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THE T. & R. BULLETIN

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DEVOTED TO THE SCIENCE AND ADVANCEMENT OF AMATEUR RADIO

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AUGUST, 1939

CONTENTS

BROADCASTING AND THE RADIO AMATEUR

THE result of the card vote being conducted by the A.R.R.L. on the issue as to whether U.S. and Canadian amateurs desire facilities to be granted for telephony operation in the channel 7·2 to 7·3 Mc., will be awaited with interest everywhere.

It may come as a surprise to those who are not subscribers to Q.S.T. that telephony operation is even *contemplated* on the " other side " but there is, as would be expected, a very good reason for the present inquiry, as will be apparent after reading the following quotations from the July, 1939, issue of that journal:—

> " The fear has been expressed that the usual 40-metre c.w. signal won't be able to compete effectively with strong carriers of foreign broadcasters. . . . Now we need every kilocycle we can get and we must not abandon any of them to any other service. It is important to keep every kilocycle busy with some form of transmission that can operate there effectively. We amateurs are also concerned about letting any foreign broadcasters build up American BCL audiences in our bands, and we feel that our own interests require us to occupy these frequencies so vigorously that BCL reception thereon is impossible.
>
> " It is argued that 'phone transmission would be better able to compete with carrier interference from foreign broadcasters. It is argued that the 'phones, happy to have some more frequencies, would use them even if the going were tough, where c.w. stations would give up the fight and move out. And there can be no doubt that 'phones given the chance, would make thorough going occupancy and prevent the building up of any American audiences for these foreign stations."

If a decision is made to allow North American Amateurs to use telephony in the 7·2–7·3 Mc. band it will indeed be a break from tradition.

* * * * * *

With September 1 but a few weeks ahead the position in Europe does not yet appear too clear. As far as can be ascertained the Governments of most countries have registered frequencies at Berne, in what will be the shared amateur-broadcast band, but whether it is intended to commence regular transmissions at once, remains to be seen.

Present indications point to two B.B.C. stations operating in the band eventually, whilst Paris Mondial, in spite of an agreement to shift, has already been making a fair splash in England

on 7,280 kc. A Portuguese station has also opened up, so before the winter comes it would seem that there will be a good deal of broadcast activity in our band, which brings us to the real point of our present remarks—who listens to these short wave broadcasts ?

We know perfectly well that our own Empire stations are listened to regularly by Englishmen abroad, and we have little doubt that the same remark applies to a few of the other better known stations, but we go so far as to say that the audiences who listen regularly to most of the semi-propaganda stations are microscopically small.

As a case in point, during the recent Spanish Civil War, stations were grinding out propaganda nightly in our 7 Mc. band, but except for we unfortunates trying to work through them, who among the general public was listening ? We have made innumerable inquiries, but so far no lay person we have asked even knew that such transmissions had taken place, yet it is safe to assume that those responsible fondly imagined half of Europe was listening.

Considering the more general aspect of the case, we believe we are correct in saying that very few people, who possess a suitable receiver, ever sit down for a whole evening to enjoy a foreign short wave broadcast.

The same comment applies perhaps even more forcibly to medium wave broadcasting. For years, set manufacturers have aimed at improved selectivity yet we are quite firmly convinced that only a small percentage of ordinary listeners makes any practical use of the technical facilities provided.

In our travels we have noted particularly that practically every British listener concentrates almost exclusively on his Regional or the National transmission. The only time a foreign station seems to be in demand is on Sunday mornings when light music comes to us through the courtesy of Sambo's Soap or Boston's Beans !

In London we have on frequent occasions wandered along suburban streets at the peak broadcast hours, and from every house where a loudspeaker is making itself heard, it is the National or Regional transmission which is being taken.

Occasionally we have turned to a foreign programme when the B.B.C. are boring us, but seldom do we find a station abroad that can give us a perfect transmission for an hour on end.

Reverting to the main point at issue—the coming of broadcasting into our 7 Mc. band—we feel that it is the duty of every member, be he a transmitter or merely a listener, to use every argument in his power to persuade those who matter that the short-wave broadcast interests already have a super-abundance of frequencies for the comparatively small listening public they serve.

Ways and means of putting forward those arguments must be the constant care of all who are responsible for obtaining a square deal for the 55,000 amateurs who have given of their best to advance the art of radio communication.

The columns of this journal are open to expressions of opinion on this important subject

* * * * * *

CONVENTION

We may perhaps be forgiven for once again referring editorially to our forthcoming Convention, which incidentally is the fourteenth of an unbroken series.

This year with a programme crammed full with interest we have every reason to hope that all records will be broken. Convention is essentially a social function designed to provide an annual opportunity for members to get together in an informal friendly atmosphere. The difficulties of past years have been overcome by arranging for the whole Convention to take place under one roof and the success or otherwise of this experiment will be watched most carefully by the Council, who are as determined as are Headquarters staff to make the 1939 Convention something that will live in British Amateur Radio history.

The questionnaire included in this issue gives full details of all functions ; it is the duty of every member who intends to be present to study it carefully.

Since the news was first published that the Society intended to stage its own private exhibition, messages of congratulation have reached us from all quarters. Members have been quick to appreciate the advantage to be gained by inspecting all that is new and good in " ham radio " within the confines of one large hall.

Our exhibitors too, realise the opportunities offered and we have little doubt that they will spare no pains in putting forward displays which will appeal. The need for qualified technicians

(*Continued on page* 136)

Crystal Band Pass Filters

By E. L. GARDINER, B.Sc. (G6GR).

PART I.

Under existing conditions the amateur radio experimenter, interested in communication, is faced with many problems, but none more serious than that of overcoming interference from unwanted signals.

In this important series of articles, Mr. E. L. Gardiner, who has for many years been closely associated with Dr. J. Robinson (inventor of the Stenode) describes his own attempts to improve receiver selectivity.

By the use of crystal band-pass filters the author has been able to reach a degree of selectivity, hitherto regarded as unobtainable by practical methods.

WE shall not be concerned in this series of articles with the application of crystal filters to straight receivers although they can be used when only one wavelength is to be received, such as will often occur in a commercial point to point service. The superheterodyne receiver, with its fixed intermediate frequency lends itself much better to the purpose, therefore it will be to this type of circuit that our remarks will in general apply. As selectivity is concentrated in the I.F. amplifier of a superhet it has in the past invariably been necessary to select both the I.F. and the general circuit arrangements mainly on account of this factor.

Choice of I.F.

The choice of a suitable intermediate frequency is well known to be a compromise. Whilst the use of a low I.F. of from 40 to 125 kilocycles, makes it easy to obtain good selectivity, second channel interference invariably occurs. In fact, when receiving very high frequency signals, it is almost impossible to avoid this trouble without raising the I.F.

A frequency of 465 kc. has come to be widely used, because it is convenient for both broadcast and amateur communication receivers, but higher I.F.'s such as 1600 kc are frequently chosen, especially for U.H.F. receivers. Unfortunately up to now the use of such a high I.F. presents a major difficulty—namely that of obtaining good selectivity from a reasonable number of stages.

The difficulty, of course, arises because tuned circuits attenuate less rapidly in proportion to the band width of a telephony signal as the operating frequency increases. It is reasonably correct to say that, with a given number of circuits of given " Q," the selectivity is inversely proportional to frequency; and this effect is inherent in an amplifier which employs ordinary tuned circuits, whatever attempts are made to reduce its seriousness. In order to maintain the same performance at a higher I.F. it would be necessary to increase the " Q " of the coils used, but unfortunately a practical limit of between 200 and 300 exists, beyond which it is very difficult to go.

Early Crystal Filter Developments

During 1929, Dr. J. Robinson, in searching for a very sharply peaked selective device, with which to test his Stenode theory of reception, introduced the quartz crystal resonator into radio receivers. The circuit which he developed now well known as the " Crystal Gate " or " Quartz Crystal Filter," is used in many of the better class amateur receivers. Whilst unquestionably a British invention (it was described by Dr. J. Robinson during his American lecture tour in 1930), the advantages of the device in relieving amateur band congestion were first realised by our American colleagues, and the excellent work of James Lamb in developing the circuit practically, is generally known.

The Operation of Quartz Crystal Resonators

A quartz crystal can be regarded as a device which has the property of introducing a much higher " Q " than is normally possible into an I.F. amplifier. Whilst the " Q " of crystals varies considerably according to type, a figure of 20,000 is not unusual. Recent work shows that the " Q " of a specific type of crystal may actually increase with frequency. It can, therefore, be stated that a crystal offers an excellent method for overcoming the limitations of a high I.F.

Through the use of quartz crystals for transmission purposes the theory of their operation is fairly well known. However, in order to follow through our present discussion it is helpful to remember that a crystal is found to behave like a series tuned circuit of very high " Q." Fig. 1a gives the equivalent electrical circuit assigned to it in the classical

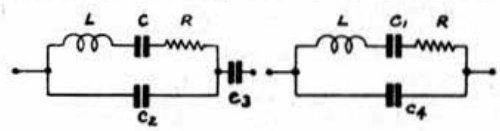


Fig. 1.

a) The equivalent electrical circuit of a quartz crystal resonator (*Left*).
(*b*) Simplified equivalent circuit of resonator (*Right*).

researches of the late Dr. Dye. Here L, C1, and R represent the effective inductance, capacity and resistance of the crystal as a resonator. C2 represents the unavoidable parallel capacity of the holder and of the small condenser formed by the piece of quartz towards its electrodes. C3 represents the capacity of the air gap, which when used acts in series with the crystal. In some publications the capacity C2 is shown divided into several parts, but as any combination of capacities can be expressed as a single resulting capacity, we can combine the various components which make up C2 and C3 into a single capacity, C4, as shown in Fig. 1b. This is still more reasonable because in many of the cases to be considered no air gap is used, thus the capacity C3 can be regarded as short circuited.

If a crystal, represented by Fig. 1b is used to couple two valves, say in place of the coupling condenser in the familiar tuned-anode arrangement, it would be bye-passed to some extent by the capacity C4. Several methods of balancing this effect will come to mind, and one or two are illustrated by the dotted lines in Fig. 2. For example, a reaction coil from the anode of V2 could be coupled

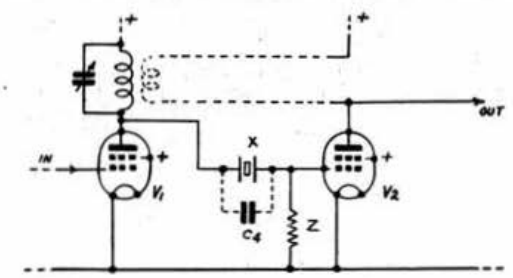


Fig. 2.

Simple arrangement for coupling a valve amplifier by means of a quartz resonator, showing two methods for neutralising the capacity of the holder.

back to the tuned anode circuit. Since a phase change of about 90° occurs both in C4 and in V2, the reaction coil can be used to feed back energy in the opposite phase to that leaking through C4, which could neutralise its effect at the output from V2. On the same lines of argument, a small neutralising condenser could be connected from the anode of V2 to that of V1, and in the same way this would compensate for the leakage. Practically, however, these arrangements have proved somewhat less convenient than the usual " Crystal Gate " circuit, which in its simplest form is shown in Fig. 3.

The Action of the Crystal Filter

The action of this filter must be carefully reviewed, because the whole of our later explanations depend upon it. The filter commences with an ordinary I.F. transformer having a secondary winding AB, centre tapped at E. In many receivers a step-down ratio is used here to match the low impedence of certain crystals, but this detail which is not important can be ignored for the moment. When an R.F. current is induced into any tuned circuit the potential is in opposite phase at the two ends of the circuit relative to it's centre point. Thus if the phase at E is taken as zero, that at A may be plus 90°, and at B minus 90°, so that A and B are in opposite phase. Therefore, energy passing from A through the crystal X to the valve grid at D will be initially in opposite phase to that reaching the same point through the balancing or phasing condenser K. Considering a frequency well outside the resonance curve of the crystal, the latter will behave as a small condenser of almost the value C4. A phase change of about 90° will occur in this condenser and also in K, but since these two changes are the same, they do not prevent energy from A and B being in opposite phase at D. If K is now adjusted to equal C4, equal and opposite potentials reach D, producing no resultant effect at the grid. This we shall term the condition of balance, where the stray capacities of the crystal and it's holder are neutralised by K. Under this condition the resonance curve of the filter will be that of the series circuit L, C, and R, in Fig. 1.

Another way of regarding this filter, which some may find easier to understand, is sketched in Fig. 4. In this the circuit is re-drawn to resemble a conventional A.C. bridge network, the trimmer across AB being omitted. This circuit is balanced when K equals C4 as it can be assumed that the reactance of the crystal itself when out of resonance is infinite. On approaching resonance, the crystal reactance falls until it becomes a pure resistance at the resonant frequency. The balance of the bridge will then be destroyed and a voltage will reach the output at D. This argument makes it clear that it is quite permissible to speak of C4 as being balanced by the condenser K.

The explanation for the increased selectivity and high " Q " of a crystal will be found by studying the actual values of L, C1, and R. For example, with a typical 465 kc X-cut bar crystal, L may be as high as 16 Henrys, and C1 a fraction of a micro-microfarad, whilst R will be very much lower than the R.F. resistance of any usual 16 Henry coil encountered in practice. The precise value of R, which is greatly influenced by the crystal holder, may lie between the limits of 3,000 to 20,000 ohms but 10,000 ohms may be taken as typical for the type of crystal mentioned. Now " Q " is given by the expression $\frac{\omega L}{R}$ which for any particular frequency ω, increases with the ratio of L to R. But L is extremely high for the crystal, and since the total resistance of the circuit is far less than that of any ordinary 16 Henry coil a very high " Q " figure will result.

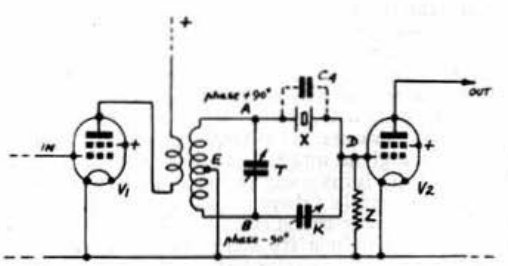


Fig. 3.

The " crystal gate," or bridge, form of coupling circuit, in its simplest form.

Variable Selectivity

When the stray capacity of a single crystal has been balanced in the crystal gate circuit of Fig. 3, we should obtain a symmetrical, sharply peaked resonance curve of the form sketched in Fig. 5. It may be thought that the shape of this curve should depend entirely on the properties of the crystal used and this would be more nearly so if the current flowing through the crystal were plotted against f. In practice however the curve which matters is that of the voltage measured across Z. It is found that the shape and steepness of the latter curve is very much affected, both by the nature of the load impedance Z and by the input circuit AB.

Advantage is taken of these effects to produce the variable selectivity crystal filters commonly found to-day in communication receivers. Since these effects are also most helpful when we come to consider band-pass arrangements, it will be worth while to examine them a little more closely now. Incidently all the well known effects obtained in the single crystal filter will be found to be reflected in the double crystal type.

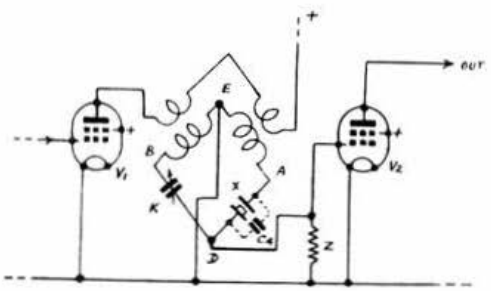


Fig. 4.

The circuit of Fig. 3 re-drawn to show its similarity to an A. C. Wheatstone Bridge network.

To simplify matters, let us assume that the parallel capacity C4 has been balanced by the phasing condenser K. The bottom half of the bridge can now be neglected, and the effective circuit can be re-drawn as in Fig. 6a. At or near resonance the circuit resembles a simple potentiometer, consisting of half the winding of the input transformer (E A) in series with the crystal X, and the load Z, the output voltage being tapped off across Z at the point D. This can be further simplified by drawing it as shown in Fig. 6b where the input coil has been replaced by a source of alternating voltage (representing the signal voltage induced in it by the primary winding of this transformer) in series with a resistance R1, which represents the dynamic resistance of the input coil. For frequencies quite near to resonance we can treat R1 as a pure resistance. If Z is also a tuned circuit, the same remarks will apply, whilst at resonance (the point at which a single crystal is generally used) the crystal itself also behaves as a resistance, which will be denoted by Rx.

The whole circuit thus resembles three simple resistances in series. At frequencies well outside resonance, Rx becomes extremely high, possibly as much as 100 megohms, therefore very little energy reaches D. This may be very simply expressed by the formula :—

$$\text{Output voltage, } V = \frac{Z}{Z + R1 + Rx}$$

which holds exactly, however, only for resonance.

When Rx is very large this expression becomes very small. The actual voltage is almost proportional to Z, thus we shall obtain the most interference from neighbouring signals when Z is large, and a better cut-off when it is reduced. At resonance Rx falls to a few thousand ohms, but however small it becomes the voltage across Z will still be limited by R1. Thus, for the sharpest curve and highest peak voltage R1 should also be low. It will not be difficult to see that when R1 is large, that is to say an input circuit of high dynamic resistance, the variations of the crystal are somewhat "masked" by the large fixed value of R1, and the response curve is therefore flatter and less selective.

This argument shows clearly that the performance of the filter depends on both R1 and Z. It is usual to reduce R1 by detuning the input coil AB. This lowers its impedance and sharpens the resulting curve. For greater band widths AB is brought into tune, increasing R1 up to a limit depending upon the Q of the coil, and widening the curve. Similar results can be obtained by varying Z, although perhaps less conveniently, and in some recently published circuits this improvement is shown. The several modifications that are found in actual crystal filters are intended to improve the impedance matching at resonance, such as by using a step-up transformer at Z to increase the voltage passed on to the next valve.

Looking at the formula it will be obvious that the largest output voltage will occur when Z is high, but this condition unfortunately leads to very poor selectivity, therefore it is not wise to increase Z much beyond the value of R1 + Rx at resonance. This means that Z may often be a good deal lower than the input resistance of the valve which follows. Therefore to match the resistance R1 + Rx to the

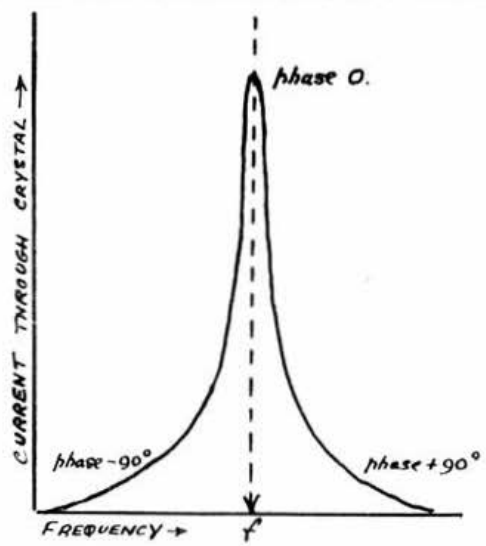


Fig. 5.

The type of response curve given by a quartz crystal coupling circuit such as Fig. 3 when the capacity of the holder is balanced.

valve it may be very useful to employ a step-up ratio. To complete the system, it may also be useful to choose a step-down ratio for the input transformer which feeds the crystal, if the latter be a low impedance type, such as a " Y cut " plate. The whole arrangement is then matched, and may be compared to an extension loud-speaker system, in which we step-down into the low impedance of the line, and subsequently step up or down at the far end to match the impedance of the speaker used. However, the crystals which will be described in these articles for band-pass use are of higher impedance, and do not call for step-down ratios.

Mathematically minded readers will have realised that the simple formula given above would need modification in order to hold at frequencies outside resonance, because the impedance of the crystal ceases to be a pure resistance, but becomes either an inductive or capacitive reactance. Similar remarks apply to Z, and to the input coil, although their change is far less rapid, whilst if Z is not a tuned circuit but a resistor, it is considerably modified in

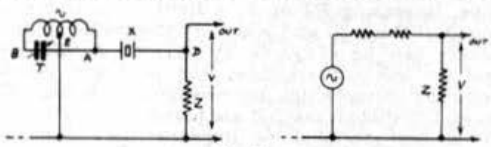


Fig. 6.

(a) Simplified equivalent circuit of Fig. 3 when in the balanced condition (*Left*).
(b) The resistance potentiometer to which a crystal coupling corresponds at the resonant frequency of the crystal (*Right*).

value by the grid-cathode capacity of the following valve. Since, however, a somewhat involved expression would be needed to include these effects, and since the general nature of the argument is quite unchanged by them, the writer has not felt justified in occupying more space by extending these mathematical points. The typical amateur is a practical man, and probably more interested in results, and methods for obtaining them, rather than with detailed theory.

This outline of the single crystal filter is intended to stress one set of practical effects which will make the bandpass arrangement easy to understand, namely, that if we want high selectivity from a crystal, the input and output circuits must be kept fairly low in impedance (or resistance); whilst to reduce this selectivity and make the " Q " of the crystal *appear* less, it is only necessary to raise these impedances to high values.

The Phasing Condenser

There is one other effect, very familiar to crystal gate users, which will also help us to understand the band-pass crystal filter. This is the effect of the phasing or balancing condenser, K in Fig. 3. So far it has been assumed that this condenser was set to balance the bridge, in order that the effect of stray capacity across the crystal can be neglected, and the symmetrical curve of Fig. 5 obtained.

If now the condenser be changed somewhat from its balancing value, the curve becomes unsymmetrical, and takes the form sketched in Fig. 7. A point of " zero " response occurs near one side of the crystal frequency f, whilst the other side of the curve is somewhat raised. If there is nothing to modify this effect, such as for example an out-of-line I.F. circuit, then the increase in response at O should be the same as the depression at P. The position of P relative to f can be varied at will by adjusting the phasing condenser K, whilst if this be varied to the other side of its balancing setting, the point P moves to the other side of f. The user of a crystal filter can therefore adjust K to obtain a zero beat response on any one interfering carrier frequency such as a c.w. signal. In doing so, however, a penalty must be paid, because the response at most other frequencies has been increased, possibly bringing in fresh interference. It will be shown later how a band-pass circuit reduces this trouble.

The production of the zero point P can be very easily explained. The crystal behaves in exactly the same way as any other tuned circuit of high Q. In particular, it shares the property of all such circuits, that if a current be induced into it, the voltage across the circuit is in phase with that current at resonance. This is another way of stating that the circuit behaves as a pure resistance to the frequency to which it is tuned, and the crystal is no exception to this rule. As we vary the applied frequency towards a lower value however, the circuit tends to become capacitive, or to behave similarly to a condenser, and the voltage leads the current in phase. By the time the skirts of the resonance curve are reached, this phase change approaches 90°, or the voltage and current are practically out of phase with each other. In just the same way, if the applied frequency is raised, the circuit becomes inductive and the voltage lags behind the current. These facts are expressed in Fig. 5, where if the phase of the voltage relative to the current (which is taken as fixed in phase, for reference) be regarded as zero at resonance, it will be very nearly — 90° out of phase towards the left of the curve, and nearly + 90° to the right. The crystal only differs in this

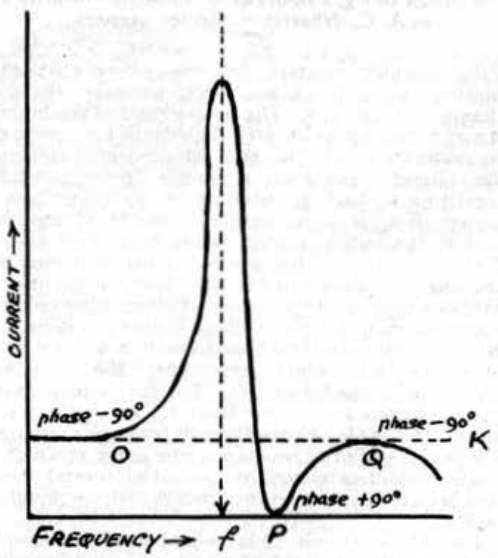


Fig. 7.

The type of response curve given by a crystal coupling circuit when the balancing (or phasing) condenser is varied.

respect because its Q is very high, and so the phase changes are very rapid, occurring, almost completely, within the range of a few hundred cycles at most.

Now if the phasing condenser K be changed from its balance setting, some voltage through it will reach the output point D. Since a condenser introduces a phase change of + 90°, the voltage reaching D will be 90° in advance of that at B. That is to say, it will be in the same phase as that through the crystal over all frequencies to the right of the resonance curve of Fig. 5. To the left of the curve therefore the voltages will be in opposite phase, and at some point between the peak and zero they must be equal and opposite, giving rise to the zero point P. Since the position of P depends upon the actual magnitude of the voltage reaching the output through K, its position will change as K is varied. If K be made less than the balancing value, voltage will predominate at the output through the crystal capacity, C4, of Fig. 3. This is derived from the point A, and is thus initially in opposite phase to

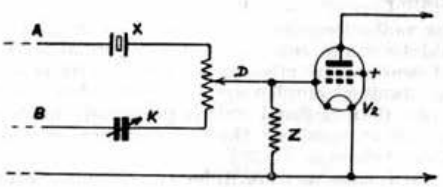


Fig. 8.

The introduction of a resistance adjustment whereby the power-factor of a crystal bridge can be balanced in addition to the capacity balance, thus giving a more perfect " zero."

that which we have been discussing. It therefore results in a zero point on the other side of the resonance curve, in fact as shown in Fig. 7.

This very simple way of regarding the effect was introduced by Dr. James Robinson when he first patented the crystal gate in about 1929, and it has proved adequate to explain all the facts which have so far come to light in the use of crystal circuits. In some treatments the point P is described as an " Anti-resonant point," and is attributed to resonance of the parallel-rejector type between the unbalance capacity of K (taken as either positive or negative) and the inductance of the crystal equivalent circuit, namely L of Fig. 1. Mathematically this treatment leads to the same numerical results as the explanation that has just been given, as should of course be the case when any set of physical facts are explained in two different ways, both of which are valid. But to the writer the idea of anti-resonance is far from attractive, whilst it seems even more difficult to imagine resonance between a negative capacity and an inductance which is not an actual coil, but merely an aspect of the elasticity of a block of quartz! Both the quantities are in a sense imaginary, and it is surely far better to use an explanation which is in accordance with everyday experience.

It is interesting to note that as resonance is approached, the phase changes are no longer sensibly 90°, but of some lesser value, and a perfect cancellation at P becomes impossible. This fact is noticable in practice, it being impossible to balance out an interfering signal which is less than perhaps one kilocycle from the crystal frequency. Notice also that the point P is due to a form of bridge balance effect, so that a perfect zero will not occur if there is an unbalance of power-factor, such as might occur if the condenser K has high losses, or any other component was of poor quality. It is thus important to construct crystal filters on low-loss lines. If in practice the response at P when removed a few kilocycles from resonance is found to be excessive, and that this the trouble is not due to poor screening between input and output circuits, then it may be accounted for by lack of power-factor balance. It may then be found that the connection of a high resistance across the side of the bridge (either across K or the crystal) which has the lower losses will improve the zero point, and it is often possible to reach very high values of rejection. As a rule the reduction of a signal at P will not be absolute, but in the order of — 60 dB. It can however be raised almost indefinitely through the addition of a resistance balance to the bridge. This may either take the form of a high variable resistance across one arm (the value being probably several megohms) ; or the effect can be obtained by the use of a low resistance potentiometer at D, as sketched in Fig. 8. This component will need to be as carefully screened as the rest of the filter, if first class results are desired.

The explanation of the effect of unbalancing K which has just been given shows how the response to frequencies on one side of a crystal filter can be raised, whilst a steep slope is obtained on the other side. Remembering the facts about input and output impedances, and the phase relationships that have been mentioned, we shall now find it easy to understand how a band-pass filter can be arrived at through the use of two crystals of slightly different frequency, acting together in a common circuit.

(*To be continued*)

Mr. E. H. Conklin, W9BNX, and his wife, W9SLG, during their recent visit to England. On the right, Mr. F. J. Towell, VU2AU. A photograph taken at G2YL.

A Transmitter for the Lower Amateur Frequencies and for C.W.R. Operation

By J. W. MATHEWS (G6LL).

SINCE the inception of the C.W.R. it has become apparent that a separate transmitter is desirable for use on the Reserve frequencies, the design of which should be such that *communication* is the prime factor. This requirement is simplified by the fact that high-power apparatus is unnecessary, a maximum of 25 watts being sufficient for all occasions.

It is the purpose of this article to describe a simple transmitter suitable for C.W.R. work. But before dealing with the circuit and construction, it is, first, desirable to consider its essential design features.

Flexibility

If possible the apparatus should be sufficiently flexible to work on either the 1·7 Mc. or 3·5 Mc. amateur bands, as well as the intermediate frequencies, without the complication of coil changing or switching.

The aerial circuit should also be arranged so that rapid frequency changing is possible.

The Marconi type of aerial is very suitable for the lower frequencies, and can be easily combined with a circuit to permit of rapid frequency change.

Stability

Stability is also of prime importance, and this problem is not solved merely by using a crystal of the required frequency. It should be borne in mind that the apparatus may have to be used on widely differing frequencies within its tuning range, and the time for changing frequency should be kept as short as possible.

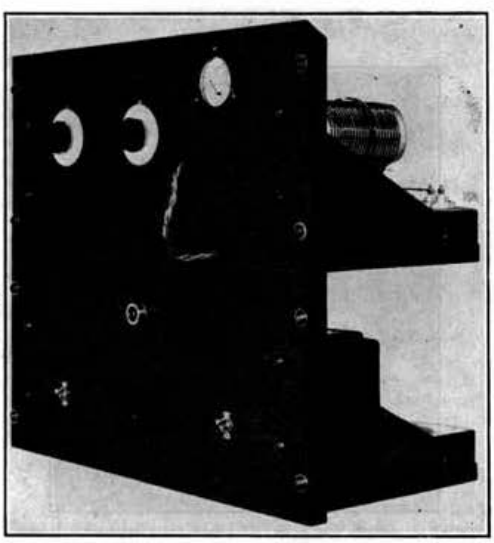


Fig. 1
Front view of Transmitter.

To this end a beam tetrode has been chosen as a P.A. valve for the design in question, since this type of valve lends itself very readily to work of this nature. A very small amount of fixed capacity is necessary for neutralising and this is sufficient to stabilise it over the whole tuning range.

In addition to this advantage the valve may be arranged to pass a certain amount of current when in a non-driven condition, thus imposing a further load on the power supply in addition to that given by a bleeder resistance. This extra load will improve the regulation of the power supply and will help to eliminate any chirp or variation in note when the transmitter is keyed.

Efficiency

The radio frequency efficiency of the apparatus should be made reasonably high, and although a small amount of efficiency may be sacrificed by using tuning condensers of somewhat higher capacity than is usual, this is practically negligible when offset against the convenience of rapid frequency change.

If the apparatus were to be used from a source of dry batteries the continuous load imposed by the P.A. valve would soon cause them to be exhausted. To avoid this condition, it would therefore be necessary to key the cathode circuit of that stage, in addition to the crystal oscillator.

