T. & R. Bulletin

Incorporating

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A CONVINCING TEST

as carried out by the "Wireless Trader" technical staff

(Reprint of report published in "The Wireless Trader" issue dated February 11th, 1928.

At the invitation of Messrs. Gambrell Bros., Ltd., we witnessed last week an exacting test of their popular "Neutrovernia" neutralising condensers. As is well known, it is essential that the insulation of a condenser used for neutralising purposes should be of a very high order and that its construction should be such as to obviate any possibility of its breaking down even after prolonged use.

Before describing the actual test, we must describe a detail modification which has recently been introduced into the design of the "Neutrovernia." It will be recalled that construction comprises two cylindrical brass electrodes, the outer one being stationary and the inner one sliding vertically within the other. The dielectric consists of an ebonite sleeve or liner between the electrodes, and the modification has been made with a view to eliminating any possibility of breakdown at the top, where the edge of the moving cylinder commences to enter the fixed one.

Reference to the sectional illustration will make the point clear. At the top of the fixed electrode the body of the condenser (which is, of course, ebonite) is undercut and the ebonite liner is made slightly longer, so as to project above the brass cylinder. Thus the moving electrode tends to force the dielectric sleeve into the space formed by the undercutting, and hence over the edge of the outer electrode, so ensuring perfect insulation throughout the whole range of the condenser.

The test itself was carried out at the company's works at Southfields. Six standard "Neutrovernias" were selected from stock by us and were subjected to a steadily increasing D.C. voltage supplied by a motor generator. Of the six samples tested, three broke down at 1,900, 2,000 and 2,250 volts respectively, while the other three successfully withstood the full output of the generator—2,300 volts.

The three specimens which succumbed in the neighbourhood of 2,000 volts were taken to pieces and examined, and it was found that the breakdown occurred at a different place in each, showing that there is no fundamental weakness in the design or construction of the condenser which would lead to a breakdown at a particular spot.

The Gambrell "Neutrovernia" is obtainable from all Dealers, price 5/6

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T&R BULLETIN.

The only British Wireless Journal Published by Amateur Radio Experimenters

MARCH, 1928. Vol. 3. No. 9.

SOCIETY NOTES

Those who attended the excellent lecture by Capt. Hartridge on February 3, when he dealt with the use of radio upon armoured cars and tanks, enjoyed a real treat. We only wish we had room to reproduce the whole lecture *in extenso*. Capt. Hartridge described the progress of the work from its inception and kept his audience entertained by many humorous stories and incidents.

One remark of his set us thinking. He said that in this field there was ample scope for amateur transmitters to take up patriotic work. It struck us as an excellent idea and one which should be encouraged. It would further enable the Society to be in the position to provide skilled operators for service should war-time ever descend upon us again. Capt. Hartridge stated that he would willingly help any who were interested to join up.

* * *

The new Committee has settled down to its work. Some of the results appear in the present issue. A series of tests outlined by Mr. Thomas. Mr. King has moved the QSL Section once again to his home where he can spend the nights packing cards into envelopes. Mr. L. H. Thomas has got the wavemeter oscillating and will tell you within .00 something per cent. how much your own instrument is out. Mr. Marcuse has got the licences well in hand. Mr. Nickless and Mr. Goyder are out finding us lecturers (we hope they will succeed), while Mr. Clarricoats is selecting menus for the Convention dinner next autumn.

* * *

The Associate grade is going strong. Quite a number of applications have been approved. There has, however, arisen some doubt regarding the distinction between this grade and the ordinary membership, especially in view of the reduced rate of subscription. Well, the distinction is, the Associate grade is non-corporate. That is, they have no say in the affairs of the Society or voting powers. They do not automatically become members of the I.A.R.U. and can only attend certain of the meetings. It is in fact intended for the broadcast listener who is anxious to increase his knowledge in radio work and wishes to associate himself with others of greater experience. In the original announcement it was stated that B.R.S. numbers would be allotted to members of this grade, but as this has resulted in some controversy, no further issue is being made pending the decision of the members.

* * *

An unfortunate error crept into last month's BULLETIN which was due to a misunderstanding between the present and the late Editor. The Ladies' Section is in the hands of Miss Dicks and not Miss Dunn as was announced. Miss Dicks is well known to the London members and offered some time ago to start and supervise the section. This had, however, to secure the sanction of the Council, and in the meantime the news came through that Miss Dunn had consented to assist Mr. Jamblin on his QRA Committee. The two items of news became mixed by some means. Meanwhile, we offer our sincere apologies to both ladies and hope that the proposed section has not suffered in any way. Miss Dicks assures us that many ladies are anxious to associate for the purpose of getting more intimate with radio technology. We wish them all possible luck and will assist as

far as possible. Meanwhile, the male gang must sit up and take notice of this new feature. Ladies have conquered most of our realms of sport and the sciences are now coming under their notice. We know there will be no apathy in their ranks and we must arouse from the " fine old crusted slumber " that we are stated to have fallen into (*vide* popular press).

* * *

With regard to this latter condition of the members, the writer of the article in question ought to have been at the February London Hamfest. There was not much slumber there and a happier evening could not have been possible. We must congratulate Mr. Exeter, Mr. Clarricoats and others responsible for these excellent little gatherings which do so much to cement the social side of our Society.

* * *

Did you hear Mr. Nickless (2KT) speaking from 2LO on February 20 ? It seemed like the good old days to hear the familiar voice of our old friend coming out of the loud speaker. Incidentally this talk had a double object. In the first place, it was an attempt to show beginners who buy wireless sets equipped for the reception of foreign stations, that this is not such an easy matter as thought; that considerable skill in tuning is also required. In the second place, it tried to persuade listeners to concentrate upon quality of reproduction from the local stations. The main object is to try to reduce the frantic wave of oscillation now invading the broadcast bands. Much of this is obviously due to the inexpert beginner who hardly realises the trouble he is causing his neighbours so long as he can hear Timbuctoo or some other far-away station. And what enjoyment is there when it is found ? In a few moments it has faded right away and the condenser is turned to create fresh disturbance. The production of high quality by means of effective low-frequency amplification and the moving coil loud speaker opens a field for just as much ability, and this is what Mr. Nickless tried to impress upon his vast audience. That his efforts were successful is evinced by the shoal of letters we have received at headquarters endorsing the policy and wishing to know more about sets for quality reproduction. So successful was this effort that we hope to follow it up in due course with particulars of a power-driven quality receiver and a moving coil loud speaker. Incidentally this talk led to a large number of new members for our Associate grade.

* * *

Great interest appears to have been taken in the R.S.G.B.-five set described by Mr. Cooper last month. The use of toroidal coils coupled with a gang condenser was a distinctly novel application. We know of a number of sets under construction, and we hope their makers will let us hear of the results.

* * *

6QB made an excellent suggestion last month to arouse interest in the 90-metre band. This wavelength has been sadly neglected of late, and yet is capable of giving excellent results. The writer worked there just before Christmas and established contact with a number of stations, including our old friend 6JV, of Norwich. It was quite a treat to see the aerial ammeter bound across the whole scale once more and try to tie itself into knots by going round twice. Shunts had to be rapidly devised to keep the needle within the scale. All good luck to the 90-metre gang.

* * *

The writer would like to thank all those who have so generously responded to his invitation to subscribe to a testimonial for our late Editor. But a good many have apparently overlooked the matter. We want to make a presentation to our late Pilot worthy of the great and vigorous work he did for us. Surely you value his work, OMs ? We must close the lists soon, and surely you want your name included.

RENEWAL OF LICENCES.

All Transmitting members wishing to renew their permits through the Society must send their written application to the H.Q. Office before March 21, 1928.

R.S.G B. Annual Dinner

The President and Committee regret that owing to lack of support they were compelled to cancel the proposed Annual Dinner of the Society.

Associate Grade.

Readers wishing to join our Associate or Non-Corporate Grade must apply on the special forms obtainable at the Headquarters Office.

These forms can also be sent, on request, to any members of the Society, to enable them to assist in recruiting to this grade.

It should be noted that no proposer or seconder is required for Associates.

Science Museum.

We have received a leaflet explaining the developments which are being made in the Science Library with a view to making the information collected available more generally. Copies may be obtained from The Science Museum, South Kensington, London, S.W.7.

Stray.

Our thanks are due to 2XV of Cambridge for his successful recruiting during the past three years.

Forthcoming Events

WED. MARCH 21. Lecture I.E.E., 6 p.m. F. L. Hogg: My Experiences of Broadcasting in Iceland.

TUES. MARCH 27. London Area Hamfest, Pinolis Restaurant, Wardour St., 7 p.m.

FRI. APRIL 20. Lecture I.E.E., 6 p.m. G. Marcuse, Vice-President, Progress in Empire Broadcasting.

A S.W. Receiver Employing a Stage of H.-F. Amplification.

By R. S. ROBERTS, EG6NR.

The application of high-frequency amplification to receivers below about 150 metres has always been accompanied with difficulties, chief among these being to make the stabilising system hold constant for the very wide frequency bands covered by the receiver.

The " Rice " or " Hazeltine " method of balancing out capacity couplings—by means of a small condenser connected in a " Bridge " system—has proved very satisfactory for broadcast receivers, and by careful design of the transformer it is possible to hold such a receiver stable over a wide band; it is when we apply such a system to wavelengths of about 60 metres and below that such problems as the capacity presented by the primary to the secondary, and the " leakage " inductance of the primary winding, become obstacles.

The problem has now been greatly simplified, if not solved, by the introduction of the screened-grid valve. This valve has an electrostatic screen in the form of a grid between the usual grid and anode, thereby reducing the capacity between the electrodes to a very low figure; inter-stage capacity coupling is therefore minimised, but attention must still be paid to magnetic couplings between coils if we are to have a lightly damped stable system. The attendant wiring must also receive more than usual care.

The diagram shows a receiver using such a valve for one stage of high-frequency amplification. The actual amplification has not yet been measured, neither has it been used below about 23 metres, but such gratifying results have been obtained that it was thought that a brief description may be of interest.

The actual valve used is a Mullard P.M.12. This is a two-volt valve having an amplification factor of 200, and an impedance of 230,000 ohms. The coupling suggested by a valve of this impedance is a tuned anode, but the system shown is practically the same thing if the choke is a good one and has the advantage of having the condenser spindle at earth potential.

The receiver has an aluminium panel, and the H.F. stage is completely screened in a copper box to effectively reduce any coupling between the H.F. and detector coils. The coupling condenser (V.C.) has a maximum capacity of about .0001 mfds., and is made variable owing to a tendency to instability as the frequency is increased.

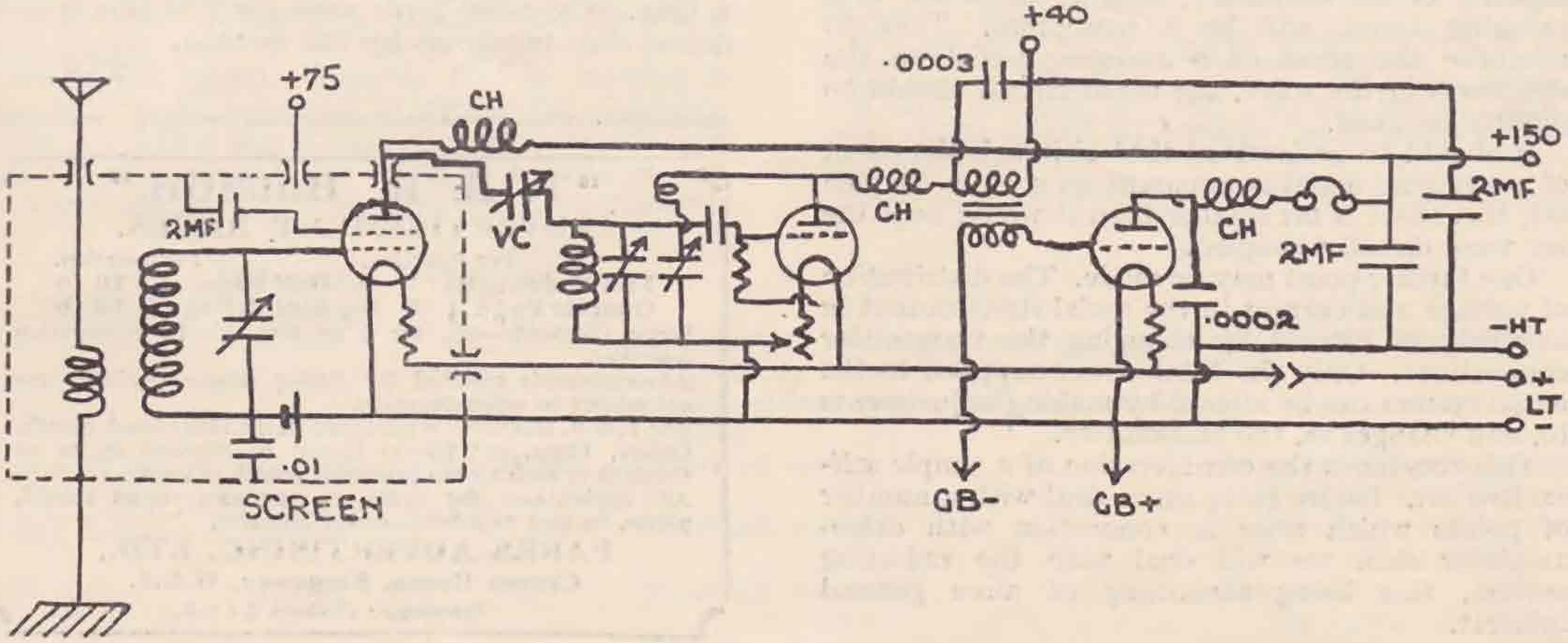
The two tuning condensers and the reaction condenser are .0003 mfds. and the coils are usual sizes, the only point being that the reaction coil is very much smaller than usual—about three turns are sufficient for a 25/60 metre band.

Before leaving the circuit it may be as well to mention the H.F. filter on the output side. This reduces hand capacity to negligible proportions when an earthed metal panel is used.

The operation of the receiver is very simple once the " hang " of it has been acquired, and any tendency to back coupling is easily corrected by reducing the capacity of V.C.

The advantages of using a receiver of this type are manifold, the chief being the ability to copy a C.W. station at R5, that is R2-3 on the " Detector and 1 L.F." set; another feature that should appeal is the elimination of " blind spots " due to aerial resonance. A curious point is that the strength of the signal is raised above the " noise "—in fact, the " noise " remains at about the same level as with the " det.—L.F. " set.

Finally, it may be argued, is H.F. worth while? It is well known that a detector valve followed by a stage of L.F. amplification has a world-wide range, but a receiver of the type just described makes the difference mentioned above, and for the benefit of those who like S.W. broadcast, it is found that the usual stations come in at greater volume and the quality has been found superior—probably due to the fact that it is no longer necessary to work so close to the oscillating point as with a receiver of the usual type.



Theory and Adjustment of a Transmitter.

(Continued from February issue.)

It has already been shown that by tapping off the load (aerial) on the anode coil, the power delivered by the valve is transformed to the correct voltage for feeding the aerial. Since the requirement for efficient working is that the plate coil shall be tuned to the working frequency (the magnetising current is wholly supplied by the condenser), it does not matter whether the tuning condenser is connected across the whole or a part of the coil, provided it is made of the correct value. If it is connected across that portion of the coil to which the load is attached, then we get the more familiar arrangement commonly referred to as the anode tap.

Control of Frequency Generated.

Bearing in mind the fact that all coils coupled to the anode coil can be ignored if we make suitable (mental) changes in the actual anode circuit, we see that the circulating current in the anode circuit will be a maximum when the grid is excited at some particular frequency. And since the grid excitation is generated by this circulating current, obviously the valve will, if self excited, generate at the resonant frequency of the equivalent anode circuit, *i.e.*, including the effect of coils coupled to it. This explains how it is that the frequency generated can be varied at will by altering the tuning of the anode circuit.

Reaction of Secondary on Primary.

