs.
H. Bradford (BRS1952), 87, Cavalry Crescent, Eastbourne.
C. E. Williams (BRS1953), Hortham Cottage, Almondsbury, Glos.
A. D. Rock (BRS1954), 4, Linton Road, Old Hill, Staffs.
F. James (BRS1955), 52, Walton Street, Oxford.
G. E. Pearson (BRS1956), 35, Bowsden Terrace, South Gosforth, Newcastle-on-Tyne, 3.
R. L. Baker (BRS1957), 139, Stanstead Road, Forest Hill, S.E.23.
W. E. Brunt (BRS1958), 43, Palmerston Road, Walthamstow, E.17.
C. Dorsey (BRS1959), 34, Halifax Road, Liversedge, Yorks.
A. W. Alcock (BRS1960), 104, Como Street, Romford, Essex.
H. M. Field (BRS1961), 56, Moorgate, London, E.C.2.
W. P. Amass (BRS1962), 9, Winfrith Road, Earlsfield, S.W.18.
J. Charles (BRS1963), 13, Elm Park Road, Chelsea, S.W.3.
H. J. Beadle (BRS1964), "Lugano," Offington Avenue, Worthing, Sussex.
J. Buckley (BRS1965), Forest Street, Corner, Weaverham, Northwich, Cheshire.
J. Gilpin (BRS1966), 51, Ruebeck Road, Rochester.
R. Grah (BRS1967), 129, Gloucester Court, Kew Gardens, Surrey.
E. G. Evans (BRS1968), 213, Millhouse Road, South Yardley, Birmingham.
V. V. E. Ross (BRS1969), 251, Church Road, Hayes, Middlesex.
R. M. Owen (BRS1970), 14, Watermead Road, Bromley Road, Catford, S.E.6.
F. E. Hurley (BRS1971), 26, The Triangle, Bournemouth.
C. Monteith (BRS1972), 31, Rosemary Road, Clacton-on-Sea, Essex.
H. J. Larkman (BRS1973), 11, Elgin Park, Redland, Bristol, 6.
Prof. D. T. Harris, M.D., D.Sc. (BRS1974), London Hospital Medical College, Turner Street, E.1.
R. H. Crabtree (BRS1975), "Lynton," Halifax Road, Nelson, Lancs.
J. M. R. Studholme (BRS1976), 50, Finborough Road, S.W.10.
M. Golkovitch (BRS1977), 3, Burwell Road, Leyton, E.10.
L. A. Pont (BRS1978), 103, Allcroft Road, Gospel Oak, N.W.5.
J. B. Wilson (BRS1979), "Fairhaven," Greylands Park, Scarborough.
R. S. Moore (BRS1980), 92, Duchy Road, Harrogate, Yorks.
W. T. Roberts (BRS1981), The Cottage, Eyarth House, Ruthin, N. Wales.
F. G. Rylands (BRS1982), 5, Atherley Road, Southampton.
A. A. Cotterell (BRS1983), "The Mendips," Bescot, Walsall, Staffs.
F. F. Bowling (BRS1984), Market Place, Stainforth, Doncaster, Yorks.
F. C. Brewer (A), 10, Penwerris Terrace, Falmouth, Cornwall.

DOMINION AND FOREIGN.

F. T. Shaw (CX1BU), Sociedad Commercial de Montevideo, Calle Rincon 508, Montevideo, Uruguay.
T. D. O'Farrell (EI6F), Park House, Booterstown Avenue, Co. Dublin, I.F.S.
L. V. Rubeck (ON4ZQ), 13, Avenue Hamoir, Uccle 111, Brussels, Belgium.
J. A. Robertson (VE2GA), 245, Edison Avenue, St. Lambert, Montreal, Canada.
W. G. Ryan (VK2TI), 21, Tunstall Avenue, S. Kensington, Sydney, N.S.W.
I. Patterson (VK3YP), 82, Burke Road, East Malvern, S.E.5, Victoria.
Prof. E. Duncan-Smith (VU2BY/2DJ), Connaught Institute, Poona, India.
J. E. Mellors (YI7RR), Main W/T Station, R.A.F., Hinaidi, Iraq.
Sergt. M. Sion (BERS302), Signal Battalion, Iraq Army, Baghdad, N. Iraq.
C. C. Cawood (BERS303), Sandakan, British North Borneo
F. J. Robinson (BERS304), British Borneo Timber Company, Sandakan, British North Borneo.
J. D. McFarlane (BERS305), Antigua, British West Indies.
H. E. Du Preez (BERS306), 39, West Street, Lower Houghton, Johannesburg, S. Africa.
L. B. Graham (BERS307), 1st Floor, E.S. & A., Bank Chambers, Broadway, Sydney, N.S.W., Australia.
E. C. M. May (BERS308), R. Signals, Kowloon, Hong Kong, S. China.
N. C. B. Cleveley (BERS309), R. Signals, Kowloon, Hong Kong, S. China.
R. C. Jones (BERS310), Burma Oil Company, Ltd., Yenangyoung, Upper Burma.
C. Krishnaswamy Naidu (FRS35), 2/105, Armenian Street, Madras, India.
J. G. Mouracade (FRS36), P.O. Box 367, Beirut, Syria.

QRA Section.

Manager: M. Williams (G6PP).

NEW QRA's.

G2AF.—C. Bryant, "Woodside," Elvin Road, Dereham, Norfolk.
G2PQ.—G. E. Mortley, "Synden," Forest Road, Tunbridge Wells, Kent.
G2SR.—E. A. Saunders, 2, The Broadway, Beddington, Surrey.
G5OP.—F. H. Pemberton, 78, Merlewood Avenue, Churchtown, Southport, Lancs.
G5SI.—H. G. Simmons, "Trevona," Wrotham Road, Gravesend, Kent.
G5XH.—L. W. Hooke, 39, Lavington Road, Beddington, Surrey.
G6BP.—G. F. Budden, 11, Copse Avenue, West Wickham, Kent.
G6BW.—Capt. B. Wallich, White Orchard, Churchill, Somerset.
G6HM.—E. R. Henman, 70, Avondale Road, London, S.E.15.
G6LR.—L. P. Elmer, 30, Parsons Green, London, S.W.6.
G6QM.—A. J. Mathews, 74, Hawthorn Road, Hornsey, London, N.8.
G6RP.—R. Parsons, 24, Priory Road, High Wycombe, Bucks.
G6YR.—R. W. Rogers, 21, Chester Avenue, Southport, Lancs.
2ACB.—M. C. Crowley-Milling, "Belmont," Pen-y-Bryn Road, Colwyn Bay, Denbighshire.
2ACK.—C. A. M. Clackson, 15, Norval Place, Rosyth, Fife, Scotland.
2ADY.—H. Eyre, "Westgrove," Locke Avenue, Barnsley, Yorks.
2AFX.—A. G. French, 29, Framfield Road, Uckfield, Sussex.
2AGZ.—G. C. W. Addison, 35, Hillside Avenue, Douglas, Isle of Man.
2AIV.—V. C. Rayner, "Lezavre," Waterloo Park, Liverpool, 22.
2AIG.—R. S. Page, "Newbry," Croutel Road, Felixstowe, Suffolk.
2AIN.—R. A. Perryman, 33, Catharine Street, Liverpool, 8.
2ASL.—A. Slator, 34, Clarendon Square, Leamington Spa, Warwickshire.
2AVD.—L. J. Davis, 223, Leigh Road, Leigh-on-Sea, Essex.
2AVH.—W. G. Hall, 48, Hawkdene, Chingford, London, E.4.
2AVL.—N. L. Avery, 82, Hatherley Road, Winchester, Hants.
2AZW.—R. C. Warne, 6, Western Place, Penryn, Cornwall.
2BBP.—W. H. Peek, 20, Bloomsbury Street, Poplar, London, E.14.
2BCF.—B. C. Leipe, 16, Carlton Drive, Leigh-on-Sea, Essex.
2BCN.—E. Le Cheminant, 167, Botwell Lane, Hayes, Middlesex.
2BFJ.—J. E. Maxwell, Jun., 3, King's Crescent, Knock, Belfast.
2BGJ.—S. C. P. Mears, 14, Foxlands Road, Dagenham, Essex.
2BHL.—W. C. Keasley, 32, Chipstead Avenue, Thornton Heath, Surrey.
2BHS.—S. Howard, 92, Arlington Road, Southgate, London, N.14.
2BJC.—J. Elphick, Burnham College, Burnham-on-Sea, Somerset.
2BLK.—J. M. Kirk, 205, Great Northway, Hendon, London, N.W.4.
2BLL.—W. Layton, Jun., 138, Gravelly Hill, Erdington, Birmingham.
2BNU.—T. Brown, 33, Hampden Road, Roker, Sunderland.
2BOC.—E. A. C. Jones, 62, Lincoln Road, East Finchley, London, N.2.
2BRF.—F. Barrett, 6, St. Thomas' Place, Grays, Essex.
2BWF.—F. W. Benson, 55, Corona Drive, Thorne, Doncaster, Yorks.

