

# THE T. & R. BULLETIN

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## TELEPHONY STATIONS, TAKE HEED

WE often wonder whether the average amateur who uses telephony realises that his transmissions are capable of being overheard by people who have little or no knowledge of our work. During the past few weeks we have received proof that a section of the broadcast listening public are in the habit of listening to amateur transmissions, and on at least three occasions we have been told on a Monday what Bill Brown and Harry Jones were yarning about on the previous day. We think, therefore, that a word of warning should be given to our members, and a plea made to them to exercise extreme care when conducting telephony experiments. It must be remembered that the so-called "all wave set" is now being sold as a standard line by most radio manufacturers, consequently amateur transmissions can often be received more easily than those which emanate from short wave broadcast stations. Once the general public realises that they have had provided for them, without extra charge, a receiver capable of bringing in our signals, the amateur bands will become a source of unusual interest to them, and we shall be judged by the type of transmissions that are overheard.

Already the gist of some of the transmissions which have been reported to us show a lack of care on the part of those responsible. We appreciate, of course, that when using telephony many amateurs have failed to realise the possibility of eavesdropping, but now that attention has been drawn to this matter we hope that discretion will be fully exercised.

The jargon used by amateurs is frequently incomprehensible to the public, consequently some misconception of its utility may arise. As amateurs we have acquired the art of giving candid reports on our transmissions, and we are sometimes apt to express ourselves in somewhat forcible terms. Such candour is often entirely misunderstood by the public, who jump to the conclusion that a Battle Royal is in progress or a contest of wit is taking place between a pair of backchat comedians. Such conversations are listened to with rapt attention, so that the gems of speech can be retailed later as "what the amateurs say."

Whilst we agree it is essential that amateurs shall give detailed reports concerning their transmissions, we think it should be possible to do so in a clear and concise manner.

May this timely reminder not fall upon deaf ears.



# THE QUARTZ CRYSTAL BRIDGE IN TELEPHONY

By E. L. GARDINER (G6GR). \*

## Introduction.

It is probably not known to most amateurs that the Crystal Gate or Bridge is a purely British invention, having been originally patented by Dr. James Robinson in 1929. It is therefore a pity that its valuable properties were not more quickly appreciated by the British amateur, and its development left to such a large extent to various American firms who immediately saw in it a technical improvement of much value. In the years 1931 and 1932 there was much discussion concerning the degree of improvement in true selectivity, apart from mere sharpness of tuning, which could be obtained from the crystal gate; and it eventually became evident that for C.W. reception at any rate the improvement was unique. No other equally simple and stable means is known whereby an interfering carrier can be eliminated in the manner possible by correct adjustment of the balancing condenser of a well-designed crystal gate; and the true position was made definite by the admirable research of Colebrook published as an N.P.L. Report in 1932, and which leaves no doubt that in certain respects there is a decided gain over earlier methods of obtaining selectivity. It is unfortunately true that for the full benefit to be obtained from the gate exceptional stability is necessary in all parts of the receiver in which it is used, and that a few years ago this did constitute a serious problem in the design of crystal receivers for amateur use. There was and still is a natural tendency to regard the crystal gate as a luxury often overrated in value, and perhaps not worth all the trouble of stabilizing the receiver and adding extra complication to the work of receiver construction which many amateurs regard as a waste of time that might be spent better in D.X., or transmitter improvements.

It is therefore most gratifying to see an article such as that by G2IG in the August BULLETIN, in which the design of a simple and effective receiver employing the crystal is described, and its advantages and associated problems so fully appreciated; and it is hoped that he will excuse the writer from adding a few more remarks on the subject. His excuse must be that of a particularly fortunate position in this particular problem, having assisted Dr. Robinson in his research on the use of crystals in reception for most of the last seven years; and who has kindly consented to allow the publication here of a few new results of this work for the first time.

## Forms of Selectivity.

Firstly, the writer would like to stress the different forms of selectivity obtained by the three typical methods now in amateur use; and to point out that selectivity is not merely selectivity by whatever means it is achieved. In other words, the ability of a receiver to separate stations depends very much

upon the shape of its overall R.F. response curve, which in turn depends upon the method by which the selectivity is obtained. Before proceeding we must consider what interference between stations actually consists of, and consideration will show that this can be regarded as the combination of three distinct effects:—

1. The heterodyne whistle between one carrier and the other.
2. "Cross-talk" or the actual programme modulation of the unwanted station received directly.
3. "Side-band Splash," or the various effects produced by the heterodyning of the sidebands of the unwanted station with the carrier (and to a less extent the sidebands also) of the wanted station. With this can be included for the present purpose several other forms of heterodyne interference of similar nature and very small magnitude, second order effects which need not be separately considered.

The virtues of any particular selectivity response curve can be estimated sufficiently for all practical purposes by considering how it reduces these three classes of interference which can occur between the station we are listening to, referred to as the wanted station, and any other adjacent station respon-

sible for interference, referred to simply as the unwanted station. Since this discussion is confined to the superheterodyne also as being the only type of receiver into which a crystal gate can be readily introduced, the selectivity can be regarded as almost entirely confined to the I.F. circuits.

## I.F. Coupling Systems.

Considering now the three types of selective I.F. coupling mentioned by 2IG, namely, a large number of efficient tuned circuits on the one hand, secondly, the regenerative I.F. amplifier, and, thirdly, the crystal gate; in each case from the point of view not only of their practicability, but of the type of response curve obtainable. The use of a number of tuned circuits in "Cascade" has long been the favoured commercial expedient for obtaining selectivity, and is used in most commercial and communications type receivers. At one time these circuits were invariably arranged in pairs "band-pass" coupled, which merely means that a degree of coupling was used which would produce two resonant peaks a few kc. apart, and the overall curve was of the type shown as A in Fig. 1. At present it is more usual to employ single peaked circuits lined up to the same peak frequency, in which case the curve resembles that of B in Fig. 1. The effect on many such circuits in cascade is to produce a relatively flat peaked curve having relatively very steep sides, signals many kc. from resonance being extremely highly attenuated. The curve has practically no "skirts."

The Editor and Headquarters  
Staff wish all members  
A very Happy Christmas and A  
Prosperous New Year



This curve has one very important advantage not easily obtained in other ways, that of eliminating break-through from a local station of very great field strength and several channels off tune; it is thus the ideal selectivity curve for the man suffering from a 100-watt station just across the road! For high quality telephony, curve *A* is, of course, good, whilst for C.W. and amateur 'phone curve *B* is better; both retain fairly good side-band response, and therefore reasonable intelligibility. But whilst the selectivity is very good indeed for stations at least 5 kc. from the wanted station, it is not so good for the smaller separations encountered in amateur working. At, say, one kc. separation there would be very little effective selectivity at all. However, in the case of C.W. working, the use of an offset beat oscillator with the consequent well-known "single-signal" or "single side-band" effect assist the apparent selectivity a good deal. For telephony, however, the separation of stations at two or three kc. is not particularly good. Of the

circuit is stable and maintained at all times highly regenerative.

#### Telephony.

For telephony, however, things are not nearly so promising. The modulation of the wanted station has been seriously attenuated particularly in regard to its higher side-band frequencies which are responsible for intelligibility, and hence phone is both weakened and of poor quality. Moreover, the skirts of the curve bring in much interference of type (2) and some of type (3), and as for the 100-watt station round the corner—the less said the better! The fact that this curve never falls to quite zero means that it will tend to come through even at several channels off tune; from the point of view of break-through the circuit is bad. To get over this the only thing to do is to add a few other ordinary I.F. circuits, thus superimposing a curve of the *B* type on *C*, and thus cutting off the skirts, and with them both the break-through and most of the other interference. Of course there will be a few other I.F. circuits in the set doing their bit, and so conditions are never so bad as at first seems probable; but to get performance equal in all ways to the first method described, nearly as many tuned circuits are necessary, and the receiver tends to become rather a multi-circuit type improved by reaction than a type depending mainly on regeneration. Also 'phone still remains of poor quality, and to restore brilliance to the tone it is necessary to employ a correcting audio amplifier having a rising curve with frequency. This is not ideal in a regenerative receiver unless the degree of reaction is absolutely consistent, since one cannot compensate for side-band attenuation unless this is always the same. Also the correction amplifier tends to make interfering C.W. stations more noticeable unless the correction is out at such time. To sum up, therefore, the regenerative I.F. amplifier is a decided improvement for C.W. working if it can be truly stabilised, but is not so good for 'phone, in which it lags behind the multi-circuit type unless combined therewith to a considerable degree.

#### The Quartz Crystal Filter.

The crystal gate operates in essentials more on the lines of the regenerative amplifier in so much that the carrier of the wanted station is greatly increased relatively to all other received impulses. However, since the sharpness of a good crystal curve is greater than that obtainable from the vast majority of regenerative circuits with stability, the carrier discrimination is greater. Also it is obtained with complete consistency, the crystal curve being the same from one day to the next, which may or may not be true of the regenerative type. After all, it is the same old case as the crystal controlled and the self-excited transmitters in a different garb—definite stability versus problematical stability. Were this the only point in favour of the crystal, however, there would be only a mild case for its adoption. The "skirt" effects are lower, and need less circuits for their elimination whilst the controls of the crystal bridge give a moderate measure of true variable selectivity. Most important of all, however, is the peculiar distortion of the resonance curve sketched in Fig. 2, which comes about as the bridge balancing condenser is moved from the setting corresponding to a symmetrical resonance curve. Space will not allow a theoretical discussion of this effect, but the resulting curve is of the nature

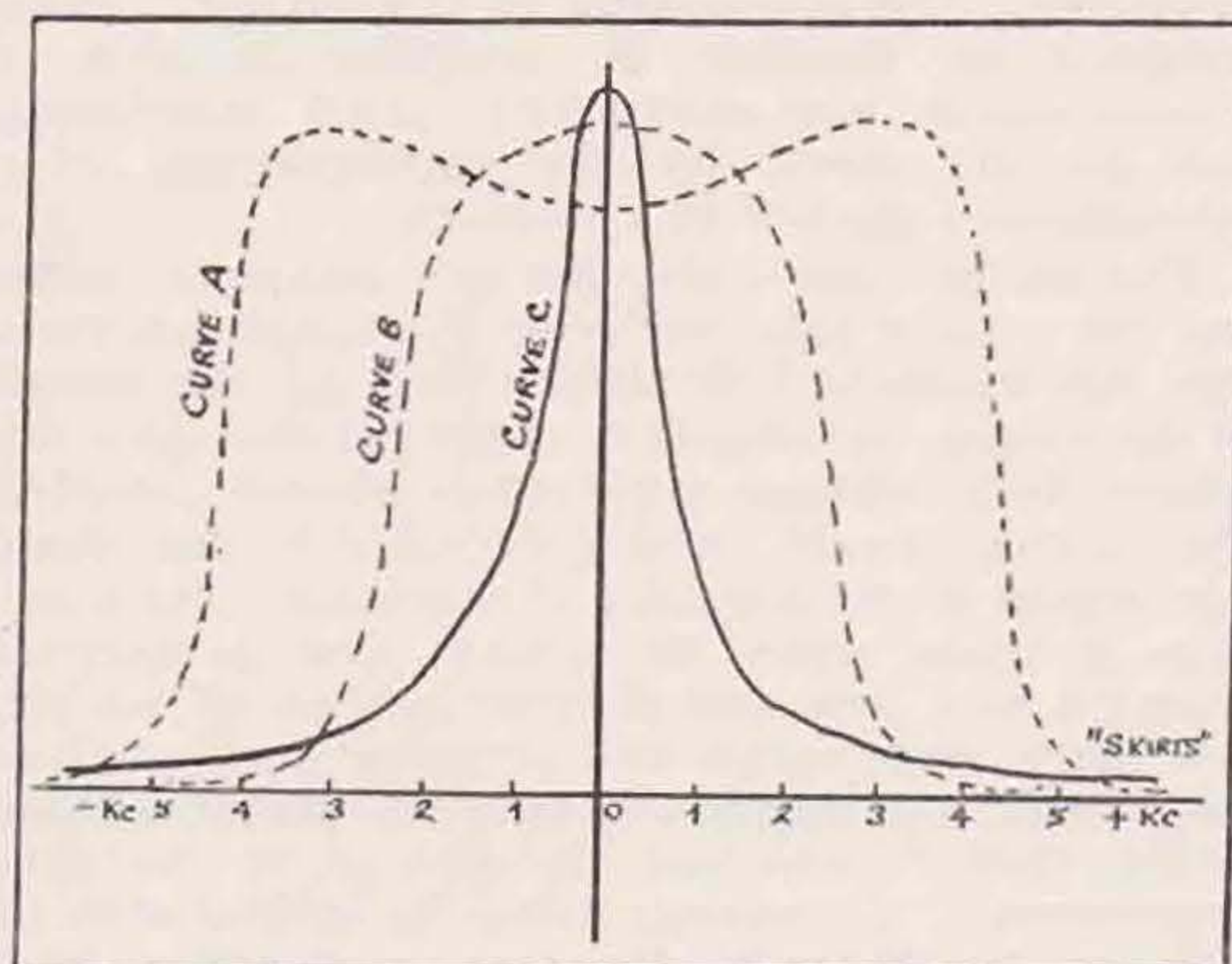


Fig. 1.

three types of interference mentioned, there is no great reduction of (1) or of (3) since the carrier of both stations is well within the response curve. The elimination of type (2) may be moderately good, depending entirely upon the actual values of the case in question. To sum up, however, this kind of selectivity curve can be made very good indeed when stations are at least a channel apart, giving complete separation of the strongest signals, but becomes much less effective as stations become nearer than about 5 kc. from each other.

Passing on now to the regenerative I.F. amplifier, and assuming this is correctly adjusted, it should give a curve due to the regenerative circuits alone similar to *C* in Fig. 1. The characteristic of this is a very high and sharp peak (not drawn to scale), and less steep sides than either *A* or *B*. In fact, for a single regenerative circuit the response at 10 or 20 kc. from resonance is still quite appreciable, the curve having considerable "skirts." How will such a curve operate in practice? Clearly interference from stations a few kc. off tune is much reduced, the unwarranted carrier is now very much weakened as consequently are its heterodyne effects thus minimising interference of types (1) and (3), whilst the wanted carrier is highly amplified owing to the sharp peak of the curve and the regenerative amplification. Thus conditions for C.W. separation are very good indeed, provided the



sketched. At a point depending upon the balancing condenser setting and which can be adjusted to any frequency on either side of resonance the response is reduced to nearly zero, a reduction of some 60 to 80 db. being quite possible, whilst at the same time the whole curve on the other side of resonance is lifted up so that the response to a side-band frequency of two or three kc. may rise some fivefold. The importance of this curve is not always appreciated—it has been said to be the simplest method known of getting a single side-band response, and in conjunction with an off-set beat oscillator can easily result in single-signal operation in which the principal interfering signal is entirely suppressed. Much has been written about the use of the crystal in this manner for C.W. reception, however, so the matter will not be further dealt with here, enough having been said about its functioning to make clear the following points on fone reception.

Ever since the value of the crystal gate in C.W. separation became obvious, research has been in progress to obtain similar benefits in telephony working. On the face of it, the crystal seems useless for this purpose, since all but the lowest frequency side-bands are so attenuated by the high selectivity that tone quality becomes useless for musical purposes and the intelligibility of phone signals very poor, although in spite of this the reduction in interference is so enormous that an overall gain in intelli-

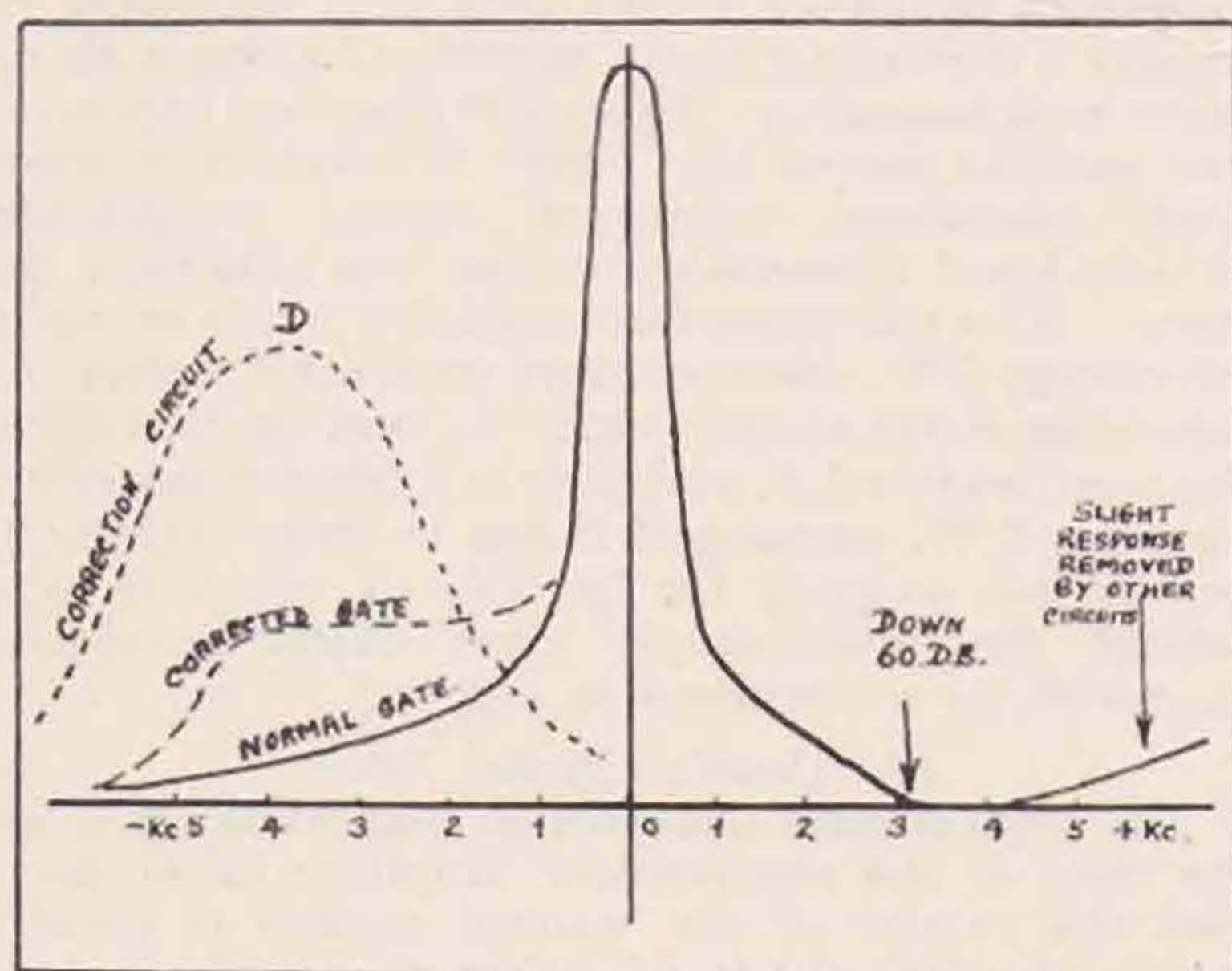


Fig. 2.

bility of otherwise scarcely readable signals results. In 1931 Robinson proposed and demonstrated that this lost tone quality could be very largely restored by the use of an audio amplifier having a sharply rising characteristic with frequency, and in the case of crystals of known properties adjusted to symmetrical resonance by means of a balancing condenser the required correction was calculated, and suitable amplifiers designed. The resulting receiver was given the commercial name of "Stenode," and gave remarkable station separation, but with the technique of that period secondary imperfections existed. Quality was largely restored, and intelligibility fully so, but there remained traces of harmonic distortion which marred the musical quality somewhat. Also in the absence of A.V.C., modern valves and automatic tuning compensation circuits the receivers were difficult to operate. A heated discussion occurred in technical circles between those who maintained that high selectivity and subsequent

audio tone correction resulted in no final advantage, and those who considered "that improved station separation actually remained after the tone correcting circuits had been applied." Eventually, and with the help of investigations by the N.P.L. and much measurement and calculation on all sides, it was established beyond doubt that whereas interference of types (1) and (2) were not affected by the system, that of class (3) was very largely eliminated, an effect which had not previously been attained by practical means. Also attention was directed for the first time as a result of this controversy to the phenomena of "demodulation" of a weak signal by a strong one, which implies that it is desirable for best selectivity to ensure that at the detector grid the wanted carrier shall be as strong as possible relative to the unwanted carrier; and that when this ratio is large selectivity is assisted by the partial demodulation of the weaker by the stronger. The crystal of course operates to bring about this big difference in carrier strengths. The phenomena of "wipe-out" unfortunately so familiar to amateurs is akin to demodulation, and shows how much interference can be cut down by the corresponding effect intentionally applied in a receiver.

The use of audio correction as a means of rendering the crystal gate workable for telephony therefore still contains difficulties which are the subject of laboratory investigation at the present time, and whilst their solution now seems almost complete, the receiver would be of a complexity that would not appeal to the majority of amateurs. The attention of those using the crystal gate is therefore directed to a new and simpler method of reaching the same goal which has recently been evolved, and which is so simple and effective that it is astonishing that it was not thought of in the early experiments. The scheme forms the subject of recent patents, but there is of course no objection to its use by amateurs for experimental purposes.

Consider the curve of the unbalanced crystal bridge in Fig. 2. It is assumed that all response much beyond 5 kc. on either side is cut off by the I.F. couplings, then there will remain an exponentially falling response to side-band frequencies on the one side of resonance, and practically zero response to all above a few hundred cycles at most on the other side—virtually a single side-band response curve except that the response to modulation is falling with frequency. Clearly the ideal curve to correct this falling reproduction is another exponential curve, such as a resonance curve, inverted. This can be done by the simple expedient of proceeding the gate by an I.F. circuit of sufficient sharpness of resonance to exhibit a similar slope, but tuned to the highest frequency it is designed to reproduce, namely, to a point *D*, which may be 5 to 8 kc. off resonance for broadcast reception, and some 2 or 3 kc. only for amateur 'phone, where intelligibility only is required. Such a resonant circuit is sketched in the dotted curve of Fig. 2, and very little consideration will show that the final curve resulting from the combination of the two is similar to that shown in short dashes—namely, a single-side band curve in which the audio response over most of the desired range is linear! There will be a sharp cut-off in the response above a certain frequency which can, however, be made as high as desired, and is therefore not undesirable, whilst there will be a



excess of base response and some phase distortion below about 100 cycles, which can be easily suppressed by a suitable base-cutting filter or the use of a small value of R.C. coupling condenser in an L.F. stage. Over the main range, however, the quality has been restored, and it is suggested that the curve is the most suitable one obtainable in any manner for amateur communication purposes.

#### *Practical Consideration.*

Considering the practical aspect of the matter, it must be realised that the stage incorporating the correcting I.F. circuit will not contribute any great amplification to the carrier, but only to the desired side-bands. It is best, therefore, to employ an additional stage at least when testing out the arrangement, and this may very well directly proceed the crystal gate and have the correcting circuit in its grid-cathode circuit where it will not be seriously damped by the valve. The coupling into this circuit should be fairly loose and preferably inductive for the same reason, since it is not very easy to get a good enough correcting circuit. The curve necessary from this will show about one-fifth response at 5 kc. off resonance, which at 450 kc. corresponds to a Q of about 300. This is only obtainable from the very best Ferrocart cored coil having a low L.C. ratio and free from external damping, and this means in practice that at 450 kc. it is unlikely that full correction will be found obtainable from a single circuit. The use of two circuits in cascade is, however, less satisfactory, since their curve is the wrong shape, and correction though present is not perfect. There is thus a very strong case indeed in this, as in all crystal gate work, to employ a lower I.F. frequency between the limits of 100 and 200 kc., 110, 125 or 175 kc. being frequencies for which components are readily obtainable. At these frequencies a circuit of more reasonable Q will give the desired correction, and measurements at 125 kc. have shown that a good low loss air-cored circuit is likely to be about right. Owing to the effects of valve damping, tuning and possible regeneration however, trial is the best method of arriving at a good working condition rather than to attempt an exact calculated design of coil. It is of course a great asset if instruments for measuring the resonant curve are available, when conditions and values to suit the set in use are soon definitely fixed. Most amateurs will not have these handy, however, and since the ear is the final criterion of an intelligible 'phone signal, it is not unreasonable to adjust the degree of correction on actual listening tests, using the lowest loss correcting circuit available and tuning it until the quality sounds most acceptable.

#### *The Most Suitable I.F.*

The hint of employing a lower I.F. frequency in crystal gate work than the usual 450 kc. is worth considering, since gains in efficiency occur at many points by so doing. The only penalty lies in an increased tendency to second channel, which should not be serious if the pre-selecting circuits are effective, and if too noticeable can be reduced to a remarkable degree by the use of a simple wave-trap of the series-acceptor type connected between grid and cathode of the first valve and tuned to the second channel frequency. The writer has found such a trap employing a coil of 16 turns  $1\frac{1}{2}$  ins. diameter wound with 24 SWG wire spaced by the wire diameter and tuned in series with a 20  $\mu$ F

condenser more effective on the 14 Mc. band than a normal pre-selector circuit, the trap being normally tuned to the centre of the second channel band. The advantages arising from a lower I.F. frequency include a better stage gain and selectivity from an amplifier of one or two stages, and much better crystal efficiency for a variety of reasons.

#### *Suitable Crystals.*

In common with 2IG it has been found that the selection of crystals for receiver work is an entirely different problem than in the case of transmission, and the design of the holder even more important. Broadly speaking, the more quartz there is in the crystal the better is it likely to operate, because a large crystal of any given shape has a lower series resistance at resonance. This implies a greater change of impedance at resonance, and hence assists a large output potential from the crystal gate with a valuable gain in receiver sensitivity. A low impedance crystal is also more easily matched to its associated circuit impedances. The second point to watch is the obvious one, that the crystal chosen shall be free from secondary resonance frequencies due to imperfect grinding or lack of uniformity in the quartz, and, unfortunately, large crystals are more likely to show this defect than small ones for obvious reasons. This requirement is vastly more exacting than in transmission work, and it is also true that the form of holder best suited to transmission is not the best for reception. Lack of "liveliness" in a crystal is more often due to slight damping in the holder than to a bad crystal, and a degree of damping inappreciable in oscillator use may render a holder very poor indeed for reception where the crystal is being required to resonate under a vastly smaller exciting energy. The crystal should be as free in the holder as possible and subject to little if any pressure, but should not be too loose, since, if so, it may become microphonic, and will give rise to noises in the receiver when the crystal is shaken or the holder disturbed. Fortunately, this problem will not greatly worry the experimenter who can try changes in his crystal mounting until it operates to his satisfaction, and can then leave it undisturbed. Commercially, however, the design of crystal and holder is considered so important that the research laboratory of one of our largest concerns has spent over a year on that apparently simple problem, and is arriving at a form of holder which will remain efficient, stable and non-microphonic under all conditions of vibration, even passing safely through the post. This problem is now virtually solved, and has resulted in a reduction of the equivalent resistance of the crystal of more than five times over that obtainable in any form of normal metal plate holder. It is believed that crystals mounted in this way will be available in the immediate future from the *Piezo Crystal Co.* for the use of amateurs, and what is probably the most fundamental difficulty in the construction of crystal gate receivers for 'phone work will then have disappeared since the sensitivity of the circuit will compare favourably with that of conventional circuits. The principal avoidable loss in signal strength has occurred in the past through unsuitable crystals and holders.

#### *A Single-Side Band Response Curve.*

In thus advocating the use of a definite single-side band response curve for amateur 'phone working



it may be argued that the quality of reproduction will suffer as a direct result of the suppression of one side band, since both are theoretically necessary for distortionless rectification by the detector. It is known that single-side band rectification gives rise to harmonic distortion, but it is also an established fact that this distortion is small for low values of modulation, but becomes large for values of modulation above about 20 per cent. Single side-band detection of deeply modulated telephony therefore results in acute distortion under normal conditions. Now it is immaterial what method is employed to obtain the single side-band response, since from the selectivity point of view the removal of one side band and with it all interference from stations on that side of the carrier must result in better station separation, however attained. By the employment of a crystal gate to get this effect, a secondary and important improvement occurs. The sharp peak at resonance due to the crystal and the shape of the overall curve sketched means that when tuned to a station the carrier response will at all times be much greater than that to any side band or modulation frequency. Thus, if a station be 100 per cent. modulated when it reaches the receiver the carrier amplitude will be increased by the crystal relative to the modulation to such an extent that the signal as presented to the second detector will be modulated by a few per cent. only a maximum of from 5 to 15 per cent. if the crystal

be a good one and the correction correct. Such a signal will be rectified without any undue distortion; the harmonics generated being negligible for intelligible 'phone purposes, and slight even for music, where it can be further reduced to any desired extent by still further reducing the modulation at the detector grid. The operation of the crystal may be regarded as that of boosting the carrier relative to the modulation, and thus removing one of the main defects of the single side-band reception of deeply modulated signals. In this respect it is an improvement over earlier methods in which such devices as a synchronised local oscillator to provide the extra carrier was used, and whilst commercially possible for point-to-point services, were far too complex to be justified in amateur working. So many unique possibilities are opened up by the use of the crystal in circuits designed expressly for 'phone operation that it would seem a fruitful field of work for the amateur interested particularly in reception, and one so far almost entirely neglected. No mention has been made of the many other applications which can be envisaged for the sharp and stable resonance curve of the crystal, its use for automatic tuning circuits, the amplification of A.V.C., the provision of a sharp and ample bias to provide inter-station noise suppression or to operate station tuning indicators, which are typical of the many circuit refinements that can be improved through the use of quartz crystals.

## Vibratory Transformers

By H. E. GUINNESS (VQ4SNA).

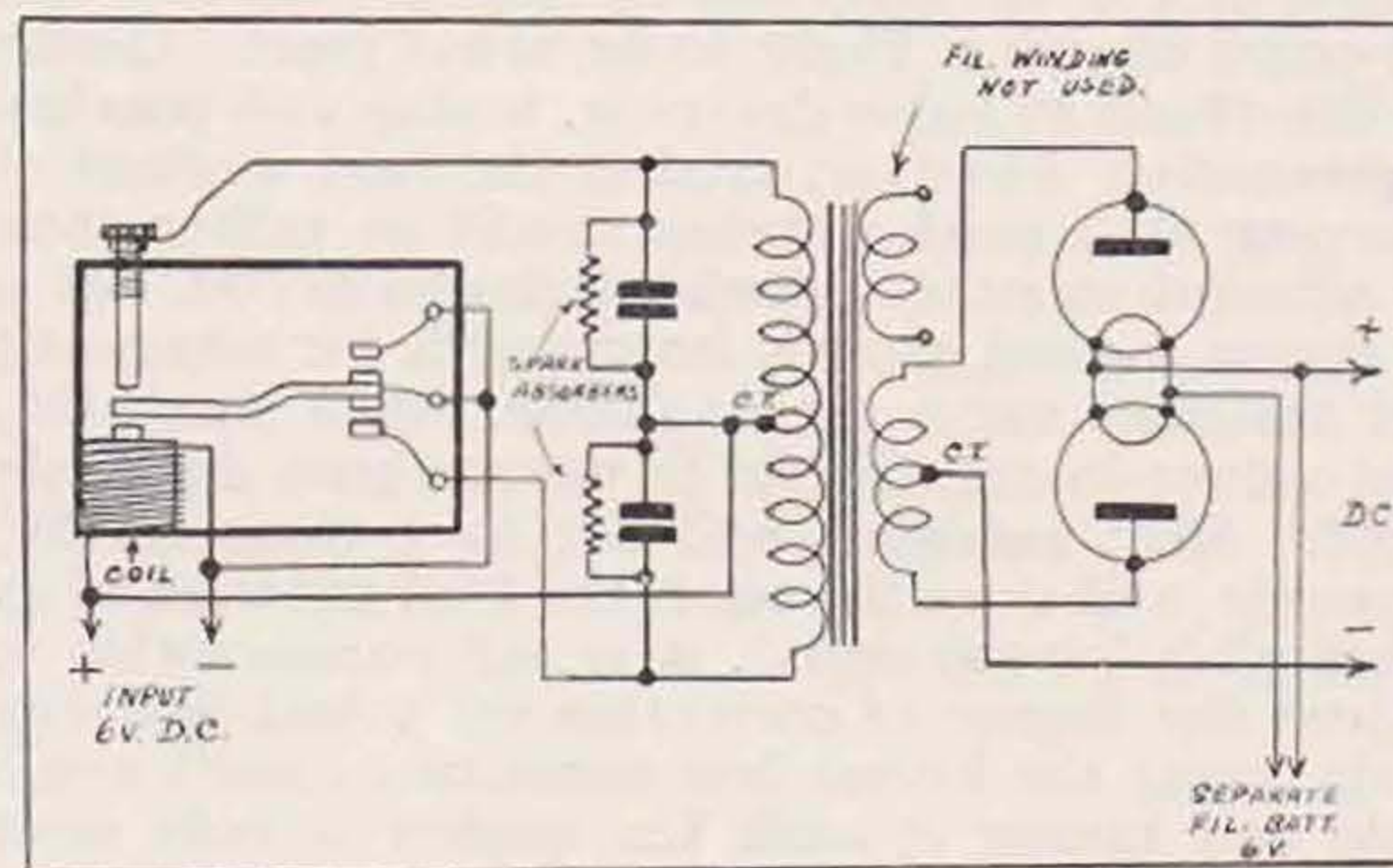
LIVING on an up-country farm in Kenya, the writer found it a matter of not inconsiderable difficulty to generate sufficient power for his transmitter. An expensive dynamo and engine were out of the question, but the problem was eventually solved by the use of a vibratory transformer. It is felt that a brief description of the experiments may be of use to any other member placed in a similar position.

