THE T. & R.

BULLETIN

THE INC. RADIO SOCIETY OF GT. BRITAIN

AND THE BRITISH EMPIRE RADIO UNION

Vol. 9 No. 8 FEBRUARY, 1934 (Copyright) Price 1/6

THE INCORPORATED

RADIO SOCIETY OF GREAT BRITAIN

AND THE

BRITISH EMPIRE RADIO UNION

53, *VICTORIA STREET, LONDON, S.W.I.* (*'PHONE: VICTORIA* 4412)

PATRON: H.R.H. THE PRINCE OF WALES, K.G.

R.S.G.B. CALENDAR.

Unless otherwise announced, all meetings are held at the Institution of Electrical Engineers, Savoy Place, W.C.2 commencing at 6.15 *p.m. Tea is served at* 5.30 *p.m.*

February 23. "*Radio Communications with the* 1933 *Mount Everest Expedition*," by David S. Richards, Esq.

March 28. "*Modulation Systems*," by H. Larnder, Esq. (Ex-C1DT.).

April 20. Subject to be announced later.

OFFICERS FOR THE YEAR 1934

President: ARTHUR E. WATTS (G6UN)

Vice-President and Honorary Treasurer - - E. Dawson Ostermeyer (G5AR
Honorary Editor - - - - - - - - H. Bevan Swift (G2TI)

COUNCIL

J. D. Chisholm, (G2CX), E. A. Dedman (G2NH), A. D. Gay (G6NF), J. W. Mathews (G6LL), H. C. Page (G6PA), G. W. Thomas (G5YK), J. C. Watts (BRS246).

CO-OPTED MEMBERS

V. M. Desmond (G5VM). T. A. St. Johnston (G6UT).

Secretary: J. CLARRICOATS (G6CL).

All correspondence should be addressed to The Secretary (or other officer concerned), The Radio Society of Great Britain, 53, Victoria Street, London, S.W.1. Insufficiently addressed letters may be considerably delaved.

THE T. & R. BULLETIN

Honorary Editor :—

H. Bevan Swift (G2TI)

Advertising Manager :—

Horace Freeman, Esq.

Vol. 9

No. 8

CONTENTS.

A PLEA FOR BETTER RECEIVERS

DURING recent visits to amateur stations in London and the provinces we have been impressed with one outstanding feature, namely, the difference in care and attention given to receivers as compared to transmitters. Whilst the average transmitter examined has been constructed on modern lines, and presumably with the intention of making it as closely approaching commercial practice as possible, receivers in general have given us the impression of having been thrown together with any old parts available.

We cannot understand this laxity, for it is certainly just as important, if not more so, that the receiver at an amateur station should be as efficient as the transmitter. It is of little avail if the last ounce of R.F. has been squeezed from the transmitter and the receiver is incapable of bringing in the replies.

Numerous instances of missed calls have come to our notice, and during this month of Empire contests hundreds more will go unheeded by those for whom they are intended. Ignoring the vagaries of skip and fading many of these lost calls can, we assert, be attributed to poor receivers.

In the last few issues of this Journal we have given prominence to receiver articles in an endeavour to improve this state of affairs, and we hope that as a result some of our readers have been aroused to a state of "receiver consciousness."

We would, however, voice a word of warning—do not slavishly follow the experience of others. In this issue our Receiver Design Group of Contact Bureau have contributed some excellent suggestions relating to detectors and coupling arrangements, but those who are interested in their results would do well to strive for still further improvements. Our Contact Bureau Manager and his assistants will appreciate information from other members on this important subject, and will see that due credit is given for new ideas.

The simple battery driven receiver consisting of a detector, followed by one or two stages of L.F. amplification, seems to hold as much prominence to-day as was the case five years ago. The reason for this is difficult to seek, unless it is because most amateurs fight shy of discarding batteries for mains supply. We should do well to ignore the statement that indirectly heated valves bring with them numerous difficulties, for, thanks to the excellent progress in valve development, every well-known type of indirectly heated valve will, when incorporated in a properly designed circuit, give a performance equal to or better than its battery-driven counterpart.

Using a standard type of screened grid valve as a detector we have available an excellent means of reaction control by adjusting the voltage applied to the screening grid providing a *good* quality potentiometer is used. We say "good" with emphasis, because there appears to

(*Continued on page* 245.)

PRESIDENTIAL ADDRESS

Delivered by Arthur E. Watts, Esq. (G6UN), at the Institution of Electrical Engineers, London, Friday, January 26, 1934.

IT is quite impossible for me to find adequate words with which to express my sincere thanks for the great honour you have done me in electing me your President. This honour is greatly enhanced, because you have chosen me to follow such a worthy predecessor as Mr. Bevan Swift, to whom the Society is so much indebted.

To be President of this Society is a great trust, but if the responsibilities are heavy, it will be the greater incentive to me to do my utmost to emulate the high standard set by Mr. Swift and to discharge faithfully the duties of the office. I want to do more than merely discharge those duties. It is my desire to keep in the closest touch with the many important activities of the Radio Society of Great Britain and the British Empire Radio Union at Home and Overseas, and to further their interests in every possible way. To merit your confidence will be my great endeavour and as time passes I hope you will be able to say truthfully that I have done so.

In 1922 our then President, Admiral Sir Henry Jackson, set up the custom of delivering a Presidential address on what might be called the politics of amateur radio, and in accordance with that custom I am going to ask you to accompany me first through a brief account of the development of the Society. As my address is to the whole of the members, and can only reach them all through the medium of the T. & R. Bulletin, I trust those present will forgive me for mentioning some facts which are well known already to most of you.

On July 5, 1913, six radio enthusiasts, who foresaw the difficulties which would probably arise through lack of co-operation, met at a house in North-West London and decided to form a local Wireless Club. Mr. Leslie McMichael played a large part in further meetings that were held, which finally resulted in the formation of the London Wireless Club, changed later to the Wireless Society of London. Fortunately for the future of the Society, Mr. A. A. Campbell Swinton, F.R.S., became the first President, and held that position for seven years, during four of which the Society was marking time owing to the War. It is a pity that we have very little information regarding the activities of these early members during the War, but we know that many of them served in Wireless units, and their experiences would make very interesting reading to-day. With the return to peace-time conditions, the Society recommenced its activities with increased vigour. In February, 1920, the first Conference of Affiliated Societies was held, and the discussions which took place led eventually to the birth of broadcasting. The Society presented to the Postmaster-General a petition representing most of the amateurs in the country, and shortly afterwards permission was given for the Writtle Station of the Marconi Company to commence weekly concerts. Only three months later Mr. Kellaway made his historic announcement regarding the inauguration of National Broadcasting, so we can feel justly proud that broadcasting in this country is indebted to the Radio Society of Great Britain for its commencement.

As a result of the interest which was being shown throughout the country in experimental radio matters at that time, it became desirable to change our name to the Radio Society of Great Britain, and at the same time H.R.H. The Prince of Wales graciously consented to become our Patron, a fact of which we are very proud. We continued to progress and by 1929 our numbers had risen to about 900. To-day they are just 2,000, with members in practically every part of the British Empire, as well as many in foreign countries. We are proud to have as Honorary Members those two great pioneers, Senator Marconi and Sir Oliver Lodge; the latter was President of the Society in 1925.

We have grown from a small local club into a National Society representing at least 90 per cent. of the active transmitters in this country, and what is also important, *we are in close touch with every Dominion and Colonial Society*. In the time at my disposal, I can only mention a few of the events that have taken place during the last ten years.

On December 8, 1923, the first two-way amateur radio communication took place between this country and North America. In 1925 the T. & R. Bulletin was first published. In 1926 the first Annual Convention was held. In 1927 the T. & R. Section joined the main Society. In 1928 the B.E.R.U. and Contact Bureau Sections were formed, whilst in 1930 the First Loyal Relay to our Patron, H.R.H. The Prince of Wales, took place. In 1931 the First B.E.R.U. Contest was held. 1932 saw the inauguration of the R.N.W.A.R., and 1933 the First National Field Day event.

Many instances could be mentioned of assistance given to expeditions, such as that to Mount Everest, and the organisers of epoch-making flights, including the long-distance flight to South Africa. Our members have always been ready and always will be ready to render all the help they can on such occasions.

I hope that some day one of our members will undertake the task of writing the history of the Society; I feel sure it would be appreciated.

We are already considering what steps shall be taken to celebrate the coming-of-age of our Society, which occurs on July 5 this year, and your Council will be very pleased to receive suggestions from you. For instance, should we make special arrangements for July 5, or should we elaborate our Annual Convention in August? The latter would be probably more convenient for those in the provinces.

I might remind you here that ours is the oldest radio Society in the world, save one, and that one is in the British Empire, the *Wireless Institute of Australia*.

Turning to the organisation of the Society at Home, owing to the rapid increase in our membership, steps were taken a few years ago to appoint well-known amateurs as District Representatives. These gentlemen are responsible for the general welfare of their district and for arranging local meetings. They are assisted by County Repre-

sentatives who are elected annually by the membership in their county. At present there are 18 districts in England and Wales, four in Scotland, and one in Northern Ireland. The present organisation, with minor alterations, has been in force for three years and has proved to be satisfactory, and as a means of contact between Headquarters and the membership I do not think it can be improved upon at present, although some modification may be found necessary in the future. Our District Representatives and County Representatives are all keenly interested in their work and render valuable assistance to the Council. The Annual District Conventionettes have proved very helpful both to the members and to Council.

I would ask any of you who make application to Council for extra transmitting facilities, to bear in mind the few simple rules laid down for guidance, and to always give full particulars as to why the extra facilities are required.

We have at present a large number of non-transmitting members, whom we are anxious to assist in every possible way, and we shall at all times be glad to meet their wishes and cater for their needs to the best of our ability.

The British Empire Radio Union is the name given to the Overseas Membership of the R.S.G.B. resident in the British Empire. It also covers the British Empire Societies which are affiliated. The B.E.R.U., as it is known for short, owes its inception to Captain Hampson, and I remember well his address on the subject at the 1927 Convention.

The actual wording of his proposal as it appears in the November, 1927, issue of our Journal, is worthy of mention. *"It is felt that the time has arrived to consider the possibility of again extending the scope of the Radio Society of Great Britain to include the Dominions and to form with them some form of British Empire Radio League, which would be worthy of the Empire."*

Although the B.E.R.U. was not placed on a firm footing until 1929, that sentiment has governed our Empire policy ever since; further, the B.E.R.U. is playing a useful part in leading to a closer and better understanding of our cousins overseas and to the fostering of Empire friendships.

We have a B.E.R.U. representative in nearly every part of the Empire who acts as a publicity and liaison officer between Headquarters and the Executive of his National Society or Group. The representative is appointed with the approval and consent of the Society on the spot, or by the local members if there is no Society. He forwards each month a report on the activities in his country for publication in the BULLETIN, and arranges for the appointment of assistant representatives where necessary and Empire Link Stations. It has been my privilege to be closely associated with the development of the B.E.R.U., and I cannot speak too highly of the work done by our overseas representatives.

On June 23 each year, we, as Headquarters of the B.E.R.U., have the honour of conveying loyal birthday greetings from the Empire to our Patron, His Royal Highness The Prince of Wales.

As an example of the type of work which is being undertaken in the interests of the Empire, I would like to mention that we have recently prepared a comprehensive list of prefixes for use by Empire amateurs in those parts of the Empire where no definite prefix has been assigned.

In the past, when new groups have commenced operations, prefices have been chosen which have been regarded as suitable, but which on examination have been found to bear no relationship with the prefices allotted to amateurs in neighbouring territories. The scheme which is being prepared will be submitted to the Societies throughout the Empire, and if adopted by the authorities will prevent confusion in future.