The following are cancelled: 2AIO, 2BPK.

I.R.T.S. LOSS

We have learned with deep regret of the death of Commandant Smyth, President of the Irish Radio Transmitters Society. Commandant Smyth was in very close personal contact with the amateur movement, and his untimely death will be felt keenly by all who had the pleasure of his acquaintance.

Our sympathies are extended to his relatives and friends, especially those connected with him in the organisation of the I.R.T.S.

QSL Section.

Manager: J. D. Chisholm (G2CX).

Those who were able to attend Convention this year and were present at the business meeting will remember that the question of report cards was discussed at some length.

After views had been given both by the D.R.s at the delegates' meeting and the general membership at the business meeting later the same morning, it was agreed that the Society should endeavour to obtain reciprocal arrangements with European societies to discontinue the exchange of listeners' report cards except where the latter refer to 1.7 mc., 28 mc., or 56 mc. transmissions.

By this means it is hoped that the volume of wasted work performed by H.Q. can be reduced at the same time that interest in the "experimental" bands is stimulated.

The ways and means of gaining this end will be discussed at the next Council meeting, and any further information of interest will be printed in these columns as soon as possible.

R.S.G.B. Slow Morse Practices

A schedule of dates, times and frequencies of the stations sending slow Morse for the benefit of those members wishing to learn the code is given below. As usual, test matter will be taken from recent issues of the T. & R. Bulletin. The page number and month of issue will be given at the end of each test. More reports will be appreciated, and are desired in order to ascertain range of transmission and numbers utilising the service. Reports may be sent *via* the Society's QSL section. If, however, replies direct are desired, stamps should be enclosed. G6VD, of Leicester, asks for reports from Midland members, as so far very few have been received by him. It will be noticed that G6AU, of Forest Gate, London, E.7, is now providing a service for East London and Essex. G5JU, of Bristol, is discontinuing owing to 56 mc. activity. G2JL, of Newport, Mon., has also discontinued, reporting that the service provided in that area has served its purpose for the time being. He will, however, recommence when the need arises. Stations willing to assist, particularly from those districts at present without a service, are invited to communicate with Mr. T. A. St. Johnston (G6UT), 28, Douglas Road, Chingford, E.4. Telephone: Silverthorn 2285.

Schedule of Slow Morse Transmissions.

Date, 1935.	B.S.T.	Kcs.	Station.
Sept. 22, Sun.	0930	1785	G5BK
,, 22 ,,	1030	1927.5	G5OD
,, 22 ,,	1100	7104	G6PJ
,, 22 ,,	1200	7102	G5GC
,, 26, Thur.	2300	1990	G6AU
,, 29, Sun.	0930	1785	G5BK
,, 29 ,,	1015	173λ	G5UH
,, 29 ,,	1030	1927.5	G5OD
,, 29 ,,	1100	7104	G6PJ
,, 29 ,,	1200	7102	G5GC
Oct. 3, Thur.	2300	1990	G6AU
	G.M.T.		
Oct. 6, Sun.	0930	1785	G5BK
,, 6 ,,	1000	1850	G6VD
,, 6 ,,	1030	1927.5	G5OD
Oct. 6 Sun.	1100	7104	G6PJ
,, 6 ,,	1200	7102	G5GC
,, 10, Thur.	2300	1990	G6AU
,, 13, Sun.	0930	1785	G5BK
,, 13 ,,	1000	1850	G6VD
,, 13 ,,	1015	173λ	G5UH
,, 13 ,,	1030	1927.5	G5OD
,, 13 ,,	1100	7104	G6PJ
,, 13 ,,	1200	7102	G5GC
,, 17, Thur.	2300	1990	G6AU

DX CHART No. 10

DX CONDITIONS: JULY 15 TO AUG. 15, 1935.

G.M.T.	14 mc.
0500	W6.7; VP5; TI
0600	W6.7; VK
—	
1400	J; VK; VU; PK
1500	J; VS1; W 6.7; KA; PK
1600	W6.7; VS2
—	
1800	KA1
1900	J; ZB
2000	W6; CX1
2100	W5.6; K4.5; VQ4; LU; PY; CX
2200	W5.6; LU; VP1.2.5; PY; CX
2300	W5; OA; CE
2400	W6.7

Peak signals from W1.2.3.4.8.9 between 1900 and 2400.

CORRESPONDENCE.

THE OSRAM DET8 VALVE.

To the Editor, T. & R. Bulletin.

Dear Sir,—Referring to the write-up in your August issue on a One-Valve Pentode Transmitter for 1.7 mc., by Mr. I. J. P. James, B.Sc. (G5IJ), may we bring to your notice that the Osram DET.8 is erroneously described as being similar to the Osam PT25*H* Valve.

We shall be glad if you would kindly insert a correction in your next issue pointing out that it is the transmitting counterpart of the PT25, but with the suppressor grid brought out to a separate pin.

The difference between these two valves is that, while the PT25H operates with 400 volts on both anode and screen, the PT25 requires only 200 volts on the screen with 400 on the anode. We are not certain whether the error was occasioned by a statement from this office to Mr. James that the valve was the counterpart of the PT25H, and if this proves to be so we would express our regrets both to him and to you for the mistake which has occurred.

We would add that supplies of the DET.8 valve will very shortly be available when the question of price has been settled.

Yours faithfully,
For and on behalf of
The General Electric Co., Ltd.
T. E. Henderson,
Osram Valve Technical Dept.

NOTES and NEWS from the BRITISH ISLES

DISTRICT REPRESENTATIVES.

DISTRICT 1 (North-Western).
(Cumberland, Westmorland, Cheshire, Lancashire.)
MR. J. NODEN (G6TW), Fern Villa, Coppice Road, Willaston, near Nantwich, Cheshire.

DISTRICT 2 (North-Eastern).
Yorkshire (West Riding, and part of North Riding), Durham, and Northumberland (Middlesbrough is in this district.)
MR. L. W. PARRY (G6PY), 13, Huddersfield Road, Barnsley, Yorks.

DISTRICT 3 (West Midlands).
(Warwick, Worcester, Staffordshire, Shropshire.)
MR. V. M. DESMOND (G5VM), 199, Russell Road, Moseley, Birmingham.

DISTRICT 4 (East Midlands).
(Derby, Leicester, Northants, Notts.)
MR. H. B. OLD (G2VQ), 3, St. Judes Avenue, Mapperley, Nottingham.

DISTRICT 5 (Western).
(Hereford, Oxford, Wiltshire, Gloucester.)
MR. W. B. WEBER (G6QW), 2, Balmoral Road, St. Andrews, Bristol.

DISTRICT 6 (South-Western).
(Cornwall, Devon, Dorset, Somerset.)
MR. W. B. SYDENHAM (G5SY), "Sherrington," Cleveland Road, Torquay.

DISTRICT 7 (Southern).
(Berkshire, Hampshire, Surrey.)
MR. E. A. DEDMAN (G2NH), 75, Woodlands Avenue, Coombe, New Malden, Surrey.

DISTRICT 8 (Home Counties).
(Beds., Bucks., Cambs., Herts. and Hunts.)
MR. G. FEATHERBY (G5FB), 30 Lindsey Road, Bishops Stortford, Herts.

DISTRICT 9 (East Anglia).
(Norfolk and Suffolk.)
MR. H. W. SADLER (G2XS), Redways, Wootton Road, Gaywood, King's Lynn, Norfolk.

DISTRICT 10 (South Wales and Monmouth).
Capt. G. C. PRICE (G2OP), The Mount, Pembroke Dock.

DISTRICT 11 (North Wales).
(Anglesey, Carnarvon, Denbighshire, Flintshire, Merioneth, Montgomery, Radnorshire.)
Mr. T. Vaughan Williams (G6IW), "Malincourt," Grosvenor Ave. Rhyl, Flintshire.

DISTRICT 12 (London North).
Mr. S. BUCKINGHAM (G5QF), 9, Brunswick Park Road, New Southgate, N.11.

DISTRICT 13 (London South).
MR. J. B. KERSHAW (G2WV), 13, Montpelier Row, Blackheath S.E.3.