The idea is, of course, by means of a vibrator, to chop up the low-voltage D.C. from a 6-volt car battery and feed it into the primary of a step-up mains type of transformer, causing a high voltage A.C. to flow in the secondary, which, when rectified and smoothed, can be used as H.T. D.C. plate current for the transmitter. This all sounds simple enough, but the difficulty is to build up a vibrator unit that will run smoothly and steadily, and pass sufficient current.

The first attempt was to use a Ford coil off an old T model. Results were certainly obtained from it, but unfortunately the coil generated such a high voltage that instead of giving nicely rectified D.C. it merely sparked across the electrodes of the rectifying valves. An old electric bell was next tried, but it was not possible to get sufficient current to flow. Eventually, with the advice and co-operation of the "brainy one" of the gang, a two-phase vibrator was built up, and expectations were fulfilled, results on the whole being very good.

Under test with an input of 6 volts 6 amps. full output was obtained from the transformer in the region of 10 watts, and it was found that there was no sign of any buzz on the transmitter's note. This seemed so satisfactory that 'phone with grid

bias modulation was tried, and results were very much above expectations. As long as the vibrator ran regularly, excellent 'phone was possible and the buzzer was hardly audible, but, of course, if it started to run erratically distortion resulted. The transmitter, incidentally, was a C.O.-P.A. with DE5B and LS5B valves.



With no "bleeder" in the circuit the smoothing condensers become charged up very highly, and the author therefore offers a word of caution to beware of shocks. He knows, because he has had some!

## Reports to the I.F.S.

Mr. F. de Burgh Whyte, E18G, asks us to mention that English stamps are invalid in the Irish Free State. He points out that many amateurs send reports to I.F.S. stations enclosing a stamp for reply, and whilst many of these reports come from non-members a proportion are from our B.R.S. and A.A. stations.



# THE DEVELOPMENT OF THE ALL-WAVE RECEIVER\*

By R. G. CLARK.

It not infrequently occurs during the growth of an applied science that, though the science may be reasonably well-founded and its principles understood, an extension of scope results in enormous deviations from the obvious course of development and very often that same obvious course subsequently proves to be the correct one. None will deny that an advanced S.W. receiver is one of the most important tools in the amateur's kit, and the development of sensitive S.W. receivers is a case in point. It is somewhat illuminating to examine our progress from the varied and, in many cases, somewhat freakish circuits of a few years ago, to the rapidly standardising and generally satisfactory types of the present time. By this means we should be able to profit by our experience and possibly improve our methods, to the benefit of future development.

Certain valuable developments have resulted from the demands made on commercial broadcast receiver designs. But for this demand, we should be unable to produce, as cheaply as we now can, ganged variable condensers of almost any desired accuracy. One company known to the author has made for a number of years variable condensers for use with high quality inductances in which the ganging tolerance permitted is only 0.4 per cent. When one considers the manufacture of hundreds of thousands of such units, it will be realised that this part of the art is fairly well understood.

The design and testing of radio frequency inductances, switches, and, more important, insulating materials has received much stimulus from the same quarter and the demand for popular priced receivers of high performance has resulted in the development of valves with conversion conductances of a relatively high order.

## *The "Standard Signal Generator."*

Undoubtedly, the most important advance of the past decade has been the introduction of the Standard Signal Generator, and with it the substitution of the quantitative for the qualitative in the evaluation of the more important characteristics of receiver performance. A signal is undoubtedly the best material on which to test a receiver, but it is one thing to claim, say, "Rio thumping in on six feet of wire at 22 hours"—one might add in parenthesis, sunspots and quarter of moon favourable—and quite another to have in the laboratory an instrument capable of producing reliably a signal of any desired strength, however great or small, which may be modulated and varied at will and which is always to be had on demand. It requires only simple arithmetic to work out what a receiver *ought* to do, but unless we know exactly what it *does*, we are really no nearer, because even the higher flights of mathematics will not put an exact interpretation on such a statement as that quoted above. Reliable S.W.

signal generators have not been available as long as the broadcast and lower frequency types, but their introduction corresponded exactly with the production of receivers which might be treated seriously for S.W. work.

## *Noise.*

Experience of the design of S.W. receivers on a commercial basis leads one to pursue the subject from the standpoint of noise. We have long been able to produce what may be quite fairly termed enormous amplifications with the aid of thermionic devices, but these degrees of amplification have not always been readily controllable or even useful. However, recent studies of noise have gone some way to improving the position.

The noise which appears along with the signal at the output of a receiver is partly contributed by the receiver itself and partly extraneous. Dealing first with internal noise, this is due primarily to:—

- (a) Thermal agitation;
- (b) Cathode noise;

and (c) Anode current supply noise, by which is meant sporadic disturbance, not hum.

Noise due to thermal agitation, that is to say electronic activity in the conducting material is practically insuperable, but is fortunately masked by the other effects. For any given set of constants, the thermal agitation voltage is proportional to the square root of the impedance across which it appears and for various well-known reasons we are unable to attain in practice very high impedances when working at the higher frequencies. In a well designed receiver in which all noise has been reduced to a minimum, we may find that thermal agitation noise is about one-tenth of the total internal noise present at maximum sensitivity, but there is more than a remote possibility that future thermionic development may cause this to become the real limitation in receiver sensitivity, and unless there are very radical changes in technique, it will be a *real* limitation, because, whilst we can play with circuits, we can't alter physics!

The mechanism of ordinary valve noise, primarily due to the first valve in the receiver in most cases, is well known, in that it is brought about by working at such low signal levels that the charge due to the arrival of discrete electrons at the anode becomes audible, many such impulses combining to make the familiar rushing sound. Although the noise is produced at the anode of the valve, it is usual to refer to it in relation to the grid input, expressing it in the equivalent microvolts ( $\mu V$ ) input at which a standard signal derived from a generator would maintain a standard output of 50 mW at 400  $\sim$ , the noise output being distributed over the audible spectrum, and the R.M.S. value of its voltage is used to compute the output.

That is to say, we compare the noise generated to a standard signal input. This level is arbitrary, of course, and some designers prefer to work to a noise level of 10 per cent. of standard output,

\*A lecture given to the London membership on September 25, 1936.



i.e., 5 mW, but for communication purposes the 50 mW level is not too high.

The noise is measured in this way, since we are only interested in knowing how small a signal can be handled at the input of the receiver.

The following main factors influence the apparent noisiness of a valve:—

- (1) Slope ;
- (2) Anode current ;
- (3) Emitting material of the cathode ;
- (4) Working voltages ;
- (5) Leakages.

In practice, the first two only are found to vary appreciably, the others being well under control, and for any class of valve we have—

$$\text{Noise} = k \sqrt{ia/S}.$$

where  $k$  = constant,

$ia$  = "static" or mean anode current.

$S$  = slope.

In any one class of valve, the equivalent noise thus derived will be found to fall between quite narrow limits, so we know well enough what to expect.

#### *Normal Noise Level.*

In order to get some idea of real values it is as well to quote actual figures at this point. Many superhets have the converter as the first valve and a valve like the octode, which falls in the general type, "electron-coupled pentagrid," will be found to have an equivalent noise level of the order of 5 micro-volts at broadcast frequencies. A word of warning must be interpolated here—some of these noise figures will seem at first sight rather bad, but it is well to recollect that they refer to the input at the grid of the valve, and as the actual voltage at the aerial terminal is developed over a relatively low impedance, considerable step-up is obtained in the tuned coupling between aerial and control grid, up to about 10 times.

Unfortunately, on going from medium to short waves, conversion conductance (which is the "slope" of a converter) is appreciably diminished, partly due to the difficulty of generating sufficient local oscillator voltage and partly, in the case of pentagrids, due to an electric induction effect, which has not, as commonly supposed, anything to do with the interelectrode capacities of the valve. It is due to the fact that the space charge below grid 4 is modulated by the local oscillator, and excites grid 4, in antiphase to the normal modulation, resulting in demodulation of the anode stream and consequent loss of conversion.

On referring to the simple expression for noise which is quoted, we observe that loss of slope is tantamount to an increase in noise, and instead of an equivalent noise level of 5  $\mu$ V, we may have to contend with a level of 10-20  $\mu$ V.

#### *Other Convertors.*

The use of separately excited pentodes or hexodes offers some advantage. The principal defect of the pentode with suppressor injection is that its anode impedance tends to become rather low in relation to an I.F. circuit. On the other hand, the addition of the second screen or fourth grid raises the high tension consumption appreciably, so that the best course usually is to use a hexode in mains-driven receivers and a carefully designed pentode for battery work where H.T. consumption is an important consideration. Both of these courses are superior to the use of a pentagrid

with a booster oscillator in parallel with grids 1 and 2, as is sometimes advocated, since whilst ensuring adequate oscillation, this does nothing to alleviate the induction effect referred to.

Hexodes suffer from a very interesting defect known as transit-time effect, for which, fortunately, a simple cure is available, but the mechanism of it merits description, and is briefly as follows: In order to obtain a high conversion slope with a minimum of anode current (thus keeping down noise) very deep modulation of the anode stream is necessary on the part of grid 3, the anode stream being shut down periodically, although the accelerative action of the screen (G2) remains. Depending on the electrode spacing and the local oscillation frequency (and consequently the rate of change of voltage on G3) electrons are driven back past G2 in the direction of the cathode, tending to produce grid current at G1. Now the interesting part of the phenomenon is that, if this process is critically examined with a precise knowledge of electron velocities, electrode fields, etc., we are forced to the conclusion that the electron cannot be forced back with sufficient velocity to overcome the small negative bias of G1 by a single reversal of direction, but that it oscillates in the G2 region in sympathy with the local oscillation, and at the conclusion of several cycles overcomes the bias of G1 and causes grid current. For this reason it is usual to operate hexodes on short waves with a bias of about —3 volts, which is sufficient to prevent the effect.

#### *Noise in R.F. Stages.*

At the present time it is quite standard practice to employ one or more H.F. stages with the sole purpose of improving the noise ratio of a receiver, and in the light of the foregoing argument it is interesting to examine the position to ascertain how far it is necessary to go with pre-converter amplification. The equivalent noise level of an R.F. screened pentode, for example, is of the order of 1  $\mu$ V, which is about five times as good as the converter at normal frequencies, and since the slope of a plain amplifier is virtually unaffected by the operating frequency within wide limits, the equivalent noise level on the higher frequencies is of the order of 20 times better. Stage gains of the order of 20 are quite practical over the high frequency spectrum, but a great deal more than this is not to be expected with convenience or without going to exceptional measures, which are hardly justified. Therefore, one stage of R.F. amplification will result in an average noise level in the R.F. tube about equal to that in the converter, but recollecting that the gain varies considerably over the working wave-band, the converter may still make more noise at the low frequency end, especially as the converter itself (due to the oscillator) usually falls off also in the same direction. To obtain really satisfactory results over all the bands and really to keep clear of the converter noise, a minimum of two stages should be used, as indeed is standard practice in one or two high-grade commercial receivers, such as the *National H.R.O.*

It is still commonly supposed that the use of two or more fully tuned stages giving appreciable amplification at the high frequencies, is a difficult process. This is not really the case, and much greater amplifications than are commonly required



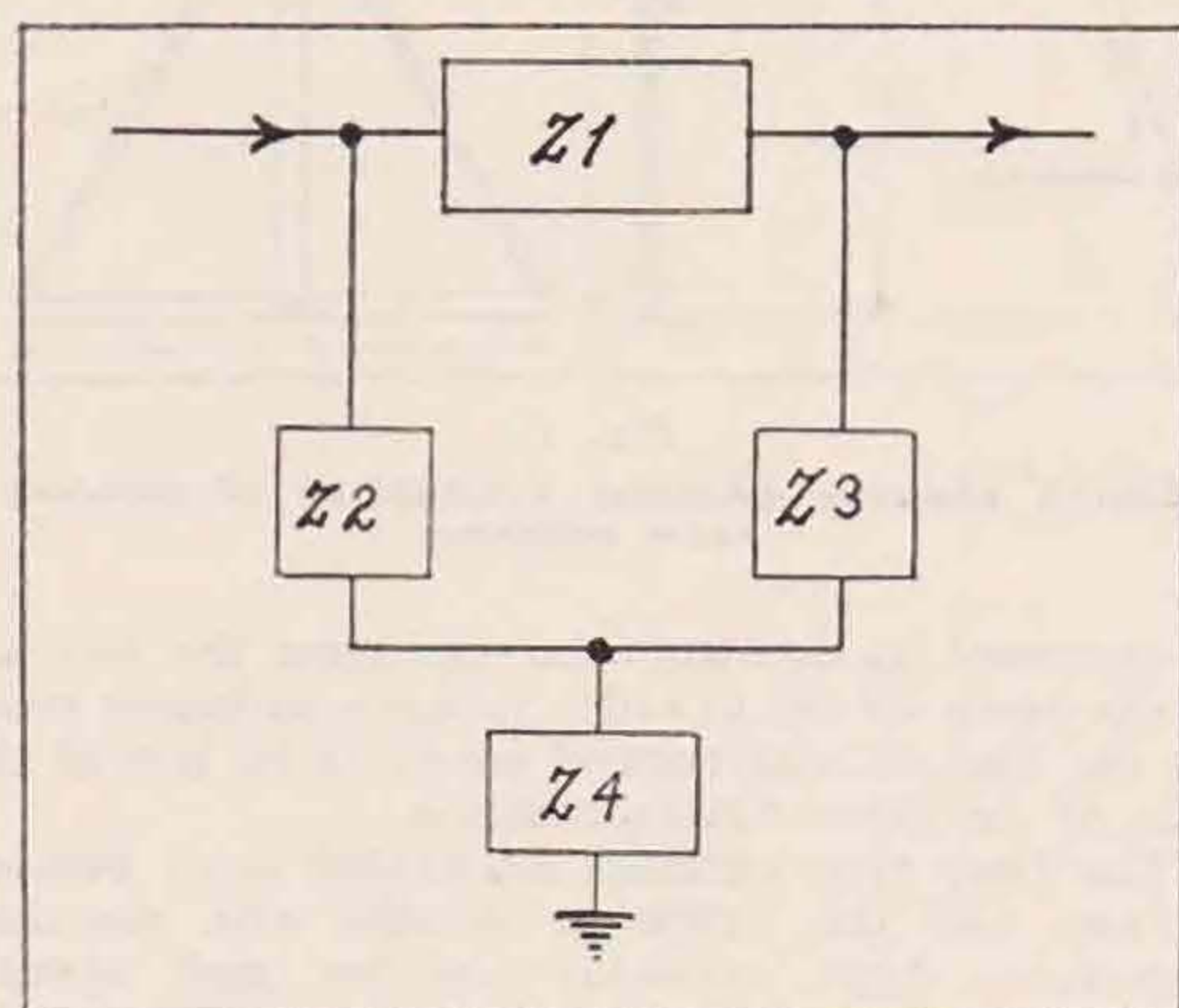
are readily feasible. For example, we have constructed in the laboratory a 3-stage amplifier giving a gain of approximately 80 decibels, that is to say, 10,000 times, at a frequency of 20 megacycles, this using entirely normal tubes, and careful construction, taking account of the principal pitfalls.

Most people fully appreciate the importance of anode-grid capacity in screened amplifier valves, and all necessary precautions are taken to ensure that the low capacity obtained by the designer of the valve is not rendered valueless by bad layout or construction. On the other hand, and although the matter has been referred to very frequently, it is not always appreciated how very vital is common earth impedance between the input and output of one stage, or worse still, several stages. This may be due to the fact that it is not realised to what extremely small dimensions this impedance must be reduced in order that the resultant coupling may compare even with the coupling due to anode grid capacity. There is a very simple form of A.C. network which has various amplifications in laboratory work, which gives an excellent illustration of this point. It is made up of four impedances, as shown, and these are related in exactly the same way in the equivalent network of a screened amplifier stage in which  $Z_1$  represents the reactance due to  $C_{ag}$ ;  $Z_2$  and  $Z_3$  the impedance due to the tuned circuits in parallel with the input and output electrodes of the valve, and  $Z_4$  representing the impedance due to common current paths in the screening, inadequate by-pass condensers, etc. For the condition  $Z_1 \gg Z_2, Z_3 \gg Z_4$ , which obtains in this case, and taking account of both phase and magnitude, we have the relation—

$$Z_1 Z_4 + Z_2 Z_3 = 0.$$

In other words, the same amount of energy will be transferred, due to  $Z_4$  as to  $Z_1$  for the case—

$$Z_4 = Z_2 Z_3 / Z_1.$$



Substituting reasonable values for  $Z_1, Z_2$  and  $Z_3$ , such as  $Z_2 = Z_3 = 10,000$  ohms and for  $Z_1$   $10^7$  ohms, we obtain for  $Z_4$  a value of 10 ohms. This may sound perfectly safe, but it is essential to recollect that this refers to an impedance and not a resistance, and at the frequencies with which we are concerned, an unnecessarily long cathode connection to earth or a cathode by-pass condenser not primarily designed for operation at H.F., and, therefore,

having a very small residual inductance, may well have an impedance far exceeding this figure. By reasonable care it is, however, readily possible to stabilize individual stages, but infinitesimal impedances common to two or three stages may render an amplifier entirely unmanageable.

#### High Intermediate Frequencies.

Although it only indirectly affects the matter of noise, the choice of intermediate frequency in superhets, primarily intended for short-wave operation has received rather scanty attention. The difficulty mentioned previously that converters suffer appreciable loss of slope with increasing frequency, is greatest when low intermediate frequencies are in use. The improvement on going from 125 to 475 kc. is well-known. With our present knowledge of low loss technique, there is no difficulty in designing an I.F. amplifier to operate at 1.5 to 2 Mc., giving entirely adequate selectivity with about 8 tuned circuits. As it is usual to employ only two intermediate frequency amplifier valves, these circuits may be very conveniently arranged as follows:—

A 2-circuit filter of conventional type.

Between the amplifier valves, a symmetrical 4-circuit filter.

Another normal 2-circuit filter as termination.

There is another advantage in the choice of this frequency band, and that is that under practically all conditions of the transmitting medium it is the band in which the lowest propagation obtains, and in view of the difficulty of rendering the tuned input amplifiers sufficiently selective entirely to exclude all I.F. disturbances, this factor is useful in very sensitive receivers. For amateur use, of course, a frequency should be chosen which will not result in "chirrup" due to the I.F. harmonics on each of the normal amateur bands, but this is quite readily arranged, since the bands themselves form approximately a harmonic sequence.

#### External Noise.

Having by the means already enumerated, produced a receiver with the lowest possible internal noise level and highest sensitivity consistent with our existing knowledge, the development of circuits capable of excluding certain types of externally generated disturbances is an obvious step. These circuits, which all employ the same basic principle, i.e., that of shutting down a part of the amplifier for the duration of the transient disturbances, can be made to operate with a fair amount of success. With the best of them it is possible to operate at sensitivities about ten times as great as those possible without any such aid, and in many cases this is a very well worth while improvement. There is no difficulty in the application of these methods with the exception of the obvious one that the time constants of all the quenching circuits must be made extremely short because the interference generates the quenching impulse which subsequently cuts it off, and in this factor lies the limitation of these systems.

It is not at present clear whether such systems are capable of much further development—it is probable that a great deal more is not to be obtained, and, although there have been many failures in the past, it is to be hoped that a basically sounder method will be evolved in the future.



# A 56 Mc. ROTATING BEAM ANTENNA

By R. PALMER (G5PP).

THE exceedingly useful five-metre rotating beam antenna, described in this article, was designed by the author to enable signals to be transmitted in any desired direction, without the necessity of a visit to the garden to move an array, every time a change of direction in the transmitted wave was required.

At the author's station, it was convenient to erect the system over a water tank, which made an excellent base, apart from the fact that the antenna was raised out of the field of a number of nearby objects likely to have a screening effect.

The antenna is supported on two wooden frames, the outer one acting as a stand taking the sockets on which the inner frame carrying the actual antenna and reflector revolves. The outer frame is so constructed that the radiators are one quarter wave above ground, or the object on which the antenna stands.

## Construction.

The actual construction of the antenna is very simple, and can be seen by reference to the drawings and photograph. Rotation through an angle of  $360^\circ$  is obtained by means of a continuous cord, wound three times round the centre spindle of the inner frame and taken into the shack. It is necessary to bring these cords off the frame at a right angle.

If the antenna cannot be erected with the base of the inner frame on a level with the control point, then the cords should be run over a smooth object, near the antenna at a horizontal, before being

brought into the station. The best way to do this is to drill a  $\frac{3}{8}$ -inch hole in the outer frame opposite the base of the centre spindle, and take the cords through this.

The copper tube aerial and reflector are cut to individual requirements, according to the frequency to be used, the reflector being placed one quarter wave behind the radiator. In fitting the aerial and reflector to the inner frame, it is essential that they

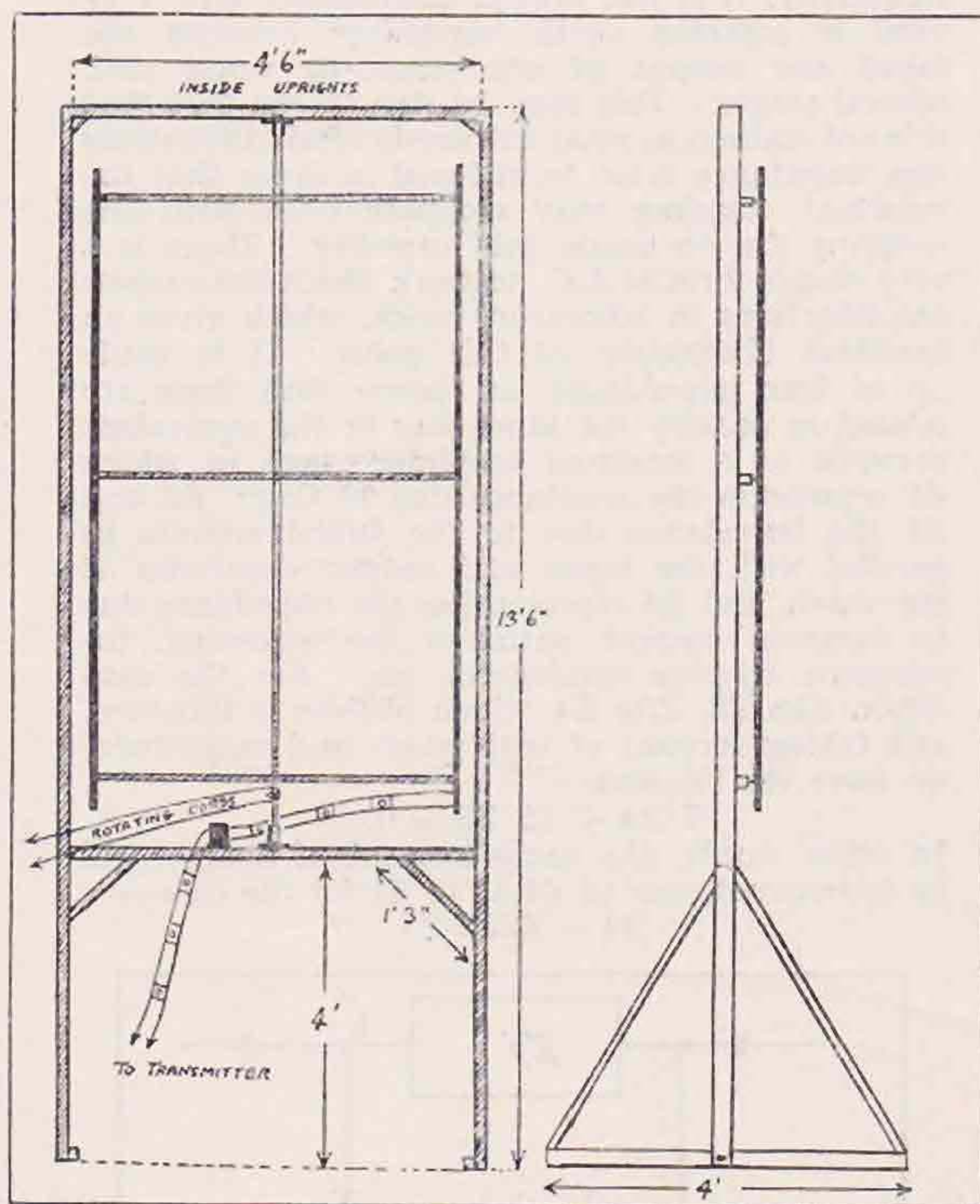
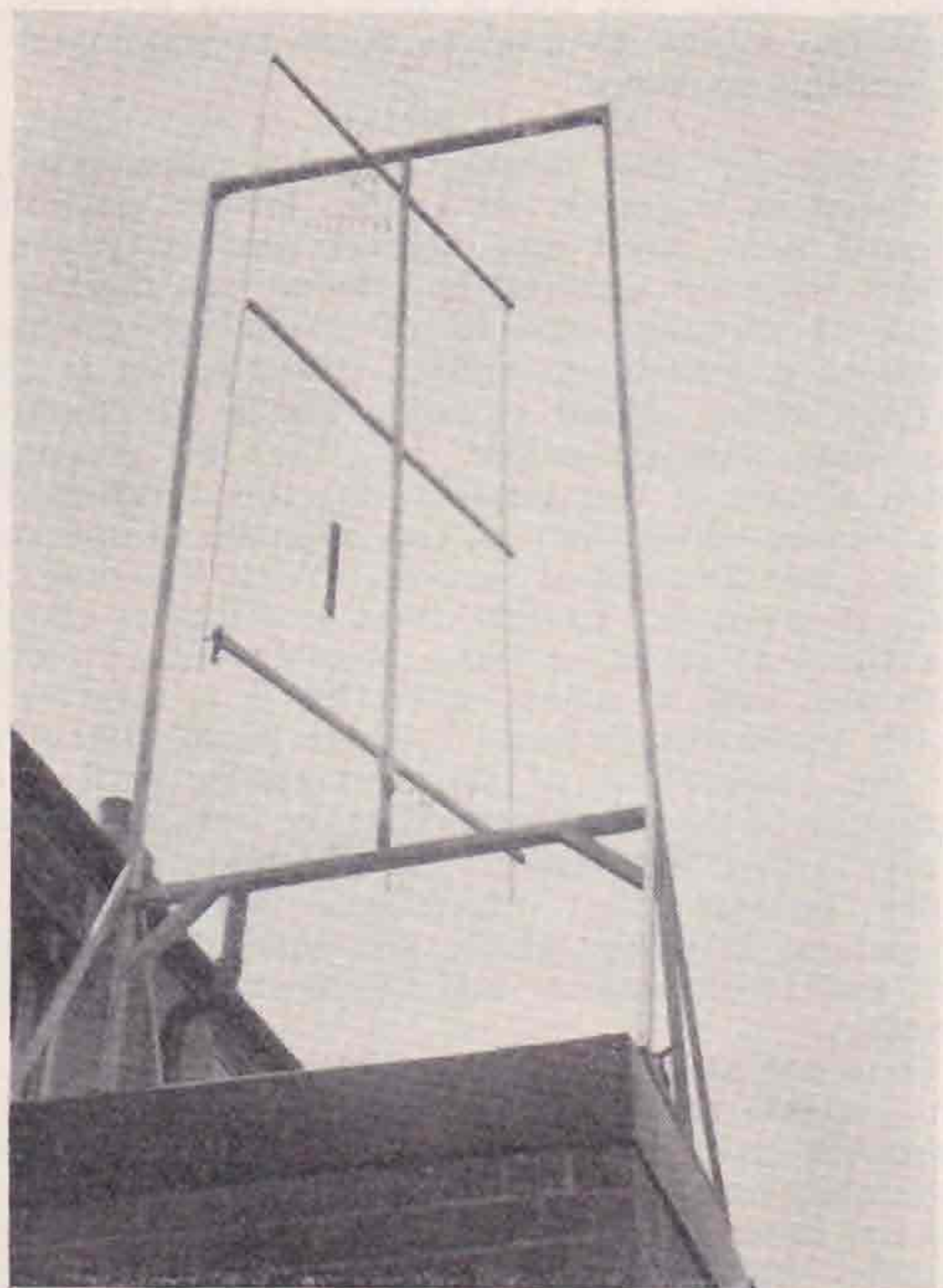


Fig. 1.

Sketch showing physical dimensions of rotating beam antenna.



be mounted, so that the tubes just clear the top bar of the outer frame, in order to leave sufficient room for the feeders, and control cords, to be free of the base of the tubes during rotation.

The Zepp type antenna illustrated is at present in use, but the single or double wire matched impedance type antennas can be used equally successfully, particularly as the feeder lines of the matched impedance aerial gives less trouble than the Zepp type during rotation.

If the Zepp type aerial is used, the feeder line should be taken and fixed to a small block, screwed to the bottom bar of the outer frame, at a point nine inches from the centre spindle, before being carried on to the radiator. If fixed in this way, no trouble will be experienced during rotation.

Perhaps a few words of explanation of the



construction of the pin at socket axis on which the antenna revolves would be of assistance to intended constructors.

That, at the top of the frame is made from one plate as A, and one as B, and one 2 in. by 5/16 in. hexagon head bolt with two nuts. A hole is first gouged into the top bar, deep enough to take the head of the bolt. The bolt is fixed to the outer frame by first passing it through the plate A, then screwing the plate to the frame with the bolt head in the hole gouged in the bar. The plate B is then locked on the bolt by means of the two nuts, after which the wooden spindle is inserted in this plate and fixed by means of two small screws in each side.

The pin and socket at the base is made in similar manner, except that the head is sawn off the bolt in this case, leaving just a pin inserted into the bottom bar the whole weight of the revolving section being on the head of the bolt at the top of the frame.

#### Practical Application.

With the help of a single fixed receiving station and using this type of antenna, it is possible to carry out considerable experimental work, in field strength, measurements, checking radiation lobes, etc., whereas normally one would move the measuring apparatus round the antenna; in this case a rotation of the aerial a few degrees each time would give the same effect as moving the receiver, with the advantage that the conditions between the transmitter and receiver are always the same, this being impossible where one has to move the location of the measuring apparatus every time a reading is made.

Tests of this nature can therefore be carried out during the winter months, when outdoor activities are curtailed by the weather.

During recent tests from this station with a low power transmitter, members of the Coventry Amateur Radio Society, with a two-valve quench receiver at the National Field Day site, about six miles away, were receiving signals at such strength that telephony was 100 per cent. readable fourteen yards from a pair of headphones laying in the open field.

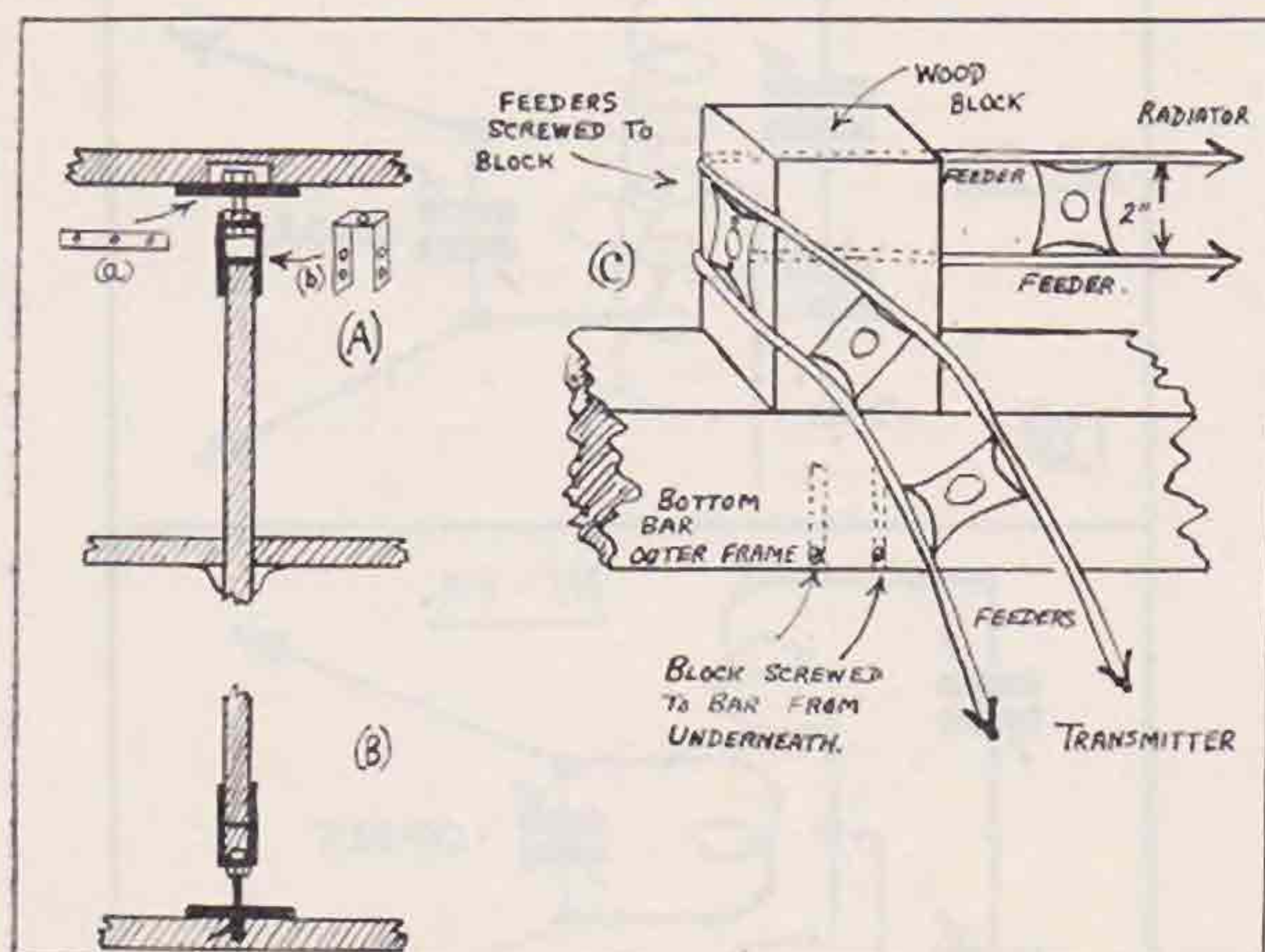


Fig. 2.