The work of the Society's various sections has been adequately covered in our recent Annual Review, but I would like to draw attention to the importance of three of these Sections in particular.

It does not seem to be generally known that our Calibration Manager has set up a standard frequency station which is capable of operation to within limits of one part in ten thousand. This is an achievement we should do well to keep in mind when considering the advantages of membership.

The Calibration Section has proved of great assistance, and I should like to couple with it the group of members who have been engaged in band occupancy tests. I mention these together, as I think it will be necessary to make greater use of them in the future.

The importance of Contact Bureau has been stressed on numerous occasions, but I cannot let this occasion pass without making a personal appeal to our more technically minded members to give it their fullest support. With approximately 400 new members being enrolled annually, it is of *vital importance to have men with experience available to give advice and lead the many C.B. groups.*

The Contact Bureau notes published in the T. & R. BULLETIN should represent a moving panorama of scientific advancement, and with every member who is able taking a hand, this should not be difficult of attainment.

We are at all times ready to co-operate with overseas societies, and it is possible that a future development of Contact Bureau may lie in this direction.

The T. & R. BULLETIN speaks for itself; you have only to peruse back numbers to see the excellent progress that is being made.

Mention of the Society's Journal gives me the opportunity of addressing a few remarks to the representatives of the radio trade. Some years ago it was common practice for experimenters to construct most of the components required for their transmitters and receivers. With the passage of time and with an increasing number of well-known amateurs turning professional, at least during the day, radio manufacturers have given more consideration to our particular needs.

The last two years have witnessed big advances in this direction, by both valve and component manufacturers. Precision condensers, well-designed transformers, and more efficient valves are but three examples of these improvements.

The carrying out of experiments is always a fairly expensive matter, and the cost of some of the parts used is high in this country when compared with other countries. If the manufacturers could see their way to reduce their prices to our members, I believe they would be encouraged to

pursue their experiments, and the manufacturers would benefit by increased sales.

I would point out further that the available market for such components is far larger than it was a few years ago, owing to the increasing interest in short-wave work. For this reason I do not think that the plea of a limited market raised some years ago can be sustained to-day.

There is one other point in this connection: it has come to my knowledge within the last few months that some of our members have required, for the purpose of their experiments, certain apparatus which would have to be specially manufactured. To give you just one example, I have in mind a "frequency halving" circuit which depends for its operation upon a rather special type of valve. I am sure that if our technical members could be supplied with this component a useful advance would be made in transmitting technique.

The last section to which I would like to refer is our Secretarial Department, which, I am happy to say, is thoroughly efficient; you all know how energetic our Secretary is, and that he is heart and soul in his work. You will appreciate that his appointment as a whole-time Secretary was a big step for us to take, but our balance sheet for last year shows that we were justified in taking that step.

Although our financial position is sounder and our general outlook better than ever before in our history, we cannot afford to relax our efforts in any way, for there is still much to be done. The primary object of the Society is to render service to its members, and by increasing our membership with the right type of material, the better will be that service.

We have at the moment a Committee dealing with interference problems from both the aspect of the transmitting amateur and the broadcast listener. It must not be inferred from this that extensive interference is being caused by transmitters, in fact, the reverse is the case, but these members have certain responsibilities, and the present time is opportune to review our position generally. Co-operation with the broadcast listener will usually overcome any troubles, but when members do experience difficulty, it is important that they should report the fact to Headquarters.

You are probably expecting me to make some reference to our relations with the General Post Office. You are aware, no doubt, that from the earliest days we have maintained close contact with the G.P.O.'s representatives, and have always found them sympathetic towards the amateur and ready to help him as much as they can. The Washington Convention gave us portions of the frequency spectrum and the Madrid Convention confirmed them, the changes made in the latter Convention being negligible so far as we are concerned. We stated our case carefully to the G.P.O., and the British Delegation went to Madrid with the intention of pressing for the amateur bands to remain the same as agreed at Washington. As a result of this support and the support of other Governments, we have not lost one single kilocycle in any one of our six bands. The next conference is to take place in Cairo in 1937. What does it hold in store for us?

Of the total number of radio transmitting stations in the world to-day, *approximately* 42 *per cent. are owned and operated by amateurs* with no interest other than the advancement of their hobby, yet in spite of this preponderance we find that the bands allotted to their use are very small. Our exclusive bands between 10 kc. and 14 mc. amount to less than 5 per cent., or if we include the 1.7 and 3.5 mc. bands, about 8½ per cent.

It is a well-established fact that when the higher frequencies, i.e. those above 1.5 mc. (200 metres), were discovered to be of practical use for long-distance communication, there was a rush to set up commercial stations.

Making allowances for the depressed state of world business, which results in less use being made of communication facilities, there must be some point when the facilities provided do not require any, or only small, extension to cope with the traffic. I believe it would be correct to state that this point has been reached and passed. If this is so, does it not seem reasonable that we amateurs, who represent 42 per cent. of the world's stations, should be given more room?

This and other matters affecting our future welfare will receive our careful attention, and in preparing for the Cairo Conference we shall give the International Amateur Radio Union the same wholehearted support as we did for Madrid. We hope, too, that before that time arrives we shall have convinced our authorities of the justice of our claim for more territory.

In conclusion, may I quote from Mr. Bevan Swift's presidential message in the December T. & R. Bulletin: "*Officers may change and policies vary, but the task of upholding all that is best in amateur radio must be continued. That task does not rest with the officers alone, but must be borne by every individual member who is desirous of safeguarding our privileges and benefits.*"

With your support and with the loyal co-operation of the Council, District, County and B.E.R.U. Representatives, Section Managers, and last, but not least, our Secretary and Secretarial Staff, I am confident that this great Society of ours will continue to make steady progress.

B.E.R.U-itis.

With due apologies to Mr. Rudyard Kipling, of "IF" fame!

If you can keep your nerve when all about you
Are jambing stations hard, and blaming it on you;
If you can "hold the air," though others flout you,
Until you get the longest message through;
If you can send, and not grow weary sending,
Nor overtire the man who has to read;
If your mistakes are rare, and prompt their mending,
If you believe that haste is never speed;
If you can calmly contemplate the chatter
Of greenhorn operators, fresh from school;
If you can sit with messages that matter,
And wait until they're finished—and be cool;
If you can read through half-a-dozen stations
The weaker signals that are meant for you,
And pick 'em out with few interrogations—
Yet never feel ashamed to ask those few.
If you're just Jack-of-all-Trades, Tinker, Tailor,
If there's just a bloomin' thing you cannot do;
If you're propelled by energy that's tireless,
If you don't fear the job that's never done;
Then take my word you're fit for work at Wireless,
—AND ANYTHING YOU GET YOU'LL EARN,
MY SON!!

Anon.

The eve of the Battle of BERU—1934.

Consult the new Guide.

INTERFERENCE ELIMINATION.

Part 2.—The Broadcast Receiving Set.

In this part of the Interference Elimination article prepared by a Special Committee of Council members, information regarding wave traps and filters is presented. It is recognised that other methods may have been successful in overcoming interference to broadcasting, and therefore, we invite members to forward details of such devices for future publication.

THE modern broadcast receiver, using two or more tuned circuits (possibly with band-pass), will not, as a general rule, suffer much from a nearby transmitter, except when the latter is using telephony on one of the lower frequency bands. This is, of course, a very general statement and must be read as such, for there are instances where very modern selective receivers suffer bad interference, whilst in still more instances comparatively old receivers, when working in the transmitter's own house, receive practically no interference.

Generally, portable receivers with self-contained aerials suffer less interference from a transmitter than receivers employing outdoor or indoor aerials; furthermore, such receivers are directional and interference can frequently be eliminated by making use of this property. Except possibly with regard to the "hum" effect in interference mentioned in Part 1, mains portables are not worse off than battery portables.

It is realised that little can be done in the case of a commercially-built portable receiver with self-contained aerial, except by fitting suppressors of the type shown in Fig. 7; therefore the receiver operating with external aerial will receive more attention.

Unless widespread interference is caused, the owners of unselective out-of-date receivers will not obtain much sympathy from Post Office inspectors. It must here be mentioned however, that the term "modern" as applied to broadcast receivers is misleading, as many sets are modern without being selective; the opposite is also true.

What is a Modern Receiver?

Ignoring crystal receivers, the types giving the greatest trouble to amateur transmitters are those employing a detector valve preceded by a single tuned circuit and followed by optional L.F. amplification. In the next category are receivers using H.F. amplification preceding the detector, in which two tuned circuits are invariably used. The first type mentioned is definitely out of date; the second is usually regarded as of modern fairly selective design. The fact, however, that a receiver employs pre-detector amplification does not class it as of modern design, even if that valve is the latest variable-mu H.F. pentode. There are a few sets in use employing untuned input to the first valve; these are not of modern design and come in category number one. In the third category can be placed receivers in which the H.F. amplifier is preceded by band-pass tuning. This arrangement marks a very distinct improvement from the amateur transmitter's point of view. Superheterodyne receivers, preceded by band-pass tuning at signal frequency and multi-tuned stage receivers occupy the fourth class. Besides being classed in category three or four, a selective receiver of modern design requires to be carefully shielded and this is a point that should not be overlooked.

From the foregoing it will be appreciated that the term "modern receiver" is very unsuitable, and may be loosely applied to those that are not capable of giving a performance up to present-day requirements. The term "a receiver of modern design" is definitely better. This point has been dealt with in some detail, as it is felt that the amateur transmitter will need to study carefully the types of receiver suffering interference; he will also do well to make himself acquainted with such receivers, the reasons for this being apparent in the concluding section of the article.

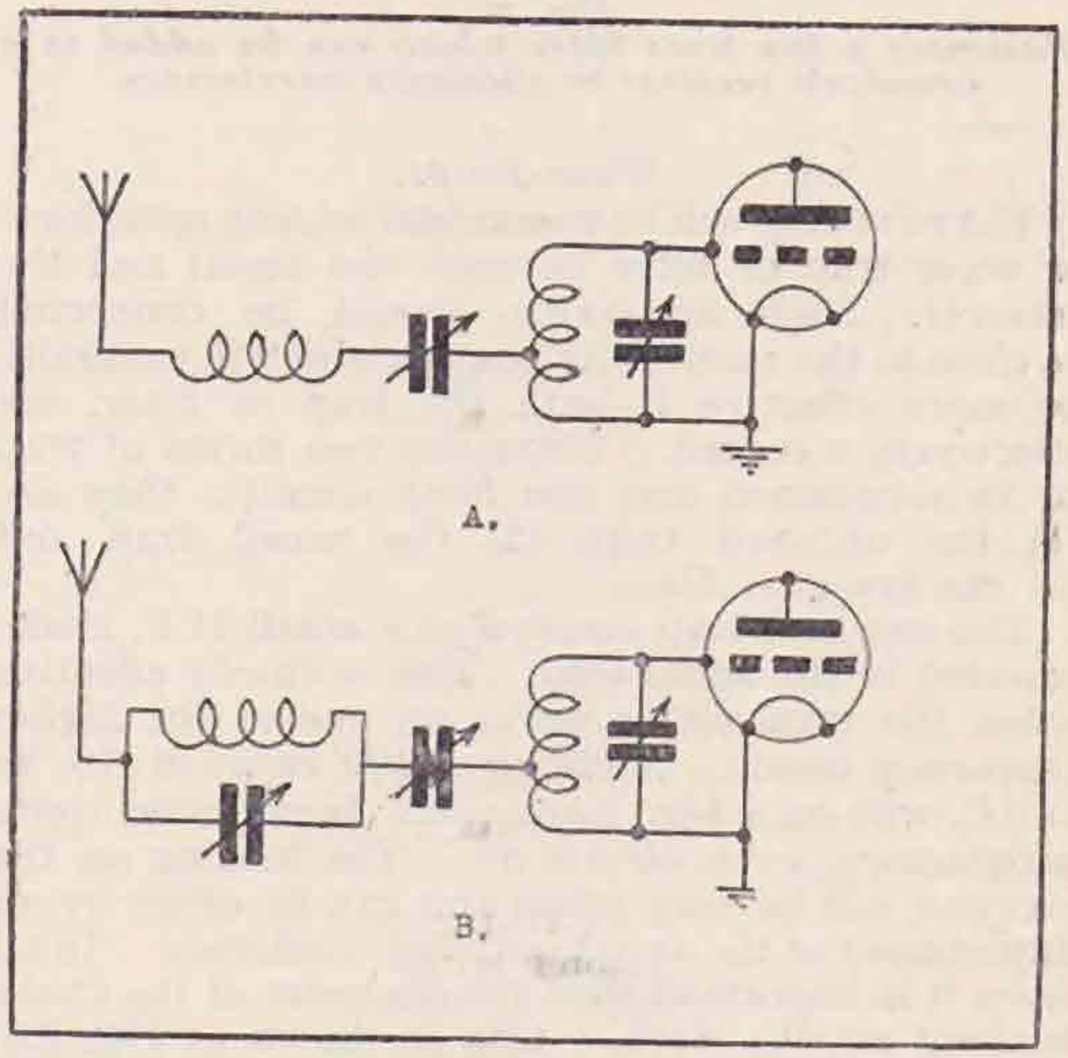


Fig. 8.
Showing how an untuned (A) or tuned (B) wavetrap should be connected between the aerial and first tuned circuit of a broadcast receiver.