Since, when operating in the 1·7 Mc. amateur band, inputs in excess of 10 watts are forbidden, a series resistance must be incorporated in the high voltage supply to the P.A. stage in order to drop the input to the statutory limit. This resistance may be short-circuited when working on other frequencies, providing permission has been obtained to use powers exceeding 10 watts.

Compactness

Since, in most cases, space is at a premium, the design should allow the apparatus to be constructed in as compact a manner as possible, consistent with efficiency. To this end, for the design under consideration, two standard chassis and panels are used, one for the power supply, and the other for the radio frequency section. This arrangement allows a reasonable amount of space between the components, at the same time presenting a neat and attractive appearance. Undoubtedly the apparatus could be constructed in a smaller space, but as no smaller standard chassis are available, it would then become necessary to construct a special rack.

Simplicity

The design should also be of the greatest simplicity, since communication and flexibility are the prime reasons for the construction of a transmitter of this type.

By simplicity is meant the abolition of bias batteries, the use of a simple power supply of one voltage, the employment of a minimum number of tuned circuits, easy neutralisation, and the abolition of coil changing.

Automatic bias may be applied to the valves by means of cathode resistances as well as suitable value grid leaks.

The anodes and screens of the valves may be supplied from a common source, the various voltages required being obtained by tapping on to potentiometers connected across the high tension supply.

The number of tuned circuits may be kept to a minimum by the use of capacity coupling between the crystal oscillator and P.A. stage, which arrangement leaves only two circuits to be re-tuned for a change of frequency, apart from the aerial tank circuit itself. This circuit should be arranged to be external to the transmitter, and coupled to it by a link line of some 80 ohms impedance. This arrangement has many advantages, the chief being that the aerial may be terminated at a convenient point near its point of entry, and a tuned circuit attached. The length of line coupling this tank circuit to the transmitter is unimportant, and may be of any reasonable length, up to say 50 or 60 ft. It is important, however, to use proper low-loss low impedance cable, preferably concentric, because if cabtyre flex or similar cables are employed, considerable loss may be experienced.

Coil changing is abolished by making the coils of such a size that they will tune to the frequency range required, in this case 1·7 Mc. to 3·5 Mc., with a ·0005 μF variable condenser in parallel. Frequency

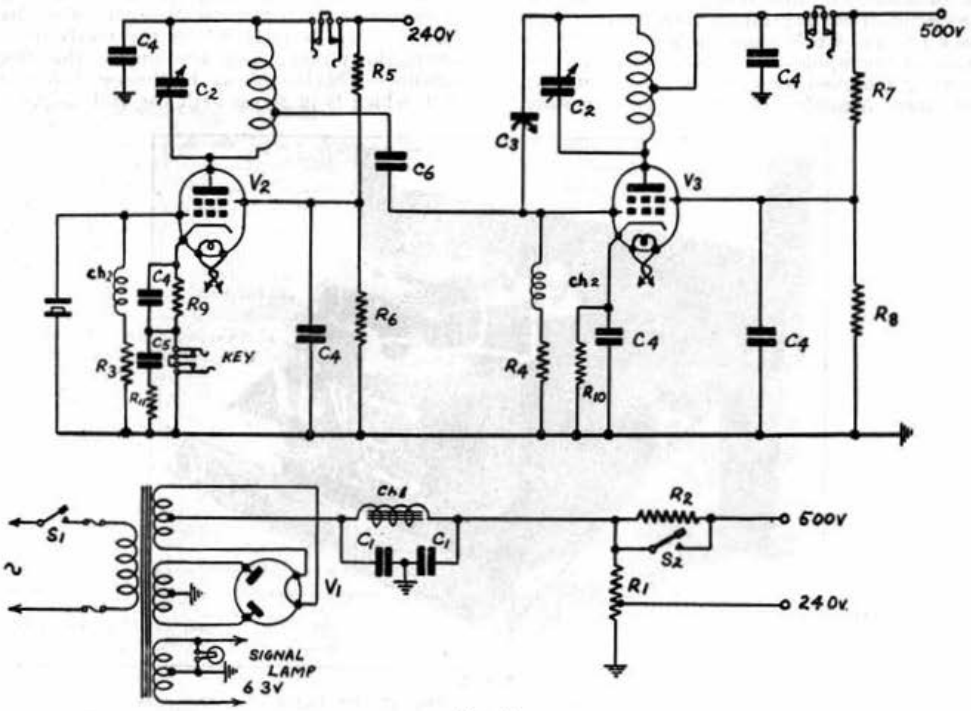


Fig. 2.
Circuit of Transmitter for Lower Amateur Frequencies and for C.W.R. operation.

Keyed Components

R1. 25,000 ohms., Type 952, Webb's.
R2. 7,500 ohms., 20 watt, Type PR10, Bulgin.
R3. 50,000 ohms., ½ watt, Polar-N.S.F.
R4. 10,000 ohms., 1 watt, Polar-N.S.F.
R5. 7,000 ohms., 1 watt, Polar-N.S.F.
R6. 43,000 ohms., 1 watt, Polar-N.S.F.
R7. 20,000 ohms., 2 watt, Polar-N.S.F.
R8. 80,000 ohms., 2 watt, Polar-N.S.F.
R9. 300 ohms., 1 watt, Polar-N.S.F.
R10. 1,000 ohms., 2 watt, Polar-N.S.F.
R11. 450 ohms., ½ watt, Polar-N.S.F.
C1. 2 μF, Type 111, T.C.C.
C2. ·0005 μF, J.B. Receiving Type.
C3. See text.
C4. ·1 μF, Type M, T.C.C.
C5. ·1 μF, Type 341, T.C.C.
C6. ·001 μF, Type M, T.C.C.

Ch1. 15 my Choke, Webb's Apex.
Ch2. H.F. Choke, Type 1010, Webb's.
V1. U12/14, Osram.
V2. 6V6G, British Tungsram.
V3. 6L6G, British Tungsram.
S1, S2. Toggle Switches, Type S.80T, Bulgin.

Other Components

3 Clix valveholders (one 4-pin, two octol).
2 Eddystone condenser brackets, Type 1007.
3 Igramic midget jacks (Premier).
2 condenser spindle extensions (Premier).
2 Eddystone dials, Type 1099.
1 Raymart 0-100 mA. meter, Type R.H.1.
1 Bulgin signal lamp, Type D9.
1 Q.C.C. crystal mount and holder, Type "U."
Sundry small stand-off insulators and feed-through insulators (Premier).

changing is effected by merely plugging in a crystal of the desired frequency, and retuning the circuits.

Owing to the comparatively low frequencies at which the transmitter is to be used, a slight departure from the usual rules governing circuit design for high frequency work is permissible. A small sacrifice of efficiency must be made too, if all the foregoing points of flexibility, stability and simplicity are to be included in the design.

Keying

One further point of design should be considered. As communication is to be the first consideration of construction, some form of "break-in" keying must be included. The simplest and most popular method of achieving this result is to break the cathode circuit of the crystal oscillator valve. This removes all trace of R.F., and the receiver may be kept running the whole time. Key clicks may be minimised or removed by a simple filter connected across the key. A further advantage of this method of keying is that relays are unnecessary as there is no reasonable limit to the length of leads connecting the key to the transmitter.

Construction

Having taken into account the foregoing considerations, the actual design and construction may now be discussed.

The transmitter is built into two *Eddystone* standard chassis, the power supply into one, and the radio frequency section into the other.

Let us first consider the power supply. As the keyed valve is to be the oscillator, it is essential that the voltage regulation of the high tension supply should be as good as possible in order to avoid "chirp" and slight changes of frequency as the oscillator is keyed. The supply, therefore, should be adequate, and suitably bled. For this reason the resistance R1 in Fig. 2 is included to act as a "bleeder." This resistance also serves the purpose of a potential divider, the anode voltage of the crystal oscillator valve being taken from a suitable tapping point. The resistance must be capable of passing the necessary current, and in the design described is a *Webb's* 25 watt type 952.

As an additional constant drain on the supply when the key is "up," the P.A. stage is biassed automatically so that the valve passes about 30 mA. when undriven. This is not so inefficient as it would appear since the anode current in a driven and loaded condition is about 70 mA. The automatic bias is therefore increased so that the valve is working under Class C conditions.

Since the transmitter is to operate on 1·7 Mc., where an input of only 10 watts is authorised irrespective of power facilities on other bands, a device must be included, as previously decided, to limit the power when working in this frequency channel. This is achieved by the use of the resistance R2, which is in series with the H.T. supply to the P.A. stage. This resistance is connected across a *Bulgin* "on-off" switch, S2, and is short-circuited when using higher power on the other bands.

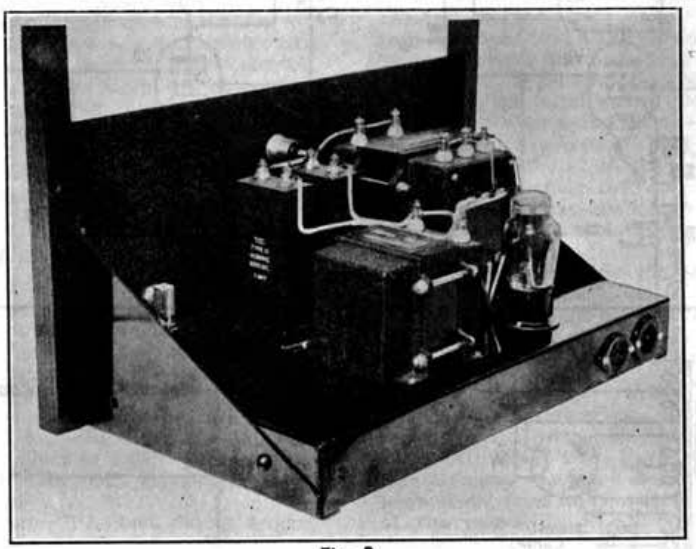


Fig. 3.
The power supply unit which is mounted at the bottom of the rack.

The remainder of the power supply is quite normal, as reference to Fig. 2 will show. A *Webb's* "*Apex*" 500 volt transformer, with two filament windings, and an "Apex" choke are used together with two *T.C.C.* 2 μF type 111 condensers for smoothing. Fig. 3 shows the layout of this section.

In the photograph Fig. 1 the mains "on-off" switch is on the left of the lower panel, and the switch short-circuiting the "10 watt input" resistance is on the right. In the centre are two "slide-lock" fuses, and above, the warning lamp. This is a *Bulgin* type D9 and is very necessary since break-in operation is to be used, and the transmitter is left switched on for long periods. The lamp, which is connected across half the L.T. supply, indicates immediately when the transmitter is on or off.

The position of the components can be clearly seen from Fig. 3. The high and low voltages from the power supply chassis are taken to the radio frequency chassis *via Bulgin* valveholders, type VH.7 and 5-pin connectors, type P.3.

The radio frequency chassis is naturally more complicated, although as will be seen from Fig. 1, the layout is quite straightforward. On the upper panel the crystal oscillator tuning condenser is on the left, next to it is the power amplifier tuning condenser, and then a 0–100 mA. meter connected to a plug which may be inserted into either the C.O. or P.A. anode circuit jacks which are visible below the meter. The jack for connecting the key is mounted at the rear of the chassis, next to the valve socket to which the H.T. and L.T. connections

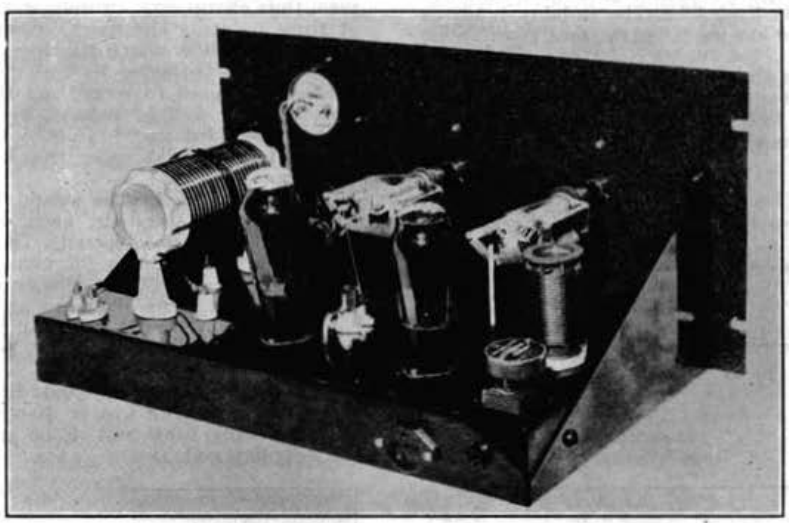


Fig. 4.
Rear view of Transmitter showing the location of components.

are taken. The jacks which are *Igranic* midget type, are arranged to short-circuit when the plug is removed.

The chassis layout is clearly illustrated in Fig. 4, all components being easily recognised. The C.O. valve is a 6V6, and the P.A. valve a 6L6G, both made by *British Tungsram*. The small neutralising condenser for the P.A. valve is mounted on two midget stand-off insulators, fitted to the chassis beside the valve. This condenser consists of two copper plates ½-in. square. One plate is fixed whilst the other has a slotted tag, which enables it to be moved towards, and away from, the fixed plate. The tag is locked under the nut when the correct position has been found. The actual capacity required is very small, about 5–8 μμF, and in consequence the dimensions of the neutralising condenser are necessarily small. The spacing between the two plates is approximately ⅛-in.

The P.A. anode coil is wound on a standard *Webbs* type B *"Apex"* former, with 14 S.W.G. enamelled wire. This does not give quite enough inductance to cover the 1·7 Mc. band, so that if the transmitter is required to work in that channel, either a slightly larger coil must be used, or some additional parallel capacity. A coil of 30 turns wound on a 3½-in. Becol former with the same gauge wire as before, and turns spaced the diameter of the wire, will cover the 1·7 Mc. and 3·5 Mc. bands comfortably. If capacity is added to the original coil, for occasional work on these lower frequencies, about 100 μμF will be required, but it is of sufficient size for all C.W.R. frequencies.

The C.O. coil which is wound on a valve base type former, consists of 30 turns close wound, 20 S.W.G. enamelled wire. A tap is made 6 turns from the anode end, from which to drive the P.A.

The aerial coupling link, as can be seen in Fig. 4, consists of two turns of 14 S.W.G. enamelled, wound round the centre of the P.A. anode coil, and supported from it by three small Trolitul spacers. Any good insulating material would of course be suitable for this purpose. The link coil terminates on two midget stand-off insulators, from which a low impedance line may be taken to the aerial tank circuit.

The aerial coupling arrangements must obviously be designed to suit the particular aerial system in use at the time, but given a tuned circuit, coupled to the transmitter in the manner described, any suitable length aerial system may be coupled to the transmitter. The turns in the aerial coil will of course vary accordingly, therefore no winding data will be given.

Aerial data for use on the lower frequencies may be found on page 132 of *The Amateur Radio Handbook*. Details of coupling methods are also given in this publication.

The two chassis are mounted one above the other, with the power supply at the bottom. Two 1 in. × 1 in. wooden supports are used for mounting, one at each side of the panel.

Adjustment

Preliminary adjustment of the completed transmitter should be carried out with the switch S2 in

(*Continued on page* 136).

A 56 Mc. RESONANT LINE RECEIVER

By G. A. Hook (2CIL) *

WITH the increasing tendency towards the employment of crystal controlled transmitters on 56 Mc. and the growing popularity of c.w., the use of receivers possessing the lowest possible frequency drift becomes a necessity. A study of the fundamental (self-excited) type of oscillator circuit will show that the inherent stability of a well-designed linear oscillator is far better than that obtainable from a circuit utilising tuned coils, whilst the " Q " is also higher. The electron-coupled oscillator gives good stability when but lightly loaded but the stability tends to fall off when the loading is heavy, as it must be for reception.

For reception above 100 Mc., the employment of a linear oscillator is practically universal and the only drawback to its use on 56 Mc is the bulkiness occasioned through the large space required to accommodate the lines. A compact design has been evolved by the author and will probably prove of interest to others. To permit of the reception of signals other than c.w., super-regeneration is incorporated, a separate valve being used for the purpose, the filament being switched off when it is not required.

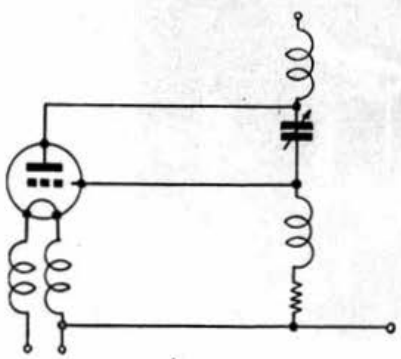


Fig. 1.
Original circuit upon which the practical design of Fig. 2 is based.

The Circuit

The circuit used in the receiver to be described is a modified Gutton-Touly as this seems, in the writer's opinion, to be the only one available which will give a good degree of stability, combined with lines of reasonable length. The original circuit is shown in Fig. 1. This has been suitably modified and is shown in its practical form in Fig. 2. The filament chokes are essential components. Control of reaction is effected by means of the potentiometer R6, another (R7) being provided to control the amplitude of the quench oscillations. The latter are applied to the detector stage through a coupling coil L3, this method resulting in very smooth control, whilst the detector may be kept in its most sensitive condition for the reception of weak modulated carriers.

Member Experimental Section

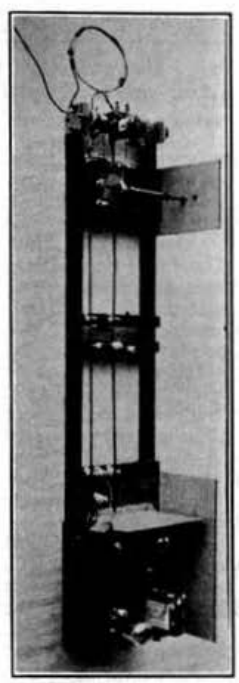
Construction

The tuning lines consist of two lengths of 3/16 in. soft drawn copper tubing, each 28 in. long, spaced 2 in. apart and supported at intervals of 11 in. by means of small brass clips fixed to 1 in. standoff insulators. The ends of the tubes are bent at right angles and slotted to form sockets for the valve pins, thus eliminating entirely any separate wiring at these points. The fixed ceramic condenser C1 is made to slide along the lines, the frequency being roughly adjusted by this means. The condenser C2 is used to spread out the band and its capacity may well be reduced by the removal of part of the fixed vane. It is mounted above the lines and close to the valve, thus keeping the leads very short.

The filament chokes are wound on 5/16 in. glass tubing in three sections, each consisting of 17 turns 28 S.W.G., close wound. The grid and anode chokes are wound with 25 turns of 36 S.W.G., spaced to occupy 1½ in., the ends being held in place by a few turns of narrow adhesive tape.

Most valves of the HL class will be found suitable as a detector, the *Osram* HL2/K being particularly good.

The quench coils are wound with 38 S.W.G. on a three section spool ¾ in. in diameter, the number of turns being 1,000 grid, 1,500 anode and 750 in the coupling coil.



The 56 Mc. Resonant Line Receiver installed at 2CIL.

The detector is transformer coupled to a pentode output valve, an increase in gain being achieved by reducing the screen voltage to 80. The quench and output stages are separated from the detector stage by an aluminium screen measuring 8 in. by 6 in. to prevent feedback and hand capacity effects.

Aerial Coupling

The system of aerial coupling described by H. F. Heap (G5HF) in a recent issue of this Journal has been found to be very effective and has been adopted in this receiver. The aerial is connected to a circuit consisting of a single turn of 12 S.W.G. enamelled wire 4½ in. in diameter, this being tuned by condenser C4. Attached to this, by means of adhesive tape, is a single turn of 14 S.W.G. wire (Systoflex covered) the ends of which are twisted for a length of about 3 in. One end is left free and the other connected *via* the preset condenser C3 to the grid line of the receiver.

Operation

With about 70 volts applied to the detector valve, oscillation should be obtained without difficulty. The condenser C1 is moved along the line until the frequency comes within the 56 Mc. band, the correct position being normally in the region of 17 in. from the valve, although it may vary owing to differing valve capacities, etc. The line can be cut at this point as there appears to be little gain in stability by extending it beyond C1. The preset condenser should be set at a point at which oscillation is only obtained when C4 is tuned just below resonance.

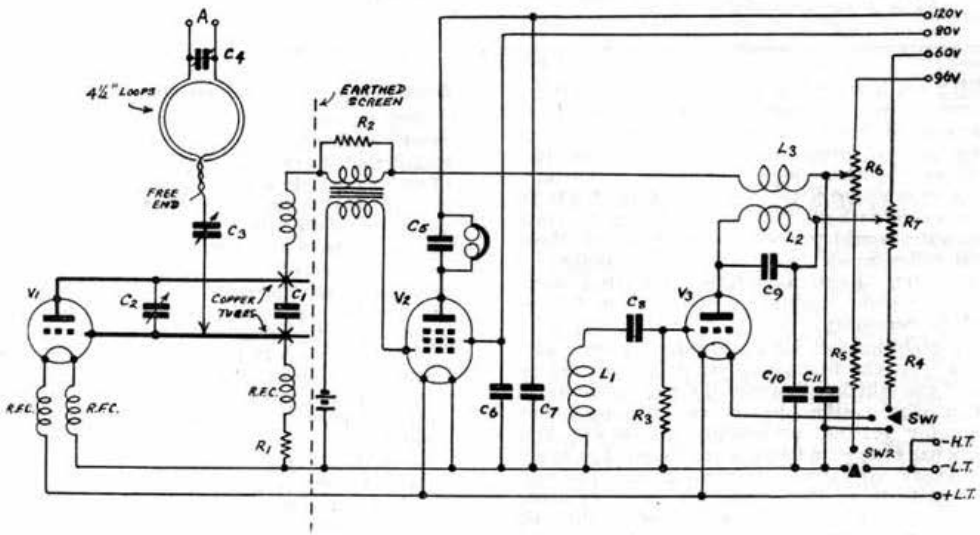


Fig. 2.
Circuit of Resonant Line Receiver adopted by the author.

Keyed Components

C1. ·0003 μF Ceramic Fixed, Type CTS945, Dubilier.
C2. 15 μμF variable, Type VC15X, Raymart.
C3. ·0001 μF Preset, Ceramic base, Raymart.
C4. 40μμF variable, Type VC40X, Raymart.
C5. ·01 μF Fixed Type 250, T.C.C.
C6, 10. 1 μF Fixed Type 50, T.C.C.
C7, 11. 2 μF Fixed Type 50, T.C.C.
C8. ·001 μF Fixed Type 250, T.C.C.
C9. ·002 μF Fixed Type 250, T.C.C.
R1. 1 megohm. 1 watt, Erie.
R2,4,5. 50,000 ohms. 1 watt, Erie.
R3. 250,000 ohms. 1 watt, Erie.
R6, 7. 50,000 ohms. wire-wound potentiometer, Varley.
L.F. Transformer. Nicore II, Varley.
Valves. V1, H210, V3, D210, Hivac.
V2, PEN220A, Mazda.

Other Components

2 adjustable insulated brackets, Type No. 1007, Eddystone.
2 extension control outfits, Type No. 1008, Eddystone.
3 slow motion drives.
2 three-point switches, Bulgin.
2 valveholders (1 x 4 pin ; 1 x 5 pin), Clix.

G2FN

Major Rodman, G2FN, has asked us to return a number of QSL cards to members who imagined they had contacted his station. At the moment G2FN is inactive.

Autumn Call Book

Supplies of the Autumn edition of The Amateur Radio Call Book are due to arrive in September. Members requiring copies are urged to place an order in advance.

Power Supplies

By J. N. WALKER (G5JU)

Part I.—Batteries

This article, the first of a series which will deal successively with all forms of modern power supplies, includes information intended to benefit readers, particularly those resident overseas, who lack mains facilities.

EVERY modern type of radio apparatus requires some form of external electrical energy to actuate it, and usually the power must be provided in two forms—one a heavy current at a low voltage, the other a high voltage at a low current. Little success appears to have attended efforts to produce a cold cathode valve, which is a pity, since such a valve would prove of great value to those situated miles away from convenient sources of electric power. Even should the difficulties eventually be overcome, a source of high tension voltage will still be necessary.

Power supplies fall into several different categories and, in the first instance, it is proposed to discuss those which will meet the requirements of the man who neither has a mains supply nor facilities for getting accumulators charged, and therefore has to rely on batteries made up of primary cells. There are many readers of this Journal, resident at home and overseas, who are so placed, and, moreover, who find it a somewhat difficult matter to obtain reliable information on types of cells suitable for their particular requirements. There are others, living in rural districts, who can get accumulators charged, but only at high cost and with considerable inconvenience, owing to the distance over which batteries have to be transported. It is very likely that the information which follows will enable them to obviate such inconvenience and possibly effect a reduction in their overall running costs.

Particular Requirements

Obviously the power supply requirements are liable to vary greatly in individual cases, depending on the type of receiver in use, whilst the problem assumes still greater importance when transmission is also carried out. One common essential is that the *overall* efficiency is high—not just the anode efficiency, which, being often secured at the expense of a heavy current drain in other directions, is a very different matter.

A further complication is that home readers will be in the position of obtaining replacements fairly quickly and with low transport charges, and may therefore be willing to allow a higher current drain than an overseas reader, who may have to wait a month or two for fresh supplies or replacements, whilst, in addition, the transport charges will represent a considerable proportion of the cost.

Before proceeding to details of the various types of primary cell made to meet the needs of users of wireless apparatus, it will not be out of place to discuss points relative to the latter.

Battery-operated Receivers

Whilst many wireless enthusiasts obtain fair results with only a single valve receiver, it can be stated that, in general, two is the minimum number of valves which will give a satisfactory all-round performance. Since a radio-frequency amplifying stage will definitely give a receiver greater range and will, to some extent, make up for a poor location, in addition to the normal and well-known operational advantages, it is desirable to include one, followed by the essential detector stage. Whether or not a low frequency amplifying stage is added will depend on the main interests of the reader. A low-frequency stage will not render audible a signal which is not already present in the detector output, and, further, it will increase the strength of background noise as well as signal, so giving no improvement in the signal to noise ratio. If it is desired only to receive telegraphy and telephony with reasonable intelligibility, the L.F. valve may well be omitted. On the other hand, for loud-speaker operation, and to secure the full graduation in tone of broadcast music, a low frequency output valve is essential, except possibly in cases where a number of programmes can be received at good strength.

There is, on the market, one particular range of valves specifically designed to operate off a single dry cell, the filament requirements being 50 mA. at 1·4 volts. This range is manufactured by *Tungsram* and brief details of the various types available were given on page 746 of the June BULLETIN. For full particulars, application should be made direct to the manufacturers.

The valves are primarily intended for incorporation in a superheterodyne circuit, but certain types—notably the 1N5G, 1H5G and 1A5G—could be used in the construction of a straight receiver. The 1H5G is a single diode triode, but only the triode portion would be employed.

Until recent years there was also available a range of 2-volt valves consuming the low current of 60 mA. but this had been discontinued and all modern battery valves, with the exception of the *Tungsram* dry cell types and a few specialised super-power valves, take either ·1 or ·15 amps. for filament heating. For the sake of economy, those consuming ·1 amp. should be selected, there being suitable valves of all types available in practically all makes. Important factors, when making a selection, are high gain and mutual conductance, economy in anode and screen currents, and ease of interchangeability, which means avoidance of unusual bases. For the benefit of those who may not have ready access to the lists of the various valve manufacturers, some advice on preferred types follows.

In the R.F. stage, a variable-mu type of pentode valve is desirable, the *Tungsram* HP211, which possesses a mutual conductance of 1·7 mA./volt at a combined anode and screen current of 3·2 mA., fulfils the requirements. The *Osram* VP21 is also a good choice.

Either a triode or a screen-grid (non-variable-mu) type of valve may be used in the detector stage. The latter will prove slightly more sensitive, whilst the current with either will be very low. The *Osram* Z21, the *Mazda* SP210 and the *Tungsram* HP210 are all screen-grid valves which possess excellent characteristics. The HL2 class of triode valve, made by the majority of manufacturers, is specially

Type M Dry Cell made by Siemens.

designed to give efficient detector action and there is little to choose between them, with a possible preference for the *Osram* HL2/K.

When only headphone reception is required—and this is advised, as any small saving in power consumption that can be effected will have a considerable effect on the life of the batteries—any of the small H.F. or L.F. types of valve will serve well in the low-frequency stage, and will give lower background noise than a pentode valve. When it is desired to operate a speaker, a pentode type of output valve should be chosen in preference to a low impedance power triode valve, as the efficiency is much higher. The pentodes available take ·15 ampere filament current, suitable types being the *Mullard* PM22A, which gives an output of 340 milliwatts with a total high tension current consumption of 7 mA. at 135 volts, and the *Tungsram* PP215, which, designed to operate at a maximum anode voltage of 90, consumes 9 mA. and gives an output of 200 milliwatts.

The total current consumption of three average valves would be between 8 and 10 milliamperes but this can be considerably reduced, without materially affecting the performance, by increasing the value of grid bias slightly beyond that recommended by the makers of the valves and by reducing the voltage applied to the screen-grids of pentode type valves, where used. A final drain of 5 to 6 mA. will represent the probable minimum.

A number of battery-operated superheterodyne receivers are available in which particular attention has been paid to economical operation. One such is the *Eddystone* All-World Eight, which consumes 1·1 amp. L.T., the H.T. current varying between 8 and 12 mA., according to the setting of the amplification control.

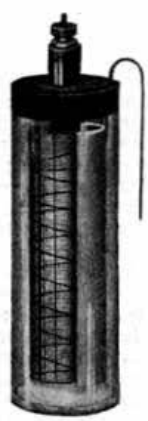
In general, it is not advisable to reduce the anode voltage to a low figure, as the efficiency will thereby fall off rapidly. A good performance can be expected with a value of 90 volts, but the employment of 120 to 150 volts, with increased bias to reduce the current drain, will make a considerable difference to the results.

Grid bias should preferably be obtained automatically, to cut out the necessity of occasionally adjusting and replacing the grid bias battery. Another point to watch is that additional H.T. current consumption is not caused through the use of potentiometer feed to the screen-grids of any valves—these should be fed either from a separate tapping on the battery or through a series resistance, to break down the voltage. The latter method is preferable, because the current drain is then taken evenly from the battery as a whole, instead of lightly from one and more heavily from the other section. The anode and screen currents of a receiving pentode or tetrode type of valve are mainly governed by the potential applied to the screen-grid, and this potential should therefore be as low as possible, consistent with a satisfactory performance.

Finally, the utmost should be made of the audio output given by the receiver. Many weak transmissions will be lost on a telephone headset which may inherently be of poor sensitivity or have developed this condition as a result of de-magnetisation. *Brown's* "A" type telephones, possessing really high sensitivity, are recommended. Care should also be exercised in the selection of a loudspeaker, the main factors being to ensure that the permanent magnet is of a type carrying a high flux density and of a material which will retain it indefinitely.

Transmission

The amateur living in a remote district has to pay even more careful attention to the choice of power supplies for operating a transmitter than he does in the case of a receiver, or the cost of running such apparatus is likely to be prohibitive. Low power will be inevitable but, in many cases, this drawback—if it may be considered as such—will be made up for to a considerable extent by various advantages seldom possessed by the town dweller, such as, for example, ample room to erect large



Re-chargeable Sack Cell.