Sketch showing construction of the pin at socket axis. The dimensions of the plate A and U-piece B are given in the Appendix.

In conclusion, the author wishes to express his thanks to the members of the Coventry Amateur Radio Society for assistance rendered in testing this antenna.

#### Appendix

##### MATERIALS REQUIRED FOR ROTATION ANTENNA.

##### Timber. For Outer Frame.

- 2 off 13' 6" × 2" × 1".
- 2 " 4' 6" × 2" × 1½".
- 2 " 4' 0" × 2" × 1½".
- 4 " 5' 0" × 1" × 1".
- 2 " 1' 3" × 2" × 1½".

##### Timber. For Inner Frame.

- 1 off 9' 0" × 1" × 1".
- 3 " 4' 3½" × 1" × 1".

- 4 Angle Blocks. Triangular, four inch sides.

##### Miscellaneous Details.

- 2. Metal Plates, 4" × 1" × ⅛". (Plate A)
- 2 " " for U plates, 9" × 1" × ⅛" (Plate B).

- 2. Bright steel hexagon head bolts, 2" × 5/16", with 4 nuts.

Quantity of 3" × 10, 1½" × 10, and ¾" × 6 screws.

##### Aerial, etc.

- 2. Lengths copper tubing, 8' 7" × 5/16".

- 6. Midget stand-off insulators.

Insulated flexible wire for feeders, according to length required.

## CORRESPONDENCE

### OUR FISTS

To the Editor, T. & R. BULLETIN.

DEAR SIR,—I wish to attract the attention of the key-pounding fraternity to an available object-lesson that affords helpful opportunity for self-analysis and improvement in code work. In brief, I suggest a comparison of our fists and operating styles with the tape transmission used at a number of commercial stations.

We commonly think of tape transmitters only in connection with the automatic reception of meaningless high-speed blurs, far removed from the world of amateur radio. Some stations are not like that, they send intelligent stuff, at amateur speeds, used for the normal operation of the station.

May I here assert with emphasis that I am not suggesting the general adoption of automatic transmissions, but what I do believe is that all of us can take a lesson from the machine. Beautiful stuff, it sets a standard on which to work.

Anyone who will study the effortless perfection of these transmissions and endeavour to emulate them will make a better operator of himself. The real proof of its excellence comes when the copying operator realises that, although the speed is easily within his capabilities, his pencil has been gliding along at a good, fast clip, and that in the course of five minutes at twenty-two words a minute he has actually copied a hundred and ten words.—Yours faithfully,

R. B. Wood (ZU6V).

### Reports Wanted

G8DK (Birmingham).—On his 1.7, 7 and 14 Mc. 'phone and c.w. transmissions.



## Further Notes on the W3EDP Aerial

By G. McL. WILFORD (G2WD).

IN the February, 1936, issue of the BULLETIN a description was given of the W3EDP antenna, but two or three points were omitted which may account for certain members who have tried it not obtaining satisfactory results. The author has received some additional data from the designer, which is now passed on at his request for the benefit of members.

In the previous article no mention was made of the capacity of the tuning condenser which is in parallel with the antenna coil. The value suggested is 250  $\mu\mu\text{F}$ . Coupling coil sizes were also omitted, and these are as follows:—

3.5 Mc.: 21 turns 14 or 16 swg. enamel, 2 ins. diam. (turns spaced wire diam.).

7 Mc.: 7 turns, ditto.

14 Mc.: 5 turns, ditto.

28 Mc.: 3 turns, 14 or 16 swg. enamel, 2 ins. diam. (spaced about  $\frac{1}{2}$  in. between turns).

In answer to the writer's query regarding the omni-directional properties of the system, W3EDP states that using an "east-west" top, he has made W.A.C. and W.B.E. several times, and has worked 90 countries in 32 zones.

Quoting from W3EDP'S letter on the antenna, he says:—

"The first important factor to remember is that the counterpoise, not the antenna, is connected to the side of the antenna coil nearest the P.A. coil, or conversely the antenna is connected to the cold side of the antenna coil."

The 84-ft. length is measured from one side of the pick-up coil and the counterpoise length from the other side. It is extremely important that "low C" prevails in the tuned aerial circuit. At W3EDP, operating on any band, the rotor plates are almost all out when the aerial circuit is tuned to resonance.

The lengths of the counterpoise vary for different frequencies, and are as follows:—

3.5 and 7 Mc.: 84 ft. antenna and 17 ft. counterpoise.

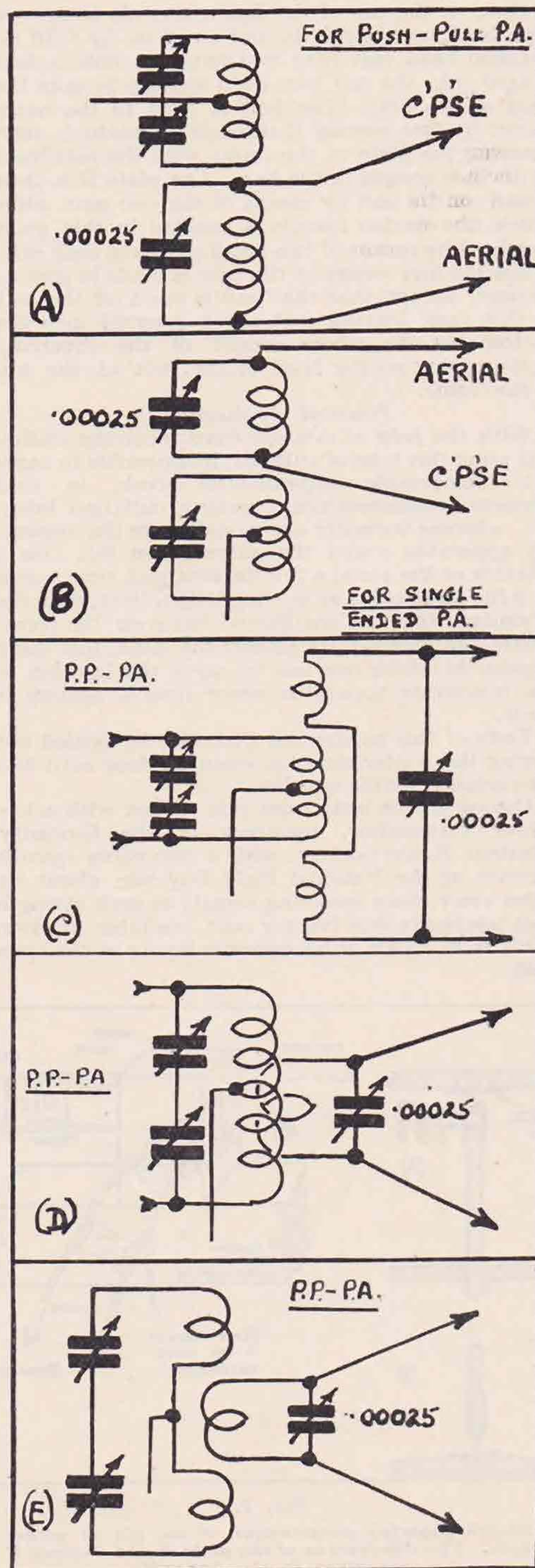
14 Mc.: 84 ft. antenna and 6 $\frac{1}{2}$  ft. counterpoise.

28 Mc.: 84 ft. antenna and no counterpoise.

All these constants are for a single-ended P.A., but strange as it may seem, they are also correct for a push-pull P.A., i.e., the coil may be placed at one end of a P.P. P.A. plate tank or in other positions, as shown in the sketches.

In general the counterpoise should be at right angles to the main run of the 84-ft. top, which need not be straight, but can be bent to suit the space available. Tests with ZS1H on 28 Mc. gave better results with no counterpoise than with one 6 $\frac{1}{2}$  ft. long. The antenna pick-up coil should be a plug-in type, and capable of being moved in the same plane as the P.A. tank to vary the coupling to the final, so that the P.A. can be loaded up to its proper load current. If any difficulty is experienced, the antenna should be trimmed a few inches at a

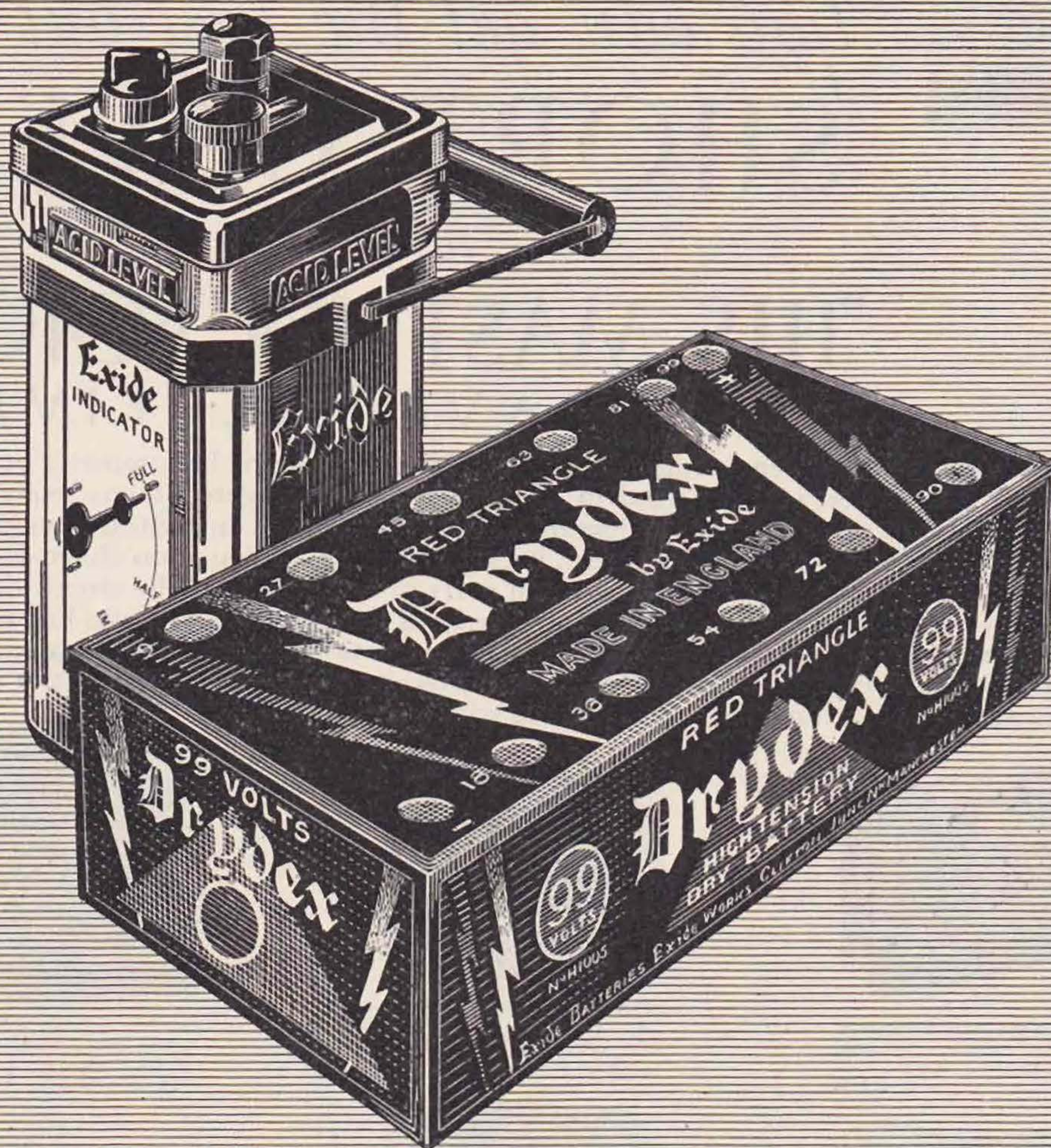
(Continued on page 286.)



Various Methods of Coupling the W3EDP Antenna.

- Push-pull power amplifier.
- Single-ended power amplifier.
- Split coupling coil.
- Coupled coil.
- Split power amplifier coil.





# Exide AND Drydex BATTERIES

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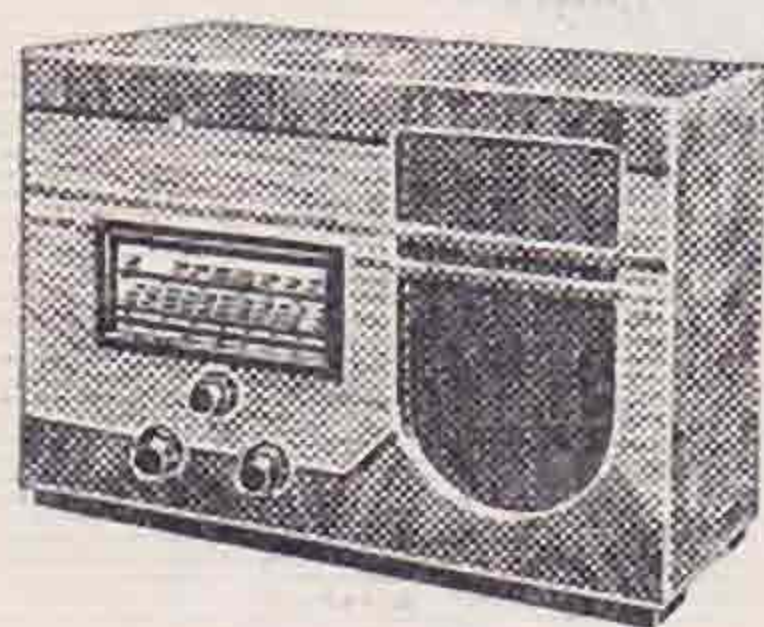
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**SHORT WAVES**  
*with a*  
**"HIS MASTER'S VOICE"**  
**ALL - WAVE RECEIVER**

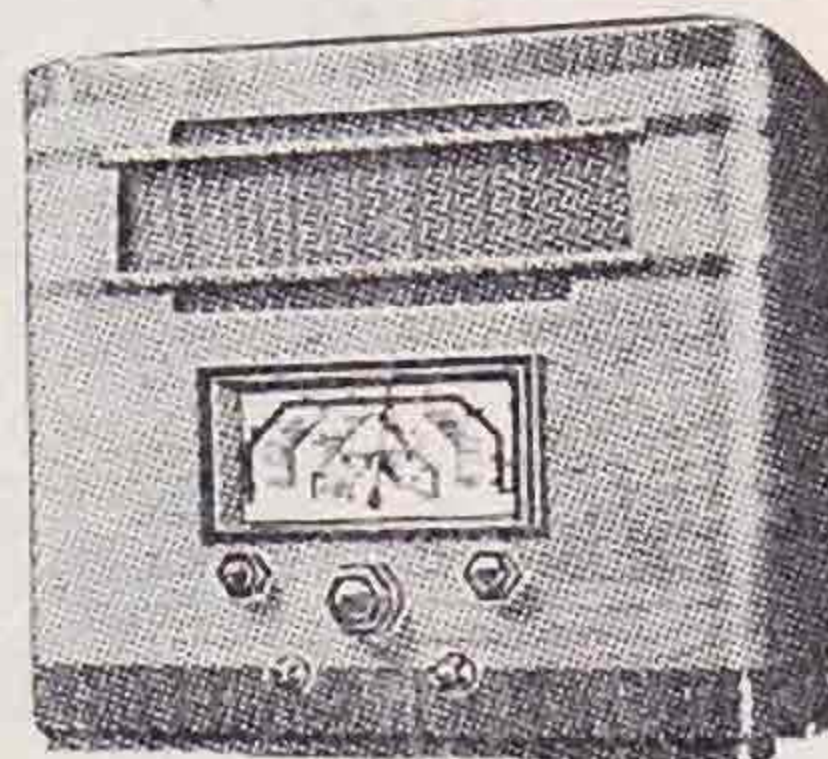
"His Master's Voice" engineers at the "H.M.V." Research Laboratories at Hayes, Middlesex, the largest of their kind in the Empire, have devoted many years to the design of all-wave receivers and radiograms. Many owners of amateur transmitters use "His Master's Voice" all-wave receivers, because of their efficiency on short waves, for two way working with other amateurs in all parts of the world. The circuit design of "His Master's Voice" all-wave instruments enables them to receive quite low-powered transmitters in U.S.A., Australia and other distant countries with good regularity and the best possible reproduction. Before you buy an all-wave or short-wave receiver you are advised to compare its performance with an "H.M.V."



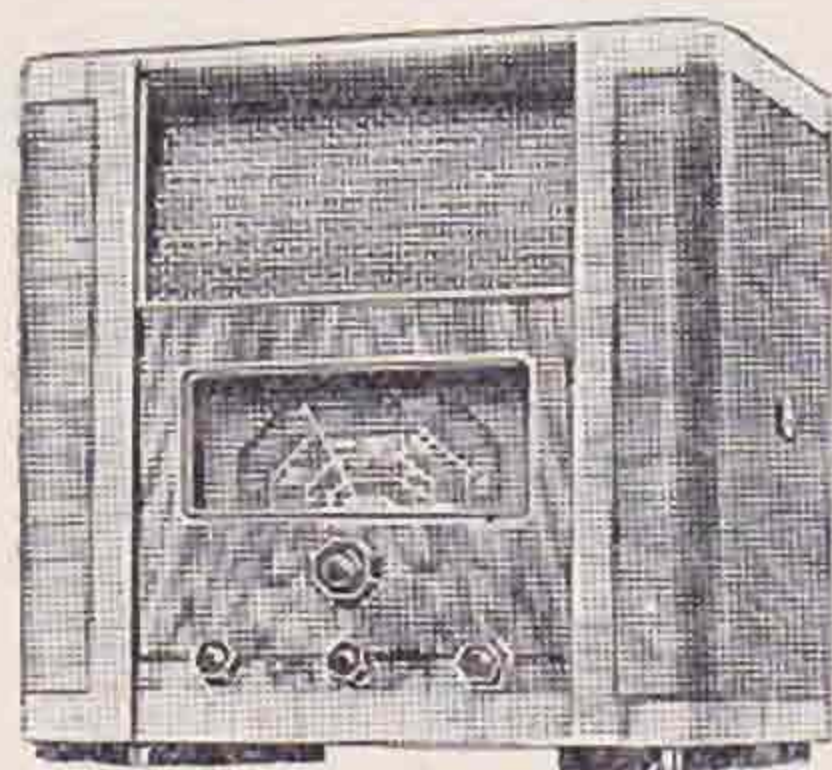
149. All-Wave Battery Receiver, 3 valves. 18-50, 195-560, 785-2000 metres. **9½ GNS.**



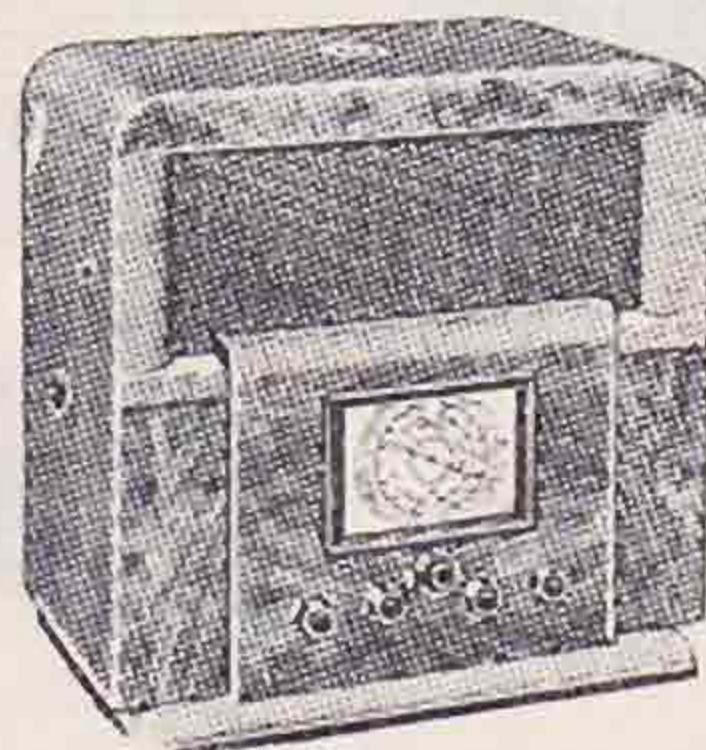
486AC DC. All-Wave Superhet. 4 valves (plus detector) with AVC. 16-50, 198-580, 750-2000 metres. **13½ GNS.**



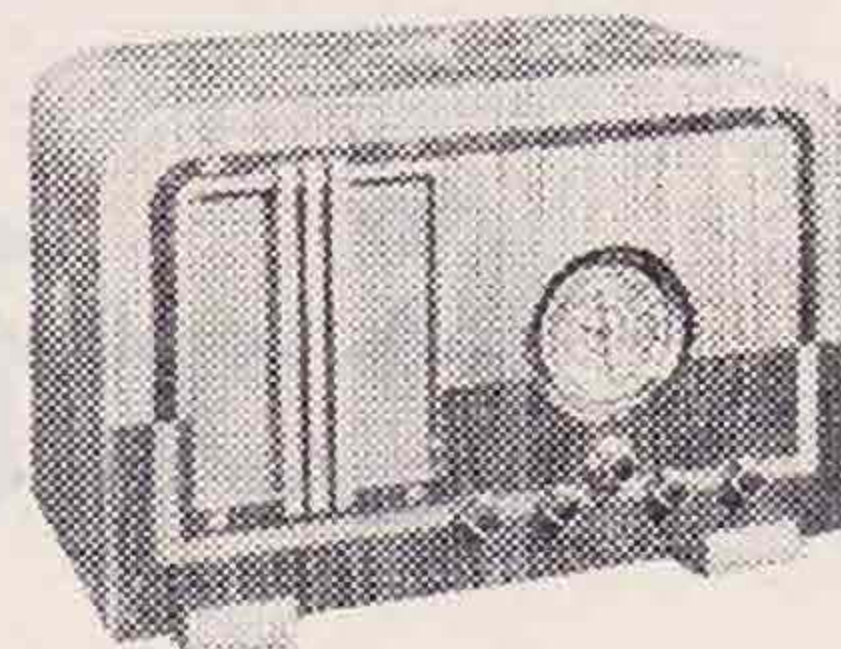
491AC. All-Wave Superhet. 5 valves (plus detector) with AVC. 16.5-52, 195-575, 725-2000 metres. **13½ GNS.**



482AC. All-Wave Superhet. 6 valves (plus detector) with AVC. 16.5-51.5, 200-580, 725-2000 metres. **16 GNS.**



481AC. All-Wave Superhet. 6 valves with AVC. 7-16 (covers Television Sound Transmission). 16.7-53, 46-140, 185-560, 750-2200 metres. **18½ GNS.**



480AC. All-Wave Superhet. 6 valves with AVC. 16.7-53, 46-140, 185-560, 750-2200 metres. **17½ GNS.**

Among the refinements incorporated in "His Master's Voice" All-Wave receivers and radiograms are two-speed tuning knobs, Vernier scales, enabling the precise position for the reception of each station to be noted, and cathode ray fluid light tuning indicators. Some "H.M.V." models have a short wave range commencing at 7 metres, enabling the television sound transmissions and amateur broadcasts on 10 metres to be heard, under favourable conditions.



## DX SCORING—A NEW METHOD

By A. E. DYSON (G6NJ).

THE very excellent article on "DX Scoring," published in the November issue of the BULLETIN, must be recognised as a valuable aid towards the simplification of the much vexed question as to "What is a country?" Generally speaking, it is the opinion of the writer that the conclusions arrived at therein will be found acceptable in most quarters.

It is not with the spirit of criticism that the following observations are submitted, rather it is with the object of further guidance in the matter.

Although previously opposed to the view that Scotland should be looked on as a separate country, the argument adduced by the writer of the article in question appears to be convincing and will, it is thought, be accepted as a good case.

In the case of the Isle of Man, your contributor suggests that an equally good case can be made out. Here we have an island, well separated from the mainland, with an entirely distinct political entity. Whatever process of reasoning we follow, it would, it is suggested, be quite illogical to look on this island as part of any of the three adjacent mainlands. It is not a question of "stopping somewhere" so much as considering the question of political existence. The argument set out in the case of the Balearic Islands would appear to suffer in comparison to those in favour of the Isle of Man, and it is therefore submitted that the latter should be counted as a separate country. (To disarm critics, it has been ascertained that the writer of this article has not contacted the Isle of Man.—Ed.)

When we reach the U.S.S.R., it is feared that the writer of this and the previous article must travel by different roads. Much as one would like to accept the reasoning of G6WY, it would appear that it is faulty. True it is, that the republics mentioned are looked on as autonomous, but one is immediately tempted to compare the position in the United States. There, we have 48 States, and it is suggested that autonomy may be as complete in each State as it is in the Republics comprised in the U.S.S.R. We read of the Nevada Divorce Laws and of the taxation in California, and these would lead one to believe that if we are to count ten countries for the U.S.S.R., we will be forced, so long as we remain logical, to increase our countries total by 47 for the United States. And if that is so for these two vast areas, what are we to do about the States of Colombia?—and Canada?—to mention but two. The writer does not think it would be wise to agree with your previous contributor for these obvious reasons.

So far as Saar is concerned, it would appear that this case and that of Scotland might be considered as almost parallel and thus it would still be counted.

But is the method of counting countries the most satisfactory method of measurement of DX achievement? True, there is already the scheme instituted by "R/9," now incorporated with the Pacific Coast magazine "Radio," but do either of these systems really constitute an adequate "DX yardstick"? For the benefit of those to whom the "Radio" method of scoring is not familiar, it should be explained that a map of the world

was published on which a scheme of divisions was imposed dividing the surface of the earth into 40 unequal zones. These divisions did, in fact, allocate zones for each continent roughly proportional to the areas concerned, but, in the humble opinion of the writer, the scheme suffered from two features. The divisions were, to a certain extent, arbitrary, and the number of zones constituted, were too few in number. It must be said in favour of the zone scheme, however, that up to the present no one has succeeded in working the whole 40 zones. Nevertheless, there are about a dozen stations who have actually been in QSO with 39 of them well within the two years since the inception of the scheme. If for no other reason than to provide these "W39Z'ers" with fresh fields to conquer, it appears that the time is ripe for an entirely new method to be evolved. We have two schemes, therefore, the "Countries worked" scheme, with its vast possibilities before finality is reached, but with the one great disadvantage that agreement as to what constitutes a country is likely to be difficult of attainment, and the "Zone" method, where doubt as to what counts as a zone is reduced to a minimum, but where the scope is somewhat limited in extent.

The ideal scheme would be, therefore, to find how we can combine the good qualities of each without including their disadvantages.

It is common knowledge that the location of any spot on the globe can be specified exactly by means of the lines of latitude and longitude. A method, therefore, which utilises these lines would meet the requirements of the ideal system as regards location. Again, radio amateurs generally, are aware that 15° of longitude represents an hour of time, and this would appear to provide a convenient basis for dividing the globe into areas. If then, we divide the earth into (virtual) rectangles measuring 15° by 15°, we shall have 288 areas of which something approaching 200 contain land areas. Here, then, we have the second desirable quality of the ideal "DX yardstick."

To put it shortly then, the system provides for the splitting up of the earth's surface into 288 areas each 15° North to South and 15° East to West.

Regarding nomenclature, it is recommended that the areas latitudinally should be designated by letters, "A" to "F" for the northern hemisphere, and "U" to "Z" for those in the southern hemisphere. From West to East the areas could be numbered 0 to 23 in that direction—the same direction that the earth rotates.

It is apparent that a map is not essential to give the information to enable any place to be located in its correct area, but if it is desired to use such, the more common Mercator's Projection would meet all needs.

Tables are appended which will enable any place, the QTH of which is known, to be located in its correct area. In order to provide against duplication, in practice, each area would be deemed to measure 14° 59' by 14° 59'.

No difficulty will be experienced in the application of these tables, it is thought, but the following



examples illustrates the method. London,  $51^{\circ} 30'$  N.:  $0^{\circ} 5'$  W. From Table "A"  $51^{\circ} 30'$  N. shows the position to be in "D," and from Table "C" we find  $0^{\circ} 5'$  W. gives us 23. Therefore, London is in Area "D23." Again, Dunedin's position is  $45^{\circ} 50'$  S.:  $170^{\circ} 30'$  E. Table "A" gives "X" for the latitude, and Table "B" shows that the longitude is 11, so the location is "X11."

The QTH of a station can often be obtained at the time of the contact, but once the location is

known, reference to a gazetteer will usually provide the required details and in the event of one not having a gazetteer—there is always one at the local Public Library.

It is recognised that the Areas constituted as set out above are not all equal, but, at least, the variation is not so great as between those of the different countries, and the boundaries of the Areas do not follow such tortuous paths as in the "Zone" scheme.

Table A.—North and South.

	0° to 14° 59'	15° to 29° 59'	30° to 44° 59'	45° to 59° 59'	60° to 74° 59'	75° to 90°
North ... ..	A	B	C	D	E	F
South ... ..	U	V	W	X	Y	Z

Table B.—East.

0° to 14° 59'	15° to 29° 59'	30° to 44° 59'	45° to 59° 59'	60° to 74° 59'	75° to 89° 59'
0	1	2	3	4	5
90° to 104° 59'	105° to 119° 59'	120° to 134° 59'	135° to 149° 59'	150° to 164° 59'	165° to 179° 59'
6	7	8	9	10	11

Table C.—West.

180° to 165° 1'	165° to 150° 1'	150° to 135° 1'	135° to 120° 1'	120° to 105° 1'	105° to 90° 1'
12	13	14	15	16	17
90° to 75° 1'	75° to 60° 1'	60° to 45° 1'	45° to 30° 1'	30° to 15° 1'	15° to 0° 1'
18	19	20	21	22	23

### Congratulations

Congratulations are extended to Mr. and Mrs. H. A. M. Whyte (G6WY) on the safe arrival of a small "Ham," who saw light as the bonfires were being ignited on November 5.

At the time of going to press we understand that Master David John is radiating T1 signals on an unknown frequency.

### Stray

Mr. E. T. Somerset (ex G2DT), now Vice-President of the Radio Society of East Africa, sends seasonal greetings to all old friends, and asks us to make known that he is leaving Mombasa for Durban. He can be reached c/o Barclays Bank in that town.

### Chichester S.W. Club

Mr. Norman Huggett (G2PF), 6, Alexandra Road, Chichester, informs us that 2BBB, 2AWZ, 2AAH, ex YI6KR and himself are proposing to form a short wave Club in Chichester. The Club will be confined to R.S.G.B. members holding BRS numbers or A.A. calls. Any member within easy reach of Chichester is asked to communicate with Mr. Huggett.

### Stray.

ON4AU informs us that his new QRA is 43, Avenue de L'Oree, Brussels. During November this station was very active on 56 Mc., but the best DX was 60 kms.



## "ALLGEMEENE-OPRUHING"

By DUD-CJ.

**H**ERE we are again, August week-end just starting, and a goodly crowd of nearly two dozen G's assembled at Liverpool Street Station, souls full of gladness, hearts full of hope (etc.), and why shouldn't we be, for don't you know?—we're off on a cruise to Holland and Belgium and we're going to see the ON's and PA's in their own shacks, and who knows what other adventures. (A rogues gallery of us appeared in September BULLETIN, p. 104.)

And, sure enough, about the middle of Saturday morning the good ship Vienna fetches up at the entrance to the Amsterdam Canal. I always think these skippers are wonderful blokes. Set off across the empty ocean, and they say to-morrow we shall see land, and sure enough, to-morrow, there it is. That's more than some of us hams could do. Anyway, Ijmuiden is the name of the place, as my atlas spells it, and the canal is about twenty miles long and full of interest and jobs of engineering that make one take one's hat off to the Dutch. Out they come, thousands of 'em, to see the boat, all riding curious shaped bikes, very "pictureskew."

Amsterdam. The famous PAOASD pair and others to greet us, and take us to see all the sights of the City by motor launch (you have to shut the roof as you go under the bridges because the lads of the village throw nuts at you). You can see the city best this way, though quite a lot of it is on the solid.

And now that we have had tea and tried shopping in Furrin' lands, we all set off to see the shack of ASD. It's up some more water, and after a little fun with the engine and one of the gang nearly going out of the band and getting a wet shirt, we are rewarded by a distant view of the famous shack. It's nearly in the water, too, no trouble with earths here, and as we arrive up goes the British Flag and an RK greets us with the National Anthem, a welcome highly appreciated. Now there's lots of PA's with us; DX men, 3.5 Mc. men, all well known

to us on the air. There is gear, too, a very fine exhibition; looked good through the bottoms of our glasses, and worked, too. The celebrations now went on the air while we worked 6LL and the rest of G wondered what had come over the 3.5 Mc. band. Then with ON4PA, plans were made for our visit on Monday. And so back to the boat, but not to bed, for the whole boat is on holiday, too. Thank you, ASD & Co., for a very FB time.

Sunday morning finds us in the Scheldt, and very soon in Antwerp, where we berthed in the wrong dock and thus missed the deputation arranged for us. However, this was put right and the party was entertained by the Antwerp gang at their famous station in the local football stadium, after which, station visits were made to 4CC, 4GW, and others. It was at Antwerp that we met a real spitch merchant, enthusiastic to bursting point, unlicensed, self-excited, in fact everything that Uncle Tom tells us. He had two nicknames, both unprintable, and his eyes sparkled and his face lit up with delight as he described the depths of his modulation, as yet unplumbed, and how when he comes on the air the whole of Antwerp has to QRT. Yet he was human, and one of the "gang."