DISTRICT 14 (East'ern)
(East London and Essex.)
MR. T. A. ST. JOHNSTON (G6UT), 28, Douglas Road, Chingford, E.4.

DISTRICT 15 (London West and Middlesex).
MR. H. V. WILKINS (G6WN), 81, Studland Road, Hanwell W.7.

DISTRICT 16 (South-Eastern).
(Kent and Sussex).
MR. A. O. MILNE (G2MI), "Southcot," Larkfield, Kent.

DISTRICT 17 (Mid-East).
(Lincolnshire and Rutland.)
MR. A. E. LIVESEY (G6LI), Stourton Hall, Horncastle, Lincs.

DISTRICT 18 (East Yorkshire).
(East Riding and part of North Riding.)
MR. T. WOODCOCK (G6OO), "Conakry," Cardigan Road, Bridlington.

SCOTLAND.
MR. JAMES HUNTER (G6ZV), Records Office, 51, Camphill Avenue Langside, Glasgow.

NORTHERN IRELAND.
MR. W. GRAHAM (GI5GV), 5 Ratcliffe Street, Donegal Pass, Belfast

NEW MEMBERS ARE CORDIALLY INVITED TO WRITE TO THEIR LOCAL DISTRICT REPRESENTATIVE.

DISTRICT 1 (North-Western)

DELAY on account of the holiday period prevented No. 1 District Notes from appearing last month, for which the District Scribe (G6CX) tenders his apologies; the July notes are now published together with the current notes for August.

* * *

An attendance of 20 was recorded at the Manchester meeting held on July 3, although by mistake July 10 was given in the district Calendar of the BULLETIN as the date of the meeting.

BRS1332, ex SU1MM, gave a very interesting talk, describing the various SU stations he had operated and visited. At the close of the talk a series of questions were put to the speaker by a B.E.R.U. visitor, M. Shams-el-Deen of Marconi's College, Chelmsford, whom members were pleased to welcome to the meeting.

A hearty welcome to the meetings was also extended to G6SH and G6HZ, and it is hoped to see them both on many occasions.

By the time this is in print, members will have held a 56 mc. field day, which was arranged with the Liverpool members for July 14, also the Conventionette will have passed by for another year, and G2OI would like to thank all those who helped to make this a success by attending.

The following stations report: 2BJG completed CO.FD.PA. 7-14 mc. G6UQ worked on Snowdon tests with portable 56 mc. Super Reg.—busy building a 56 mc. transmitter. 2AXH also working hard down on 56 mc. 2ACP trying to get upward modulation, using grid control on reasonable power. 2BZX listening on 28 mc. reports hearing I.U. BRS1504 on reception, G6HZ has already started by building a QRP CO.PA, QRP because his new QRA only sports gas mains, he will use a 33-ft. vertical aerial. BRS1332 (SU1MM) not active due to likely move of QRA back to SU (we will be sorry to lose you, OM!) G6SH on 56 mc. work, also 1.75 mc. fone. BRS1549 still busy with morse and waiting to hear from G.P.O. about AA. G5US testing fone and aerials on 14 mc. G5OZ new CC Tx. working W, VE, TF, ZB after QRT four weeks' illness; the above Tx. was used at N.F.D. G5YD working duplex fone with the States. 2DH and 2WQ also busy with skeds on 56 mc. fone. 6QA, 6AX and 6ZS are all busy on

Supers and general working; we also hear active 5PX, 2BK, 6GX, 5XF, 5VN on various bands. G2OI would be glad if these stations would just drop him a card once a month before the 10th, stating their activities, and wishes again to thank G2IN for sending the following list of station reports. G2IN work this month confined to 56 mc., on June 30 ascending Ashurst Beacon in terrible weather, G5CV on Snowdon was contacted both ways until 1400, distance about 75 miles, other 56 stations worked being 6GL, 2DC, 6DO, 2KZ, 5MQ and 2II located at Colwyn Bay, 45 miles distant; the operators at 2IN included 5ZI, 6SX assisted by an ex-VE station, Mr. C. I. Anson, now resident in Southport and a prospective R.S.G.B. member. A 56 mc. link is contemplated between 5ZI, 2IN and 2II. If sufficient listeners and possibility of record two-way on 56 warrant it, test will be carried out from either Pendle Hill or Inglborough in the near future. G5ZI is now permanently settled in Southport, and is erecting the station: 56, 7 and 14 mc. will be frequencies used. 6SX has erected a current-fed twisted feeder antenna for 14 mc. and finds it FB, busy helping 2IN with 56 mc. work, also finds a push-pull modulator very good. 6KY has constructed new CO.PA.TX, for use on 160 metres. 5ZR is building 56 mc. rig, but is not on the air with it yet. 5OP active on 160 m. 5KL by the time this is in print will be in new QRA and hopes to be in action soon. 2AMQ is experimenting with lower-power tri-tets, using battery screen grid valves. 2AIO has been granted full permit and hopes by now to have passed the Morse test (congrats and good luck, OM!). On June 28, 29 and July 1 he heard 28 mc. sigs from F8, FA8, ZB1 and OE; has also received confirmation of reception of VQ8A, Ascension Island, and K6JPD on 14 mc.

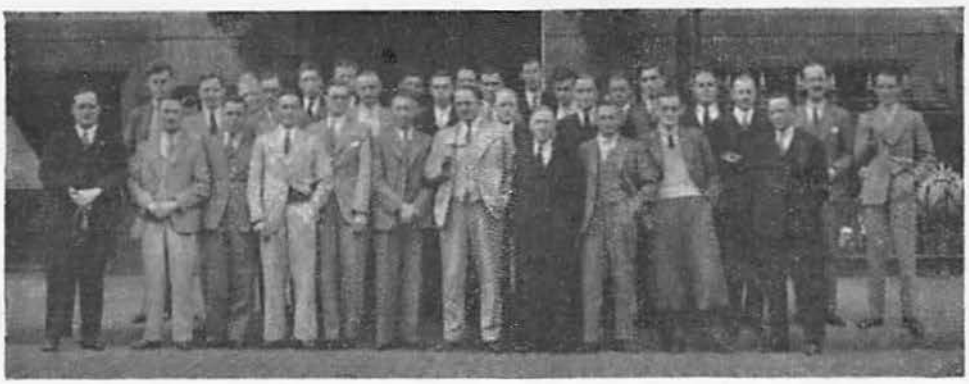
G6ZU reports active on 7 and 14 mc., busy building for 56 mc. BRS1908 busy on various bands, including 56 mc. BRS1705 states that he will be forced to leave the district on account of business reasons—he is being transferred to Greenock, Bonny Scotland. Well, good luck, OM, and good hunting! Sorry to lose you so soon. BRS1599 is busy with a Ham Band Two. The members welcome a new man—he is working CO.PA at 9 watts, using ½-wave Zepp, and states that G2RB is active. What about it, 2RB?

An attendance of 13 was recorded at the Liverpool July meeting, including OK2NY, who was over on a visit and staying for a few days at Wallasey. The comparatively poor attendance was no doubt due to the fact that some of the regular supporters of the meetings were away on holiday, but the C.R. would like to see some of the less-frequent attenders back in the fold. Plans are under consideration for obtaining alternative accommodation for the meetings where more space will be available, but greater support for the meetings is required to justify a change.

G2OA described an ingenious transreceiver which he has under construction, mainly for use on 56 mc., and it is hoped that he will shortly be able to give a practical demonstration at one of the meetings.

The 56 mc. tests which had been arranged for Sunday, July 14, were cancelled so far as this district was concerned on account of exceptionally bad weather, but interest in this band is certainly reviving and renewed activity is becoming apparent.

Only four members from the Liverpool area were present at the North-Western Provincial Meeting held at Manchester on Sunday, July 21, but further support was given by members from Southport and other parts of the West Lancashire area. No doubt the fact that the meeting was held during the holiday period had something to do with it, but the poor support given by this area was very disappointing. Congratulations are again due to the Manchester Section for the excellent arrangements and the smooth and successful running of the meeting, and the review of the Society's activities and general address so ably delivered by our enthusiastic Secretary was alone well worth the visit.



Manchester Provincial District Meeting, July, 1935.

Reports of local activity in this area were not very plentiful in July. G2JT reported that he had changed the doubler in his exciter unit for an H.F. pentode and was keying in the suppressor grid circuit, which he found completely eliminated B.C.L. QRM. He has evidently been bitten by a prevalent complaint, as he is keying with what he describes as an excellent bug. BRS1876 is to be congratulated on obtaining his AA licence. G5OP, 6KY and 5ZR were heard turning out some excellent phone and are getting very good results. G5RY reported that he was testing a new aerial system for

160-metre transmissions, but did not give details. (Further reports will be welcome if these tests show an improvement, OM !) G2OA has transferred his affection temporarily from 14 mc. to the 56 mc. transreceiver mentioned above and has been roving the district with it. He has also received a visit from his old friend OK2NY. Nothing has been heard of G6TT, and it is understood that he is on vacation.