Returning again to the problem of a loose coupled set, we will now investigate the effect of coupling up the secondary to the primary, on the generated frequency. We have already seen that the field threading through the primary is modified by the presence of the secondary, and as a result, the resonant frequency of the whole system is slightly different from that of the primary alone. Further, varying the tuning of the secondary will obviously alter the common field and hence the primary field to a lesser degree. This means that the generated frequency is altered by varying the tuning of the secondary. Now it can be shown that the rate of change of the resonant frequency (of the whole circuit) is greatest when the secondary circuit, considered alone, is equal to that of the primary circuit, also alone. In this state of exact tuning of the secondary, the effects of small changes of capacity of the secondary, such as those due to a swinging aerial, will be a maximum. Thus to minimise the effect of a swinging aerial on the steadiness of the wave, the aerial circuit should be slightly detuned.

It should be understood that although the effect of a swinging aerial is apparent on a loose coupled set, this effect is far smaller than it would be if the set were directly coupled.

One further point may be made. The distribution of voltage and current in the aerial itself cannot in any way be altered by changing the transmitter connections. Only the total power supplied to the aerial system can be altered by making adjustments to, and changes in, the transmitter.

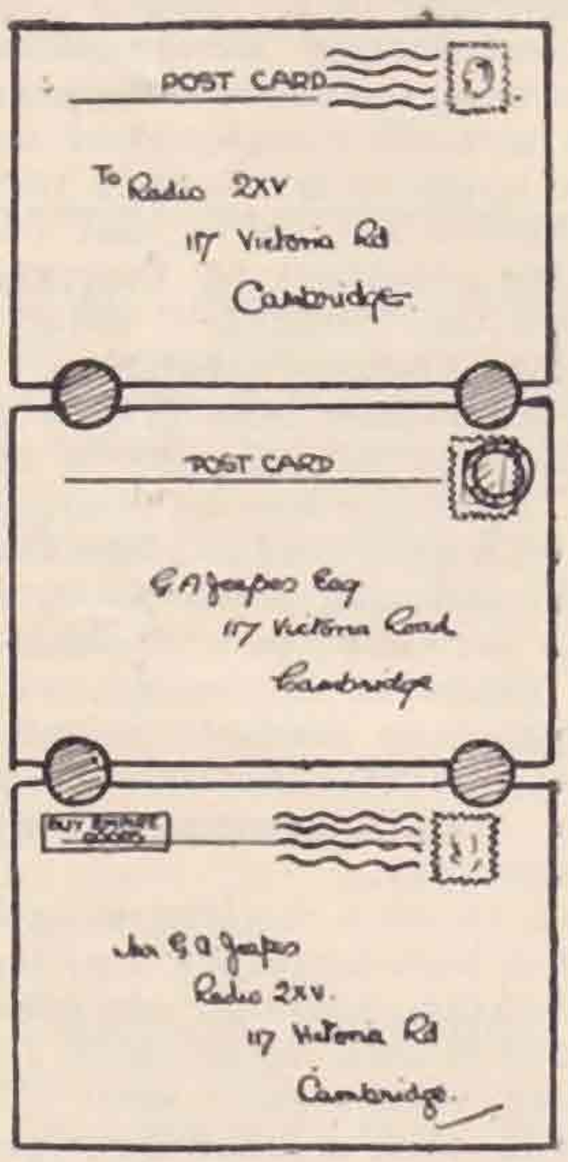
This concludes the consideration of a simple self-excited set. Before going on to deal with a number of points which arise in connection with drive-amplifier sets, we will deal with the radiating system, this being something of more general interest.

That Wallpaper Problem.

By J. A. JEAPES, 2XV.

Many of us suffer QRM because we pierce so many holes in the wall by using tacks or drawing-pins for attaching cards to the wall, also this is rather a lengthy process if many cards are to be hung at any one time—this was the experience of the writer, when moving into a new QRA recently, when some 300 cards were to be affixed to the wall.

However, the difficulty was overcome in an easy and inexpensive, also a very neat manner as follows:—the cards were laid face downwards in columns of ten flat on the table, and at each place where the cards met edges, a 1-in. round gum-label was stuck at each side half on one card and half on the other



(these labels can be purchased at any stationer's for about 1s. 3d. per thousand, and are used in shops for attaching prices to goods)—having joined up all the cards to be hung in strips of ten (or any other convenient number), the same are hung from the top of the wall by means of two drawing pins only; this means that two pins will hang ten or more cards at a time. Over 300 cards were hung at this station in less than two hours by this method.

2XV.

Threshold Howl.

By A. S. CLACEY (EG6CY).

The attention which has been directed to the above subject in recent issues of the BULLETIN prompts me to announce a few observations and thoughts of my own, and is the sole excuse for this note. Since I have not made a study of the subject I am unable to offer any authoritative evidence for my views, and accordingly I propose no special theories, but merely put forward the matter for what it is worth.

Until quite recently I used the arrangement shown in the figure in my short-wave receiver, and have never experienced the phenomenon under consideration. The valve used was a Mullard P.M.1 H.F., followed by a Ferranti A.F.3 transformer, the R.F. choke being the standard Cosmos product. The receiver functioned well down to at least 7.5 metres, and would probably work on even shorter waves without much trouble.

A short time ago I inserted a grid leak and condenser (Dubilier 2 Meg. Dumetohm and Dubilier 0·0001 mfd. condenser) with a view to strengthening weak signals.

At once I made the acquaintance of threshold howl, to my great disgust, and in my attempts to overcome it took the free end of the leak to L.T.+ instead of L.T. —, thus effecting a +2-volt bias (approx.). The symptoms immediately developed with much vigour, and I began to develop a certain interest in the subject.

Accordingly I inserted various valves as rectifier in turn, and was rather surprised by the changes produced. I append in tabular form the general results obtained, together with the few conclusions to which I have come as a result.

Possibly some of our more enlightened members will give us the benefit of their superior knowledge in the tangible form of an explanatory article.

As a result of the above I have come to form the opinion that grid current probably has something to say in the phenomenon of threshold howl, and would like to hear the results obtained on placing a micro-ammeter in the circuit. I imagine the results would be enlightening.

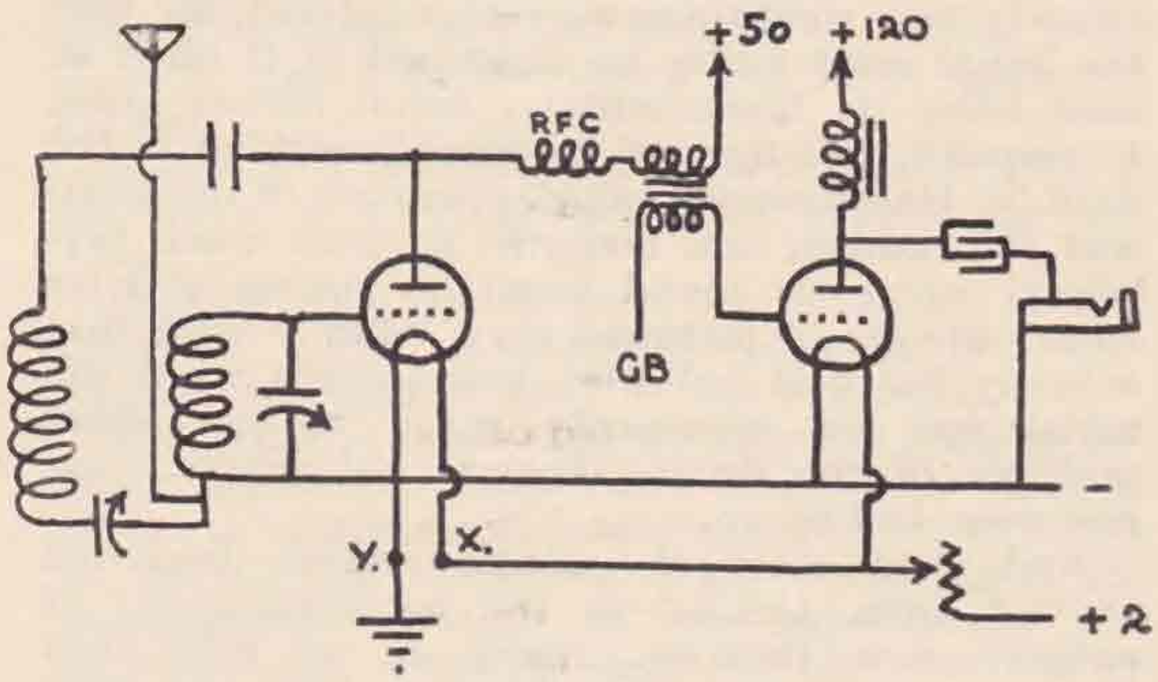
It will be observed that the SP 18B takes the positive bias without trouble, and in this connection it is interesting to remember that grid current does not start in this type of valve until the grid is appreciably positive (I believe about 1·5 to 2·0 volts is the figure). Possibly also its working is assisted by the reduction in differential resistance when a positive bias is applied to the grid, since it refused to oscillate when taken to a point of zero potential relative to the negative end of the filament.

A difficult point to reconcile to this theory is that the SP 18G objects to a positive bias, although its grid current does not start until the grid is made 1·5 to 2·0 volts positive. Possibly other factors enter the field at this juncture which counterbalance the grid current effect.

Another point which will be noticed is that the trouble becomes more prominent on the shorter wave-lengths, and for this I can offer no suggestion at the moment.

Referring to the sketch of the circuit of my receiver shown in the figure, I might mention that 50 volts H.T. is applied to the rectifier and 120 volts to the L.F. valve (with appropriate G.B.).

The H.T. supply is from Exide W.J. accumulators. For reception on all except the shortest waves the aerial is tapped directly on to the grid coil, half turn from the earth end.



Valve.	Differential Resistance.	Amplification Factor.	L.T.+ (X.)	L.T. — (Y.)
S.P. 18B.	70,000	35	Satisfactory working all waves. Slight tendency to howl on shortest waves (7·5—15m. say), but no actual howl.	Would not oscillate.
P.M.1 H.F.	28,000	13·5	Howl all waves.	Satisfactory most waves Howl on shortest.
P.M.1 L.F.	18,000	8·9	Howl all waves.	Satisfactory most waves Howl on shortest.
S.P. 18G.	17,000	15	Howl all waves.	Satisfactory all waves. No howl.

Northern Area Social.

Sixteen members of the Northern Area held an enjoyable social at the Guildford Hotel, Leeds, on Saturday, January 28.

After meeting at the hotel, a visit was paid to the Leeds Station of the B.B.C., first the simultaneous board, control room and studio, followed by a journey up to the transmitter two miles distant.

The party then motored to Rawdon where 2YU's station came under the combined scrutiny of those present and emerged with flying colours. On their return to the hotel, a satisfying repast was provided and despatched.

A meeting was held afterwards, Mr. S. R. Wright, Area Manager, taking the chair. It was unanimously decided to hold a conventionette in Manchester, on March 31, at 11 a.m., and it is hoped that many members in the area will attend and make the Conventionette a real success.

The transmitting situation was discussed, and much useful information exchanged.

6WD and 5CX were the organisers and deserve credit for the success of the whole affair, which was most enjoyable.

The following members were present:—5KL, 6DR, BRS26, 5UB, 6WD, 5CX, 6YR, 6TY, 6LU, 5WQ, 6IG, 2SO, 6VJ, 2DR, 2ADC. 2BPH and 6BY failed to arrive, having suffered a breakdown, and 6OO was prevented from attending.

"Straightening Out the Aerial."

A Universal QRH System.

By Hugh J. B. Hampson (6JV).

Ever since the "downward tendency" began in the wavelengths investigated by amateur workers, the need to discover an aerial system which would radiate effectively upon *all* waves has been pressing, and many have been the attempts to adapt existing systems in order to produce the Utopian aerial.

In the days when 440 metres—and even 200 metres—were the rule, the matter was simple, because the aerial was worked above its fundamental and the inverted L type with counterpoise was almost universal.

But when the move down to 45 metres was made entirely new conditions were encountered, for now the aerial must either be shortened or it must be used *below* its fundamental. Aerial meters failed to respond, and most of us were "working in the dark." Harmonic (so called) operation of the aerial was the fashion, and many of us were much perplexed when we found that the tuning was far from critical—in fact was very "flat"—and that actually the best radiation was secured when the aerial was *not* necessarily tuned to any exact multiple of the drive. Theory and practice did not seem to line up.

And then came the Hertz system—imported red-hot from U.S.A.—to the accompaniment of entirely new theories. Many of us were thus "side-tracked," and abandoned our L's and their problems to investigate the Hertz. Then came current-fed types and Hertz-Zeppelins, and all the rest of the "chopped" systems, each with its own particular snag or difficulty. But the greatest of these was undoubtedly the fact that any chopped aerial will only work upon a limited band of waves which must be in harmonic relationship.

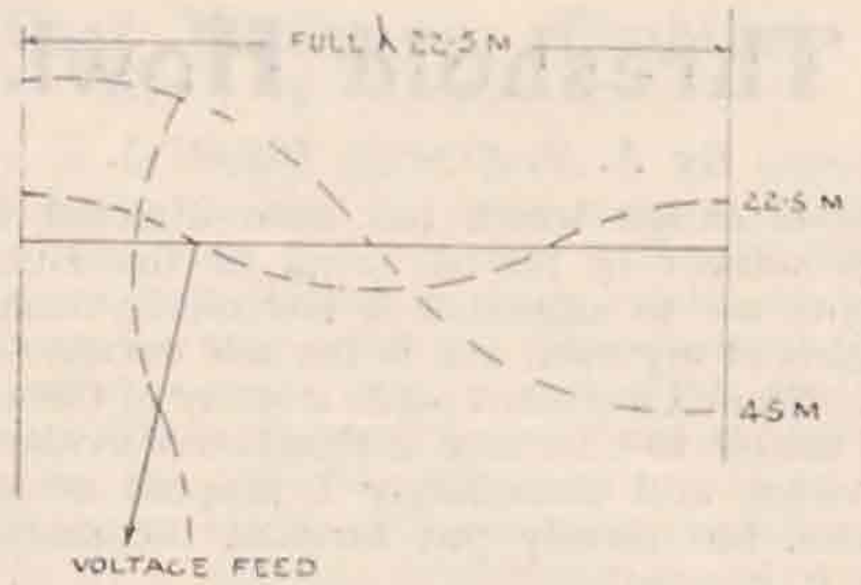
It was this difficulty which drove the writer to further investigations of the old inverted L.

Let us see why the chopped aerials fail to provide us with our Utopian system (an aerial which will radiate effectively on any QRH). We will consider the best-known systems briefly :—

1. The Voltage-fed Hertz (with Single Line Feeder).

As described in the text-books the "roof" is cut to a length which is finally corrected by trial and error (and cutting pliers). The single line feed is that attached at some point which is roughly half-way along a quarter standing wave The location of the optimum feeding point is an elaborate process connected with many measurements and squared graph paper. When all is finally correct for the QRH desired, the system will only work over a very narrow band of frequencies at its fundamental and may or may not work successfully upon harmonics, because the length of the feeding line is fairly critical and the position of feeding point, if correct at the fundamental, will be incorrect in the case of harmonics (Fig. 1). Radiation of feeder, etc., are minor problems, too, and chokes and/or condensers must be pressed into service—and so on.

Briefly, then, the voltage Hertz is *not* a universal QRH aerial.



2. Current-fed Hertz (Levy).

It is not generally realised that the length of the feeders is fairly critical for correct operation.

Consider a half-wave Hertz whose "roof" is of correct length (Fig. 3). Because it is current fed at the centre, we must consider current distribution. There will be a current loop at centre, and because a current-fed aerial cannot be fed by a feeding system whose length is such as to provide at its points of attachment to roof anything but current, it follows that the length of the feeders (plus coupling coil) must be such as to provide voltage nodes at the extremity of each of the two wire feeding lines.

Consider Fig. 2. YZ is a Hertz aerial whose length is such as to accommodate 1½ standing waves. It is current fed at centre, and the length is clearly correct for the QRH chosen. Suppose the ends Y and Z were attached to insulators whose extremities are fixed to the mastheads by cords and counterweights running over pulleys. Now, if we draw B and E together until we can fix an insulator between them the result will be a Levy aerial with ½ λ on roof and ¼ λ on each feeder. (See Fig. 3.) The lettering in Figs. 2 and 3 corresponds.