And so good-bye to Antwerp and its good fellows, and off to Zeebrugge. It's windy by the time we get there, and we are glad to get behind the Mole to dodge the flying sand, but an early encounter with the gang and we soon forget the WX. "Papa," who came all the way from Ghent to meet us, was the ringleader, accompanied by many more, including one F, and 4DX, who spoke vivid nautical American, and an old salt, 4LM, who with great enthusiasm fought the Battle of Zeebrugge all over again in French and great detail. It will be many more years yet, maybe, before the Mole is completely taken.

With the battle over for the day, and the Zeebrugge War Museum explored, we are off, station visiting in the compound seaside resorts of Knocke, Heyst and Lezoute. The inhabitants must have wondered to see a string of about 30 "furriners" wandering in and out of what are probably to them quiet suburban residences!

To-night we return to G, but the wind is by now a gale, and so we are kept amused until the last, and although there were no real casualties in the party, at least, not reported, some of us were not sorry to be on the solid in the morning.

Now the trip is ended, but we shall not forget it or the many who helped to make it FB for us. Many thanks to all you Hams across the North Sea and to 5UK who did all the work of preparing the holiday and looking after us. Let's get on 80 and listen for the "Allgemeene Opruiking."

### Greetings

Mr. A. H. Bird (G6AQ), Hon. Secretary for Great Britain and Northern Ireland of the World Friendship Society of Radio Amateurs (U.S.A.), extends Christmas greetings to all members who have contributed to the success of the movement in which he is interested.



A DX Contest aboard the good ship "Vienna." G5JO, 6MN, 2AX and 6CJ, practice the gentle art of shove-halfpenny.



## EAST AND WEST OF SCOTLAND CONVENTIONETTES

By "SCRUTATOR."

FOR years it has been felt that Scotland should endeavour to organise one of these "get-togethers," but until recently the difficulties have been well-nigh insuperable. These difficulties involved transport chiefly, as the membership, although numerically large enough for the project, was of such a scattered nature that it was found impossible to provide facilities which would be acceptable to all.

In the past twelve months, however, a radical change has taken place in the composition of the membership and its development. In this period the membership has increased in an almost incredible fashion, and this, coupled with rapid growth in the vicinity of the large towns, simplified matters considerably. Being in an advantageous position for observing the change, the Scottish Records Officer decided that it should be taken advantage of without delay, and sounded Headquarters as to the possibility of a visit from a representative from Council. His overtures met with a kindly response, to the effect that our President, Mr. Watts, and Mr. Clarricoats, would both make a point of attending such functions as could be arranged. Having obtained the added inducement of such a visit, Mr. Hunter felt that serious difficulty no longer existed and proceeded to make arrangements.

After some discussion it was realised that at least two Conventionettes would require to be arranged, to fall on successive days, one to be held in Edinburgh in the east and the other in Glasgow in the west. By this arrangement it was felt that a larger turnout in each of the Districts involved would be assured. "D" District and "A" and "E" Districts set about their preparations, and the dates of November 13 and 14 respectively were fixed upon. The arrangements for the "D" District meeting were left in the capable hands of Jack Wilson (G6XI) and his able lieutenants. In "A" and "E" Districts there already existed an organisation designed to function in matters of this nature, and Messrs. Tyre (G5TY) and Adams (G5KF), together with their permanent committee, were not slow in making matters move satisfactorily.

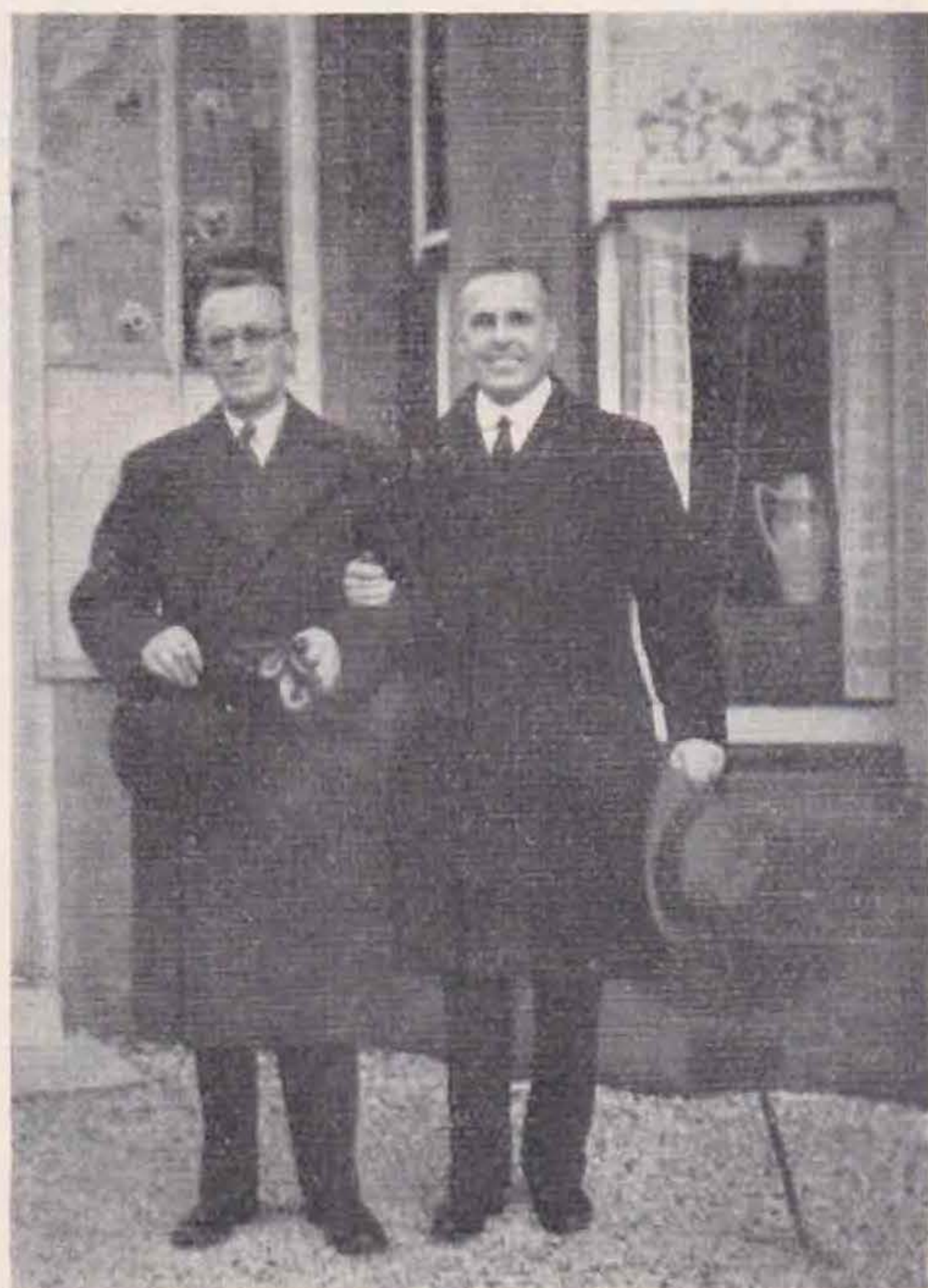
Came the day. At 1.35 p.m. on Friday, November 13, Messrs. Watts and Clarricoats arrived in Edinburgh and were met by Messrs. French (G6FN) and Rowden (G6SR). The afternoon—the only dry (atmospherically, that is) period of the visit—was spent in showing the visitors over the historic Castle, War Memorial, etc., and also over the fine stations of G6SR and G6FN. Our Scottish Vice-President motored through from Glasgow in the afternoon, and together with Mr. Hunter, Scottish Records Officer, and Mr. Wilson (G6XI), awaited the arrival of the visitors at the Royal Hotel, which was to be the scene of the Conventionette dinner.

At the dinner several other Districts were represented, and in all a party of about 35 sat down to renew the inner man.

As is usual, "Clarry" rose to the occasion, and those present were kept interested by him and his

little black book for at least two hours. Our President also, in his genial style, expressed the joint thanks of "Clarry" and himself for their warm reception. He also told us many interesting things regarding the preparations for Cairo and his part in them. Round about 10.15 the hotel people obviously desired our absence, and accordingly the whole party adjourned to the lounge, where there were informal chats (and back-chats also) until about 1 a.m., when the gang cleared off and left our visitors to seek their well-earned repose. So much for Edinburgh.

The following morning, G5YG pulled his buggy out of cold storage (if you do not believe me about the "cold" part, just try Edinburgh in the early morning when a cold north-east wind blows, brrr!), and with "UN" and "CL" left for Glasgow via the south end of the Forth Bridge. Arrived about noon, and after lunch the visitors were taken for a run round the Clyde estuary, while the components of the Glasgow Conventionette spent the afternoon in interesting visits to the Dalmarnock Power Station and the B.B.C. studios. After an afternoon rendered miserable by torrential rain, our visitors were duly delivered at the Institute of Engineers and Shipbuilders in time for the reception at 5.15. Here once again "CL" and "UN" needed no



Mr. Arthur Watts and Mr. Jack Wyllie, photographed outside G5YG during the recent visit made by Headquarters' Representatives to Scotland.



introduction and quickly made themselves at home with old friends and new ones. On this occasion they were treated to a Scotch institution known as a "high tea," after which the proceedings of the



*G6IS, 5YG, 5YZ and 6ZV (at front) taken at Greenock during the visit to Scotland made by G6UN and 6CL. G5XQ should have been in this group, but our tame photographer muffed his focus!*

evening began. Again, "Clarry" wove his spells and provided his hearers with a lot to think about. He was then followed by our President, who dealt in detail with certain subjects especially near to

his heart and expressed his appreciation for the kind reception both had received.

Mr. Mason (G6MS) made comment on the indebtedness of the members to Mr. Wyllie for his services to the Society in Scotland. Mr. Wyllie acknowledged suitably. Mr. Tyre moved a vote of thanks to the visitors, which was enthusiastically accorded, and after some general discussion the meeting terminated at 10.30, leaving one and all with the pleasantest recollections of the personalities of Messrs. Watts and Clarricoats.

Much credit attaches to Messrs. Tyre, Adams and their committee for the smooth fashion in which the function ran to schedule.

Sunday found "UN" compelled to return to London, but the writer had the pleasure of taking "Clarry" on a tour round a number of the west coast stations (albeit in awful weather), in course of which the following stations were visited:—G5XQ, G6IS, G5DK, G2LQ, G6MD and G6ZV, and last of all G5YG, where the expedition came to rest for the night, thoroughly tired out.

To assess the undoubted value of a visit such as this is impossible, but it is certain that not one of those present at either Conventionette will ever forget the first occasion on which our President and Secretary visited us, and it is certainly the hope of all that it will not be long before we have the opportunity of welcoming the representatives of Council once again.

### Stray

Mr. J. M. Railton draws attention to the fact that the new Czecho-Slovakian short-wave broadcaster operates under the call OLR. Reports may be sent via OKIAQ.

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Anode Current	-	-	-	55 mA
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Suppressor Bias Volts (C.W.)	-	-	-	120 Pos.
Suppressor Bias Volts (Phone)	-	-	-	120 Neg.
Anode Load	-	-	-	10,000 Ohms
Anode Current	-	-	-	105 mA
Anode Input	-	-	-	95 Watts
Anode Output	-	-	-	70 Watts
Screen Current	-	-	-	35 mA
Grid Current	-	-	-	2 mA
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# HINTS AND TIPS FOR 56 Mc. WORK

By W. A. SCARR (G2WS) \*

**M**ANY 56 Mc. enthusiasts have lost heart through lack of co-operation from other amateurs, and one of the purposes of this article is to reveal the possibilities of single-handed work on this band.

Perhaps the most fruitful field for experiment on the ultra-short bands is the investigation of range of signals propagated in various ways, and the effects on these signals of various objects, large and small, which lie in their path. In this connection, the relative efficiencies of vertical and horizontal aerials is still disputed, and there is room for considerable experiment in the production of directional effects and radio beams.

Another type of investigation, which usually requires the services of two or more persons, is the daily variation of reception at one point from a fixed transmitter operated from day to day under precisely the same conditions and a careful comparison of the data obtained with statistics of temperature, barometric and other conditions. A record of this type, kept regularly for several months, should be of singular interest, particularly if the fixed stations are 20 or more miles apart.

For the experimenter who must perform work alone, however, a low-power transmitter may be set up at very little expense and left running whilst he goes forth with a portable receiver to "listen to his own signals." The writer has spent considerable time in this way recently and obtained many interesting results.

If a car is available, much time is saved by erecting a simple aerial "on board." This is a real test of ingenuity, but careful designing will produce good results, whether the choice be a simple 8-ft. wire mounted on a wooden lath or a more complex arrangement. One plan is to use a wooden support for the aerial which is attached to the coachwork or mudguard at one end. The aerial lies horizontally at the side of the car when not in use and is swung into a vertical position for reception.

Good locations may usually be reached in other ways, however, and interesting work may be carried out by erecting various types of aerials at one spot and comparing results. The efficiency of different reflecting systems is easily determined in this way.

We must now consider the kind of signal to be sent out by the unattended transmitter, and a short description of the very simple apparatus used by the writer may be of interest.

Both ultra-audion and long-lines oscillators are in use, but the circuit chosen is of little consequence. Ordinary receiving valves should be used and as only two or three watts are needed, the necessary voltage may be obtained from an ordinary H.T. battery of 120 volts, or more economically from a small power-pack, such as the H.T. unit of an all-mains receiver.

As experiments were first carried out with the familiar super-regenerative receiver, arrangements were made for an ICW signal to be generated, this mode of transmission being permissible on the 56 Mc. band. An audio-oscillator was built for the purpose, and the writer is indebted to G5YP and G6YQ for the design of this unit, which is similar to the one they used so successfully during the recent tests on Snowdon.

A one-to-one transformer or centre-tapped choke is required for the circuit, and a condenser of about .002 $\mu$ F. is placed in parallel with the whole winding. The pitch of the note produced by the oscillator depends on the capacity of the condenser, and various values should be tried until a suitable high-pitched note is obtained. The complete audio circuit is shown in Fig. 1, and almost any power valve may be used. The H.F. choke and .0003 by-pass condenser may be omitted if these are included in the transmitter circuit.

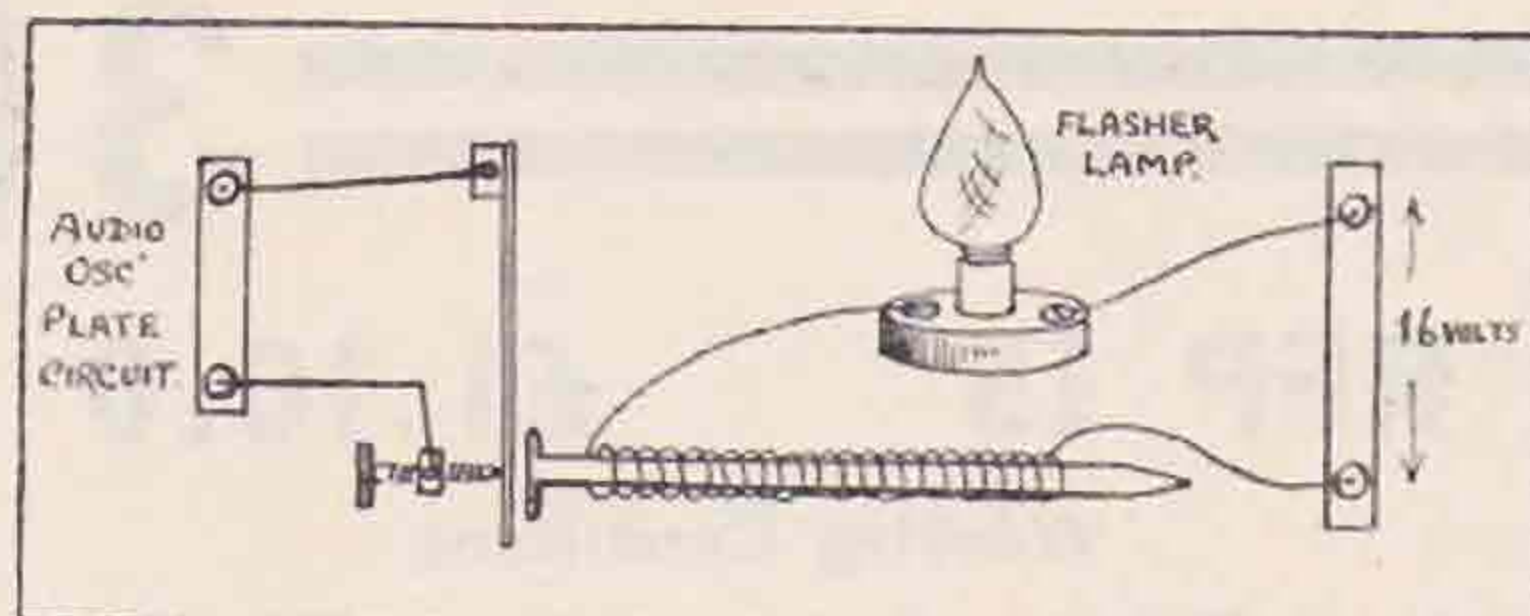


Fig. 2.

In order to transmit an intermittent signal while the transmitter is working unattended, a simple device is used as shown in Fig. 2. A "flasher lamp" of the type supplied with sets of fairy lamps is employed in the circuit. These lamps are obtainable at Messrs. Woolworth's in the Christmas season for 3d. each, and contain a simple thermostatic device which breaks the circuit every second or so. The lamp circuit may be worked conveniently from an 18-volt grid bias battery or a section of an ordinary high-tension battery, and included in the circuit is a coil of about 300 turns of D.C.C. wire wound round a large nail.

A piece of springy tin is mounted with the free end close to the nail head, which when the current flows through the coil, is attracted by the magnetised nail. Contact is then broken between the

(Continued on page 286.)

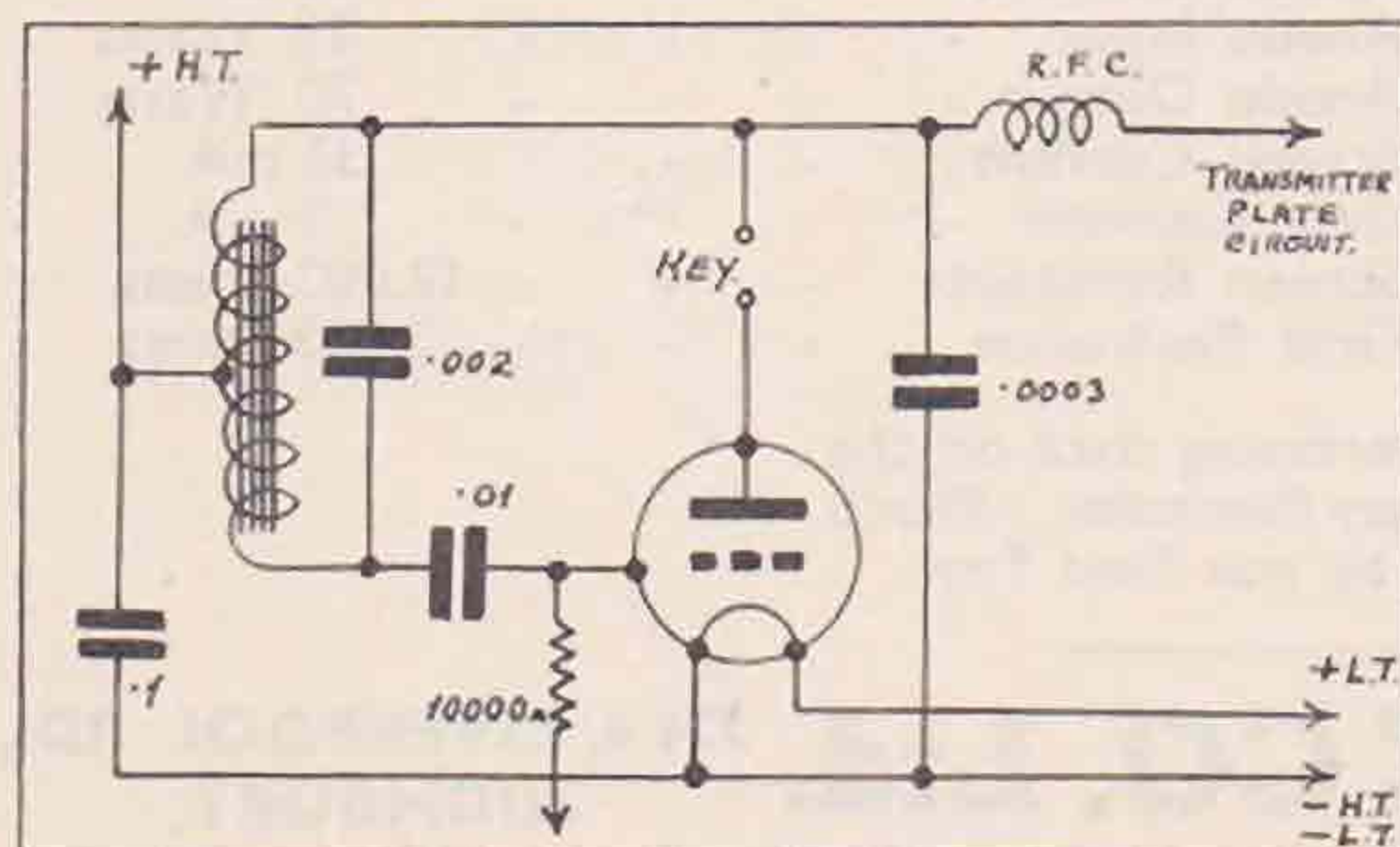


Fig. 1.



# N.F.D. AND LOCAL RADIO SOCIETIES

By JAMES N. ROE (G2VV) \*

*We are pleased to give publicity to the following article from the pen of the energetic Thames Valley Society Secretary. We trust that other members with ideas on the subject will send them either to the Editor or to the Chairman of the Tests and Awards Committee.*

HAVING read the 1936 N.F.D. report published in the September issue of THE BULLETIN, the writer feels that the time is opportune to voice a few thoughts in connection with the actual allocation of stations co-operating and competing in this annual event.

The Thames Valley Amateur Radio and Television Society has some 40 members residing in Surrey, Middlesex and Berkshire, thus during N.F.D. its members are split up between Districts 7 and 15.

Naturally, as members of the R.S.G.B. we wish to support our particular district, but there has been a feeling that it would be far more interesting to us, as a local Society, if we could establish a station of our own which would take an active part in N.F.D.

The particular paragraph in THE BULLETIN report which prompted this article was the clause pertaining to "town groups throughout the country operating portables on any pair of bands."

To the writer's mind this seems a very sound suggestion and would allow more District members to take an active part.

Although we are all keen on winning trophies it must be borne in mind that, as G6CL stated in his article, "the real object of N.F.D. is to fit ourselves for operation of emergency transmitting and receiving gear."

Certainly with town groups and/or local societies taking part the awarding of trophies would need further thought and, possibly, a few re-arrangements.

Would it not be possible, where an active local society affiliated to the R.S.G.B. exists, for that society to establish one or more stations during N.F.D. and (1) work entirely as a separate affair, submitting its own results; or (2) work in conjunction with the largest town group in its particular R.S.G.B. District? In either case only R.S.G.B. members would be allowed to operate, providing, of course, they hold a full radiating permit.

In the event of several groups in one District taking part in N.F.D. it is suggested that each group operates on one band only. If eight groups participated there would be two groups working on 1.7 Mc. and so on for each band.

Entries could be submitted separately or compiled together as a total for that District by the D.R.'s and T.R.'s, etc.

Each group having only one band to work would ensure that the maximum time would be spent on that particular band, knowing that another group would be attending to the other band. More consistent results should be gathered in this way with no waste of time.

A further point in G6CL's article and one which the writer feels should receive careful attention by the R.S.G.B. Tests and Awards Committee is the comment upon the portability of the gear used in N.F.D.

The original idea of N.F.D. was to carry out tests with portable gear, but many stations seem to be almost permanent erections! Apart from not being portable some are not even transportable unless, as the Secretary said, lorries are available!

This seems all wrong, for a station that has been erected beforehand and transported *en bloc* should



G2NN, operating one of the Thames Valley Society portable stations; G5LC, also poses. The compact nature of the gear is clearly apparent.

produce good results, providing the equipment has been working well at a permanent QRA.

Possibly some further rules on this point would be worth while, as many stations during N.F.D. are truly portable, and on the face of things it seems an unfair advantage for another District to be running an almost permanent station.

As a Society with some experience in organising local field days (naturally these cannot be compared with N.F.D.) it has always been our main desire to use truly portable gear. Portable by car. A few points concerning the field days arranged and held by the T.V.A.R.T.S. may be of some interest.

We hold two or three field days each year and on

(Continued on page 286)

\* Honorary Secretary, Thames Valley Amateur Radio and Television Society.



## THE MONTH ON THE AIR

By JOHN HUNTER (G2ZQ).

TO everyone who has sent in reports and encouragement, very many thanks; both are very much appreciated. This month there is some bad news, so we will get rid of that first.

OS1BR is *not* genuine; this has been proved as the card sent to the address he gave for QSLs in Suez has been returned by the Egyptian G.P.O., after having been postmarked by very nearly every rubber stamp in SU. EP1A is another disappointment; that Iranian QRA that he gave Clarry sounded very impressive, but G6CL's card came back with the speed of a dud cheque!

G5CP during Junior B.E.R.U. worked VS5YB, who imagined himself in the British Solomon group; sorry, CP, I'm afraid you are another of the victims of that lowest form of life, the pirate who uses a DX call. And another—G6ZO recently worked VQ4BP, who told him he was in Nairobi; well, ZO's aerial just doesn't radiate in that direction. I don't know if G5HH is another victim, but he reports working TA2BS, Angora, and asks if this is the first G-TA QSO. Sorry again, HH: even if TA2BS turns out to be genuine, G2TM has beaten you. Two years ago, he worked TSF, and was very surprised to get a home-made QSL with a real Turkish stamp and postmark. G8HA has also worked TA2BS, who uses 40 watts to a Hartley.

BRS1535 provides this month's star catch, having heard ZK1AA (always assuming that the ZK is not another pirate!): he is T8X on 14340. ZC6BL is reported from Jerusalem by many people, and G2MI has worked QY6 of the same town on 7 Mc. VC1KR, worked by several Gs, has a T6 note, variable frequency, and says he is in a lighthouse off St. John's, Nfld., and is using that call until his licence arrives. I wonder? GADHL, the new Empire flying boat *Canopus*, has been heard on 14080; sounds as if something in his transmitter had slipped, as to the best of my knowledge, the Airways frequency is well below the ham band. A self-excited TPTG produces his roughish note.

YV5AA and VP7NI are two stations reported by BRS1535 on 14110 and 14010 respectively, whom many Gs would be glad to work. Several years ago many Gs worked YV3LO, but in spite of promises, he never QSL'd. More recently has been VP7AA, who also failed to QSL, as he was unlicensed. HS1PJ has apparently started the ball rolling in Siam as HS1PU and HS1RJ are both reported this month; in spite of the similarity of the three calls, there seems no doubt that they are all genuine; but is HS4T? I very much doubt it.

Baffinland, which, incidentally, counts as a separate country from Canada, is very much in the news at present, with VE5RA, of Resolution I., VE5TV of Nottingham I., and VE5ST, whose location is at present unknown, all working the U.K. regularly.

Good news for those who are after WAS: G2QT is regularly hearing a Nevada station on ten—W6MVO, a YL 'phone in Reno—but has not yet

been successful in raising her. Have any Gs worked this station?

G5YX has been going some good work with ten watts; he has raised XU6SW as well as 3 ZLs out of 4 called. However, G5RF can beat even that, for he worked 3 VKs, 2 ZU's and 4 ZLs, as well as getting S8 several times from the States, with an input he thought was ten watts. However, when he was looking the power pack over to see why the mills were so low, he discovered that one of the rectifier anode fuses had blown, and his volts were 260 instead of 500. Not bad for five watts! It seems that his aerial is of more use to him than his power pack—it's a 99-ft. end-fed affair, Collins-coupled to the final amplifier, and after he put that fuse back, he started getting S7 in W6 on 28 Mc.

G6XL starts by telling me that conditions in the North (Leeds) aren't what they are in the South, and then quite spoils the effect by producing a list of really good DX, including K7FCR, XU6SW, XU6AZ and HS1PU, as well as an excellent score in the VK/ZL contest.

G8DA has heard all continents in just over an hour, and has been concentrating on Asia this month; he reports PK4RK, 14330; PK4AU, 14395 ('phone); VU2CQ, 14350; XU6SW, VS7RF and VU2DY.

From Ireland GI6TK suggests a new "distinction," which he calls CAC—Contacted All Counties—for those who have worked stations in every county of the United Kingdom. I should like to know if there is any interest in this; I rather doubt if there are hams in some of the Irish counties, or even some of the Scottish ones. He also reports FK8AA—does anyone know anything about him?

G6NF has made a welcome reappearance in the DX ranks, and has recently worked W6CUH on 7 Mc. There is a small band of low-frequency enthusiasts, led by G2PL, who are working plenty on 7 and 3.5 Mc. these days. G2PL started the 3.5 Mc. DX season by working ZL1DI on November 29 in the morning. He also heard ZLIAN at S5, and ZL2NQ at S6 (ZL1DI was S8 and gave PL S6).

My own log looks very barren this month, due to being away from home, but a few details may be interesting. 14 Mc.: W7BYE/7 in Montana, 14320, and PZ1AL, HK5FG, both self-excited. 7 Mc.: VP4TC at 2200 nightly, often working RNWAR ships who are also in the 7 Mc. band. K6KVX and K6JPD (also heard by G6CJ) come through among the W6s and 7s in the early morning, of which W7EJC in Wyoming has provided some Gs with a new State. VU2FT on 7150 comes in at about 23.00—he is in the Signals at Pindi. In the mornings, too, the rarer ninth district States are heard, including W9ULQ, 7250, in SD, and W9MKZ, 7010, in Kansas.

Please keep up these reports and ask amateurs abroad to send them, too. The more we have the more interesting this page can become. So, for now, cheerio and plenty of DX till we meet again.



## THE 56 Mc. BAND

By L. G. BLUNDELL (G5LB).

**N**OT for a very long time has there been so many items of interest for inclusion in these notes, and be it noted that all the following reports concern amateur signals almost exclusively.

Just too late for last month's notes came the news (via G2YL and W9FM) that on May 6 last W3SI was heard by F8PA, who reported him R5 QSA5. W3SI was using 'phone with an input of 600 watts.

Early in November G6PK had a very pleasant surprise in the form of a report from a receiving station in YT7!! His C.W. was heard at RST 559X, and the report tallies with the log for the time concerned. PK has confirmed this reception and is on watch for signals from the same direction.

From G6YL is some information on recent conditions as experienced by that well-known North African station CN8MQ. In a recent QSO on "ten" with 6YL, CN8MQ mentioned the fact that 56 Mc. was very productive of DX signals during the hours of 10.00 and 13.30 G.M.T., and signals from SP1 and LP, together with a loud harmonic from OH30I, have been heard at good strength. 8MQ is on schedule with G6DH and is listening every day at 10.00 and 14.00 G.M.T.

On November 15, BRS1173 reports hearing W's on 7.5 metres; calls identified were WIHHX, IAXO and 2AO: these stations were heard between 16.10 and 17.20, receiver being a super-regen. Average 'phone QRB was R7. As a strangely fitting "follow through" to the above report from G6YL, on November 22 both BRS250 and G2HG logged signals from CN8MQ. BRS250 first heard him at 10.23 at R3/0 QSA3/0, and at about 11.10 2HG found the signal at the same strength and readability. Owing to a very bad chirp the signals were hard to copy and hold for any length of time. It seems that the absence of commercial harmonics is no criterion of conditions existing at any given time, and we can therefore assume that for a time at any rate the skip is suitable for DX contacts—activity permitting—particularly during the hours of daylight.

Via G2YL, it is understood that a W1 signal was heard on 56 Mc. in South Wales recently, but no details are to hand as this was a "chance" item picked up whilst listening round on 7 Mc.

While not being strictly within our province, but at the same time coming under the heading of U.H.F. work, is the frequency band used for television and sound channels. This particular spot in the spectrum was at first thought to be comparatively safe from upper layer influence and to have a "service area" as laid down by the usual quasi-optical rules. But recent information shows otherwise, and in one instance a real DX "hop" is shown.

BRS1173, in addition to hearing W's in the region of 7 metres, has also heard German commercials on approximately 6 metres.

ZT6K has been picking up transmissions from Alexandra Palace on 7 metres. Full details of this astounding feat were published in *Wireless World* of November 27.

With the growing number of U.H.F. receiving stations there will no doubt be some very interesting observations made from time to time, and it seems likely that a few holes will be knocked in the quasi-optical theory as it is known to-day.

\* \* \*

Back to our own sphere of activity and note the steady growth of CW stations in regular operation. In addition, it is noted from time to time that straight receivers come in for a pat on the back on a score of fetching in weak carriers that pass unheard on a super-regen., in many cases a QSA5 signal would have resulted if the carrier had been keyed. But time will tell, and for the present scheduled transmissions continue as given in last month's notes.

Please note that any station proposing putting out regular transmissions over an extended period should forward details for publication in these columns.

Only one member answered last month's appeal for more activity during daylight hours: this is G5OJ (Ewhurst, Surrey), who is on *pro tem.* at 12.30-13.00 on Fridays. He will much appreciate reports from any QRB. More activity is badly needed round about mid-day during the week, so if any stations can oblige, please advise G5LB at the earliest.

This month sees the termination of the first half-year's test of the potentialities of 56 Mc. as a DX medium and, thanks to those who started the ball rolling, a certain amount of additional and useful information has been forthcoming.