An example of Inert Cell.

aerial systems running in different directions, and the absence of screening and absorption caused by metal-work and house wiring.

The design of a transmitter for use under such conditions will be fairly simple. Much may be accomplished with the aid of a single valve crystal oscillator whilst two valves at the most will prove sufficient for all normal requirements. For various reasons, it will be desirous to employ pentodes, or, alternatively small twin Class B triodes, and there are a number of ordinary receiving valves which possess suitable characteristics for low power transmitting work. In addition, *Osram* manufacture a special low power pentode transmitting valve, having a 2-volt filament. One point which may be mentioned with regard to the use of receiving valves for transmitting work is that the anode current may be safely allowed to run up to a higher value than normal, since the valve is delivering R.F. power and the internal dissipation is thereby reduced. A transmitter, specially designed to meet the needs of those with restricted power supplies and capable of efficient operation on telegraphy and telephony, is at present undergoing tests and full details will be given in a later article, when also further hints will be offered on the choice of valves for low power transmission.

Types of Batteries Available

After the foregoing introduction to the subject we can proceed to discuss the actual batteries which are on the market, for the provision of L.T. and H.T. current, bearing in mind that they must be of the primary cell type, *i.e.*, delivering electrical energy by virtue of a chemical action during which the elements are used up, as contrasted to the secondary cell, which first of all has to undergo a chemical transformation during the process of charging, before it is capable of delivering a supply of electrical energy. The desirable characteristics of cells for this purpose are long life, maintenance of voltage during long periods of operation, low internal resistance, and reliability, without the necessity of constant attendance.

L.T. Cells

The first essential is a relatively large supply of current at a comparatively low voltage, wherewith to heat the filaments of the valves. The first type that comes to mind is the heavy duty dry cell, which has to-day been brought to a high standard of efficiency, chiefly through care in manufacture and selection of chemical material. Actually, of course, the cell is by no means dry but incorporates a fair degree of moisture. It is always more economical to employ large cells, which are capable of delivering a moderately high current when occasionally required and which offer greater resistance to deterioration under adverse climatic conditions, than the smaller sizes.

In this connection, one cannot do better than peruse *Siemens* Catalogue No. 640, which is devoted entirely to primary cells and batteries. This particular firm has had long experience in the manufacture of primary cells, and their products can be confidently recommended as being among the best and most reliable obtainable. Dry cells are available in a variety of sizes, the largest being the type M, the capabilities of which can be judged from the fact that it weighs no less than 9¾ lbs. In the majority of cases, the type N, weighing 5½ lbs., will give satisfactory service over a long period. When it is desirable to keep the weight down, as, for instance, during occasional portable work, the Full O'Power Cell—size 640 for home use and size No. 6 for overseas—is recommended.

The drawback of the dry cell is that its useful life deteriorates, although admittedly very slowly, even if it is not actually in service. This means that if long transport journeys are involved, or if the cells are stored for a period before being put into service, especially in tropical climates (which conditions are likely to be the experience of overseas readers), the life of the cell will be shortened and premature failure may occasion considerable inconvenience. To obviate this disadvantage, the Inert Cell is manufactured. This type of cell possesses the important and useful feature that when it leaves the factory it contains an exciting agent in an absolutely dry and inactive condition. No action takes place and no current can be drawn from the cell until plain water has been added, so that the electrical output and life of the cell is not reduced in the slightest by keeping it " on the shelf " in any climate. In other respects, the Inert Cell is equal to the normal type of dry cell.

Siemens manufacture the Inert Cell in a wide range of sizes. Owing to the absence of moisture, the weights are less than the equivalent sizes of dry cell —for instance, type No. 53, of identical dimensions to the type M dry cell, weighs 8 lbs., whilst type No. 54, equivalent to type N dry cell, weighs 4½ lbs. The weight naturally increases when water is added but the reduced weight, when dry, may effect some saving in transport charges, when long distances are involved.

Finally, we come to the rechargeable L.T. sack cell, which, the manufacturers advise, will give more economical service than any other type, the reason being that, instead of the cell being discarded when worn out, it is possible easily to replace the elements, after which the cell is again ready for another long period of service—approximately 500 hours at a discharge rate of ·25 amp.

The L.T. sack cell is made in one size only and weighs 9½ lbs. in an uncharged condition. The normal discharge rate is ·25 amp., and the maximum ·5 amp., this range meeting the requirements of the majority of battery set users. The cell is fitted with a wooden cover to prevent undue evaporation, and like the inert cell, it is absolutely inactive as sent out. The electrolyte consists of a solution in water of the special Siebrosal salts supplied with the cell and it should be renewed at the same time as the elements. The writer has had two of these cells in service for several months, providing L.T. current for a three-valve battery receiver, and can testify to the fact that they are very reliable. No attention has been given to them beyond topping up with plain water at very infrequent intervals, and, in all respects, they have been found equal to the acid accumulator previously employed. The elements are of massive construction and are evidently good for many months to come before renewal will be necessary. Creeping has been conspicuous by its absence.

The E.M.F. provided by any of the Lechanche type of cells mentioned is 1·5 volts. If a heavy current is drawn from a small cell, the internal resistance drop will cause a reduction of available

voltage, but, in the larger dry cells and in the wet cells, which have a low internal resistance, the voltage drop may be ignored provided the current is within the maximum discharge rate. The voltage drops as the cell approaches the end of its useful life.

Since the majority of valves require a full two volts for efficient operation, it becomes necessary to employ two cells in series, with a certain amount of resistance in series to absorb the excess voltage. The value of the resistance will depend on the actual current consumption and, in the case of a three-valve set of the type previously advised, a resistance of three ohms will be suitable. In practice, it is advisable to employ a variable resistance, in order that some may be cut out as the cells age, thus maintaining a constant voltage at the terminals of the valve-holders.

H.T. Batteries

The common form of dry H.T. battery will, in many cases, fulfil the requirements of the normal small receiver. The advice previously given to employ a battery capable of giving an output in excess of normal needs, again holds good and greater economy will result from the use of a super-capacity battery of high quality than from the cheap type. The Full O'Power V8 battery, manufactured by *Siemens*, delivers up to 20 mA. at 120 volts and is recommended. The cell containers are made of pure zinc in one seamless piece, ensuring a long life. Other sizes, both as regards voltage and current output, are available.

The dry battery, made up as it is from a number of dry cells, has to be completely discarded once its initial period of useful service is over, whilst it also gradually deteriorates during storage. The Inert Cell is available as an alternative and any desired voltage can be secured by connecting a number in series. The smallest size made is the Type 60, which weighs 5 ozs. A special form of battery, consisting of a number of rechargeable H.T. sack cells, of a type somewhat similar to the L.T. cells but, of course, much smaller, is, however, to be preferred, since its useful life can be prolonged indefinitely by replacement of the elements as they become worn. The old type of battery, made up of a number of small wet cells, was admittedly a somewhat messy affair, but the modern version, as manufactured by *Siemens*, is quite different. Careful attention has been paid to small details, the result being a neat, clean cell, which is provided with a cork top to prevent evaporation. The cells are despatched unassembled and therefore in a completely dry form. When set up, the special Siebrolyte salts form, with the addition of a small quantity of water, a jelly electrolyte, thus rendering the cells completely unspillable.

The rechargeable H.T. sack cell is made in three sizes, viz., HT1, HT2 and HT3, corresponding to small, large and extra large capacity H.T. dry batteries. A specially designed teak container is available to hold the cells, partitions being provided for separating adjacent cells, thus ensuring insulation between them, and also between adjacent rows. Tests have been carried out on a number of the size HT3 cells over a period of several months. A continuous drain of 20 mA. has been maintained for periods of several hours, and the voltage has been found to keep sensibly constant. It is evident that a considerably greater current could be drawn for short periods, thereby extending the scope of the battery beyond ordinary receiving use. The smaller sizes would be suitable for operating receivers taking a small and moderate current respectively, whilst the larger cells would prove useful for low power transmission, in which service the drain would be of an intermittent nature, and it would be permissible to draw up to 40 mA. for short periods. The H.T. cells the writer has in use show no sign of deterioration and have proved perfectly reliable.

Mention has been made exclusively of *Messrs. Siemens* products, because this firm specialise in the manufacture of primary cells. Those desirous of obtaining further information should apply to the manufacturers, requesting list No. 640 in the case of home readers, list No. 655 in the case of overseas readers, and leaflet No. 621 for details of the special H.T. cells. Special attention is paid to batteries for export, due regard being paid to the more severe climatic conditions under which the batteries will be used—hence the issue of a special catalogue. Agents exist in most parts of the world, from whom supplies can be drawn.

(*To be continued.*)

British Standard Specification No. 833

British Standard Specification No. 833 deals with radio interference suppression for automobiles and stationary internal-combustion engines. Limits and methods of suppression are discussed.

The specification is one of a series of five British Standards relating to the suppression of radio interference, the others being :—

B.S.613 Components for Radio-interference Suppression Devices (excluding Devices for Traction Equipment).

B.S.727 Characteristics and Performance of Apparatus for the Measurement of Radio Interference.

B.S.800 Limits of Radio Interference.

B.S.827 Radio-interference Suppression for Trolley-buses and Tramways.

Although the specification under consideration relates to the suppression of interference of various kinds, it is primarily concerned with the protection of reception at points not in the immediate vicinity of the sources of interference, and the degree of suppression has been specified with this end in view. The components and suppression methods are, however, also appropriate to the protection of reception in the immediate vicinity of the sources of interference, *e.g.* on a car-radio set.

The specification requires reference to B.S.727.

B.S. Specifications can be obtained from British Standards Institution, 28 Victoria Street, London, S.W.1, price 2s. each, by post 2s. 2d.

* * *

VU2FX

Mr. L. J. Thomas, until recently VU2FX of Rawalpindi, has now returned to England. He wishes to thank all Home members who co-operated with him in tests, whilst abroad.

NATIONAL FIELD DAY, 1939

DISTRICT 4 EASY WINNERS

By J. KIRK* (G6ZO)

NATIONAL Field Day was once again an outstanding success, and the participants (from quite a large number of countries) who co-operated with the R.S.G.B. must have felt that the trouble they took in setting up portable gear, and the energy put into the operating of it was well worth while.

Not all had a hitchless week end, for Field Day always brings out those little weaknesses in gear and operating ability which at other times pass unheeded if not unnoticed.

Conditions appeared to treat us quite fairly though there was nothing to write home about as far as 14 Mc. was concerned, in fact it is several years now since we had really good conditions on that band for N.F.D.

The Leading Scores

Hearty congratulations to District 4 on winning the shield for the first time—their total of 655 was produced by consistently high scoring at each of the four stations, rather than by one station of super excellence putting them ahead.

Second place was jointly taken by last year's winners, Northern Ireland, and District 5 with 607 points each. Close on their heels came the North London District 12 with 601 points, making four totals exceeding the 600 mark. Last year this was only accomplished by the GI group, and the slight alteration in the scoring system did not make that difference.

District 15 with 583, and District 8 with 582 points claimed fifth and sixth places respectively.

GI5QXP did excellent work to lead the 14 Mc. stations with 192 points and G2IOP, the District 4 representative on this band, put up the fine score of 190. Yet, last year five stations exceeded 200 points.

On 7 Mc. there was hot competition for first place which G5BJP obtained with 202 points. The Scottish "B" District's station GM3RLP ran them close with 200 whilst G5FAP, G3BKP and GW8NPP all scored more than 190 points.

The District 7 station, G6GSP produced the staggering score of 197 points on 3·5 Mc., but "Rusty" the D.R. (of B.E.R.U. contest fame) was one of the four ops. at this station, so we begin to understand.

G8DTP, Leckhampton Hill, Gloucester. Four of the operators off duty. From left to right: G5BM, 8ML, 8DT and 5BK.

On the top band GW6AAP would have been an easy winner, but unfortunately they had to withdraw their entry due to a misunderstanding regarding the use of a 260 ft. aerial. We sincerely hope that next year's N.F.D. may provide a more satisfactory result to the competition for the much coveted "top-band" replica. District 8, therefore, with 133 points came out as 1·7 Mc. winners. Almost all the 1·7 Mc. stations scored many more points than last year, when only one total exceeded 100.

The Best from the Logs

On 1·7 Mc. HB1AW and HB1CE provided contacts for G2FIP, 2UJP, 5RIP, 5UMP, 6SNP, 8MUP, and GM6RIP which was real DX for N.F.D. work.

On 3·5 Mc. many stations made contacts with D, HA, HB, LA, ON, OZ, PA and SM.

On the notorious 7 Mc. band, despite the presence of a few selfish high power 'phone operators who could surely have kept off for just 24 hours in the year, a number of stations worked the few W's who were taking an interest in the event.

G5JOP, Swavesey, Cambs.
G5BQ and G2XV standing, with G5JO front left, operators at the District 8, 3·5 Mc. Station.

W2OB worked GM3RLP, G5AOP, 5BJP, 8DTP, and GW8NPP. W3HSD worked G2ZVP, 5AOP, 5JBP, 6PYP, and 8DTP. G5AOP also raised W1KRX and W2HUG, and GW8NPP contacted W1LEH, 2HUG and 2MER. G2JBP had PY1BR. G2HWP worked VO1O and GW5FUP raised VO1K.

On 14 Mc. DX was quite plentiful and only two or three stations failed to work a W.

SU5AAP and SU5KW were worked by almost all stations, but the only stations to W.A.C. were GI5QXP, G5JZP and G8JOP.

GI5QXP and G6USP worked KA1. G6USP also worked VU2AN, 2FS, 2JG and 2FOP. GM6JDP raised CE4AD and PJ5EE. G5DRP and G8JOP worked ZC6RL and 5DRP also hooked VP5PZ.

* *Member of R.S.G.B. Tests Committee.*

VP4TO came on and worked G8PUP and G5JZP. G5JZP also got ZS5DG and GI5QXP had ZS6BQ. CX2AJ was contacted by G2RCP and G2IOP. G6YKP and G6ZOP worked VU2AN. 2JG and 2FOP, 6YKP also getting K4FCV and VU2BX, and 6ZOP getting LU6DG. G2IOP, 2RCP, 6CJP, 6USP, 8PUP, 5JZP, 8PVP and 8JOP raised VK–ZL; and I.U3HK, 6DG and 7BH provided South

G5VDP, Thurstonland.
G8GU and 2PC operating the District 2, 14 Mc. Station

American contacts for many, as did PY1FH, 1FM, 1FW, 1GJ, 2AL, and 4CP. G2JDP worked VQ4KTF and G8PVP contacted VQ4JRW. G5GRP had EA9RA, and several stations worked K4–K5. G6GNP worked VO1O, and GM6JDP, VO3O. CT3AN gave contacts to G5DRP, GM5GKP and G8JOP.

Co-operation

The Swiss, Dutch and Norwegian amateur societies are to be thanked for their co-operation which helped a great deal to make the event such a success. We wonder if, next year, our Norwegian friends could clear up the muddle that occurred this

GI3MLP, Killinchy, Co. Down.
GI3ML, 5HV, 2DYO and 2HBL, at the Northern Ireland, 1·7 Mc. Station.

year, by adopting the LB prefix *universally* for their portables, and reserving the usual LA for fixed stations.

Ex-ST2CM and SU5KW ran a station under the latter's call at Cairo, and kept going throughout the contest, working as many G portables as the Egyptian portable SU5AAP, which is saying something. VU2FOP, situated ten miles north of Jubbulpore, Central Provinces, gave coveted contacts

GM6JDP, East Renfrewshire.
The chief operator gets busy on 14 Mc. for Scotland A District.

to no less than 15 of our stations but he experienced much trouble from static which made 7 Mc. working impossible. He heard eight further portables which were not worked, and says that G8PUP was the loudest and most consistent station, being 589 at times. He deplores the fact that many fixed G stations replied to his CQ N.F.D. calls.

Check Logs

Thanks are due to G2MI, 3CKP, 3NTP, 4BC, 5CIP, 5QU, 6CL, 6GH, 8LOP, ZB1E, 1X, LA9D, VU2FOP, BRS82, BERS337 and BERS195, for the check logs they submitted. BERS195 heard G3CKP and G8KUP on 7 Mc., but he concentrated on 14 Mc. this year and logged 24 different G, GM, GI, EI portables on that band as well as VU2FOP.

The Gear Used

Brief details of the apparatus used at the leading stations on each band are given below.

1·7 *Mc.*	G5PAP	Trans.	C.O.
		Rec.	H.R.O
		Aerial	132 ft. end fed.
		Power	Dry batteries.
	G6SNP	Trans.	ECO/CO–PA (T25D).
		Rec.	National SW3.
		Aerial	148 ft. plus end loading coil.
		Power	HT and LT accumulators.
	G6VDP	Trans.	C.O.-P.A. (47-46).
		Rec.	O-V-Pen.
		Aerial	150 ft. with 130 ft. counterpoise.
		Power	DC/DC convertor.
3·5 *Mc.*	G6GSP	Trans.	C.O.-F.D. (RK11).
		Rec.	H.R.O. off batteries.
		Aerial	132 ft. doublet.
		Power	Dry batteries.
	G8ABP	Trans.	C.O.-P.A. (T20).
		Rec.	1-V-2.
		Aerial	132 ft. doublet.
		Power	12 v. motor-generator.

3·5 *Mc.*	G6RBP	Trans.	C.O.-P.A.
		Rec.	O-V-1.
		Aerial	132 ft. doublet.
		Power	Motor-generator, DC to AC.
7 *Mc.*	G5BJP	Trans.	C.O.-P.A. (809).
		Rec.	Eddystone L.P.C.
		Aerial	½-wave doublet.
		Power	DC/DC Motor-generator.
	GM3RLP	Trans.	C.O.-P.A. (T40).
		Rec.	6 valve superhet.
		Aerial	132 ft. end fed.
		Power	500 v. DC/DC convertor.
	G5FAP	Trans.	C.O.-P.A. (809).
		Rec.	TRF.
		Aerial	½-wave doublet.
		Power	DC/DC convertor.
14 *Mc.*	GI5QXP	Trans.	C.O.-F.D.-P.A.(RK11).
		Rec.	TRF.
		Aerial	99 ft. end fed.
		Power	Dry batteries.
	G2IOP	Trans.	Tritet-P.A. (RK39).
		Rec.	TRF.
		Aerial	Windom.
		Power	DC/DC convertor.
	G6CJP	Trans.	Tritet-F.D.-P.A.
		Rec.	Superhet.
		Aerial	132 ft.
		Power	DC/DC convertor.

Other Comments

GI5UR who had a difficult time on his 7 Mc. station (due to the other operators falling out at the last minute) kept things going himself for the whole 24 hours in order not to let his district down.

G5JBP, the District 17, 7 Mc. station, had a labour-saving layout, including remote controlled frequency switching, separate power supplies for transmitters' and receivers' L.T. and H.T., and for the relays. A *Hallicrafter* Superskyrider and a 16 valve all-wave superhet loaned by the R.A.F. were receiver and standby respectively.

VU2FOP, who put out a most consistent signal, only used 15 watts input to an ECO, with a half-wave doublet on 14 Mc.

Conclusions

The standard of operating seemed about normal for the event—some was excellent, some was fair to mediocre, and of course some was poor! The French B.C. station on 7 Mc. appears to have made a thorough nuisance of itself, but we have already commented on 7 Mc. 'phone so——

The weather was perfect and visitors were abundant, and one and all must have felt spurred on to try again next year.

NATIONAL FIELD DAY, 1939

How the Districts Finished

Position.	District.	Band Used.				Total.
		1·7 Mc.	3·5 Mc.	7 Mc.	14 Mc.	
1	4	128	163	174	190	655
2	N. Ireland	110	128	177	192	607
2	5	119	164	187	137	607
4	12	121	136	196	148	601
5	15	93	157	172	161	583
6	8	133	140	192	117	582
7	Scot. A	89	163	185	135	572
8	7	127	197	160	84	568
9	Scot. C	111	139	160	123	533
10	13	108	139	179	105	531
11	10	83	135	193	113	524
12	14	101	179	184	59	523
13	3	87	144	202	89	522
13	16	127	133	149	113	522
15	Scot. B	103	129	200	65	497
16	1	113	137	153	89	492
17	2	129	153	141	67	490
18	17	85	158	169	73	485
19	Scot. G	87	135	173	54	449
20	18	78	142	132	85	437
21	Scot. H	74	130	150	74	428
22	6	94	109	148	64	415
23	19	110	113	102	81	406
24	11	—	126	113	130	369
25	9	74	105	124	61	364
26	Eire	99	121	65	19	304
27	Scot. F	—	124	142		266
28	Scot. D	—	—	102	72	174

STORM OVER SNOWDON

By D. S. Mitchell (GW6AA) and M. C. Crowley-Milling (GW6MX)

IN view of the widespread interest in the "Snowdon 56 Mc. Tests," it is believed that a brief account of the last expedition will interest a number of members.

Snowdon is the highest mountain in England and Wales—3,570 ft. above sea-level, very fortunately there is a mountain railway going practically to the summit, otherwise radio experiments, on any scale, would not be a practical proposition. This railway, which operates on the rack and pinion principle, was designed by Swiss engineers, and is a wonderful engineering feat. It is nearly five miles long, and the ascent occupies just under one hour. The diminutive engines make enough noise to put a first class express locomotive to shame and as a point of interest they consume 8 *cwt.* of coal in climbing to the top!

Just below the summit on the western side is located a flat-roofed reinforced concrete building, constructed at great expense by the Mountain Railway Co., which took five years to build and cost £14,000. The work could only be carried on for six months of the year, and then only when the weather permitted; further the foundation is hewn from the solid rock. When it is realised that every piece of material had to be brought up from 3,000 ft. below, the cost appears more reasonable. Labourers require twice the normal wage to work up there, and after having had more than a taste of it ourselves, we don't blame them!

This year it was planned to spend six days on the summit covering the R.S.G.B. 56 Mc. Annual Field Day on July 9.

During previous tests in September, 1938, our 56 Mc. signals had been reported in London, Bedfordshire, Oxfordshire, and other distant places. With improved apparatus and aerial systems we had high hopes of even better results, but were doomed to be defeated by the worst weather it has ever been our misfortune to experience.

Those amateurs living in the south who were disappointed at not hearing our signals so far away this time, will we feel sure, realise that we did our best in the face of the conditions with which we had to contend.

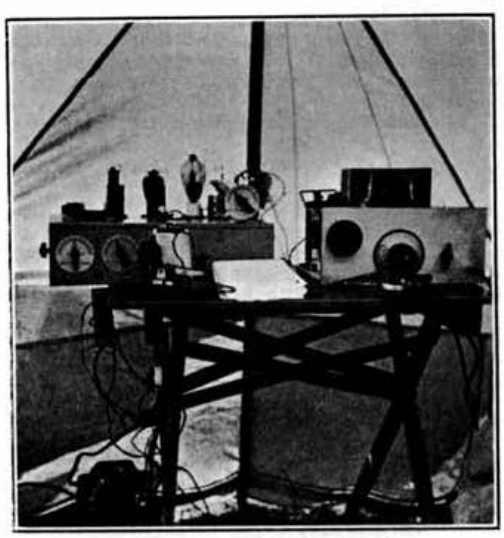
Our apparatus—four car and trailer loads of it—was taken to the foot of Snowdon on July 3 and 4, and we had arranged to go up early on the 5th, but no regular trains were running, due to the bad weather. The railway company, however, very kindly ran a special train to take us and the gear to the summit.

For the whole of that day the wind was too strong for the erection of masts, but we managed to put up 400 ft. of feed lines ready for the aerials.

To our dismay Thursday, July 6, dawned with stronger winds, and it was much colder, making the hands numb after a few minutes exposure. Those who have not reached these altitudes can have no conception of how cold it can be at 3,500 ft., even in July. The wind made it impossible to do further outside work until late in the afternoon, so we set to work in the little room which had been reserved for our gear, and got everything working well. We erected some aerials in the evening, but filling the "stay-sacks" with rocks took most of the time until dusk. The wind was blowing at about 40 m.p.h. at this time, and very cold with frequent bursts of torrential rain. It was exceedingly painful handling sharp rocks and tying hard and moisture-sodden ropes with hands chilled to the bone. The wind got up again that night, but not sufficiently to do much damage.

We worked all day Friday in thick mist and rain, but with not much wind. However, quite unexpectedly, about 6 p.m. the wind suddenly rose, and in about half an hour was blowing at hurricane force. It fairly shrieked in the stays and wires, and the mist raced across the summit like steam under high pressure. The larger masts started pulling their sacks, and we worked frantically piling heavy rocks on them. So strong was the wind that we had to tie our spectacles on with wire! At 8 p.m., after securing all that we could, we retreated down to the building for some food and rest.

About 9.30 we decided to put on our oilskins again and go out to tighten things up, in the hope of saving the masts. But the wind had become worse with the result that we were blown down several times in attempting to reach the summit. One of the aerials had gone, but all the masts were still up. It was impossible to stand on the top, and all work had to be done while clinging to the stays, or on hands and knees. So great was the shrieking



The apparatus used at G2QYP during the Annual 56 Mc. Field Day.

of the wind that a person shouting at the top of his voice would not have been heard 10 ft. away. With a continuous blast like this, and a practically sheer drop of over 1,000 ft. on three sides, one does not view lightly the prospect of being blown near to the edge! The gale must have continued into the early hours, but we were too tired to hear it.

When we went to the summit next morning, there was a scene of complete desolation. Only two masts standing out of six we had left up the previous night and all our arrays gone—the wind had dropped, and it was raining steadily. *THIS—after months of careful preparation, and all the work of the past few days*—we just looked at each other and felt pretty shattered.

Should we give it up there and then? We certainly felt like it, but decided to stick to the job, and do our best to repair some of the damage.

A missing mast was found right down one side—one of the stays had caught on a projecting rock, otherwise it would have gone to the depths below, never to be seen again.

It may seem laughable to those who were not there, but after having been on Snowdon for four days, we had a single half-wave vertical, and a single half-wave horizontal aerial working by the Saturday afternoon. It was now too late to reconstruct the wrecked beams, so we decided to work continuously with the simple half-wave aerials.

We fairly leaped for joy when EI8L came back to our first call at 3.30 p.m. on July 8, and gave us S.8!

On the Sunday (56 Mc. N.F.D.) many contacts were made with stations in Manchester, Liverpool, Sheffield, Wolverhampton, Nottingham, the Lake District, and other places. Reports have since been received from Birmingham, Worcestershire, and Gloucestershire, but due mainly to our inability to use beam aerials, and possibly partially due to bad conditions for extended ground-wave working, no reports were received this time from London or the extreme south.

The results of the 1938 tests showed what could be done with high-gain directional arrays, so, in spite of our unfortunate experience, we are determined to try again next year.

Particulars of the apparatus used, etc., will be given later in the article dealing with the 56 Mc. N.F.D.

Our thanks are again due to the Snowdon Mountain Railway Co., and their staff for the great help and kindness shown to us. Also particularly to Mr. and Mrs. Gibson at the summit, who cheerfully dried our sodden clothing time after time, dosed us with rum when necessary, and kept the "inner-man" continually satisfied.

Fade-Out on 7 Mc.

Mr. P. Spencer, G8MH, of Bushey, reports a severe fade-out on 7 Mc. from about 10.30 G.M.T. until about 11.05 G.M.T. on Sunday, July 16. During this time, signals from stations outside the London area disappeared completely, whereas prior to the fade-out G8MH had been taking part in a successful five way telephony QSO with G6JB (South Devon), 3GS (Jersey), 8OK (Guernsey) and 3BG (Derby).

Static level at 3GS was very low throughout the morning whereas during the previous day it had been extremely heavy. 8MH observed only four bursts of static during the fade-out, but found the background level rather higher than usual.

The two Channel Isles stations heard one another throughout the fade-out, but G8MH was only able to work one station, namely, G2VJ (West London) on telegraphy.

G3GS supplies the following information for July 16 and 17.

July 16, 11.00 G.M.T., Bara. 29.50, Thermo. Shade 64°
" 17, " " 29.80, " " 62°

Sky observations:—10.20 G.M.T. 10/10 black clouds passing overhead to N.E. 10.27 G.M.T. (start of fade) 9/10 cloud, break approaching from S.W. During fade-out, sky gradually cleared and at 10.58 G.M.T. 6/10 cloud with brief periods of sunshine.

G8MH will be pleased to exchange information on this fade-out with other stations who noticed the effect.

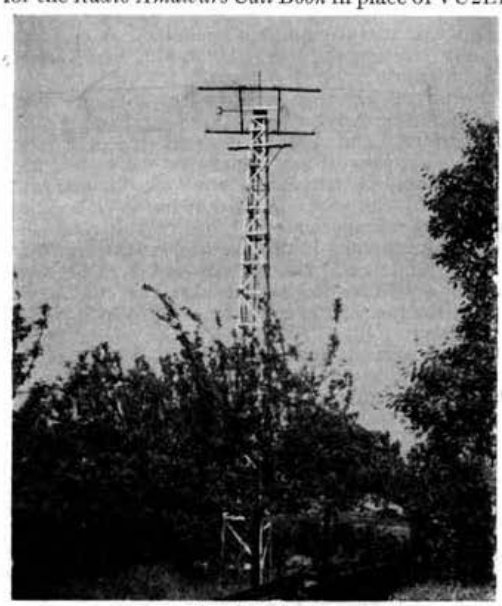
Thanks

The Spanish amateurs in camp at Gurs, B-P., France (F. Borrell, L. Contarini and Perello), wish to thank, through this medium, those members, especially G3PV, 2YS, 2LU, 2ZT, 5GR, 5PP, 3YO, 6TD, 8PJ, and 2FQO, who were kind enough to send them journals, etc., as they are no longer allowed to send un-franked letters as hitherto.

Further copies of radio journals would no doubt be acceptable, but it is suggested that these be sent in packets of two or three only otherwise they become subject to Customs duty. G2IY.

QRA Station for India

Mr. W. H. G. Metcalfe, VU2EU, advises us that he has been appointed Official Indian QRA Station for the *Radio Amateurs Call Book* in place of VU2LK.



Rotating Beam.

An interesting example of a rotating beam constructed by G3LN, Yardley, Birmingham. The elements are ⅝-in. galvanized conduit driven by a worm gear and cable. The radiator is of the W8JK type.

AT THE HOME END

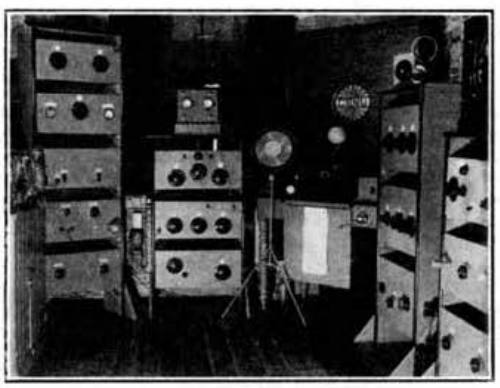
A series of short station descriptions prepared by H. Abraham, GW3AJ. Further contributions, particularly from more recently licensed members, will be welcomed.