Returning to Fig. 2, suppose we cut out the sections X to A and X to D, and join at X. We can re-draw as Fig. 4.

Because we must have voltage loops at insulators we must re-draw voltage curve (and so, of course, current distribution accordingly). Fig. 4 shows that we are now trying to excite with current feed at a voltage loop, and we must not expect optimum excitation. Tight coupling (brute force) will push something into the system, of course (it is possible to stuff a chicken with a force pump), but the system will not excite properly or easily.

Apply the same argument to Fig. 3 by removing the wire between coupling coil and A and D respectively—i.e., shorten the feeders. The same thing holds and excitation must be "brutal" if the aerial is to radiate at all.

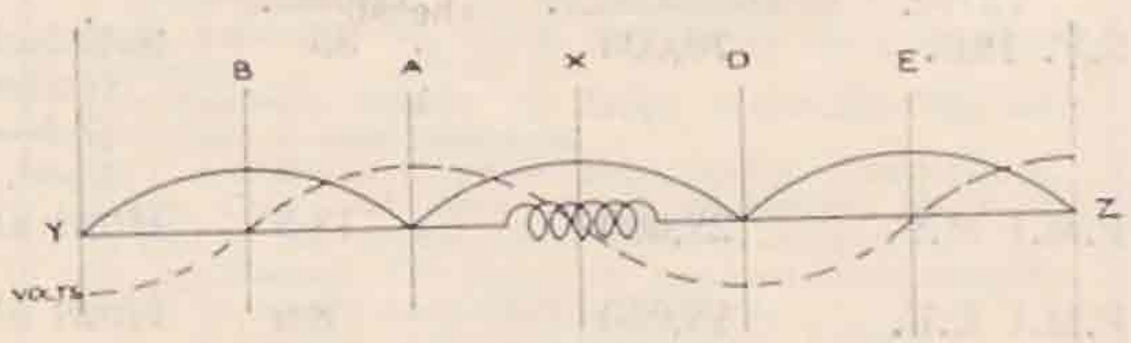


FIG 2

If we realise then that the Levy is merely a "bent Hertz," we can see that the length of the feeders is of equal importance with the correct length of roof, and because this length of feeder required must vary with the QRH employed, it is seen that the current-fed Hertz cannot solve our problem of providing the universal aerial.

3. HERTZ-ZEPPELIN.

The same argument which was used in the case of the Levy, regarding the necessity of arranging that the length of the feeding lines shall be correct, applies equally in the case of the Hertz-Zeppelin.

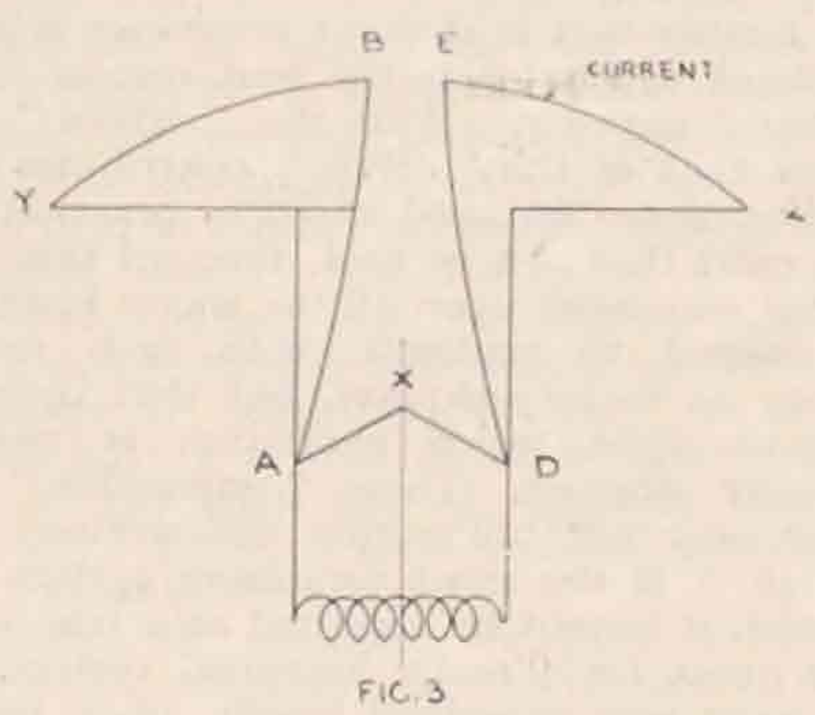


FIG. 3

In that case the standing waves upon the feeders must be such as to provide *voltage* at the extremities of the feeders, while in the case of the Levy we saw that we must provide *current* at the point of attachment to roof. This system, then, is evidently not universal. Fig. 5 shows a Hertz-Zeppelin having a full wave upon roof and ¾ wave on each leg of feeder. Fig. 6 shows the same system "straightened out." The lettering corresponds in both figures.

4. THE UNTUNED AERIAL AND COUNTERPOISE.

This system, as usually employed at amateur stations, consists of single or multi-wire aerial, and single or multi-wire counterpoise.

The writer has found that the distribution of voltage and current upon each wire of a three-wire fan counterpoise is similar and so considers that we may safely examine the case of a single wire aerial and counterpoise for simplicity. Usually (through exigencies of space and general domestic convenience) the counterpoise contains a less length of wire than the aerial. In this case the system is merely an ⊏ shape Hertz with the coupling coil asymetrically located.

Experiments at 6JV have forced the conclusion that where the feeding point is otherwise than centrally located in the system (as at X in Fig. 7), it is possible for a portion of the system only to receive excitation. If the QRH selected is such as to provide standing waves upon the system so that the feeding point falls at a *current* loop, while *voltage feeding* is attempted, the shorter length of wire between the feeding point and either end of the antenna will alone receive excitation.

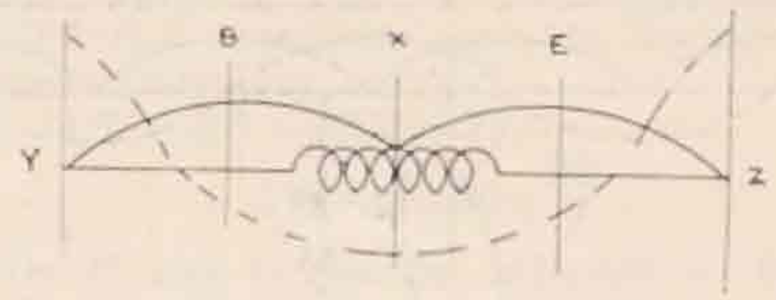


FIG. 4

Consider Fig. 7. The system cannot work as a Hertz having two full waves on roof with voltage feed at X because this point is located at a current loop, but the aerial might work either a sa 1½-wave Hertz VXY voltage fed at V, or as a 2-wave Hertz VXZ, also fed at V.

Tests at 6JV indicate that in such a case the shorter length VXY will normally be excited, while the longer VXZ will be more or less "dead," depending upon the exact location of feeding point X with regard to the nodes and loops upon the system.

Similarly it is believed that if current feeding is attempted at a voltage point the same thing may occur.

Because the counterpoise is normally shorter than the aerial, it generally happens that this receives the greater part of the excitation.

The writer is aware that the above is a somewhat bold statement to make, and though convinced of the truth of it himself, would urge readers to verify the matter for themselves before accepting it unquestionably. Details of the experiments and measurements made in order to test this theory would occupy too much space, and a little thought will show how this may easily be done.

In order, then, to guard against the possibility of this asymetrical excitation, the writer is firmly of opinion that it is a safe rule to stipulate that the aerial and counterpoise *shall be of equal length*.

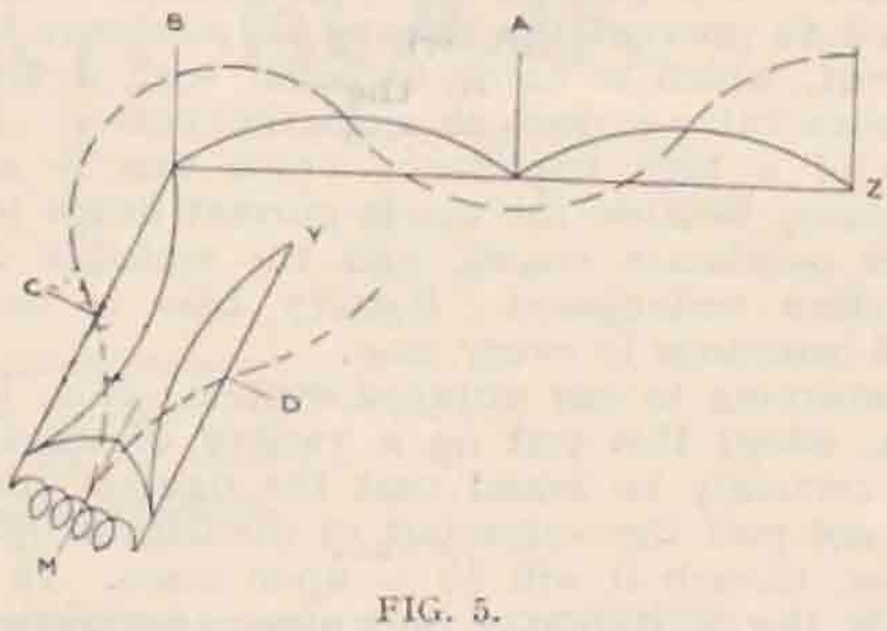


FIG. 5.

Alternatively—and because the ohmic resistance of the earth connection is relatively small compared with the total R. of the antenna (upon short waves)—the counterpoise may be abandoned in favour of a simple earth with results which appear to be quite equal.

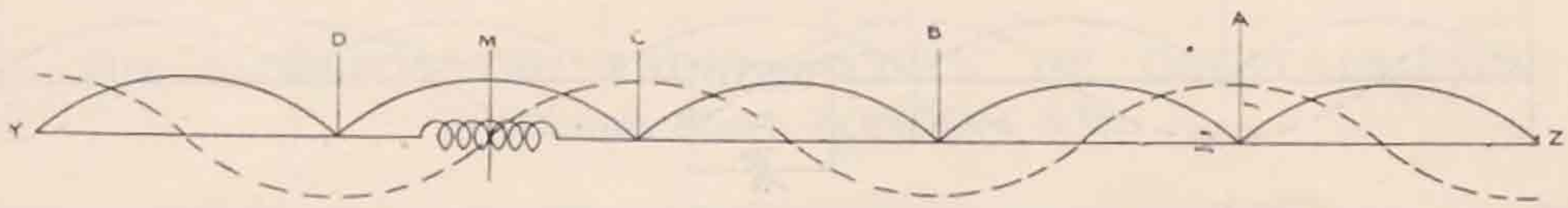


FIG. 6

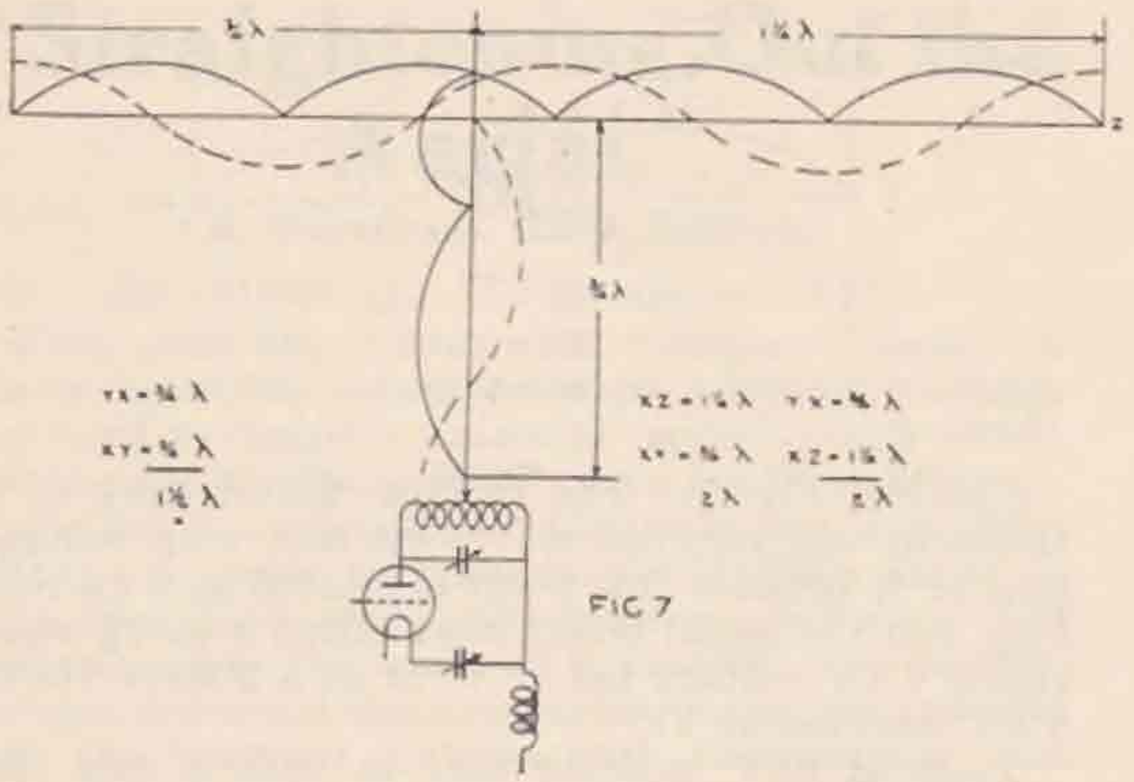


FIG 7

However, if the counterpoise is preferred it may certainly be employed—but for safety in avoiding asymetrical excitation, this should be of the same total length as the aerial.

Suppose, then, that we have erected such a system, let us attempt to excite it at different waves. How can we tell with certainty that the system will "excite" (or "draw power") efficiently from the drive?

The writer's method is very simple and conclusive: it is merely to note whether, as the coupling is tightened, the valve of a self-excited set will be "pulled out of oscillation" due to increased aerial load. Unless this can be done there is no certainty (otherwise than by more elaborate tests) that the system can be adequately excited. If this can be done, there is absolute assurance that the correct per cent. coupling and/or correct per cent. detuning of aerial will provide correct excitation by matching the aerial load to the valve employed, which is, of course, the correct adjustment for efficiency, stability and purity of tone. A word of warning is, however, necessary before adopting this method. The grid of the valve must be battery biased to prevent the passing of excessive anode current, which is liable to occur with a low impedance valve as soon as oscillation ceases. In the case of a high impedance valve this is not so necessary because the anode current drops to zero when oscillation ceases, and the emission is not therefore endangered. Battery bias is however good insurance in every case.

Returning to our untuned system again, let us, then, adopt this test on a variety of waves. It will certainly be found that the tightest coupling will *not* pull the valve out of oscillation upon all waves, though it will do so upon some. In other words, the excitation of the untuned aerial counterpoise system will vary with the QRH selected, and it is not therefore the solution of our problem any more than other types already reviewed.

It may here be urged in reply that certain stations have and still do normally employ this system upon all waves upon which they transmit and that their DX is second to none.

This is not disputed, but the reason is considered to be that these stations have succeeded by good fortune rather than by good management in erecting a system whose physical dimensions happen to be such as to provide a fair efficiency upon all the waves upon which they work, without optimum efficiency upon all, while there can be little doubt that "brute force" excitation is not entirely absent.

The further fact that exact resonance is not the adjustment which yields the best results (because then the "impedance" of the "driven" circuit is below that of the "drive") contributes to the flexibility of the untuned aerial in practice.

The most that can be said, then, of this system is that it *may* work upon all the waves upon which it is desired to transmit, with such moderate efficiency as to be adequate, but that there must be waves upon which excitation is not even reasonably efficient. These "impossible" waves may or may not fall within the working range. Although it is the most promising system so far examined, it cannot be accepted as a true solution to our quest for a really universal system.

We have now examined briefly all of the most generally used aerial systems, and have come to the conclusion that none is ideal for our purpose because none is truly universal.