One of the most important points has been the general improvement in ideas as regards transmitting and receiving equipment: this has been mainly effected by the use of crystal or otherwise stabilised circuits with one or more doublers, following with, perhaps, a PA. As a natural sequence, receiver design received a much-needed "clean-up" and C.W. work was firmly established as a step in the right direction.

During the summer months many unusual signals were heard, and although there was a chance that some of them may have been unwittingly "home-grown," generally speaking, the band was for once getting the research it deserved. As was to be expected, commercial harmonics provided the first DX signals, but later there was news from far and near of amateur signals "going places" unthought of under previous conditions, and as a result started the more pronounced move for DX contacts with the use of C.W. as the most promising type of transmission for this work.

There is cause for a spot of self-congratulation for all concerned in what has been accomplished in the past six months, but there is no excuse for relaxation in this work as future progress is entirely dependent on individual endeavour. It is largely up to him as to whether 1937 will simulate its predecessor by continuing to give incentive for amateur research and experiment on the ultra-high frequencies, and whether the rate of progress will be maintained.



In conclusion, the writer wishes to thank all those who have been good enough to regularly furnish interesting material for incorporation in these notes month by month. A fine spirit of co-operation was shown at the very beginning, and it has been encouraging to note that this happy state of affairs has been maintained throughout. Those who have been responsible for the scheduled transmissions as given in these columns from time to time are particularly deserving of a word of praise for the way they have stuck to what has been at times a thankless and tedious job. Others, too numerous to mention, who have shown interest and put forward suggestions are also thanked for what has been an additional help in estimating the amount of ground to be covered in these notes to make them of generally acceptable and useful nature. Any further suggestions on any matter applicable to DX work are welcomed—particularly if concerning C.W. working—and will, if possible, be utilised.

This being our final contribution for 1936, the writer takes the opportunity of wishing all members the compliments of the season.

\* \* \*

In the last notes, BERS250 was mentioned in connection with information received concerning signals from Wellington, N.Z., the credit should have gone to BERS380.

## THE 28 Mc. BAND

By NELLY CORRY (G2YL).

**C**ONDITIONS during November were very similar to those of October, but showed a decline towards the end of the month, and the band sometimes went "dead" as early as 17.00 G.M.T.

Australians and New Zealanders were more numerous than before, but the latter were usually only audible for a short period around 08.15 G.M.T., and VK's are now often stronger at mid-day than earlier. Stations which have been coming through well, in addition to those mentioned in these notes last month, include ZL1CD, 1DV, 2BG, 2GQ, 2PC, 3AB, and VK2AE, 2PN, 2UD, 2VG, 3BR, 3CZ, 3HM, 3KX, 3XP, 4BB, 5FM, 5HW and 5KO.

Activity in Asia is gradually increasing, and new stations heard on the band in November include VU2AM, PK3ST, VS6AS, J2CB, J2CE and J3DC, but J's, like ZL's, are getting rather scarce now. VU2AU and VS6AH are probably the most consistent stations, the latter's 'phone being R7 in England at times. PK3ST made his first G contacts with G6IR and G6DH on November 5.

African 28 Mc. stations continued to get through well, and their numbers were swelled by FT4AG, SU1CH, SU1SG and ZE1JR. ZS1H was audible at all hours of the day, and it is rumoured that his 28 Mc. Contest score is now in the neighbourhood of 130,000 points!

South and Central Americans were heard spasmodically, but there are still only a few active stations. They include CP1AC, K5AY, LU1EP, LU9AX, OA4J, PY1BR and VP2AT.

All districts of U.S.A. and VE1, 2, 3 and 4 were heard during the month, and occasionally it seemed

as if the usual occupants of the 14 Mc. 'phone band had emigrated *en bloc* to 28 Mc. W6 stations have been as good as ever, but for some reason W7's have become scarce.

European signals were considerably louder and more numerous than at the same time last year, the most consistent countries being the comparatively distant ones, *i.e.* Russia, Finland, Latvia, Roumania and Jugoslavia. New G stations appear on the band almost daily, and the number now active must be approaching the 100 mark. A noteworthy feature this winter is the frequent reception of "distant" G's at about R3/4. Stations in London and south-east England constantly hear G2DH, 2GQ, 2HX, 2OA, 2TM, 2XC, 5FV, 5QY, 5RI, 5SY, 6IR, 6LH, 6NJ, 6OS and 6YL, while G2DH (Manchester) and G6YL (Northumberland) report the reception of such stations as G2NH, 2NM, 2PL, 2RD, 5BM, 5GQ, 5OJ, 5WP, 6CJ, 6CL, 6DH, 6GR, 6LK, 6QB, 6QZ, 6RH, 6WN and 6WY.

G6DH has added considerably to his contest score during November by working 22 different Oceanic, 7 Asiatic, 15 African, 20 European, 5 South American and 207 North American stations. On November 22 he worked VS6, 3 VK's, LU, ZU, OH and W2 in just over 2½ hours, and apart from the Asiatic contact was W.A.C. in 1½ hours!

G6WN gained his W.A.C. and W.B.E. by working ZL2PC and ZL3AB, but still finds it impossible to raise VK. G2DH, who previous to October had not been active on 28 Mc. since 1928, has also completed his W.A.C. by a QSO with VK4EI. G6LH worked four continents during his first three days on the band, but found conditions poor after November 18. G2PL has recently worked ZL, VK, J, PK, VU, ZE, ZS, FB and had 30 W6 and W7 QSO's, but cannot raise a South American and rarely hears one.

G6YL has made W.A.C. and W.B.E. twice since October 21, and her 30 different countries worked with 6 to 10 watts input include VK, VS6, U9, ZS, ZE, FB, LU and PY. The following details of her gear may encourage other QRP G's to try 28 Mc. The transmitter is an Ultraudion using an LS5, receiver is an 0-V-1 with 36 volts high tension, and aerial is a North-South A.O.G. about 50 ft. high. All contacts have been made from the H.F. end of the band, and she suggests that DX stations, even if they prefer to transmit at the L.F. end, should sometimes tune their receivers from the H.F. end after a CQ.

G6CL worked VK and PY for his W.A.C., the latter contact was on a chance call after PY1BR had worked G6WN.

VU2AU has worked VE2KA, this contact giving him the first VU-WBE on 28 Mc.

## 28 Mc. International Contest

Members are reminded that the second 28 Mc. International Contest concludes on December 31, 1936. Entries must reach Headquarters not later than February 28, 1937.

It will be appreciated if 28 Mc. operators will ask all overseas stations whom they work to send in their log of contacts made this year.



# BOOK REVIEWS



*British Standard Specification, No. 415, 1936.* For mains-operated apparatus for radio, acoustic and visual reproduction. 18 pages. Published by the British Standards Institution, Publications Dept., 28, Victoria Street, London, S.W.1. Price 2s. net, post free 2s. 2d.

The present specification is a revision of the 1931, No. 415, bringing it up to date to deal with the development of visual reproduction and the comparatively high voltages employed therein, and also to include consideration of apparatus connected to D.C. mains.

The specification firstly defines the terms used; for example, "High Tension" is defined for the purposes of the specification as any power supply exceeding 150 volts.

The design of such apparatus is then considered from the viewpoint of safety to users, and these regulations are in addition to relevant regulations issued in the well-known I.E.E. Regulations for Electrical Equipment.

The construction of cases, chassis, transformers, condensers, is dealt with in some detail. It is interesting to note that where condensers are used in D.C. apparatus for isolation purposes the minimum test voltage rating for the condenser shall be 800 volts D.C. Minimum clearances between live parts and minimum creepage distances over insulation surfaces are defined by formulæ based on the voltage used. Tests for insulation resistance and heating are also specified, and finally a standard form of marking for mains apparatus is given, and a dimensioned drawing of a "standard finger" used to determine the accessibility of live parts.

The R.S.G.B. was directly represented on the Committee which prepared this specification; it is brought to the notice of all those concerned with the design of mains apparatus.

T. P. A.

*Two Hundred Meters and Down.*—The story of Amateur Radio. By Clinton B. DeSoto (Assistant Secretary, A.R.R.L.). 184 pages, QST format. Published by A.R.R.L. Price 1 dollar, post paid; or from R.S.G.B., Sales Dept., at 4s. 3d., post paid.

The author, being an American, sees amateur history from that viewpoint, and his book tells the story of American amateur radio, dealing with its contemporaries in other countries when they come into the picture through international conferences or long-distance contacts. True, the story of amateur radio is largely, but not entirely, the story of the American development.

The author has become the first historian of amateur radio, and he has spent many years collecting material for this book. Originally he intended publishing it privately, as it has always been a private work, commenced before his associations with A.R.R.L. This makes the work more valuable

because the author is quite free to express his own views, and his decisions as to the relative importance of events are uninfluenced.

The historian's lot is not always a happy one; his task, especially in this case, is extremely difficult. Early amateurs will read this book with a critical eye, each one thinking a different period or event is of major importance. They may be a little irritated here and there by minor things, as your reviewer was, but the test really is: "Is this a sincere, impartial and capable history of our growth?" The author, in a foreword, says: "... neither impartial observation nor accurate evaluation nor unbiased recounting is possible within the limitations of human nature." While agreeing with this, the writer's opinion is that this book is sincere, as impartial as the limits permit, and undoubtedly capable. More than that, it is, in the main, written in a wonderfully bright and interesting way. The only exception is in the final chapter where the author seems always to choose the longer word; but, even so, the writer found this last part, "Whither Amateur Radio?" the most valuable part—giving an extraordinary review of present trends, especially with regard to telephony and C.W. This section should be read and considered by every telephony enthusiast; it may give some of them thought for to-morrow.

There is little necessity for the writer to go into detail as to the scope of the book. It begins with "amateurs" such as Hertz, Marconi, Loomis, etc., and tells their story. Then the spark days are recalled; the growth of radio clubs, and the war. After the war came C.W., and then the wonderful development of the short waves... international regulations... technical progress... until to-day.

The writer found the book extraordinarily interesting, and recommends it to all amateurs. It is a valuable and timely addition to our growing literature, and amateurs who take a pride in their craft will want to possess a copy.

T. P. A.

*TELEVISION: Technical Terms and Definitions.* By E. J. G. Lewis. 95 pages and 13 diagrams. Published by Sir Isaac Pitman & Sons, Ltd., London. Price 5s. net.

This book is rather a cross between an encyclopædia and a dictionary; the author, in most cases, goes a little further than merely giving the definition of the word, but hardly far enough to earn the title of "encyclopædia" for the book.

Our readers will have realised long ago that television has brought along thousands of new terms, and possesses almost a jargon of its own, in addition to that of all the sciences bound up in the technique. These terms are being added to every day, and a book such as this cannot be even moderately complete for very long; this has been realised by the author, for he has supplied plenty of space for the reader to add new terms and their meanings as they come into common use.

The definitions are concise and clear, and the book should be a very useful guide and reference to those who experiment with television gear, or to those who will be called upon in the near future for its servicing.

T. P. A.



# RESEARCH AND EXPERIMENTAL SECTIONS

## MANAGER :

H. C. PAGE (G6PA), "Warren House," Warren Road, Bexleyheath, Kent.

## ASSISTANT MANAGER :

J. C. ELMER (G2GD), "Aethelmar," Seabrook Road, Hythe, Kent.

### SECTIONS :

#### No. 1 : TRANSMITTER DESIGN

S.M. : (To be appointed)

G.M. : 7 and 14 Mc.

S. BUCKINGHAM (G5QF), 41, Brunswick Park Road, New Southgate, N.11.

G.M. : 28 Mc.

(To be appointed)

G.M. : 56 Mc.

J. N. WALKER (G5JU), 4, Frenchay Road, Downend, Bristol, Glos.

G.M. : Artificial Aerials

A. W. LISTER (G5LG), Royal Military Academy, Woolwich, S.E.

#### No. 2 : RECEIVER DESIGN

S.M. : J. MAWBEY (BRS. 1300), 109, Clare Road, Tankerton, Kent.

G.M. : General

J. MAWBEY (BRS. 1300)

G.M. : 56 Mc.

J. N. WALKER (G5JU)

#### No. 3 : AERIAL DESIGN

S.M. : F. CHARMAN (G6CJ), Orchard Cottage, Stoke Poges, Bucks.

G.M. : General

F. WILSON (G2XX), 85, Risca Road, Newport, Mon.

G.M. : 28 Mc.

L. O. ROGERS (G2HX), "Audwen," Estcourt Road, Gloucester.

G.M. : Joint Group with Propagation

G. A. H. ECKLES (G5GC), 57, Sutton Road, Beverley High Road, Hull.

#### No. 4 : PROPAGATION

S.M. : J. C. ELMER (G2GD), "Aethelmar," Seabrook Road, Hythe, Kent.

G.M. : 56 Mc.

D. W. HEIGHTMAN (G6DH), 59, Burrs Road, Gt. Clacton, Essex.

G.M. : 28 Mc.

MISS N. CORRY (G2YL), "Redholm," Walton-on-the-Hill, Tadworth, Surrey.

G.M. : Conditions

J. HAIGH (G6HA), 2, Greenock Terrace, Leeds, 12.

G.M. : Literature

A. T. MATHEWS (G5AM), 24, Woodside Park Road, North Finchley N.12.

G.M. : Joint Group with Aerial Design

G. A. H. ECKLES (G5GC).

#### No. 5 : VALVES AND INSTRUMENTS

S.M. : D. N. CORFIELD (G5CD), 10, Holders Hill Gardens, Hendon, N.W.4.

#### No. 6 : AUXILIARY APPARATUS

S.M. : A. O. MILNE (G2MI), "Twemigh" Kechill, Gardens, Hayes, Kent.

G.M. :

F. W. BENSON (2BWF), 53, Corona Drive, Thorne, Doncaster.

#### No. 7 : MICRO-WAVES (112 Mc. and above)

S.M. : DR. C. G. LEMON (G2GL), 19, Lena Gardens, Hammersmith, W.6.

#### No. 8 : CONTEMPORARY LITERATURE

S.M. : A. T. MATHEWS (G5AM), 24, Woodside Park Road, North Finchley, N.12.

#### No. 9 : TELEVISION

S.M. : E. L. GARDINER (G6GR), The Nyth, Norwich Road, Northwood, Middlesex.

G.M. : Contemporary Literature

E. J. SCUDDER (BRS. 981), 32, Queen Street, Folkestone, Kent.

## NEWS OF THE MONTH

### *Developments in Receiver Design.*

THIS month we have much pleasure in presenting as the leading article a contribution from the pen of Mr. E. L. Gardiner on the subject of the crystal gate as applied to the reception of telephony. It is generally agreed that the crystal gate when employed for the reception of C.W. signals is a great advance in the development of the modern short-wave receiver; therefore, if this method can be adapted for telephony, and Mr. Gardiner shows how it may be done; we have made yet another step forward.

### *Television.*

The Television Section Manager has asked that all reports of distant reception of the B.B.C. television signals shall be forwarded to him. Obviously, before one can make use of a television receiver, it is necessary to know just how the signals are likely to be received, and this information should therefore prove of considerable importance. The collection of the data should present no great difficulty, for anyone in possession of a receiver which will tune down to 7 metres is in a position to help. Therefore, no matter whether you have a two-valve receiver, or a superheterodyne, send in your report to Mr. Gardiner, whose address will be found by the side of these notes.

### *Something for Nothing.*

It has been brought to our attention that the various Section Managers, whose positions are purely honorary, are being put to considerable expense in the way of postage by inconsiderate members who write to them, and omit to enclose a stamped addressed envelope.

Many of their correspondents appear to be under the impression that these men are under an obligation to provide them with information of all kinds, and that no acknowledgment or thanks is necessary. We would point out that this is certainly not the case, as all their efforts are given entirely free.

It is hoped that in future members will bear this in mind, and act accordingly. Please send that stamped addressed envelope, and, if your query is replied to, spare a penny for a post-card acknowledging receipt of the reply. A query sent to any other technical magazine costs at least 2s. 6d.

### *Radio and Medicine.*

Elsewhere in this issue will be found an article by Mr. E. de Cottignies (BRS2562) on a subject that may be a new one to many members. However, we know that there are a certain number who are interested in such matters, and we make no apology for introducing it. We shall be glad to receive comments from them. The present article is intended to serve merely as an introduction to the subject, and is necessarily of an elementary nature.

### *56 Mc. C.W. Tests.*

We draw the attention of members to the article



on this subject by our 56 Mc. Transmitter Design G.M. We have always felt that any advance in technique on the ultra high frequencies must be beneficial, and the proposed tests should aid this development. The theory that these frequencies have only an optical range seems likely to be abandoned very soon, and therefore it is obvious that greater stability in our transmitters, and lower noise levels in our receivers must lead to better results.

### Contemporary Literature

One of the most important requirements for successful research work on any subject is a good source of reference to works of a similar nature. In the past it is true we have made attempts to do this, but our efforts have not been too successful. Therefore it is proposed to entirely reorganise this branch of our activities.

The first requirement is some enthusiastic member to undertake the task of correlating all available references on various subjects affecting our work. Most of the periodicals, etc., which deal with similar subjects to our own will be supplied. We shall therefore be glad to receive applications for this position. Anyone who wishes for fuller details should write to the RES Manager.

G6PA.

### Individual Members

The following have enrolled as Individual Members since October 27 :—

No. 1 Section : G2UJ, G6MI, G5PT, VE3AU.

No. 2 Section : G2UJ, G6MI, G5PT.

No. 3 Section : G5BX, G5PT, VE3AU, 2BIG, BRS1681.

No. 4 Section : G5PT, 2BIG, BRS1681, 2489.

No. 7 Section : G6MI.

No. 9 Section : 2AIH, 2AHK, BRS1753.

## 56 Mc. C.W. Tests

By J. N. WALKER (G5JU).

THE scheme outlined below is unique in character and should prove of great interest to all using the 56 Mc. band, whether members of R.E.S. or not, and whether transmitters or otherwise.

Briefly, it is suggested that, for the month of January next, all using the band desist from the use of a voice or tone modulated carrier and, in its place, key the carrier directly. Doubtless many of the resulting notes will be weird and wonderful in character, but we all know that the poor notes frequently heard on the 7, 14 and 28 Mc. bands are usually more or less readable. A certain amount of experiment will be necessary to clean up the notes and the two most likely troubles, creep and chirp, can be cured, the former by allowing the oscillator valve to warm up for some time, the latter by adjusting the aerial load and possibly putting a high resistance across the key, so that weak oscillation is maintained with the key up. Power supplies, swinging aerials, etc., may need attention which will, in any case, be beneficial.

It will be obvious that quench receivers will not be suitable for the reception of C.W. signals and

it will be necessary to cut out the quench action, either by removing the quench valve or short circuiting a quench coil. The result will probably be violent oscillation, and it will be necessary to fit a variable resistance in the anode feed of the detector valve to control this. It will be much more pleasant searching for weak signals and many headaches will be saved!

It is becoming evident that horizontally polarised waves are less affected by obstructions in their path and have a greater carrying power than vertically polarised waves. It is therefore further suggested that, during January again, all those at present using vertical aerials change over to horizontal ones.

Fixed time schedules are impracticable for all, but it is hoped that groups in various parts of the country will fix up definite times during which they will be active. Everyone who can possibly spare the time is requested to come on the air from 11.00-13.00 G.M.T. Sunday mornings, so making this a peak period.

The purposes of these tests are manifold. Primarily, they will show what possibilities the 56 Mc. band holds for comparatively long-distance communication, but they will also provide an opportunity to enthusiasts situated in isolated parts, as well as encouraging a greater interest in the use of C.W.

It is emphasised that comparatively long calls must be given and the station call signed frequently, in order that weak stations may be identified through car and other interference, and possible fades.

Will all those who take part in these tests please send in a *résumé* of their activities and results to the writer at the end of the month, when a synopsis will be prepared for publication in the BULLETIN? It is expected that further tests, on similar lines, will be held during one of the summer months, and it is hoped that by then more stations will be prepared to use crystal-controlled transmitters and more sensitive receivers.

### 3.5 Mc Tests

Members interested in 3.5 Mc operation are reminded that a series of tests with Australia and New Zealand have been arranged for the weekends, January 9 and 10, and 16 and 17. See Page 162, October issue, for details.

## CRYSTAL CONTROL FOR ALL—

BAND.			ACCURACY.
(a)	1.75 Mc. ...	16/6	± 1 kc.
..	3.5 and 7 Mc. ...	15/-	± 2 kc.
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Temp. Coeff. (a)—(23 × 10 <sup>6</sup> )			
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# ELECTRICAL AND RADIO SCIENCE AS APPLIED TO MEDICINE AND SURGERY

BY E. DE COTTIGNIES (BRS2562).

## *An Introduction.*

THE possibilities included under this heading are legion, indeed one cannot allow a fertile imagination too much rein, as this would lead to the premature establishment as facts of potential impossibilities. Nevertheless, it is only by consideration of these apparent impossibilities that new ideas occur, and the wheel of progress set in motion.

The one thing, without which none of us can enjoy life, to wit, good health, is mainly the concern of our physicians and surgeons. All life is, however, but a complicated system of electrical and atomic structures, and why, therefore, should pure sciences not be applied to the study of health and disease?

We can make the work of a physician so much easier, and so enable him to diagnose and cure our ills more perfectly and rapidly.

How helpful to a physician, to have a portable instrument, by which he can hear and see his patient's organs as well as study their electrical activity. How useful to be able to send a complete "symptom-picture" over the air, sound and vision, to a distant specialist, for immediate consultation.

How can all this be? If the reader will bear with me for a short time, I will do my best to introduce him to this vast subject of Electro-medicine.

I can, unfortunately, only touch on the fringes of the subject, for if I were to go into every branch in detail, with full description of apparatus, the whole would fill a book. I hope, however, to add to this introduction with short résumés and reports.

## *The Body.*

Many organs of the body produce audible sounds, changes in the character of which help us in assessing pathological changes. Corresponding to these sounds are regular (or irregular) cyclic potential changes, which also have their significance and diagnostic value. Further, in living tissue which is undergoing pathological change, high electrical activity takes place, which, if detectable, has considerable diagnostic value.

## *The Reproduction of Body Sounds.*

The sounds made by the heart are divisible into three main groups, namely, those due to muscular contractions, those due to closure of the valves, and those (murmurs) due to the rapid passage of the blood past the structures of the heart. The range of the audio-frequencies coming from the heart is therefore a wide one.

In pathological conditions of the heart, the sounds may change very slowly, the pitch rising or falling by but a few cycles at a time. Now, if these gradual changes could be observed at an earlier date than is now possible with the stethoscope (a relatively insensitive instrument), treatment could be started much earlier, with obvious benefit to all concerned. Extraneous "noises" must, of course, be eliminated if a true "sound-picture" is to be obtained.

This is accomplished by the use of a specially designed microphone apparatus which gives a

pick-up of the heart sounds free from incidental noises. The impulses are fed to a high-gain, "high-fidelity" amplifier and thence to speaker. A cutting-needle or Blattnerphone strip is coupled to the output when it is desired to take a permanent record of the sounds. Sounds originating in other organs (lungs, arteries, etc.) are reproduced in a like manner.

A visual impulse corresponding to these various sounds is obtained by feeding the output to one pair of deflecting plates of a Cathode-Ray Oscillograph, the other pair of deflectors being coupled to a suitable time-base. (Fig. 1).

## *The Cardiac Cyclic Voltage.*

Rhythmic cyclic changes take place in the electrical condition of the heart; changes which vary in health and disease. It is found that these variations are represented in parts of the body where they can easily be detected by electrodes, such places being the limbs.

"Patient electrodes" are placed in pairs; for example, one on the right leg and one on the left

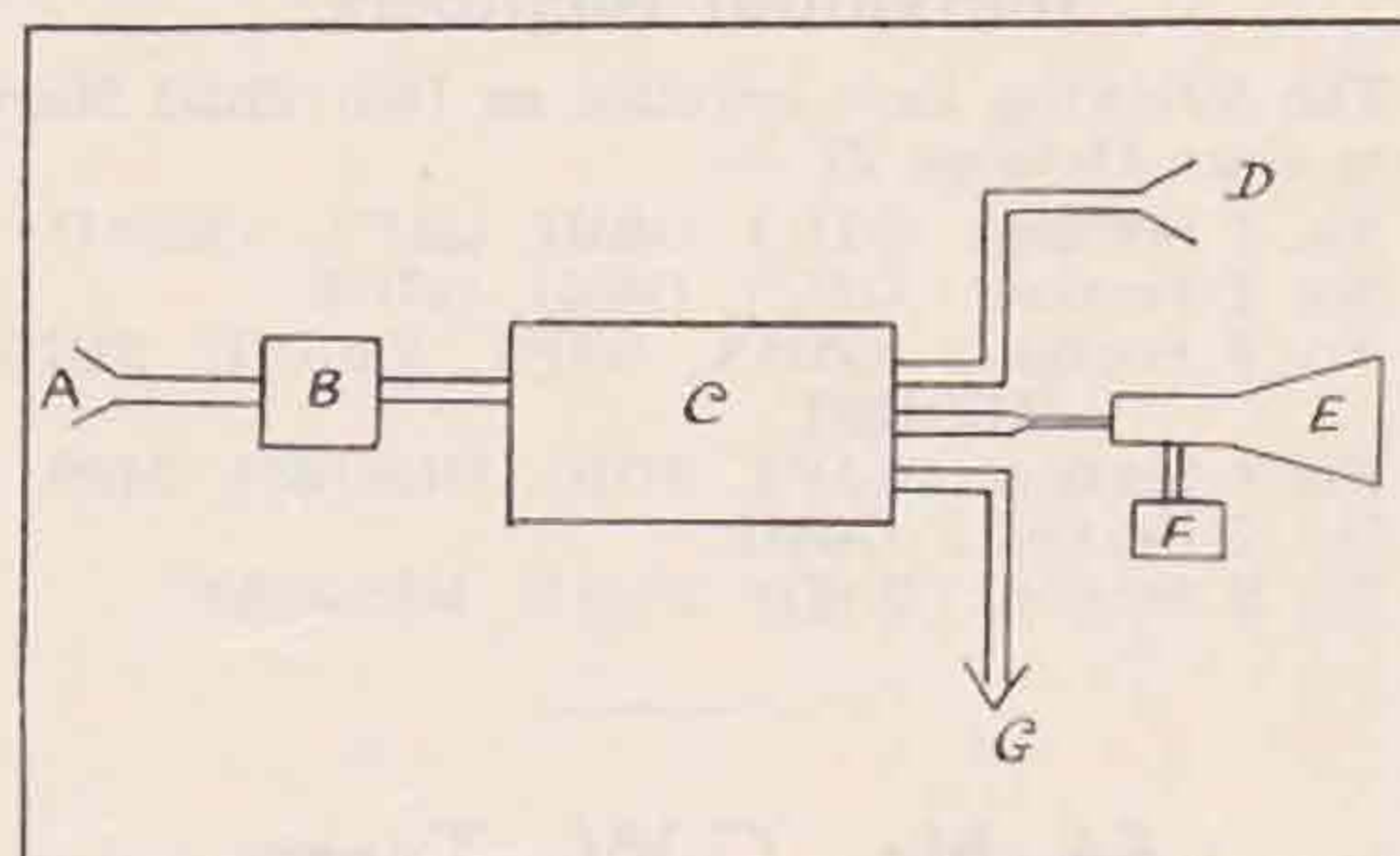


Fig. 1.

Diagram 1. Clinical Sound Reproducer and Recorder.

- A. Patient Microphone Apparatus.
- B. Pre-Stage Amplifier.
- C. Main "High Fidelity" Amplifier.
- D. Speaker.
- E. Cathode Ray Tube.
- F. Time Base.
- G. Cutting Needle or Blattnerphone.

arm; the impulses are then led off to apparatus by which they can be measured.

## *The Electro-Cardiograph.*

Until recently the heart-action current itself was led away to a very sensitive mirror galvanometer to produce a direct reading. This method gave poor results, mainly due to the smallness of the "amplitude curve."

## *The Valve Cardiograph.*

This new method uses the cardiac potential swings themselves to control the electron stream in the first tube of a sensitive amplifier. The visual effect is produced, as before, with an optical system.

A permanent record of these effects is produced by connecting the output to an optical system in which the spot of light corresponding to the cardiac voltage plays on to a moving photo-film-strip.



### The Cathode-Ray Cardiograph.

In the latest method, a direct visual wave-form is produced by feeding the output from the amplifier to one pair of deflecting plates of a cathode-ray tube, the other pair being coupled to a time-base, see Fig. 2.

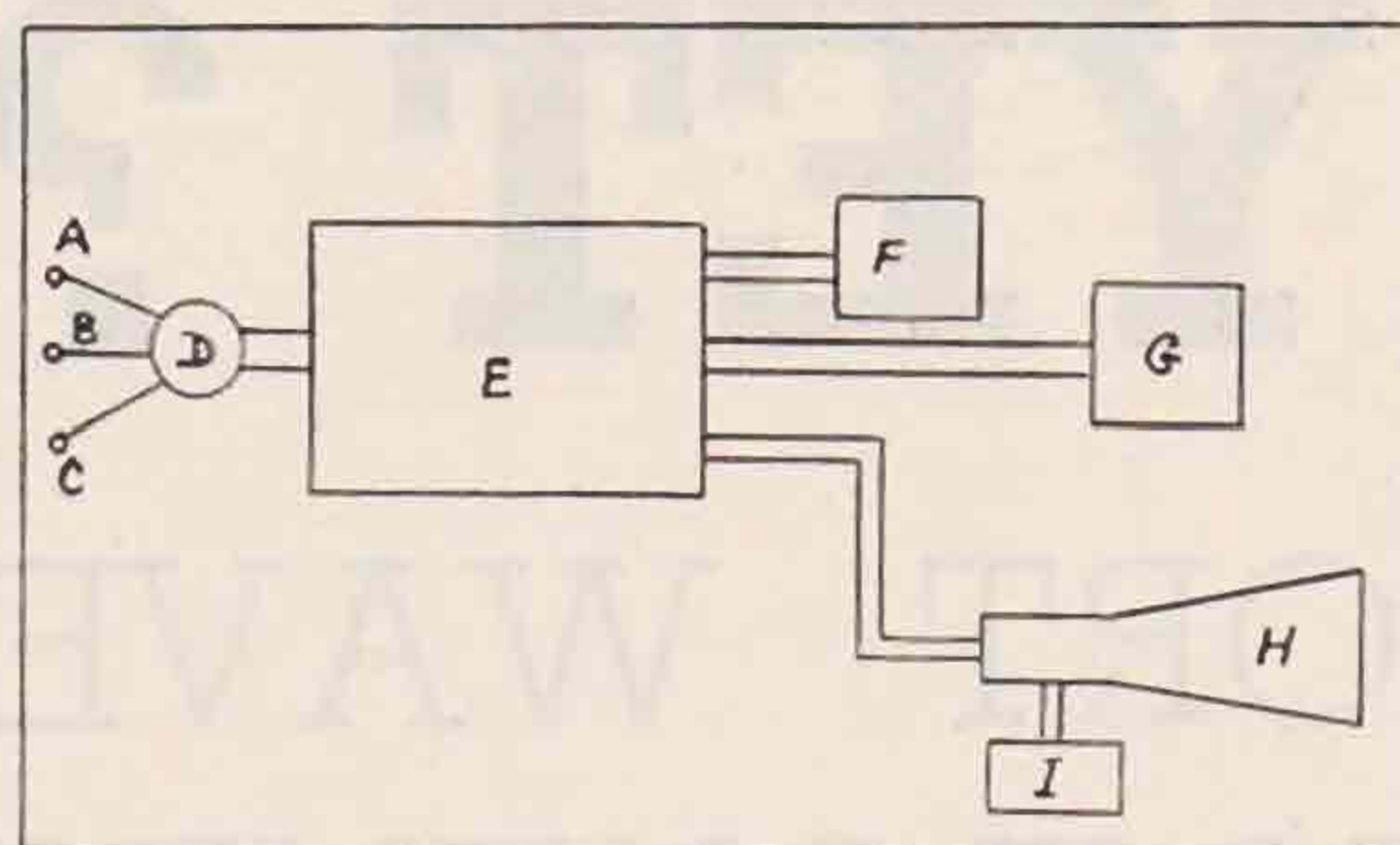


Fig. 2.

### Cathode Ray and Recording Cardiograph.

- A. } Patient Electrodes.
- B. }
- C. }
- D. Selector Switch.
- E. Amplifier.
- F. Optical System and Film Recorder.
- G. Optical System giving scale reading.
- H. Cathode Ray Tube.
- I. Time Base.

### The Electric Diagnostician.

An interesting item comes to us from our friends in Canada. It is well known that where pathological activity is found, so also is found increased electrical activity in the tissues of the body. The detection of these increased activities throws much light on the nature and prognosis of the pathological activity stimulating them.

Detection is carried out by one "roving" and one "fixed" electrode, the impulses being led off to a sensitive amplifier. The interesting thing about this amplifier is that it incorporates a special pre-

selective "eliminator" of the cardiac potential changes, which would otherwise distort the results.

The amplified impulses are led into an optical system and read off in arbitrary units, 1 to 1,000,000.

A special system of "paralleled" resistances enables units 1 to 100, 1 to 1,000, and so on to be read off.

### Other Applications.

Although not directly connected with the main issue, certain other applications of electricity and radio to medicine might well be mentioned here.

X-rays and the methods of taking pictures and obtaining direct vision with a fluorescent screen are too well known to be more than mentioned.

Less known are the subjects of High Frequency Therapy and H.F. Surgery.

### H.F. Therapy.

It is found that if a limb or other part of a patient suffering from one or other of the more "mysterious" disease, such as rheumatism, be placed in the field of a strong "flux" of H.F. impulses, of the order of 10 to 30 megacycles, great benefit ensues from the uniform warming and "flushing" effect throughout that limb or part.