No. 1. G6NU—Gillingham, Kent

Mr. W. E. Nutton, owner and operator of G6NU, is a confirmed believer in rack construction as the photograph plainly shows.

The five-section rack on the left contains 200 and 500-volt eliminators, a three-stage speech amplifier and modulator (Heising modulation is used), a 250-volt pack for primary keying, CO's for 1·7 and 3·5 Mc. and a PA for these bands.

Separate CO, FD and PA for 7, 14, and 28 Mc. are housed in the next rack, whilst the aerial matching system can be seen above these units.



The neat rack and panel station operated by G6NU.

G6NU overcomes the loss of efficiency entailed in utilising one receiver for the whole of the amateur bands by using one SG and detector stage for 1·7 and 3·5 Mc., and a separate unit on the same lines for the 7 and 14 Mc. bands; both sections are arranged to work in conjunction with a push-pull amplifier. For 28 and 56 Mc. an adaptor is used, and this can be seen on the table.

Other equipment includes eliminators for the receivers, a charger, monitor and heterodyne oscillator and a 56 Mc. portable rig.

The colour scheme adopted throughout is in battleship grey and black lacquer, including the microphone of which G6NU is very proud!

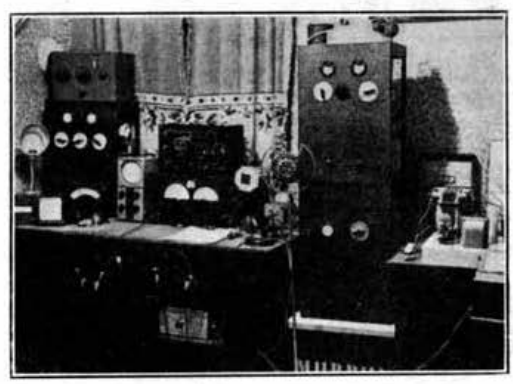
No. 2. GW2BG—Abertillery, Monmouthshire

Although GW2BG, a call-sign which hides the identity of Mr. G. R. Silverthorne, of Abertillery, may appear to those ardent listeners who are familiar with the occupants of the bands to be a new-comer, actually the station was first licensed in 1924. During the years 1929 to 1937 little transmitting was undertaken, hence the apparent newness of the call.

In company with most old-timers, 2BG has happy memories of the old days when the bands were "wide open spaces," and his greatest thrill in those days came in 1927, when, with an input of only 7 watts from dry batteries, on the old 45 metre band, a Dutch ship was worked while off the south-east coast of Africa. This received great prominence at the time and 2BG still has copies of an excellent "write-up" in the Dutch *Radio World*.

The present equipment consists of a crystal oscillator stage using a *Mazda* AC4Pen, driving a T40 power amplifier. A three-stage modulator is used with two *Osram* DA30's in push-pull in the output; the microphone is of the transverse current type.

Other equipment at this up-to-date station includes an RME 69 receiver with built-in noise silencer, a cathode ray oscilloscope, and a highly accurate signal generator.



An old-timer uses modern gear. GW2BG is frequently heard on 1·7 and 3·5 Mc.

GW2BG's interests lie chiefly on the lower frequency bands, and in particular on the "top band" where he has obtained some excellent reports on his 'phone transmissions. This is all the more creditable, as his present location does not permit the erection of an aerial really suitable for this band.

No. 3. GM3OM—Stirling, Scotland

GM3OM, the station operated by 22-year-old Mr. O. M. Derrick, of Stirling, suffers from that bug-bear of amateur radio—D.C. mains. How well he has overcome this disadvantage may be gauged from the fact that he has qualified for both W.A.C. and W.B.E., whilst second place was obtained in the 1938 R.S.N.I. Contest.

His new transmitter consists of CO-FD-PA, and uses the American 48 type of valve. C.W. is used

exclusively on 14 Mc. but on 7 Mc. plate modulation with *Mazda* PP 3521's in push-pull is adopted.

GM3OM's chief interest is in aerials, and the one in use at present—a two section W8JK beam 30 ft. high, running N/S—has proved most effective in contacting W's and VE's; all districts of the U.S.A. were worked in three hours during the 1939 W/VE Contest.

GM3OM, of the newer school, suffers from lack of A.C. mains, but in spite of this handicap results have been excellent.

In the photograph—reading from left to right—can be seen a Frequency Meter/CW Monitor, the receiver—a 1-v-1, head amplifier and above this a combined field strength and phone monitor.

No. 4. GI8PA—Belfast, Northern Ireland

Those amateurs who have worked Dr. J. Parke, of Belfast, owner and operator of GI8PA, will gain an excellent idea of the neat layout of his station from the photograph.

The transmitter uses a 6L6 (tritet), coupled to a T20 which in turn drives a T40 with inputs up to 100 watts. For telephony, two *Marconi* Reisz microphones in push-pull work into push-pull MH41's, followed by AC/HL's, also in push-pull, and these drive two 6L6's in Class AB. Over-modulation is indicated by a negative peak indicator.

GI8PA (Joe, to his friends) believes in neatness. Incidentally he also believes in real experimenting. Present work is on micro-waves.

For reception two receivers are used; 10-valve Marconi, covering 5–2,000 metres, and a 2-V-1 peaked for 900 cycles in the audio stage, and having regeneration in the first R.F. and detector stages.

Dr. Parke's professional activities (he is on the staff of the Methodist College, at Belfast, and may often be heard working G13FH, the transmitter of the College Radio Society) are also concerned with the production of radio waves, though in this case the frequencies concerned are measured in cms. and not in metres. Although little difficulty has been experienced in building a transmitter for these frequencies, rumour has it that a receiver for 500 Mc. has caused 8PA a good many headaches!

Cosmic Notes

Several groups of sunspots crossed the central meridian during the last two days of June and a moderate magnetic disturbance was experienced on these days. The F2 layer extraordinary ray vertical incidence critical frequency at Washington, U.S.A. noon was 7,900 kc. on June 28. Further large spots crossed the meridian on July 2 and 3 and a severe ionosphere and magnetic storm followed on July 4 and 5. This was sufficiently severe on the latter day to affect all frequencies above 6 Mc. The F2 layer critical frequency could not be observed at Washington on that day as a result of the storm, but the critical frequency for the F1 layer ordinary ray was 4,600 kc.

A quiet magnetic period followed, but three large groups of spots were observed to cross the central meridian on July 8 and 9 and Tokio Observatory reported an eruptive prominence of great height on the following day. The same observatory, also, counted as many as 220 individual sunspots on July 9. There was a slight magnetic disturbance on following days and the F2 critical frequency on July 12 was 7,900 kc.

Moderate magnetic disturbances occurred on July 14 and 16 and a large group of spots crossed the central meridian on July 17. On this day the F2 layer critical frequency was 7,000 kc. at Washington. Further groups of spots were observed with C.M.P. July 19, 23 and 27.

During the month several Dellinger type fade-outs were reported as a result of the increase in solar activity.

Station W1XAL from which much of the data in these notes is obtained is closing down for one month for rebuilding and erection of new directional aerials. This, combined with the writer's vacation may make it impossible to supply any Cosmic Notes in the August issue of this journal, and in that case notes for both August and September will be prepared for the September issue.

G2XC.

Reports Wanted

G3VW (London, N.W.9) on his 1970 kc. transmissions.

EXPERIMENTAL SECTION

Manager:
A. M. HOUSTON FERGUS (G2ZC),
Churt House, Churt, Surrey.

Aerial Group Manager:
E. R. RADFORD (G2IM),
1 Gibbs Green, Edgware, Middx.

Receiver Group Manager:
H. R. HEAP (G5HF),
404 Victoria Avenue East, New Moston,
Manchester, 10.

Propagation Group Manager:
P. MALVERN (G8DA),
10 Selkirk Street,
Cheltenham, Glos.

Transmitter Group Manager:
J. N. WALKER (G5JU),
4 Frenchay Road, Downend,
Bristol, Glos.

THERE appears to be a definite demand on the part of members to hold an Experimental Section meeting at Convention, and whilst views vary as to whether this should be of a technical or business nature, the popular opinion is that we should offer an opportunity for members to meet one another in order to discuss technical matters.

With these pointers before us it will be our endeavour to arrange matters so that everyone has a chance to obtain maximum profit and pleasure.

The question of contemporary literature raised in the July issue is one which we feel can be discussed with advantage at the meeting. Various suggestions have already come to hand, indicating that the work undertaken by Mr. L. Fryer is appreciated.

Group Information

The two methods of exchanging information between members living long distances apart are by means of amateur radio and by letter budgets. It is not known how many members exchange data " over the air " but in " Contact Bureau " days one group at least arranged weekly schedules, in addition to passing a regular monthly letter budget. Letter budgets are only of value if those contributing, remember that the data circulated is for the general information of the Group, and that rapid rotation has an important bearing on its usefulness.

Section Records

Members will greatly assist the E.S.M. and his G.M.'s, by giving notice promptly of changes of address, call-signs, etc. Such information can be passed to a member's G.C., preferably in the regular letter budget.

A list of all known active members of the Section is published this month, and all non-active members have been notified individually that their membership has been cancelled. In a voluntary organisation mistakes are bound to occur, therefore, if any member has been overlooked, or through no fault of his own has not received instructions, he should write direct to his G.M. Cases have occurred where members, have written in on their own, but there may be others who are in doubt as to how or where they stand. This is mentioned because we have a specific case before us of a G.C. failing to send a circular to each individual member of his group ; similar events may have occurred without the G.M. being aware of the fact.

The following list of active members is made up as from June 30, 1939 :—

Aerial Group

Group Manager : E. R. Radford, G2IM.

Assistant Group Manager : S. E. Martingell, G2MV.

Sub-Group 1.—Martingell, G2MV (G.C.) ; Ewens, G3QO ; Hobson, G5BX ; Hill, G3RC ; Jones, G5ZT.

Sub-Group 2.—Derrick, GM3OM (G.C.) ; Westlake, G6KR ; Hobson, G5BX ; Jones, G5ZT ; Dell, GW2UL.

Sub-Group 2*a*.—Howes, G2CF (G.C.) ; Taber, G3GU ; Salter (Mrs.), G3LT ; Williams, G3BI ; Garnett, G6XL ; Haywood, GW2UH.

Sub-Group 3.—Dell, GW2UL (G.C.) ; Hobson, G5BX ; Howes, G2CF ; McDermott, G3NZ ; Cooper, G5VT.

Sub-Group 4.—Flintham, BRS193 (G.C.) ; Keen, 2BIL ; Bayley, 2FYF ; Tate, BRS3503 ; Beerling, 2CJC.

Propagation Group

Group Manager : P. Malvern, G8DA.

Assistant Group Manager : L. F. Coursey, G4JZ.

Aurora Sub-Group.—Allcorn, 2FIH (G.C.) ; Cawson, 2ART ; Gooding, G3PM ; Graham, GM3TR ; Hamilton, G5JH ; Hartley, 2FIB ; Newby, G8CP ; Paulton, G4IT.

Barometric Sub-Group.—Crossland, G5CI (G.C.) ; Banks, 2CNC ; Blackwood, G3TG ; Donald, G3TO ; May, BRS3319 ; Shackle, 2DVQ ; Scudder, BRS981.

Cosmic Sub-Group.—Murden, BRS3379 (G.C.) ; Hamilton, G5JH ; Jones, G5ZT ; Williams, G2XC.

Fading Sub-Group.—Jones, G2JT (G.C.) ; Cymerman, BRS3101 ; Gould, G3KX ; Hobson, G5QZ ; Hopwood, 2AAV ; Lomas, G2HB ; Ward, G3WD ; Westlake, G6KR.

Magnetism and Conditions Sub-Group.—Money, G2UP (G.C.); Darnton, BRS2227 ; Hobbs, G8AA ; Kirk, G4CL ; Lane, 2AGZ ; Perks, G4CP ; Pittam, BRS2977 ; Woollatt, G3ZI ; Wood, ZS6DZ.

1·7/3·5 *Mc. Sub-Group.*—Maling, G5JL (G.C.) ; Bryant, G3SB ; Hall, G8JM ; Hallingey, G8PI ; Harvey, G5KT ; Kestin, G3ZL ; Kieller, G6HR ; Myler (Mrs.), G3GH ; Turner, G8NL.

28 *Mc. Sub-Group A.*—Corry (Miss), G2YL (G. C.) ; Blanchard BRS3003 ; Heightman, G6DH ; O'Hagan, G2CR ; Parker, G6QZ ; Seymour, 2AZX ; Arnold, VU2AN.

28 *Mc. Sub-Group B.*—Iserbyt, BRS25 (G.C.) ; Hamilton, BRS3179 ; Spencer, G8MH ; Vance, G8SA ; Williams, G2XC ; Santangeli, 11ER.

28 *Mc. Sub-Group C.*—Wallich, G6BW (G.C.) ; Clayton, BRS3214 ; Gregg, G5CG ; Jefferies, G8PX ; Robb, G16TK; Sey, GM8MJ.

56 *Mc. Sub-Group A.*—Holford, G5NG (G.C.); Buckwell, G5UK; Brackenbury, G8BB; Ewens, G3QO; Marchant, 2ACU; Quarrington, 2FJV; Stevens, G3YH; Williams, G2XC.

56 *Mc. Sub-Group B.*—Miller, 2AAH (G.C.); Archer, 2AXP; Ayre, G8OS; Cymerman, BRS3101; Holley, G5TN; Tranmer, G6TG; Troy, GM3YS; Disteche, SU1RD.

Receiver Group

Group Manager: H. R. Heap, G5HF.

T.R.F. Sub-Group 1.—Brett, G4IG (G.C.); Casson, BRS3593; Crouch, 2FIU; Dickinson, G4DP; Malin, BRS3520; Platt, G2VO; Rice, 2BRI; Smith, 2FWV; Udall, BRS3310; Upton, BRS3106.

Superhet. Sub-Group.—Blatherwick, G3VU (G.C.); Holley, G5TN; Parsons, G8TC; Shirley-Price, BRS1550.

U.H.F. Sub-Group 1.—Wake, G5RP (G.C.); Blakemore, BRS2368; Colles, BRS2683; Cosh, 2DDD; Simmonds, BRS3413; Walkden, BRS3617; Wentworth, G8IU; Willridge, 2AZQ.

U.H.F. Sub-Group 2.—Beedle, G6OW (G.C.); Sparkes, 2DCT.

Corresponding members.—Allen, G2UJ; Corfield, G5CD; Flintham, BRS193; Gardiner, G6GR; Marchant, 2ACU; Milne, G2MI; Miles, G2NK; Oakley, BERS451; Peter, BERS460.

Transmitter Group

Group Manager: J. N. Walker, G5JU.

Assistant Group Manager: H. H. Phillips, GW4KQ.

Sub-Group 1.—Phillips, GW4KQ (G.C.); Frazer, GW3BL; Galea, ZB1E; Lauridsen, OZ DR 001; Mahieu, ON4AU; McKinley, VE3ZU; Metcalfe, VU2EU; Peach, (?); Turner, ST2CM; Williams, W1APA.

Sub-Group 2.—Sherry, G6JK (G.C.); Gardiner, G6GR; Evans, GW3GL; O'Brien, G3LP; Squire, G6ZQ.

Sub-Group 3.—Appleby, G3RZ; Gill, G8KO; Holford, G5NG; Hunter, GM6ZV; Tranmer, G6TG.

Sub-Group 4.—Dale, G5VD (G.C.); Ball, G3FU; Blakemore, 2CQG; Carslaw, 2ACY; Willridge, 2AZQ.

Aerial Group

Sub-Group 1. 56 *Mc. Transmitting.*—Individual members in the group are conducting tests in connection with feeder losses.

Comparison tests with a square beam against a W8JK and a three element close-spaced array proved the former to be superior by 4dB and 6dB respectively. An article dealing with the square beam is in course of preparation.

Sub-Group 4. 56 *Mc. Receiving.*—Experiments show that a 600 ohm feeder line gives superior results to a 72 ohm line. It is also found that the W8JK beam when tilted 15 degrees from the horizontal considerably increases signal strength. Other aerials under tests are a Longwire up to 16 half-waves, the Yagi, the Bruce Longwire, the Reinartz and various rotatable arrays. It is hoped to publish the results of tests later in the year, meanwhile letter budgets continue to circulate.

G2IM.

Propagation Group

Referring to last month's Editorial, it is our opinion that 56 Mc. contacts with U.S.A. amateurs are unlikely. During our summer, the sporadic E layer controls the propagation of 56 Mc. waves over long distances and the normal skip distance is about 1,000 miles. This accounts for the reception of signals from Italy and Sweden, while Egyptian signals have been heard in Great Britain and Sweden as a result of double skip. Three skips would be required to take signals into U.S.A. so that stations with beams in that direction would be more likely to obtain results if the beam pointed south-east. 56 Mc. DX in winter would take place by reflection from the F layer, but as sunspot activity and hence F layer ionisation and critical frequencies appear to be getting less, trans-Atlantic contacts on 56 Mc. are unlikely for several years.

Aurora contains a report from Professor Carl Störmer that the greatest auroral displays recently in South Norway occurred on March 29 and April 17, 18 and 24. These dates coincided with severe magnetic storms and the existence of poor conditions on 14 and 28 Mc.

The *Barometric* Sub-Group is making use of the Air Ministry weather maps provided by the G.C., G5CI. The countries normally heard at the same time on 7 Mc. have been divided into areas and the reports thus show prevailing conditions at a glance.

The *Cosmic* Sub-Group are continuing to record sunspots and members who can, should see a moving film of chromospheric eruptions which is unique.

A study of the graphs in G2XC's article last month shows that on 28 Mc., signals from the west are often affected to a greater degree and for a longer time during a magnetic disturbance than are those from the south. A similar effect is being studied on 14 Mc. by the *Magnetism and Conditions* Sub-Group, whose members are discussing the effect of polarisation during such disturbances as opposed to the "deflection" theory mentioned last month.

Despite the lack of activity, the 28 Mc. Sub-Groups found the band open for contacts on many days, and it is emphasised that conditions on 28 Mc. will indicate if DX is likely on 56 Mc.

G6DH has been studying the relation between weather and the reception of 56 Mc. extended ground wave signals. Whenever the upper air between 1,000 and 3,000 feet is at a higher temperature than at ground level, the 56 Mc. signals are bent, *i.e.* for the signals to be refracted they must be propagated from cold to warm air. This bending is apparently in the manner of light waves and, if so, 112 and 224 Mc. signals should be refracted to a greater extent. The 56 Mc. Sub-Groups are collecting further evidence of this effect, but require more co-operation from stations active on the band.

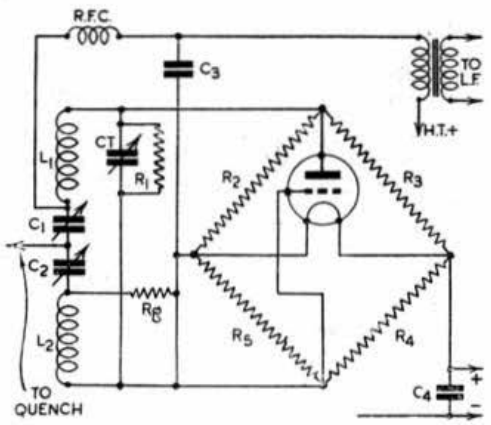
It has been noticed that Daventry Empire and British Isles commercial stations are well received during magnetic storms. This may be due to the absence of other stations or the fact that the signal is received over the direct route, and the round-the-world signal which causes fading is wiped out by the storm.

There is room for new members who are keen, and definite problems for study by the Sub-Groups will be welcomed by the G.M.

G8DA.

Receiver Group

It is generally recognised amongst amateurs that only high grade insulation should be used in constructing U.H.F. transmitters, but it is not so commonly known that the insulation in U.H.F. receivers is equally important. A case has come to our notice where a normal quench receiver was constructed using a condenser with bakelite insulation and a poor quality valve-holder. The equivalent circuit of the receiver with these components in the receiver is shown in the diagram, and whilst it may be argued that the resistances offered by the actual insulation are high, the performance of the receiver showed that this was not the case. Tuning



Resultant circuit using faulty insulation for tuning condenser and valve holder on a normal detector. It will be seen that many parasitics are possible in such a layout.

R1—Condenser insulation.
R2—Plate to L.T. negative.
R3—Plate to L.T. positive.
R4—Grid to L.T. positive.
R5—Grid to L.T. negative.

was found to be exceptionally flat, even for a quench receiver, and replacing the condenser with one of the Trolitul type considerably improved matters. It was also noticed that the receiver was quite " dead " from about 56 to 58 Mc., whether used straight or with quench. Re-building the entire receiver with new components, except the valve-holder, failed to cure the trouble, but replacing this component with a Trolitul holder removed the " dead spot." It is interesting to note that the " dead spot " frequency was constant and independent of the external circuits. This example is quoted to show how small details of design may completely spoil an otherwise good receiver.

All types of insulation except the Ceramics or Trolitul should be studiously avoided and the whole R.F. assembly should be mounted directly on to the valve-holder and tuning condenser, so that the bulk of the insulation is air. It is also necessary to point out that good condenser insulation is wasted if that component is mounted on the rotary spindle in the conventional manner by means of a metal bracket ; especially is this to be avoided when using wooden baseboards. Modern variable condensers are available in which the Trolitul is already drilled for a bracket, but even when purchased undrilled it is a simple matter to drill holes provided the tool is not allowed to get hot.

Stability is another factor affected by insulation, as poor insulation is usually equivalent to a resistance which is continually varying. This point should be kept in mind when constructing frequency meters, signal generators, etc., where actual R.F. efficiency may not be important and constructors are apt to " make do " with poor insulation.

G5HF.

Transmitter Group

Certain members of Sub-Group No. 1 have been investigating the set problem which concerns the relative advantages of wood and metal chassis and a brief summary of their findings (due mainly to ZB1E) is set out below.

When dealing with stages which take inputs of the order of 10 watts, the wooden type of chassis tends to be the more efficient as the dielectric losses at this power are less marked than the absorption losses introduced by the presence of a metal chassis. With self-excited oscillators however, screening for greater frequency stability may be found desirable, in which case it will be preferable to employ a metal chassis.

In the case of a metal chassis, it has been found that coils should preferably be :—

(*a*) placed parallel with the chassis and not less than their diameter away from it,
(*b*) made of a small diameter relative to their length—say a ratio of one to two, and
(*c*) mounted with their ends not nearer than their diameter from a metal panel.

In the case of higher power stages, the losses due to the proximity of a metal chassis may be considerable. It was found that the field at the end of a 3 in. diameter coil carrying 25 watts of R.F. energy at a frequency of 14 Mc. produced a loss of nearly four watts in an aluminium panel $\frac{1}{8}$ in. thick, at a distance of $2\frac{1}{2}$ in. The loss due to the proximity of a wooden panel $\frac{3}{8}$ in. thick and the same distance away was too small to be measurable.

Similar disadvantages were noticed by GW4KQ when carrying out tests with an artificial aerial, and eventually the wood-cum-metal combination was used. It would appear that this type possesses the advantages of both methods with but few of their disadvantages, as the table below shows.

Wood-cum-metal Chassis

Advantages	*Disadvantage*
1. Ease of connection, forming a common earth and screen between stages.	1. Rather more difficult to work than either plain wood or metal alone.
2. Very small losses in low power stages.	
3. Thin metal may be employed, thus tending to economy. Rigidity is assured by the wooden part.	

The views and findings of other members on this subject, which is of fundamental interest to all amateurs, would be appreciated.

G5JU.

BOOK REVIEWS

MODERN RADIO COMMUNICATION. By J. H. Reyner, B.Sc.(Hons.), A.C.G.I., D.I.C., A.M.I.E.E., M.Inst.R.E. 255 pages and 139 illustrations. Published by Sir Isaac Pitman & Sons, Ltd., London. Price 7s. 6d. net.

This is the third edition of Volume II of the well-known radio trilogy. This volume, readers may remember, deals more fully and deeply with the principles outlined in Volume I, and is suitable as a preparation for the City and Guilds Final Examination, P.M.G. Certificate, etc.

Three editions since 1935 ensure that the book lives up to its title, and the present edition contains considerable new material. The text has been amended in many places.

The chapter on transmitting aerials has been expanded by the inclusion of a more analytical discussion of radiation, field strength and radiation resistance. That on feeders is usefully increased by treatments of phase-change, matching sections and feeder losses.

A number of additions have been made to the receiver section, principally in the matters of selectivity, valve input impedance and noise level. With superheterodynes, the theory of mixing and noise in frequency changers receive increased attention. Automatic frequency control is the main addition to the detector section.

There is an expanded treatment of the output stage in the L.F. amplifier chapter, and an addition in the form of a short discussion of negative feedback. The effect of resistance in filters is explained, and a fuller treatment of equalisers given.

The additions and re-arrangements have increased the value of this little book, and it will be found more useful than ever to students.

T. P. A.

CATHODE-RAY TUBES. By Manfred von Ardenne. Translated from the German by G. S. McGregor, M.C., in collaboration with R. C. Walker, B.Sc., A.M.I.E.E., A.M.I.Mech.E. 530 pages and 465 illustrations. Published by Sir Isaac Pitman & Sons, Ltd., London. Price 42s. net.

The cathode-ray tube has become one of the most important instruments at the disposal of the engineer, all in a few years and mainly due to the extremely rapid development forced by television. Once it was the denizen of the class-room, but later the radio and electrical engineers were only one jump ahead of their other engineering colleagues in recognising the worth of this immensely valuable new tool, and its importance in research work is now almost equalled by its importance in the "field."

It is, then, of particular interest that a book of this calibre and scope should be made available in English. The German version has been a classical text on the subject for some time, and in addition to being translated it has now had a thorough revision by the author. The matter presented is as up-to-date as rapid development allows.

The book is divided into four chapters and each is sub-divided into many sections.

The first chapter is concerned with the theory and construction of the tube. It includes a detailed analysis of the production of rays, different methods of focusing, control of the energy in the rays, deflection—including a discussion of the effect of time of transit of electrons in H.F. work—tube construction, and descriptions of practical tubes of both standard and special types. After a section on the manufacture and testing of tubes, the chapter concludes with a short discussion on the possible precision of measurement.

The second chapter is about accessories, and here are considered the source of operating voltages for the tube, the increase of sensitivity by amplification and the question of a time-base. This section includes the important problem of converting the variable to be investigated into a measureable voltage. The chapter concludes with a description of the photographic apparatus required for recording traces, and much practical information about its use.

The third chapter deals with the various ways the cathode-ray tube can be used as a measuring instrument A large part of this chapter is occupied by H.F. technique and the use of tubes for the examination of amplifiers, photo-cells, loudspeakers, rectifiers, components, transmitters, receivers, and in propagation work. Then follow applications in many branches of engineering and even in medical research.

The final chapter deals with the tube as an operating unit, particularly in the sound-film and television fields.

There is an extensive bibliography at the end of each chapter. The illustrations are numerous and excellent.

The book is an outstanding one which covers a very wide field in a masterly way.

T. P. A.

THEORY AND DESIGN OF VALVE OSCILLATORS FOR RADIO AND OTHER FREQUENCIES. By H. A. Thomas, D.Sc., A.M.I.E.E. 270 pages and 103 illustrations. Published by Chapman & Hall, Ltd., London. Price 18s. net.

This is the latest addition to the series of monographs on electrical engineering, all of which are written by authors of eminence in their particular fields. It will be agreed that few men are so qualified to write on oscillators as Dr. Thomas, and this book is one for which there has been great need. There is an immense amount of technical literature on the subject, but it is scattered throughout the pages of scientific journals and is difficult of access for the average inquirer. Dr. Thomas here presents the more important material including much of his own pioneering work in this field, and a thorough bibliography.

The work is written for the "advanced student and technician;" the reader with a reasonably good knowledge of A.C. circuits, and mathematics up to differential equations, should have no difficulty.

The author points out that as there is much easily available literature on crystal-controlled oscillators, and their construction is relatively simple, the present book deals only with uncontrolled self-oscillators. We amateurs have now a renewed

interest in this type and there is a real need with us for more information on the design of oscillators with high frequency-stability. But, apart from the master-control of transmitters, there are many jobs for the self-oscillator; they range from low audio-frequency to ultra-high frequency requirements, in heterodyne oscillators for receivers, oscillators for line work, frequency meters, audio-oscillators, and so on.

The author begins by outlining the problem as one where a knowledge is desired of four main points: magnitude and constancy of amplitude, harmonic content, efficiency, and value and stability of frequency. He then proceeds to investigate the fundamental principles of self-oscillation, and includes a clear account of a graphical analysis from which a knowledge of the effects resulting from a variation of any one of the circuit parameters may be obtained. For example, how a load change will affect the frequency and amplitude of oscillations may be predicted. This qualitative treatment gives a clear conception of the conditions of oscillation and lays a foundation for the study of frequency stability later.

The author then describes the various types of oscillator, starting with the simple dynatron, and then shows how the various retro-active types may be evolved from a simple prototype by the omission of one or more circuit elements. The conditions necessary for oscillation are analysed for the main circuits in common use, and the special case of relaxation oscillators is also studied, including the Van der Pol type for nearly sine-wave form.

The next section deals with the important matters of efficiency, amplitude and wave form. After describing the simple theory for approximate solutions, the author deals with the analytical method for closer results and applies the method to the dynatron and triode oscillators. The graphical method of solution is also described. The analytical method of Moullin for the approximate determination of harmonic amplitudes is explained and a practical example given.

The next few sections are concerned with the subject of frequency and its stabilisation. The factors which govern the frequency are first investigated, and then the question of stabilising. The changes due to temperature effects on inductance coils and condensers are studied and much valuable design data are given here, and later in two chapters on the stabilisation of inductance and capacity. The next section deals with the frequency stabilisation of the maintaining system. The author deals firstly with the arrangements for ordinary circuits, and then with special circuits such as the Franklin, long-line, Kolster, Dow, and others.

The final chapter describes the automatic monitoring of large-power oscillators by direct reference to a low-power stable-frequency oscillator, and though this field is not fully developed yet, it has attractive possibilities.

This book will be of very great usefulness to radio engineers and will surely be a welcome help in a subject which is of vital importance. Prof. E. V. Appleton, in a foreword, says "to anyone likely to employ a valve generator for any purpose whatever, this volume can be unhesitatingly recommended as a friendly and trustworthy guide."

T. P. A.

ELECTROLYTIC CONDENSERS. THEIR PROPERTIES, DESIGN AND PRACTICAL USES. (Second edition.) By Philip R. Coursey, B.Sc., M.I.E.E., F.Inst.P., etc. 190 pages and 113 illustrations. Published by Chapman & Hall, Ltd., London. Price 10s. 6d. net.

The author, who is a well-known authority on this subject, has made a considerable number of changes and added new material to this edition. A few errors which appeared in the first text have been removed, and in several places the treatment has been made more explicit. The latest developments in technique have been included, and in this connection may be mentioned the "etched" and "surge-proof" forms of dry condensers. The latest forms of "wet" condensers are also described.

The majority, probably, of the readers of this book are interested in the use of condensers rather than in their manufacture. The large section devoted to the electrical properties of electrolytic condensers should prove of real value to them, especially as much new material has been included. The added information on the conditions governing expectation of condenser life is obviously of vital interest.