Let us look at the problem from a new angle. We know that we can set up an oscillating circuit which can be tuned to any QRH, and we know that we can magnetically couple to the anode coil a closed circuit consisting of an inductance and variable condenser which can be tuned to resonance with the drive. We know also that any aerial system possesses a certain "capacity to earth" which is governed by its physical dimensions, and that this capacity will vary with the QRH upon which the system is made to oscillate. This is called the "effective capacity" of the system (at that frequency).

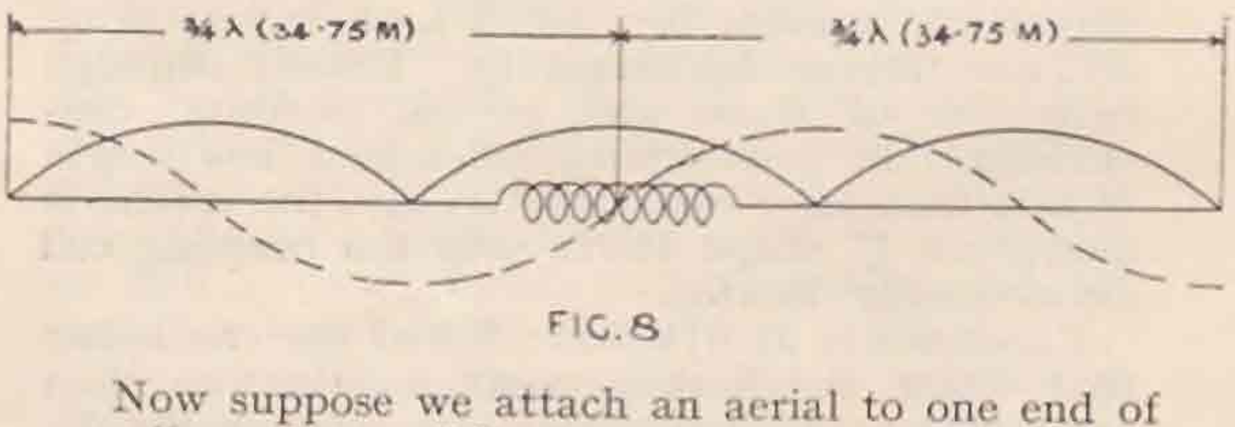


FIG. 8

Now suppose we attach an aerial to one end of our "coupling coil," which has already been tuned to resonance (by means of the variable condenser), we shall now have added the effective capacity of the aerial to the capacity of the tuning condenser,

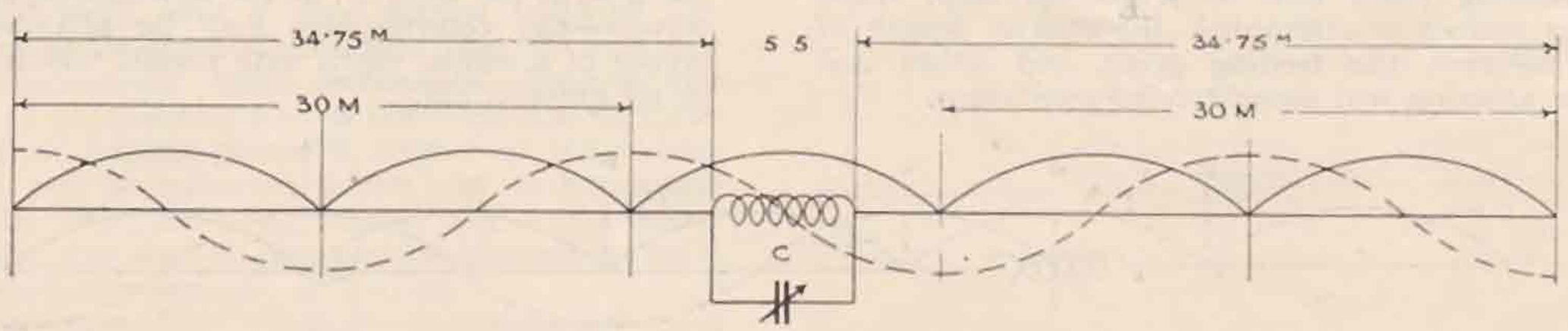


FIG. 9

and we should expect that in order to bring the whole system to resonance again, we shall have to decrease the capacity of the condenser. Suppose we try this. It will be found that our supposition is correct, and that this always holds good on any and every QRH to which the drive may be tuned. We have made a discovery.

It will be noticed that no matter to what QRH the drive may be tuned an adjustment of the tuning condenser can always be found which will satisfy our previously mentioned test which requires that the valve shall be pulled out of oscillation when the coupling is increased.

It will also be noticed that the coupling coil is highly susceptible to capacity effects owing to the fact that its free end (the end not attached to aerial) must obviously be at a voltage loop. The intense field so formed renders the system liable to "swinging effects" and instability of note, etc. If we now connect this free end to earth (or to —L.T.) and re-tune to compensate for the variation thus made in "effective capacity," we shall find that we have a system which is capable of being tuned to any QRH and of radiating that QRH effectively, and with good stability (provided per cent. coupling is correct).

Suppose, for example, we have built a bent Hertz (aerial and counterpoise with central coupling coil) for use on 45 metres and that its length is such as to accommodate $\frac{3}{4}$ wave from centre of coupling coil to each end (Fig. 8).

If we now wish to use this system on 30 metres (say)—Fig. 9 shows how this can be done by adding parallel tuning condenser C and adjusting this until coupling coil will accommodate such portion of the standing wave as would occupy 5.5 metres of straight wire—

Then $34.75+5.5+34.75=75$, *i.e.*,

$$2\tfrac{1}{2}\lambda=2\times30+\frac{30}{2}$$

Evidently C and L can be adjusted so that this circuit can accommodate any fraction of the standing wave (up to resonance, *i.e.*, $\frac{1}{2}$ wave), and the system is thus adjustable to the nearest $\frac{1}{2}$ wave no matter what QRH may be employed. In the case of an earthed system, the parallel tuned coupling coil will evidently accommodate any fraction of the wave to the nearest odd $\frac{1}{4}$ wave.

We have solved our problem at last, and the solution is found to be so simple, and so much "under our noses" all the time, as to have escaped attention. It is, in fact, the old Marconi aerial which is as old as the first radio message. And yet there is a difference, because in the original Marconi system the aerial was made to oscillate "stiffly" with the loading coil, *i.e.*, the whole system was in oscillation throughout, while in the "6JV modified Marconi system" (if the writer may so dignify the scheme) the coupling coil with its parallel tuning condenser must be of such C.L. variables that it can be tuned to resonance with the drive without the aerial being attached. If preferred the earth connection may be replaced by a counterpoise of exactly the same length as that of the aerial and lead-in, but there appears to be little gained by this, and the earthed system has enabled NU, NC, WNP, and all Europe, etc., to be worked on 23, 32 and 45 metres, while local

schedules are regularly kept on 90 metres (input 5 to 35 watts), and it is therefore claimed that the 6JV adaptation of the Marconi aerial fills the bill entirely, and is the simplest possible solution of our quest for a truly universal aerial.

From the foregoing remarks it will be seen that the Levy aerial can probably be adapted to work on any QRH merely by employing a coupling coil and parallel tuning condenser of such dimensions that it will tune to resonance with the drive without the feeders being attached.

When this has been done, the feeders would be attached and the capacity of tuner reduced until resonance is again reached. The Hertz-Zeppelin will not necessarily work in the same way, because the feeding point of the system is not centrally located and hence assymetrical excitation may result upon some waves as previously explained.

There is opportunity here for instructive tests by those who may possess such aerials.

Before leaving the subject the writer would like to add the opinion that although the system described has been proved to work effectively upon a variety of waves which bear no harmonic relationship, it is probable that there is some optimum physical length of wire for any particular QRH. This matter of itself furnishes an interesting field for further experiment, and is one upon which the writer is not qualified to speak at present.

The subject is indeed a large one, and much more might be written even by the present scribe, but this article is intended to be merely a brief outline of certain aspects of the matter. At the same time it is considered that one further note may usefully be added.

Experiments carried out at this station have indicated that much misapprehension exists generally regarding so-called "harmonic excitation." Actually there appears to be no harmonic relationship whatever between the fundamental and/or any harmonic of the drive and the QRH at which the aerial system will oscillate if shock excited and tuned to optimum radiation.

That is to say, if the drive is tuned to 45 metres the natural loaded frequency of the aerial when tuned to optimum radiation will *not* be 90 metres, or 135 metres, or 180 metres, or 225 metres, etc., but will be some QRH which is not necessarily in harmonic relationship at all. This can easily be demonstrated and when appreciated will remove considerable confusion of thought.

In the August BULLETIN, on page 15, 5MU describes a simple aerial system in which the aerial is clipped on to the anode coil through a variable condenser.

This system is in reality the capacity coupled counterpart of the 6JV system above described, and as such will certainly work on any wave and with an aerial of any length. The coupling condenser in series with the aerial is convenient both as a means of preventing the H.T. from reaching the aerial in a series-fed circuit, and also as a means of regulating the aerial load (*i.e.*, the coupling which in this case is capacitative). It is not however essential to successful working, because the per cent. coupling may be adjusted by varying the point of attachment of aerial to anode coil. The closer this attachment is to the filament end of coil the looser is the coupling. It is believed that certain of the Irish stations, whose results in last year's QRP tests were so gratifying, employed just this system (without the coupling condenser). That these stations used aerials specially "chopped" to one-half wave (*à la* Hertz) makes no more difference to the argument than would aerials of any unselected length have made to their general efficiency. Had these aerials been longer, for example, their capacity would have been higher, and the capacity of the condenser tuning the anode coil would merely have been slightly less when tuned to the same QRH. Their angles of radiation and polar diagrams, etc., would have been different, however, with consequent modification of "skip-distance" and performance, etc.

In conclusion, the writer would like to say that the above expressions of purely personal opinion are the results of careful and systematic experiment only, and that no deep knowledge of mathematics is claimed. The result may, of course, be an example of certain folk rushing in where angels fear to tread, but if this article shall have served to stimulate discussion which may lead to a clearer grasp of the principles involved, the writer will be satisfied that his own attempts to "straighten out the aerial" have not involved a waste of space in the BULLETIN which might have been more profitably employed.

We Wonder

Does our QSL Manager still QSL ?

Who invented the Z Code ?

How 2AX8's "F.A." fone is going.

What a certain QRP station thinks about GW station who works NU on 0.3 watt !

How 6LB felt at 18.04 G.M.T. on Sunday, February 12. Did his hand shake very much ?

What has happened to someone's DET1 after a trip up to 8 metres ?

How many Yanks make a breakfast ?

S.O.S.

We must have more technical articles and other matter for the April issue.

Correspondence upon the articles in this issue is specially invited. Contributors like to hear your opinion about their efforts.

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Re Transmitter Efficiency.

By E. MEGAW (6MU).

I have read with interest Mr. Goyder's excellent article on "Transmitter and Aerial Efficiencies" in the February BULLETIN. The method employed is very similar to that described by the writer in the BULLETIN of July, 1927, but the advantages of Mr. Goyder's method of measuring the anode dissipation are obvious, particularly for low-power stations. I am inclined to think, however, that it would be difficult to duplicate the results with accuracy unless the thermometer is permanently fixed to the valve. This measurement of anode dissipation is the only difficulty in the test, and probably the only satisfactory way to get over it would be to use a thermo-couple and galvo, the thermo-couple being shielded from convection air-currents and placed in a definite position relative to the valve. The method employed is really a matter of individual convenience and for all-round approximate work the thermometer is possibly the handiest. If accurate measurement is attempted, the power absorbed by the grid circuit should also be considered for self-excited circuits. If the method used for efficiency measurement depends on the temperature of the *anode* (*e.g.*, the writer's "visual" method), the total grid power should be added to the measured anode dissipation as the small amount of heat radiated from the grid probably does not affect the anode temperature appreciably. If the method depends on the temperature of the glass envelope, we may assume that grid dissipation is already allowed for. Grid dissipation is, of course, the product of the voltage on grid and the grid current. If a grid leak is used, the power dissipated in it should be allowed for in any case. This power $= R \times Ig^2$, and the voltage on the grid $= R \times Ig$, so that with a grid leak total grid power $= 2 \times R \times Ig^2$, and this may make an appreciable difference to the efficiency. By way of example, the (corrected) efficiency obtained at the writer's station using about 75 watts input to a DET1 ranges from about 55 per cent. to about 67 per cent., according to wave-length and adjustment.

I should like to offer one criticism of Mr. Goyder's article, namely, that the method described has no bearing on the radiation from, or the efficiency of, the aerial system, for surely the efficiency of an aerial can only mean the ratio of power radiated to aerial input and this bears no definite relation to the transmitter efficiency. Admittedly in the case of the "voltage-feed Hertz," referred to by Mr. Goyder, the aerial is probably radiating most power when it is drawing most power from the transmitter, but this is an exceptional case. It would be of interest to know if results of this test agree with the theoretical considerations indicated in the writer's remarks with reference to this aerial in the February BULLETIN. (Fig. 3g.)

The measurement of true aerial efficiency is a difficult job, but the true power in the aerial can be found if the R.F. circuit losses are known. These may be determined as follows: Run the transmitter at normal voltage and frequency, but with no aerial lead connected: measure the valve efficiency; now the total R.F. power (=input × efficiency) is supplying the R.F. circuit losses; measure the circulating current in each L-C circuit. (Suppose we are only concerned with the grid and plate L-C circuits: call the currents in these I_1 and I_3.) Reduce the voltage and again measure R.F. power and the two circulating currents, say I_3 and I_4. Then, if the two power readings are P_1 and P_2 and the RF resistances of the two circuits are R_1 and R_2:—$P_1 = R_1I_1^2 + R_2I_2^2$ and $P_2 = R_1I_3^2 + R_2I_4^2$. Hence R_1 and R_2. If there are more L-C circuits, take more readings until there is a sufficient number of equations to enable all the R.F. resistances to be found. Finally, measure the circulating current in each circuit under working conditions with the aerial connected and then RI^2 for each circuit gives the R.F. power lost in it, and if the total R.F. power lost is subtracted from the valve output, the result is the power in the aerial.

The writer would be very pleased to hear from others who are interest in measurements concerning valves and their associated circuits.

Essay Competition.

The Committee have pleasure in announcing that small prizes and diplomas will be awarded for essays on the following subjects:—

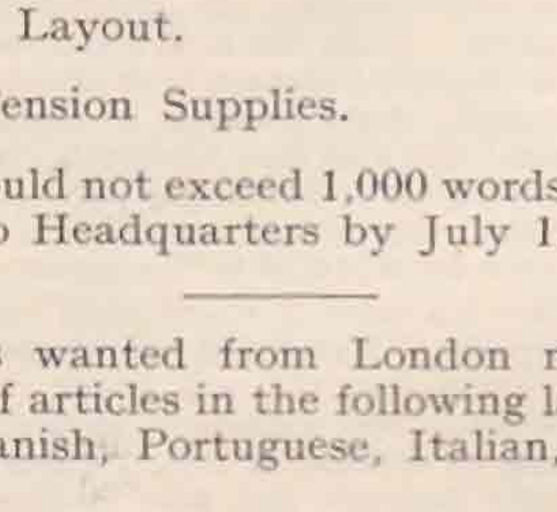
1. Fundamental Circuits. Receivers and Transmitters.
2. Hertzian Systems.
3. Quartz Oscillators.
4. Station Layout.
5. High Tension Supplies.

Essays should not exceed 1,000 words, and should be sent in to Headquarters by July 1, 1928.

Volunteers wanted from London members for translation of articles in the following languages:—German, Spanish, Portuguese, Italian, Dutch and Norwegian.

Correction.

The Editor regrets that a mistake occurred in the article on "Keying" by G. W. Thomas (5YK), in the February issue of the BULLETIN. The circuit included in the article was not Mr. Thomas', the correct one being shown herewith.



6QB.

By L. H. Thomas.