It is hoped that the day will come when each of the sub-centres of control in our brain will be discovered to have its own particular "resonant" frequency, which will result in the selective treatment of mania, insanity, epilepsy, migraine, etc., with a few doses of H.F.

### H.F. Surgery.

This again is quite well known. A powerful generator is used, giving a range of about 3 to 60 megacycles. One electrode is clamped to the patient's limb, the other to a fine-edged needle, the "cutter." If the frequency is carefully chosen for each operation, the cutting is not only quick and clean, but also sterile and bloodless; for the current sterilises as it passes, and the higher frequencies seal the smaller blood-vessels by coagulation.

## SIGNALS ROUND THE WORLD ON 28 Mc.\*

**D**URING the month of October this year amateurs working on the 28 Mc. band have noticed the prevalence of British stations which were received in this country at distances from 50 to 300 miles and at times when good long-distance communication was possible. Echoes have been common also on signals from stations at comparatively close proximity to each other. An example of this is given by G6WY, who received the "H" of G6DH as six dots. On the other hand, stations at distances somewhat greater—100 or more miles—are received steadily.

It seems almost conclusive, therefore, that these signals are reaching the country of origin by going "all round the world," and that it is literally necessary for the wave to travel round the globe for the north of England to communicate with the south on this frequency. This is strengthened

by the fact that these occurrences took place in the early mornings, when it is inconceivable that ionisation would be sufficient to produce nearly vertical reflection.

Evidence from BRS25, among others, also supports the theory.

Perhaps the logic of the matter is best put by G6DH, who writes as follows: "Stations such as G6LK are heard, on certain days, generally around 08.00 G.M.T., with echoes which are often so strong as to make their ground waves unreadable. Obviously if the ground wave were *not* audible (G5SY, for instance) we should be able to *read* the echo! On the days when G5SY has been heard conditions have been good for Japan and New Zealand, and other English stations have echoes. If we look at a globe and trace a great circle starting to north-east from England, we pass through Sweden, tip Finland, through Russia and Siberia, Mongolia,

(Continued on page 286.)

\* Notes compiled by the Propagation Section, R.E.S.



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## BETWEEN



## OURSELVES

## Christmas Holidays

Headquarters will be closed from mid-day, December 24, until 9.30 a.m. December 29.

## B.E.R.U. Junior Contest

Members possessing 10-watt permits who wish to be recommended for the use of 25 watts during the B.E.R.U. contests in February, are requested to make application to the Secretary, not later than January 9, 1937.

No application can be considered after the above date.

## New District Formed

As a result of the visit made by our President and Secretary to the Newcastle area, arrangements have been made to form a new District to be known as Northern. The Southern boundary will be along a line just south of Redcar to the southern side of Northallerton, thence to Richmond and across to the Westmorland boundary.

The counties of Durham and Northumberland are included in the new District.

The Council are pleased to announce that Mr. H. Hornsby (G5QY) has accepted their invitation to serve as the District Representative for the new District, which will be referred to as No. 19.

## Radio Handbooks

Copies of the Radio Handbook, edited by Frank Jones, are now available from Headquarters at 4s. 6d. each, post free.

## Winter Edition of the Call Books

The new edition of the call book is now available, and although we carry large stocks, it is advisable to order promptly to avoid disappointment. The price is 6s., post free, to members.

## Windward and Leeward Islands

We have been informed by the Colonial Office, London, that the following call signs will in future be used by amateurs operating stations in the Windward and Leeward Islands.

Virgin Islands	...	...	VP2V
St. Kitts-Nevis	...	...	VP2K
Antigua	...	...	VP2A
Montserrat	...	...	VP2M
Dominica	...	...	VP2D
Grenada	...	...	VP2G
St. Lucia	...	...	VP2L
St. Vincent	...	...	VP2S

In each case, another letter will be added to complete the call sign. When the two-letter groups are exhausted, three-letter groups will be used.

## Town Representatives, 1937

Up to the time of going to press nominations had been received on behalf of the following members:

## District 1:

Birkenhead	...	Mr. G. Russell-Lee (G6GL).
Warrington	...	Mr. F. Vost (G2DF).

## District 2:

Barnsley	...	Mr. C. T. Malkin (G5IV).
Leeds	...	Mr. W. F. Wilson (BRS2317).
Sheffield	...	Mr. A. Pemberton (G2JY).

## District 3:

Coventry	...	Mr. L. W. Gardner (G5GR).
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## District 5:

Cheltenham	...	Mr. W. G. H. Brown (G5BK).
Oxford	...	Mr. H. J. Long (G5LO).

## District 6:

Torquay	...	Mr. G. Claydon (2CAA).
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## District 7:

Portsmouth	...	Mr. L. E. Newnham (G6NZ).
Reading	...	Mr. A. Lambourne (G5AO).
Southampton	...	Mr. L. G. Stoodley (G8DM).

## District 10:

Cardiff	...	Mr. V. J. Bartlett (G5BI).
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## District 11:

Prestatyn and Rhyl	...	Mr. J. H. Wood (G5YP).
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## District 12:

London, N.	...	Mr. R. E. Pidsley (G6PI).
Watford	...	Mr. L. Gibson (BRS1224).

## District 14:

Brentwood	...	Mr. M. B. Edwards (2ALX).
Chelmsford	...	Mr. L. B. Fuller (G6LB).
Southend and East Essex	...	Mr. C. J. Greenaway (G2LC).

## District 15:

Hayes	...	Mr. E. le Cheminant (2BCN).
London, W.	...	Mr. H. Crowe (G6CO).

## District 16:

Brighton	...	Mr. C. F. Barnard (G8AC).
Eastbourne	...	Mr. F. E. Wingfield (2BIU).
Gravesend	...	Mr. R. S. Martin (G2IZ).
Hastings	...	Mr. C. S. Bradley (G5BS).
Heathfield	...	Mr. R. J. Lee (BRS1173).

## District 17:

Boston	...	Mr. G. Hutson (G6GH).
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## District 19:

Darlington	...	Mr. H. Fletcher (2BHF).
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## N. Ireland:

Belfast	...	Mr. S. N. Johnson (Gi5SJ).
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## S.A.R.R.L. Contest

The S.A.R.R.L. DX Contest has been rearranged to take place during the first four week-ends in January, and just prior to the B.E.R.U. Contests. This Contest unfortunately clashes with our 1.7 Mc. Contest, which was announced some months ago. We have at Headquarters a limited supply of entry forms which are available on receipt of a stamped addressed envelope.



## Amateur Radio Map of the World

The A.R.R.L. have recently published an entirely new amateur radio map of the world, printed in colours, and measuring 55 ins. by 30 ins. The projection is Modified Equi-distant Azimutal, centred on the U.S.A. Although this is a disadvantage for amateurs resident abroad, there is much about the map which will appeal to British amateurs.

Its chief features are :—

1. The provision of a Country index and list of prefixes.
2. World time zones based on Greenwich.
3. Radio Zones and U.S. Inspection Districts.

The international prefix for each country is clearly printed, making quick reference an easy task.

Used in conjunction with the new Great Circle projection map produced by *Messrs. Illiffe's*, of London, this map should prove of very great value to all amateurs.

The price is 5s. 6d., post free, from headquarters.

## Rules for 1.7 Mc. Transmitting Contest

1. The Contest will commence at 23.00 G.M.T., Saturday, January 9, 1937, and will conclude at 13.00 G.M.T., Sunday, January 10, 1937.

2. Entrants must be fully paid-up members of the Society, and be resident within the British Isles.

3. The British Isles, for the purposes of this contest, includes England, Scotland, Wales, Northern Ireland, the Irish Free State, and the Channel Islands.

4. Entries will only be accepted on official log sheets which can be obtained free of charge from Headquarters prior to the commencement of the contest. Entry forms must be returned within 14 days of the conclusion of the contest.

5. Entry forms, unless completely filled in, will be disqualified.

6. The declaration at the foot of the entry form must be signed by the operator.

7. Proof of contact may be required.

8. Contacts with or calls from ship or unlicensed stations will not be permitted to count for points.

9. Only one person will be permitted to operate a specific station during the contest.

10. Leading stations will be granted certificates of merit, whilst a trophy may be awarded at the discretion of Council.

11. An exchange of reports (readability, signal strength and tone) will be required before points for a contact can be claimed.

12. Only one contact with a specific station will be permitted to count for points during the contest.

13. One point will be scored for Inter-British Isle and European contacts, and five points for contacts outside Europe.

14. The input to the final amplifier must not exceed 10 watts, nor may this figure be exceeded on any previous stage.

15. Council have the right to amend or alter the rules at any time prior to the commencement of the contest, and their decision will be final in all cases of dispute.

## Changes of Address

It will be appreciated by Headquarters if members will notify all changes of address immediately. Failure to do so often results in unnecessary delays.

## PA DX Contest

As we go to press we are informed by N.V.I.R., the Dutch Society, that they are holding a DX contest during the last three week-ends of December, 1936, and the first week-end of January, 1937. The contest will extend from 19.40 G.M.T. on Saturdays until 20.40 G.M.T. on Sundays.

Each Dutch station will give a code to the station contacted, and it is requested that this should be recorded on the DX station's QSL card. Only one contact with a specific station on each band will be allowed to count for points during each week-end.

A special certificate will be awarded to the leading station in each country with the greatest number of PA contacts.

## CALIBRATION SERVICE

Crystals should be sent direct to the Calibration Manager enclosed in a small tin, and securely packed to avoid loss in transit. The Society cannot be responsible for any loss that might occur in sending crystals through the post.

Return postage must be enclosed as postage stamps, and not attached to the Postal Order.

Calibration fees: 1.7, 3.5 and 7 Mc. crystals, 1s. 6d.; 100 kc. crystals, 2s. 6d.

All communications should be addressed to :—

Mr. A. D. Gay (G6NF),

"Oak Dene,"

156, Devonshire Way,

Shirley,

Croydon,

Surrey.

See page 117 of *A Guide of Amateur Radio* for particulars of frequency meters, etc.

## 1.7 Mc. Tests

The Council, acting on the advice of the Tests and Awards Committee, have decided that a 1.7 Mc. Transmitting Contest shall be arranged for the week-end January 9-10, 1937, in place of the combined 1.7 and 3.5 Mc. Contest previously announced. Entry forms are available on request from Headquarters.

It will be appreciated by the Tests and Awards Committee if the use of telephony can be dispensed with by stations working in the 1.7 Mc. band during the 14 hours set aside for the contest.

## A.R.R.L. Handbooks

We have been advised by the A.R.R.L. that the 1937 edition of their Handbook will sell at 1 dollar 25 cents. Accordingly we have advanced our price to 5s. 6d. post free for members and 6s. post free for non-members. The edition has been enlarged by 64 pages, and now contains 544 pages. Headquarters hold a large stock.

## Reports Wanted

G8HI (Swansea), on his 1,756, 7,150 and 14,300 kc. 'phone and c.w. transmissions.



## W.B.E. and H.B.E. Certificates

The following ordinary W.B.E. certificates have been issued:—

Call.	Name.	Date, 1936.
G5SS	A. W. L. Summers ...	October 13
W6HIW	R. C. Baird ...	" 13
VE2AX	W. G. Southam ...	" 14
W5BNO	J. Hemley ...	" 14
ZS6T	A. A. T. Cooke ...	" 14
VK4ER	E. H. Reilly ...	" 15
VS1AA	J. MacIntosh ...	" 19
G6LH	Rev. L. C. Hodge ...	" 21
G2KX	H. K. Williams ...	" 23
G5MY	H. Mee ...	" 28
G6HB	T. H. Beaumont ...	" 28
VK4RJ	Rev. J. R. Dellbridge ...	" 31
ZS5Z	J. H. Pullin ...	November 4
W9MRW	E. H. Leland ...	" 12
G6XI	J. Wilson ...	" 19
VK5ZX	A. H. Heath ...	" 20

### For 28 Mc.

G2PL	P. Pennell ...	October 23
G6CJ	F. Charman ...	November 13

### For Telephony.

ON4PA	C. Anthierens ...	November 3
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The following H.B.E. certificates have been issued:—

Call.	Name.	Date, 1936.
G16YW *	T. P. Allen ...	October 22
BERS195*	E. Trebilcock ...	" 22
G2PL	P. Pennell ...	" 23
G2DH	Dr. H. N. Walls ...	November 6
G6YL	Miss B. M. Dunn ...	" 11

\* First awards.

## QSL Section

Manager: J. D. CHISHOLM (G2CX).

Ever since its formation in the early days, the QSL Section has been the subject of much complaint; complaint which in the course of years has been increasing in volume. It is appreciated at Headquarters that things are not running as smoothly as they might, and it is the purpose of the notes this month to explain how this is, and how it can be improved.

In the first place, we would like to put on record our belief that the Section is now more efficient than ever before. To explain the apparent paradox we would point out that whilst the number of members making use of the Section has increased enormously, the value of QSL cards has gone down. Thus, if in 1926 the average transmitter replied to 75 per cent. of the cards sent to him, his colleague of 1936 probably replies to only 50 per cent. The reason no doubt can be found in the fact that DX is no longer elusive, and floods of report cards have probably weakened even the conscientious amateur.

Here are a few points that we should like the grouser to consider before he judges the QSL Section too hardly.

Consider that you have sent a QSL to a transmitter abroad, and examine the chances of receiving a reply.

You wait until you have a packet of cards for HQ before you despatch it. It is posted abroad within a period of a fortnight. The cards are sorted at the other end. It is placed in the appropriate file to wait for an incalculable time until posted to the addressee. There is a 50 per cent. chance that the card may now be written off as a dead loss if your correspondent has no envelopes. It reaches its destination. The recipient may be keen on QSL's and reply at once, or he may be an ordinary human being and (a) not interested, (b) lazy, (c) unable to remember ever having worked you. Assume, rashly if you like, that after six months he is stricken with remorse and sits down to wipe up arrears—his card to you then has to overcome the following hazards. It is sent in due course to the National Society in the country concerned, where it may remain indefinitely; it is a fact that we often receive packages of cards all more than a year old! It reaches London, and after six months lying in the files, is probably destroyed because you have no envelopes. Alternatively, it is posted to you when there are two others waiting in the Bureau for you; if you are not a very active station this may take months.

More than enough has been said to show you that the efficiency of our QSL Section is useless against these difficulties. We can only deal with the cards which arrive here, and make certain that our side of the bargain is fulfilled as promptly and accurately as possible. The rest lies in your hands. If the practice of sending QSL's declines, then the installation of a conveyor belt at HQ will do nothing to help matters. The method that numbers adopt in dealing with their QSL mail is to reply to all cards received, and to originate none. My personal opinion, as distinct from the official, is that this is the only means to secure that the only cards passing are those that *somebody* wants.

## NEW MEMBERS.

### HOME CORPORATES.

- H. R. GOODALL (G2IL), 26, Bassett Crescent West, Southampton, Hants.
- R. C. KAYE (G6RO), 153, Longley Croft, Lowerhouses, Huddersfield, Yorks.
- L. G. STOODLEY (G8GM), 31, Ripstone Gardens, Highfield, Southampton.
- H. E. WARD (G8GD), "Brooklands," 83, Mulgrave Road, Sutton, Surrey.
- G. A. DODD (G8GX), 57, Danson Road, Bexleyheath, Kent.
- K. HOLLOWAY (2AOH), 38, Australia Avenue, Maidenhead, Berks.
- A. ROBINSON (2AXX), 42, Carrick Knowe Drive, Edinburgh 12, Scotland.
- H. S. McLINTOCK (2BHM), 30, Lingard Street, Barnsley, Yorks.
- E. G. BRIGHT (2BKT), 44, Weald Road, Brentwood, Essex.
- J. P. HAWKER (2BUH), 5, Friday Street, Minehead, Somerset.
- L. CLAYTON (2BXC), 8, Rollit Crescent, Hounslow, Middlesex.
- L. D. PHILP (2BQH), University Union, Edinburgh, Scotland.
- J. S. BEGG (BRS2638), 37, Firhill Avenue, Airdrie, Scotland.
- S. G. GREEN (BRS2639), "Durban" Five Oaks Road, St. Saviour's, Jersey, Channel Islands.
- K. A. HUGHES (BRS2640), 4, Bankside Road, Woodhey, Rock Ferry, Birkenhead, Cheshire.
- G. C. OXLEY (BRS2641), 23, Spa Croft, Tibshelf, Alfreton, Derbyshire.
- S. WINSTANLEY (BRS2642), "Wiwory," Iain Road, Bearsden, Dumbartonshire, Scotland.
- J. RUSSELL (BRS2643), "Glenbrae," Ballycairn, Lisburn, N. Ireland.
- P. McCORMACK (BRS2644), 321, Springburn Road, Glasgow N., Scotland.
- L. T. DAVIS (BRS2645), Highview, Southwold Road, Ralston, Paisley, Scotland.
- L. W. CHAMBERS (BRS2646), 26, Stirling Street, Halifax, Yorkshire.
- H. T. LUNSON (BRS2647), 80A, Beaconsfield, Brighton, 6, Sussex.
- DR. W. J. NICHOLL, M.D. (BRS2648), 363, Upper Newtownards Road, Belfast, N. Ireland.



- K. J. GRIMES (BRS2649), 3, Clarendon Park, Tor Vale, Torquay, S. Devon.  
 G. A. TATE (BRS2650), Langford, near Bristol, Somerset.  
 C. T. BARRINGTON (BRS2651), 49, High Street, Taunton, Somerset.  
 G. VERRY (BRS2652), "Sunnyside," South Wootton, King's Lynn, Norfolk.  
 L. M. SHANOCK (BRS2653), "Ronede," Station Road, New Milton, Hants.  
 R. R. EVA (BRS2654), Laity Wendron, Helston, Cornwall.  
 F. F. WHITE (BRS2655), 27, Holmesdale Road, Victoria Park, Bristol, 3.  
 E. N. BROWNE (BRS2656), 45, Lostock Road, Davyhulme, near Manchester.  
 R. ROOKE (BRS2657), c/o Mrs. Tearle, 14, Grasmere Avenue, Preston Road, Wembley, Middlesex.  
 J. E. S. PATERSON (BRS2658), 42, Grange Road, Southport, Lancashire.  
 S. H. PATTISON (BRS2659), 5, Paragon Terrace, Dunmurry, Belfast, N. Ireland.  
 A. KAYLL (BRS2660), Willersey, Broadway, Worcs.  
 K. MALLETT (BRS2661), "Henbury," Tankerton Road, Tankerton, Kent.  
 C. A. GROVER (BRS2662), 3, Market Street, Newbury, Berks.  
 D. S. BRUCE (BRS2663), 39, High Street, Galashiels, Selkirkshire, Scotland.  
 H. W. TOASE (BRS2664), Sunnysdale House, Friarage Street, Northallerton, Yorks.  
 A. GRAHAM (BRS2665), 357, Langside Road, Crosshill, Glasgow, S.2, Scotland.  
 K. M. FRASER (BRS2666), 76, Ava Street, Kirkcaldy, Scotland.  
 E. G. FILBY (BRS2667), 36, Boston Gardens, Brentford, Middlesex.  
 R. NICHOLSON (BRS2668), 8, Pine Road, Strood, Rochester, Kent.  
 T. FLEMING (BRS2669), The Point, Stenhousemuir, Scotland.  
 A. DALZIEL, B.Sc. (BRS2670), 53, Lamington Road, Cardonald, Glasgow, S.W.2, Scotland.  
 S. A. CRATE (BRS2671), 4, Glen Crescent, Yoker, Glasgow, Scotland.  
 N. T. MAJOR (BRS2672), 24, Lower Avenue, Exeter, Devon.  
 A. T. BOWER (BRS2673), "Anatolia," Greenfield Road, Little Sutton, Cheshire.  
 H. K. DANIEL (BRS2674), "Oaklea," 103, Broad o'th Lane, Bolton, Lancs.  
 R. C. PENHALIGON (BRS2675), Kenwyn Hill Garage, Truro, Cornwall.  
 F. J. HAWKINS (BRS2676), 117, Mill Street, Cannock, Staffordshire.  
 D. A. LAFBERY (BRS2677), "Uplands," Old Coach Road, Wollaton, Nottingham.  
 R. CUTHBERT (BRS2678), 113, Perth Road, Cowdenbeath, Fife, Scotland.  
 M. RYLE (BRS2679), 5, Herschel Road, Cambridge.  
 G. MUNRO (BRS2680), 16, Lawrence Street, Long Eaton, Notts.  
 F. SMITH (BRS2681), 152, Aysworth Road, Ilkeston, Derbyshire.  
 J. N. WATSON (BRS2682), Tully Crine, Bearsden, Kingswood, Surrey.  
 W. M. COLLES (BRS2683), Ermyrway, Grange Road, Leatherhead.  
 J. E. LEE (BRS2684), 34, Johnson Road, Lenton Sands, Nottingham.  
 M. McPHERSON (BRS2685), 42, Haywood Street, Glasgow N.W., Scotland.  
 M. LITTLE (BRS2686), Monaco, St. Saviour's Road, Jersey, Channel Islands.  
 D. A. HARBORD (BRS2687), 58, Heathfield Road, Mossley Hill, Liverpool.  
 G. W. BAGSHAW (BRS2688), Roseneath, 200, Baslow Road, Totley, Sheffield.  
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 H. R. JEAKINGS (BRS2690), c/o Jeaking, Son & Co., Mill Street, Bedford.  
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 E. M. FROST (BRS2692), 69, Longford Street, Derby.  
 A. THALLON WOOD (BRS2693), 113, High Street, Kirkcaldy, Fife, Scotland.  
 C. WELLARD (BRS2694), 20, Ridgeway Avenue, Gravesend, Kent.  
 G. F. MORLEY (A.), Revesby Bank, Revesby, Boston, Lincs.  
 C. H. HEWSON (A.), Duke's Head Hotel, Old Bolingbroke, Spilsby, Lincs.

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 R. E. TREBILCOCK (VK3TL), Victoria Street, Kerang, Victoria, Australia.  
 G. A. GREENHILL (VK4LE), 39, Whynot Street, West End, Brisbane, Queensland, Australia.  
 C. R. ELSBURY (VK6JE), 24, Addis Street, Kalgoorlie, Western Australia.  
 E. H. LELAND (W9MRW), 335, Harrison Avenue, Waukesha, Wisconsin, U.S.A.  
 F. C. ELLIOT-WILSON (ZS6A), "Tilorna," 85, Clarendon Drive, Roodepoort, Transvaal, South Africa.

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Manager: M. WILLIAMS (G6PP).

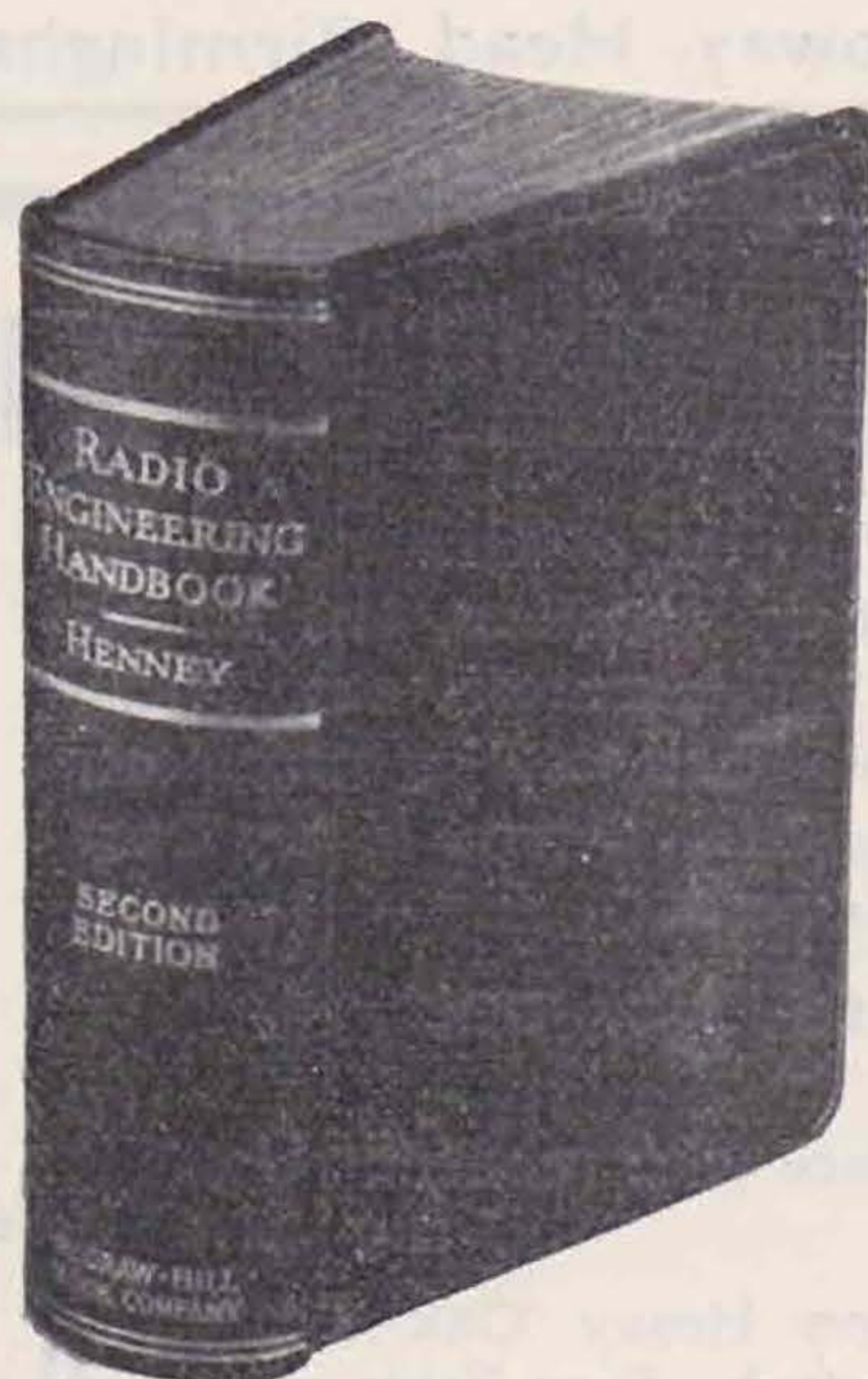
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## NEW QRA'S.

- G2DZ.—B. HALL, 11, The Inlands, Daventry, Northants.  
 G2IP.—C. J. REED, Brondeg, Goitre Fawr Road, Killay, Swansea, Glam.  
 G2KW.—W. F. GERAGHTY, Devonshire House, Farnborough Road, S. Farnborough, Hants.  
 G2QU.—D. CAMPBELL, "Riverside," Church Road, Busby, Renfrewshire, Scotland.  
 G2TX.—E. H. OSBORNE, c/o Mrs. Laybourne, Coastguard Bungalow, Felixstowe Ferry, Felixstowe, Suffolk.  
 G5AW.—A. E. WOOD, 14, College Road, Preston Road, N. Wembley, Middlesex.  
 G5GF.—H. STOPHER, 13, The Grange, Shirley, Croydon, Surrey.  
 G5MG.—DR. G. F. BLOOMFIELD, c/o Mrs. Aidons, Alice Villas, Brantham Hill, near Manningtree, Essex.  
 G5MI.—N. VAN PERLSTEIN, 45, Belstead Road, Ipswich, Suffolk.  
 G5OZ.—E. HOLT, 6, St. Leonards Drive, Woodland Park, Timperley, near Altrincham, Cheshire.  
 G5QC.—A. G. DE Q. COLLEY, "Westfield," Halloughton Road, Four Oaks, Warwickshire.  
 G5XU and G2FW.—T. N. LORD, Hazelhurst, London Road, Bracebridge Heath, Lincoln.  
 G6FT.—R. T. FROST, "St. Felix," Vardar Avenue, Williamwood, Clarkston, E. Renfrew.  
 G6FZ.—V. C. RAYNER, "Lezayre," Waterloo Park, Waterloo, Liverpool, 22.  
 G6IZ.—E. G. INGRAM, 9, Holburn Street, Aberdeen.  
 G6QK and G2IR.—R. HILTON, Cleeve Hall, Manuden, Essex.  
 G6SF.—MISS B. SALTmarsh, Sandridge, near St. Albans, Herts.  
 G6YP.—W. B. J. HACKNEY, 78, Robin Hood Way, Greenford, Middlesex.  
 G6ZX.—A. C. BROWN, 76, Belgrave Road, London, S.W.1.  
 G8AR.—E. E. ELLIS, 3, Felstead Crescent, Sunderland, Co. Durham.  
 G8CO.—F. BARRETT, 6, St. Thomas's Place, Grays, Essex.  
 G8DU.—C. A. J. PLANT, 9, Hilton Road, Harpfields, Stoke-on-Trent, Staffs.  
 G8DY.—H. I. POPAY, V8 Flight, C Squadron, E. & W. School, R.A.F., Cranwell, Lincs.  
 G8GB.—J. F. SALISBURY, "Downfield," Winscombe, Somerset.  
 G8GC.—K. E. ARIS, 9, Oak Avenue, Hornsey, London, N.8.  
 G8GG.—H. FENTON, 25, Abbey Road, Blackpool, S.S., Lancs.  
 G8GL.—T. O. I. PICK, Elmwood House, Leeming Bar, Northallerton, Yorks.  
 G8GN.—R. W. ARNOTT, Oakdene, Redbrook Road, Monmouth.  
 G8GP.—E. V. NEAL, 55, Angus Street, New Cross, London, S.E.14.  
 G8GQ.—J. RICHARDSON, "Chichelea," Clay Lane, Newport Pagnell, Bucks.  
 G8GS.—C. W. FARRELL, The Holt, Queen's Road, Knaphill, near Woking, Surrey.  
 G8GT.—H. R. SCOBELL, "Sherborne," Bucknall's Drive, Watford, Herts.  
 G8GV.—L. E. OWEN, 70A, High Street, Beckenham, Kent.  
 G8HA.—J. H. EMMERSON, Green Gates, Burwood Park, Walton-on-Thames, Surrey.  
 G8HC.—T. P. MEANY, Ozone Hotel, Bridlington, Yorks.  
 G8HI.—P. BEVAN, "Kandahar," Broadway, Sketty, Swansea, Glam.  
 G8HJ.—H. B. JEFFERIES, 91, Crofthill Road, Glasgow, S.4.  
 G8KY.—DR. D. G. KENNEDY, Waterloo House, Savile Park Road, Halifax, Yorks.  
 2ACY.—J. CARLOW, Merchiston Castle School, Colinton, Midlothian, Scotland.  
 2AJD.—J. D. MACKAY, 15, St. Bride's Road, Newlands, Glasgow.  
 2ANT.—D. A. G. EDWARDS, Selwyn House, Pilkington Avenue, Sutton Coldfield.  
 2AOF.—R. H. FARR, 32, Broomhead Road, Wombwell, near Barnsley, Yorks.  
 2AOG.—A. G. COLE, 56, St. Saviour's Road, St. Helier, Jersey, C.I.  
 2ARO.—J. RAY, "La Haule," S. Erskine Park, Bearsden, Glasgow.  
 2ATZ.—C. TURNER, 4, Moreton Avenue, Whitefield, Manchester, Lancs.  
 2AUI.—L. W. DYMOND, "Fairway," Vern, Teignmouth, Devon.  
 2BAA.—M. GIBSON, 7, Melville Avenue, London, S.W.20.  
 2BAM.—R. A. NAPPER, 43, Albermarle Road, Taunton, Somerset.  
 2BBB.—J. WILLIAMS, 30, Romney Terrace, Chancery Lane, Maidstone, Kent.  
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 2BUN.—N. THOMAS, "Derwen," Kenneth Avenue, Colwyn Bay, N. Wales.  
 2CAM.—L. F. BENNETT, 64, Roseford Road, Cambridge.  
 2CAR.—J. A. JAGGAR, "Katja," Holford Road, Merrow, Guildford, Surrey.  
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 2CCK.—D. WERSCHER, 19, St. Kilda Road, West Ealing, London, W.13.  
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 2CDW.—P. FROST, 103, Thoday Street, Cambridge.  
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 The following are cancelled:—2AAF, 2AJL, 2AMH, 2ARI, 2AZD, 2BAP, 2BBN, 2BJK, 2BPI, 2BVV.

### R.S.G.B. Slow Morse Practices.

Details will be found 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 of transmissions and numbers utilising the service. If, however, a reply is desired, a stamp should be sent. Will stations in areas at present not served offer their services to Mr. T. A. St. Johnston (G6UT), 28, Douglas Road, Chingford, E.4. (Telephone: Silverthorn 2285.) Any suggestions concerning slow morse practice will be welcome. Slow morse practices will shortly be given by members of the Radio Society of Northern Ireland and City of Belfast Y.M.C.A. Radio Club.

### Schedule of Slow Morse Transmissions

			G.M.T.	Kc.	Stations
Dec. 30	Wednesday	...	23.00	1,775	G6ZQ
Jan. 1	Friday	...	23.00	1,785	G6QI
" 1	Friday	...	23.15	1,852.5	G5DY
" 3	Sunday	...	09.15	1,775	G6ZQ
" 3	Sunday	...	10.00	7,260	G5JL
" 3	Sunday	...	10.15	1,930	G5SU
" 6	Wednesday	...	23.00	1,775	G6ZQ
" 8	Friday	...	23.00	1,785	G6QI
" 8	Friday	...	23.15	1,852.5	G5DY
" 10	Sunday	...	09.15	1,775	G6ZQ
" 10	Sunday	...	10.00	7,260	G5JL
" 10	Sunday	...	10.15	1,930	G5SU
" 13	Wednesday	...	23.00	1,775	G6ZQ
" 15	Friday	...	23.00	1,785	G6QI
" 15	Friday	...	23.15	1,852.5	G5DY
" 17	Sunday	...	09.15	1,775	G6ZQ
" 17	Sunday	...	10.00	7,260	G5JL
" 17	Sunday	...	10.15	1,930	G5SU
" 20	Wednesday	...	23.00	1,775	G6ZQ

## Trade Notes

We are frequently asked by new members to give advice on the choice of keys for morse practice. Unfortunately, very few good quality well-balanced keys are available at reasonable prices in this country, but thanks to Capt. Leslie Dixon an extensive range of types both new and second-hand is available from *Electradix Radio*, 218, Upper Thames Street. From their latest list we note that the G.P.O. platinum double-arm four-contact point type of key is available for 30s. This key originally cost 7 guineas, and is probably the very best of its type ever produced.