The C.R. was unable to attend the August meeting in Liverpool and has therefore received no reports, with the exception of those kindly sent to him by G5RY.

The 160-metre band is still very active in this district and many stations have been heard working during B.C.L. periods. QRP, CW, stations have been getting good contacts. Congratulations to 2BOW on receiving his full call of G6FW—he has a CO.PA.

G5XD has been putting out excellent fone on this band. G2FD and 5RY have been carrying out modulation tests with satisfactory results. G5SF, 5ZR, 6KY, 6PO and 5TH are also reported to be working on this band. G5OP, after weeks of experimenting, has succeeded in constructing a mike at reasonable cost, which compares very favourably in results with an expensive commercial model. Reports received on the fine quality are very gratifying. G6CX is building a new modulator unit employing the " Class AB " system, together with the special power supply required to operate it, and hopes to obtain an audio output exceeding 30 watts, with a power supply voltage of 400 volts.

DISTRICT 2 (North-Eastern)

Fewer reports of activity are to hand this month, probably owing to holidays and Convention. The latter was visited by several members, including G6BX, 6KU, 2XH and BRS1834, and the various visits to works, etc., and meetings with many Empire and home members were thoroughly enjoyed. The Bradford stations are mostly active, and G2PK has been heard putting out some good-quality phone. A desire for better quality has made a few members begin construction of high transverse current microphones, two of which, by G6BX and 2VO, have a very fine response indeed.

In the Stockton district G5XT hopes to be on the air in a week or so with his new TX, and G6ZT and G2FO are active on 7 and 14 mc. respectively. Experiments on 56 mc. are being made by G2FO, 6ZT and 2BQO, and after many tests with single-valve circuits, these were discarded, and satisfactory results have now been obtained using push-pull systems. An outbreak of pirate stations has occurred, and it is hoped that this will be subdued shortly. The notes this month are somewhat short, partly due to lack of material, and also to the fact that they had to be made up earlier due to Convention.

DISTRICT 4 (East Midlands).

Mr. Lees (G2IO) informs us that the next Nottingham meeting is to be held on Sunday, September 22, at 7 p.m., in the County Tavern, High Pavement, Nottingham.

Mr. J. Curnow (G6CW) is welcomed back to No. 4 District.

DISTRICT 5 (Western).

The Bristol section held their usual monthly meeting during August which was very well attended.

G2HN has been carrying out modulation tests using a high quality speech amplifier giving about 15 watts undistorted output. G5KT has rebuilt his c.c. transmitter for use on 7, 14 and 28 mc. and is constructing a separate c.c. transmitter for 1.75 and 3.5 mc. Since rebuilding his 56 mc. transmitter he has been getting much better results. The 66 ft. Hertz antenna has been lowered at one end and is now semi-vertical. Since this change VK, VU, J3, CM, W5, W6, VS2 have been contacted for the first time, and phone has been put over to W8LIJ. He is most active on 14 mc.

G5UZ is putting out an excellent signal with 5 watts on 7 mc., using a pentode crystal oscillator only. A frequency doubler stage has been added with a view to trying DX. 2BMV has moved his station to a more favourable part of the house, and is busy with code practice and complete rebuilding operations, with a view to applying for his full licence. 2BRB has constructed a 3 stage c.c. transmitter for 7 and 14 mc., and is busy with code practice. He is using a half-wave 14 mc. Doublet receiving antenna, and hopes to apply for his full licence shortly.

DISTRICT CALENDAR

September/October, 1935

SEPT. 24.—District 14 (East London Section). 8 p.m. at G6AU, 63, Margery Park Road, Forest Gate, E.7.

SEPT. 25.—District 14 (Essex Section). 8 p.m. at G6CT, 23, Eastwood Boulevard, Westcliff-on-Sea.

*SEPT. 25.—District 15.—7.30 p.m. at BRS1500, 167, Botwell Lane, Hayes, Middlesex. The subject will be " Peaked Audio *versus* Single Signal."

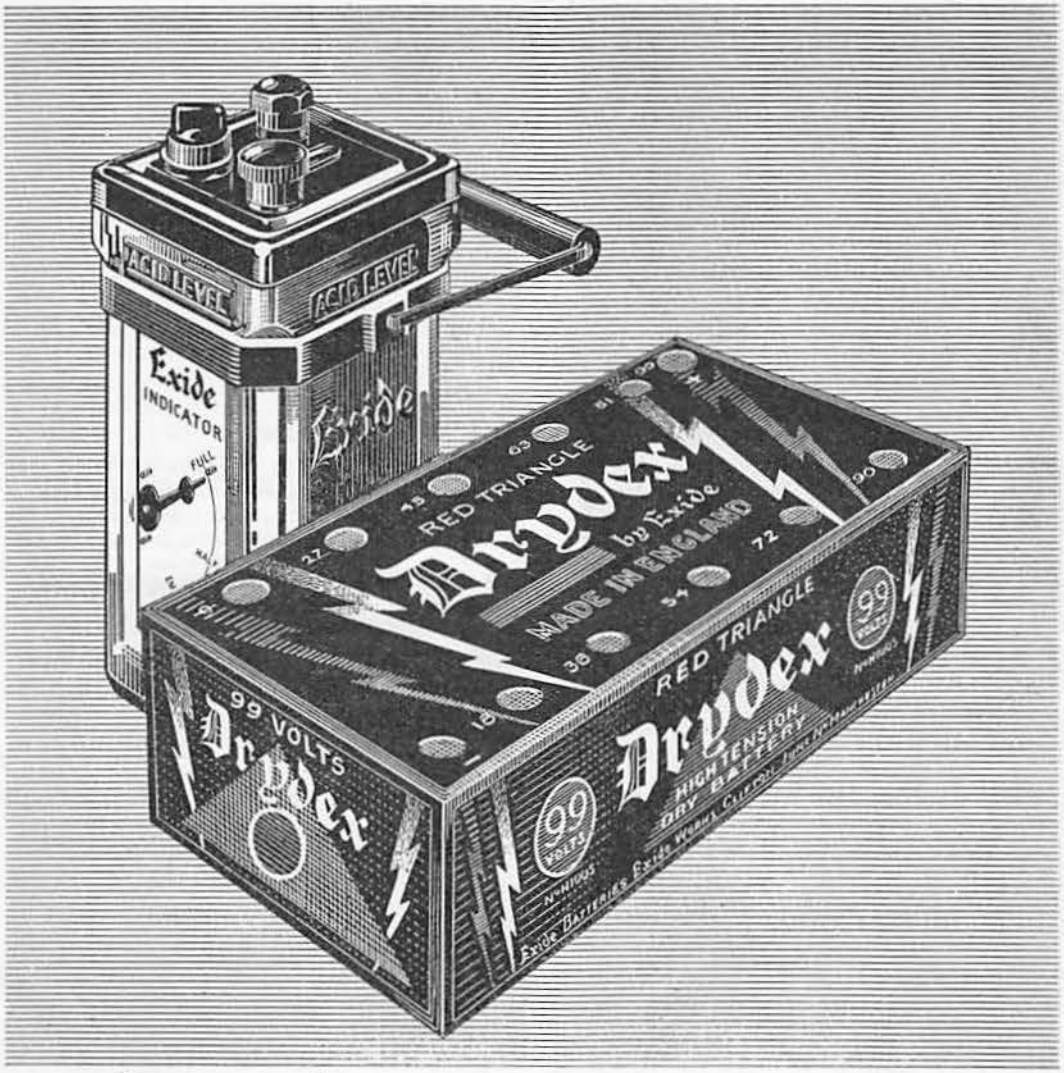
SEPT. 25.—Scotland " A " District. 7.30 p.m. in Room " A," Institute of Engineers and Shipbuilders, 39, Elmbank Crescent, Glasgow.

SEPT. 29.—District 13. South London Surprise Conventionette. The last of the Season. Write to the D.R. for full information and reservations.

OCT. 6.—District 7. 2.30 p.m. at Pitcher's Café, High Street, Guildford, Surrey Discussion on " Aerial Feeding and Matching Networks."

*Sale of disused apparatus.