6QB is one of the many stations that began under difficulties and has remained under them ever since! Difficulties go and fresh ones arrive, but the usual share is *always* there. The aerial originally erected went from the top of the house to the top of a house some ninety yards away, and when first put up worked excellently for DX reception of 2FQ, 2OM, etc., but when the transmitting licence arrived in 1923 a full-fledged tree had sprung up under the aerial and was apparently making off with a fair proportion of the radiated energy. The tree could not be chopped down, but the aerial was, with a view to shortening it. It was at this point that the first tragedy occurred—the owner of the house on which the far end of the aerial was fixed suddenly turned "BCL," and down came the aerial, eggs, shells and all. Since then the maximum length available has unfortunately been 60 ft., which is just too short to be interesting as a Hertz-type aerial until the new wavelength scheme comes into action.

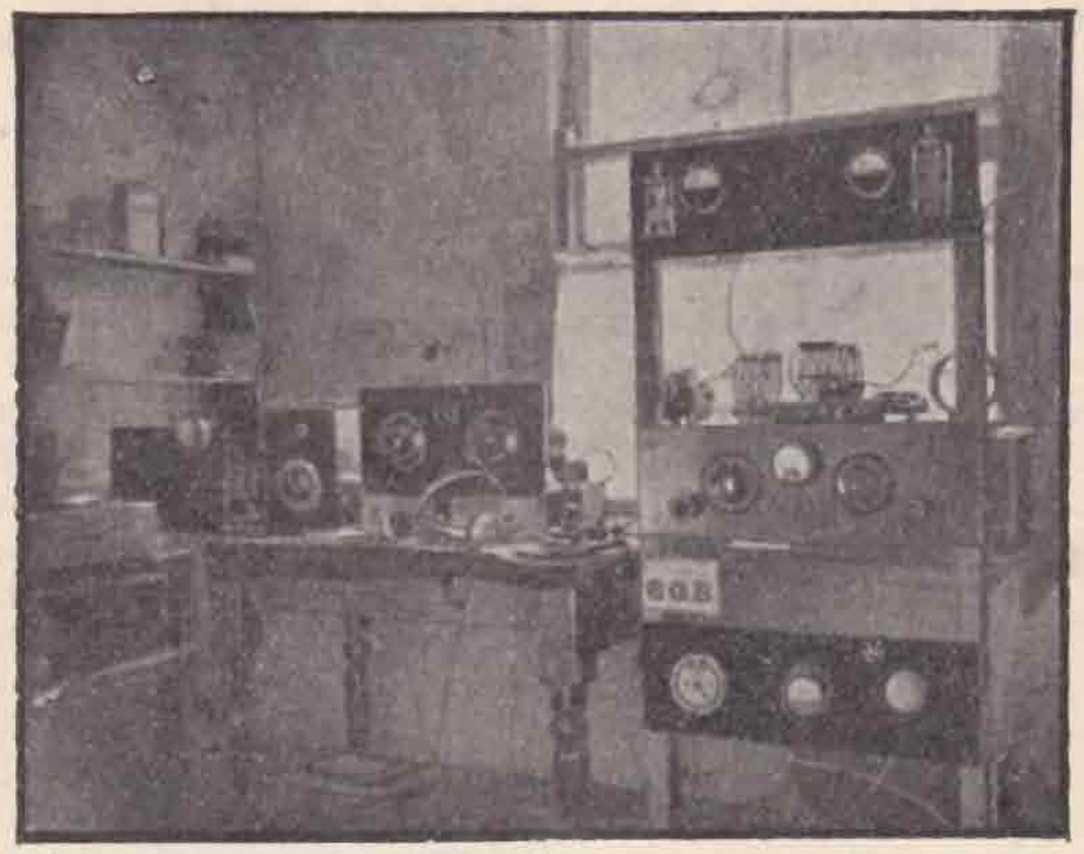
The best work done was certainly on 90 metres. Forty-five metre work has been productive of fair results, but nothing compared with those obtained on 90 metres during 1925. About 30 yards from the aerial runs the network of wires, standards, rails and all kinds of metal junk that calls itself the Southern Railway, and the writer believes that all this mess has a large effect upon the feeble signal radiated from the aerial with the usual input of 8 watts. It is hoped that soon after this appears in print 6QB will have moved far from such atrocities, and will be able to work more efficiently on 45 and 23 metres than before.

The photo shows a general view of the layout in the shack. Almost any circuit can be put into use at a few moments notice, as the only fixed parts of the transmitter are the "power unit" and two variable condensers. Power is obtained from a Type D. M-L converter, which is fed with 12 volts 2 amps. from two large car batteries, and delivers 20-25 milliamps. at 500 volts. The necessary rheostats, switches, meters, etc., both on the input and output side, are fixed in their positions, and to change the transmitter one simply undoes connections to five terminals (aerial, counterpoise, H.T., L.T. and L.T.) and removes the top board with the "works" intact. The new transmitter on test is then put in position, its five terminals connected up, and off we go.

This has been the most convenient arrangement so far for low-power work, although it probably would not be satisfactory for a QRO set with mains and rectifiers.

The house is not, of course, blessed with mains, which is another of the pet difficulties. The mains thoughtfully end about 90 yards away, and nothing will induce the company to instal them. The chief engineer is reputed to be a BCL.

The diagram shows the usual tuned-plate tuned-grid arrangement used for 23, 45 and 90 metres. The only differences from the usual arrangement are that the anode tuning condenser is taken right across to the filament, instead of being straight



across the anode coil, and therefore has a fixed condenser in series with it to stop sparking.

With an LS5 a grid-leak of 60,000 ohms is used. This is probably not the most suitable value for the valve, but it keeps the anode current down to a reasonable figure and allows of keying in the H.T. lead, with a 1-mfd. condenser and 100,000-ohm resistance across the key, without undue slowing-down of the M-L, and the note generally seems fairly pure and steady D.C.

The receiver is a straight low-loss detector and L.F., using "Aero" coils with a range of 15-220 metres. The writer hopes that stations that call 6QB and do not get a reply will think of the Southern Railway and excuse him! This atrocity turns out perpetual QRN at R5, ascending to the regions of R9 every time a train passes, and reception is often impossible for periods as long as five minutes.

Regarding results with the 8 watts input, the best DX at 45 metres is NE8WG in North-West Labrador, distance being 3,500 miles. Six or seven NU's have been worked, although not much intensive "sitting-up" is done. The best daylight reports were R7 from Riadh, Arabia, at 1530 during January, and R6-9 from Tripoli at midday. Four continents and 37 countries have been worked, and the best work on 23 metres so far is NU.

Tests are at present being carried out with the object of comparing the diagrams of radiation given with a half-wave Hertz aerial (arranged as an inverted L and voltage-fed at the end), a third-harmonic system, and a small fundamental aerial. Perhaps when something has been found out on the subject O.M. Editor may grant a little more space for a "write-up."

Annual Log Book.

We regret that the original date for issue of the Annual Log Book did not materialise owing to unforseen difficulties. We hope to produce it towards the end of the month. We thank all those who have ordered copies for their kind indulgence.

Wanderings in Europe with a One-Valve Short-Way Hook-up.

By G2TO.

TO the accompaniment of much QRM from the YL, who also made the trip, it was resolved to include a single-valve detector set in the kit before setting out for land of mountains and snow last June, when the owner of 2TO took his "vacation." The first consideration was the permits necessary for the countries passed through, so application was made to the Belgian, French and Swiss Legations in London for assistance in the matter. Each, in turn, politely refused, but the latter intimated that the Department of Posts and Telegraphs at Berne should be approached. Accordingly, a letter was directed to them and a permit to import one radio set into Switzerland at a cost of about 10 francs was received. Nothing, however, was obtained for Belgium or France, for it should be explained that the proposed route was Harwick-Antwerp-Brussels-Luxembourg-Bâle-Lucerne. By sheer bravado, not a cent was paid during the whole trip for customs or licences. The explanation of the various means adopted cannot be penned, but I can disclose them to anyone really interested! It is very important to declare the apparatus at the port of sailing from England as no duty will then be charged on return to this country.

On arrival at Antwerp, then, I had to persuade the Customs fellow that I had no evil intentions, and after serious consultation with his superiors and several perusals of said letter from Berne, which was in French, I was allowed to carry on and was the last one to board the train for Brussels. I had a great "wind up" in the vessel during the crossing, for on trying the gear in my bunk, no light came from the valve! (Ugh! terrors now the valve's gone.) But no, it was a wire off the L.T. single cell inside the set, and by luck I had brought a spare cell. (Huge relief at hearing the ship QSO GNF.)

Arrived in Brussels, I met my friend W2, who again escorted us around the city. A schedule had been fixed up with 2TO senior for afternoon, but owing to police vigilance, W2 advised me not to punch anyone's key that day. So the QSO was abandoned. I learned of the differences that had arisen between Réseau Belge and a large section of transmitters, but could not get to the bottom of the trouble. A few aerials were visible in Brussels, but not many. They seem to have the idea that an extremely long aerial is necessary, and with three or four wires at that. I saw some 250 to 300 feet long. Customs was again "managed" on entering France about midnight quite successfully, and all was peace till Bâle was reached about 6 a.m. on Sunday morning. The magic letter was again produced and a host of officials perused it and examined the set, and forgetting to look at the other luggage I had, passed all as O.K., and 2TO sailed forth into the land of milk chocolate! The hotel at Lucerne is quite beside the lake, and some chestnut trees decorate the edge of the water, so a banana skin was tied to the end of a reel of 32 d.c.c. and lowered by the YL from her bedroom window on fourth floor to ground, when the banana skin was hitched on to the highest point of chestnut tree to which it could be thrown. A good earth was obtained from hot-water pipes and with this shocking aerial for reception, 2TO senior pushed his raw A.C. straight across on schedule and various home news was picked up. A good many other G stations came through F.B., especially the D.C. notes. F's were plenteous and one or two Italians came in. No insulators were used (unless banana is). Time 2.15 p.m. Sunday. In the evening the same wire was used for an aerial between two fir trees on a hill called Gutsch, about half a mile away. Sigs. again arrived about 6.30 p.m., slightly stronger, if anything, and 45 metres seemed full of F's and G's. Schedules were maintained at various hours, and strongest reception was always obtained after 10.30 p.m. at night. By the way, all signals from England must have been shielded seriously by the big hills, which surround Lucerne and lie in a direct line with this country. The set was also capable of adjustment to receive long and short B.B.C. Daventry was missing except for a weak carrier. Bournemouth came through best, London sometimes, others also ran. Zurich and Berne were O.K. Throughout the experiments rainy weather was experienced and some QRN was present (and often QRM from the YL!) Since the weather was poor, it was decided to go on to Venice to find the sun, and on the way Customs again worried us at Chiasso. No difficulty was experienced owing to YL making eyes at Mr. Mussolini's representative, and although a somewhat strict examination took place, we were allowed to get back into the train. (Keep clear of those Mussolini men if you go that way, OM's; they're terribly inquisitive.) Passing Lugano, Como, Milan and Padua, we entered Venice over a long neck of land which connects it with the mainland, and gondola-ed to our hotel, escorting ye set. As no bananas were available on this occasion, a long piece of macaroni was procured and the 32 d.c.c. was attached to a portion of cheese which kindly consented to walk upstairs and hop off the top of the building to the nearest lamppost. Result—reception good, G's still strongly in evidence, B.B.C. nil. After several days in this queer city, where I saw no motor-car, bike or cart, the mosquitoes drove us away to Berne, where we had a delightful time, thanks to the kindly offices of Mr. William Le Queux, in looking over Radio Berne—the broadcast and commercial stations being at Müenchenbuchsee, near Berne. Details of the Swiss B.B.C. were given us, and it was found that the radio germ has not penetrated the Swiss heart deeply because bad reception is caused by the hilly nature of the country. Great surprise was expressed at our experiences on short waves. Huge QRM was produced by the trolleys of the electric trams in Switzerland till recently, when all the companies voluntarily changed the contact arm on all trolleys in the country from metal to a species of hard coal, which does not arc, and, therefore, prevents QRM. Would our English companies do this? Passing on to Paris, a visit was paid to 8NOX by invitation by radio. 2TO was worked on schedule, and by the time I left 8NOX, what with liqueur and blazing away in what French I remembered from school, I was very exhausted, for I found my friend was a lad of sixteen who knew no English! All trans-

mitting gear is very cheap compared with ours, and it invites one to chance the licence question. Whether occasioned by frog pie or snail gravy I can't say, but " little Mary " was very troublesome at this point, and a dash was made for home, so as to avoid a funeral abroad. A few words on the set used. It was made up to my own patents, and employed a Pranco tuner, D.E.R. valve, single dry cell L.T., 30 volts H.T. and coils outside the box for B.B.C. All the rest of gear except B.B.C. coils were inside the case, which measures 9½ by 8 by 5.

"The Effect of Temperature Rise on High Volt Low Current Machines."

RALPH H. PARKER (G2KK).

THE losses in heating temperature rise may be divided into the following :—Copper losses, Core losses, Mechanical losses, and Stray Load losses.

Copper Losses are the $I^2 R$ losses in the windings. In any complete copper circuit in the machine the copper losses in watts are equal to the square of the current flowing in the circuit multiplied by the resistance of the circuit. Usually the copper losses constitute a very large portion of the whole losses. The total copper losses in a shunt generator would be equal to the sum of the $I^2 R$ loss in the armature and $I^2 R$ loss in the shunt field. Here it may be noted that, inasmuch as the machine is self-excited, the current in the armature will be equal to the sum of the output current and the field current. In the average shunt or *compound* generator the shunt field losses are greatest of the copper losses ; armature losses follow, while the series losses are very small.

Core losses are usually caused by the changing of polarity and fluctuation of the magnetic path throughout the machine. These may be assumed as eddy current and hysterisis losses.

Mechanical losses may be determined as windage, bearing, brush friction ; usually small. The bearing friction may be taken as the greatest. There are a few losses coming under the heading of Stray losses, such as current flowing in coils short-circuited by brushes, as a great deal of care should be taken to have commutation when the conductors are in a neutral plane.

It is usual to reduce the ripple in high voltage machines ; the armature cores are given a twist of ½ to ¾ of a slot ; these will be subject to much greater conductor eddy current stray load losses than of the usual straight slot. Some of the factors for reducing the temperature rise are ventilation, iron, both for magnetisation paths and radiating surface and speed of machine. Usually vent ducts are provided through the armature, and in some cases around the windings.

Circulation is accomplished by means of a fan either forcing or drawing the air through these in machines of lower rating ; the armature being exposed between the poles is usually sufficient to keep the temperature rise very low. The heat generated would be dispersed via the frame. It is quite evident that the higher the speed of the armature the lower the temperature for the same losses.

Overheating may be caused in overloading machines or over-speeding, and in the case of separately excited machines over-excitation.

Overloading, *except* in the case of an over-compounded machine, reduces the terminal voltage. It will increase the series field and armature current, and not only increasing the copper losses but the core losses depending upon the compounding of the machine. The majority of machines are designed to take an overload of 40 per cent. to 50 per cent. for a short period, but not for its full rated time. In the case of over-speed the terminal voltage rises in proportion, and in consequence of this the core losses increase, the shunt field current is increased, this increasing the copper losses, adding again to the increased core losses. At very high speed it is possible to get a breakdown in insulation and an effective soft commutator.

In the case of an over-excited machine, with external excitation the core losses will be greatly increased, and probably the armature current also.

It is quite obvious that all these losses may be determined in heat, and the purpose of these few lines are not to advocate running of machines at half load or again half speed, because the efficiency would be very low and the output very unstable, and thereby urging the users of high voltage machines to give entire satisfaction to themselves and the manufacturer, by using their generators, as, and what they are designed for, and NOT to attempt to increase the manufacturer's rating.

Calibration Waves.

At the end of last year the QRP Transmitters Society decided to start a small calibration service, and as is probably known to many transmitters this has been undertaken by G. W. Thomas (5YK). This was to be continued until such time as the R.S.G.B. started their promised service. Judging by reports received the service was a success, and some have asked that it should be made an official R.S.G.B. Calibration Service. Mr. Thomas has agreed to this change and the service will in future be known as the R.S.G.B. Calibration Service. The QRP Transmitters Society should feel proud of the fact that they were responsible for starting the first accurate short wave calibration service in the country.