TREATMENT OF INTERFERENCE.

The treatment of interference problems at the receiving end will now be dealt with, and reference is made to the three types of interference outlined earlier. The first effect "wipe-out" with or without hum is the most important, and it should be emphasised that the following comments apply equally to c.w. or telephony transmissions.

In the first place, ascertain that the aerial is not unduly long and that the coupling from the aerial to the first tuned circuit is loose.

A long aerial would be one of, say, 100 ft.; 50 ft.

or less appears to be sufficient for most reception purposes, and will usually improve broadcast selectivity. An indoor aerial will often be found satisfactory when the receiver is located within 20 to 30 miles of the broadcast station.

By loose coupling is meant the insertion of a small condenser, say, a pre-set of .0003 mfd. maximum capacity between the aerial and the grid coil and very preferably a point less than half-way up the grid coil from the earth end. Alternatively, an aperiodic aerial coil of, say, one-fifth the turns of the grid coil, and fairly tightly coupled to the latter, may be used, though the coupling will necessarily depend upon the turns ratio.

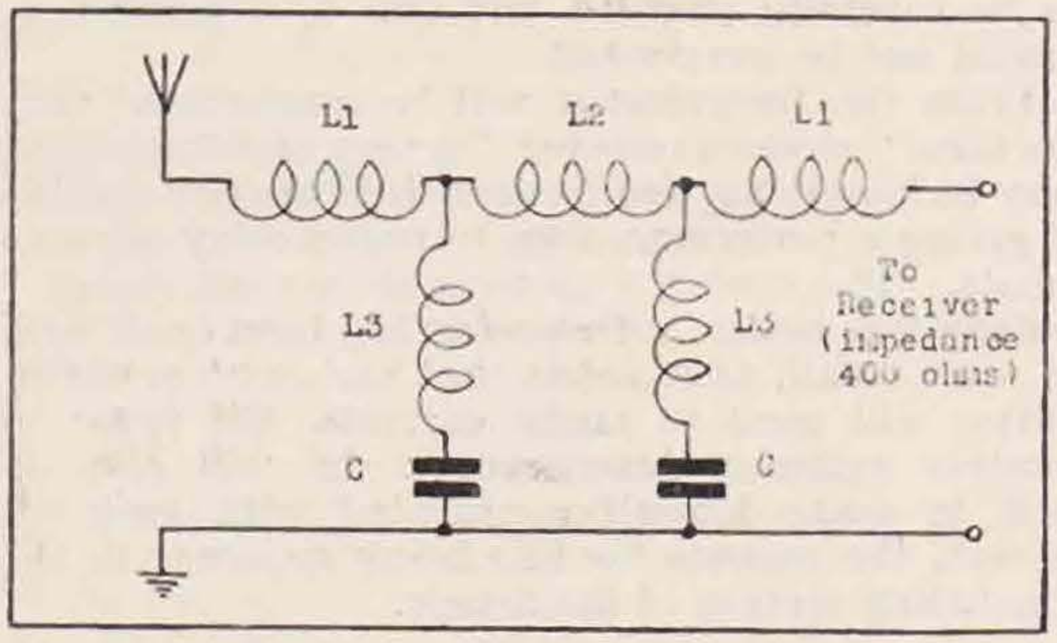


Fig. 9.
Illustrates a low pass filter which can be added to a broadcast receiver to eliminate interference.

Wave Traps.

The next step will be to consider adding some form of wave trap or filter between the aerial and the receiver. Such apparatus should be connected as close to the receiver as possible and will naturally be more effective if both the trap or filter, are effectively screened. There are two forms of trap to be mentioned and one filter circuit; they are (1) the untuned trap, (2) the tuned trap and (3) the low-pass filter.

The untuned trap consists of a small H.F. choke inserted in the aerial lead. This is chiefly effective when the transmitter works on one of the higher frequency bands. A choke of 100 turns of No. 36 D.S.C. wire on a ⅜-in. former has been found quite satisfactory, even on 3.5 mc. The loading on the receiver will be very small and can be offset by an adjustment of the aerial coupling condenser. In all cases it is important that the diameter of the choke be kept small. Such a trap is shown in Fig. 8A, and will be found quite effective where the interference is not very bad.

Far more effective on the 1.7 and 3.5 mc. bands is the tuned trap, shown in Fig. 8B. This is similar to the wave traps employed to obtain greater selectivity on the broadcast bands where a local station gives a bad swamp effect. A .0003 mfd. variable condenser will be found suitable, and the accompanying table gives the coil sizes for these two bands. The coils are wound with No. 20 D.C.C. wire on a 3-in. diameter former.

Band. Metre.	Band. kc.	Turns. (3-in. diam.)
160	1,750	22
80	3,500	8—10

Where such an arrangement is required for both bands, the coil could be provided with a tapping point, or alternatively, a larger (pre-set) condenser could be used.

Low Pass Filter.

The filter described is intended for fitting between an aerial and a broadcast radio receiver for the prevention of interference from local 1.7 and 3.5 mc. transmitters, either amateur or commercial.

The filter comprises two "T"-type sections in series, forming an unbalanced filter with a sharp cut-off. The circuit is shown in Fig. 9. The components are five coils and two condensers, the coils being wound on valve bases (1⅜-in. diameter. and the condensers of the mica dielectric type) A word of warning is necessary here: it is essential that the coils be wound with No. 30 D.S.C. wire with the turns touching and secured in place with Durofix or similar cement, so that they do not become loose; the condensers must be of a reliable make and have a low loss and be reasonably accurate on capacity. It was found during tests that the filter as first tested gave a most unsatisfactory characteristic, due to the inferior condensers fitted, they having a capacity of .000177 instead of .0002 mfd. and an equivalent phase angle of 500 ohms as against 20 ohms for a good condenser. It is recommended that *T.C.C.* Type M are used.

TABLE OF VALUES.

Band.	L1.	L2.	L3.	C.
1.7 mc.	20	40	35	.0002
3.5 mc.	20	40	10	.0002

L. in microhenries. C in microfarads.

WINDING TABLE.

Coil.	Turns. 1.7 mc.	Turns. 3.5 mc.
L1	20	20
L2	30	30
L3	27	13

The values of the coils and the turns required are shown in the tables; the coils L3 are shown as different for the 1.7 and 3.5 mc. bands, although the filter for 1.7 mc. could be used for 3.5 mc., but the one for 3.5 mc. would not be satisfactory for 1.7 mc. The filter is arranged to have a characteristic impedance of 400ω at each end, as this figure is likely to suit most aerials and receiver input circuits. The curves of the filter using both 1.7 and 3.5 mc. coils, are shown in Fig. 10, where the loss of the filter in decibels is plotted against frequency. The curves were obtained by terminating both ends of the filter with non-inductive resistances of 400 ohms and applying a variable frequency oscillator across the input. The input volts were read off for various frequencies and the corresponding voltages across the output, these measurements being made with a high impedance diode valve voltmeter. The ratios of the input to output volts were converted to decibels. As can be seen from the curves, the loss over the broadcast range of frequencies is negligible, but over the respective bands the loss is high and in the order of 40 decibels. It is regretted that accurate figures of losses over 40 decibels could not be measured, as the filters were unscreened and pick up in leads, etc., became troublesome, so

Are you contemplating applying for an A.A. call?

the peaks of the curves have been omitted. It is evident, however, that the filters would give a reduction in the strength of interference of from 4-5 " R " strengths, which in most cases would

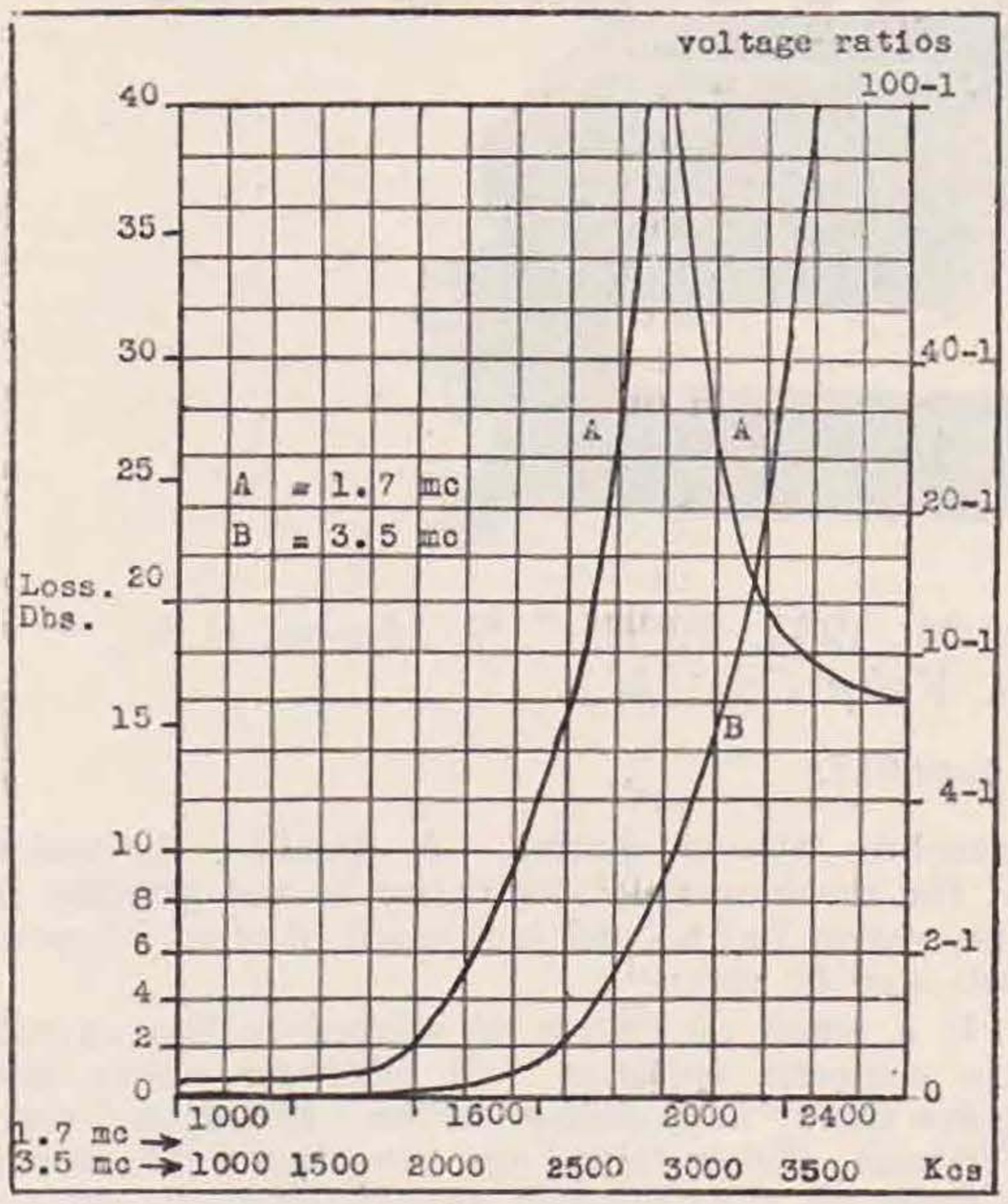


Fig. 10.
Curves showing losses through low pass filter, measured in decibels. These were obtained by terminating both ends with non-inductive resistances of 400 ohms, and with a variable frequency across the input.

reduce telephony interference to a negligible value. The losses of the filters would be slightly modified in practice by variations of aerial and receiver impedance, and in general the cut-off points would be at a slightly lower frequency. As a practical test, the filter was connected between the aerial and a 4-valve broadcast receiver, and the programmes of the London Regional, Midland and Northern stations, together with those of Brussels, Vienna and Rome, were received on the loud-speaker, whilst telephony was being transmitted with an input of 25 watts on 3,545 kc. on the *same* aerial without any audible interference.