In the under 20s. range there is a special Government design key made by S. G. Brown and listed at 18s. 6d. This key is usually sold at 3 guineas. For the low price of 7/6 the R.A.F. type K.B. key made in solid brass is available.

*Electradix* are also well known as makers of 25 types of microphones, one of their most attractive lines in this range being the Eilsee Model B listed at 55s.

A comprehensive sales list is available on application.

\* \* \*

The Gramophone Company has recently introduced a series of records for frequency test (constant and gliding) and sound recording. These special records cover the whole recorded range in well-defined steps from 8,500 to 25 cycles per second, together with a continuous gliding frequency covering the same range; there is also a double-sided demonstration record. DB4033 covers sound demonstration, DB4034 constant frequency (8,500-4,500 cps.), (4,000-2,250 cps.), DB4035 constant frequency (2,000-900 cps.), (850-500 cps.), DB4036 constant frequency (450-275), (250-100 cps.), DB4037 constant frequency (90-25 cps.), and on its reverse, gliding frequency 8,500-25 cps.

The records have been prepared to illustrate the fundamental properties of sound, providing a convenient yet scientifically accurate means of conducting investigations and demonstrations with the minimum of apparatus. Aural illustrations can be conveniently demonstrated by means of a radiogram and visual illustrations by means of an oscillograph coupled to the speaker terminals through a suitable transformer.

The frequency test records have been recorded so that the R.M.S. velocity is substantially constant from 8,500 to 250 cps. Below this figure the practical limitation of groove space does not permit the same velocity being maintained, therefore the recording level has been made to drop smoothly from 250 down to 25 cps. For example, 100 cps. is recorded at a level of +5dB and 50 cps. at 0.5dB, whereas the recording level between 8,500 and 250 cps. is +10.5dB above zero level.

Calibration and room reverberation tests can also be conveniently conducted.

The set of five records is contained in the H.M.V. Album No. 252.



# NOTES and NEWS



# BRITISH ISLES

## DISTRICT REPRESENTATIVES.

### DISTRICT 1 (North-Western).

(Cumberland, Westmorland, Cheshire, Lancashire.)

Mr. J. NODEN (G6TW), Fern Villa, Coppice Road, Willaston, near Nantwich, Cheshire.

### DISTRICT 2 (North-Eastern).

Yorkshire (West Riding, and part of North Riding).

Mr. L. W. PARRY (G6PY), 13, Huddersfield Road, Barnsley, Yorks.

### DISTRICT 3 (West Midlands).

(Warwick, Worcester, Staffordshire, Shropshire.)

Mr. V. M. DESMOND (G5VM), 199, Russell Road, Moseley, Birmingham.

### DISTRICT 4 (East Midlands).

(Derby, Leicester, Northants, Notts.)

Mr. J. J. CURNOW (G6CW), "St. Anns," Bramcote Lane, Wollaton Notts.

### DISTRICT 5 (Western).

(Hereford, Oxford, Wiltshire, Gloucester.)

Mr. R. A. BARTLETT (G6RB), 31, King's Drive, Bishopston, Bristol, Glos.

### DISTRICT 6 (South-Western).

(Cornwall, Devon, Dorset, Somerset.)

Mr. W. B. SYDENHAM (G5SY), "Sherrington," Cleveland Road, Torquay.

### DISTRICT 7 (Southern).

(Berkshire, Hampshire, Surrey.)

Mr. E. A. DEDMAN (G2NH), 75, Woodlands Avenue, Coombe, New Malden, Surrey.

### DISTRICT 8 (Home Counties).

(Beds., Cambs., Hunts., Rutland and the town of Peterborough.)

Mr. G. JEAPES (G2XV), 89, Perne 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).

Capt. G. C. PRICE (G2OP), The Mount, Pembroke Dock.

### DISTRICT 11 (North Wales).

(Anglesey, Carnarvon, Denbighshire, Flintshire, Merioneth, Montgomery, Radnorshire.)

Mr. D. S. MITCHELL (G6AA), "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.

### DISTRICT 13 (London South).

Mr. J. B. KERSHAW (G2WV), 13, Montpelier Row, Blackheath S.E.3.

### DISTRICT 14 (East London).

(East London and Essex.)

Mr. T. A. ST. JOHNSTON (G6UT), 28, Douglas Road, Chingford, E.4.

### DISTRICT 15 (London West).

(West London Postal Districts, Bucks, and that part of Middlesex not included in District 12.)

Mr. H. V. WILKINS (G6WN), 81, Studland Road, Hanwell, W.7.

### DISTRICT 16 (South-Eastern).

(Kent and Sussex.)

Mr. A. O. MILNE (G2MI), "Twemigh," Kechill Gardens, Hayes Kent.

### DISTRICT 17 (Mid-East).

(Lincolnshire and Rutland.)

Rev. L. C. HODGE (G6LH), The Bungalow, Skirbeck Road, Boston, Lincs.

### DISTRICT 18 (East Yorkshire).

(East Riding and part of North Riding.)

Mr. W. A. CLARK (G5FV), "Lynton," Hull Road, Keyingham, E. Yorks.

### DISTRICT 19 (Northern).

(Northumberland, Durham, and North Yorks.)

Mr. H. C. D. HORNSBY (G5QY), "Newlands," 105, Kenton Lane Newcastle-on-Tyne, 3.

### SCOTLAND.

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

### NORTHERN IRELAND.

Mr. W. GRAHAM (GI5GV), 5 Ratcliffe Street, Donegal Pass, Belfast.

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

### DISTRICT 1 (North-Western).

**H**OYLAKE.—At the October meeting of the Wirral Amateur Transmitting and Short Wave Club, Mr. H. D. Bramwell (G2RF) gave a most interesting and enlightening talk on 56 Mc.

Individual reports are as follows:—G2FZ working the usual DX; 6GL comparing horizontal and vertical transmitting aerials and rebuilding; 6HQ also rebuilding; 2BDT active; 2AHG is believed to be struggling manfully with a super-het; 2BON has built new receiver, which he says is very FB; 6CX has altered direction of aerial for 14 Mc. radiation. The members in this locality wish to thank 2RF on his retirement as T.R. for Liverpool for the excellent way in which he has organised the Liverpool monthly meetings.

**Blackpool.**—Members reporting active include the following:—G5MS, who states that a spell of poor conditions on 14 Mc. is making him think about doing something on 56 Mc.; 6MI testing 6L6 on 56 Mc.; 6VQ applied for 25-watt permit and rebuilt CO-PA; 8AK still running CO from

batteries on 7 Mc.; 2AMH is now G8GG and on 7 and 14 Mc. with CO-PA/FD; 2BSF left the district and is now in Garstang; 2BCL has received a post in radio in Birmingham.

**Nelson.**—Owing to the fact that the Nelson and District Short Wave Club has been forced to cease activities through lack of members, no meeting room is now available, and until other arrangements are made, no dates can be given for future meetings.

A special meeting of the club was held on November 19, which the majority of the local R.S.G.B. members attended.

The following report active:—G2RB, 5ZN, 8DC, 8FI, 2AQY, and BRS1922.

G8DC hopes to be on the air for the first time by the time these notes appear in print.

**Rochdale.**—There is nothing in particular to report this month, but the majority of the members are active, including G8DJ, 6AX, 6QA, and BRS1152. 6QA intends to transfer his station back to his old address at 13, Haslam Street, Rochdale, in an effort to get away from the screening effect of telephone wires.



*Liverpool.*—A good attendance was recorded at the November meeting. The members heard with regret from Mr. Bramwell (G2RF) that he was compelled to relinquish his position as T.R. owing to the demands made on his time by business. His enthusiastic efforts in support of the Society are well known to all, the large increase in membership during the past twelve months being due almost entirely to his activities. The thanks of all concerned are offered to him, and it is hoped that he will still be able to find time to attend the meetings, which will now be taken in charge by Mr. Davies (G2OA), who was at one time C.R. for West Lancashire and West Cheshire.

After disposing of official business, the remainder of the time was devoted to a junk sale, with the satisfactory result that the deficit due to the recent North-Western Provincial Meeting has been completely wiped out.

Most stations in the district are active, but no reports of outstanding importance have been received.

### DISTRICT 2 (North-Eastern)

*Sheffield.*—A party of 18 visited the Automatic Telephone Exchange on October 29 and had a very fine time. An interesting lecture on cathode ray tubes was given by Mr. Shaw, of Cossors, on November 6. Mr. Shaw hopes to become an AA member soon. The meeting for December 31 is cancelled and the next one will be on January 7. Active stations are: G5TO, DX 'phone and expecting new receiver; 2AS awaiting QRO permit; 2MF and 2HQ testing 'phone; 2JY rebuilding; 2XH unable to attend meetings, due to illness in family, which we hope will soon pass; BRS1800 is now 2CBQ; 2606 and 2598 are expecting AA calls. Other stations active are: 6LF, 5UJ, 6PJ, 2DJ, 2BXA, 2BKN. The T.R. sends seasonal greetings to all members.

*Stockton-on-Tees.*—Apologies to members in the area for non-appearance of last month's notes: the scribe had to send off the report before notes had arrived. Meetings are being held on alternate Fridays at members' QRAs: particulars from G2FO. G8CL is using series modulation on 14 Mc. and is having good W contacts; 6ZT is active and rebuilding; 5XT and 5QU are on 7 Mc.; 2FO is on 14 Mc. and has worked 10 new DX countries after increasing power to 25 watts: he had fair success in the VK contest; 2BHF has applied for full licence and testing modulation systems on transmitter; 2BQO is testing series modulation, but not yet satisfied with results; BRS2297 is now 2CBA and testing MO-PA on battery QRP; 2BPI has passed morse test and awaits call. We are sorry to lose 6MF, who is now at Stevenage, and we send him our best wishes. (Stockton-on-Tees is now part of District 19.—Ed.)

*Leeds.*—The Leeds Radio Society has arranged a DX receiving contest every Sunday in December, and a system of sending collective listening reports to certain DX stations is being tried. On November 16, 2AHL gave an interesting talk on the "Fundamentals of Transmitting." 2AHL wishes to co-operate on 28 Mc.; 2AHM is testing triode frequency meter; 2BLA is trying out frequency measurement gear; BRS2317 active on all bands; 2439 reports fadeout on 28 Mc. on November 15 from 17.05 to 17.15 G.M.T.; 2546 is active;

### FORTHCOMING EVENTS

- |              |  |
|--------------|--|
| December 15. | District 14 (East London section), 7.30 p.m., at G6UT, 28, Douglas Road, Chingford, E.4.   |
| " 16.        | District 14 (East Essex section), 8 p.m., at G6IF, "The Chalet," Woodside, Belfairs Garden Estate, Leigh-on-Sea.   |
| " 16.*       | District 15, 7.30 p.m., at 2BVX, 59, Coningsby Road, High Wycombe, Bucks. Discussion on 28 Mc. by G6WN.  |
| " 17.        | District 13, 8 p.m., at Brotherhood Hall, West Norwood.  |
| " 18.        | Annual General Meeting, 6.15 p.m., at I.E.E. Tea at 5.30 p.m. Lecture and demonstration by Mr. Angier, Decca Record Co. Subject, "Gramophone Recording." |
| " 20.        | District 4 (East Midlands), 3.30 p.m., at Trent Bridge Hotel, Nottingham.  |
| " 20.        | District 11, 6 p.m., at G5OD, "Rocklyn," Peulwys Road, Old Colwyn.   |
| " 23.        | Scotland "D" District, 7.30 p.m., at R.S.A. Rooms, 16, Royal Terrace, Edinburgh.   |
| " 30.        | Scotland "A" and "E" Districts, 7.30 p.m., in room "A," Institution of Engineers and Shipbuilders, 39, Elmbank Crescent, Glasgow.                        |
| January 3.   | Scotland "F" District, 7.30 p.m., in R.S.A. Rooms, 16, Royal Terrace, Edinburgh.   |
| " 3.         | District 7, 2.30 p.m., at Royal Oak Hotel, Stoughton, Guildford.   |
| " 6.         | Scotland "D" District, 7.30 p.m., in R.S.A. Rooms, 16, Royal Terrace, Edinburgh.   |
| " 6.         | S.L.D.R.T.S., 8 p.m., at Brotherhood Hall, West Norwood.   |
| " 11.        | Scotland "B" District, 8 p.m., in Empress Café, Aberdeen.  |
| " 13.        | Scotland "H" District, 7.30 p.m., at Abbotshall Hotel, Milton Road, Kirkcaldy.   |
| " 16.        | R.T.U.N.I. meeting at Lecture Theatre, Faculty of Agriculture, Q.U.B., Elmwood Avenue, Belfast.  |
| " 22.        | District No. 4 (East Midlands), Dinner and Dance at Trent Bridge Hotel, Nottingham.  |
| " 29.        | London meeting, 6.15 p.m., at I.E.E. Tea 5.30 p.m.   |

\* Sale of disused apparatus at this meeting.



2AHM has removed to Ilkley and we send him our best wishes in his new post. All members are asked to send reports to the T.R. before the 21st.

*Bradford.*—Most stations are active, and members meet at the Bradford Radio Society meetings. G6KU has joined 6XL and 6AZ on 14 Mc. after a long absence. Individual activities are not known as no reports were received. The T.R. and Scribe sends Christmas and New Year greetings to all members.

### DISTRICT 3 (West Midlands).

Activity in the Coventry District appears to be very brisk, and it is with pleasure that we publish the following notes.

*Coventry.*—The date of the annual dinner of the C.A.R.S. will be announced shortly. Local meetings of the Society have been held weekly throughout the summer, and the attendances have been maintained at a high level. There is an experimental copy of a proposed magazine being produced at present, with regular publication in view. "Calling all CARS" may be the title. The Coventry Corporation, following the lead of those of Birmingham and Wolverhampton, have supplied 15,000 QSL cards to local amateurs, and further recognition is evidenced by the advice that is being sought by the local authorities in connection with the installation of radio on the fire tender for emergency communication with the fire station. The local evening paper, the *Midland Daily Telegraph*, continues to act as the official organ of the Society. The T.R. describes the new design of the club badge, deliveries of which are now awaited. It consists of the "Ham Diamond," with the letters C.A.R.S. in the corners, joined by a flash. The motto, "Orbis Voci," is set out between the representations of the two hemispheres, the whole being in blue and silver.

2CBJ, of Shipston-on-Stour, reports from Cambridge. He has a 59 tritet, 46 FD/BA and 10 PA rig, and hopes to report regular activity in future.

### DISTRICT 4 (East Midlands)

A very good attendance was registered at the last monthly meeting in spite of heavy fog. Several members from outlying districts put some of the locals to shame.

An interesting talk was given by G2WS on "56 Mc. long-line transmitters and TRF straight receivers." WS must be complimented on the fine workmanship of the sets on view.

The annual celebrations of the District will take the form of a dinner and dance, to be held on Saturday, January 22, 1937, at the Trent Bridge Hotel. Final particulars will be given at the next meeting in December. It is certain from the enthusiasm shown at this early date the attendance will be well over the 50 mark.

The next ordinary meeting is on Sunday, December 20, at 3.30 p.m., Trent Bridge Hotel, Nottingham.

### DISTRICT 5 (Western)

Reports appear to be scarce this month, and, apart from the Bristol and Cheltenham areas, the District appears to be inactive. The D.R. realises that this is far from being the case, but would point out that *no reports mean no District notes.*

This applies also to a number of stations in the Bristol area, who are known to be active.

*Bristol.*—The usual monthly meeting was held at Carwardine's Café, Bristol, on November 5. The T.R. 2BYU was in the chair, and the large attendance had a real "firework" night. The Chairman challenged the correctness of the minutes of the previous meeting on the ground that they did not mention the reason why the present meeting was not called at the Bristol Amateur Clubroom. After discussion the minutes were finally accepted as a correct record. Subsequently it was agreed to accept the offer of the clubroom and in future all R.S.G.B. meetings will be held there, at 23, Bridge Street, Bristol.

The question of carrying out communication experiments at a local colliery created a good deal of discussion.

It was proposed and agreed that in future lectures will be given at the commencement of meetings.

Stations active: 2GQ, 5FS, 5JU, 5KT, 5UZ, 5UH, 6VF, 6VK, 6BW, 8DP.

*Cheltenham.*—Some of the Swindon Short-Wave Club and 2AKR were visitors last month. Two more full calls are expected shortly. Interest is increasing, active stations being G5BK, 5BM, 6ZQ, 8DA, 8DT, 2AQO, 2BLS, 2BNM.

### DISTRICT 6 (South-Western)

There appears to be great activity in the South-West at this time of the year, many stations report active, and practically all bands are in use. The 7 Mc. band seems in great demand, and in this connection the D.R. would mention that he is now working a little on this band and will be very pleased to QSO District 6 stations.

The D.R. hopes that all members sent in their Council ballot forms and also T.R. nomination forms. In the latter case, should it be found that there is no T.R. nominated for any area, the D.R. will probably be asked to get someone to carry on the job. This should not be so, but if it has occurred, perhaps the local members will put things right by sending suggestions to the D.R.

Local meetings do not appear to have been so well attended lately, but as illnesses seem to be the chief trouble, it is hoped that things will be better this month.

*Torquay.*—At the last meeting, which was attended by eight members, the D.R. described and demonstrated the resistance, capacity, and inductance bridge that formed the basis of a short talk at Convention.

6WT, 2CI, and 5SY still carry on their tests on 56 Mc. from QRA to QRA, and have successfully effected three-way duplex on the band; 5SY has had some good 28 Mc. contacts: all American districts have been worked six times over on this band, as well as all VE districts once; best DX results have been a report of R7 from ZL2BP and a 'phone contact with VK2GU at QSA5R7 each way.

*Exeter.*—The local meetings are being well attended, a recent one having all the membership but one. Arrangements are being made for a short talk at each meeting. 5WY is off the air for the time being owing to troubles with the TX. 5QA has been concentrating on 14 and 56 Mc.; on the former band he has worked ZL, VK, K6, J, XU, and HS.



*Taunton.*—No report has been received, the first miss for a very long time. 6BW is heard quite a lot on 7 Mc.

*Bideford.*—Members here are very active and 6FO writes in very optimistic vein. The Bideford and District Short Wave Society now has its own club room. 6GM has 450 volts of batteries going with a T25D. 2ADJ is learning morse, while 6FO is working W's early mornings on 3.5 Mc. at R7.

*Penryn.*—No meeting was held in November, but all members are active and show great interest in 7 Mc. 2BXT is working on morse and several BRS members are engaged in band occupancy checks.

### DISTRICT 7 (Southern).

*Guildford.*—G5CM is doing good work on 28 Mc., having now four continents to his credit with an input of 6 to 8 watts. 6LK is trying to get going with fairly high power on 56 Mc., using a pair of RK20's in the final stage. 5WP and 5RS are heard occasionally working DX. Conditions on 28 Mc. seem to have deteriorated somewhat, so 6GS has been working on his super again, and has at last got it going on 28 Mc. It is also working remarkably well on the lower frequencies, although there have been a few snags due to use of regeneration on both r.f. and detector stages. 2CAR has been resting after his efforts in the VK-ZL contest.

*Portsmouth.*—The South Hants R.T.S. held their November meeting in Southsea, when G6NZ lectured on "Considerations of Transmitter P.A.'s," giving, among other things, calculations for the 210. For the January meeting, BRS1907 is to speak on "Radio Measurements." These meetings are normally held on the first Wednesday in each month. G6WS, still rebuilding, is on with a 46,2ZR, G2ZR with BRS2105 has rebuilt the TX and altered his aerial. 28 Mc. activity continues. 2XC and 6NZ are both active on this band and both find regenerative power F.D.'s quite effective as final stages. Alexandra Palace transmissions are heard here by several members on both straight and regenerative quench sets. Congratulations to BRS2482, who is now A.A. Others report usual activity.

*Croydon.*—The Croydon membership holds meetings regularly as the Surrey Radio Contact Club. The main meeting is held on the first Tuesday of each month, with an additional meeting for BRS members on the third Tuesday. These latter meetings are more elementary and include class for morse instruction. *Messrs. Everett & Edgcombe, Ltd.*, are sending a representative to the January 5 meeting to lecture on "Electrical Measuring Instruments and Their Uses." The meeting will be held at the "Alhambra," Wellesley Road, West Croydon, at 8 p.m. Further particulars are available from G5XW, 35, Grant Road, Addiscombe.

*Reading.*—A good muster was present at the November meeting, and welcome was extended to 2BVU on his first appearance and to two new members, 2BIG and BRS2618. In the absence of a lecturer, the evening was given over to general discussion, dealing with single-signal receivers. Most members report active. G5HH awaits QSL cards for claiming WAC and WBE, PY and ZC giving the necessary contacts. 5AO also awaiting cards for WAC. 2YB has erected his new masts and has worked VK, ZL, etc., from his new QRA. 2BIG has a single-valve transmitter, using a 6A6

valve, and 8BK is putting out good quality telephony. The next meeting will be held on December 16. The T.R. sends season's greetings to all Reading and District members.

*Southampton.*—8DM forwards an interesting report, our first from this town. He is active on 57 Mc. with self-excited resonant line transmitter. 5PT and 2ZU are also active on this band. 2VF is active on 14 Mc., as is 5OB, who is also getting ready for 56 Mc. tests. Alexandra Palace transmissions are well received on three-valve super-regen. by 8DM, vision being R6 to R9 and sound R5 to R8, with peak reception on dry frosty nights. Will Southampton and District members please report regularly to 8DM, L. G. Stoodley, The Physical Laboratory, University College, Southampton?

The district meeting last month was held at G2NH and was a "Question Meeting," at which we were pleased to welcome G5IS from No. 13 District. Many knotty problems were discussed and everyone went away a wiser, but not necessarily sadder, man! The next meeting is to be held at Guildford on January 3. Our usual meeting place is no longer available and we are trying a new QRA at the Royal Oak Hotel, Stoughton, Guildford. For the benefit of those coming by road, the hotel is just off the Guildford-Aldershot road, near Stoughton Barracks.

The D.R. takes this opportunity of wishing everyone a Merry Christmas and a Prosperous New Year, and thanks members for their support during the past year.

### DISTRICT 8 (Home Counties)

At the first official district meeting to be held in Peterborough, on November 13, fourteen members attended, and made the evening a success. Discussions in the main were of a business nature, and most members took the opportunity of "airing their views" on several subjects. Several suggestions claimed to improve members' benefits in the Society were put forward, and these have duly passed to H.Q. for that full measure of consideration which some of the ideas would seem to warrant, but more anon of these.

Reports this month are few and far between, but activity in the district seems to be very great. G5JO is still busy on 7 and 14 Mc. 'phone, and continues with aerial experiments. It is suggested here that the results of his findings in this direction might be found useful in the form of an article in simple language for the "BULL." (Agreed.—Ed.) 2PL is doing some very fine work on 28 Mc., and hopes shortly to be "showing us the way" on 56 Mc. (Good luck, om.) 5DR is now almost ready to make a big noise from his new QRA, which incidentally is the next house to 2AKA. Both of these members have built single signal supers, and at a rough guess we rather think they will need 'em!

The St. Ives group seem to be quite active, but send no reports, and since your D.R. hears no chatter over the air from these stations he cannot even "conjure up" a report for them. G2NJ has been elected President, and 2UQ and 5NX respectively are Vice-Presidents of the Peterborough Radio and Television Society. All are active on 7 Mc., the latter two using 'phone on this band. BRS2075 is a joint Secretary of the above society. 2171 now claims the call 2CCF. A warm welcome is



extended by all to 1540, who is devoting his time to patiently listening on 56 Mc.

2AZF entered the VK/ZL receiving contest, and anxiously awaits the results. He is also trying to find out how to make an artificial aerial not radiate outside the house. (Try using it in a screened room, om!) 2XV has at last cleared up his trouble of R.F. getting into his speech equipment on 14 Mc., and found it was being picked up by the shaft of the volume control, which protruded through the sheet iron box in which all the L.F. equipment is housed—he may also tell us later how, with the aid of 5DR's brains and his own brawn, he replaced a broken rope through the pulley of a 40-ft. mast without taking it down or climbing the pole.

The next district meeting will be held in St. Ives at the same place as before, unless members are notified otherwise. This is the Lamb Hotel, and the meeting time will be 8 p.m. sharp. The date is January 8. Note it. BRS2684 becomes 2CDW, and Mr. Frost is now getting his equipment together, also the first G8 to appear in Cambridge is 8FF, late 2AOL. Welcome to the fold of fully fledged ether shakers.

#### DISTRICT 9 (East Anglia)

Activity during the month has been somewhat curtailed owing to the approach of Christmas. However, a few reports are to hand, so our previous notes have apparently taken effect!

We regret to hear from 5MG that the damp has compelled him to close down his 56 Mc. activities for the winter. This is very unfortunate, as his QRA is ideal for the ultra-high frequencies, as is shown by the C.W. contacts he has already made. 5MI, who is on 3.5, 7 and 14 Mc. with C.W. and phone, sends in an interesting report. 5UD at Swaffham is moving his QRA, and is to rebuild his transmitter on the rack principle. In Norwich, 6QZ is waiting confirmation for his WBE and WAC on 28 Mc. having this month worked VK2 three times and also VE2 on fone. 2JS, owing to a successful football forecast, is expecting to put out some high quality phone in the near future!

We welcome Mr. Verry as a new BRS member at King's Lynn. He has been most useful in climbing trees at the 2XS farm. Mr. Loades, of King's Lynn, has now received his AA call and has a short-wave bench installed. Others active in the District include 2MN, 2XS, 5QO and 6UA.

#### DISTRICT 10 (South Wales and Monmouth)

Please note that the new QRA of the D.S. is 171, City Road, Cardiff, and all future correspondence should be addressed to G5BI at the above. Telephone: Cardiff 7797.

Activity appears to be on the increase this month, and we welcome 2BVV of Port Talbot, who is now 8HI; he is active on 7 Mc. band with phone and c.w.

We all deeply sympathise with our Swansea T.R. (2UL) on the recent loss of his father, who passed away after a month in hospital. For this reason, 2UL has been inactive for the past two months.

Congratulations to 5TW and 5LV, who have contacted VK on 10 watts. 5FK, 5KJ, 5PH and 6JW are all active, while 2SN and 2WO are QRT during the winter months, but are burning the midnight oil on theory. There is little corporate activity in Swansea at the moment, but they hope

to get the Club going again shortly. BRS2035 has applied for his A.A. licence.

In Cardiff the Club still hold their weekly meetings, and a very interesting talk was given recently by 5XN on Goyder Lock, while the worthy Secretary (2BQB) gives regular talks on transmitters for the beginner. The Club hope to have their AA call by the time this is in print. We are pleased to welcome BRS2583 as a member, and may other Club members follow his example.

5XN and 8AM are still active on 7 Mc., while the former is also putting out a good signal on 1.7 Mc.

6ON and 2BHA are very active on 7 Mc. phone, and appear to be getting some pleasing results. 2BSN and 2BHZ have very fine transmitters ready for the air which would do credit to any two-letter man.

Newport is inactive, except for 2JL, who seems very pleased with things generally.

2JL is active on 1.7 and 56 Mc., and is doing quite a lot of work on the latter band with the aid of a field-strength meter and a car. One day he couldn't use the said car, so he packed the set in a suitcase and mounted a bus, much to the annoyance of two dear old ladies who couldn't quite make out just where the screeching noises were coming from. He has heard 5JU of Bristol from his QRA.

Will anyone who wishes the Newport meetings to be continued please communicate with the T.R. (2JL). It seems a pity that they have to be discontinued after so many years, especially when there are more members than ever in the area.

Things are certainly stirring in Blackwood, and both 2BAQ and 2BXD are swotting the code and hope to get two-letter calls shortly. 8CT has put up a 45-ft. mast with the help of the Club members, and is active on 7 and 14 Mc. 6BK cannot work DX on 14 Mc., but has worked W1, 3 and 8 on 7 Mc., using QRP.

The Blackwood Club are holding their annual "hamfest" on Thursday, January 7, at The Central Café, Blackwood, at 7 p.m. Price, 1s. 6d. a head.

G8FJ still ploughs the lonely furrow in Ebbw Vale. Keep it up, OM!

We sincerely hope that QRM isn't getting too bad for 5VX these days.

G2OP is out of action at the moment, having become demasted in the recent gale.

#### DISTRICT 11 (North Wales).

Following a circular letter from the D.R., one of the best attendances at a District 11 meeting was recorded at G6AA on November 22. G5OD was nominated and elected T.R. for Llandudno, Colwyn Bay and area, while arrangements were made for a member to take over the duties of T.R. in the Rhyl-Prestatyn area. There was a most interesting exhibition of apparatus, including an impressive demonstration of his very efficient transceiver by 6OK. Using a short aerial in the meeting room, G6YQ at 16 miles was contacted on phone with an input of 1.5 watts, and a report of R6-7 received! 2NF and 5YP/P were also contacted, the latter using a transceiver in a car which left the meeting place and drove on until signals disappeared. General activity still continues on the 56 Mc. band. 2NF has heard amateur harmonics, and also harmonics of several 19-metre



broadcast stations in the region of the 5-metre band. 6AA has also heard several harmonics.

We are all expecting the band to open up for fundamental DX, especially in view of the reception of the Alexandra Palace 41 Mc. transmissions by ZT6K.

Don't forget the next meeting (see "Forthcoming Events"), and bring along your latest apparatus to show.

#### DISTRICT 12 (London North and Hertford)

The November meeting was held at Southgate and attended by members from all parts of the district, a large percentage of Hertfordshire members being present in spite of inclement weather. Mr. Moxon (G6XN) described superhet receiver principles and the development of the single-signal super.

The D.R. would appreciate it if members would arrange to let him have at the January meeting any articles or information which would be of interest in connection with the district's proposed experiments with measuring equipment.

Congratulations to G6CL on obtaining his WAC on 28 Mc.

The D.R. and C.R.'s wish all members a very enjoyable Christmas and a Happy New Year.

#### DISTRICT 13 (London South).

The District meeting held on November 19 was almost entirely occupied with discussions on the new T.R. scheme in South London. The position in the District as it now stands and the plan for the future were detailed at some length by the D.R., and it is felt that all those who attended the meeting thoroughly understood the position. For the benefit of those members who were not present it may be well to make a few comments in these notes. One of the main objects of the T.R. scheme is to subdivide the District into certain small areas, in each of which a representative will operate for the purpose of organising local gatherings, collecting local news and forming a closer liaison between the membership and the D.R. than is at present possible. It must not be thought that by discontinuing the monthly meetings at Norwood we mean to suggest that these have not been satisfactory. They have served a very useful purpose, and without them District 13 could not have regained its position in the affairs of the Society. The new plan which is being put into operation has been chosen with the idea of drawing in many members who have been unable to attend meetings at Norwood. We wish to see everyone in the District taking an interest in matters, and it is felt that the procedure in the past has rather tended to cut out those who were unable to attend District meetings. It is, of course, up to the membership as a whole to make a success of the matter, and we look to them to support their T.R. to the best of their ability. The D.R. will, of course, attend as many meetings as possible, and any matters of importance can always be passed to the T.R. for communication to the D.R. It is proposed to hold occasional meetings at Norwood for the purpose of junk sales and discussions on various important matters; notice of these meetings will appear in these pages as and when necessary.

On December 17 a District meeting will take place at the Brotherhood Hall, and it is hoped to make some preliminary arrangements for Field

Day, 1937. As the following general meeting will not be held until next spring, we hope to see a good attendance in December. The monthly meetings of the S.L.D.R.T.S. will, of course, not be affected by the T.R. scheme.

Finally, the D.R. would like to wish everyone a very happy Christmas and a prosperous New Year. His sincere thanks are offered to all those who have helped so readily in making a success of District 13 in 1936.

#### DISTRICT 14 (Eastern).

*East London.*—A well-attended meeting, held at G6AU, Forest Gate, witnessed the N.F.D. Films. Among those present were G2LC, and BRS207 from Southampton. An appeal is made for a QRA for January and February meetings. G6UT is again active on 56 Mc. each Sunday morning. G5DY is giving slow morse practice, and from reports he obtains, his work is being appreciated. G6AU is rebuilding.

*East Essex.*—There were 17 present at the November meeting held at G2MY, Thundersley. This year's N.F.D. films were shown and much appreciated by all. The meeting was then opened for discussion on 56 Mc. work and suggestions for next N.F.D. A welcome visitor to the meeting was Mr. L. V. Rubeck (ex ON4ZQ), who announced that he had come to settle down in Hadleigh. He is well known to many as an operator of the R.B. station at the 1935 Brussels Exhibition.

The Southend 56 Mc. stations are now looking for co-operation outside their town, and would welcome help from surrounding districts (District 16 please note!). Any offers should be addressed to G5UK, who is organising the U.H.F. tests here.

We are sorry to lose G2WG, who is moving to Hutton, but he hopes to keep in touch with this area.

Active stations are: G2SO—testing his new rig on 7 and 14 Mc.; 5UK, new speech amplifier, and getting good results with his transceiver on 56 Mc.; 2KT also active on 56 Mc.; 2UK building 56 Mc. gear; 5VQ expects to have an automatic morse sender in operation soon; 5XI, rebuilding; 2BNR, BRS1647, 2625, 2635, 2612, 2622, all active with 56 Mc. receivers. BRS 2568 and 2572, of Pitsea, are learning the code. The usual stations are on 7 and 14 Mc.