2BYH has succeeded in getting his 3 stage transmitter working very well after experiencing trouble with it. He is busy with code practice and logging DX phone. BRS744 has observed the QRK of the West Regional station with a portable receiver, while journeying through Devon and Cornwall. It was noticed that results were very poor in the Plymouth and Dartmoor areas, but that the QRK increased considerably when 30 miles



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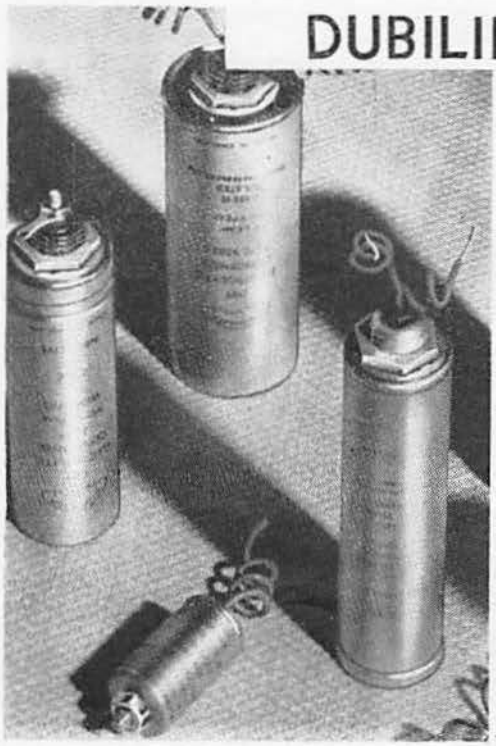

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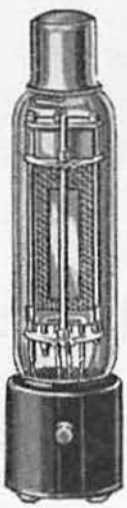

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to the South West of Plymouth. He is preparing to make a receiver for 56 mc. work. G6YA is very busy with studies at the moment.

G5WI is operating on 14 mc. with excellent results on QRP transmissions using drive. He finds an end-fed Hertz very good for DX on QRP. He wishes that stations not desiring contacts would not use the band for long test calls and modulation tests. He is getting ready for the September B.O.C.

G5JU, G5KT and G5WI were very pleased to welcome W3AWH, who was on a visit from Woolacombe, Devon, at their stations.

Activity in Oxfordshire is high for the time of year. The Wiltshire Letter Budget is very well supported by all members and is still most interesting.

DISTRICT 6 (South-Western)

Congratulations to the winners of N.F.D. We in the South-West hoped to be in a better position, and we will make better preparations for next time. We wish that better use could be made of the results, as it seems that at present there is a great deal of valuable information going to waste. For instance, the question asked by the D.R. in District Notes on conditions during N.F.D. is still unanswered! Is the scoring of points really all we are after?

A long and interesting report has been received from G5IJ, of Newlyn, Cornwall, regarding his QRP work, and we congratulate him on his article in last month's BULLETIN on "A One-Valve Pentode Transmitter for 1.7 mc."

BRS1611, of Plymstock, is now 2ALA, whilst BRS1438 and 1759, of Exmouth and Otterton respectively, have obtained their two letter calls. Congratulations to all three.

Conditions on 28 mc. appear to be falling off again, though on one or two occasions signals have come in very well at G5SY. Commercial harmonics appear at some time every day, sometimes only for a few seconds. WQP and WDU have been heard on the band. Contacts have been made with D, F, FA, OZ and HB.

DISTRICT 7 (Southern.)

With Convention over, we are now looking forward to the "season," although activity in No. 7 has been maintained at a high level throughout the summer and DX work on 14 mc. has been the rule rather than the exception. The 56 mc. work in the northern section of the district seems to have faded out, but to compensate for this the Portsmouth area has been very active on this frequency. The 1.7 mc. band seems about stationary, and the number of stations active on this frequency is approximately the same as at this time last year.

The monthly meeting programme has been fixed tentatively for the next six months, and members should note the following dates and venues in their diaries:—

October 6.—Pitcher's Café, High Street, Guildford.

November 3.—Reading. Exact venue to be fixed. Walton-on-the-Hill.

December 8.—G2YL., Redholm, Tadworth, Surrey.

January 5.—The Tumbledown Dick Hotel, Farnborough.

January 26.—G2NH, 75, Woodlands Avenue, New Malden, Surrey.

February.—No meeting due to B.E.R.U. Contests.

March.—The Hand and Spear Hotel, Weybridge, Surrey.

All meetings start at 2.30 p.m, and tea is provided, usually at a charge of 1s. The following subjects are due for discussion at these meetings:—Station layout; interference suppression and prevention; modulation; aerial feeding and matching networks; the s.s. super, with special reference to home-built *versus* commercial-built designs; H.F. measurements at amateur frequencies. This programme should provide much of interest to all, and the D.R. hopes that we shall have bumper attendances at all our meetings this coming winter.

DISTRICT 9 (East Anglia).

It is regretted that our District was not very well represented at Convention; however, the D.R. was pleased to see G5IX and G5JL there, although according to last month's issue the latter has moved to District 15.

The fact, if true, is very much regretted, for G5JL was a very willing worker.

Holidays seem to have been interfering with activity lately, but it is expected we shall all be settling down in earnest shortly—and sending in a few reports, so that these notes may be more easily compiled.

2AWI, now G6FB, is living well up to his call sign and is doing some excellent DX with a 1 valve Hartley TX, on which he has already had several W and VE contacts.

We are glad to announce that next years "No. 8" Convention is being held in Cambridge, we shall therefore be able to combine, and it is hoped that all members will keep a lookout for the date of the fixture.

It is also hoped to hold a smaller Conventionette in Cambridge later this year, details of which it is our intention to give in our next issue.

DISTRICT 10 (South Wales and Monmouth).

This month we welcome two new members, BRS1943 and 1949. Fourteen attended the usual monthly meeting at Newport and considering the holidays this is a very creditable performance. 2BPG is using a matched impedance vertical aerial and reports that it is far better for reception than the usual ½-wave variety.

G2JL, G2XX and 2BPG have been working on 56 mc. and are trying to contact Bristol.

The Blackwood Radio Club is holding another field day in September.

G5FI is thinking of holding a Hamfest at Cefn Coed towards the end of the month, and asks those interested to communicate with him at The Grange, Cefn Coed, as soon as they receive the BULLETIN so that he can complete the arrangements.

The D.R. regrets that it was impossible for him to attend Convention this year. As far as is known at the moment the only two from the District who attended were G2UL and G2XX.

There is no news again from the Swansea group, and it is presumed that they have gone all summer-like as long as the weather lasts.

DISTRICT 12 (London North).

The D.R. was pleased to welcome several old friends at Radiolympia, where he spent a week selling Guides at the expense of his vocal organs.

The Convention dinner was well attended by the North London group, but, owing to holidays, the Finchley members were not present. A large percentage of North Londoners present at the dinner were fortunate enough to obtain components donated by the manufacturers. We were glad to note that G5CD received a book on " Practical Mechanics," whilst several other members will now be able to use real insulators !

Both G6CL and G5QF entertained provincial and local members at their home QRA's on Convention Sunday, station visits were made and at G5QF a heated discussion on the Collins coupler took place.

We are pleased to donate a portion of the local ether to Mr. Samson (ex ZL4AI), who has recently taken up residence in this district. Congratulations are offered to Mr. Kirk on becoming 2BLK. G6PI has had regular R8/9 fone QSO with 11KB and 11T on 7 mc., with an input of 9 watts. Our QRP stations, G5NM and G2VD, have been doing good work. G5BO has developed a craze for " Bugs," and has obtained the necessary stay bone from his YL ! G5MG re-visited us from the wilds of Manningtree. G5VY has been displaced from his shack by his son (2BII), who has pensioned off the DE5's.

G5VY and G6JI have resumed their Sunday morning skeds on 56 mc. from 10-11 a.m.

Stabilised and high Q transmitters are being used, and reports will be welcome. BRS1511 has erected a rotating directional antenna for 56 mc., and has received both N. and S. London very well. G5BB has installed a Collins, and reports an increase in efficiency. It is noticed with pleasure that several members are trying this coupling with a view to cutting out B.C.L. interference.