The section on applications has been extended and re-cast into two sub-sections dealing with polarised and non-polarised electrolytic condensers, respectively. The applications of the latter type seem limited, at present, to the starting of single-phase motors. This section, with that on electrical properties, occupies just over one-third of the text.

The book is well-illustrated, presented in a clear but organised style, and is non-mathematical. Simple formulæ are given where necessary, and practical data as to sizes and electrical characteristics are freely provided. There are many informative graphs to illustrate the text.

T. P. A.

Trade Notice

Holiday & Hemmerdinger, Ltd., 74–78 Hardman Street, Deansgate, Manchester, 3, inform us that a copy of the new Premax Technical Bulletin, No. 3, entitled "Antennas," will be sent to any reader who forwards 3d. in stamps.

The Bulletin gives technical details of several Premax rotary beam aerials and a wealth of information of interest to all who experiment with aerial systems.

Among the latest Premax products is a monel metal aerial of the telescopic adjustable type made from seamless tubing. The extended length is 24 ft. 8½ in. and the collapsed length 8 ft. 7 in.

The Premax 10-metre Hi-Q Vertical Radiator requires no insulators and appears to be ideal for those with restricted garden space.

McElroy Retains his Title

We have been advised by Mr. H. R. Adams, G2NO, that Mr. T. R. McElroy has again retained his world championship for high speed telegraphy, and in doing so set up a new high record of 75 words per minute. Mr. McElroy took perfect copy at this speed for 3 minutes.

It is hoped that before long British Isles amateurs will be given an opportunity of meeting Mr. McElroy, as a European visit is planned.

THE RELATION OF THE CARRYING CAR TO THE ACCURACY OF PORTABLE FIELD-INTENSITY MEASURING EQUIPMENT. John H. Dewitt, Jr. M.I.R.E. and A. C. Omberg. Non-member I.R.E. Proceedings of the I.R.E., January, 1939.

The distortion of radio-frequency fields in the vicinity of automobiles is shown to be due to a secondary field resulting from eddy currents induced in the metal parts by the primary field.

Theory and experiment demonstrate that the error of measurement caused by the presence of a metal-body car is independent of frequency within the broadcast band. It is shown that the distortion of the field changes with the position of the car, being greatest when the car is in line with the direction of the source and least when the length of the car is normal to the direction of the source. One method of equalising this difference is pointed out. Measured field contours around three types of automobiles are illustrated.

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SOME PRINCIPLES IN AERONAUTICAL GROUND-STATION DESIGN. P. C. Sandretto, A.M.I.R.E. Proceedings of the I.R.E., January, 1939.

This paper describes the problems of adjacent-channel interference that were encountered when the air-transport industry established numerous voice radio circuits. It describes the early solutions to this problem and the later investigations and equipment corrections necessary.

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OBSERVATIONS ON SKY-WAVE TRANSMISSION ON FREQUENCIES ABOVE 40 MC. D. R. Goddard, A.M.I.R.E. Proceedings of the I.R.E., January, 1939.

The results of daily observations at Riverhead L.I., N.Y., since September, 1937, of European 40 to 45 megacycle transmitters are reported. Measurements of field strength were made on English, French, and German television signals. Multipath propagation of the English video-frequency channel was observed optically and the difference in path length determined.

* * *

RADIO INTERFERENCE—INVESTIGATION, SUPPRESSION, AND CONTROL. H. O. Merriman, A.M.I.R.E., and F. G. Nixon, A.M.I.R.E. Proceedings of the I.R.E., January, 1939.

The work of the Radio Division of the Department of Transport of Canada in investigating and controlling radio interference is described.

A detailed description is given of the equipment in the experimental car, which is used for special investigations and measurements of signal strength and interference in the field.

Thirty-three investigation cars are equipped with directional receivers and experimental surge traps. Two investigators on each car tour their respective districts, locating sources of interference and recommending cures. Means of suppressing interference, generally, are outlined, including the use of capacitors, choke coils, and shielding. The particular applications of these cures are described as relating to street cars, electromedical apparatus, and domestic and commercial equipment.

A summary of means of measuring interference in foreign countries and in Canada is given with special reference to the work of the International Electrotechnical Commission.

* * *

ELECTRON-BEAM MAGNETRONS AND TYPE-B MAGNETRON OSCILLATIONS. Kinjiro Okabe. Non-member I.R.E. Proceedings of the I.R.E., January, 1939.

Various experimental results with electron-beam magnetrons are given. The mechanism of type-B magnetron oscillations is described using a novel method which takes into consideration all the experimental results hitherto obtained in connection with magnetrons of various types.

* * *

A STUDY OF ULTRA-HIGH-FREQUENCY WIDE-BAND PROPAGATION CHARACTERISTICS. R. W. George, A.M.I.R.E. Proceedings of the I.R.E., January, 1939.

Signals reflected from buildings and other large objects introduce distortion in the received signal because of their relative time delay and phase relations. This distortion is especially evident in the form of blurred and multiple images in television reception. Data on the relative merits in this respect, of vertically and horizontally polarised waves transmitted from the Empire State Building in New York City, were obtained at the two frequency ranges of 81 to 86 Mc. and 140 to 145 Mc. Some data using circular polarisation at the lower frequency range were also obtained.

The effects of indirect-path signals were indicated on recorded curves showing field strength versus frequency. The methods and equipment used to record these data at a number of representative receiving locations are briefly described.

A minimum of indirect-path signal interference was found to be general with horizontal polarisation at both signal frequency ranges. In this respect, circular polarisation was found to be slightly preferable to vertical polarisation. Horizontal polarisation also gave somewhat greater field strength.

Miscellaneous data and observations are described, including sample propagation-characteristic curves. In conclusion, some relations between direct- and indirect-path signals and propagation paths are discussed.

56-MEGACYCLE RECEPTION VIA SPORADIC-E-LAYER REFLECTIONS. E. H. Conklin, A.M.I.R.E. Proceedings of the I.R.E., January, 1939.

A theory that 56-megacycle transmission at a distance of 400 to 1,200 miles takes place via sporadic-E-layer reflections has been investigated by comparing numerous reports of such reception with ionosphere data provided by the National Bureau of Standards U.S.A. Simultaneous transmission conditions on lower frequencies are also considered. An indication is given of the necessary geographical separation of ultra-high-frequency transmitting stations, operating on the same frequency, to avoid occasional severe interference.

* * *

THE SECTORAL ELECTROMAGNETIC HORN. W. L. Barrow, A.M.I.R.E., and F. D. Lewis, A.M.I.R.E. Proceedings of the I.R.E., January, 1939.

An electromagnetic horn radiator two of whose opposite sides are flared, the other two being parallel, was studied experimentally at wavelengths between 40 and 100 centimetres. For comparison, measurements were also made on parabolic reflectors and broadside arrays. By virtue of its unusual freedom from secondary lobes and stray radiation, its ability to operate well over a broad band-width, its simple construction, and its ease and stability of operation, the electromagnetic horn offers unique possibilities as a directive radiating system for microwave applications. These results and the application to a straight-line blind-landing system for airplanes are discussed.

* * *

THEORY OF THE ELECTROMAGNETIC HORN. W. L. Barrow, A.M.I.R.E., and L. J. Chu, Non-member I.R.E. Proceedings of the I.R.E., January, 1939.

A theoretical analysis of the operation of the electromagnetic horn "antenna" is derived from Maxwell's equations. The details apply to a horn of sectoral shape. The analysis also applies to a tapered hollow-pipe transmission line. Certain transmission qualities, like the phase constant, attenuation constant, velocity of propagation, etc., are calculated for horns of any angle of flare and the field configuration within the horn is plotted. One result is a clear understanding of the propagation of waves within the horn.

Calculations of radiation patterns made in this analysis agree satisfactorily with experiments reported in a companion paper.

LETTERS TO THE EDITOR

The Editor does not hold himself responsible for opinions expressed by correspondents

WIRED WIRELESS IN WAR TIME

To the Editor, THE T. & R. BULLETIN

DEAR SIR,—As an old member of the Society and one who depends on wired wireless for a livelihood, I feel called upon to give an alternative view-point from that expressed in the R.M.A. statement published in the July issue.

The advantages of wired wireless in a national emergency are such that the Postmaster-General was quite justified in stressing them.

In towns where a relay system is in operation(one house in every four is quite a common percentage, in some towns even better figures are obtained), assuming a bomb exploded near blocks of property with the result that the distributive system at these points was interrupted, surely the advantages accruing to the other thousands of subscribers would be considerable. Further, if relay brackets were destroyed so also would be aerials, mains, etc., thereby making the commercial set useless.

The relay system with its own generating plant will operate if the mains are off—and there is a distinct possibility that this would happen. Further if the B.B.C. "ether-borne" programmes are jammed or interrupted, relay subscribers will still receive news by means of direct lines from the B.B.C. studios.

There is also the even greater advantage of local news and announcements from A.R.P. and Police sources, the distribution of which is only possible with a local wired system.

It is of course obvious that radio relay is no substitute for a wireless set. It is not intended to be. It is improvement.

Yours faithfully,
E. R. WARD (G8GI).

56 Mc. Calls Heard

G8NM (July 1–20): 3IZ (14 5·6), 3NJ (12 589), 3ZK (20 568), 5VD (16 5·7), GW6AAP (108 559), 8JV (45 558), 8KD (16 569).

G6IH: 5NF (92 459), 5MQ (109 559), 6DL (32 R8), 3YZ (22 R8), 5ZT (118 459).

BRS3003 (Coulsdon) (July 10–20), O.V. Pen: 2WS (10 549), 2MC (21 559), 2NH (9 579), 3OO (18 569), 5BY (4 559), 5RD (24 559), 5OX (6 549), 6LK (21 569), 6VX (8 549), 6WL (18 569).

G6DH (June 20–July 20): 2DN (68 439), 2QY (62 549), 5MA (70 549), 6VX (55 5·6), 6WL (55 558X), 6XM (95 5·3/4·9), ON4DJ (85 559), CS3VA (599 tone).

2ADZ (July 1–23) (over 50 miles), O.V.1: 2XC (53 557), 5TX (63 577), 6CW (120 588), 6DH (72 559), 8JV (120 579).

Amateur Radio in The House

Mr. Bartlett (Independent, Bridgwater, Somerset), rendered a service to the amateur radio movement when he recently asked in The House of Commons what steps were being taken to use the services of amateur wireless operators in time of war. He further asked whether the P.M.G. was aware that with little expenditure a 24 hours service could be maintained in the event of a main breakdown of the grid system.

The Postmaster General (Major Tryon), in his reply, stated that it has been decided, after consultation with the Government departments concerned, that in time of war all experimental wireless telegraphy stations will be closed down. The P.M.G. referred to the steps which have been taken to enrol wireless experimenters in the Naval and Air Force Reserves so that their skill shall not be wasted.

THE MONTH ON THE AIR

A COMMENTARY OF AMATEUR RADIO CONDITIONS FOR THE MONTH OF . . . . . JULY, 1939

by ARTHUR.O. MILNE (G2MI)

MAY I take this opportunity to thank those who have kindly written or telephoned good wishes and encouragement, also for the undiminished support which the " regulars " have given to their new scribe. I know you will understand that it is not possible for me to reply individually, so please continue to write or phone (Tel. HURstway 1877).

* * *

July was quite a good month, apart from a few bad days and a tendency to QRN; the early mornings and evenings furnished good DX and practically all parts of the globe came through well on 14 Mc. with the exception of South Africa. The early morning West Coast W signals were particularly good and amply repaid an occasional twiddle back on the old alarm clock. As might be expected, 14 Mc. provided most the good fare, but EI7M tells us that 7 Mc. was also good for W's around 02.00 B.S.T.

CR6AF was mentioned last month, here is his QRA :—J. de Mello, Coemba, Angola. He is reputed to QSL 100 per cent. and is active about 20.30 B.S.T. G5RV and G6CL worked 17AA on 14390 and the former had a phone contact with a station signing 17AT who seemed genuine, but we wonder ! He also worked VP7NS who is on 14100 most evenings at 23.00 B.S.T. looking for G contacts. G2MI and 8IG were also lucky in this connection. 7NS uses 125 watts to a pair of 809's and a three element rotary. 'RV wants to know if anyone has had a card from W6KKG in Utah or TG9BA. Yes, BERS195 has had one from TG9BA.

CT3AN was a surprise catch for several G phones recently, including G2WD and 6OQ. Something familiar about the operator's voice revealed Bert Allen, G8IG, who had called in to meet the CT3 gang while on a holiday cruise. It appears he roped in 3AB and 3AD and with the aid of some of their gear, got 'AN on phone. He has so imbued the Madeira boys with his enthusiasm that CT3AN is to try out his English for the benefit of some of our Century Club aspirants, so look for him in the American phone band. An interesting report comes from G3SB who heard HB9BG at 22.10 B.S.T. on July 10 on 1810 kc. 569. Beat that for mid-summer or whatever one calls it. The HB is using 50 watts.

G2ZQ must have been spending his holiday in the shack for here is list of some of his contacts :—KB4FCS 14400, VK9XX 14280 (kindly put through by SU1WM), HP1X (who QSL's) 14275 (send your cards via W1JPE not W8DOD), H16Q 14420. It occurs to us that listing these off-frequency people only encourages their misdemeanour; what do you say ? Should they be barred ? To continue the 'ZQ recital, XU2PA in Tientsin, J8CD 14375, VP7NT 14400, HR4CX 14395, XU8ZX 14300 (an American in China, QSL via W6ATN), and GX7AX 14300. Several other G's have worked this station and if he is whom we think, you will get your cards in due course. 2ZQ is still trying for YN9G, T4 on the HF edge and has heard HR4AF on 7050 kc. He also tells us that YY's are YR's who have recently had their licences cancelled ! G6RH worked NX2A who gave his QRA as Godthaab, Greenland, and promised a card. He seemed to know a lot about Greenland, but so does TA1AA about Turkey, so we prefer to wait.

G2ZQ and 6CL both qualified for W.A.S. by working W6QQL in Nevada. Johnny beat " Sec " to it by a few minutes. Talking of W.A.S., it has always seemed to be one of the most difficult certificates to get and it would be interesting to know how many British Isles amateurs there are who want only one or two States. As an experiment therefore, if anyone who requires two or less will pass along his requirements to " M.O.T.A.," we will make out a short list for publication to facilitate the fixing of a few skeds if someone strikes lucky. G2MI wants New Mexico and will accept a telephone call at any hour of the day or night if you have one waiting for him. Roll up ! Roll up ! G2AT is another beneficiary from W6QQL and has also added VS6AF to his list. G4IT as a newcomer mentions the difficulty some of the newly licensed stations are having with the QSL's they receive which are really the property of the pirate who appropriated their call before they received their permits. G4IB is another victim. This seems almost as dirty as pinching the call of a licensed station. The G7EE type of chap is bad enough, but the call sign snatcher is just a low scoundrel.

While the moaning machine is free-wheeling to a stop, here's another one. Can anyone explain why we all use the R.S.T. code so religiously for cw, yet always say " your phone Q5 R8 " ? It has reached the pitch where we say " you are R7 on the S meter." Let's be consistent, how about a great international crusade or, alternatively, the exercise of a little sense ?

G3AH sends a nice little list with VP2AT 14410, VP7NT 14415, EK1AA 14350 and VK7JT 14300 as his show piece, while G8TV of Romford has worked all W districts with W5EGY at 6.55 a.m. C.S.T. as a freak contact, confirmed by card. Incidentally 5EGY is located at Texarkana which

appears to be half in Texas and half in Arkansas. Wouldn't it be nice to find someone with one end of his aerial in Texas and the other in New Mexico? G8TV is the first man we have met who is proud to be called a RAT. If you don't believe it, work him and obtain his card! Please keep a look out for his C.C. on 57520 kc.

By the way FQ8QS, the disappointment mentioned last month, should have read FQ8BS; also LX1EP is a fake after all. Sorry you've been trrroubled!

G4FL Bexleyheath, using a 6L6G-CO/809-PA and a doublet, sends a remarkable list of contacts, but unfortunately no frequencies. He says LZ1C gives P.O. Box 3, Sofia, but this sounds rather too simple to be possible! He wonders if TA1AA is up to his tricks again. XU9UX gave Box 24, Ichang, and promised a card. Just to show what can be done here are some of his phone QSO's—CE, CO, HR, LU, OA, VK, VP1, VP3, VP4, VP5, VP6, VU, XE, YV, ZE. After that the Kentish quarter-kilowatts ought to give it up and go in for cacti or chickens. 4FL complains of lengthy local phone QSO's whilst the DX is coming in; we heartily agree. See to it fellows.

CP4ANE was the only signal on the band at 03.30 B.S.T. the other morning 14338 kc. but appeared to be hearing only W's.

A letter comes from VQ8AD in which he tells us that he has returned to Mauritius. He says he has 500 spare QSL's with his old call VQ8AS on them and will mail one against a reply coupon to anyone who has QSO'd. Why not put them in the bureau o.m.? He mentions a contact whilst in Chagos with XU6TYL, the operator of which said he was on a world cruise and gave QTH as 600 miles south of the Caroline Islands and would QSL when he returned to U.S.A. Any information on this one?

DX PERSONALITIES—No. 2

An old-timer with a new call. "Bert" Allen, G8IG, originally G2MI, was first G8 to obtain the W.A.S. certificate—and he got it with telephony contacts!

Now for our old friend Eric, BERS195. At last he has been granted his permit, but still awaits his call. His DX position now stands at 172/143, *i.e.* heard 172/confirmed 143. LZ1ID, TG9BA and KF6ODC (Phoenix Island) gave him the extra three. He asks whether there are any U8's in Turkomen, Uzbekistan and Tajikistan. Well the Call Book lists only three all told—U8AA in Frounze, U8AB in Kizyl-Kia and U8ID at Tashkent, which is in Uzbek. Quoting a letter from VE5LD, he gives information on the zone position of that station since 1934 and here it is.

1934/35 Cambridge Bay Victoria Island. Zone 2.
1935/38 Gjoa Haven King William Island. Zone 2.
1938/39 Bathurst Inlet Canadian Mainland. Zone 1.

Sorry to have upset anyone, but there it is and can't be altered. VK4KR is on Willis Island which is several hundred miles off the Queensland coast and is run by the Island's sole inhabitants, the two commercial ops. in charge of the weather reporting station. 'I95 heard 26 G portables during N.F.D. and also VU2FOP. List elsewhere.

G8ON takes us to task for wanting to keep European phones out of the American band. Reference to last month's issue will show that we said "when the W's are coming through." Obviously there is nothing objectionable in using the phone band for eastern DX or during short skip, but a couple of local phones can blot out the whole of the W band and spoil things for everyone for miles round. He asks if ZC6EC, VU7BR and VE1HK QSL; yes, o.m., we have seen dozens of cards from these stations. He thinks AC4AU "QRA Lhasa" was a Scandinavian pirate, and wonders where all the VQ4's have got to; don't know, but look at all the VQ2's we have instead!

MX1A was a stroke of luck for G8IG on the 22nd, H.F. end of 14 chirpy D.C. note. VU2EU is a wonderful signal on 14345 with 5 watts input, G5XB and many other G's have worked him. 'XB sends the following frequencies which may help to keep you up to date. OQ5AV 14340, CR7AF 14360, UK6WA 14400, ZE1JI now 14315, VQ2HC also 14315, XU8WS 14375, KA1FG 14350. 'XB gives it as his opinion that if we were forced to use the apparatus of seven years ago we should find the present time almost a null point in conditions, and that things appear to be better than they really are due to the improvement in technique.

The following is from W2IXY via G3LT: VR6AY's transmitter is undergoing overhaul at U.S. Submarine Base (NY2AE) and is due back in Pitcairn at the end of August when Andrew Young hopes to be back on the air. KIRA with a T7 note, H.F. end of 14, told G3MI that his QRA was "5500 km. S.E. by you Asia X1MT" which is, of course, what we all were wondering. G4AU sends in a long list of DX worked, including MX1A but no frequencies, asks who is OP4GK, 7 Mc. 11.40 G.M.T. on June 10 and also reports working VS9BC, no details. G8IL tells us his ambition is to beat G8IG to the Century Club. An interesting point is raised by G3JR who asks for frequency, time and tone of all rare DX sent in for this feature. Several others have asked for a summary at the end of the article, we will see what can be done. 3JR points out the obvious experimental value which information of this kind has over the plain list of calls, especially to the man who is mainly interested in aerial design. Some new ones he reports are

EA4BC 14390, T6 1315, K4FHR 14370 0115, VP1JR 14405, T6 0530. He thinks LX1C is genuine. BRS2763 heard XE1FF on 7050 and YV1AN 7040 both on phone. The old band is looking up.

G5LU sends a fine list of phone QSO's and wants only Nevada and Arizona for W.A.S. He is using a two element rotary 66 ft. high. By the way, if anyone contemplates putting up a rotary, first consult your local Town Planning Act and thus save yourself the blow of having to dismantle it again as has been the unhappy experience of one of our members.

BRS2768 gives ZC6HS's QRA as S. Spector, P.O. Box 163, Haifa.

Finally a note from G2FI who mentions hearing NP4TEE reporting himself as near the North Pole with a chirpy signal in the late afternoon. This station said he was using a wind generator and that his periods of operation were erratic. Any dope? Yes I7AA is quite genuine, but prior to the recognition of the conquest of Abyssinia would not QSL direct to G's. He did, however, supply a list of contacts to the ARRL for Century Club purposes. 2FI says that OXVC is active again between Gibraltar and Algiers.

Don't forget the lightning switch these thundery days. 73 till September and see you at convention. Please let me have your news not later than the 26th of the month. Material received after that date has to be held over.

In Search of B.E.R.T.A.

Call.	Dominion Districts.	Colonies.	Total.
G3BS	25	14	39
G6ZO	25	14	39
G8KP... ...	25	14	39
G5OJ	25	13	38
G2HX ...	25	13	38
W1WV ...	23	15	38
GM8HA ...	25	11	36
G2UX... ...	22	14	36
ZS6DM ...	21	14	35
G5ND... ...	24	10	34
G3BI	24	10	34
VU2AN ...	20	14	34
VU2FO ...	23	11	34
W9YNB ...	25	9	34
G3DO... ...	20	14	34
ZS6BT ...	18	15	33
VS7RP ...	18	15	33
G2GK... ...	25	8	33
G2LC	24	8	32
GM8MQ ...	21	10	31
W1IKT ...	21	9	30
G5LU	19	11	30

Members who have received confirmation from 30 *or more British Dominions and Colonies are asked to forward their call to* G2MI *for listing in the above table, which is revised monthly.*

QSL Bureau Notice

A recent examination of incoming cards to the QSL Bureau revealed an increasing number of cards for unlicensed foreign stations. These cards choke the files and will, in future, be scrapped.

The following is a list of the most commonly-used faked calls:—HV1PP, HZ2GK, LZ1AK, LZ1AP, LZ1C, NZ2A, TA1AA, YN9G and YR2UR.

Members are warned not to send cards to these or to any other obviously false station.

We also direct attention to the illegality of forwarding cards, *via* SU and other licensed amateurs, to stations using calls such as YY1X and YY5XL.

Further we would again point out that time will always be saved if cards for out-of-the-way stations such as CP4ANE, VR4AD etc. are sent direct instead of *via* the Society's QSL Bureau.

N.V.I.R. European Contest

The annual European contest organised by N.V.I.R. will run from September 16–23. A six cypher code will be transmitted by each Dutch competitor.

Cards or logs must be received at N.V.I.R. QSL Bureau P.O.400, Rotterdam, before December 1, 1939.

A special certificate will be awarded to the highest scorer in each country.

Daily operating times are 17.40–21.40 G.M.T.

HBICE.

Not since the hey-days of VR6AY has there been such a scramble for a new country as occurred early in August when HB9CE took a portable station into the Principality of Liechtenstein. Operating c.w. at the high frequency end of the 14 Mc. band the operator must have created a new high record for contacts per diem. He should be QSL'd *via* his home address, Badenerstrasse 68, Zurich, Switzerland.

British Isles Calls Heard

Eric W. Trebilcock (BERS195), Powell Creek, North Australia, May 26–June 23, 1939.

During N.F.D. :—7 Mc. G3CKP; 8KUP. 14 Mc. G2IOP; 2JDP; 3TXP; 5DRP; 5GRP; 5JZP; 5RVP; 5VDP; 6CJP; 6GNP; 6KSP; 6USP; 6YKP; 6ZOP; 8JOP; 8PUP; 8PVP; EI9NP; GI5QXP; GM6JDP; 6VOP; 8CNP; 8HMP; 8KRP; VU2FOP.

7 *Mc.* :—G2HY; 2MD; 2PW; 2QO; 2QV; 2WQ; 3BU; 3GW; 3IN; 3IV; 3TA; 3XD; 3VV; 3YT; 3ZA; 4CI; 4DN; 4GX; 4KB; 4KL; 4LK; 5HH; 6YR; 8AZ; 8CJ; 8LV; 8ND; 8RL; 8SJ; GW8SO; 8UH.

14 *Mc.* Phone :—G5VM.

14 *Mc. CW* :—EI6G; 9N; G2AT; 2QO; 2VF; 3FX; 3ZV; 3NO; 3VN; 3WS; 5JX; 6FG; 6AG; 6KU; 6WR; 8IM; 8KC; 8OB; GI5QX; 6TK; GM6HZ; 6NX; GW5OD.

* * *

VP4TO (D. G. Bagg, ex G6BD, Pointe-a-Pierre, Trinidad, B.W.I.), February 13 to June 9, 1939, inclusive.

14 *Mc. C.W.*; G2—LC, NN, SY, VF. G3—CI, DA, IQ, LB, QV, TB. G4—DN, IN. G5—CG, FM, HH, GI5HJ, HS, GI5NJ, UX, WI, XB, ZB. G6—AG, GM6HZ, MQ, NM, OS, RS, XA, ZO. G8—AC, AX, BH, DW, GM8FB, GO, KH, GM8KR, PV, GM8SQ.

The above stations have not yet been contacted. Full reports will be supplied on request.

The 28 Mc. Band

By NELLY CORRY. (G2YL)

THE number and variety of signals reported during the past month compares very unfavourably with those received in July, 1938. This may be partly due to decreased activity, more particularly in Europe, but there is no doubt that most of the blame can be laid on poor conditions. In Great Britain the recent spasm of DX on 56 Mc. has naturally led a good many erstwhile " Ten-metre-addicts " to confine their 28 Mc. activity to occasional listening, as even local 56 Mc. QSO's are obviously more entertaining than abortive 28 Mc. test calls.

For the fourth consecutive month no VK or ZL signals were reported, and during the past month apparently no PK or Asiatic signals were audible either. VU2FO was active 09.00–13.00 G.M.T. on Sundays, June 25, July 2, 9 and 16, and heard VU7BR each day but no other signals. VU2AN reports a severe attack of " 56 Mc.-itis," in spite of no results up to date. He often hears Chinese and Japanese commercials, but the highest frequency logged daily during July was around 30/35 Mc., compared with an average of 40 Mc. in March.

Egyptian and other North African stations were heard spasmodically, and the only other signals reported from this continent were FB8AA on July 15 and 23, and ZS2AL and ZS6W, heard on July 23 by BRS3179 and BRS2763.

From South America PY3EN was a good 'phone signal for some hours on the evenings of July 9 and 19, and PY1HX (harmonic), CE3AG and LU5AN were logged by BRS2763 and BRS3003 on July 10, 11, and 25 respectively. G5BM heard a K4 signal, possibly a harmonic, on July 9, and W1WL, S5 'phone on July 13. All other reports to hand are devoid of W and VE calls, but 2AZX states that during June he logged four W's, in districts 1, 2, 3 and 9, on the 6th, 9th and 22nd. (It is interesting to compare the above Western Hemisphere conditions with those of July, 1938, when 16 South American and 12 Central American and West Indies stations, and W's in six Districts were logged.)

European signals were not so consistent as during June, and the only countries reported were D, EI, F, HA, PA, SM and SP, some of them harmonics. PA0APX writes to say that he is active at Summer Tests periods during the weekends, and with an automatic sender daily from 18.09 to 18.20 G.M.T.

The hissing phenomenon was heard by BRS3003 on July 2 at 17.27 G.M.T., and on July 15 intermittently 18.24–18.49 G.M.T. and at 18.54 G.M.T.

Reports from the following stations are acknowledged with many thanks: G2XC, G5BM, BRS2763, 3003, 3179, PA0APX, VU2AN and VU2FO (via G4AJ).

The 56 Mc. Band

By CONSTANCE HALL (G8LY)

THE writer wishes to thank all who replied to the circular letter which was sent out recently. Ninety-six letters were despatched and already 55 replies have been received, so if full justice does not appear to have been done to any report in particular, it is due to the tremendous but very welcome response.

A suggestion is put forward by G2ZV, that " Calls Heard " should include time and date, as well as mileage and RST, thus enabling those who are experimenting with aerials to obtain a definite report. The suggestion is excellent, so please include these particulars in future lists.

The " star " operator this month appears to be Mr. J. Curnow, G6CW, who has now worked over 100 stations 28 being located over 100 miles away. He is using 75 watts to a rotatable beam, six half-waves in phase, horizontal. His station which is on a slope facing south, obtains good reports from the south, whereas G8JV, on a slope facing north, obtains better results to the north, differences of 2 or 3 S points being recorded. G8JV is using a six-element beam directed on London.

An air mail letter from SU1RD in response to the circular, mentions that in Cairo, SU1CR, MW, RO are carrying out tests, but that he alone, in Alexandria, is on that band, although SU1KG, CB, TM, have RCA175 receivers working down to 56 Mc. SU1RD uses 678g–6D6, 6CL, 76 with an Acorn R.F. stage, but he is eagerly awaiting delivery of an RME 36 to use in front of his HRO and/or RME with Acorn RF. His transmitter employs RK34,807–RK39–35T, on 56520 kc., while the aerial is a half-wave horizontal doublet with reflector and no screening towards G. He was heard by OZ2AU at 16.00 G.M.T. on June 22. W9NY, winner of the R.S.G.B. 56 Mc. International Contest, mentions that conditions have been different from last year. He missed some of the best days, but during June worked W3, 5, 8, 9.

Home conditions have been very patchy during the last month, and 2ADZ draws attention to the contrasting weather we have been experiencing. CS3VA, heard by many, is a genuine station in Lisbon, using a Government transmitter, hence the CS call, input at present is 300 watts. Many

Eric Cosh, 2DDD, operating the receiver used at G2ZVP, South Downs, during the recent 56 Mc. Field Day.

commercial harmonics have been heard with SNB the most prominent.

Log Extracts

July 4.—G2ZV heard G2AO (38) for the first time ; 5CD heard G2FUN (?).

July 7.—G6WL when in contact with 2DN (near Croydon) was heard by 6DH east, and 2XC south-west, both reporting 449 ; his aerial is a horizontal dipole. 2BI experienced peculiar conditions, signals coming in at good strength, fading out in from 15–30 seconds and not reappearing. 2XC heard 6WL 339.

July 8.—G2XC worked 2MV (52) 569 at 13.15 ; 5XY heard an SM7 for a few seconds at 13.55, and 2MV received SM5SN at 15.15, S6.