The use of one of the above forms of filter in the aerial coupling to the broadcast receiver, used in conjunction with a short and loose-coupled aerial, should remove all interference *picked up by the aerial.* It is not usually practicable to redesign the tuning system of a neighbour's receiver, though the point may be borne in mind. The now-popular variable-mu screened grid valve, with its accompanying volume control is a very great help in suppressing shock excitation and the use of this form of volume control, rather than control after the detector valve, should be encouraged. Even with the use of the older type of screened grid valve, the use of more grid bias will frequently relieve interference.

With regard to interference not apparently picked up by the aerial, attention is again drawn to the suppressors in the mains leads to an all-mains receiver. This was discussed in detail in Part 1. It may be mentioned here that in the case of such receivers no earth is better than a poor earth, but where an efficient and short-path earth can be obtained, this should be used.

One further point deserves mention, and that concerns the choice of leaky grid or anode bend detection. It has been found that where a mains receiver is operated in close proximity to a transmitter, severe interference is experienced, even if the aerial and H.F. valve are removed. If mains suppressors are not effective, a change from leaky grid to anode bend detection may materially assist. In view of the fact that the results of such a change are not due to the increased selectivity (lower damping) of the grid circuit (for interference may be obtained, even when this circuit is " shorted "), the reason for the improvement is not obvious; comments from members will be welcomed.

(*To be concluded.*)

EDITORIAL—(*Concluded*).

be a definite need for a really reliable potentiometer which will stand up to its work without becoming noisy in action or disconnected after a short period of use. Providing the voltage on the anode is kept reasonably low, the power supply is well smoothed, and proper decoupling resistances are employed, a perfectly silent background should be obtained. Such a valve, if followed by a transformer coupled stage and a pentode, not over-run, will produce an entirely satisfactory receiver capable of fulfilling the exacting requirements demanded.

The main drawback to the use of indirectly heated valves is the time required for the cathodes to heat up, but this small disadvantage can be overcome by the simple expedient of using a separate switch to keep the cathodes heated during transmission.

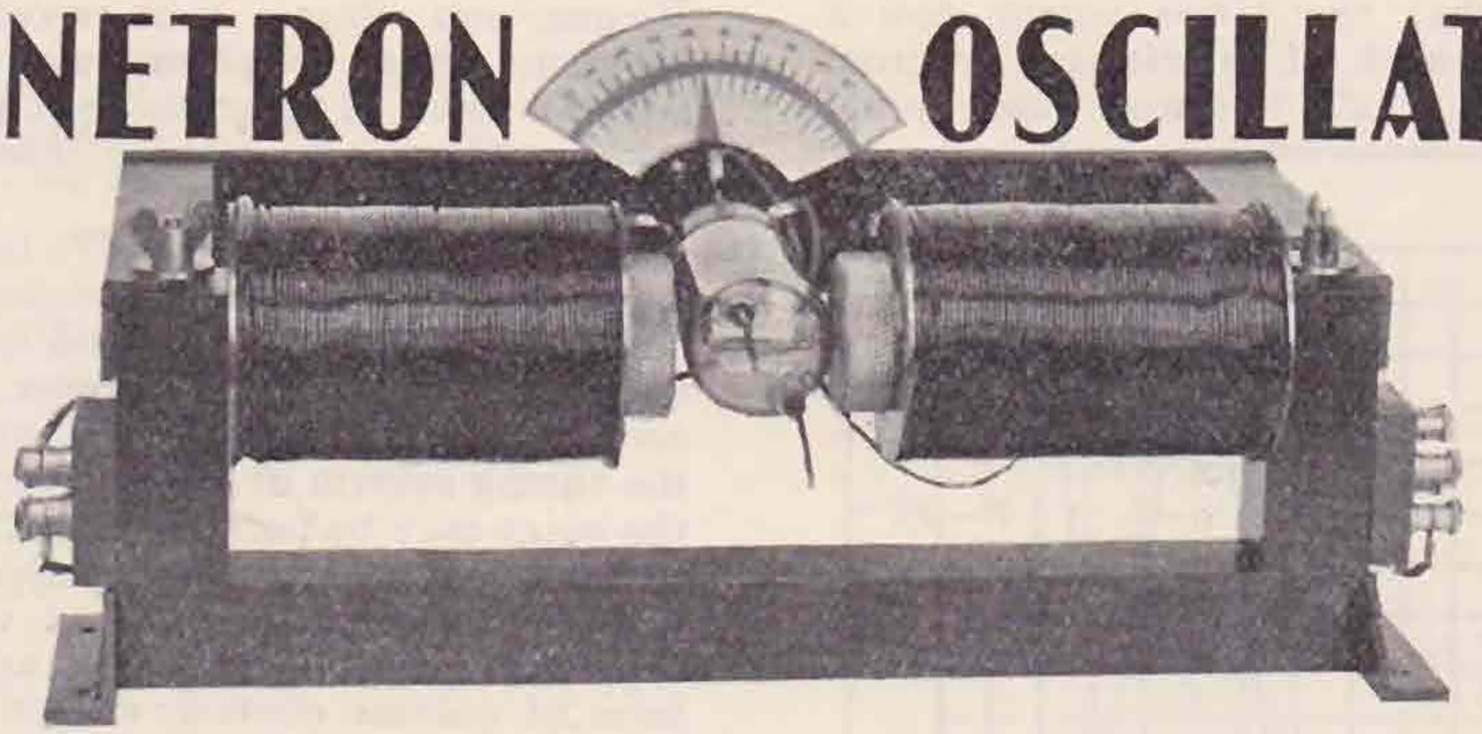
One further minor disadvantage noted from experience is the fact that these valves appear to " work up " during the first few minutes' operation, rendering them more conductive, thus necessitating a readjustment of the reaction control. This feature might be overcome by some simple system of automatic volume control, and the suggestion is offered to our Contact Bureau members for their consideration.

Apart from a straightforward two-valve set of the type mentioned, we should do well to consider the possibilities offered by the new single signal superheterodynes. At present such receivers must be regarded as being in the luxury class, at least in this country, but a useful and effective substitute is to be found in various forms of short-wave superhet adaptors. We recently constructed one of these adapters, and were surprised at its adaptability and ease of control.

An ordinary straight three-valve receiver can by this means be converted into a superhet, the H.F. valve becoming the intermediate stage, while the signal detector becomes the second detector. The adapter valve performs the dual function of first detector and oscillator.

We feel there is much scope for further improvement in short wave receiver design and construction, and we hope that as time passes this portion of an amateur station will receive the attention it deserves. Remember, a lost call is doubly disappointing.

MAGNETRON OSCILLATORS



(Lecture delivered before the Society on November 24, 1933, by E. C. S. Megaw, B.Sc., Research Staff of the M.O. Valve Co., Ltd.)

(Continued from page 216.)

IT is possible to obtain frequencies higher than the upper limit of the dynatron oscillation by making use of the factor which fixes that limit, namely, the electron inertia. To do this, the magnetic field strength must be near the critical value. The relation between field strength, anode voltage and anode diameter must be approximately that given by equation (1). In this condition many of the emitted electrons just miss the anode, and travel in nearly circular paths between filament and anode as indicated in Fig. 3c. The frequency at which the electrons travel round their orbits depends chiefly on the magnetic field strength. The wavelength corresponding to this frequency is given approximately by

$$\lambda = 12{,}000/H \text{ (cm.)} \quad \ldots \quad \ldots \quad (2)$$

where H is the field strength in gauss.

If an oscillatory circuit tuned to this wavelength is connected between the anode segments, as in Fig. 5, oscillations can be maintained in it. Such oscillations are called electron inertia, or "electronic," oscillations. The full line curve in Fig. 8 shows the approximate values of magnetic field strength required for wavelengths between 20 cm. and 60 cm. The dotted curve shows the critical values of anode voltage for an anode diameter of 1 cm. The optimum anode voltage is usually a little below the critical value. It will be seen from the figure that a reduction in wavelength requires an increase in both field strength and anode voltage.

In addition to the adjustment of the tuned circuit, field strength and anode voltage there are two other adjustments to be made for maximum output at a given wavelength. These are (1) the filament emission, which has an optimum value increasing with the anode voltage, and (2) the angle between the electrode axis and the magnetic field direction. In the case of the dynatron oscillations the greatest output is obtained when this field angle is zero, but for the electronic oscillations the electrode axis should be tilted at an angle of a few degrees to the field direction. The optimum angle increases slowly as the wavelength increases.

Both these effects are intimately connected with the mechanism by which the moving electrons maintain the oscillation. A detailed discussion of the mechanism of oscillation is not possible in this paper, but a brief indication of what happens will now be given.