The schedule of transmissions will in future be as follows :—

Second Sunday in each month :—

1000 G.M.T., 46 metres (nominal).
1005 G.M.T., 45 metres (nominal).
1010 G.M.T., 44 metres (nominal).

Fourth Sunday in each month :—

Similar schedule commencing at 1400 G.M.T. When British summer time is in operation the above times should read B.S.T. The call will be as follows :—

R.S.G.B. de g 5YK (repeated). Here R.S.G.B. calibration service QRH (exact wavelength) metres, one minute dash, AR.

The wavelength stated during the transmission may be taken as accurate to ·05 metres. The wavelengths will be checked up by Mr. L. H. Thomas, (6QB), from time to time, on the R.S.G.B. official wavemeter.

Any criticisms or suggestions about this service will be welcomed by 5YK or headquarters.

Grid Leaks, Etc.

By 5YX.

The full advantage of a variable grid leak is not realised by a number of amateurs, and in the case of a QRP station, one can, by the intelligent use of a variable grid leak increase the output and decrease the input as well as getting a better note when using R.A.C. for H.T. supply. The general results found at 5YX have shown that high value grid leaks give much greater efficiency than the low values people seem often to use. With valves of the low impedance variety used at various times, such as DE4, DE6, DER, LS5, LS5A, and W.E. Power valve, a value of grid leak between 50,000 and 90,000 ohms has always given best results, and in the case of the LS5A up to ½ megohm has been used. Of course, with high impedance valves such as DE5B, T50, etc., low values are required—10,000 ohms or so.

Originally a water grid leak was used, but this was found to be somewhat unreliable and was not conveniently variable, and what seem better methods are now used. The following methods may be of interest and although they are, metaphorically, as "old as the hills," yet the fact that they are not more commonly used seems to suggest that their merits are not fully appreciated.

Perhaps the most refined type of variable grid leak is the diode. For some time at this station a DER run off a 2-volt accumulator constituted the grid leak. The value of the grid leak is controlled by the brightness of the filament. As a high value was required the grid was connected to the negative end of the filament, and when acting as the grid leak to the LS5 the DER was run with a resistance of 3 ohms in series with its filament. The charm of this type of leak is that by turning the rheostat knob one has beautiful continuous control of the value of the grid leak from a very high resistance approaching infinity to a relatively low value. For those stations who do "fone," modulation can be obtained by connecting the output of a microphone transformer between the grid and filament of the grid leak valve. This method will produce tolerable "fone," but it is not recommended to those who want to produce really good radio telephony of 5KH standard.

It need hardly be pointed out that the grid leak valve cannot be run off the same accumulator as the transmitting valve as the filament of the grid leak goes to the "grid side" of the grid condenser. The grid condenser had better be placed on the low R.F. voltage side of the grid coil otherwise a big mass such as an accumulator, connected to a high voltage point of the R.F. circuit, will cause losses. At 5YX the grid leak, like everything else, was choked off entirely from the R.F. circuit.

The best adjustment for the grid leak has always been found to be near the "howling point." If the grid leak is turned down until the transmitter howls, and then is turned up so that the transmitter just does not howl, then apparently one has maximum efficiency, *i.e.*, minimum input for maximum output. However, it will be found that the half-wave harmonic is being generated in rather an undesirable amount, and to get really maximum efficiency on the wave it is proposed to use, the grid leak should be turned up just a little. Also on 23 metres the wave climb that is always met with in high efficiency self-oscillators can be reduced somewhat by reducing the value of the grid leak. As regards flexibility, the valve grid leak is almost ideal. As a word of warning, do not expect a DER to like acting as a grid leak to powers over 10 watts. For QRO stations a bright emitter would be better as the strain on the filament of a dull-emitter valve would be likely to impair the dull-emitting properties. For experimental purposes the valve grid leak is very useful, but in a "stabilised" transmitter it becomes a bother; one forgets to turn it off and then wonders why the accumulator is run out next time one comes to use the transmitter, and a constant grid leak would serve as well.

The wire-wound grid leak is obviously indicated, but the prices charged for the tapped ones seem to be a stumbling block for some,; also most of the tapped grid leaks made for transmitters usually only go up to 20,000 ohms, which for efficient QRP stations is not enough. The B.C. wire-wound anode resistances are more or less suitable, but the guage of wire used seems rather fine for rough work; and it is probably not realised by some that for the sum of 4s. 6d. (the price of a B.C. anode resistance) one can, if one spends a little time, make a perfectly good wire-wound grid leak or general purpose high resistance up to the value of 86,000 ohms approximately. One can purchase retail a ½-oz. reel of No. 46 S.W.G. D.S.C. Eureka wire for 4s. 6d., and with an old wire reel, a twist drill, vice, and some ingenuity, one can in two hours make up a tapped resistance exactly as one would like. One can wind it non-inductively if one is supercilious, and one can put insulation between the layers if one fears a "flash over."

Besides using it as a grid leak, it will serve as an anode resistance, or the resistance for the 9EK keying system, or as one is now being used at 5YX, as a "potential divider" across the output of the broadcast H.T. eliminator for supplying grid bias to a power amplifier.

Strays.

ED-7GB would greatly appreciate reports on his 43-47-metre transmission.

EK4AFA writes, in answer to a query 6CL asked, concerning the change in tone of his crystal controlled note from T8 (pure D.C.) to T9 (crystal).

"The phenomena you mention on my signals is not at all clear to me, but I suggest that the "N cut" (105 metres per millimeter axis) gives the T9 signals, whilst the "T cut" (150 metres per millimeter axis) gives the T8 effect. The "creep" on my signals is possibly due to the fact that the crystal has not quite the same overall thickness, and therefore has two or more corresponding frequencies. On one piece I used I found this occurred, and in order to overcome the trouble I put the crystal into a solution of hydrofloric acid; the result was, after a two minutes immersion, that the crystal had now but one definite frequency. The acid apparently dissolved the upper layer."

Heard on the 45-metre band.

NU ? (R9) "Sa bo this is my QRP perker."

EG2MS: "R OK Sa little feller here my receiver."

Contact Bureau Notes.

By 6YW.

Things at C.B. are looking a little brighter this month. The new members are: G5JW, G2ZC, G2MJ, BRS107, G6CA, G6VJ, BRS26, G6LN, G6CL, and AI2KX. Total is now 34.

I welcome 2KX as our first DX member, and hope that time will produce some other DX applications.

At the request of D.F.T.V. I have arranged to co-operate with a similar bureau to be organised by EK4CL, and I hope that this liaison will be for the benefit of amateurs of both countries.

ED7MT, who says some kind things about the C.B. idea, has offered to put Danish experimenters in touch with me, and is translating the C.B. notes each month for the benefit, I hope, of the ED's. These developments are encouraging, and I hope the British members will enrol in greater numbers and keep our "own end up."

Where are the transmitters on the 8 metre band? BRS107 is ready with a receiver and will be glad to arrange schedules.

G2MJ is investigating sunrise fading (hi!), and heroically transmits for 10 minutes at 07.00 G.M.T. daily, and also at 14.00 and 18.00 G.M.T. on Sundays. His wave is 44.5 metres and reports are requested.

GI6MU sends me three reports on experiments, which I will discuss partly this month and partly next month. I feel that C.B. notes should consist almost entirely of such details, and I want some more items of interest. Who will be next?

6MU remarks that the general idea of S/W coils is that they should be wound with heavy wire (sometimes plated), of large diameter and on elaborate formers. Inspired by a remark in "QST," he wound some coils on the bakelite base of an ordinary dud valve. The glass will come away if you soak the lot in methylated spirits for a few moments. The results were so satisfactory that this type is now used at 6MU for all waves from 9 to 200 metres. They have also been tried at 6YW, and I am quite satisfied that they are the best type that I have tried yet.

The grid coil is wound with anything from 20 SWG to 28 SWG, but 24 SWG is recommended by 6MU, who adds "D.C.C." This coil is connected to the G and F pins, and the reaction coil, of the finest wire available, is connected to the P and other F pin. It is spaced 1/16 in. to ¼ in. from the grid coil. The whole thing is given one coat of good thin shellac. To quote 6MU: "This may sound a very criminal proceeding . . . but signal strength is not appreciably affected . . . any multi-stage amplifier will give you as much of that as you can stand, but unfortunately other things will be strong besides the signal." It is better to have a quieter signal and less background, and I have heard 6MU's receiver and I can say that I have never heard such a good performance anywhere.

Any good valve holder of low capacity may be used for the coils, but avoid those wobbly anti-vibration ones.

Here are the exact sizes of the ones in use at 6MU, and a .0005 mfd. parallel condenser is employed:—

9/20 metres: Grid 1¾ turns, 24 SWG. Reaction 4½ turns 42 SWG.

14/40 metres: Grid=3¾ turns, 22 SWG. Reaction=7¾ turns, 42 SWG.

21/65 metres: Grid=6¾ turns, 22 SWG. Reaction=10¾ turns, 42 SWG.

60/200 metres: Grid=19¾ turns, 28 SWG. Reaction=22¾ turns, 40 SWG.

At 6YW the greatest benefits of this type of coil were the very small field, and the ease of changing from one wave to another. Space is also saved, and I think that any losses the former and holder will introduce will be balanced by the smaller losses due to the much smaller field. If you try these I think you will adopt them.

Result of Ballot

FOR DIVISION OF MID-BRITAIN AREA.

IN FAVOUR OF DIVISION - -	39
AGAINST - - - - - - - - -	16

In accordance with the rules of the Society, members of the Western Mid-Britain Area should forward their nomination for the Area Manager to Head Quarters before Monday, April 2nd, so that Voting Forms and list of nominations may be included in our next issue.

QRP Tests.

For Transmitting and Receiving Stations.

Many people have suggested that some more QRP tests shall be run, and we hope that the following arrangements will meet with approval.

We often find that very divergent results are obtained from stations in the same district; this is often due to the superiority of one aerial over another, and in order to equalise everyone's chances, all stations participating in these tests will use an indoor aerial, preferably of the Hertz type, where the length bears some relation to the wave-length used. In this way advantage can be taken of a knowledge of the voltage and current distribution when designing an aerial for maximum efficiency and reduction of losses in surrounding materials. It is important that all the antenna system shall be under the same roof as the transmitter.

Open to all members of the R.S.G.B. and sections residing in the British Isles, whose subscriptions are not more than 30 days in arrears at the commencement of the tests, and who have the necessary licence.

Times and dates are: 00.00 G.M.T., Saturday, June 9, to 24.00 G.M.T. Sunday, June 17, 1928.

Wave-lengths: 23 metres and 44-46 metres.

Power: Maximum input of 10 watts to the anode of a self-excited oscillator; or, in the case of MOPA sets, a maximum input of 10 watts to any single valve or amplifier stage. Any source of power supply may be used, and precautions must be taken to ensure a smooth and sharply-tuned wave. Keying by marking and spacing waves is prohibited outside quiet hours.

No schedules whatever may be arranged.

An abstract of the log showing the following details only must be in the hands of the Tests Manager, R.S.G.B. Headquarters by Monday, June 25, 1928:—Date; time; duration of contact; station worked; strength the contesting station was received; wave-length used; power input.

Other members of R.S.G.B. who are not participating in the transmission side of these tests are asked to log all calls to British stations giving Station called; date; time and wave-length. An award will be given for the best such log sent in.

On the transmission side the results will be judged on a general basis of good work, which is not necessarily DX. In considering the results the power used will be a factor. Certificates and prizes will be awarded to the winners.

All cards confirming QSO's should reach the R.S.G.B. by Monday, July 16, 1928, or earlier if possible. Members are reminded to address envelopes containing these cards clearly, to the Tests Manager, otherwise they may be returned via the QSL Section in error.

The Committee reserves the right to count only QSO's for which confirmation is obtained, and to disqualify any contestant through infringement of the above rules, or for any other reason they may see fit.

The decision of the R.S.G.B. General Committee must be taken as final, and no correspondence whatever can be entered into regarding the result.

G. W. Thomas, 5YK,
Tests Manager.

Notes and News from the Areas.

NOTICE TO AREA MANAGERS.

Commencing immediately reports revert to the old style. Area Managers are asked to use their discretion when sending in reports, and are asked to draw them up on the lines adopted in this issue.

Area Managers may appoint an independent representative in the London Area to attend meetings of the Committee and to vote on their behalf. A letter appointing a member to the purpose mentioned shall be addressed to the Hon. Secretary informing him of the appointment.

Members appointed by Area Managers for this purpose shall not already be serving on the Committee as Representative Members.

London Area.

Manager: G. A. Exeter (6YK).

First and foremost, these notes, for some inexplicable reason, were not published last month. Inquiries have failed to ascertain the reason why, and I must therefore ask all those who sent in reports for last month, to accept our sincere apologies for their non-appearance. To those who know the tremendous amount of work dealt with by a few enthusiastic souls at headquarters, and the amount of chaos produced when for some reason or other just even one of those workers has to stop putting his shoulder to the wheel, it will be at once apparent that the loss of such a willing worker as our late editor must cause some sort of upheaval, and it is to this reason I attribute the failure of this area's notes to appear last month. As far as I am able I shall include the non-published reports this month.

Just a word about the last London Area Hamfest. I personally thank all those who put in appearance to help to make it the most successful gathering we have held, excepting the Convention affair. The room was stretched to its full capacity, and if another member had arrived late, we should have had to sit him on the stairs. I do not think that I shall be accused of exaggeration if I say that I am sure that every one present enjoyed himself, even our worthy Hon. Secretary who, I am sure, slipped back twenty years and forgot for the moment the weighty matters of administration. We were all glad to see him, and hope that our next gathering will again be able to welcome him, as we did at this one. I should also like to place on record my grateful thanks to Dr. R. H. Reece (2MS) and Mr. Tomes (6TN) for their kindness in enabling me to give the members the demonstration of the moving coil speaker, and I know that in this I shall also be voicing the opinion of all those present.

Now about the next one!!!! We have decided to arrange for this to take place on March 27th at Pinolis again, and as before 18.30 for 19.00. That is a date "to paste in your hat," as our NU friends say, so please do all in your power to roll along, and to help in the matter of arranging accommodation, *will all those who intend to come please drop a card to their respective divisional managers AT ONCE.* We do not want to arrange for about 40 and have a hundred turn up at the last moment, and not be able to seat them. Now, please *do not forget the date, or that card.* If possible, I shall try to arrange something to interest all of you, either in the shape of a demonstration or another form of entertainment, but I am making no rash promises, so do not be disappointed if I am unsuccessful.

One other thing. The Committee have decided to revert to the old style of reporting, preferring to rely on the discretion of the area managers for the deletion of useless information, so all those who refrained from sending in because of the old conditions, are now asked to justify this decision.

Northern Division.

By 6CL.

2AX has at last got over the pond—Baltimore R5. He and 6CL have been licensed to use a portable (call 5PS): this is being designed.

2AXL has succeeded in satisfying the P.O. and is now 5QF.

6UN is experimenting with Hertz systems. TPZO best QSO R4.

5UM is working on 150 metres and will be pleased to calibrate any set between 150-200.

6PN is still QRT.

6PP is again to the fore. Best QSO AQBD1 (R1)—input 4 watts! He is testing couplings and finds very tight coupling best up to 1,000 miles, but for greater distances a slacker coupling seems necessary.

6CL and 6PP with 6NK, of Weybridge, ran a week of skip tests. Summary of results will be published next month if possible. 6CL has tested TG/TP against TG only but finds no advantage. FM has at last been raised—twice in one evening during the skip tests!

BRS92 has remodelled his receiver and is using O-V-3 for DX on the B.C. waves.

The remaining 150 odd Northern Area stations were all QRT apparently.

Station Visits.—6KW and 2SH to 6CL.

Southern Division.

By 6PG.

2AI.—Mainly working on 170 metres and 90 metres, fone and CW. Input 5-9 watts RFB, grid modulation. DX reports welcomed. Schedule on Sundays at 09.30 with 2AU and 2HO.