July 9.—SU1RD heard a very strong carrier, no speech or CW, about 16.00 and again on July 10. G5AX heard CS3VA calling 6YL, at 18.55 Q4 S5 i.c.w., fading to zero after one minute. 5MQ worked I1ZU at 12.10, and 6LC heard an Italian on 'phone. GW2PH heard 5MQ and 6AAP at the L.F. end, as good signals. Later when listening on about 60 Mc. he logged them again but their notes had deteriorated. His receiver is a *Hallicrafter* 5–10 ; 2XC heard 2QYP (Elstree). Reports concerning the 56 Mc. Field Day are held over for a special article.

July 10.—Gave G8OS his best QSO, G6CW (140) 569 ; BRS 3003 heard SPW at 18.05 ; SU1RD heard G speech at times, but not intelligible. Moral—key that carrier sometime during each contact.

July 11.—G2ZV had 100 per cent. QSO with 6CW (still inter-G record) and mentions that his output from a 6L6 was about 4 to 5 watts used as a power doubler to a four-element Yagi beam, with wide spacing. 6XM heard 6CW for the first time and called him unsuccessfully on and off for 3 hours, using a 112-ft. end-on aerial. On July 12 he put up a new half-wave doublet, gave a test call and back came 6CW. BRS3179 heard 6CW loudest ever at 589. 2ADZ heard numerous harmonics including CDE (Santiago, Chile ?) 577 to zero, whilst 6CW was an amazing signal.

July 12.—G6WL received 6CW at 22.40 as best heard (100) ; 8LY also heard him for the first time (130) 578. 2DDD noticed a peculiar phenomenon at 23.50 when 5CD was working 6CW. 5CD was received Q5 S7, and 6CW at Q5 S6–7. At 24.00 5CD reported that the carrier at 6CW had completely faded out, but there was no fading on 6CW at 2DDD, up to 0028, when he finished listening.

July 14.—G6IH heard SU1R (?) at 22.17 with heavy QSB. 2ADZ was still hearing 6CW, 2MC heard several 14 Mc. harmonics.

July 13.—G5NF worked 6CW at 21.30 559 both ways, and received a report from 6IH, at 20.50 459 ; 5XY heard 6CW for his best DX to date and 2QY worked 5TX (80) (who is not generally heard) at 21.30.

July 16.—G8GQ heard French 'phones at 15.05, working duplex with QSB to zero.

July 17.—G8AA heard U0YI calling UXN at 19.30 567, for about two minutes.

July 18.—G8LY heard 3OO for the first time, 449, also 5AA on 'phone.

July 19.—G8ML heard 2BI for the first time (82) 549, his signals having to bend down in Cheltenham over the Cotswolds. 2BIL heard Italian or Spanish 'phone at 17.34, S2–3 with rapid QSB ; 2MV received CS3VA, as did 5CM at 14.00, QSB to zero. The band was alive with stations for a few minutes, but few were modulated.

July 20.—G2MV heard CS3VA and again on the 21 and 22.

July 21.—G2XC heard several harmonics, 5AX heard CS3VA between 15.25–17.30 peaking Q5 S6 ; 2ZV heard 5XY (24) 437 for the first time when Italian harmonics were audible. 2ADZ noticed static on the band and received six harmonics (Poland, N. Africa, Italy). Local G's were down in strength.

July 24.—G3YY heard CS3VA, 18.05–18.15 Q5 S8 slow QSB to zero, but at 18.15, a sudden peak to S8+ ; a tremendous noise level was noticed during his fade out, yet an S8 carrier at the L.F. end remained steady from 18.00–19.00. CS3VA was also heard by 6DH, signals up to 40 Mc. being audible, 2BIL also heard this station between 18.05–18.20 with QSB zero, 5XY at 17.25, 579 ; 2CIL at 17.35–18.25 with extremely slow QSB and five minute peaks. 6YL heard CS3VA 17.09–18.05, but for a change he was not calling her ! This is her best DX (1300) to date but in fairness to her it should be mentioned that she has only just received (late July) a message from CS3VA re schedules which had been delayed *en route*. Incidentally good " DX " days, *i.e.* June 24 and July 24 coincided with the Moon's 1st Quarter.

General Notes

SNB was heard on July 7, 8, 19, 21 by 2XC, on July 8 by 8NM, July 11 by 8JV, July 21 by 2ZV, and on July 3 by 6LK, from 12.30–13.40 56/89. G6IH when conducting field strength tests with BRS3193 found that with a strong field from his transmitter no attenuation occurred down the opposite slope of the Malvern Hills, even when the observing car was 900 ft. below the summit, and on the far side.

G6YL mentions that the Italian amateurs most regularly heard in G use vertical aerials, and that I1FA and I1SS do not know morse code. I1RA uses C.W. sometimes, and I1TKM more frequently. F8VC heard a GM 'phone at 18.00 on June 18, but it was impossible to get the call. (The moral is still the same—use c.w. !) On June 30 at 19.43 G6YL heard a station at 559X calling " CQ Europe " on about 57·6 Mc. There was bad static at the time and he either faded very suddenly or broke off. The signal sounded like a W, but no one else reports this mystery call.

G6DH transmits daily on the following schedule : 21.00 beam, south-west ; 21.45, beam to south-east/north-west for schedule with ON4DJ ; after 21.50 a watch is kept for Midland stations.

An interesting suggestion comes from G5WH, which is mentioned here in the hope that someone will comment upon it.

In the Midlands, local amateurs have a " shedule night " every Wednesday evening between 21.00–23.00 B.S.T., when at least six stations are known to be operating, *irrespective of conditions*. The scheme saves listening to a so called " empty band," and provides a constant check for testing various apparatus. Incidentally the 56 Mc. R.E.S. Group use Wednesdays as a " check night " too.

(*Continued on page* 136).

Headquarters Calling

NEWS AND VIEWS FROM 53

Research Awards

The Council has, on the recommendation of the Experimental Section Manager, made Research Awards to the following members :—

Mr. H. R. Heap, G5HF, Manager of the Receiver Group, in recognition of numerous technical contributions to THE T. & R. BULLETIN.

Mr. S. W. Allcorn, 2FIH, Aurora Sub-Group Manager, in recognition of outstanding contributions to the Group's Monthly Publication " Aurora."

Both awards will be presented at Convention.

Bulletin Honorariums

The Council has been pleased to award Honorariums to the following members who contributed articles to Volume 14 of THE T. & R. BULLETIN.

Dr. G. Bloomfield : " Insulating Materials for the Higher Frequencies."

Mr. G. Slack (G5KG) : " Optimum Plate Tank Values."

" Shack " : " Workshop Practice."

Mr. E. J. Williams (G2XC) : " Sunspots, Magnetic Storms, and Radio Conditions."

Mr. S. O'Hagan (G2CR) : " Transmitter Theory Applied to Practice."

Index

It is with pleasure we again record our thanks to Mr. R. E. Griffin, G5UH, who has kindly prepared the Index for the last Volume. A copy of the Index is included as a Supplement to this issue.

District 12 Representation

Due to a breakdown in health Mr. Seymour Buckingham, G5QF, will be unable to carry on his full duties as North London and Hertfordshire D.R. for the next few months. During his absence from home, Mr. Percy Solder, G5FA, 35 Torrington Gardens, New Southgate, N.11, will act as deputy D.R. All matters concerning licences and notes for publication in THE BULLETIN should, therefore, be sent to him until further notice.

Mr. Buckingham will be pleased to receive letters from members who care to write to him c/o G6CL.

New District 10 Representative

The Council takes pleasure in announcing that they have appointed Mr. G. R. Scott Farnie, GW5FI, The Grange, Cefn Coed, Breconshire, Representative for District 10.

Mr. Farnie has been associated with the society since 1929 and throughout this period he has taken an active interest in local affairs. Mr. Farnie holds a commission in the R.A.F. V.R. and is a District Controller in the C.W.R. His call is frequently heard on 3·5 Mc. and other frequencies.

The Council feels sure that under his guidance, District 10 will continue, as hitherto, to make steady progress.

Somerset Trophy

In view of the decision to arrange two 1·7 Mc. Contests each year, Council has agreed that the Somerset Trophy (which is held by the winner or winners) shall in future be awarded bi-annually.

The winners of the January 1939 Contest will hold the trophy from Convention 1939, until March 31, 1940, whilst the winner of the November 1939 Contest will hold it from April 1, 1940, until the 1940 Convention.

New QRA's

Mr. H. A. M. Whyte, G6WY, who has for several years acted as QRA Manager, finds himself unable to continue this work.

Until a new manager is appointed details of new and changed addresses should be sent direct to headquarters.

The Council records its thanks to Mr. Whyte for his past services.

Unlicensed Operation

Further to the notice published on Page 46 of our July issue the G.P.O. has informed us that the holder of an A. A. Licence living in the Chingford district of London, was discovered infringing the licence conditions, by the radiation of signals under a misappropriated call sign. The licence has been suspended for six months.

Both the G.P.O. and the Council hopes that the publication of this second case of illegal operation will act as a deterrent to other possible offenders.

A New A.R.R.L. Publication

The A.R.R.L. are publishing this month an Antenna Handbook prepared by their Headquarters staff. Sixteen chapters, profusely illustrated, deal with both the theory and practice of all types of aerials from simple doublets to multi-element rotaries. The construction of masts, lines, and rotating mechanisms is also covered. The book, which is in QST format, runs to over 100 pages.

The price to home members is 3s. post free. Supplies are expected to reach London early in September, so place an order now.

Netherlands 56 Mc. Field Day

The N.V.I.R. announce that their annual 56 Mc. Field Day will commence at 12.40 G.M.T. Saturday, August 26, ending at 16.40 G.M.T. on August 27.

During the week-end all P.A. 56 Mc. stations will be attempting contacts with stations in Holland and abroad. Additionally an aeroplane with a 56 Mc. transceiver will cruise over the country and join in the tests during the Saturday afternoon.

R.S.G.B. Slow Morse Practices

Details appear below of the slow Morse practices organised by the Society for those members wishing to learn or improve their code. 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, by telephony. A telephony announcement will also be given at the commencement of each test to assist those interested in tuning-in the sending station. It is emphasised that reports will be appreciated and are desired in order to ascertain useful range and numbers utilising the service. If, however, a reply is desired, a stamp should be sent. Will stations in areas not at present served offer their services to Mr. T. A. St. Johnston (G6UT), "Normandale," Little Hallingbury, Essex (Telephone: Bishop's Stortford 785) ?

	B.S.T.	*kc.*	*Call.*	*Location.*
Sundays	09.00	1755	G8NF	Manchester
	09.00	1865	G3LP	Cheltenham
	10.00	1800	G8PR	Staffordshire
	10.15	1920	G6VC	Northfleet
	10.15	1765	GW3GL	Conway
	10.30	1761	G3RQ	Bristol
	12.30	1758	G6VD	Leicester
Tuesdays	22.00	1934	G3GD	N. Devon
Wednesdays	22.15	1865	G3LP	Cheltenham
	22.30	1813	G4AU	Charlton
Thursdays	21.30	1765	GW3GL	Conway
	22.00	1934	G3GH	N. Devon

New Members

HOME CORPORATES

J. A. WINSTANLEY (G2JA), 15 Connaught Avenue, Whitefield, Manchester, Lancs.
A. B. BOSWELL (G3DA), 22 Boscombe Avenue, Peel Green, Manchester, Lancs.
L. G. JACKSON (G3OZ), 629 Harvey Road, Alvaston, Derby.
SQDN.-LDR. M. V. RIDGEWAY (G3PF), No. 22 Squadron, R.A.F. Station, Thorney Island, Emsworth, Hants.
M. P. BAYLISS (G3PQ), 2 Albion Street, Kenilworth, Warwickshire.
J. GOFFIN (G3UX), 64 Blair Athol Road, Sheffield, 11, Yorks.
T. L. STEPHENS (G3XV), Post Office, Donnington Wood, Wellington, Salop.
M. SMITH (G3YB), 61 Orchard Road, Northenden, Manchester, Lancs.
G. CROMPTON (G3YJ), Woodfield House, Woodfield Terrace, Bury, Lancs.
G. HIRST (G3ZT), 11 Badby Road, Daventry, Northants.
S. GARNETT (G4AW), 18 Prosperous Street, Bolton, Lancs.
P. W. WINSFORD (G4DC), 103 Erlanger Road, New Cross, London, S.E.14.
E. PRESTON, Ph.D. (G4HT), 68 Archer Lane, Sheffield, 7, Yorks.
J. E. MCLINDON (G4JM), "Dartry," 22 Highlands Road, New Barnet, Herts.
A. W. LANGTON (G4MP), "Tappington," Squirrel's Heath Road, Harold Wood, Essex.
I. CAMPBELL-BRUCE (G5IB), 15 Cheyre Place, London, S.W.3.
A. T. K. MOIR (G5WN), 46 Wisteria Road, Lewisham, S.E.13.
WM. B. SMITH (G6IM), 2 Wigston Road, Oadby, Near Leicester.
H. BOAKES (G8SB), 2 Radley Gardens, Kenton, Middlesex.
H. STOW (2BUK), 4 Glendale Avenue, Glenfield, Leicestershire.
W. G. CHALCROFT (2CLD), 60 Pennington Road, Southborough, Tunbridge Wells, Kent.
J. L. C. HARVEY (2CQJ), "St. Margarets," Oak Hill Park, Hampstead, N.W.3.
R. THORNLEY (2DAF), 15 Blundell Road, Fulwood, Preston, Lancs.
S. L. EVATT (2FPN), 274 Alfreton Road, Nottingham.
F. GRIFFITHS (2FPX), 5 Swanage Road, Small Heath, Birmingham, 10.
L. W. SMITH (2FSI), 12 Sun Lane, Blackheath, London, S.E.3.
E. KAY (2HCY), 49 Blackburn Street, Radcliffe, Manchester, Lancs.
A. W. GRICE (2HFO), 6 Bradmore Avenue, Ruddington, Nottingham.
A. BOWICK (2HGO), 122 Marlborough Avenue, Hull, East Yorks.
C. SHARPE (2HIF), 28 Roundhay Road, Bridlington, East Yorks.
H. N. STOTT (BRS3675), 134 Moston Road, Middleton Junction, Lancs.
F. E. LEDGER (BRS3676) 56, Cranmer Street, Nottingham.
C. W. TEBBUTT (BRS3677), 48 St. Giles Street, Norwich.
D. ROCHE (BRS3678), "Neptune Lodge," Sandycove Avenue West, Sandycove, Eire.
H. JACKSON (BRS3679), 44 Gough Road, Leicester.
WM. LLOYD (BRS3680), Wynnstay Arms Hotel, Llanbrynmair, Montgomeryshire.
H. L. HECTOR (BRS3681), 14 Long Drive, East Acton, London, W.3.
J. WHEELER (BRS3682), 92 Chesham Road, Bury, Lancs.
C. H. MESSENGER (BRS3683), 35 Orchard Way, Bognor Regis, Sussex.
W. F. HEAD (BRS3684), 26 Main Avenue, Torquay.
H. HOBOURN (BRS3685), 66 Victoria Road, Wisbech, Cambs.
R. BEGLEY (BRS3686) 198 Oval Road, Croydon, Surrey.
J. PENNOCK (BRS3687), 27 Stranton Street, Thornaby-on-Tees, Yorks.

DOMINION AND FOREIGN

G. WERKEMA (PA0APX), Huizum (Fr.), Near Leeuwarden, Netherlands.
TAN KOON SAN (PK4KS), Pangkalpinang, Banka, Dutch East Indies.
B. R. MANN (VK3BM), Quambatook, Victoria, Australia.
H. WADDINGTON (BERS474), c/o 33 Naval Hospital Road, Gibraltar.
E. A. SALISBURY (BERS 475), c/o Mrs. C. Salisbury (Staff Nurse), Government Hospital, Madura, South India.

W.B.E., H.B.E. and B.E.R.T.A. Certificates

The following certificates have been issued since the last list appeared :—

W.B.E. (Telegraphy)

Name	*Call Sign*	1939
J. H. Fraser*	VK2AFJ ...	July 1
J. Gouck	GM3NH ...	,, 11
W. Allison	W5VV ...	,, 11
A. R. Craig*	VE5ADD ...	,, 11
D. A. Rice*	W3GXU ...	,, 11
W. J. Chalk	G3IC	,, 11
R. Moffitt	G5KX ...	,, 11
H. J. Withers	G6XA	,, 14
J. Kilgariff*	VK5JT ...	,, 18
O. Saarep*	ES4D	,, 18
R. W. Paide*	ES5C	,, 18
A. Tops*	ES1E	,, 18
H. Baumert*	D4DTC ...	,, 18

(W.B.E. Telegraphy)

Name	*Call Sign*	1939
J. Turnbull ...	G8UK ...	July 18
L. Ralli ...	G4AJ ...	,, 18
W. D. Wadsworth	VE5ZM ...	,, 18
G. S. Maxey* ...	W6BIL ...	,, 19
R. M. Martin*	K4FCV ...	,, 19
H. S. Chadwick	G8ON	,, 19
A. W. Gover ...	G4AU	,, 22
L. J. van der Toolen*	PA0NP ...	,, 25
J. P. Vesper* ...	VK2PV ...	,, 25
A. E. Hochstein	SU1AX ...	,, 25
J. F. Davies ...	G3CI	,, 27
T. Kennedy ...	G6UC	,, 27
C. J. M. de Decker*	ON4PW ...	,, 28
D. A. Dyer ...	GW8UH ...	,, 28
T. A. Appleby	G3RZ	,, 28
Ch. Becker ...	LA3J	,, 29
A. B. Boswell ...	G3DA	,, 29

W.B.E. (Telephony)

L. C. Verhyden*	W9TIZ ...	July 11
R. Jones ...	GW3JI ...	,, 11
B. F. Phillips ...	GW5PH ...	,, 11
A. C. Simons ...	G5BD	,, 19
de Bremond Hoffman*	W6MXD ...	,, 19
H. J. Beenen*	PA0BE ...	,, 25
A. E. Hochstein	SU1AX ...	,, 25

H.B.E.

E. A. Hardwick	BRS1330 ...	July 11
H. J. Chater ...	G2LU	,, 11

B.E.R.T.A.

No. 58	W. Allison ...	W5VV ...	July 11
,, 59	H. J. Chater ...	G2LU ...	,, 11
,, 60	D. R. Tibbetts*	W6ITH ...	,, 11
,, 61	R. H. Summers	W8OQF ...	,, 11
,, 62	E. R. Radford ...	G2IM ...	,, 11
,, 63	G. Russell-Lee	G6GL ...	,, 18
,, 64	S. Comach* ...	VE2EE ...	,, 18
,, 65	H. Baumert* ...	D4DTC ...	,, 18
,, 66	H. J. Beenen*	PA0BE ...	,, 25
,, 67	E. Kerker* ...	PA0XF ...	,, 25
,, 68	J. R. Letts ...	G8IL ...	,, 28

* *Denotes Non-member.*

Golders Green and Hendon Radio Scientific Society

The annual 56 Mc. open competition organised by the above Society will take place on September 17 instead of September 10 as previously advertised. The event, which is open to all interested in 56 Mc. development, will commence at 11 a.m.

Eight sites will be selected in the country around Watford, Berkhamsted and St. Albans, and each receiving group will be required to visit each site in rotation. The portable transmitter in use will be crystal-controlled and will operate under the call G5CDP. Different code words will be radiated from fixed, but unknown, positions at stated times.

The event will end with an effort to find the transmitter, following which parties will meet at about 5 p.m. for tea and an informal 56 Mc. discussion at Old Mill House Tea Rooms on the Berkhamsted-Kings Langley Road, about ¾ mile from the former town.

Further details will be sent, if accompanied with a stamped and addressed envelope, on application to Col. H. Ashley Scarlett, D.S.O., 60 Pattison Road, Hampstead, London, N.W.2.

Kingston and District Amateur Radio Society

This society has recently made a drastic change in its policy. Among other things all members are now required to have a certain standard of technical knowledge. This, however, does not debar the absolute novice from entry, as "Probationers" are accepted and given all the technical and Morse tuition required to gain full membership. For this purpose meetings are held at 8 o'clock every Friday evening at the Secretary's house, 23 Warefield Road, Hampton.

The next general meeting is being held at the "Three Fishes," Kingston-on-Thames, on September 6 at 8 o'clock when *British Tungsram* will give a lecture on their transmitting valves suitable for amateur use. The Thames Valley Amateur Radio Transmitting Society and the New Malden Society will be guests.

The Society now has a very strong foundation of keen and active members, 18 of them holding Post Office licences for full transmitting facilities.

Any member interested in the Society is cordially invited to write to the Secretary, G8IP, for further information.

Trade Notice

Taylor Electrical Instruments Ltd., 45 Fouberts Place, Regent Street, London, W.1, have sent details of their measuring equipment including a range of Universal Meters which are hand calibrated and have 70 ranges, reading up to 2,000 volts A.C. or D.C., 20 amps. D.C., 5 amps. A.C. and from 0·1 to 5·0 megohms. Capacity, inductance and output can be measured in decibels. Prices are Type 80A, 10 Guineas, Type 80B, 12 Guineas, Type 80C, 14 Guineas.

A cheaper instrument, Type 90 with 32 ranges is available at 7 Guineas. This model reads up to 1,000 volts A.C. or D.C., 2·5 amps. A.C. or D.C., and up to 1 megohm with internal battery. A 4½ in. square type moving coil meter hand-calibrated is included.

CALIBRATION SECTION

Crystals and frequency meters of the heterodyne type can be accepted from members for calibration and these should be sent DIRECT to the Calibration Manager:

Mr. A. D. Gay, (G6NF),
156, Devonshire Way,
Shirley,
Croydon, Surrey.

Crystals should be enclosed in a small tin and securely packed to avoid loss in transit, whilst frequency meters should be packed in a wooden box or substantial cardboard container.

Return postage for crystals and frequency meters must be enclosed as stamps and not attached to the postal order. The Society cannot accept responsibility for any loss or breakage that might occur in sending apparatus for calibration through the post.

Calibration Fees (Members only)

Crystals, 1.7,3.5 and 7 Mc. types...1s. 6d. each
Crystals, 100 kc. type ... ...2s. 6d. ,,
Heterodyne frequency meters 5 points within the amateur bands ...5s.
For each extra point at any desired interval 6d.

56 Mc. ACTIVITY

By ERIC COSH* (2DDD)

SINCE the publication of the July issue of THE T. & R. BULLETIN a considerable number of members have forwarded particulars of their frequencies and equipment in use.

It is now possible to publish a list of over 60 stations, with their locations, and normal crystal frequencies, together with the calls of a further 50 stations who have been reported working, but who have not forwarded information.

In order that the lists published may be of the greatest value, it will be necessary to make additions, alterations, and deletions monthly, and to accomplish this, the compiler would much appreciate the co-operation of receiving stations who maintain listening periods throughout the year.

British Isles Stations

Station	*Location*	*Frequency*
2DP	Thornton Heath, Surrey	57464
		57016
		56928
2NV	Stourton, Staffs	56250
GW2PH	Nr. Rhyl, N. Wales	58248
		58944
2QV	Hurst Green, Sussex	56220
2QY	London, N.W.7	56200
2RD	Sanderstead, Surrey	56400
2XC	Widley, Nr. Portsmouth	56060
2ZV	Littlehampton, Sussex	56320
3CU	Tooting, London	56070
3DA	Manchester	57504
3NR	Kings Langley, Herts	59080
3PZ	Northampton	57360
		57960
3SU	Petworth, Sussex	58888
3VK	New Malden, Surrey	58800
3YY	Brighton, Sussex	58760
5AA	Ashtead, Surrey	56180
5BM	Cheltenham, Glos.	56488
		56640
5CD	Hendon, London	57500
5CM	Alfold, Surrey	56112
		57520
GW5FU	Rhyl, N. Wales	56120
5HF	Middleton, Lancs	57000
		56020
5MP	Hythe, Kent	56020
5NF	Farnham, Surrey	59160
5NG	Egham, Surrey	57400
5OJ	Ewhurst, Surrey	56232
5TN	Weston-super-Mare	56272
5UK	Westcliff-on-Sea, Essex	57000
5VT	Bishops Stortford	56400
5XY	Havant, Hants	56184
5ZT	Preston, Lancs	56020
GW6AA	Colwyn Bay, N. Wales	56120
		56740
		56960
		57160
		57320

* "*Anslyn*," *Mill Road, Angmering, Sussex.*

To avoid unnecessary correspondence in regard to the card index system, transmitting stations should provide the following information :—

1. Normal crystal frequencies.
2. Particulars of transmitting and receiving apparatus in use.
3. Aerial systems in use.
4. A brief description of the surrounding country in regard to screening, contours, etc.

112 & 224 Mc.

It is essential that all members licensed for operation on one, or both of these bands, should forward particulars as for 56 Mc. activity, together with details of any schedules kept.

Station	*Location*	*Frequency*
6CW	Nottingham	57640
6DH	Clacton, Essex	56200
6FU	Lewisham, London	56292
6GR	Northwood, Middlesex	57200
6IH	Malvern, Worcs.	56344
6LC	Lowton St. Marys, Lancs	56424
6QZ	Norwich	56340
6TG	Scarborough	56120
6TL	Manchester	56316
6VF	Bristol	56400
8BI	Manchester	56280
8CV	Farnham, Surrey	56035
8DM	Southampton	56528
8JV	Nottingham	57780
		59510
8KZ	London, W.10	56312
8LY	Winchester, Hants	58828
8ML	Cheltenham, Glos.	56800
8NM	Barnsley, Yorks	56120
8OS	Billingshurst, Sussex	57452
8SK	Enfield, Middlesex	57000
		56320
		56200

Overseas Stations

SU1RD	Sidi Gaber, Alexandria	56520
		56800
SM5SN	Stockholm 20	56720
		57200
SM7UC	Villa Tuna, Akarp	56300
F8CT	Villa Cyclamen, Arcachon, Gironde	56336
F8VC	224, Bd. Voltaire, Paris, 11E	56576
F8AA	60, Bd. St. Beuve, Boulogne	57000
F8NW	Villa St. Jean, Hardelot Plage, Pas-de-Calais	57216
F8DG	11, Rue Felix, Puteaux, Seine	58000
ON4AU	23, Av. de L'Oree, Bruxelles	56080
OZ7T	Tranegaardsvej 25 Hellerup	57100

(*Continued on page* 136)

Around the British Isles

NOTES AND NEWS FROM THE DISTRICTS

DISTRICT REPRESENTATIVES.

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

DISTRICT 2 (North-Eastern). *Yorkshire (West Riding, and part of North Riding).* MR. L. W. PARRY (G6PY), 13 Huddersfield Road, Barnsley, Yorks.

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

DISTRICT 4 (East Midlands). (*Derby, Leicester, Northants, Notts.*) MR. L. RIDGWAY (G2RI), 90 Romway Road, Leicester.

DISTRICT 5 (Western). (*Wiltshire, Gloucester, Hereford.*) MR. J. N. WALKER (G5JU), 4 Frenchay Road, Downend, Bristol.

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

DISTRICT 7 (Southern). (*Berkshire, Hampshire, Oxfordshire, Surrey.*) MR. W. E. RUSSELL (G5WP), "Milestones," Westfield Road, Mayford, Woking, Surrey.

DISTRICT 8 (Home Counties). (*Beds., Cambs., Hunts. and the towns of Peterborough and Newmarket.*) MR. S. J. GRANFIELD (G5BQ), 47 Warren Road, Milton Road, Cambridge.

DISTRICT 9 (East Anglia). (*Norfolk and Suffolk.*) MR. H. W. SADLER (G2XS), "The Warren Farm," South Wootton, King's Lynn, Norfolk.

DISTRICT 10 (South Wales and Monmouth). MR. G. R. SCOTT FARNIE (GW5FI), "The Grange," Cefn Coed, Breconshire.

DISTRICT 11 (North Wales). (*Anglesey, Carnarvon, Denbighshire, Flintshire, Merioneth, Montgomery, Radnorshire.*) MR. D. S. MITCHELL (GW6AA), "The Flagstaff," Colwyn Bay, Denbighshire.

DISTRICT 12 (London North and Hertford) (*North London Postal Districts and Hertford, together with the area known as North Middlesex.*) MR. S. BUCKINGHAM (G5QF), 41 Brunswick Park Road, New Southgate, N.11. *Deputy:* MR. P. SOLDER (G5FA), 35 Torrington Gardens, New Southgate, N.11.

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

DISTRICT 14 (Eastern). (*East London and Essex.*) MR. T. A. ST. JOHNSTON (G6UT), "Normandale," New Barn Lane, Little Hallingbury, Bishops Stortford.

DISTRICT 15 (London West). (*West London Postal Districts, Bucks, and that part of Middlesex not included in District 12.*) MR. H. V. WILKINS (G6WN), 539 Oldfield Lane, Sudbury Hill, Greenford, Middlesex.

DISTRICT 16 (South-Eastern). (*Kent and Sussex.*) MR. W. H. ALLEN (G2UJ), 32 Earls Road, Tunbridge Wells.

DISTRICT 17 (Mid-East). (*Lincolnshire and Rutland.*) MR. W. GRIEVE (G5GS), "Summerford," New Waltham, Lincs.

DISTRICT 18 (East Yorkshire). (*East Riding and part of North Riding.*) MR. E. MITCHELL (G5MV), 40 North Marine Road, Scarborough.

DISTRICT 19 (Northern). (*Northumberland, Durham, and North Yorks.*) MR. R. J. BRADLEY (G2FO), "High Crest," Yarm Road, Eaglescliffe, Co. Durham.

SCOTLAND. MR. JAMES HUNTER (GM6ZV), Records Office, 51 Camphill Avenue, Langside, Glasgow.

NORTHERN IRELAND. MR. J. A. SANG (GI6TB), 22 Stranmillis Gardens, Belfast.

New Members are cordially invited to write to their local District Representative.

DISTRICT 1 (North Western)

Blackburn.—Field Days have taken up most of the time of the local members during the past few months and much valuable data has been collected. The tests have been carried out on 7 and 56 Mc. but the last 56 Mc. Field Day had to be abandoned because of a terrific gale. The portable gear, which has been purchased out of subscriptions, includes two 50-ft. "A.R.R.L." masts which can be extended up to 70 ft. in a few minutes, a 25 ft. mast to carry a 56 Mc. rotating beam, transmitters for all bands, generators for H.T. supplies and batteries.

G8DJ has just completed the erection of a 60 ft. mast with 35 ft. rotating beam on the top. The following are active: G2TM, 3VV, 2HW, 2PB, 3HI, 3TU, 3WA, 4JK, 4CJ, 4FD, 4KT, 6BH, 6WH, 8FI and 8JA.

Forthcoming Events

Aug. 16	District 15 (High Wycombe Section), 7.30 p.m. at G3MI, "The Meades," Chesham, Bucks.
,, 17	District 13 (Central Areas), 8 p.m. at Brotherhood Hall, West Norwood.
,, 20	District 14 (East Essex Section), 3.30 p.m. at G6UT, "Normandale," Little Hallingbury, near Bishop's Stortford.
,, 21	District 13 (Woolwich Area), 8 p.m. at Memorial Hospital Hall.
,, 23*	District 15, 7.30 p.m. at G6CO, 22 Chipstead Gardens, Cricklewood, N.W.2.
Sept. 6	District 1 (Manchester Section), meeting at Brookes Café, 1 Hilton Street, off Oldham Street, Manchester. 56 Mc. night.