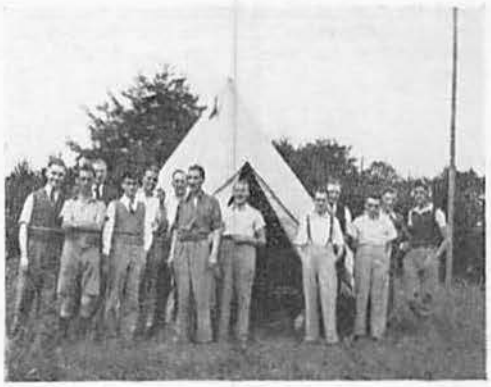
It is rumoured that G6CL's beansticks have grown to 30-ft. masts. G6TV is putting up a matched impedence antenna system. G2XJ and G5NQ are having a complete rebuild. 2BTZ is shortly applying for his full ticket. It is proposed to build a district 1.7 and 3.5 mc. TX. G5QF will be pleased to receive the following gear for its construction : one 0-100 m/a. meter, one 0.50 m/a. meter, one 0.5 amp. hot wire meter, one crystal holder, two six-pin coil formers and bases.

The next meeting will be held at the " Wander Inn," Church End, Finchley, on Tuesday, October 8, at 7.30 p.m. The talk will be announced later.

DISTRICT 13 (London South).

In spite of very hot weather 25 members attended the District meeting held on August 8. At this meeting the question of District finance was fully discussed, and a scheme adopted whereby it is hoped to have in hand next year a reasonable sum to cover N.F.D. expenses. As has previously been pointed out in these notes, it is felt that valuable work on the 56 mc. band is being wasted in South London through lack of co-operation. This matter was also on the agenda for the August meeting, and as a result of the discussions which arose it was decided to inaugurate a District " Who's Who " on 56 mc. Mr. Shersby (G2GZ) has kindly offered to be responsible for compiling it, and we should be glad if all those members who are interested would write to him giving details as to when are their most usual times of activity. Mr. Shersby will endeavour to forward a copy of " Who's Who " to all contributors as soon as he receives sufficient reports, and will also keep everyone advised as to any alterations as and when they occur. We sincerely hope that all 56 mc. enthusiasts will do their best to support this move, in order that the success which it deserves may be achieved.

The South London Field Day, held on July 27 and 28, was a great success, and was very well attended. A photograph of those who were present appears elsewhere in this issue. We hope that next year's field days will be as well supported.



South London Field Day, July 27-28, 1935. G2WV (D.R) fifth from left.

Individual reports this month are few. G5OX has been on 56 mc., but is very busy at the Radio Exhibition, and has had little spare time this month. G2AI is recovering from his illness, and hopes to be on the air shortly. G6CB has erected a 45-ft. mast at his new QRA, and is having a fair amount of success using 9 watts input. G2YG and G2UW have both been away on holiday. G2GZ has now completed his new 14 mc. transmitter, which is a great success. He reports having worked a number of North American, also PY1AW and ZB1E. He has received his permit for transmission on the 28 and 56 mc. bands, and hopes to be active on these frequencies in the near future. G2ND reports activity solely on 7 mc., and is very worried over his inability to make contact with any American stations. G5JW has been active on the 56 mc. band, and is experimenting with a portable transmitter most Sunday mornings. He is using a half-wave vertical telescopic mast placed on the roof of his car as a transmitting aerial. It is hope to continue these Sunday morning tests from various localities South of London after his return from holiday in mid-September. Co-operation and reports will be welcomed. (Please inform G2GZ, O.M.)

The South London Surprise Conventionette is fixed for September 29, and we look to all members of the District for support. Full details are now obtainable from the D.R., so please write and intimate your intention of being present, when you will receive full instructions as to time and place. By the time these notes appear in print Convention and Radiolympia, 1935, will be a thing of the past, and we do sincerely hope that everyone had a very enjoyable time. Please don't forget September 29. Write NOW.

DISTRICT 14 (Eastern).

No meetings were held during the past month. For September meetings see Calendar. The Southend " gang " have been visited by VP6MR, W7BLX, G2XS and G5KG. Congratulations to 2BCF, ex BRS1584. A number of Westcliff A.A. members are applying for their full licences. G2LZ and G2DQ have been busy with portable gear. G5VQ and G6CT are testing out various aerial systems. The following stations are active : G2SA, G2KT, G5VS, G6CT, G6OH, G6IF, G6KV, 2BWP, 2AKA and 2BNR. Now that G2SA has acquired at Convention a PX25 extra F.B. phone will be expected. Congratulations to the following : BRS1725, of Poplar, now 2BBP ; to BRS1559, of Dagenham, now 2AQC. QRA's are wanted by both the East London and Essex sections for October meetings. On 56 mc. the following stations have been heard : G2RR, G6JI, G6UT, G2XP and G2NU. On this band G2AW, of Bromley, is frequently heard, and signals are strong in East London.

DISTRICT 15 (London West and Middlesex).

The venue for the September meeting (see District Calendar) is about one mile from either the G.W.R. station or the main Uxbridge Road, and can be reached by tram or rail. It is hoped that a good attendance will be recorded.

It was gratifying to see so many members of the district at Convention. The D.R. was able to make many personal contacts with those he had not previously met.

Apologises to G6MN and G5YP, who attended the summer outing and whose names were omitted from these notes last month.

G6VP had a rectifier valve holder go up in smoke during the hot weather. G5LI worked VE4 and W's, and is testing Collins' coupler. Congratulations to 2BQX, who is now G5ZS, BRS1226 has built a valve voltmeter, and is rebuilding shack, but will be leaving district in October for some months. 2BAI had 2AKA, 2BCF, 2AWG, BERS228 and BRS1287 as visitors. Heard VP9, VP6, VE, CM and also W5 on telephony at QSA5, R8 in August. G6WN has been on 28 mc., but made no contacts, and only two on 14 mc.

DISTRICT 16 (South Eastern).

Olympia and holidays have prevented North-West Kent from being as active as usual. HB9P is staying in Beckenham, and is working his HB friends from nearby stations. 2AW, whose 56 mc. rig is at the top of his mast, reports that he uses a water-cooled valve, when it rains! He works 5RD and 2JU across London regularly. 2GB has been heard by 2OL, of Ealing, on 56 mc.

G2JH went to Tunbridge Wells recently and increased the 56 mc. enthusiasm by taking portable gear. 5OQ, 2UJ, 6OB, and 5KV are all active, and the latter wants reports from anywhere on his 7 mc. signals. 2BTI is co-operating with 2PQ on 1.7 mc. 2BVO is still working for his full ticket, and 2AUH and 2AVN are building for 56 mc.

In Folkestone, 2BAX and 2AZM are hard at work on 56 mc., but 6XB and 2IC have not done very much during the last month. 6CH is considering coming on the band and joining the QRM. 2BZZ reports activity. No report has been received from Ashford.

Two reports come from Sussex this month, direct to the D.R. One from 6CY, who reports active on 56 mc. in conjunction with 5IB. He asks for co-operation and reports. The other is from BRS1173, who has been away, but is now once more active, and deprecates the general slackness in the county. 6VC is trying for 14 mc. DX in Gravesend, and 2IZ has been cutting his own crystals with a motor-driven disc cutter, incidently plastering the ceiling with carborundum mud!

The D.R. and his wife went to Brussels with the R.S.G.B. party, and would like to record their appreciation, both of G5UK's organisation and the wonderful welcome they received from the ON fraternity. It would be waste of time mentioning names, because everyone put themselves out to entertain the visitors, and ensured they had a good time. If you want to see some marvellous " Ham " built gear, visit the Television stand at Brussels Exhibition. This stand, by the way, has a large building to itself, and is entirely run by members of Reseau Belge.

G2AX, the only other No. 16 district member on the trip, did his best for his local BCL's by doing the parachute jump at the Fun Fair. Fortunately he survived even this attempt at a good excuse for not sending in a monthly report.

The Medway members are active, but their report this month is too late for inclusion.

Scotland.

There is very little to report in Scotland, the holiday feeling still prevails at the time of writing.

G6ZX is rebuilding and will duly advise interested members when he will resume his 56 mc. transmissions. We learn with regret that G2DI has met with a serious accident and we wish him a speedy recovery to health.

The following changes have taken place in the membership : —

In " A " district : Mr. Shankland, BRS 1538 becomes 2BJS ; Mr. Goldsmith, BRS 1718, 2BGO ; and Mr. Ferguson, BRS 1761, 2AFY. " B " district has one change, Mr. Milne, BRS 1598 now being 2BYF ; while in " D " district, Mr. Clackson, BRS 1730 is now 2ACK.

We have still yet another departure to record from " A " district : Mr. Scott-Hay, G2FV, having gone south to take up an appointment with a well-known firm of radio manufacturers.