5BQ working on 45 metres, half-wave Hertz, is O.K. up to 2,000 miles, but in U.S.A. signals are weak. Same aerial on 23 metres gives R6 from NU8CKC, but no Europeans except EG5UX.

6HP still testing aerials and has got one to work. States were QSO 28 times, and report received from AC2CK (Tientsin), giving R4 on 7 watts. This agrees with log.

6QB-6LT has 20 metres going better; 15 NU's worked. Best QSO NU4QY in Florida, and best report R7 from 1ASF. In common with 6BB and 6HP, he finds that coupling the coils in TP/TG circuit alters skip. Uncoupled signals are louder in Europe but do not carry so far. 6LT has not yet materialised, but everyone will have a surprise shortly.

6WY is a newcomer to the Southern gang. Tests on skip distance using TP/TG. Advice on chemical rectifiers would be welcome.

BRS50 found January good for DX, and added AQ, FB, FD, SU, OA, OZ to his list. Schedule with NU2ALI, who is using 3 watts.

2BWR is very busy and has nothing to report.

2BQH reports fine DX conditions and heard all NU, Philippines, etc. All Continents, and logged about 700 stations outside Europe.

6AP, testing with chemical rectifiers, would welcome reports from anybody. Has had a few QSO's.

6PG is still testing with half-wave aerials, but has nothing startling to report. Is still QRV schedules on 23 metres.

Eastern Division.

By 6LB.

6LB has successfully concluded his Zeppelin feed Hertz tests by working NU1CJC on 23 metres, using 6 watts, this being his first QSO "across the pond."

6UT is still trying to discover which type of aerial suits his station best.

6LL is keener than ever on 8 metres and has got a Hertz to function on that wavelength.

5PD is doing very little radio beyond erecting a Zepp-Hertz. (This type of aerial finds great favour among the "Cockney" hams.)

Inter-station visits are another feature gaining popularity in the division, and the following have been made during the past few weeks:—3LB to 6UT, 5PD, 2AFG. 6UT, 5PD, 5YK, 2AFG, and 6LL to 6LB.

Western Division.

By 6YK.

6JY has managed to QSO, NU being reported R3 when using 8 watts. He is rebuilding from the Hartley to T.P.T.G. and hopes to try the 90-metre band.

6KM still continues his aerial experiments and finds that increase in top gives better results. He would like more G stations to work with.

6VP has been doing capital work on 23 metres and 45 metres. Has a whole bag of NU's and has pushed fone R9 to FM8RIT. (Very FB, OM.)

6YK has been too busy in other directions to put much time on the air, but has been jigging up his RX for 8 metres.

2MS has worked NU's by the dozen, getting very fine reports, but no other DX.

6TN has been working OA stations on 45 metres at about 19.00 G.M.T., and has been reported by them as being the first G station they have heard on that band.

Northern Area Notes

Area Manager: S. R. WRIGHT (2DR).

Reports from the Yorkshire sub-area are scarce this month, although there is plenty of work being done. Perhaps the hams had such a good time at the social gathering that they forgot to report.

That gathering was undoubtedly the event of the month, and I was glad to have the opportunity of meeting many members of this area with whom I had previously only corresponded.

There is no doubt that the area as a whole is not showing the interest that it was a year ago, and I am anxious to know the reason. Will someone let me have their theories on the matter?

Will sub-area managers please canvass their respective sub-areas and make sure that there is a good turn-up at the Conventionette in Manchester on March 31. The time and place of meeting will be sent by post to every known member in the Northern Area. Anyone who has not had a notice, please write me at once on seeing this. It is hoped that some member of the T. & R. Committee will take the chair.

Roll up, fellows, and make the affair go with a swing.

Yorkshire.

Reports to 2DR.

6OO has forsaken 23 metres temporarily, but is putting in some good work on 45, using an inverted L. aerial on the third harmonic and 8 watts input to an L.S.5 valve. He finds this arrangement suits the T.P.T.G. circuit very well.

2YU had his station inspected by an army of hams on the occasion of the meeting in Leeds. Considering the difficulties under which he is working, the results are certainly a credit to the owner. A voltage-fed Hertz is used, erected at an angle of 45 degrees. 9th district NU was worked at 08.40 G.M.T. with this aerial and gave R4-5 when the input was 10 watts from dry batteries.

6DR is carrying out tests of an end-on Hertz on 23 and 46 during February. His T.P.T.G. seemed to dislike work early in January, so he slung a hay-wire outfit together with somewhat astounding results. (Hay-wires always work the best, OM!!)

2BPH.—Still busy with simultaneous radiation of two frequencies. Would be glad to assist anyone by fixing schedules for listening.

6BY is testing Hertz aerials on 23 and 45 metres, and also studying skip distance on 23. Would be glad of co-operation by Leeds station for 8-metre work. Any offers, Leeds? QRA: R. Bottomley, "Glynwood," Brighouse, Yorks.

2DR has forgotten how to use a key, but is busy with fading experiments on 5GB in conjunction with the Research Board. Some interesting gear has been erected for this work, and if any hams are interested, and would like to help, please write. Special apparatus and a stop-watch and little sleep are essentials!

6UJ is a newcomer. What about a report, OM?

The following failed to report:—5SZ, 2XY, 6TY, 6XL, 6BR, 5US, 6YR, 6WD, 5CX, 6IG, BRS107. What about it, hams?

Cheshire and North Wales.

Reports to 6TW.

2SO.—Nothing to report. Receiver being re-built.

BRS98.—Nothing to report.

BRS127.—Welcome, OM. Standing by for tests Sunday mornings and most evenings. For schedules write 44, Ashfield Road, Altrincham, Cheshire.

5PO.—Still under difficulties owing to QRA, so is trying to find a new one. Little work possible at present.

6TW is facing a change-over from DC to AC. You have my sympathy, OM. He cannot raise G stations at any price. (What about skip distance, OM?)

Notts, Derby and Lincs.

Reports to 6MN.

BRS97.—QRW exams.

2ADC.—Nothing to report.

2ABI.—New member. Welcome, OM. Experiments on 45 and 8 metres here.

BRS103 reports few G's heard. Is this because no one is transmitting or skip distance?

BRS111.—Not much doing owing to heavy calls on time by business.

BRS45.—Busily engaged with Morse code practice. Another station in the offing!

5QT.—QRW 'Varsity.

6UY is trying 'phone experiments on 45, but sends no details.

6LI is observing fading on stations below 35 metres. He finds the periodicity of 2XAD about three per second during daylight. Observations are still being taken from the Pyrenees. Should like to hear from you on the fading experiments, OM. How do you measure the periodicity?

6LN is exploring the ether with 2-4 watts input with a large amount of success and would like schedules with BRS stations interested in fading work.

6MN has done a little 'phone work on Sundays, but is chiefly employed in checking skip distance effects on a full-wave Hertz.

6UO has concluded a series of tests on the L.S.5 valve and says he gets out as good on 8 watts as with 10. He is still busy testing aerials.

Lancashire and Isle of Man.

Reports to 5XY.

BRS120 is experimenting to find the best reception aerial for short wave work.

BRS79 has been busy on the receiver, but sends no details of tests carried out.

5XY is now installed in his new shack, and expects to be busy by the time these lines are in print.

5JW continues with Zeppelin aerial tests on 23 and 45 metres. Results tend to prove that this type of aerial is fairly directional. Has any other ham found this to be the case?

Durham, Northumberland, Cumberland and Westmorland

Reports to 2AIZ by the 12th.

No reports received.

Mid-Britain Area.

Manager: (6JV).

Members will be interested to learn that 6AT is arranging to transmit calibrated waves shortly from his station at Dudley. A crystal which has been checked by N.P.L. will be used as a frequency standard. Full details will be published as soon as 6AT has completed the necessary preparations.

The time has arrived to settle something about this year's Conventionette. I have upon several occasions asked members to express their views, but with the one exception of the Cambridge Sub-Area, no response has been forthcoming. I must, therefore, assume that members prefer to leave the decision to me, and I feel that it would be difficult to improve upon last year's arrangements. Unless, therefore, I hear anything to the contrary by March 20, arrangements will be made to hold the Conventionette at the Cock Hotel, Kingsthorpe, on August Bank Holiday.

However, the result of the referendum upon the Area division proposal will be known before the date specified, and this may, of course, modify the whole outlook.

Shropshire (reports to 5SI).

Beyond working a weekly 90 m. schedule with 6JV, 5SI has not been on the air much. He has had bad luck with batteries.

Leicestershire (reports to 6WW).

No report received.

Cambridgeshire (reports to 2XV).

5JO has now secured 45 and 23 permit and some good Q.R.P. fone work has been done on this wave; he is testing various methods of modulating. A few U.S.A. QSO's have also been effected on C.W.

5YX has been getting a MOPA down to 12 metres nicely, but that seems to be the limit; he hopes to get a good 8 metre outfit rigged up by March.

6CR has made a new transmitter, but gets the H.F. anywhere but up the "spout"—a copper pipe aerial here gives excellent reception.

2DB has a transmitter and also a new automobile—the car wins.

2XV has been doing a little "glass blowing," having "sucked in" two fifty watt bottles on 23 metres within 5 days hi!!—A 250 watt valve is now being installed, when 32.5 and 23 metre work will be resumed—meanwhile, QRP 6 watts to LS5.

5YK and 2HK.—Dark horses, no reports, but good sigs. being heard, methinks there is a flavour of "New Ford Car" about this!!!

Northampton (reports to 6TR).

2CH is preparing for crystal controlled phone on 90 metres.

BRS89 is doing research work at Cavendish Lab., and has some excellent short wave reception to his credit.

6TR is QRT, but contemplating the building of a Split Hartley transmitter for 23 metre work.

Warwickshire.

[No one has come forward with suggestions for a new Sub-Area Manager. Meanwhile, Mr. Gardner (5GR) has kindly carried on. Please give this matter your attention, and inform me in due course. —6JV.]

5BB has been testing circuits and has adopted direct Hartley for further tests. Experiments are being conducted with aerial coupling with a view to obtaining a steady wave.

BRS29 has done little short wave work. He reports having heard a G station sending "test" calls almost on top of 2ZY Manchester, and very rightly protests.

BRS3 reports that the D.C. mains have arrived, and that battery charging troubles having vanished, they hope to resume work.

5GR contemplates a QRO, as he finds his present input rather too low for serious work.

Staffordshire (reports to 5UW).

2NV has been altering his aerial, and installing new H.T. plant.

2WN.—No report.

2OQ.—Testing ½ Harmonic current-fed Hertz for 23 metre band; results very good.

2YV.—No report.

5LK.—Shack flooded out, and now QRM with insurance company.

5NU.—Too QRW business.

5UW has been comparing meterological conditions with DX, and finds so far that the former has little bearing upon the latter.

5PR.—Still awaiting installation of mains for H.T.

6BH reports a heap of bad luck with his transmitter and valves.
6OH has been active, but not reported.
6HT.—Rebuilding for more power.
6PB has been changed over from D.C. to A.C. Mains hence busy rebuilding.
6UZ has decided to manufacture his own A.C. instead of using the very ripply D.C. (?) town mains.
2NO has not reported, likewise 5AF, 2AAD, 2BOC.

Norfolk.

6JV has settled down to the Ultrandion circuit and a simple aerial system which enables effective radiation upon any wave desired. He has written some notes upon his aerial experiments, which have been passed to the Editor.

Southern Area Notes.

Acting Manager: 2ABK.

6FT.—During the recent gales some tests were made to ascertain how a swinging aerial effects signals, using various methods of aerial coupling. Interesting dope was collected. Now on 180 metres.
6GZ.—QRW on 45 metres. Comparing TPTG against plain Hartley with fixed input of 4.2 watts QRP. Worked schedule with ED7DB. Soon going QRO on 23, and 8 metres.
5UY experiments with RFB circuit and half-wave Hertz. Now has returned to TPTG for fone and C.W. with 6 watts on DE5, and wants reports.
2MI busy on 45, QSO Moscow, Morocco, Portugal, etc., also 180-metre work.
2MJ still QRW business.
6VV, Chatham, has installed 1,000 volt generator and will soon be on air again.
BRS42 has built TPTG receiver, as described in BULLETIN, and says it goes F.B. Reports some very good DX about 15.00 G.M.T.
BRS114 is getting good results using two indoor aerials for different wave-bands. Hopes to experiment with underground aerial shortly. Swatting code with 5UY. TNX for photo OM, es card.
6CJ has built new transmitter, crystal or plain MOPA. Had visit from 5YX and 2nd op.
2HJ has had aerials under consideration and has had interesting results with Zepp antenna and several new countries have been raised.
5UY.—A further report tells of tests with SP18R and has had R10 from Bordeaux, and fone R4 at 230 miles R4. Also has tested keying methods to eliminate chirp.
6YL, as the call implies, is our YL op for this district, and is going full strength on 45m. Has QSO'd all Europe practically, and NX1XL (twice), University of Michigan Expedition in West Greenland. Has QSO EP and EU stations—also YL's.
2ABK has been busy constructing a 0—V—1 Reinartz, plus RFB transmitter, portable for 5QK field days, and hopes to test same when weather improves. Let me have your reports, OM's, I don't get many for "BULL" nowadays. TNX.

South-Western Area.

Manager: 2OP.

I had hoped to announce in this issue the date of the proposed meeting and "feed," but there has been serious QRM in the form of 'flu which put "paid" to all activities for the last three weeks. Indications are for a Saturday in May, at Bristol.
5VL has been "finding out things" on 23 metres. NU worked most evenings lately. Would be glad of experiences of other stations on this wave.
6JK using TPTG with V/F Hertz QRP, 45 metres, 1st NU QSO third and fourth districts, reports R3-4. 'Phone R6-7 all over England. Twenty-three metres, first QSO with RJC off Gibraltar. Copenhagen R5 in daylight. Also reports visits from several well-meaning people telling him that his aerial is sparking. (Better thus, OM, than call out the Fire Brigade.)
6RB first established with NU last October, now reports conditions especially good with NU and NC. Tests show that RAC overcomes QSS better than D.C. Best DX 23 metres, FOA7N, who gave R5. On 45 metres, NC3BK gave R5 also, and NU3SM gave R8. Very interesting QSO with PGO in Nova Zembla, the latter's first QSO with this country.
6ZR on input 2.7 watts "FM" has now been worked three times. Schedules running with G6OQ and GW17C.
What about the others in the district? Keep the pot boiling, OM's!

Scottish Area Notes.

By 5YG.

January has yielded THREE reports, and as they are almost entirely negative, I do not propose to reproduce them.
It would appear as if these notes do not now find favour in the area, and unless February shows a considerable indication that this is not so, I propose to discontinue their regular insertion.
THREE REPORTS FROM FORTY STATIONS!!!!

Irish Free State Notes.

By 11B.

I have received only two reports this month, from 12B and 17C! The former has, however, kindly sent a few notes received by W S.I. from other stations. This is a most unsatisfactory state of affairs, OM's, and surely it should not be too much trouble to send a postcard report once a month. I won't take up more useful "BULL" space with a "grouse," but *please do do it*.
12B has found DX condition mainly good. Had 11 transatlantic QSO's during January on 45 metres, besides Europe and North Africa. Testing on 23 metres and wants reports.
14B has rebuilt his transmitter, and is carrying out 'phone tests on 45 metres, using grid modulation.
16B is QRT at present.
18B has has serious trouble with hand generator, but maintained schedule with NX1XL, using 100 volts from dry cells. Hopes to have D.C. mains available soon.
14C busy with exams.
16C building a transformer for full-wave Rect. A.C., assisted by 18C, and has done little key work.
17C (90 metres) finds things quiet on this band, 45 metres QSO NE and NU eighth district, 23 metres handling test messages from NU, but reports conditions poor for QRP.
11D, on 23 metres, has worked ninth district NU, but finds conditions very uncertain on this band.
13D experimenting with 'phone, choke control, on 45 metres.
11B, on 45 metres, testing crystals on QRP. Twenty NU QSO's, of which 11 were test message relays.

Northern Ireland Area Notes.

By 6MU.