* *Sale of disused apparatus at this meeting.*

Will members please send their reports to the T.R. not later than the 15th of the month or hand them in at the monthly meeting?

Burnley.—G3VO has changed his RME69 for an SX23 and is still working W6 with his 8JK beam; 8TD who only wants two States for WAS is trying hard for them before taking the plunge on August 30. All members wish Mr. W. H. Dyson and his future wife a life full of happiness and trust that G8TD will still be heard working DX. The following are also active: G3HK, 3IY, 3KT, 3WU, 3SJ, 3ZM, 2RB, 5ZN, 8UA and 2BFB.

Manchester.—An attendance of 26 was recorded at the last meeting when Mr. Brannigan of the Manchester Wireless College gave a very interesting lecture on Electrical and Radio Theories. He dealt very thoroughly with A.C. and D.C. circuits, giving numerous equations. A hearty vote of thanks was extended to him at the conclusion. Mr. Brannigan was welcomed as a prospective R.S.G.B. member.

All 56 Mc. reports sent in to G2OI or passed on to him over the air will in future be forwarded to G8LY for inclusion in her article.

The following report active: G5HF, 5YD, 5OZ, 3SP, 4LP, 4LQ, 3AH, 4HK, 2HW, 3MR, 3HZ, 3DC, 2OI, 2WQ, 3DA, 2RA, 2DH, 2LK, 3BY, 2JS, 6NL, 2FRN, 2ARC, 3228, 6OM, 5WR, 6TL, 6LC and 3DC.

G2OI is still waiting for cards from members giving particulars of crystal frequencies used. Please send yours by return so that he can complete the crystal register. He acknowledges with thanks the register sent by G3PM of the Ashton and District Radio Society.

Please bring your 56 Mc. receiver to the September meeting; see "Forthcoming Events."

DISTRICT 2 (North Eastern)

The holiday season is again upon us, and in most cases, reports are rather scanty. It is to be hoped, however, that all T.R.'s will make an effort to send them in regularly, once the autumn starts. No reports have been received for some considerable time from certain areas.

Barnsley.—A SWL report is to hand from New Zealand, on the Barnsley Club's 7 Mc. portable transmission, during N.F.D. Best wishes are sent to G8IJ, who has joined the R.A.F.

Doncaster.—The local society made a visit last month to the Doncaster Airport. Due to the kindness of the Borough Surveyor, Mr. R. E. Ford, and Mr. L. H. Riddell, a member of the Aero Club, a very pleasant evening was spent. 2BCQ made a flight with Mr. Riddell in his radio equipped plane, and contact was made between them and the wireless cabin at the airport, where the party were gathered. An inspection was made of the equipment on the machines of North-Eastern Airways, and the ground station gear of the Manchester Civil Aviation Dept. The following are active, G3NJ, 4DP, 5GJ, 8IC, 2AMT, 2BCQ, 2CLK, 2CKR, 2CXR, 2TTO, BRS193 and 3494. G2XA of Hull was a recent visitor.

Keighley.—G2VO home on vacation, is active on 1·7 and 7 Mc. Morse classes are held at G3NN, 21 Ferniehurst Road, Baildon, on Monday nights (beginners) and Wednesdays (advanced). The club night is Friday, when visitors are welcomed. Stations active include G2VO, 3NN, 4HI, 5VC, 6MC and 8UO.

Leeds.—One report to hand, from a recently licensed station, G4MC, of 6 Bramley Street, Bramley, who is active on 1·7 Mc. Reports on his 1,762 kc. transmissions are requested, and will be acknowledged.

Bradford.—The holiday season in this particular town is now nearly over, and most of the members and clubs will be thinking of winter activities. The T.R. suggests that perhaps in the autumn, a meeting and supper, open to all local amateurs, might be held, provided a suitable place can be found. Run on Convention lines, the cost would be kept at a minimum. Those interested should please discuss the matter with others and inform G6KU, after which the possibilities will be explored. Offers of QRA's for meetings are also requested. Some very enjoyable times have been had in the past at such meetings, and we should like to see them revived. Those prepared to support them should write to the T.R.

Activity is well maintained individually. In an effort to avoid local QRM on the 1·7 Mc. band, several members have obtained crystals on the same frequency. They are finding the arrangement very successful for working one another.

DISTRICT 3 (West Midlands)

District Representative : V. M. Desmond (G5VM), 199 Russell Road, Moseley, Birmingham, 13.

District Scribe : G. M. Whitehouse (G2YV), Trumwyn House, Cannock, Staffs.

Town Representatives :

Birmingham.—G. Brown (G5BJ), 94 Sunnymead Road, Yardley.

Cannock.—T. Ball (G6SW), " Meadsfoot," Dartmouth Road.

Coventry.—L. W. Gardner (G5GR), 40 Medina Road.

Rugby.—H. S. Norris (G8FJ), 19 Charter Road.

Shrewsbury.—E. R. Westlake (G6KR), " Ardlui," Wenlock Road.

Stoke-on-Trent.—A. H. Wilson (G2WN), 8 Stanley Street, Hanley.

* * *

Cannock.—G6SW has been finding many DX stations on 14 Mc. with his new RM70. 2YV, who has very little time to spare, is occasionally heard on 7 Mc. 'phone. 4CN is building a speech amplifier for grid modulation. 4CP with a new transmitter has added K6 to his list of DX worked. The Cannock and District Amateur Radio Club has suspended meetings until September, but future activity will be greatly hampered as several members have been called to the militia.

It is hoped that all T.R.'s will supply news for these notes, sending reports to the Scribe before the 25th of each month.

DISTRICT 4 (East Midlands)

Owing to holidays we lost the services of our lecturers for the monthly meeting at Nottingham on July 23 when 30 members were in attendance, but this gave us a chance to clear up one or two important points effecting District policy. Talks of this kind are of great value because grouses can be aired and thrashed out instead of being nursed. The junk sale which followed took one hour and twenty minutes to conduct so if 5KG continues his assistance we suggest that 6MN brings a bag full of coppers to cope with it !

No monthly meeting will be held during August or September, so please watch these notes for an announcement of a meeting immediately after Convention.

Leicester.—Activity is well sustained here but reports are few owing to holidays. Five local members are operating on C.W.R. frequencies and code speeds are going up.

Nottingham.—The T.R. would be obliged if members will let him have notes for this column and for the local newspapers. G8JV recently had an exciting time while working 56 Mc. portable, first he was almost arrested on suspicion of being connected with the I.R.A. and later chased by a bull ! He and G6CW are doing grand work on this band, but experience a lot of trouble from harmonics of stations on 14 Mc. and a list of offending stations has been compiled. If one might be you *please* get in touch with G8JV who will gladly assist in its suppression. G3AA is moving to West Bridgeford thus making five full licences in this previously peaceful suburb. Another full call is welcomed (G4LY ex-2CZX) at Mapperley whilst 2FXY awaits results from his Morst Test. It appears that G5TT cannot find the heart to part with his station after all, but will be very glad indeed to see visitors as time sometimes hangs heavy. We are glad to hear he has been granted a pension for life. (Keep your pecker up O.M. and watch the DX roll in. D.R.) Our thanks to G2IO for N.F.D. QSL cards.

Chesterfield.—G8MW has taken over the duties of T.R. for th's area and would like to hear from all local members as well as those in Buxton. This includes B.R.S. members.

Worksop & Retford.—Congratulations to G8PO on passing his examination in Elect. Engineering ; he is active on 7, 14 and 56 Mc. and hearing medium DX on this latter band. 2CAJ though not active at present intends to apply for a full call very soon. G8SD has changed QRA and remembering what this " one-watt-wonder " could do with batteries only, it will be interesting to see what happens now he has A.C. mains and a rig full of 6L6's. 8ON is active on 14 Mc. and reports a good month for DX, the 23rd being outstanding.

Monthly meetings recommence at G8ON on September 10 and Morse classes on September 11. The T.R. had the pleasure of a visit by G2RI (D.R.) and it is hoped that a local meeting can be arranged to coincide with his next appearance in this part of the District. 2CSA and 3577 are busy with code and rebuilding, the latter passed his signals test in the " Terriers " with flying colours. Good work O.M.

Northampton.—Activity here is of a high order, G3PZ is on 1·7 and 56 Mc. while 2SY, 3RF, 4IN and 5LP are keeping the rest of the world busy on 14 Mc. G8KY has made his own 45-ft. high 8JK Rotary Beam ; which is an outstanding example of individual effort and the envy of all the locals. 2DYH is getting ready for a full licence, whilst BRS3517 is welcomed. It is intended to arrange a local meeting in the near future therefore the T.R. (G2SY) would like all members to get in touch with him in order that a suitable time can be arranged.

* * *

The D.R. has received information that serious interference is being experienced in both Leicester and Nottingham from third harmonics of 14 Mc. transmissions. In some cases the lookers-in do not know it emanates from amateur stations, but in view of the possibility of Television becoming more popular in the near future it is suggested that efforts be made at an early date to reduce this trouble.

DISTRICT 5 (Western)

Through the generosity of 2BYU and G2HX, a useful sum was realised at the *Bristol* July meeting to augment the local fund, which had been seriously depleted by the purchase of a D.C. to A.C. rotary convertor. The acquisition of the latter will permanently solve at least one N.F.D. problem.

Activity is normal for the time of year. Many members are taking advantage of the good conditions prevailing on 14 Mc. in the early mornings. 2BVD entered the 56 Mc. N.F.D. but a series of misfortunes robbed him of success.

The *Cheltenham* group propose to hold a " Hamfest " and Dinner on the evening of Sunday, September 3 and enthusiastic support is solicited. Full details will be available from the T.R. (G8DA) and from the D.R. The first local " Hamfest " held last year was a great success and it is hoped that this year's function will be even better supported.

G5BM and 8DT have built 56 Mc. convertors for

their communication receivers. The following stations are active on the frequencies shown on Wednesday evenings and Sunday mornings: G5BM (56488), 8LB (57488) and 8ML (57456).

DISTRICT 6 (South Western)

Torquay.—A very enjoyable 56 Mc. Field Day was held on Sunday, July 23, from 12.00 to 18.00 B.S.T. Those assisting were G2CI, 3HW, 5QI, 5SY, 6WT, 2CWR, 2DYM, BRS3392, and 3444. Members who took out portable receivers were mainly engaged in direction finding experiments on the transmitting stations. The transmitters produced some very enjoyable contacts and the results of the attempts at D.F. proved decidedly instructive. The peculiarities of the band with regard to the latter seem very difficult to understand, and offer a line of research worth following.

It has been decided to hold a similar field day on Sunday, August 27, but in order to provide a better opportunity of solving some of the problems, the range of action will be somewhat reduced. The field for D.F. experiments will therefore be confined to the area bounded by the line: Torquay, Newton Abbot, Ashburton, Totnes, Dartmouth and Brixham. Will all those who wish to take part please note? The 56 Mc. experiments between G2GI, 3HW, 5QI and 5SY continue with considerable success.

At about 6 p.m. on July 22, G5SY when on 56 Mc. heard "G6YL de CS3VA" repeated for a considerable time on i.c.w. The signal was RS56 accompanied by a swinging fade of two or three seconds period. G5SY would like to know the origin of the call. (See "The 56 Mc. Band."—Ed.)

North Devon.—The T.R. reports there is very little activity at present. The holiday season is on and most people spend a great deal of time out of doors, weather permitting.

Salcombe and Kingsbridge.—There is a desire on the part of some of the local members to start gatherings of their own. As we have knowledge of G2CF, 6DI, 6JB, 4DT, 2FIZ, 2DNY, 2DUI, and 2DYM in that area, there are sufficient members to qualify under the T.R. scheme. We therefore suggest they get together and elect someone to carry out the duties of T.R., at least, until the regular elections take place at the end of the year. We shall be interested to hear of what is being done.

Plymouth.—Five members were present at the July meeting at 2DLJ, when changing conditions on 14 Mc., rotary beams, and frequency checking were discussed. Both G8HF and 3TX are considering the erection of rotary beams for 14 Mc., and 8PN has built a peak limiting speech amplifier. 2DLJ did well in the B.E.R.U. Receiving Contest. The next meeting will be at G3TX, 55 Greenbank Avenue, Lipson, on Monday, August 21.

DISTRICT 7 (Southern)

Owing no doubt to the holiday season these notes strike a new low level but it is to be hoped that the return to activity after the summer will be marked by an increase in the number of reports. It is four months since the appointment of the D.R and one or two of the T.R.s seem to have been unable to find anything worthy of reporting in that time, in fact the D.R. begins seriously to doubt their existence.

Reading.—Congratulations to new calls G5RP (ex-2CZQ), 2FZI, 2FXD, 2HAX, and welcome to BRS3656. VU7BR (ex-G5TB) keeps in touch with his old QRA through 2YB and has contacted most of the Reading Group. N.F.D. station G5AOP had four U.S.A. contacts on 7 Mc. 6GT built the rig whilst the staff was G2IT, 3KJ, 4AB, 5AO, 5HH, 6GT, 6WO, 2BHS, 2BKD, 2FPB and 2FZI. G5RP, 2BKD, 2FXD and 2HAX have joined the R.A.F./V.R. whilst G3HS, 5AO, 6NW, 8KJ, 8TH, 2AYP, 2BHS and 2FZI are in the R.A.F./C.W.R. Welcome to G4NG of Andover.

Guildford.—An informal meeting will be held at The Tumbledown Dick, Farnborough, on Sunday, September 3, at 2.30 p.m.—all are welcome. A charge of 1s. 6d. will be made for tea.

DISTRICT 8 (Home Counties)

A District meeting was held at the Waffle Café, Petty Cury, Cambridge, on the evening of Monday, July 24, when there was an attendance of 15 members. The chief feature of the evening was a talk by G2PU on "The Elements of Aerial Design."

The speaker dealt in great detail with the properties of several aerial systems, emphasising the need for careful consideration of the many aspects of a particular location, as opposed to the more usual "hit and miss" method. His talk was much appreciated.

Cambridge.—G2XV, who is active again after an extensive rebuild, is pleased with results. The new rig belies the name of "Gerry-built," for it is a most workmanlike job in every detail. We liked particularly the home-built change-over relays. 5JO is getting out very well on an "Expanded Lazy H" aerial, as recently described in *Radio*. 5BQ and 5DQ are active on 7 and 14 Mc. the latter using an 8JK beam. We understand that 8ST, who has moved to Hemingford Grey, Hunts. recently demonstrated his 56 Mc. transceiver to the Territorial Association in N.W. London. 5DR is on the air again from 20 Mill Road, and is experimenting with aerials to suit the new location. 5OV and XZ2DY are testing out the new transmitter which the latter is taking back to Burma. 8FF and 8SY are believed to be active.

March.—G3BK (14 Mc.) and G3WW (7 Mc. phone) are both active. After a succession of new receivers 3WW has finally decided on an R.M.E. 70. 3DY (Whittlesey) is also active on 14 Mc. phone.

Peterborough.—G2NJ is carrying out interesting tests on 1·7 Mc. at Heacham Beach, Norfolk, with box-kite aerials. He reports a rise in QRK with a strong wind.

Bedford.—G5FO, who is on 14 Mc. phone, recently worked his first VE. 5CX is a new arrival to the town, and hopes to be on the air shortly. 2MD and 5PA are both active. Congratulations to 2CAP, who has passed his Morse Test, and awaits his full call.

Luton.—G3KG hopes to be back on the air by the time these notes appear. BRS3617 and 3518 are now 2HGC and 2HFL respectively.

2HGC has completed his modulator and is busy on the transmitter. BRS3610 has constructed an A.R.R.L. type mast, and 3QG is doing likewise.

St. Ives.—G4AZ (Fenstanton) is getting out well on 7 Mc. phone but finds 14 Mc. more difficult. He is busy on a V beam, with 60 ft. masts and hopes for improved results when this is completed.

DISTRICT 9 (East Anglia)

Ipswich.—There is little local activity to report this month, but we are pleased to welcome BRS3661 and 3665 as new members.

Reports are as follows :—G8MU trying a vertical extended double Zepp for 56 Mc., a W6AM beam for 28 Mc. and a close spaced beam for 14 Mc. ; 6TI has 32 confirmations towards B.E.R.T.A ; 2JD has forsaken the key for the mike ; 3OJ is looking for 14 Mc. DX ; 2AN rebuilding both modulator and receiver ; 8AN active on 7 and 14 Mc. 2JD has received a card from BERS195 in VK8 reporting reception of G2JDP on 14 Mc. on six occasions during National Field Day.

Norwich.—G6QZ had the misfortune to miss the 56 Mc. Field Day owing to illness ; he has now recovered and operates regularly on 56 Mc. Reports from other Norwich stations would be welcome.

Gt. Yarmouth.—G3RW is operating on 14 Mc., phone and c.w. and experimenting with a tilted doublet aerial while 2BXJ is carrying out tests with a balanced Colpitts oscillator. Congratulations to BRS3366, now 2HFK ; other stations known to be active are 2FAO, 2BIC, BRS2999 and 3468.

Lowestoft.—With summer holidays claiming first place, activity here is confined to a minimum. G5QO, after a spell on the ultra-high frequencies is now turning his attention to 14 Mc.

G8AX (Mattishall), is obtaining good results on 14 Mc., and using a W8JK beam he has had a number of S9 reports on his phone transmissions from DX stations, 8AX also works on 1·7 and 7 Mc. ; 3IN (Saxmundham) is concentrating on QRP battery transmitters. In a recent low power contest using three watts he contacted 54 stations in 15 countries on 7 Mc. 3RK (Beccles) has forsaken 7 Mc. for the present and is working DX on 14 Mc.

Other stations active include G3UT, 3XT, 8WI, 2APD and 2FFT.

DISTRICT 12 (London North & Hertford)

District Representative : S. Buckingham (G5QF), 41 Brunswick Park Road, London, N.11.

Deputy D.R. : P. Solder (G5FA), 35 Torrington Gardens, N.11.

Town Representatives :

Potters Bar.—J. Goddard (G2GO), 33 Park Avenue.

Watford.—P. Spencer (G8MH), 11 Nightingale Road, Bushey, Herts.

Welwyn.—J. Hum (G5UM), " Byeways," The Drive.

Area Representative :

A. J. Mathews (G6QM), 74 Hawthorn Road, N.8.

* * *

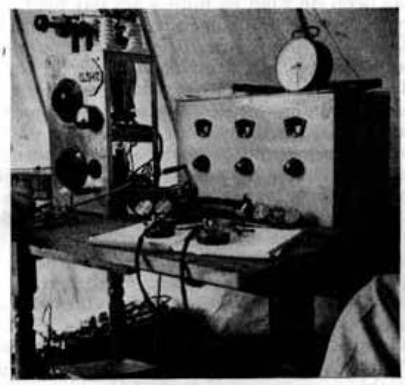
Notes are scarce due no doubt to the holiday period, but from what we hear there is no dearth of rebuilding which points to activity with renewed vigour when the season starts again.

It is hoped that members in North London, which now number approximately 200, will turn up in force at Convention and take advantage in full of the added attractions being offered this year.

The monthly meetings at the Orpheum Cinema, Temple Fortune, will begin again on the third Friday in September, the 15th. As this coincides with the day THE BULLETIN is published, please make a note of the date now.

It is proposed to hold a meeting of T.R.'s and A.R.'s to bring the various areas into closer contact and also to arrange a set programme of lectures for the coming season in advance. Members who have suggestions for any particular subject they would like discussed are asked to inform their representative as soon as possible so that arrangements can be put in hand.

Activity reports follow :—G8NY is shortly installing a two section rotatable beam for 14 Mc, 5FA is using an HK24 (presented by W2IOP) on 7 Mc. with great success and is one of those rebuilding in easy stages. Receivers are also engaging the attention of some members. G6LL, who has just completed a converter for 56 Mc. using Acorn valves, reports that it shows great promise with a sensitivity of 1 micro-volt per meter. 2DHR who has spent twelve months experimenting and building a communication receiver has made a very fine job of it. BRS3412 has solved the difficulty of running an SX18 from D.C. mains with the help of G2NO and



G6ZOP, Mill Hill.

A close-up of the 14 Mc. Transmitter used by District 12.

a 6 volt accumulator but the performance does not come up to A.C. mains operation. 2FVX awaits his Morse test, and we wish him the best of luck.

GM3LO, GI5ZY and PA0GE visited a number of local stations during their recent stay in London. G6CL entertained SM5VR, Hon. Secretary of the Swedish National Society.

The following are active on various bands :—G2YD, 2XJ, 3GX, 3MO, 3SH, 41G, 5FA, 6CL, 6OT, 6QM, 6WU, 8NY and 8TY.

Central Herts.—G2FB continues to be the area's most active station, and the amount of DX he works on 10 watts is amazing. 6XN took portable gear out near Stevenage for the 56 Mc. Field Day, but little luck resulted, although many stations were heard. 3TL leaves Stevenage for a G.P.O. training course at Bristol. 5UM has started 1·75 Mc. telephony after eleven years of " mike-shyness." 5ZJ, of Letchworth, has rendered valuable aid to local telephony stations with oscilloscope checks. 8PM is now secretary of Murphy Radio Society, and has been running some intriguing D.F. competitions with the Society's station (G8LM). Another Welwyn Garden City member, 2KQ, has three times decided to sell out, but has changed his mind every time !

Watford Area.—The usual monthly meeting held in conjunction with the Watford and District Radio and Television Society was very poorly attended. A demonstration was given of their

56 Mc. receivers (Superhet and Straight respectively), by G5RD and 3NR.

The only reports of activity received are from G3NR, 5RD and 6GR who are all busy on 56 Mc.

G8MH preparing for 56 Mc. is building a 1-v-1 for this band. He will be on 58584 kc. shortly.

DISTRICT 13 (London South)

The meeting of the Central Areas which took place at Norwood on July 20 was well attended. It was suggested that future meetings at the Brotherhood Hall should be fixed for the third Thursday in each month. Will all members therefore please note that a meeting of the Central Areas will take place on the third Thursday in *every* month. A notice will, of course, continue to appear under "Forthcoming Events."

Wandsworth Area.—G2TH is on the air again and working DX. 2RC is active as also is 3TA who is using a half-wave doublet with good results.

Kennington Area.—G6HM was last heard contemplating activity on the 56 Mc. band but no signals have been heard so far. 3CI is active and complains that his call sign is being persistently pirated. He has a batch of QSL cards together with a suitable admonition awaiting the culprit. 6AN is heard occasionally on 14 Mc. telephony. 2JB operated portable during the 56 Mc. Field Day and reports would be very welcome; contacts included two at a distance of 35 miles using phone with 2 watts to a "long lines" oscillator.

Woolwich Area.—G4DZ is building and hopes to be on the 56 Mc. band by the end of August. 8LN is still having trouble with his RK39. 4AU and 3ZJ have both been very active and have worked a lot of DX. The latter has two aerials with rapid switching whilst the former has developed an E.C.O. unit, which really gives a T9 signal. It is hoped that everyone will make an effort to attend the next meeting as the attendance on July 24 was rather low.

Several other members report active including 2LW, 2GZ, 2UX, 3GU, 8TN and 4GD. The latter is having considerable difficulty in neutralising a 6L6G.

DISTRICT 14 (Eastern)

Brentwood.—As local activity is low owing to the holiday season there will be no further meetings until September. G4AG, 3JW and 3VD are rebuilding. 3LA is at present building a 7 to 28 Mc. transmitter and replacing three burnt-out mains transformers.

Chelmsford.—The following are known to be active G5RV, 2SA, 2KG, 4AC, 3OX, 8PB, 6LB. The area is happy to welcome W9MH who is over here.

East Essex.—As usual during the summer months local activity has decreased slightly. The monthly meeting held at G2SO's new home was attended by 16 members, and included G5RV, 6LB and 8PB from Chelmsford and the D.R. G2SO is getting his transmitter on the air again and hopes to again contact DX. The next meeting will be held in September.

Romford.—The Romford Radio Society participated in another interesting D.F. contest held at Welwyn and were represented by four car parties. 2CWF again came in first and in record time. Membership is on the increase and our blind member is to be congratulated on obtaining his A.A. Licence. The society again assisted at the Red Triangle Fete on August Bank Holiday.

East London.—It was G3LA who assisted on N.F.D. at G6UTP and not G3LP. All members who can attend the August meeting at G6UT, Little Hallingbury, on Sunday, August 20, will be welcome.

DISTRICT 15 (London West, Middlesex and Buckinghamshire)

It is usual for a good attendance to be recorded when the district meeting is held at G6VP but that held there in July saw a distinct change in the number present as the total was no more than 14. However, in spite of the smallness a hectic time was in store for all, when argument arose round Convention, policy, membership and many other kindred matters effecting the welfare of the society. The D.R. supported by one or two members were able, we believe, to reply satisfactorily to all questions. We should like to thank G6VP for his hospitality and look forward to the next time when we shall meet there.

The District Magazine is to have a new Editor as G5JL finds other activities taking up too much of his time to allow him to do justice to it. We should like to say how very much we owe to his efforts in keeping the magazine running for the past three years. He himself says that it will probably be wise anyway to have a change and has for some time now advocated that the editor be voted for annually. The amount of work involved in the production of even so small an issue as ours must have taken up considerable time and on behalf of all those who took an interest in the magazine we say "Thanks 'JL for all the hard work on our behalf."

The new editor is none other than our old friend Mr. W. E. Corsham (G2UV), who is we believe one of the oldest amateurs in the district. For the benefit of those who are not well acquainted with past history we would mention that he was a member of the Council of the R.S.G.B. in very early days and was the man who invented the QSL card! All in all a first-class ham, knowing more about amateur radio in this country than most of us. He has a big task before him and while we know he is capable of seeing it through we should like him to receive support, so will members drop him a line giving him an idea of what interests them and if possible send a short article for inclusion in the magazine. Again a letter for the budget would not be amiss and it would also assist the D.R. when a report for THE BULLETIN is due. G2UV's address is 143 Abbotts Drive, Wembley, Middlesex.

A small increase in reports is noted this month but the T.R.'s still complain of their inability to extract information in writing from the members. G3HT sends a copy of the Edgware Short-Wave Society Magazine. This is a very praiseworthy effort, containing humorous and interesting articles and two photographs.

We have received a letter from Mr. Le Cheminent, ex-G6AC who is now in Newfoundland signing VO2O. He wishes to be remembered to those he knows in the district and is on 14 Mc. nightly looking for G contacts.

A welcome is extended to G4HV, 2AVJ, 2BRF, 2FTD and 2HFY, all new members, and congratulations to BRS3557 and 3608 who are now G4MT and 2AIW respectively.

Edgware.—G3HT, 3VW, and 2FTD report, the latter for the first time.

High Wycombe.—Seven members attended the local meeting at G8JK. G3MI would welcome more activity on 1·7 Mc. in the daytime. 8VZ has built a regenerative-preselector and is finding it a good all-round performer. G6JK and 2BAO are active.

Twickenham.—G3BQ after experimenting with receivers for nearly a year, has decided it is cheaper to buy one! He is now working DX again. 2AIW is busy with preselector and exciter units.

Wembley.—G5SR and 6WN still manage to raise DX but the latter needs a rebuild. G5SR bemoans the fact that the D.R.'s comments at the District Dinner have either been forgotten or ignored.

DISTRICT 16 (South Eastern)

District Representative: W. H. Allen (G2UJ), 32 Earls Road, Tunbridge Wells, Kent.

Town Representatives:

Ashford.—R. G. E. Dennett (G8RK), 81 Beaver Road.

Bognor Area.—C. J. Rockall (G2ZV), "Aubretia," Seafield Road, Rustington.

Brighton and Hove.—H. Lunson (G3WR), 80a Beaconsfield Road, Brighton, 6.

Eastbourne.—F. Wingfield (G3CX), 48 Willingdon Road.

Heathfield.—R. J. Lee (2HLF), 9 Theobalds Green.

Gravesend.—R. S. Martin (G2IZ), 41 Mayfield Road.

Maidstone.—L. J. Cleggett (BRS2834), "White Cottage," Detling Hill.

Medway Area.—J. E. Bryden (2BOL), 24 City Way, Rochester.

Whitstable.—W. Crossland (G5CI), 13 Queens Road.

We would remind new members that they are invited to send a report of their activities to their T.R. before the 25th of each month.

G3GW of Sheerness is working a portable on the 1·7 Mc. band each Sunday between the hours of 15.00 and 18.00 B.S.T., on C.W. only, and would appreciate QSO's and reports.

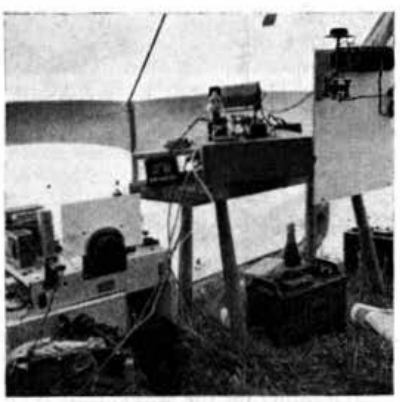
Gravesend.—G3GP, the club's portable 56 Mc. station, had considerable success during the 56 Mc. Field Day, the site chosen being near Grays, Essex. The transmitter, built by G6PG, was a tritet, followed by two push-push doubler stages, whilst an aerial seven wavelengths long was employed. Contacts were made with G2DPP, 2ZVP, 5FNP and 5UKP, the second mentioned station being 65 miles distant. 2BIL, operating a portable receiver near Brighton, is thanked for his very complete and useful log of the station's activities. Thanks are also due to G4FN and his wife, for their help during the day. Arrangements for next season provide for weekly meetings with lectures once a month and morse classes on alternate weeks. G6VC has forsaken 56 Mc. temporarily and is now on 14 Mc. He worked nearly 120 W stations in one month. Other stations active include: G2IZ, 2TN, 5IL, 5SI, 5SU, and BRS3530.

Heathfield.—BRS1173 reports, as such, for the last time, and we wish him all success under the call 2HLF. As he seems to shine on whatever band he uses his receiver this seems a most appropriate call! He reports having heard F8AA, F8NW and ON4DJ on 56 Mc. Other members active are: G4GW, 5AQ, 5JZ, and 5PR. We welcome 2BGU as a new member.

Maidstone. — G5XB operated portable from Detling Hill during N.F.D., a number of members assisting.

Tunbridge Wells.—The following report active: G2UJ, 4AY, 4IB, 5OQ, 6ML and 8NO.

Whitstable.—G4BY and 5CI are active on 1·7 and 7, and 7 and 14 Mc. respectively. 5CI now has a 50-ft. lattice tower and a 50-ft. mast erected. Local members will be pleased to see members on holiday if a little notice is given.



G2UJP, Hawkenbury, Kent.

Some of the gear used at the District 16, 1·7 Mc. Station.