A cordial welcome is extended to the new members in this area: BRS 2612, 2622, 2625, 2633, 2635.

The T.R. conveys his Christmas greetings to all members in the District.

#### DISTRICT 15 (London West, Middlesex and Buckinghamshire)

The November meeting was not so well attended and this was no doubt due to location. December will see us visiting High Wycombe, and it will be interesting to see what support is forthcoming there. (See Calendar for date.)

Junk sales are to be curtailed in future and a talk given or paper read to add further interest. Venues and offers of talks for future meetings are requested by the D.R.

Those responsible for the dinner have gone ahead with arrangements and the probable date will be January 23 or 30, and the charge about 4s.



Will members attending the next meeting note that the nearest noteworthy place is the Beaconsfield Arms and should ask for this after leaving the station or coach!

Reports are better this month and most sections of the district are represented.

*West London.*—G6WN on 28 Mc. is now WAC and WBE after contact with ZL on the seventh. BRS2239 hearing quite a lot on 28 Mc.

*South Middlesex.*—Active: G2LA, 2NN, 2VV, 5KX; G2LA building frequency meter and compiling Crystal Register for benefit of local R.S.G.B. and T.V.A.R.T.S. members. (Don't forget G6PR compiles one!) G6GB building shortwave super. G2NN will soon be on 'phone again, while G2KI and G5VB are too busy for radio. 2BXC is a new member and we welcome him.

*West Middlesex.*—Only BRS2241 and G6VP report, the former is applying for AA and the latter still sticking to aerial problems.

*North-West Middlesex.*—G6LJ recently visited SM5SI and SM5WJ while on business.

*Bucks.*—2BVX built transverse current microphone and BRS2498 has been listening on all bands except 56 Mc. He welcomes the TR scheme.

The T.V.A.R.T.S. held their Annual General Meeting on October 28 and witnessed a television demonstration at the invitation of Mr. N. C. Rogers, of Weybridge. This is the first time the Society has had the opportunity of seeing a complete B.B.C. television programme, and it was all the more interesting because the distance was twenty-five miles from Alexandra Palace. The results were surprisingly good and only occasional interference was experienced from car ignition, but the subject matter could have been more interesting. Between forty and fifty members were present and Mr. Rogers was accorded a hearty vote of thanks at the conclusion.

#### DISTRICT 16 (South Eastern).

*Brighton and Hove.*—The group are pleased to welcome Capt. Houghton (G2OJ), who possesses a private physical laboratory which must be one of the best in the country. He has allowed local members to inspect his gear. They also welcome Mr. Hill (BRS2564) and Mr. Heaver, who both have experience of professional radio.

*Heathfield* reports that all members are receiving the Alexandra Palace; and BRS1173 also claims to have heard American police stations on 7 $\frac{3}{4}$  metres.

*Eastbourne* reports general activity.

*The M.A.T.S.* have held their annual dinner, plus a cabaret. The Scribe regrets that business prevented him from taking up some of the Folkestone group.

*Tunbridge Wells* reports that G5OQ, 5KV and 2UJ are back on 1.7 Mc. 2UJ is also putting out a signal on 56 Mc., assisted by 2AVN, and using a push-pull long lines outfit with two 015/400's.

*Bromley and District* report that a record meeting (25), including many distinguished visitors, was held at G2AW on November 21. OW's and YL's were invited, and a successful evening of songs and dances resulted. Thanks are due to Mr. and Mrs. AW for their generous hospitality.

Folkestone Radio Amateurs are all active, and are starting transmitter building classes for the beginners. They are still putting out a CC CW signal

on 56 Mc. every Tuesday evening, between 20.00 and 21.00.

Congratulations to our old friend Ham Whyte and his charming wife on the advent of David. The Godfathers are 2ZQ and 5YH, which seems to ensure that the wee fellow is at any rate expected to master the morse code as part of his youthful education! The whole District will wish the best of luck to the ever-popular G6WY and his family.

#### DISTRICT 17 (Mid-East).

As very few alterations have been received for the Crystal Register, it is presumed that the first issue was reasonably correct. In case anyone should have any new frequencies, will they please let me know as soon as they read this as the District Scribe will be producing the revised issue as soon as the Christmas festivities are over. The list will first be sent up to H.Q., so that it will also serve as a convenient list of the R.S.G.B. membership in the district. The register will be revised each year during December.

*Boston.*—6GH now has his new *Tungsram* OQ70/1000 working and is highly gratified with the results. Excellent output is obtained on 28 Mc., but contacts on this band are difficult owing to severe interference from cars. 6LH has been exclusively on 28 Mc., but finds conditions unreliable. During the first part of the month he worked VK, FT, VE3 and several W's, including a W6. 2AAS has a new TRF-v-1, which is very stable and is bringing in plenty of DX. His CO-PA is complete except for meters. BRS2609 of Burgh is busy revising his morse and has applied for an AA permit.

*Brigg.*—8AP has worked VK, ZT, FT and TF and is now building the 1936 Jones Exciter Unit, which will drive a type 210 in the PA.

*Cranwell.*—Three interesting lectures have been given to the CARTS. One on measuring instruments as applied to radio, one on the measurement of L.F. and H.F. inductances and one on Television by Mr. Parr, of Ediswan's. All these lectures were well attended and aroused great interest. In the shack 6TV is busily engaged on preparations for getting on the air again. 6AC is working for an examination and expects to be leaving Cranwell shortly, thus depriving us of another valued member. We shall be relying on the new members there to try and take the places of stalwarts like 2LR and 6AC. It is good to learn that enthusiasm runs high and the success of the "A" station during N.F.D. was an achievement which we hope we shall be able to reproduce next year.

*Lincoln.*—5XL has obtained Council's sanction to a 50-watt licence and is now awaiting a visit from the G.P.O. He has had fair results on 3.5 Mc., but little success on 14 Mc. Plans are in hand for a new transmitter which will produce the desired results.

*Sleaford.*—News comes from 2BZO at University College, Nottingham, that he is studying almost everything except radio, but the Christmas vacation will remedy that deficiency. Congrats. to BRS2448 who is now 2CBD.

Finally, may the D.R. extend on behalf of the Boston members their cordial seasonal greetings to all the district and those with whom they have been in contact during 1936.



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**EDDYSTONE 1937**  
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**DISTRICT 19 (Northern).**

The important meeting of November 12, held at G2LD's address, was attended by over 30 members from all parts of the district, in spite of stormy weather. Both our President and Secretary were heartily welcomed and many matters of R.S.G.B. importance were elucidated. Our thanks to G2LD for his hospitality.

*Stockton.*—See District 2 report.

*Sunderland.*—The following are active: G5NS, G6HV, G6UD, G5AC, G6GY, G6TR. G6UD has obtained the first WAC in Sunderland. G8AR has worked ZL on 14 Mc. phone.

*South Shields.*—Meetings are held on alternate Thursdays at G5WZ. The following are active: G5WZ on 56 and 112 Mc., with superhet receiver, G5SD, G6VG, 2BOZ and 2ADU. The last two have applied for full permits.

*Newcastle.*—Meetings are held fortnightly at G2LD. The following report active: G2LD, 2ARY, G5AY, 2BGG, G2PN, G6MK, G5RI, G2GC, G6IR, G6YL, G5QY. The last seven are on 28 Mc. and on this band G6IR and G2PN still need two continents for WAC, G5RI is WBE; and G5QY WAC and WBE. We all congratulate G6YL on her 28 Mc. WAC and WBE on 8 watts input. G2XT will soon be active again in his new ORA, while G2OT is now shipboard operator. Congratulations to G2OS on his recent marriage.

**Scotland**

The main item of news this month is, of course, the visit of our President and Secretary, which took place between November 13 and 15. However, this matter is dealt with fully elsewhere and we will make no comments here.

*"A" and "E" Districts.*—There is practically no news to report and members will realise that if they make no reports to their District officers then they cannot expect to read of their doings in these notes. So, O.M., if you wish to see a fuller report of the District activities, the remedy lies in your own hands—write to your D.O. at least once a month. At the November meeting in Glasgow, Mr. J. R. Brinkley (BRS2336) gave a most interesting lecture on Long Distance Telephony, which was illustrated by a very fine collection of slides. There was a good attendance of members present and everyone enjoyed the lecture very much. There is one change to record—Mr. Jefferies (2AJJ) has been issued the full call G8HJ.

*"B" District.*—The District is very active, most of the transmitters being on the air. G2OX is building an ambitious receiver incorporating two stages of H.F. Amplification. Another station, G6BM, is rebuilding his receiver in an endeavour to cure local QRN. Several stations are doing QRP work, including G6IZ, who is using a 53 as crystal oscillator, and G5YN, who is putting out a very fine telephony signal, using only 1.5 watts choke modulated. G6LG and G8AT are doing well, the transmitter at G8AT employing two Ostar Ganz valves running on 220 volts D.C. G5TA has now managed to quieten his converter sufficiently to permit operation on 7 Mc.

*"C" District.*—Activity continues at a high level in this District, all the fully licensed transmitters being active. G6KO is on as much as business permits, and is using a 14 Mc. matched

impedance aerial. Break-in is being tried out at G6LD on 7 Mc. BCL QRM has caused G5SC some worry. G8CF is going well on QRP, as is G6RI, who is doing great stuff, having reports of R6 from CR9AB and PK4RK, when using only 8 watts from dry batteries; other DX includes several contacts with VK. G5NW who took unto himself recently a YF, is now considering how best to get going at his new QRA. Mr. R. Patterson, BRS2372, is now 2CCC.

*"D" District.*—This is another District in which activity is at a high pitch, although most of the stations report conditions as being rather poor. G5YX is rapidly developing into the DX man of the district, working ZL regularly; contacts have also been had with XU and PK. This is genuine QRP work on D.C. mains. G6FN has something to say about Collins networks for receiver and we hope to see an article for the BULLETIN from him, as soon as the full dope is completed. Those active on 28 Mc. now include G2TM and G6SR. Another fairly recent recruit to the fully-licensed ranks, G6JH, is doing well with DX. G6UU and G6HZ are active on 7 Mc. New receivers are in use at G2BD and G6RZ. A W.B.E. certificate has been received by G6XI. G2TM is conducting Morse classes with great success and all those interested are asked to apply to him. Mr. Shearer (BRS2506), has been issued the artificial aerial call 2CCG. Meetings in the District continue to be well supported.

*"F" District.*—G6RV is now testing part of his new rig. Tests with a 6A6 oscillator are being made by G6XW. G6NX has now erected new aerial on his new mast and reports it a big success, contacts being had with XU, ZL, VK and VE5 being amongst those made. Mr. Murdoch 2ANM, has been issued with the full licence. G8FT and Mr. Pender, 2BJI, awaits full call after passing Morse test successfully.

*"G" District.*—Meetings are being well attended. G6RG is going ahead with his preparations for coming back on the air, and has erected two 80-foot masts. Mr. W. Vinnicombe (BRS1010), is now 2CCA.

*"H" District.*—This District continues to make very good progress and meetings are being well attended. Morse practice is doing well and is appreciated by the members. It has been decided to hold a District dinner and this has now been arranged for Saturday, January 16, at 7.30 p.m., for 8 p.m.

**Northern Ireland**

Mr. E. O. Byrne (2BYN) has passed his morse test, and is waiting for his full call. His crystal frequency is 7,180 kc. GI6TK reports active, and has been in contact with W1 on 3.5 Mc.

The D.R. would like to draw the attention of members to his notice *re* N.F.D. in the November issue of the BULLETIN.

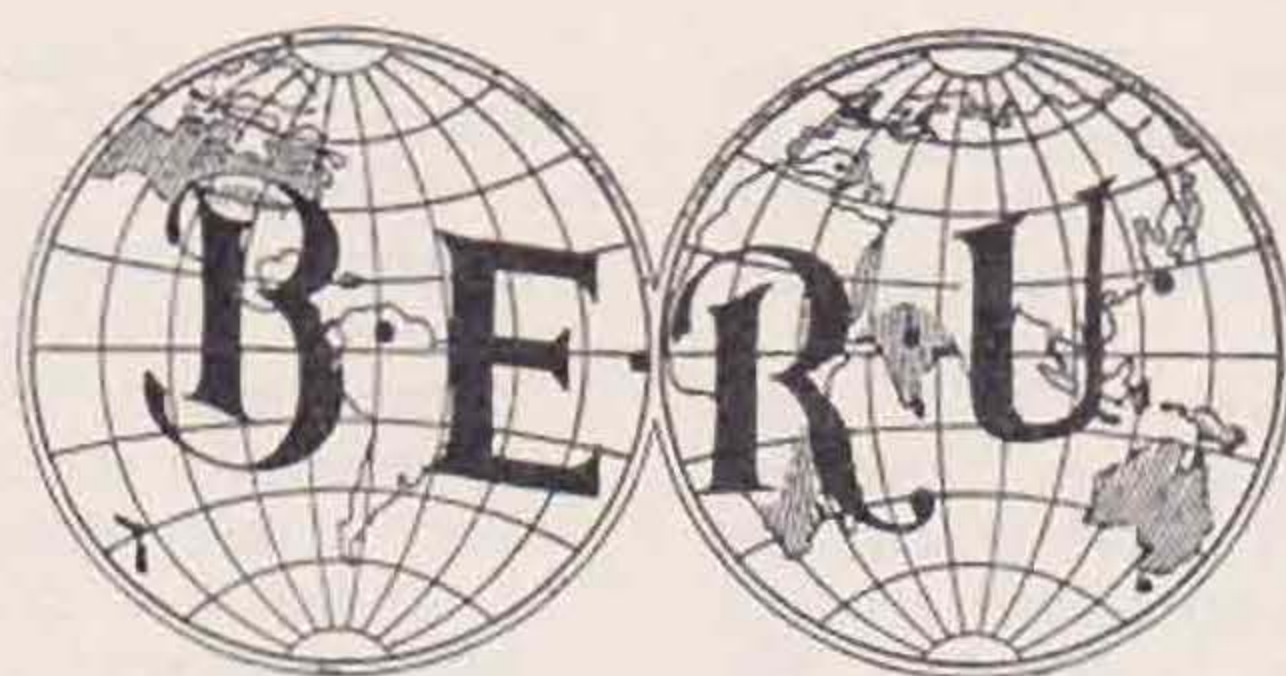
The compliments of the season to all.

**Town Representatives 1937**

A list of Town Representatives appears elsewhere in this issue. Members located in towns without a T.R. are invited to nominate suitable persons to take office.



# Empire



# News.

## B.E.R.U. REPRESENTATIVES.

*Australia*: I. V. Miller (VK3EG), P.O. Box 41, Tallangatta, Victoria; Sub Representatives: J. B. Corbin (VK2YC), 39, Mitchell Street, McMahon's Point, Sydney, N.S.W.; R. Ohrbom (VK3OC), 22, Gordon Street, Coburg, N.13, Victoria; A. H. Mackenzie (VK4GK), Fire Station, Wynnum, Brisbane; G. Ragless (VK5GR), South Road P.O., St. Mary's, S.A.; J. C. Batchler (VK7JB), 21, Quarry Street, North Hobart, Tasmania.

*Bahamas, Bermuda and the Eastern Part of the West Indies*: P. H. B. Trasler (VP4TA), Point à Pierre, Trinidad, B.W.I.

*Burma*: W. G. F. Wedderspoon (VU2JB), Government High School, Maymyo, Burma.

*Canada*: Earle H. Turner (VE2CA), 267, Notre Dame Street, St. Lambert, P.Q.; W. P. Andrew (VE3WA), 1337, Dougall Avenue, Windsor, Ont.; F. Taylor (VE5GI), 4374, Locarno Crescent, Vancouver, B.C.

*Channel Islands*: J. le Cornu (G2UR), 1, Les Vaux Villas, Valley Road, St. Helier, Jersey.

*Egypt, Sudan and Transjordan*: F. H. Pettitt (SUI5G), Catholic Club, Mustapha Barracks, Alexandria.

*Hong Kong*: G. Merriman, (VS6AH), Box 414, Hong Kong.

*Irish Free State*: Captain G. Noblett, M.C. (EI9D) Barley Hill House, Westport, Co. Mayo.

*Kenya, Uganda and Tanganyika*: W. E. Lane (VQ4CRH), P.O. Box 570, Nairobi.

*Malaya and Borneo*: J. MacIntosh (VS1AA), Posts and Telegraphs, Penang, S.S.

*Malta*: L. Grech (ZB1C), 18, Constitution Street, Zejtun, Malta.

*Newfoundland*: E. S. Holden (VO1H), Box 650, St. John's, Newfoundland.

*New Zealand*: C. W. Parton (ZL3CP), 69, Hackthorne Road, Cashmere Hills, Christchurch.

*North and South Rhodesia*: R. A. Hill (ZE1JB), P.O. Box 612, Salisbury, S. Rhodesia.

*North India*: J. G. McIntosh (VU2LJ), Bukhia Tea Estate, Letekujan P.O., Assam.

*South Africa*: W. H. Heathcote (ZT6X), 3, North Avenue, Bezuidenhout Valley, Johannesburg.

*South India*: J. S. Nicholson (VU2JP), c/o Kanan Devan Hills Produce Co., Ltd., Munnar P.O., Travancore.

## Australia

By VK3EG via G6CJ.

Local activity since the tests seems to have been concentrated on 28 Mc., and reports to hand show many European contacts. On 14 Mc. conditions have started their usual change over, with poor DX in the afternoons and good European DX at night. Also, unusually good QSO's have been had some nights with the rarer ZS, SU and VS districts. SUICH has reached R9 on a good night, and two-way 'phone contacts with ZS2X, ZS4J, ZU6A, VS2AK and VS6AB have been phenomenal when conditions were just right. One or two nights a week signals have lasted R8/9 for three to four hours between 13 and 18 G.M.T.

Except for QRN, the 3.5 Mc. band has been mainly quiet, though we have already heard odd European amateurs at peak times, which corresponds to sunset here. At this period of the day QRN falls to a minimum. We are hoping to have good support for the January tests.

In the DX contest, the most consistently strong signals were those from G2FZ, 2PL, 2ZQ, 5SR, 5YG, and 6CJ. G5MS and 2YL always seemed audible here before other G stations, but did not seem to rise correspondingly at peak as did other signals.

56 Mc. is being well investigated, and field days so far have been very encouraging, though no outstanding DX has yet been marked. A

test with VK7/VK3 was held recently, but although local contacts were good, no VK7 was heard in VK3, and it is not yet known if any VK3 was heard in VK7.

May I conclude by thanking all G and other Empire amateurs who gave us support in our contest? VK members join in wishing everyone a Merry Christmas and lots of Happiness for the New Year.

## Egypt, Sudan and Transjordan

By SUI5G via G6DH

There is nothing of interest to report from Cairo except a visit from SUIAP, who is using Class B modulation with his RK20. This station is handicapped at present by the lack of a good receiver, but hopes to make good the deficiency shortly.

In Alexandria SUIKG is having difficulty in maintaining his schedules with G5XG owing to poor conditions on 14 Mc. SUI5G is on 14 Mc. from a new QRA. SUIWM and ISG are on 28 Mc. and find conditions quite different from those which applied last year. A case in point being the VK's which have been coming in considerably later than last season. During a 90-minutes QSO with VK4AP, SUI5G's signals were reported R9 on peaks with an R5 echo. VK4AP suggested this effect was due to the fact that the signals were travelling both ways across the world. The explanation seems quite sound, more especially as one signal was getting over slightly ahead of the



other. Views on this phenomena will be appreciated from other 28 Mc. workers. (During October and the early part of November this echo effect was noticed by G6NF, G6WY and others. —ED.)

We were pleased to hear from ZC6CN and ex-2ALP that the Palestine amateurs may be active again in the near future. The latter will use the call sign ZC6NX and will appreciate reports on his QRP 14 Mc. signals from G and W. He will be using an input of about 3 watts from dry batteries.

### Irish Free State.

By EI9D.

It is rumoured that EI4D is collecting gear again, and may be back on the air shortly. 9D is solving the "no mains" problem by installing a small car engine which will be located in a garden shed and remote controlled. 5F continues to work DX and to justify his reputation as our best DX station. 8G is active on all bands with 'phone and cw. 5J is doing very good work with an input of only 3 watts to a CO. 6J has settled down in his new QRA, and is putting out good quality 'phone on 7 Mc. 7J is also getting out well, but is rebuilding for QRO.

G2CD was on a visit to EI8J recently, and looked in at some of the Dublin stations. EI8J is also very active. 6L is now in his new QRA, 13, Grosvenor Square, Rathmines, and is active with 10 watts cw. on 7 Mc.

In wishing all the Season's Greetings, EI9D hopes that stations will find five minutes' leisure, during the holidays, in which to forward a report for the January Notes.

### Kenya, Uganda and Tanganyika

By VQ4CRH.

We extend a hearty welcome to two new members in VQ4CRG and BERS370 and wish them the very best of luck.

This month we have to congratulate VQ4CRB (ex-BERS229) on obtaining his call.

Conditions for DX were exceptionally good on the 14 Mc. band during the months of October and November, in spite of QRN owing to the stormy season.

VQ3FAR reports having tried out the W3EDP antenna with a slight improvement over the more orthodox types. FAR's experience in his present FB location is that antenna experiments are rather disappointing as whatever aerial used seems to give equally good results, and he considers it would be easier to decide about their characteristics if one or two types would turn out completely "dud."

VQ4SNB is still seeking better efficiency on 14 Mc. and is adding to obtain that end. He hopes to be on phone very shortly with a 50-watt input. SNB reports excellent DX signals pouring in at his shack, which is situated well up in the Colony's highlands.

VQ4CRH has found that the Zepp recently erected is a good asset to the station and well worth the time and trouble spent on it, as quite a number of DX stations have been contacted amongst them being K7 (Alaska), he only missed landing the elusive ZL through a neighbouring territory phone station. What CRH remarked is not recorded!!

Other stations active are VQ4CRB, CRO, CRE, CRQ, and KTB.

The local postal authorities have now discontinued issuing the CR call-signs, and have recently adopted the three last letters of the call corresponding to the initials of the licensee. This is generally welcome, as the old 4CR calls became very monotonous and often led to confusion.

There is a whisper in the air that the P.M.G. intends to revise the licences, but in what direction is only at present a speculation. If it is a question of limiting the number of licences, opposition will be forthcoming. It is unfortunate, but sadly true, that we have a few licence-holders who have not shown any signs of activity for some considerable time, and it may be that the P.M.G. has designs in that direction. Nuff said!!!

### Malaya and Borneo

By VS1AA.

There is a dearth of news this month. VK, ZU, ZS and ZT stations are plentiful on 14 Mc., but W's have fallen off. 7 Mc. is remarkable for its scarcity of signals! QRN is bad.

VS1AA is on local leave. 1AF and 1AL have not been able to do much amateur work of late, and this seems to hold good for most of us. 1AL has qualified for his W.B.E. by working VE5. Congrats., OM. He has rebuilt his P.A., using TZ 05/20's in push-pull, link-coupled to a 59 doubler.

Mr. Gilding (ex BERS304) is now operating at Ambala, India, with the call sign VU2ZM.

We heartily welcome VS4JS to the fold, and wish him every success. His address is Jesselton, British North Borneo.

The Letter Budget is again in circulation. Would interested B.E.R.S. who desire to be circulated kindly send in their names to VS1AA?

### Rhodesia.

By ZE1JB.

By a majority, the Experimental Radio Advisory Committee at its meeting held in September, decided against the limitation of the number of licences. The representatives of Messrs. Cables and Wireless, Ltd., abstained from voting. To date, the B.E.R.U. representative has heard nothing from the Post Office as to whether the recommendation of the Committee will be acted upon or not.

As no reports have been received except a short résumé from ZE1JY, there is little information for the notes.

ZE1JB has had a few QSO's on 28 Mc., but time has not permitted much work and conditions seem to be rather erratic. The final stage of the regular transmitter is being used as a power doubler, but the valve is inclined to run hot, and it is hoped to use a straight amplifier as soon as time to construct it can be found. The following is a short list of stations heard by ZE1JB on 28 Mc. in the odd hour or so spent on the air: G2DH, 5GQ, 6DH, 6RH, 6YL, PA0AZ, OH2HK, D3CSC, W9BBU, and ZS1H.

ZE1JC is now using a Genemoter as his power supply and is very satisfied with the results. 1JE and 1JF have not been heard, but when last seen, ZE1JF was busy rebuilding the transmitter.



1JH has his outfit going on 14 Mc., but has not had time to do any operating. 1JJ is said to be inactive excepting on 56 Mc., where he is looking for a DX contact. 1JS is using a pair of American RK23's in his final stage with suppressor grid modulation and is said to be putting an excellent signal into North America, which seems to be his strong point. 1JU has not been heard here, but we are told that he is still keeping up his reputation on 28 Mc. 1JY has his transmitter ready to go on the air, but work has kept him off, in addition to which his receiver has been damaged by lightning.

As these notes will be the last to appear before the end of the year, I take the opportunity of wishing all members of the B.E.R.U. everywhere a happy Christmas and may 1937 be an even better DX year than 1936.

### South Africa

*Division One.*—The 56 Mc. band is very much alive in Cape Town at present. ZT6K is reported to have picked up 56 Mc. cw signals from U.S.A., and a local listener is reported to have received 7-metre television signals from London. ZS1B carried out some experiments between an aeroplane and the ground on this band. Results were most encouraging. One surprising thing noticed was that QRM from the ignition was almost negligible, although no suppressors were fitted. The plane used was a Rearwin Sportster loaned by the Air Taxi Company, Cape Town. Further tests will be carried out shortly using improved apparatus.

ZS1B has built a Reinartz Rotary Beam for 56 Mc. and finds it most satisfactory, although not entirely unidirectional. 14 Mc. is still very good. North and South America is coming in well after 20.00 G.M.T., and Europeans are heard from 18.00 to about 20.00 G.M.T.

ZS1H reports that conditions on 28 Mc. are the same as last month. He expects to be operating on 56 Mc. about February next year using only cw, and, of course, crystal control.

*Division Five.*—Conditions are definitely improving on all bands, and DX is getting back to normal.

ZS5Z reports exceptional activity on 14 Mc., having made contacts with WI-9, VE, VK, VQ, KA, K6 and G. ZS5U has been active on 7, 14 and 28 Mc., with many DX contacts. The following B.E.R.U. members have also been active: ZU5V, ZU5D, ZT5V, ZS5R, ZT5R and ZU5Q.

Mr. Davidson is welcomed back on the air after an absence of about twelve years, having been allotted the call ZS5AK.

*Division Six.*—ZS6C is active on 7, 14 and 28 Mc. His transmitter is a 53 oscillator-doubler into a 46 amplifier. Frequencies are 7,179, 14,358 and 28,644 kc. He has made W.A.C. on 7 Mc., and now hopes to do the same on 28 Mc.

ZT6X can be heard nightly on the 14 Mc. band. His transmitter is a 53 oscillator-doubler, 210 buffer, and DET.1 amplifier.

ZT6AQ has raised his antenna to 110 ft. in an attempt to get above the maze of BCL aerials which surround him. He is still getting his fair share of DX. ZS5T is the only local amateur using 28 Mc. telephony, and reports are very satisfactory. ZT6AD is working DX on 14,364 kc., his outfit is 59 Tri-Tet circuit, a real low-powered job. ZU6V has worked W6 and PK1 using a 2A5 oscillator, 210 buffer, and an Eimac 35T as amplifier. ZT6J,

6Y, 6D, ZU6P, ZS6AN, ZU6G, and ZS6B have been heard.

ZT6X is often heard on 14 Mc. with a signal full of punch.

Have the following O.M.'s sold their keys: ZS6M, ZU6Y and ZT6R?

### Denmark.

By OZ7Z.

The general meeting of E.D.R. was held in Copenhagen on September 27, and was attended by nearly 100 members.

The following new council was elected:—

A. Flensburg, OZ1D, President.  
Steen Hasselbalch, OZ7T, Vice-President.  
Helmer Fogedgaard, OZ7F, Editor.  
Ole Winstedt, OZ2Z, QSL Manager.  
K. Larsen, OZ7KL, Secretary.  
H. Hansen, OZ2VH, Treasurer.

The statement read by the retiring President, Mr. E. Steffensen, OZ2Q, showed that the past year had been a very successful one for E.D.R. Membership had increased by as much as 47 per cent., and there are now close on 300 licensed amateur transmitters in Denmark. Also the financial status was very satisfying. During the year the entire international 3.5 Mc. band has been opened for Danish amateurs.

The 28 Mc. band is again open, and the few OZ stations working there have very good results to show. The band has been practically dead during the summer months, but signals began to come through in September. The first in this country to get a 28 Mc WAC was OZ2M, and he is now followed by OZ7KG. A few more need only a single continent.

14 Mc. has also been very good for DX recently. Most Danish stations are working in this band.

On behalf of the Danish amateurs, I extend my best wishes for Xmas and the New Year to British amateurs, home and overseas.

### "T. & R. Bulletin."

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**W3EDP ANTENNA**—(Continued from page 248.)

time until the correct load is achieved. Some variation in the length of the antenna is to be expected due to local conditions, thus experiment is necessary for each particular installation. Incidentally the total length may be as short as 82 ft.

It is also important to note that in coupling the antenna coil to the Final P.A., the point of maximum current is *not* always indicative of the point of maximum output, in other words, if the coupling is made too tight the P.A. current will increase, but the output may increase only up to a certain point at which it will either stick or begin to fall. If the point of maximum output as indicated on the meter is not the point of maximum loading for the P.A., the antenna must be trimmed slightly to obtain a better impedance match. When the system is working correctly it will be possible to load or even overload the P.A. by simply tightening the coupling between the antenna and P.A. coils.

The above comments represent the main points explained by W3EDP, who has asked the author to mention that pressure of private business prevents his individual reply to members' queries.

It is suggested that readers who have used or intend to use this aerial system should send G2WD a summary of their results, together with any queries that may arise, so that a comprehensive report can be forwarded to the designer. At a later date it is hoped to publish a further series of notes.

In forwarding this information, comparative results with other systems should be mentioned.

**56 Mc. HINTS AND TIPS**—(Continued from page 256.)

spring and a screw, which are included in the plate circuit of the audio oscillator.

There are, of course, other ways in which this device can be used to produce intermittent signals. For instance, if it is desired to experiment with crystal control on the 56 Mc. band, the high-tension supply to the output valve may be passed through the spring and screw, thus producing an intermittent signal which is easily recognised.

In conclusion, the writer would like to put in a plea for further effort in the direction of receiver design. It may well be that as we approach the year 1939, the range of 56 Mc. signals will increase tremendously, and it is hardly likely that the super-regenerative receiver will survive for long. Straight receivers are not difficult to build, and are ideal for the reception of C.W. signals, provided these are reasonably stable. The production of stable transmitters apart from those employing crystal control, is another field of experiment with which we may well occupy ourselves during the coming months.

**FIELD DAYS**—(Continued from page 257.)

each occasion different bands are employed. This year we started off with a 7 Mc. Field Day, when four stations were in operation at Chobham, Hindhead, Dorking, and Guildford. The nature of the event was to contact as many stations as possible

between 12 noon and 6 p.m. Points were awarded for each contact based on the N.F.D. point system.

In 1935 we held a very successful 56 Mc. Field Day, when many R.S.G.B. members not connected with the Society turned up. In each event we limited the power to ten watts maximum, which had to be derived from dry batteries, whilst the actual erection was confined to the day fixed for the event. Nothing, apart from the location, may be arranged beforehand. Aerials are usually strung from trees or even supported between two cars.

Some outstanding results have been achieved which prove beyond doubt that should an emergency ever arise the T.V.A.R.T.S. could put a five or ten watt station on the air on any band and know exactly what sort of results to expect. By keeping the gear portable in every sense of the word and allowing only a short time to "get it fixed up and going" a great deal of experience has been gained. Fortunately, we do not anticipate emergency work in this country, but no amateur can afford to disregard the motto of the Scout Movement—"Be Prepared."

Let us hope that R.S.G.B. members will voice their opinions regarding the present state of affairs, for if we all keep quiet we cannot expect the Tests and Awards Committee to know what we are thinking. So what about *your* views, O.M.?

**SIGNALS ROUND THE WORLD ON 28 Mc.**—

(Continued from page 265.)

just a little south of Japan, through New Guinea, just a little off Queensland, through the centre of New Zealand, and then back via Chile, Brazil, Madeira and home. For a signal to go completely round the world it is necessary that the ionisation over the route should be fairly uniform and not too intense, so the signal is not refracted back to earth, but gradually bent round the earth's periphery. This condition is fulfilled for the route just described, for in the area of maximum daylight the signal is passing over the northern part of Russia (where the ionisation would be low). I should add that the time I am referring to is 08.30 G.M.T. By the time the signal reaches Japan it is getting near the equator, but here it is evening, so that the ionisation is not too great, and the same applies to New Zealand. The region of lowest ionisation will, of course, be over the southern Pacific and lower South America, where it will be midnight (and late spring, G.D.), but even here it appears that ionisation is sufficient to bend the signal, since on several occasions signals from Brazil and the Argentine have been heard early in the mornings. I have received a report from BRS2205, of Selkirk, Scotland, who heard me QSA5 R6 at 09.10 G.M.T. on October 31. It is very improbable that ionisation would be anything like sufficient to bend my signals at so short a distance early in the mornings at this time of the year. At first one might query the apparent steadiness of these round-the-world signals, but it is always very noticeable that, on these high frequencies, signals from great distances, while they are audible, are much more steady than those from short distances (e.g., VK's are steadier than W's)."

This logic seems unanswerable, and we suggest that once again there is another "scalp" to be added to the collection made by amateur radio in general, and RES in particular.