If a small oscillation is started in the circuit, the segment voltages will alternate above and below the H.T. voltage as in the "dynatron" case. Without the alternating component of anode voltage the electrons just grazed the anode surface (Fig. 3c). When oscillations occur, some of the electrons which start from the filament while the voltage of the nearest part of the anode is high, receive an extra acceleration and absorb energy

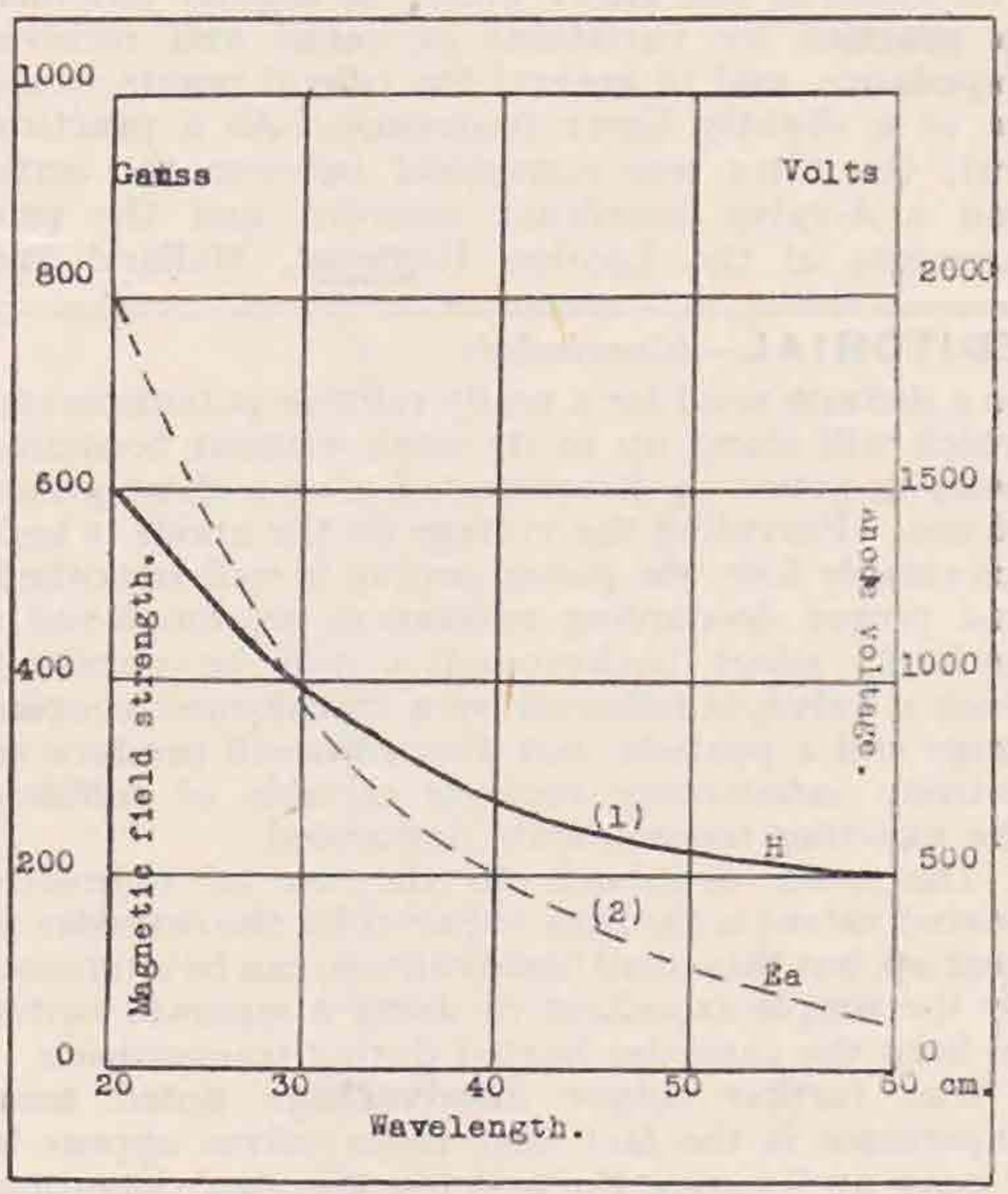


Fig. 8.—Approximate relations between wavelength of electronic oscillation and (1) magnetic field strength (for any anode diameter), and (2) anode voltage (for 1 cm. anode diameter).

from the circuit. These reach the anode after one-half cycle, and give up their extra energy to it. Other electrons starting while the voltage of the nearest part of the anode is low are retarded, miss the anode, and travel round orbits of decreasing amplitude giving up some of their energy to the circuit each half-cycle. After a number of cycles these electrons also reach the anode. Provided the average energy given to the circuit by the electrons of this second group is greater than that absorbed by the electrons of the first group, the oscillation will be maintained. The distinction between the two groups of electrons depends on the point in the oscillation cycle at which they leave the filament. In this way the oscillating voltage on the anode segments provides the link by which some of the energy given to the moving electrons by the H.T. supply is transformed into high frequency energy in the external circuit.

The object of tilting the electrode system relative to the magnetic field is to make the "useful" electrons reach the anode when they have given up the maximum amount of energy to the circuit. If the angle of tilt is too small, these electrons start absorbing energy again before they reach the anode. If the angle is too large, they reach the anode before they have given their full contribution to the circuit, and the energy taken up by the other (absorbing) group of electrons also increases.

It has been noted that there is an optimum value of filament emission, and hence of anode current. This means that at a given wavelength an increase of anode current above a certain value leads to a decrease in output. This is due to the accumulation of space charge which reduces the effect of the moving electrons on the circuit.

A description has been given of the two ways in which very high frequencies can be obtained from the split anode magnetron. In both cases the aim has been to give a general picture of how the oscillator works rather than a detailed discussion of what goes on inside the valve. The internal mechanism is, in fact, not yet completely understood, but enough is known to enable valves to be designed which perform very satisfactorily in practice. Before giving typical operating data for actual valves it will be convenient to summarise the operating conditions for the dynatron and electronic types of oscillation. This is done in the table below.

In this table λ is the wavelength in cm. E_a the anode voltage, d_a the anode diameter in cm., and H the magnetic field strength in gauss.

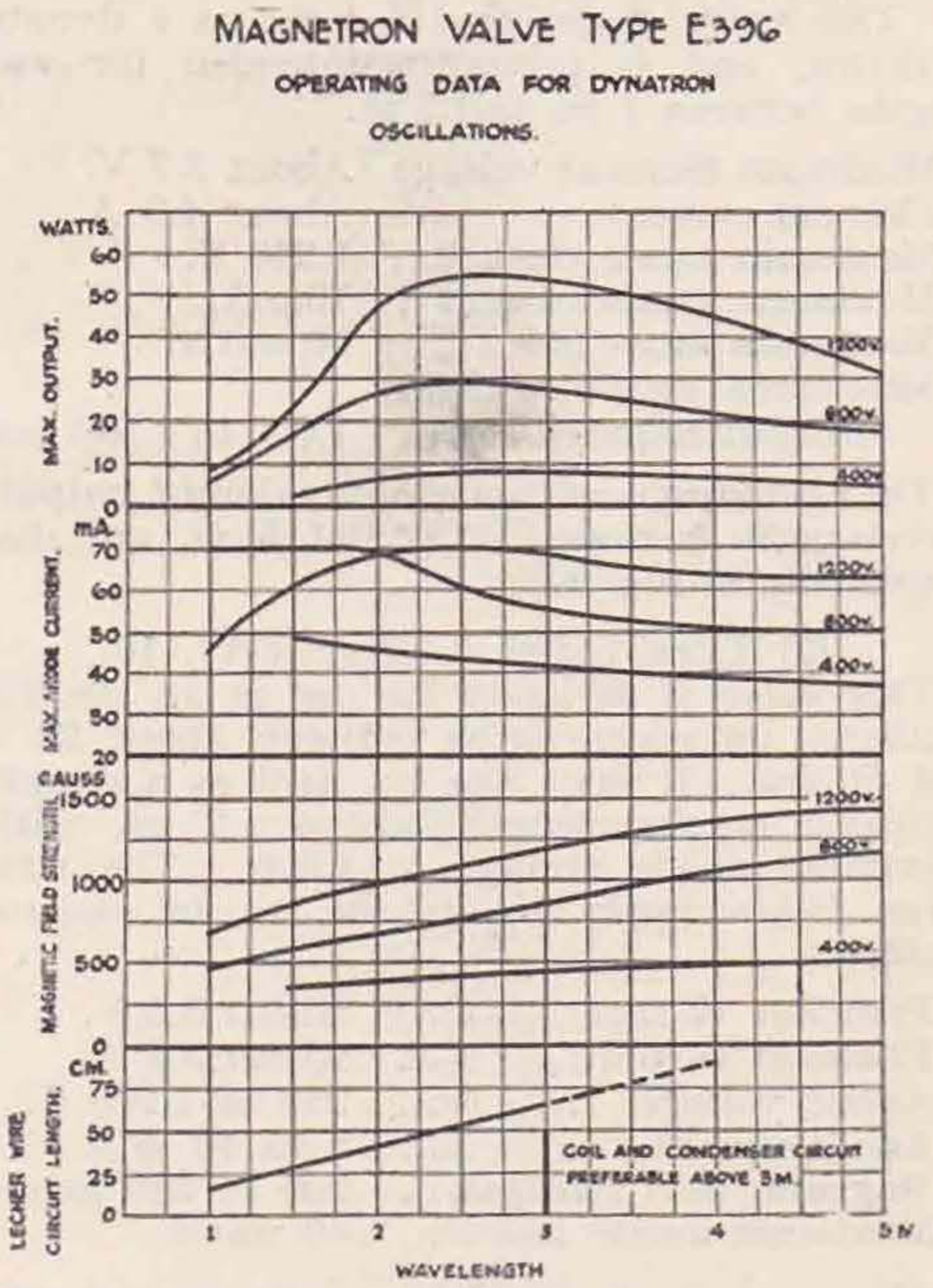


Fig. 9—Magnetron valve type E.396: operating conditions for maximum output with anode voltqge 400, 800 or 1,200 (dynatron oscillations).

	Dynatron Oscillations.	Electronic Oscillations.
Wavelength	Depends mainly on circuit dimensions.	Depends mainly on magnetic field strength.
Circuit length (parallel wires) ...	Rather less than $\lambda/4$.	About $\lambda/2$.
Magnetic field strength	Adjusted to give maximum output: optimum value between 1.5 and 3 times the critical value ($\sqrt{180E_a}/d_a$).	Adjusted to give required wavelength (λ = approx. 12,000/H).
Anode voltage	May have any value up to safe limit.	Must be near the critical value ($d_a^2 H^2/180$).
Anode current	May have any value up to safe limit (or space charge saturation.	Must be adjusted according to anode voltage.
Optimum field angle	Zero.	A few degrees: depends on anode voltage and current.
Approx. minimum wavelength in cm.	$3{,}600\ d_a/\sqrt{E_a}$.	$22\ d_a^{3/5}$.
Wavelength range conveniently covered.	0.5 to 10 m.	10 to 70 cm.
Order of efficiency	50 per cent.	5 per cent.

Some typical operating data will now be given for two magnetron valves made by the M.O. Valve Company both similar in appearance to Fig. 1.

(1) TYPE E.396 (Now C.W. 11).

This valve is designed for use as a dynatron oscillator, and is primarily intended for wavelengths between 1 m. and 5 m.

Maximum filament voltage	About 3.7 V.
Flament current	About 4.0 A.
Maximum anode voltage	1,200 V.
Maximum anode current	70m.A.
Maximum anode loss ...	50 watts.
Maximum magnetic field strength required ...	1,000 to 1,500 gauss.

The operating conditions for maximum output on wavelengths between 1 m. and 5 m. are shown graphically in Fig. 9.

(2) TYPE E.396 A. (Now C.W. 10).

This valve is designed for use as an electronic oscillator on wavelengths between about 22 cm. and 50 cm. It may also be used as a dynatron oscillator on wavelengths above 1.2 m., with a maximum anode voltage of 1,000. The ratings given below apply to its use as an electronic oscillator.

Filament voltage... ...	About 3.0 V.
Filament current... ...	About 3.5 A.
Anode voltage	250 to 1,200 V.
Anode current	5 to 40 m.A.
Magnetic field strength ...	200 to 550 gauss.
Maximum anode loss ...	40 watts.

The approximate operating conditions and output are shown in Fig. 10 for wavelengths between 22.5 cm. and 50 cm.