DISTRICT 17 (Mid East)

Grimsby Area.—There is very little activity at the moment but several stations are staging their annual rebuild. Apart from the 56 Mc. group there is nothing of importance to report. On that band, 6LI is participating in all tests and experimenting with various aerial systems. Other active members with 56 Mc. gear are 5GS, 6AK, 3YQ and 3ZG.

Boston.—We are pleased to hear from our old friend 6GH again. This area has been left out of the notes for some time owing to C.W.R. activities but we trust we shall hear further from them regarding their activity on the Amateur Bands.

Pointon.—We have to acknowledge the usual report from 8GI who never fails to let us know how things are going locally. The Scribe would here like to point out that 8GI's was the only report received last month hence the absence of any notes from District 17 in the July issue!

In the absence of any information from Lincoln, Cranwell, Brigg, Mablethorpe and Sutton we presume these areas are enjoying the summer (?) recess although we are of the opinion that there is some activity not being reported, particularly in the Mablethorpe and Sutton areas. What about it?

DISTRICT 18 (North and East Yorkshire)

Bridlington.—A welcome to R.S.G.B. membership, and congratulations on receiving a three-letter call are extended to Mr. C. Sharp, now 2HIF. He is at present busy with the construction of a very elaborate superhet.

Scarborough.—G6SO had the misfortune to be off work for two weeks due to being affected by gas escaping from a refrigerator. He is now well again but reports that his mains transformer has gone up in smoke. 6GT spent a few days at the beginning of July in southern England, visiting 2AAH, G8OS, G5TN—members of the 56 Mc. Propagation Group B of the E.S.—and G6BW at Churchill where the latter's aerial systems and rig were duly admired.

The operators of the 7 Mc. N.F.D. station (G8KUP) were highly delighted to receive a reception report from BERS195 in VK8. Eric Trebilcock

G8FCP, Cranwell, Lincs.
Operators at District 17, 3·5 Mc. Station.

stated that only one other 7 Mc. station was heard during the contest. The Hull 14 Mc. transmitter (G6OSP) was reported in the VK notes last month, with certain remarks about receivers which caused amusement in Scarborough.

July 17 was an unofficial visitors night at the Scarborough Short-wave Society, as the following guests were welcomed: 2CXV, 3OY, 3VG, 5GJ and 8FW.

Driffield.—G3DW has been transferred to Moray in Scotland. Good luck to him as GM3DW.

Hull.—The visit of local members to the Hull Technical College provided a unique opportunity for amateurs to see for themselves the methods adopted in modern commercial transmitters and receivers. As a point of interest it was apparent, for some reason better known to themselves, that this visit had little appeal to the fully licensed members. Out of an attendance of 30, four only held transmitting licences.

G3KSP, Scarborough.
G5GI takes a turn at the District 18, 1·7 Mc. Station.

The chief wireless instructor of the college, Mr. C. T. Holmes, A.M.I.E.E. explained briefly and also demonstrated the wireless equipment of the college, including four transmitters (complete with effective artificial aerials) ranging from a 1½ kW. medium wave transmitter to a ½ kW. short-wave transmitter, aircraft sending and receiving apparatus, various commercial mains receivers covering all wavebands, direction-finding gear, an automatic alarm receiver and selector, several high precision testing instruments and, last but not least, the experimental transmitter owned by the college, G3CH. The T.R. expressed his gratitude to Mr. Holmes for arranging a most enjoyable and interesting evening.

The next meeting will be on Wednesday, September 13, at the Broadway Hotel.

DISTRICT 19 (North Eastern)

May the D.R. put forward yet another plea for monthly reports to T.R.s? Remember you are entitled to this column and it is up to you to keep it going. All that is necessary is to send a post card to your T.R. by the 20th of each month.

Stockton-on-Tees and Middlesbrough.—G2FO is preparing to move to a new address and will be inactive for some time. G5XT, 8CL and 3YK are active on 14 Mc. phone. 5QV, 8OH, 8PS and 2CZO are also known to be active.

South Shields.—Fortnightly meetings at 5WZ continue to be well-attended and membership is increasing. G8VV is making plenty of DX phone contacts, while 8JO finds good DX on cw. Other active stations are 6PB, 8IF, 6XO and 8AO.

GI5QXP, Portaferry, Co. Down.
Left to right (front), GI5AJ, 5QX, 6TB; back (centre), 2HCC, right, 6TK.

Scotland

News is exceedingly scarce this month, no doubt due to holidays.

"A" District.—We welcome GM8HA who has arrived from "D"; he expects to resume activity on the air during August. Congratulations to Mr. D. A. McQueen, BRS3321, who has joined the ranks of the benedicts. Both he and Mr. Peattie, 2FQG, have passed the morse test and await calls. At the final meeting for the season held in June, an interim financial report, showing a very satisfactory

(*Continued on page* 136.)

BRITISH EMPIRE NOTES & NEWS

Australia (Queensland)

By VK4GK

Activity in VK4 at the moment is surprisingly low. No doubt the very cold spell we have had is in a measure to blame, but conditions for DX work have also been poor. American stations on 14 Mc. can be worked by the score during the afternoons, but after contacting the first hundred or so, interest in that part of the globe begins to flag somewhat!

British and other European stations come through fairly well in the mornings, but contacts are few indeed; we are now blaming QRM at the reception point and not our transmitters.

At our last monthly meeting, one member arrived a few minutes late; he had come straight to the place of meeting, from Grafton 170 miles away; surely the kind of enthusiasm we like.

The sympathy of all VK members is extended to Mr. Scholz (VK4HR), who has recently lost his father.

Australia (Western)

By VK6WZ

July was very wet here and boisterous periods took their toll of aerials. Activity is not particularly brisk, due no doubt to the "folding up" of 14 Mc. after about 8 p.m. local time.

VK6MW has been elected president of the local division of W.I.A. for the coming year and, in addressing the first meeting for the new term, spoke optimistically of the future. A U.H.F. section has been formed to foster and co-ordinate 56 Mc. work in W.A. and with the other active groups controlling field days and general developmental work the new body should contribute substantially to W.I.A. activity. At the moment there is some operation on 56 Mc. but several stations are re-building or are otherwise occupied and activity is not at its highest. Another "field test" will be arranged at the end of winter.

VK6MW, 6XZ, 6FL and 6AF are active on 7, 14 and 28 Mc. with greatest activity on the first two bands. 6AF reports European contacts on 14 Mc. in the mornings (23.00–01.00 G.M.T.), whilst 6FL is spending more time now on 7 Mc. 6WZ hopes to operate on 3·5 Mc. soon although this band is empty of VK6 signals at present. Other States and New Zealand can be heard there most evenings.

Channel Islands

By 2AOU

Jersey.—Visits have been received from G2FZ, 4AZ, 8IS and 8OK. The latter who is from Guernsey is applying for membership. G3GS has been erecting and testing various aerials with assistance from 2AOU. He is seeking a good aerial for 7 and 14 Mc. operation, but up to the present has been unsuccessful. G4LI is at a new QRA, and, after much heartburning, has succeeded in erecting a 50-ft. pole. 2CNC has applied for a full licence.

Alderney.—G3XN is active, with the co-operation of 2BMU, and has received a 25 watts permit.

Eire

By EI9D

It is noted that although EI4J, 5F, 6F and 9N sent in check logs for the B.E.R.U. Junior Contest apparently no EI's competed in this or in the Senior event. Accordingly one presumes that the I.R.T.S. B.E.R.U. Cup will not be awarded this year.

Malaya and Borneo

By VS1AA.

VS1AE, Penang, is now going full swing, and judging from his letters he is enjoying amateur radio immensely. 2AL also reports some good DX. 1AA is still hanging fire, as rumour has it he may be moved. He has had "tropical trouble" with his SX17, three breakdowns occurring in less than two weeks. To study tropical conditions please come to Malaya. Manufacturers kindly note.

Malta

By ZB1E

At the June meeting it was decided that meetings will be suspended during the months of July August and September, and that the first meeting will take place early in October.

Conditions during the latter part of July were very poor on all bands, and the summer static often raised the noise level to such an extent that no signal under S7 could be read. This, coupled with the hot weather, has rendered activities in general very sluggish. No reports have been received.

The exceptionally dry and hot atmosphere which has prevailed for the past six weeks has enabled ZB1E to confirm that the single-wired fed aerial loses much of its efficiency when operated against a dry ground. Comparisons were recently completed by feeding the same aerial both by Zepp. feeders and single-wire. Under "wet ground" conditions the single-wire feed was found to be much superior to the Zepp. feed, whilst under dry ground conditions the Zepp. feed gave distinctly better radiation.

The writer wishes to point out that no cards are to be expected from the ZB1J at present on the air with a T5/7 note; he is a pirate. The real ZB1J, Mr. Newman, left Malta some time ago, as stated in these notes at the time, and his call has been cancelled.

Northern India

By VU2AN

As VU2LJ is finding very little time available for radio, VU2AN has promised to function as B.E.R.U. representative until such time as he returns to G. To make these notes a success, members are asked to send a monthly postcard outlining activities to

VU2AN at Zhob Signal Section, Fort Sandeman, Baluchistan.

A 56 Mc. group has been formed with seven members in Northern India, and additional members will be made very welcome. A letter budget is in circulation and the articles show keenness and a high standard of knowledge. VU2FO's practical experience as G2DC is a great help to the group. To date members have been engaged in constructing gear, but it is hoped that all will be transmitting to regular schedules by the time these notes are in print.

At the opposite end of the scale to the above experimental activities, are the frivolous conversations of one or two VU 'phone stations. Amateurs are only too often judged on the activities of their telephony stations, and with the Rome conference due in 1942, it behoves us to confine our activities to the purposes for which we are granted our licences.

This month we say goodbye to VU2FX, who departs to take up a post as instructor to the Militia in England. The best wishes of the VU group go with him. 2LJ is concentrating on a beam for G, and from results of work past and present he should shortly be able to write a book on the subject. 2JG is also interested in the same problem, so there should be no difficulty in an Asian contact from G in the coming months. 2EU has built a three stage receiver on a chassis measuring 5 in. × 4 in. × 2 in., and calibrated it up to 70 Mc. As the valves are an SP2 and a type 19, the size must be nearly a record for non-midget valves. 2AN is active daily on the ultra-high frequencies and finds this study more interesting than rag-chewing. He makes an occasional appearance on 14 Mc.

INDEX TO DISPLAYED ADVERTISEMENTS

G2RD.—R. E. T. DABBS, "Heatherdene," The Woodfields, Sanderstead, Surrey.
G2SQ.—G. J. SHORTEN, 47 Cherry Tree Walk, West Wickham, Kent.
G2TH (ExZD4AB.)—T. F. HALL, 36 Jessica Road, Wandsworth, London, S.W.18.
G2TM.—W. P. MITCHELL, 111 Roe Lee Park, Blackburn, Lancs.
G2XC.—E. J. WILLIAMS, 34 London Road, Widley, Portsmouth, Hants.
G2YZ.—A. K. WALL, 11 Hill Crescent, Bexley, Kent.
G3AA.—T. P. SUMMERTON, 107 Wilford Lane, West Bridgford, Nottingham.
G3BA.—T. P. DOUGLAS, "Hunston," 43 New Street, Daventry, Northants.
G3ID.—A. E. TUPMAN, "Port House," 14 Brunswick Place, Dawlish, Devon.
G3KK.—H. J. GRANT, 60a Church Street, Weybridge, Surrey.
G3LB.—A. R. YATES, Civilian W.E.M., 10th Sqdn. Signals, R.A.F. Station, Dishforth, Thirsk, Yorks.
GM3NI.—D. BRUCE, 2 Eyre Crescent, Edinburgh, Scotland.
G3OX.—J. REED, 3 Hill Crescent, Hill Road, Chelmsford, Essex.
G3QL.—C. BROWN, "High Lawn," Geraldine Road, Malvern, Worcs.
G3RO.—A. M. JOHNSON, 18 Queensland Street, Edge Hill, Liverpool, 7.
G3RV.—E. M. BROWN, 1 Rectory Close, South Chingford, E.4.
G3RY.—J. E. THOMSON, 16 Coniston Road, Reddish, Stockport, Cheshire.
G3VR.—W. WILKINSON, 70 Wrose Road, Five Lane Ends, Bradford, Yorks.
G3WB.—G. R. SLAUGHTER, 34 Fairway Avenue, Gainsborough, Lincs.
GW3ZT.—G. R. HIRST, "Queenswood," Hillside, Bargoed, Glamorgan. (Also Licenced as G3ZT at Daventry.)
G4BX.—J. W. HEFFERNAN, 74 Broadway North, Walsall, Staffs.
G4DU.—A. E. HYDE, 115 High Lane East, West Hallam, Derby.
G4FA.—G. W. PARKS, "Troon," Burrill Avenue, Cosham, Hants.
GM4HB.—W. I. MUIRHEAD, "The Birks," Dalkeith, Midlothian, Scotland.
G4IJ.—E. G. DYER, 25 Annerley Road, Bournemouth, Hants.
GM4JO.—W. R. EADIE, 15 The Loaning, Whitecraigs, Renfrewshire, Scotland.
G4KH.—J. R. CROUCHER, 10 Kingsley Road, Pinner, Middlesex.
G4LI.—H. E. LE DAIN: "Erin Villa," Samares, Jersey, C.I.
GW4LN.—J. MANNING, 16 Riversdale Road, West Cross, Swansea, Glamorganshire.
G4LR.—BLYTH & DISTRICT RADIO CLUB, 32 Coomassie Road, Blyth, Northumberland.
G4LZ.—G. PETCH, 31 Kenneth Road, Brislington, Bristol, 4, Gloucestershire.
GM4MG.—J. C. BARRON, 15 Elm Place, Aberdeen, Scotland.
G4MH.—J. F. FISH, "Thornleigh," Station Road, Thornton, Blackpool, Lancs.
GM4MM.—J. M. MILLER, 91 Balshagray Avenue, Broomhill, Glasgow, W.1.
G4MN.—W. G. LEWIS, 51 Somerset Road, Edgbaston, Birmingham, 15.
GM4MQ.—A. L. FORGE, 61 Pettycur Road, Kinghorn, Fife, Scotland.
G4MS.—W. G. JOHNSON, Pinchbeck Hall, Spalding, Lincs.
G4MT.—A. F. TRINDER, 265 Oldfield Lane, Greenford, Middlesex.
G4MU.—P. W. SMITH, 67 Billing Road, Northampton.
GM4MV.—L. B. FISHER, 32 Margaret Street, Greenock, Renfrewshire, Scotland.
G4NB.—G. B. MOSS, 74 Hinckley Road, Nuneaton, Warwickshire.
G4NM.—A. H. GREENHALGH, 28 Gynsill Lane, Anstey, Leicestershire.
G4NU.—L. FRANKS, 57 Woodlands Road, Aigburth, Liverpool, 17.
G4OQ.—G. C. LIDSTONE, 18 Chalton Drive, London, N.2.
G4PA.—A. SAUNDERS, 23 Ampton Street, Gray's Inn Road, King's Cross, W.C.
GW5BI.—V. J. BARTLETT, 171 City Road, Cardiff, Glamorganshire, South Wales.
G5CV.—D. WALTERS, "Lymebury," 4 Manor Road, Harrow-on-the-Hill, Middlesex.
G5JZ.—C. W. K. SANDS, "Corona," Heathfield, Heathfield Tower, Sussex.
G5LM.—DR. A. J. H. ILES, "Southam," Private Road, Taunton, Somerset.
G5PF.—L. Frost, "Mikado," Station Road, Bognor Regis, Sussex.
G6BM.—D. W. MILNE, c/o Mrs. Philips, Greenfields Cottage, Little Sutton, Wirral, Cheshire.
G6KI.—R. W. KIDNER, 160 Franklin Road, King's Norton, Birmingham.
G6NL.—C. R. THOMAS, 77 Nicholas Road, Charlton-cum-Hardy, Manchester, Lancs.
GM6SJ.—D. MAYES, 81 Mill Road, Hamilton, Lanark, Scotland.
G6VA.—E. J. PICKARD, 42 Southam Road, Hall Green, Birmingham.
G16GW.—R. CARLISLE, 14 Hopefield Avenue, Portrush, Co. Antrim.
G8FM.—J. H. SHANKLAND, B.Sc., 27 Kew Road, Rugby, Warwickshire.
GM8KR.—C. A. L. CLACKSON, 24 Blake Street, Brucefield, Dunfermline, Scotland.
G8LZ.—E. J. BONNER, B.Sc., "Rublislaw," Pleasington, Near Blackburn, Lancs.
G8MD.—J. A. DRINKALL, 61 Glenluce Drive, Farringdon Park, Preston, Lancs.
G8TJ.—A. GARNOCK-JONES, 91 Warwick Road, London, S.W.5.
2APT.—W. LEIVERS, 9 Beardall Street, Mansfield, Nottingham.
2BXP.—W. L. PRESTIDGE, Police Station, Nimmings Road, Blackheath, Birmingham.
2BZK.—M. MORRIS, 81 London Road, Newbury, Berks.
2CCJ.—MAJOR C. A. CARKEET-JAMES, "Littleshaw," Woldingham, Surrey.
2CMN.—N. WHYVEL, 287 Haughton Road, Darlington, Co. Durham.
2CNC.—E. BANKS, 7 Royal Crescent, Don Road, St. Helier, Jersey, C.I. (This was given incorrectly in our last issue.)
2DRA.—E. P. INMAN, 27 Harlow Crescent, Harrogate, Yorks.
2FIA.—T. W. JOWETT, 550 New Hey Road, Mount, Outlane, Huddersfield, Yorks.
2FHD.—MRS. S. DYER, 25 Annerley Road, Bournemouth, Hants.
2FUW.—M. M. WILLIAMS, 17 Glanselsig Street, Blaen-y-Cwm, Treherbert, Glamorganshire, South Wales.
2FXN.—A. J. WYLIE, 41 Ferry Road, Monifieth, Angus.
2HGS.—P. V. S. DAVIES, "Stevenage," 17 King Street, Shrewsbury, Salop.
2HBB.—M. J. SIMKISS, "Kewstoke," Vicarage Road, Wollaston, Near Stourbridge.
2HCZ.—E. S. G. FISH, 52 Muir Drive, Irvine, Ayrshire, Scotland.
2HFK.—J. A. FRANCIS, 55 Stanley Road, Great Yarmouth, Norfolk.
2HFQ.—H. W. EAGLAND, 2 Lord Street, Slaithwaite, Near Huddersfield, Yorks.
2HHW.—E. BRANNAN, 3 Rhodes Terrace, Gold Street, Barnsley, Yorks.
2HIS.—R. A. JEWELL, 13 Augustus Road, Wimbledon, London, S.W.19.
2HJA.—A. W. WALKER, "The Chalet," 51 Greencourt Road, Petts Wood, Kent.
2HJP.—I. A. HENNELL, "Plorys," Princes Way, Wimbledon Park, London, S.W.19.
2HJQ.—R. H. HARRISON, "Colebrooke," 29 Merryhills Drive, Enfield, West Middlesex.
2HKB.—J. L. INSLEY, "Little Wychdale," Gunter's Lane, Bexhill-on-Sea, Sussex.
2HKS.—R. P. B. UDALL, "Gorton," Longdon, Near Rugeley, Staffs.
2HKR.—J. R. HAMILTON, "East Mountain," Kennington, Ashford, Kent.
2HKV.—W. TOZER, 15 Bramble House, Devon's Road, Bow, London, E.3.
2HLF.—R. J. LEE, 9 Theobald's Green, Heathfield, Sussex.
2HLV.—J. OAKES, 6 Gresty Terrace, Crewe, Cheshire.

British Isles Calls Heard

PY1GR (via G5BD), 7 Mc. Phone: Gw5zl, 5zz (June 2), 8nd (June 5). BERS454.

At Alexandria (May 28–June 1), 14 Mc. C.W.: G4in, 5sr, 6ux, 8tv.

At Malta (July 8–12), 14 Mc. C.W.: G3ii, 3xs, 4ad, 4au, 4br, 4dn, 4ic, 4jt, 4ot, 5dr, 6gz, 8lu, 8oa, 8ws. 14 Mc. Phone: G2fb, 2bb, 2tk, 3do, 5fo, 5tp, 5vt, 5wo, 6ux, 6wt, GW8hi, G8ny, 8tx, 8uj. 7 Mc. C.W.: G4fd, 3co. 7 Mc. Phone: G8on, 4bo. 3·5 Mc. C.W.: G4bt.

At Alexandria (July 15–24), 14 Mc. C.W.: G2km, 3bk, 4bu, GM3rl, G3fp, 3tk, 3vn, 3yb, 4as, 4hw, 5sr, 5qi, 5xw, 5yv, 6ll, 6vv, 6yr, 8gi, 8go, 8lu, 8nb, 8pl, 8tp. 14 Mc. Phone: G3bm, 3do, 5bj, GI8ts.

EDITORIAL—(*Continued from page* 74)

on each stand has been explained to those who have been invited to exhibit, and from our knowledge of those concerns who will be supporting us we feel certain that no member will be able to say afterwards that facilities for making technical inquiries were lacking.

* * *

Just as we go to press our Exhibition Manager informs us that every available foot of stand space has been reserved. Unfortunately a few prominent companies left their applications too late. To them we proffer our apologies.

J. C.

TRANSMITTER FOR THE LOWER AMATEUR FREQUENCIES—(*Continued from page* 85)

the "10 watt" position. A crystal of suitable frequency should be plugged into the holder, and the anode circuit tuned to resonance. To neutralise, remove the voltage from the P.A. anode and screen, temporarily. Then slide the neutralising condenser plate in and out until no dip is observed on a single turn bulb coupled to the C.O. coil when the P.A. anode condenser passes through resonance. The neutralisation of the 6L6 which is quite a simple matter to adjust, holds over a wide range of frequencies.

It will be found that an input of 25 watts can easily be achieved and the output for this power is very satisfactory.

As long as adjustments are carried out with a low input, no arcing will take place between the condenser vanes, even without a load on the P.A. When properly loaded, no arcing will take place, even on maximum input.

It should be borne in mind that before any modulation is attempted with this transmitter, the tuning condensers should be replaced with types giving considerably greater spacing.

It is hoped that the description of this transmitter will encourage further interest in c.w. work on the lower frequency bands, besides providing an efficient piece of apparatus for use on C.W.R. exercises.

THE 56 Mc. BAND—(*Continued from page* 115)

G5WH suggests that if such a scheme could be made *national*, longer distances would probably be covered, greater interest created, and many contacts now made by chance would become more reliable, whilst results generally obtained would soon look foolish by comparison. Please let the writer know if you would co-operate in such a scheme.

56 Mc. ACTIVITY—(*Continued from page* 119)

Calls reported to be working

G2AO, 2BI, 2DN, 2GG, 2IN, 2KI, 2MC, 2MR, 2MV, 2NH, 2UJ, 2WD, 2WS;

G3BY, 3GP, 3HW, 3OO, 3QO;

G5BY, 5CV, 5IB, 5JU, 5KH, 5MA, 5MQ, 5NC, 5RD, 5TX, 5UI, 5WH, 5WV, 5ZI;

G6FO, 6GS, 6LJ, 6LK, 6NA, 6OH, 6OT, 6OW, 6PG, 6VA, 6VX, 6WL, 6XM, 6XN, 6YL;

G8IX, 8KD, 8MG, 8NV.

DISTRICT NOTES—(*Continued from page* 130)

position, was presented by the auditors, Mr. J. Ferguson, GM6WD, and Mr. D. Niven, 2CHN.

"G" District.—Mr. D. S. Bruce, GM3NI has resigned from the position of D.O., consequent on his departure from the district. Mr. A. Anderson, GM3TD, has taken over the duties for the present. Meetings are suspended until September.

56 Mc. Calls Heard

G2ZV (June 26–July 25): 6DH (120 449), 5UI (30 557), 2AO (38 338), 6NA (30 567), 2MC. (44 447), 6XM (41 568), 5OJ (38 568), 3OO (61t Q4 R5), 6OU (68 568), 5RD (72 Q4 R3/5), 5XY (24 437), 8IX (? 458), 6GS (30 559), 2NH (40 569).

2DDD (July): 2XC (24 568), 2MV (36 579), 2MC (52 579), 2ZV (2 599), 2NH (40 568), 3OO (52 Q4 R5), 3YY (15 599), 3SU (12 599), 5TX (35 587), 5CD (52 Q5 R7), 5NF (30 559), 5XY (21 338), 5CM (17 589), 5OJ (22 568), 8OS (12 578), 6OU (39 457), 6XM (32 558), 6CW (154 588), 6LK (21 599), 5AA (34 458), 5UI (29 335/6).

EXCHANGE AND MART—(*Contd. from Back Cover*)

TUNGSRAM OQ70/1000 U.H.F. Triode. 10 volt fil, 1,200 volt unused, boxed. List 130s. Snip at 45s.—G6GH, 11 Wide Bargate, Boston.

WANTED. "Skybuddy." Must be in a reasonable condition and cheap. Cash waiting.—2BDF, 349 Copnor Road, Portsmouth.

EXCHANGE AND MART.

Advertisement Rates

MEMBERS' private advertisements 1d. per word, minimum 1s. 6d.
TRADE advertisements. One inch Semi-Display (max. 50 words), 10s., half inch (max. 25 words), 5s. TERMS: Cash with Order. All copy and payments to be sent direct to Advertisement Managers, Parrs Advertising Ltd., 121 Kingsway, London, W.C.2, by not later than the 30th of the month for the following month's issue.

EIMAC 35T. UNBOXED UNUSED. £2. 65-ft. Co-Axial Cable £2. Carr. fwd. Raytheons 59's, 57's, 2A5, 2s. Acturus 6N7, 56, 6F5, 6C5, 1s. 6d.—GM8MQ, 79 Omar Crescent, Buckhaven.

EVRIZONE SUPERHET TUNER, 5-190 metres, switched coils for R.F., Mixer, Oscillator, separate bandset and bandspread condensers with S.M. Dials. Few weeks used. Cost £4 10s., accept nearest 50s.—G6YR, 21 Chester Avenue, Southport.

FOR R.S.G.B. EXHIBITION, Sept. 21-23. Wanted two enthusiastic London members as Stand Attendants. State age and remuneration desired.—Box 108, "Parrs," 121 Kingsway, London, W.C.2.

FOR SALE. Large quantity of Transmitting apparatus including Transmitters, Cathode Ray Oscillators, Automatic Morse Transmitter, Meters.—KENNEDY, " Rushmere," Weedon Road, Northampton.

FOR SALE. 2 Jones type Preselectors. FB for " Sky Champion," and " Buddy " users. For eliminating second channel, and increasing signal strength, 25s. each, including new 7s. 6d. Tube and carriage. Year's guarantee.—G8KP, 125 Oakwood Avenue, Wakefield.

FOR SALE. Detached 3 Bedroom House. Ideal QRA 600 ft. above sea-level. 5 mins. station. 35 mins. Victoria or London Bridge. Ideal Ham Shack 18 ft. × 9 ft. sound-proof, no domestic QRM. Garage, garden for 3·5 Mc. half-wave. Freehold. £1,450, or offer.—2FUX, " Winscombe," Burgh Wood, Banstead, Surrey. Burgh Heath 421.

FOR SALE. 100 watt TX, 6F6, 756, T55, 1,000 volt Power Pack 300 mils. 70 watt mod. 4-46's P.P.P. Power supply speech Amp. and modulation Transformer perfect order, built in 6-ft. steel rack. Astatic T3 Mike, PME69, DB20 preselector. Offers wanted, complete or separate. Send stamp details.—GM3OL, " Westland," Pleasance Avenue, Dumfries.

FOR SALE. Complete Station. TX. co. fd. pa. pushpull, link coupled; six Ferranti meters incorporated, including Thermo-coupled aerial meter, also mains filter, key click filter, variable input transformer, 10, 25, 50-watts, 3 enclosed crystals, R.A.F. key; 3 power packs fully smoothed; all enclosed five stage black cabinet, detachable panels, tx fronts glass panels. RX. TRF 3 valves, aluminium chassis, with eliminator, new l.t. separate mains amplifier and speaker. Also l.t. charger, and aerial tester (Walker June 1938 Bulletin) fitted new Ferranti meter, and coils. Sacrifice £20, consider near offer, useful exchanges. Guarantee all perfect working order; inspection invited.—WARREN, 152 Bishop Road, Bristol, 7.

G3KH Closing down. Offers wanted for T40 P.A. with Tube, Comet Pro, 400-volt Power Pack, 25-watt Modulator 6L6s, shure Crystal Mike. Other bargains in gear. Send requirements, stamp for Lists.—49 Turnbull Drive, Leicester.

G5KT.—Outstanding QSL's. Trial order will convince you cannot do better. Samples. State AA, G, BRS, SWL.—33 Howard Road, Westbury Park, Bristol, 6.

G6DS.—Known the world over for quality. QSL Cards and Log Books. Send for samples. —QRA, 14 Lambley Avenue, Mapperley, Nottingham.

GM6RG Disposing of surplus, including Frank Lester 5 metre converter, complete (see QST), for operation from 250-230 50-cycle mains, new and unused, in carton, £10 15s.; complete 20-metre, 10-metre and 5-metre transmitters, all separate rack and panel jobs, and in operation now, first two any power up to 500 watts, 5-metre transmitter 120 watts, each one crystal-controlled, offers; also power supply giving any current up to 500 mils. at 1,000, 2,000 or 3,000 volts, mains input 230-270 50 cycle, another giving 600 mils. at 2,000 volts, another giving 250 mils. at 1,000 volts, another giving 120 mils. at 400 volts. 600 watt modulation transformer, and driver transformer, meters of all kinds, field-strength meter in case (see QST). R.F. and other relays of all kinds, transmitting and receiving condensers, fixed and variable, variable and fixed resistances of all powers to 500 watts, and many different values, etc.; inquiries and offers wanted.—BRYAN GROOM, " The Hollies," Galashiels, Selkirkshire.

OLDTIMER-G6MN for 1st Grade Clear Type QSL's and Log Books. Send for Samples. G, AA, BRS.—G6MN, Worksop.

" PSE UR CRD OM " but let it be a " Ham-aid." Samples from G6XT.—TILLOTSON BROTHERS, Commercial Street, Morley, Yorks.

QSL's.—250, 4s. 6d. 1,000, 9s. Post free. Samples gratis. State whether BRS, AA.—G. ATKINSON BROS., Printers, Elland.

QUALIFIED SERVICE ENGINEER requires position on Radio Maintenance (aged 22). Good percentage marks on examination papers. Had 3 years' practical experience servicing commercial sets, 13 months transmitting (G3MG). Reason for leaving present employer is to gain further experience in radio. Copies of testimonials on request. Please state wages, etc., in answering.—Advertiser: 20 Poolsbrook Road, Duckmanton, Chesterfield, Derbyshire.

TX.CO.6L6.PA. 6L6 Premier Power Pack, 500 v. 200 mils. 6·3 v. 3 amp. 7·5 v. 2 new 6L6 spares, also RX.1.V.2. Eddystone components, 5 accumulators. Worked 4 Continents. £10 lot or offer. Owner purchasing commercial job.—G3QF, 16 St. Stephens Terrace, London, S.W.8.

(Continued on previous page)

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