6YW has built a new receiver and an Armstrong transmitter which he finds more efficient than Hartley, but not so good for QSB; present aerial seems very directional Eastwards; QSO's include AQ1LM (R4 with 6 watts), AQS (near Spitzbergen) and Finland eight times.
5WD has worked EW, EC and EH for the first time, getting R6 from all except EC, where CW and fone were reported R8. He still can't raise NU.
2WK is using a new third harmonic aerial; he has been having trouble in getting a P.D.C. note, but will have a generator going soon.
6JA has been getting good reports on C.W. and 'phone from most of Europe, but can't QSO EL or EM; he will be glad of reports from this direction.
5HN is still on very low power, and is finding it hard to get QSO's.
5HV has worked Madeira with 8 watts, and has been getting good reports on his 'phone.
6MK has been trying some new aerials.
6MG will have a generator going soon.
5MO seems to be usually QSO FM8RIT on 23 metres! He will have valve R.A.C. shortly.
2IT has again disappeared. Hi!
6MU's QSO's have been mostly AI and GI! Also AWL near Colombo and Manila.
Several stations have not reported this month; reports should reach me by the 15th, and I hope the GI's will continue to set the G's a good example in this direction. The "new method" of reporting seems to be unpopular generally, though I think it is agreed that the reports should be brief *and* interesting. Very few if any GI's have been able to participate in the A.R.R.L. contest.

Foreign Reports.

Denmark.

(By ED7MT).

Reception conditions have improved considerably recently. EG's are received with greater strength after dark and QSO's are possible. NU was received well but not as QSA as SB.
E.D.R. has now assigned their reception members with the distinctive number DR005, etc. It is hoped that this organised method will assist our British friends. We hope soon to send lists of British Calls Heard to the BULLETIN. ED calls heard will be welcomed by E.D.R. Please QSR via EG6CL or ED7MT.
Reports are as follows:—
7FP using QRP has been QSO up to 1,500 km's. He is experimenting with filters.
7HM has rebuilt his transmitter and has done much early morning reception.
7JO has been QRW until midnight every evening.
7MT has been in daily QSO with NX1XL, using 10 watts. He has now finished his "big baby," designed for half a kilowatt! Coils are ¼" copper tube and the whole set enclosed in a glass case. He is installing a 500 watts' motor generator and hopes to be on the air very soon with 80 watts RAC!!

7ZG reports the death of his last power valve. He worked 107 QSO's, using 25 watts to a Phillips TA 04/5.
DR007 was the only Danish station to hear 6NK and 6PP during their recent skip tests. 6CL was heard once by 7EW who has been QRW all the month at college.

Germany.

(By EK4CL).

Reception conditions seemed to improve last month a good deal, European stations being heard sometimes at remarkable strength, as well as lots of DX stations, amongst them especially the NU's.

Picture telegraphy tests on short waves between Southern and Northern Germany gave fairly good results.

Many German hams are anxious to investigate the relations between reception conditions and WX, and would appreciate co-operation with foreign amateurs. 4YAE and 4ACI have developed a new device, which gives very pure reproduction of gramophone-records.

Berlin hams are very pleased to greet here NU2BD, who will transmit as EK4CJ in a few days' time.

Our next annual convention will be held very likely in Dresden during April or May. We heartily invite all our friends abroad to be present and we shall state exact date in next report.

Holland.

(By EN-OCX).

Just before writing these few lines we have got a message from our national headquarters informing every I.A.R.U. member in the country that there will be;a big convention this month, the third meeting to be organised under "foggy conditions." Instead of our national tricolour still the pirate's flag is floating from our aerial-masts. But never mind, all matters are still going strong over here. The month of January seemed to have been a fine one for DX; even many low-power merchants succeeded in crossing the pond and all got remarkable reception reports.

EN-OFK one day awoke and found his station confiscated—the big success of working with raw AC!!

EN-OVN now has good R.A.C. and is opertaing his 100-watter with rather low input, but results are fine.

EN-OF3 has come back on the air again after a long absence.

EN-OPRS only operates on 32 metres. Input 5 watts and gets astonishing reports from all distances up to 700 miles covered in full daylight.

EN-OCX's aerial is the lowest of the big collection of B.C.L.'s round his station and when transmitting has terrific QRM from re-radiated music. Worked Moscow and Maroc on 3 watts.

Correspondence.

Instructions to Correspondents.

We are always glad to hear from members. Correspondence published in these columns should be written clearly on one side of the paper and marked "For Publication."

All correspondence should be addressed to the Editor, T. & R. BULLETIN, *who reserves the right to refrain from publishing any material which is lacking in general interest or for other reasons. Correspondence for publication will* not *be acknowledged.*

Correspondence must be kept reasonably brief.

DEAR SIR,—In reply to Mr. D. M. Ely *re* article on "Insulation," October issue, I never implied that any kind of wood was superior to air-spaced coils, 90 and 160-metre coils, I find, must be supported. I should be inclined to think that boiling any wood for hours in P. wax would be as likely to destroy the natural insulating properties of wood rather than improve them. I only boiled for a few minutes till bubbles stopped rising. My QRA then was on the seashore, and moisture was the rule, rather than the exception, and after one of these coils had been in an outside workshop it tested O.K. I put on Megger first, and then in the plate circuit of my transmitter and worked Moscow R4 on 1.6 watts.

(G6YZ.)

To the Editor of T. & R. BULLETIN.

DEAR SIR,—I find someone is using my call sign, 2QC. I have received three cards from abroad from stations who say they worked me. Unfortunately, I have been unwell for many months and have not touched the transmitter since October last, though I hope to get going again in a month or so.

Would you please insert a warning in the "BULL." I have written to the P.M.G.

Yours faithfully,

F. VERNON SMITH (2QC).

Station Approach,
High Street, Rochester.

THRESHOLD HOWL.

To the Editor of T. & R. BULLETIN.

DEAR SIR,—I was greatly interested in 6CJ's recent article in the "Bull" on threshold howls, and have been carrying out some tests in this direction myself.

I find that when using an old L.F. transformer, with a characteristic curve something like a camel's back, threshold howl is entirely absent, but soon as an ultra modern transformer, with a straight "curve" between 50-8000 cycles, is susbtituted, the trouble begins.

I have tried the "Pukka" H.F. filter recommended by 6CJ, but it had not the slightest effect. I don't think the H.F. chokes I used were to blame.

I have also tried H.F. chokes in H.T. + H.T. — and both H.T. leads, but without effect.

It would appear then that one should use as cheap an L.F. transformer as possible in an S.W. set.

In fact I have come to the conclusion that one of the best tests for an L.F. transformer is to put it into an S.W. set. If it works well it is a bad transformer! When a second L.F. is used it does not seem to matter whether a good or bad transformer is used in the last stage.

Gi6JA.

THE DESIGN OF SHORT-WAVE TRANSMISSION AERIALS.

DEAR SIR,—May I express my disagreement with one statement made in the otherwise excellent article by Mr. E. Megaw, in the last two issues of the BULLETIN?

Mr. Megaw states in several places that the length of the feeder system must be either a half- or quarter-wavelength. This is incorrect. When a double transmission line is used it can be of any length whatever provided that a suitable reactance is placed between the wires at the home end. In the familiar case of the Levy aerial this reactance will be zero if the feeder is half a wavelength long, and increases to infinite reactance if the feeder is a quarter wavelength long. Further, the reactance required must be either positive or negative according to which quarter wave is interrupted by the transmitter. This means that sometimes a condenser is required and sometimes an inductance.

The disposition of the stationary waves on the feeder system will depend upon whether the resistance of the aerial system, referred to the point at which it is fed, is greater or less than the characteristic impedance of the feeder line. If the two are equal then the line can be of any length and will require zero reactance at the home end to satisfy optimum conditions.

I do not wish to go into detail in this letter as the question will be treated in detail in due course. One further point may be mentioned here, an ammeter in the feeder line will never read *less* than the aerial current, and as a general rule reads considerably more. This is true irrespective of the type of feeder system employed.

Yours faithfully,

FRANK AUGHTIE G6AT.

To the Editor of T. & R. BULLETIN.

DEAR SIR,—Have just received a card from NU8BBP, Mr. Ed. Ehlinger, Auburn Avenue, Utica, N.Y., U.S.A.. in which he states I have given him his first report from England. He asks me to make it known that he is anxious to receive reports from British amateurs, all of which he will acknowledge.

Mr. Irwin C. Kodar, NU2BBC, 829, Southern Boulevard, Bronx, N.Y. U.S.A., is anxious to work with, or receive reports from, British, stations, and, meanwhile, sends his 73's to them all. His QRH is 38.25 metres.

Yours truly,

T. A. ISERBYT (BRS25).

To the Editor of T. & R. BULLETIN.

DEAR OM,—I am writing to notify you that 2AX has now been further licensed to experiment with a portable transmitter with the call sign XEG5PS.

I shall be glad of reports on the signals from this station.

Very sincerely yours,

G. S. BRADLEY (2AX and 5PS).

To the Editor of T. & R. BULLETIN.

DEAR SIR,—Whilst in communication with New Zealand last evening, I received a message from OZ3AU on behalf of OZ3AX. The message was addressed to the London hams, and I promised to forward same to the BULLETIN for publication next month.

The message is as follows:—

"To G2KF from OZ3AU,—OZ3AX arrives in London on March 15 next, by the S.S. *Orsova*. Please inform the London 'gang.'—Sig. OZ3AU."

Last evening was exceptionally favourable for good contact with the Antipodes and my own station was in touch with OA3HL and 3VP in addition to OZ3AU within just over an hour. All three stations reported good signals and theirs were also very good indeed. G2KF is again active and is working on both the 33 and 23-metre bands.

Wishing the BULLETIN every success,

Yours faithfully,

J. A. PARTRIDGE (G2KF).

January 30, 1928.

Q.R.A. and Q.S.L. Sections.

Under the heading "YL SECTION," on page 8 of the February BULLETIN, I note that it is stated Miss Dunn, G6YL, has been co-opted on to the QSL sub-committee. I think this should be QRA sub-committee. Miss Dunn has been giving me valuable assistance in collecting QRA's for a considerable time unofficially, and she very kindly accepted my invitation to continue this help in the official capacity of a member of the QRA sub-committee immediately the scheme was passed by the committee.

I have received a large number of new QRA's from members during January and the early part of February, and as these were in time for publication in the R.S.G.B. Annual, I do not propose to publish them this month, as the book should be out before these notes appear in the March BULLETIN.

I hope members will inform me of any errors or omissions, in order that I may publish all available information monthly as heretofore, and this request applies particularly to the British QRA's, as the Annual must be maintained as the most up-to-date and authentic publication in this respect.

I shall revert to the usual form of monthly report for this Section next month.

C. A. JAMBLIN (G6BT),
Manager, QRA SECTION,
82, York Road, Bury, Suffolk.

The Q.S.L. Bureau is again in the hands of 5AD at his address, i.e.,

166, Kentish Town Road,
London, N.W.5,

and please send all Q.S.L. to that address.

One 2d. stamp for any number of cards, and for any country, is all that is required when sending your cards.

Please keep me supplied with stamped addressed envelopes for your replies; by doing so you will alleviate the hefty job of this section.

It is not intended to publish a list of cards waiting, as if anyone does not send envelopes, all cards left over will be destroyed at the end of each month.

In response to several inquiries about Free Countries, below is the list. Cards for other countries to be accompanied by one 2d. stamp:—France, Germany, Spain, Holland, Belgium, Denmark.

In a rough estimate a complete Free Service would cost the Society about £15 a year at the least, whereas, when a member can send as many cards to other countries as he likes for 2d., it is not necessary to burden the Society in this manner.

These stamps will help to cover the cost of free country QSR also. I think all members will agree, that when the duty of QSR is undertaken free, it is worth 2d. for each batch of cards you send.

"ACK DON."

CHANGE OF CALL SIGN.

2BPP now 5QP.
2AXL now 5QF.

B.R.S. NUMBERS.

NUMBER RELINQUISHED.

B.R.S. 121 by R. A. N. Johnson.

NUMBERS ISSUED.

127.—V. Percy, 44, Ashfield Road, Altrincham, Cheshire.
128.—L. E. Tonkin, 238, Drakefell Road, Brockley, London, S.E.4
129.—W. J. Sharratt, 15, Woodwarde Road, E. Dulwich, S.E.22.
130.—R. F. Speake, "Arncliffe," Penn, Wolverhampton.
131.—R. L. Rowlands, North View, Wivelsfield, Haywards Heath, Sussex.
132.—G. E. Jones, Tregarth, Redruth, Cornwall.
133.—W. H. Bendall, 45, Over Lane, Belper.
134.—S. W. Rowden, Rosebank, Pilrig Street, Edinburgh.
135.—W. McLean Mitchell, Meadow Cottage, Selkirk.
136.—W. P. Jones, 21, Marion Street, Newport, Mon.
137.—H. Lucas, 33, Clee Road, Cleethorpes, Lincs.
138.—L. H. Shearer, Trentham, Commonside, East Mitcham.
140.—J. C. Wicks, 161, Sangley Road, Catford, S.E.6.
141.—P. B. Crinks, Newick House, Cheltenham.
142.—R. Jardine, 76, Staines Road, Essex.
143.—C. Rhodes, 83, Shaftesbury Road, Hammersmith, W.6.
144.—H. A. Savage, Burnham-on-Crouch, Essex.
145.—C. L. Woods, 95, Fore Street, Exeter.
146.—A. J. White, Gladstone Road, Fakenham, Norfolk.
147.—Cadet R. H. N. Johnson, Waverley, Hendford, Yeovil.
148.—
149.—C. Taylor, The Close, Burcote, Nr. Abingdon, Berks.

Readers will be interested to know that a society has been formed at Budapest under the name of the Hungarian Short-wave Amateur Society (MRAE). The Secretary is Kurt Nekolny, Budapest II, Buday Laszlo utca 5/c. The Society, which numbers some 140 members, sends its greetings to all British members, and information that their co-operation is always available.

A neat badge of the International lozenge-shape has been adopted

Calls Heard.

Calls heard by AQ-1LM. Receiver, O-V-2; wavelegnth 17-50. From January 8 to February 12, inclusive.

GREAT BRITAIN.—EG. 6tg, 5yk*, 6yv, 2kf*, 6wl, 2ax, 6lc, 6hu, 2cs, 5ls, 2nh, 6mu, 6yw, 6rb, 6oo, 5ux, 5by*.
AUSTRALIA.—3kw, 5ja, 5ws, 3jk, 5rg, 5rj, 6mu, 2yj, 3jw, 5xg*, 5cm*, 3lp, 2gr*, 5wh, 7cw, 7ch, 3ls, 2we, 5dx, 3ot, 5wa, 5hg.
BRAZIL.—SB. 1ah, 1br, 1ao, 1aw, 1ca, SNM.
UNITED STATES OF AMERICA.—NU. 1awe*, 1ajx, 1aqt, 1adb, 1amd, 1aaw, 1gh, 1akm, 1bke, 2nen, 2ags, 2alu, 2rs, 2cxl, 2ty, 3ec, 3ceb, 3hf, 3ani, 4ob, 5ayl, 5cc, 7sdy, 8hd, 8tir, 8cjm*, 8clp*.
CANADA.—N.C 1ad.

* Indicates 20 metre band.

QRA:—C. D. CONNERTON, P.O. Box 117, Baghdad, Iraq.

CORRECTION OF CALL SIGN.

The call sign described as 2LK in the February BULLETIN, situated at Maidenhatch, Pangbourne, Berkshire, should have read 2OK.

Trade Notices.

A very interesting little booklet, written by the well-known radio writer, Mr. W. James, has been received from the Telegraph Condenser Co. (T.C.C.) describing eliminators for D.C. and A.C. working. Complete circuit diagrams are given and information regarding values of components to use and construction. This booklet will be sent free to any applicant; send a stamped addressed envelope to the firm, Wales Farm Road, North Acton, W.3.

* * *

Messrs. the Abingdon Wireless Supplies send us a list of their resistance units for use as grid leaks and anode purposes. They also specialise on resistance coupled units and enclosed crystal detectors.

AN UNLICENSED TRANSMITTER.

An unlicensed transmitter was convicted and fined £10 and costs at Rochdale Police Court on February 10.

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