Fig. 11 shows a dimensioned drawing of a field magnet suitable for use with the E.396 and E.396A valves. The magnetic circuit is constructed of mild steel. The coils are wound on this brass formers, and each coil has 800 turns of 18 S.W.G. enamelled wire. The resistance of each coil is about 2 ohms. These windings are arranged so that they can be operated in parallel from a 6-volt accumulator or in series from a 12-volt accumulator

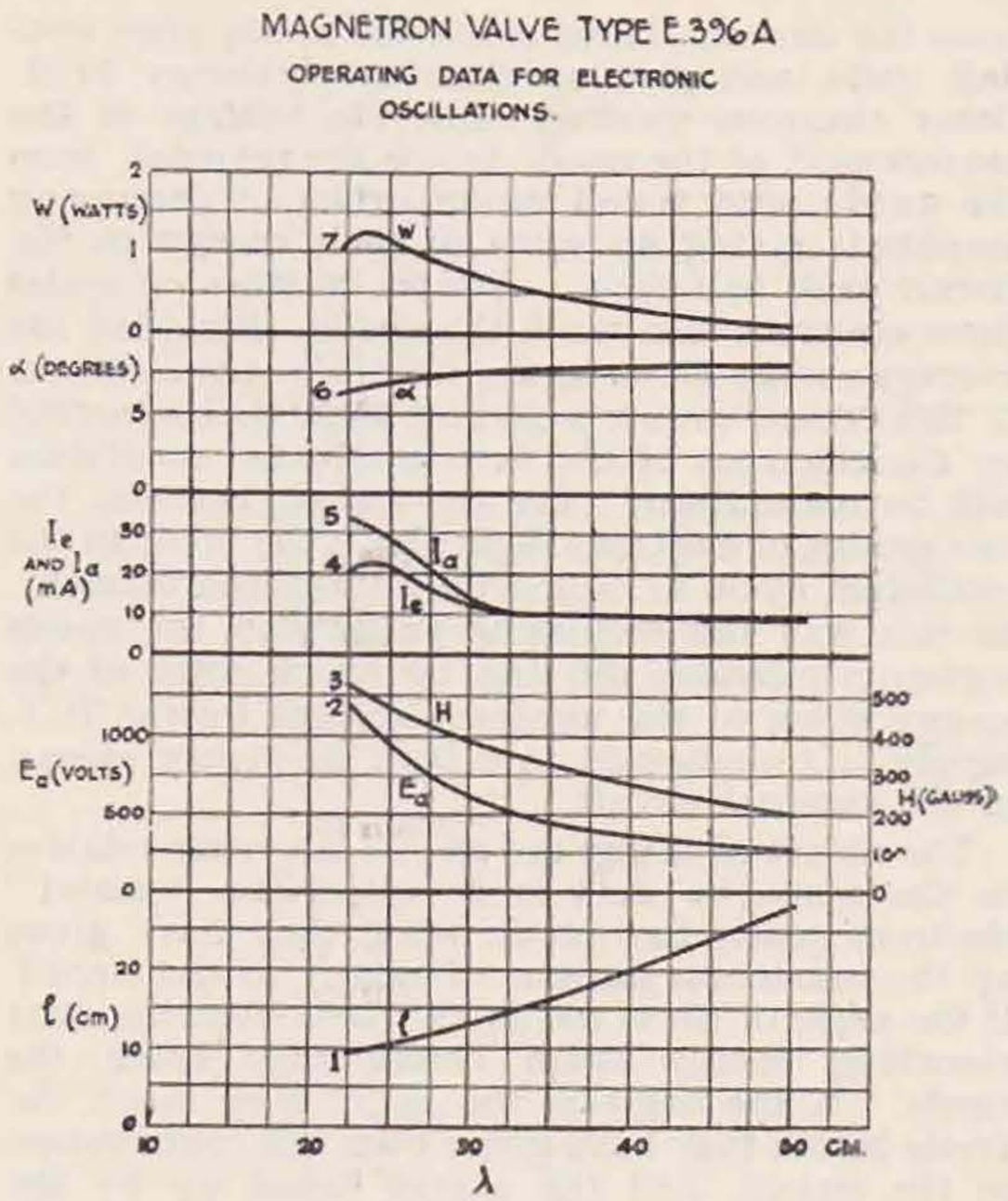


Fig. 10.—Magnetron valve type E.396A: approximate operating conditions and output for electronic oscillations. The curves show

1 The optimum length (l) of the parallel wire circuit from the anode centre to the bridge.
2 The optimum anode voltage (Ea).
3 The optimum magnetic field strength (H).
4 The optimum anode current with no magnetic field (Ie).
5 The anode current with magnetic field adjusted (Ia).
6 The optimum field angle (α).
7 The power output obtainable.

for field strengths up to about 1,000 gauss. The magnet is shown in the drawing with pole tips 2 ins. in diameter screwed into the ends of the 1-in. cores carrying the windings. The object of these large pole tips is to give the very uniform

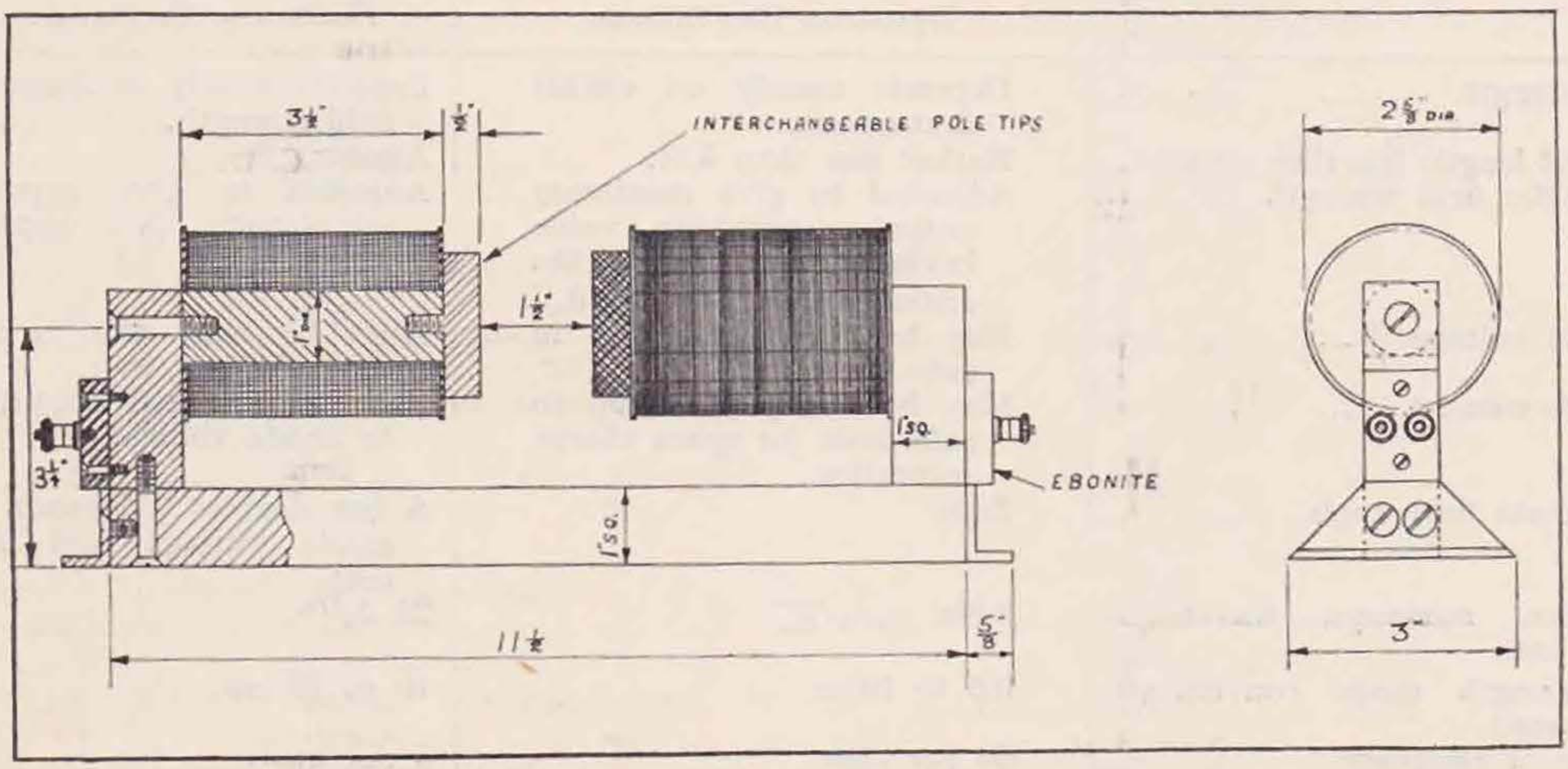


Fig. 11. Field magnet for magnetron valves type E.396 and E.396 A.

field required for the efficient production of electronic oscillations. For dynatron oscillations field uniformity is less important, and pole tips about 1⅛-in. in diameter can be used with a considerable economy in magnet power at high field strengths. The following table gives the approximate field strength obtained with various currents (coils in series). For continuous operation the current should not exceed about 3.5 A.

Field current :		0.5	1.0	1.5	2.0	3.0	4.0	5.0 A.
Field strength	2-in. pole tips	200	380	560	720	—	—	gauss.
	1⅛-in. pole tips	—	—	—	760	1,080	1,320	1,510 gauss.

No valve mounting is shown in Fig. 11, but this is easily constructed according to individual requirements. A simple and satisfactory mounting can be seen in the title heading, which illustrates the same magnet system as Fig. 11. The mounting must permit the valve to be moved slightly in any direction to ensure proper alignment of the electrode system in the magnetic field. For electronic oscillations a scale should be provided to measure the angle of tilt of the electrodes.

ACKNOWLEDGMENT.

The author desires to tender his acknowledgment to the General Electric Company, and the Marconi Company, on whose behalf the work leading to this publication was done.

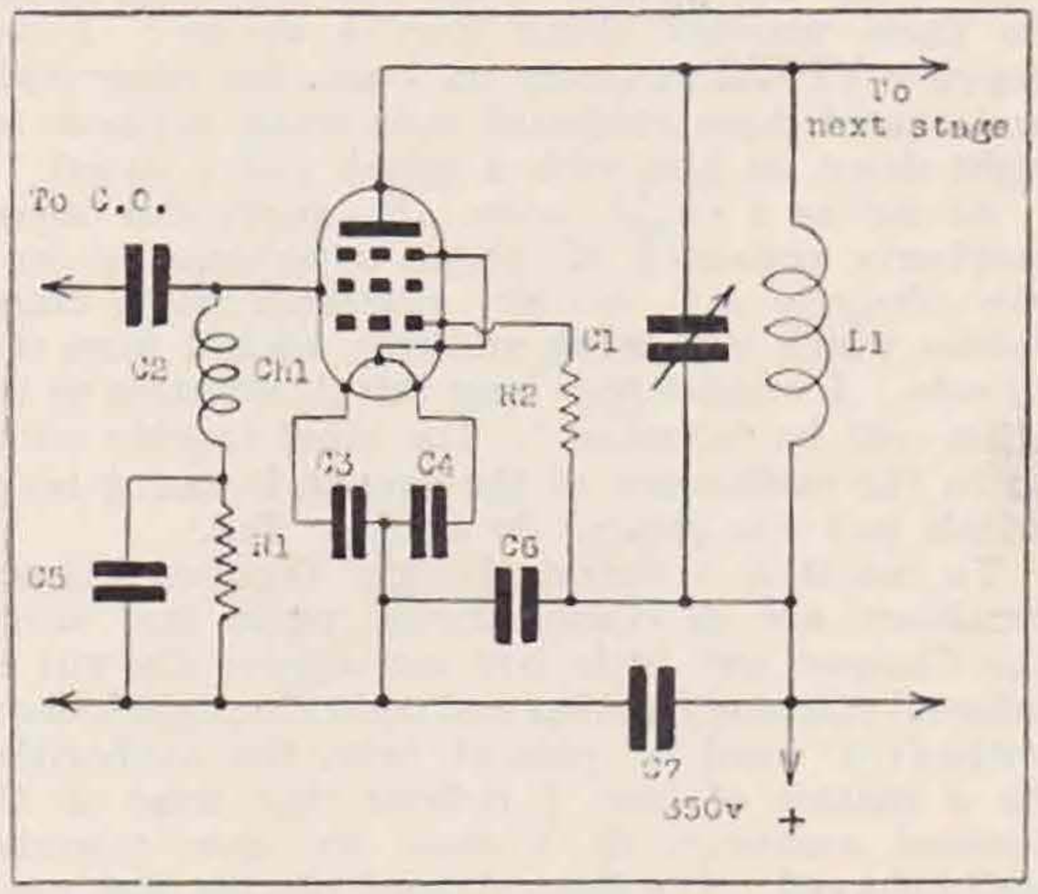
Technical Topics.