The Autumn being near again, meetings come to the fore. " A " district this year have had to find new accommodation and this has been secured at the Institute of Engineers and Shipbuilders, 39, Elmbank Crescent, Glasgow. The room taken is very suitable and will accommodate considerably more than our last one, and we therefore hope to see a large attendance at the first meeting which will take place on September 25, 1935, at 7.30 p.m. in Room " A " at the aforementioned place. No definite news regarding meetings in other districts is yet to hand with the exception that " D " have provisionally fixed September 25 for their first, the location is still uncertain.

Northern Ireland.

Due, no doubt, to summer vacations and similar attractions, amateur radio has been given rather a miss, and, as a result, reports are brief.

BRS1612 has obtained an A.A. licence, and will

henceforth be known as 2BJF. 2AFO has obtained a radiating ticket, and has been allotted 5OY as his new call. 5QX has rebuilt his transmitter, and reports contacts with 90 East Coast Americans during the past two months.

Up to the present the rush of N.F.D. subscriptions has completely overwhelmed the D.R.!

Belgium.

By ON4AU.

During July and August conditions have been very good on all bands. On 28 mc. LU came through well, and it was possible to hear some harmonics, especially those of PY1AW and PY5AA. ZS1H and ZT1H both report having heard ON4AU.

On 14 mc. ON4AU succeeded in working W1OXFP, the schooner *Morrissey*, which at the time was 77° N. 67° W. Many other contacts have been effected, including one with K7BB of Shumagin Island, Alaska.

On 7 mc. the QRM from W has been very bad, but at about 0400 G.M.T. ZL comes through well. ON4NC has obtained his fone W.A.C. His input has not exceeded 20 watts. This is the sixth Belgian fone W.A.C. A competition is taking place between ON4RX and ON4UU to see who can first reach 100 countries QSOd. At present 4RX has worked 99, and 4UU 98.

Holland

By G6FY.

Attention is focussed at the moment on the N.V.I.R. European Contest, which will be held from September 21 to 29 inclusive. During this contest, Dutch amateurs will be endeavouring to contact European stations on all wavebands; a code consisting of five figures has to be transmitted at each contact, and its accurate reception confirmed in writing by the station worked. British amateurs to whom such code numbers are transmitted during the contest period are particularly requested to co-operate by forwarding promptly QSL cards with a mention of these numbers.

A cup is offered for annual competition in this event, and the first, second, and third entrants receive gilt silver, silver, and bronze NVIR medals respectively.

It has long been a habit of the broadcast listener in Amsterdam to support his aerial from a pole on the roof—the result being a forest of unsightly masts. By order of the municipal council, these are shortly to be removed; amateur transmitters, however, alone retain the right to erect poles. Thus the amateur movement secures a new recognition and an excellent advertisement.

Interest in field days is as great as ever, and valuable information on the design of direction finding equipment is being collected.

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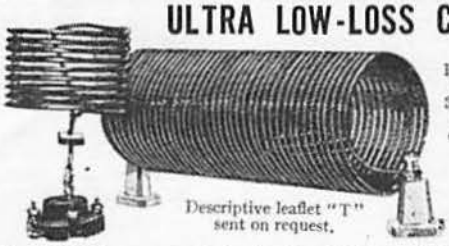
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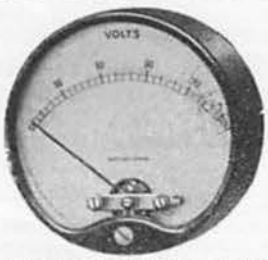

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Channel Islands.—Capt. A. M. Houston Fergus (G2ZC), La Cotte, La Moye, St. Brelades, Jersey.

Egypt, Sudan and Transjordania.—F. H. Pettitt (SU1SG), Catholic Club, Mustapha Barracks, Alexandria.

Hong Kong.—C. Emary (VS6AX), P.O. Box 391 Hong Kong.

Irish Free State.—Col. M. J. C. Dennis (E12B) Fortgranite, Baltinglass, Co. Wicklow.

Jamaica, British Honduras, Turks Island and Cayman Island.

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Malaya and Borneo.—J. MacIntosh (VS2AF), Posts and Telegraphs, Penang, S.S.

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Egypt, Sudan and Trans Jordania

By SU1SG *via* G5OQ.

Conditions during the month have been somewhat erratic, occasional good DX has been coming through, and full use has been made of these periods.

SU1RO made what is believed to be the first CX-SU contact.

Licenses are being issued slowly, and so far only about five have received them.

SU1WEM has at last made his debut, and is transmitting a nice T9 signal on the 14 mc. band. His call has been changed by the Postal authorities to SU1WM.

SU2TW has received his gear from G, and hopes to be active soon. This station has taken over the preparation of DX charts, and would be pleased to receive reports on conditions from all members in order that a representative chart may be circulated each month. Send all reports direct to T. Wimbush, Signal Section H.Q., R.A.F., Heliopolis.

SU1RK had arranged with the editor of *Egyptian Radio* to publish articles on "ham" radio. Unfortunately, however, a hitch has occurred which makes it doubtful if these articles will be published. Just at present it is not known exactly the nature of the trouble, but it is believed to be of official origin.

SU1FS has been rebuilding to C.C., and hopes to be active in September.

SU1SQ has at last received valves, and expects to renew acquaintance with old friends during early September.

Hong Kong.

By VS6AX *via* VS1AJ and G2RF.

On 14 mc. conditions have been bad, though VS6AQ has worked W8CRA several times, and also PY2BX. On 7 mc. VK stations have been heard regularly, though static level was rather high. VS6AH, who has left hospital, entered married life on August 31, and will be inactive for a couple of months. VS6AX has been experimenting with QRP and plate modulation, and has also been away on visits to Canton. VS6AQ has been active on 7 and 14 mc. BERS273 has been concentrating on 7 mc., and BERS282 is still on code practice. VS6AX has been active on 7 mc., and has been getting good reports on his new transmitter.

XU8CB has re-opened with a 90-watt rig, and sends a report confirming good conditions on 7 mc. 8CB requires G for W.B.E., and is anxious for a QSO. Active stations are VS6AQ, 6AX, 6AZ, XU8CB, BERS273 and 282.

Irish Free State

By EI9D.

It is with very great regret that we have to record the passing of Commandant Smyth of I.F.S. Army Signals, who, for two years past, ably occupied the Presidency of I.R.T.S. Commandant Smyth was keenly interested in the welfare of amateur radio from its early days, and his unexpected death on the 30th July came as a great shock to us all. To Mrs. Smyth and family we extend our very deepest sympathy.

Due to the courtesy of the Minister for Posts and Telegraphs, EI9D, 6F and 8G were shown over the Athlone BCL station on the 2nd inst. The QRO there is very impressive. The gear was ably and interestingly explained by Mr. Carson, who was in charge, to whom this expression of our appreciation is due.

EI7G is now the call of Mr. R. H. McDonnell, 5, Longford Terrace, Monkstown, Co. Dublin, whilst EI9G has been issued to Mr. T. P. Tierney, of 55, Moyne Road, Rathmines, Dublin. Congrats, OMs.

The QRA of EI5F is now No. 4 Bungalow, Deerpark Road, Mount Merrion Estate, Dublin, and not as heretofore.

EI9D and EI6F attended Convention and had a very good time. They take the opportunity of expressing to G2YL their thanks and appreciation for a very enjoyable evening spent at Walton-on-the-Hill.

Following Convention, it has now been definitely decided that I.F.S. hams are eligible for membership of B.E.R.U. at the overseas subscription rate of 12s. 6d. per annum. If, however, membership of R.S.G.B. is desired the full subscription of 15s. is payable. Prospective members are requested to note this.

At a special general meeting of I.R.T.S. held on 27th ult. it was decided to apply for honorary affiliation to B.E.R.U. It is hoped that this will lead to still closer co-operation in the future.

Reports are scarce this month, no doubt due to holiday QRM. EI5F, however, has been working ZL almost every morning on 7 mc. with 60 watts. They tell him he is one of the few Europeans getting across. Otherwise there is little of interest to report.

Kenya, Uganda and Tanganyika

By VQ4CRH.

Members of this Zone offer their congratulations to SU1EC and VU2JP on winning the Senior and Junior 1935 Contests respectively, also to BRS 250 for pulling off the Receiving section of the Contest again.

During July conditions on 7 mc. have not been good so far as DX is concerned, but the 14 mc. band was exceptionally lively and was used generally by all active stations during the month.

Local stations have started slow morse practices for the benefit of local listeners. Transmissions are on 7 mc. every Friday at 10.45 G.M.T.

VQ4CRO is again on the air with a new rig, and has had some very good DX.

VQ4CRR has made his first appearance on the air. His outfit at present is a TPTG using an LS5.