By "LITTLE TOM."

In response to many requests from readers, our correspondent hiding his identity behind the *nom-de-plume* of "Little Tom" will, from time to time, set problems of general interest and invite members to contribute answers. These he will endeavour to tabulate and summarise.

It is suggested that if this new feature receives sufficient support, a special award of some kind will be made to those submitting the most helpful contributions over an extended period.

Answers to Problem 1 must be addressed to "Little Tom," c/o The Editor, R.S.G.B., 53, Victoria Street, S.W.1, to arrive not later than March 15, 1934, and should be clearly written on one side of quarto paper.



PROBLEM NO. 1.

In the frequency-doubler circuit illustrated the values of all component parts have been omitted. Re-draw the circuit, showing the values to be used for an arrangement which will be suitable for use as a 7 or 14 mc. doubler and give the reasons *why such values have been specified.*

Resistance-bias is to be used and the valve is a Pentode of the PM24M or PT41B class. The power supply available is of the order of 350 *volts at a maximum of* 50 *ma.*

EFFICIENCY IN C.C. TRANSMITTERS

(*Continued from page* 251.)

of which is earthed to base line. By the use of a well-constructed condenser, the true nodal point of the circuit is thus definitely maintained at zero potential, and circuit balance ensues. In practice neutralisation becomes very easy; one great point in favour of the circuit is that change of wavelength does not affect the neutralising, the value of which remains constant—even on changes from 7 mc. to 28 mc. In addition, as the valve capacities are in series, more turns may be used in the anode circuit further contributing to the all round efficiency.

Below is tabulated data obtained in comparing the output of the usual C.C. transmitter with that suggested in the above notes :—

	A.	B.
Input to final amplifier watts	10	10
Frequency kc.	14,348	14,348
Class of amplification ...	B	C
Turns tank coil	7	14
Method of mounting TX ...	Wooden baseboard	Metal chassis
Calculated power in aerial watts	3.8	7.9

In taking the above measurements, the same aerial and instruments were employed in each case, and every endeavour was made to establish exactly the same conditions.

It is hoped that these results and the very obvious superiority of the push-pull Class C amplifier will provide some incentive to break away from the conventional arrangement used by most amateurs.

"SOLILOQUIES FROM THE SHACK."

By Uncle Tom.

(It seems that our slightly demented uncle's facility for throwing bricks is the one thing about him that is all there.)

I HAVE just seen a rather amusing film of "ye good olde days." It appears therefrom that YL's, when their ordinary education was completed, had to go to a "finishing school" before being allowed to QSO the OM's who were patiently awaiting them.

(Yes, love, I *know* this is a radio article in a radio paper—you just wait a minute.) At these said "finishing schools," if we are to believe Hollywood and Wardour Street, the YL's learnt the art of doing things *nicely* and gracefully. They were even taught to sit down—with the utmost *care*, if you follow me, but still not in such a manner as to suggest that, for some reason or other, it was a painful business.

They were likewise taught how to enter a room and (far more important) how to leave it again, with just the degree of grace, elegance, poise, or what you will, that delighted the OM's of the period.

Now for the point. What about a Finishing School for "hams"? By gosh, don't some of them need it? There is no evidence that the finishing schools of Ye Olden Days taught common sense, but I should imagine that that commodity *did* enter into the curriculum.

It is a strange thing to me that, for every man who develops into a decent "ham," there is at least one who stays *just* as he started. I have never been one to slate the poor old novice—on the contrary, he has my whole-hearted sympathy—but why do so many people stay *novices?*

I could quote so many instances of "fists" and operating procedure that don't improve; notes that don't improve; untidy, inefficient stations that don't improve. These Peter Pans of radio *do* want a Finishing School and, if I were unkind, I should mean that word "finishing" in the literal sense.

Well, suppose some of them happen to experience a slight reddening of the ears while reading this. I want to suggest that they could do the job very well for themselves, simply by converting their jellified spines into something approaching backbones, and *getting down to it.*

As I have often said before, we haven't many bad operators in this country. (Of course, there are half a dozen or so glaring exceptions, but let them pass.) It isn't so much the "fists" as what the said fists send on the air.

Please look at page 236 of the last issue of the "Bull." and note friend SU1EC's abbreviations. Doubtless some of you think he's a nasty rude man—but that only shows that what he says has got under your skin and hurt a little bit.

I want to suggest an addition. "76"—an entire QSO, complete with all the understood formulæ and "Pse pse qsll qsll" and all. Never mind the sig.-strength and tone—all we want is a card. Just "X1XX de Z1ZZ—76—VA." Think of the time that would save and the larger number of QSO's that you could cram into the unforgiving minute. Then the time would come when "76" would be so understood that you needn't even use that. Come to that, why worry about the call-signs. Just send each other cards and there's no need to come on the air at all.

After which, let us thank goodness that we have got some good "hams" who are a credit to the amateur fraternity and to themselves. No names, no pack-drill, but I *have* heard some model QSO's from time to time. Strangely enough, too, most of them have emanated from people that don't care a hoot whether the man they are working is DX or in the next town, so long as they have a *real* QSO.

Now, my friend, Mr. Pillworthy, although he doesn't admit it, would far sooner have a sloppy formula-QSO with a Yank than a real rag-chew with a Swede or a Finn. I wonder why? He knows jolly well that his signals are reaching America; why this insane desire for QSO's which are simply terminated abruptly as soon as reports have been exchanged? It *must* be card-madness that's responsible for it.

Will anyone suffering from an incurable desire to cover their walls with cards please write to me and they shall have any number up to 2,000. Rare old Colonials, common South Americans, imperforate Europeans, every known watermark, used or unused. Just state your needs and the acreage you want to fill, and I will supply you—but for the love of Mike don't you ever come on the air again, because that's just what I'm hoping to stop by papering your walls for you.

We are now right in the middle of B.E.R.U., and doubtless some of us have developed strong ideas about 7 mc. "spitch." What the *Heck* (that's not the word I want, but it'll have to do) do these maniacs think they're up to? I was copying VP5PZ so nicely on 7 mc. the other night and one of these animated soda-water syphons sat right down on him with a splash and a squirt.

As far as I could judge, this particular super-raspberry consisted of 'phone superimposed on a raw 25-cycle A.C. carrier, generated by a transmitter which was being violently rocked from side to side. I wonder how long this desecration of the ether will be tolerated? The chief trouble seems to be the inefficiency of the French licensing body, which just lets pirates do as they like.

To me it is a horrid thought that we licensed amateurs are so conscientious, while just across the Channel any little boy can apparently put an infernal machine together and make the night hideous without a word of protest from the authorities. As a matter of fact, I believe that most of the *licensed* amateurs in Europe are now tolerably well-behaved. It's these darned pirates that cause the trouble. There's nothing I should enjoy more than a trip round France with a replica of the Post Office "detector van," suitably arranged for short waves. (Oh, and one thing more—a good old-fashioned birch!)

EFFICIENCY IN CRYSTAL CONTROLLED TRANSMITTERS AND A PRACTICAL PUSH-PULL AMPLIFIER.

By E. N. Adcock (G2DV).

WITH the moderate power used by most amateurs in this country, maximum H.F. output for D.C. input to the stage feeding the aerial is a most desirable state of affairs. However, without exaggeration it can be said that the average crystal-controlled British station puts no more H.F. into the aerial than that obtainable from a properly designed transmitter using half the power. Small tank coils, high insulation losses, and inefficient Class B operation are the main reasons for this state of affairs.

Let us therefore examine some of the main causes of losses occurring in a driven amplifier :—

1. *Circulatory and impedance losses in tank circuit.*—In order that maximum power be developed across the tank coil it is essential that the ratio

$$\frac{\text{Impedance of tank circuit}}{\text{Impedance of valve}}$$

be as high as possible. Likewise, the circulatory losses are proportional to the square of the H.F. current in the tank circuit. A-very high L/C ratio is therefore necessary.

2. *Insulation and absorption losses.*—It is unfortunately common amateur practice in this country to mount the components of the transmitter on a wooden baseboard. From practical observations made on commercial transmitters it has been established that insulation losses constitute over 50 per cent. of the total losses. It cannot therefore be too strongly urged that the transmitter be built on metal, using the very minimum of insulation necessary near circuits carrying H.F. Care, however, should be taken in mounting the coils and tuning condensers up as far from the metal as practicable, otherwise losses by absorption are likely to be high.

3. *Operation of the Final Amplifier.*—Common amateur practice indicates that the neutralised amplifier be biased to a point approximating cut-off, that is, Class B amplification. However, by biasing to a value double that required for cut-off what is termed Class C amplification is obtained. As is generally known, the rise and fall in voltage of the drive causes H.F. current in the tank circuit to take approximately sinusoidal form. With Class B, current falls to zero during a portion of each cycle whereas when the higher C bias is applied the time during which current flows is much less. It is therefore obvious that for the same power input, losses by circulatory currents and plate heating will be considerably reduced by using Class C.

A little consideration, however, will show up two possible disadvantages in the use of this method of amplification. Owing to the high value of bias used, greater drive than that required for Class B is essential. Further, in a single-ended amplifier, although the ratio of H.F. output/D.C. input has been increased, a larger harmonic content will be present—probably to the extent of 50 per cent. second harmonic, with rapidly decreasing amplitude as the order of the harmonic increases.

Push-Pull Amplification.

Now by the use of a push-pull amplifier all even harmonics are eliminated. (There are other advantages—to be dealt with later.) Its use is therefore highly desirable, but owing to the poor results frequently obtained with this type of amplifier, it is often discarded. Let us therefore examine the circuits in Fig. 1.