The Davidson Trophy has been won this year by VQ4CRL. Congratulations, OM. This trophy is now awarded in conjunction with the BERU Contests. VQ4CRL reports that he is shortly leaving VQ for South Africa. His departure I understand is for good, in which case we are all sorry to lose such a valuable member and would like to take this opportunity of wishing him the best of luck and a "Happy Landing" in sunny South, hoping to hear a new ZS call on the air in the near future.

Malaya.

By VS2AG, *via* VS1AJ and G6CJ.

Conditions on 14 mcs. have been good and American European stations have been coming in well from 13.00 to 17.00 GMT. VS1AJ received an R8 report from X2C and X1AY. On the 29th July, conditions were particularly good and 2AG worked W, VK, VS6, South Africa and most of Europe with his new 100 watt transmitter. On August 15, a peculiar "corridor" effect was observed at 13.00 GMT, when 2AG received an R7 report from FB8C, W6 and W7, with Europe inaudible. Normal conditions returned at 15.00 GMT when OE and VK were contacted.

On 7 mcs. conditions are improving, though static still makes things difficult until the later hours. However, 2AG has contacted with W6 and Europe.

VS1AJ has commenced encouraging results with his 56 mc. transmitter, but rain has hindered progress.

Our E.L.S. station, 1AJ, has been very busy handling B.E.R.U. traffic for VU, VS6 and VK, and seems to be the only link station in the East maintaining reliable contact with G.

BERS179 has received excellent results with car aerials and low power. He thanks B.R.S. stations for local reports, his log looking like assorted extracts from the Call Book, with W.A.C. and W.B.E. almost the first night.

Mr. Maxwell, late G2RQ, is welcomed to Malaya and we look forward to hearing him on the air with a VS call shortly.

The following stations report active: VS1AB, 1AD, 1AJ, 2AG, 3AC, 3AE.

Southern India.

By VU2JP *via* VS1AJ and G6CJ.

VU7AB is awaiting his repaired generator, after which he will be active. Another Eiffel Tower has gone up and is 60 ft. high, 4 ft. square at the base, and 1 ft. square at the top. Directional aerials will be pivoted on the top at an early date.

VU2AU, 2BY, 2EB and 7FY are active but send no reports. 2JP has been active with ELS schedules, and the letter budget has taken up the rest of spare time. The letter budget mentions several points of interest, the main being that of crystal frequencies. A chart is kept by 2JP, but there are many who are cc., but who have not reported their frequencies. There are also others who contemplate using crystals, and therefore in order to avoid QRM will those who already have crystals and those who intend purchasing please write to VU2JP.

(*Continued on page* 120.)

EDITORIAL.—(*Continued from page* 87).
who were present at Convention, andwe have no doubt that a full complement will be found.

Here, then, is a task of real importance, and one that will demand the giving up of a certain amount of personal time, but we believe those who offer their services will be amply repaid when the full significance of their work is revealed.

We should be wrong in suggesting that Band Occupancy and Commercial Activity figures *alone* will carry weight in international discussions, but there is much truth in the old adage that accurate figures often turn the day in favour of those who possess them.

INGANG !—(*Continued from page* 101).
to Mr. Max Buckwell (G5UK), the organiser of the visit. It was largely due to his knowledge of "the ropes" that not one single difficulty arose throughout the week-end.

Sincere appreciations are also extended to M. Paul de Neck, Baron L. Roche, M. Vestrepen, M. Embrecht and M. Kersse, the moving spirits behind Reseau Belge.

And now "Uitgang !"

HIGH DEFINITION TELEVISION—
(*Continued from page* 98).

The method of attack which gives the best response curve is to use a resistive-inductance coupling, as in Fig. 3. The value of C—the valve and stray capacities—is found and its reactance, at the highest frequency required, is calculated. Resistance R is made this value and the inductance L is then wound to have half the reactance of R at f max. An example follows: f max.= 1.0 mc. and C=35 mmf. Reactance 35 mmf. at 1 mc.= 4,500 w., and hence R=4,500 w. At this frequency half this reactance (2,250 w.) is by a coil of 360 μH=L. These values being the optimum coupling arrangement, together with suitable decoupling to give a flat response over the whole band.

A call must now be made to the valve manufacturer for production of H.F. pentodes with effective slopes not lower than 2.5 ma./v. and the lowest possible anode-earth and grid-earth capacity, for, at the present, valve constants are such that above 2 mc. the stage gain tends to unity with this method of coupling.

The only other alternative is the faking of the high-frequency end of the characteristic by reducing R and increasing L, this being an interesting line for the experimenter.

One aspect of this may be applied to the anode load of V_2 (Fig. 2). If the resistor 4 is reduced to about 1,000 ohms and a few hundred microhenries inductance added in series, preferably damped with 5,000 w. in shunt to stop free oscillation in the coil, the boundaries between blacks and whites in the picture undergo a startling change and give the effect of additional side lighting to the scene, or, in the extreme, a bas-relief effect.

Receiver performance can be checked by using the picture-forming oscillograph on a 25 or 50-cycle time base on one pair of plates and connecting the other pair across the output of V_2 when the waveform of Fig. 1 is obtained. In this way amplitude linearity can be examined and the available gain estimated after a rough calibration of the oscillograph created from known A.C. sources.

R.E.S. NOTES—(*Continued from page* 104).
coupler helps here. For duplex phone a trap in the aerial is essential for anything better than 100 kc. separation. With a band pass filter and a straight set it is possible to get within 50 kc. without using two R.F. stages to compensate for a weaker band pass coupling. Wavetraps and band filters should be screened.

With a superhet properly designed and a good wavetrap, better than 20 kc. separation between stations can be obtained, which is good considering that the "home" carrier is radiating all the time.

A suitable wave-trap can consist of a 1½-in. former in a 2½ to 3-in. can, and wound with 35 turns of 24 SWG, tapped for aerial connection at 15, 25 and 30 turns, and tuned with a .00015 mf. condenser across the whole coil. The condenser should be totally screened if possible. The coupling to the receiver is effected by winding a few turns ¼ in. away from the wave-trap coil, to match a similar number of turns wound on the aerial coil in the receiver.

For a doublet aerial the taps can be omitted, coupling between the trap and feeders being made by a small coil much in the same manner as between the trap and receiver in the way already described.

G5YD.

EMPIRE NOTES—(*Continued from page* 119).

Mr. J. Shepherd Nicholson (VU2JP), Winner of the Junior B.E.R.U. Contest, 1935.

Malta.

By ZB1E *via* G6ZU.

Owing to a call to special duties our representative had to cancel the August meeting.

ZB1B has left with the Fleet and will be away for two months.

ZB1I is leaving for G in mid-September. We are sorry to lose him, and wish him the best of luck.

The following are active: ZB1C, ZB1E and ZB1H.

The following new members are welcomed to Malta: BERS297, 298 and 300. The writer will be pleased to meet them.

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G5HK offers surplus gear, 440 volts Exide W.H.10 H.T. Accumulators in crates, £5; 2 Marconi T250 Valves, £1 each. WE4212 with holder, £2 10s. 1 WE 4211E with holder, 15s.; 1 do. 40, £1. 1 Ferranti AF 5c, 1 ditto, AF 5cc, 1 ditto, OPM 1 c., £3 the three. Pair of Pye PP Transformers, £1. 2 Marconi Junior Transformers, 600 v. Hand Generator, £2 10s. Set Eddystone Plug-in Short-wave Coils. Other surplus gear. State requirements and send stamp for list.—55, Mona Road, Sheffield.

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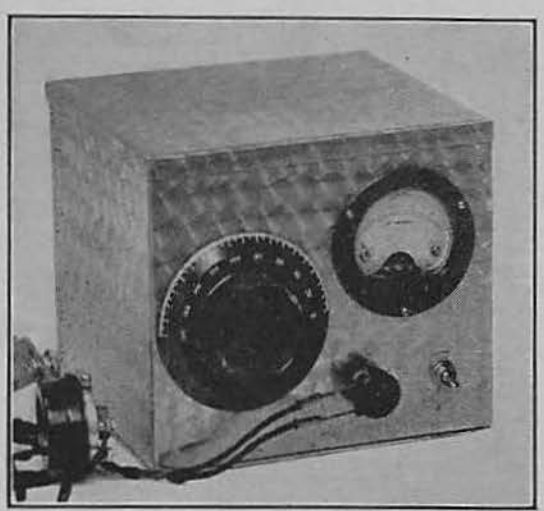

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Printed for the Inc. Radio Society of Great Britain, 53, Victoria Street, London, S.W.1, by Lolley Brothers Ltd., 40, Southwark Bridge Road, London, S.E.1