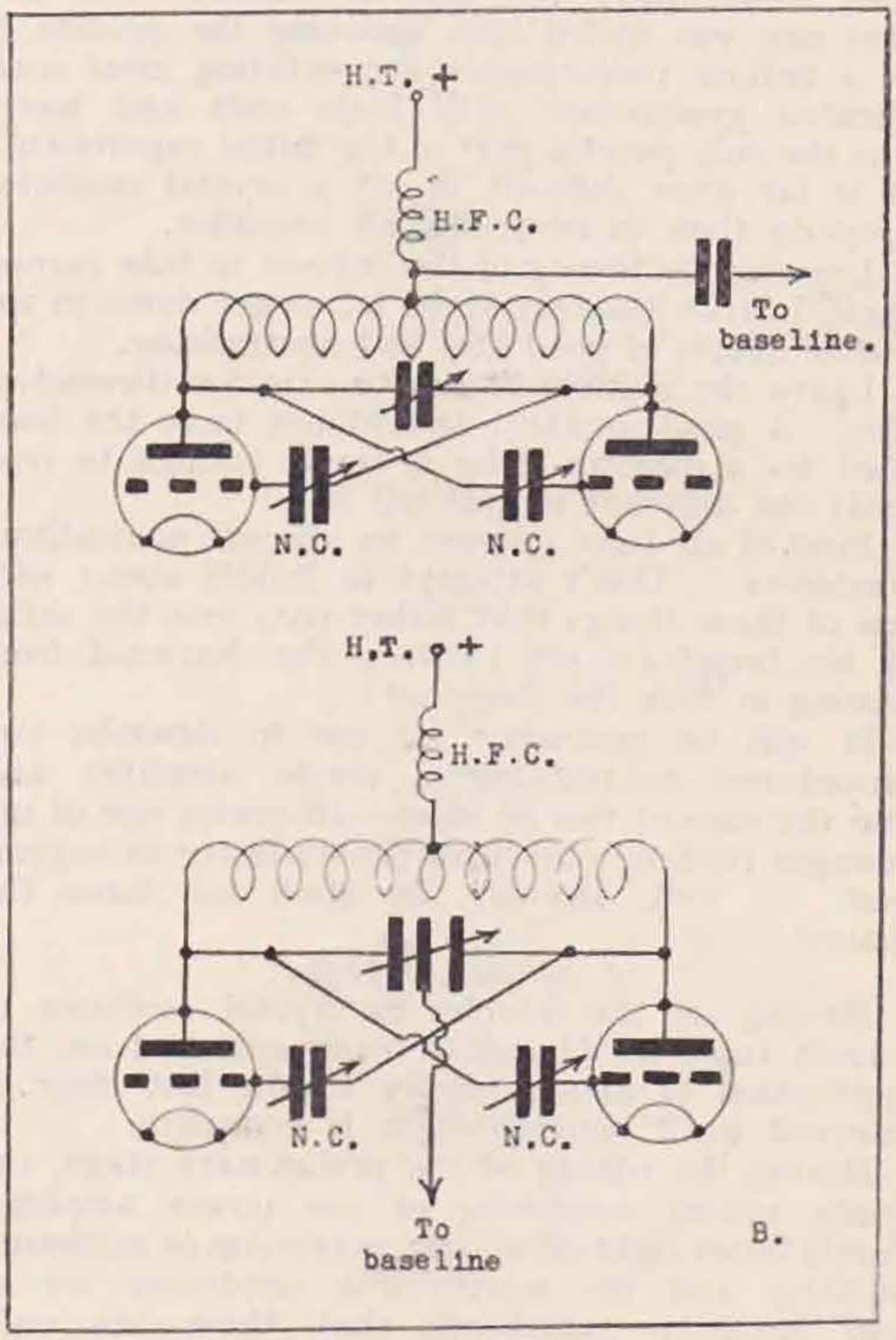


Fig. 1.
Push-pull final amplifier circuits. (a) The usual arrangement where X must be at the electrical centre of the coils. (b) An improved method using a series gap condenser with the rotor earthed.

At A we have the usual circuit arrangement employed. For complete circuit balance, point X must be at the electrical centre of the coil. In practice this condition is virtually impossible to obtain, and one valve dissipates a large amount of its current in heat. By the elimination of the by-pass condenser to base line, the nodal point is left " in the air," parasitic oscillations frequently occur, and true neutralisation is impossible unless some loss (e.g., the use of a very small tank coil) is introduced.

However, consider the circuit at B. Here the tank is tuned by a series gap condenser, the rotor

(*Continued on page* 249.)

HELPFUL HINTS.—No. 5.

NEUTRALISING

A Painful Recollection.

THIS title should attract the attention of some of our morbid members who may anticipate the grim details of how the first 50-watter went wrong.

The experience, although connected with the main heading, is actually the simple account of the writer's first attempt to neutralise an amplifier after being told exactly how it should be done by several of the leading experts. Had my more experienced readers been duped in the same way, they would have felt just as foolish. The fact that one was fooled into believing the process to be a tedious performance necessitating most complicated gymnastics with little coils and lamps was the only painful part of the initial experiment ! It is far more difficult to set a crystal oscillator properly than to neutralise an amplifier.

Leaving the theory of the subject to take care of itself, in true amateur style, let us get down to the visible effects of good and bad neutralising.

Leave the audible effects to care for themselves also. A good amateur should not have the least need for a monitor if he is clever enough to read what the different meters tell him !

First of all, have you got an efficient neutralising condenser ? Don't attempt to fuddle about with one of those things that father puts into the aerial of his broadcast set to keep the National from coming in with the Regional !

It will be necessary for me to describe two procedures—neutralising a single amplifier and also the case of two or more—otherwise one of my younger readers may have the audacity to suggest that . . . well, anyway, he shall not have the chance !

A Single Amplifier.

Having set the doubler or crystal oscillator to correct tune, all filaments being switched on, the application of anode supply to the last stage is reserved until neutralisation is complete.

During the tuning of the preliminary stage, the anode tuning condenser of the power amplifier should be set right off to, say, maximum or minimum capacity and the neutralising condenser set at zero capacity—remember that these are only instructions for the first attempts.

When the circuit is *not* neutralised, the effect of bringing the anode circuit into resonance with the grid coil is to absorb energy from the latter and place the valve in the position of being able to feed back anode energy into its grid circuit. This means that a load will be imposed on the driving stage and its anode current will *rise* when the power amplifier is brought into tune—just as if a wavemeter circuit were coupled to the driving stage.

Assuming the driver is all tuned, rotate the power amplifier tuning condenser slowly through its travel and watch the anode current of the driver. Assuming also that the valve is not neutralised already by stray or residual capacities, the current will be seen to rise and fall again as a certain place is passed. Mark on the P.A. dial this point, because here is the resonance point of the power amplifier circuit.

Put a little capacity into circuit in the neutralising condenser and retune over the resonance spot on the P.A. You will see that the anode current deflection on the driver is now considerably less—or even zero. Continue inserting more and more capacity until no deflection is noticed when the resonance spot is passed. Tune to the correct setting on the P.A.—the resonance setting, which is the operating setting—wet one finger and touch the anode of the P.A. If this causes the anode current of the driver to move at all it will then be easy to move the neutralising condenser a little to either side until no effect is observed. The stage is then approximately in tune and almost perfectly neutralised.

Switch on the H.T. to the last stage and tune its anode circuit exactly. Switch off and on once or twice and see whether the anode current of the driver is different when the P.A. is " alive " from the value when it is " dead." If there is a difference, note whether it is more or less. If more, reduce neutralising capacity and *vice versa*. Tune the aerial, make corrections on the P.A. anode to compensate for any " pull," and try switching on and off again. There should be no deflection at all in the anode current of the driver during this test. If not, you are fully neutralised.

If you notice a deflection, then the neutralising condenser must be slightly juggled until absolute stability is obtained. Remember that small changes in either the anode tuning condenser or the neutralising condenser have mutual effect. For any alteration in either, make sure that the other is still correctly set. For example, if the tuning of the aerial necessitates slight alteration of the anode circuit—which it often does—the neutralising will have to be touched up again.

If you live in the country and key the power amplifier itself, the operation becomes childishly simple because the pressing of the key for a moment or two will be enough to show how the driver stage is taking it. When the key is operated and *no* deflection is seen in the driver anode current, then everything is perfect.

At very high frequencies it is not possible to get perfect balance always, and one must compensate by arranging for the deflection to be as small as possible—about 4 per cent. being the maximum tolerable. Never be content with this if you can do better.

It is perfectly safe to operate with quite large errors, such as a deflection of 20 per cent., just for momentary test, in cases of mistake or doubt. It won't blow the transmitter up !

Do not allow this to happen in the case of a crystal oscillator being the preceding stage or the crystal runs the risk of cracking on account of the high " feed-back " taking place.

Two or More Amplifiers.

Let us commence by assuming as before that this is the first experience, but that the operator is already familiar with the procedure for one amplifier. For heaven's sake don't go on the air with two amplifiers in cascade on the same frequency until you are able to operate one alone perfectly.

By this time the rough settings for the first stage are known. The second amplifier should have its tuning condenser and neutralising condensers both set to some place in which they are bound not to be right—zero capacity.

Tune the first amplifier by the customary rules, you will by now be able to do this in less than a minute, and you will set it so that no deflection takes place in the anode current of its driver stage when you apply the H.T. voltage—by the way, if the subsidiary stages all feed from the same supply, a mental note of the anode current of the driver must be made as the effect of suddenly loading the supply might be enough to give an erroneous jump at the moment that the H.T. is applied to one stage only.

However, now that the first stage is tuned—*all* filaments being alight throughout the process of tuning—it will *not* require altering again with alterations in the tuning of the final stage.

Try rotating the anode tuning condenser of the final stage and you will soon find the resonance spot as indicated by the rise and fall of anode current in the 1st amplifier. Adjust the neutralising condenser of the final stage until this deflection vanishes—but remember the setting for resonance. Apply the H.T. and watch the effect, when tuned on the 1st amplifier anode current. If no effect, then there is no feed-back, none of the preceding stages will be effected either, and the two amplifiers are both perfectly neutralised.

Write down the settings of the different dials so that they can be tuned exactly within the shortest time. A cascaded transmitter should never be tuned in a hurry because the valves and the crystal require time to warm before the final adjustments are made. Crystal oscillator, two amplifiers and an aerial can be tuned right from putting in the coils to the final switching off in about seven minutes without rushing the job. Actually, the advantages to be gained from proper neutralisation are :—

(1) No spacer waves.
(2) No tendency for the crystal to stop oscillating suddenly.
(3) Cooler valves.
(4) No danger from feed-back.
(5) Constant and increased output.
(6) Pure D.C. wave.

A badly neutralised amplifier will often attempt to burst into self-control, thus producing variable output and a sudden influx of ripple into the carrier.

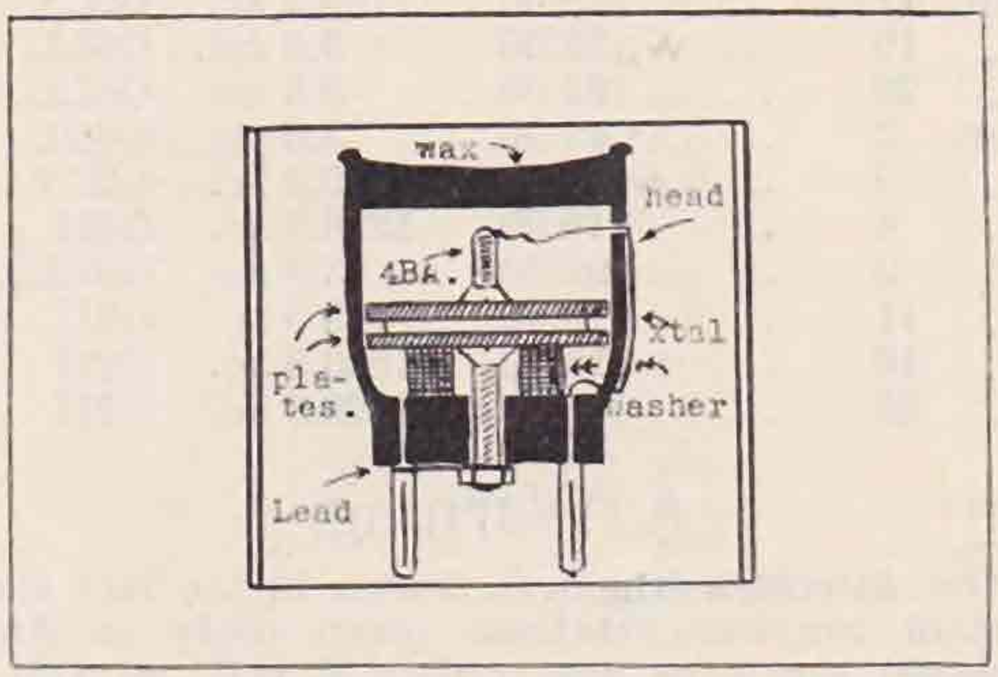
A single-plate type of condenser is all that is usually needed in the way of capacity to neutralise most modern valves. A. E. L.

A Plug-in Crystal Holder

By W. Graham (Gi5GV).

WITH reference to Mr. Runge's article which appeared in the November issue of the Bulletin, experimenters may be interested in a similar holder which has been in use at my station for some time past.

The body or case of the holder is made from the base of a Cossor receiving valve which was found to be just the right size to take a 1-in. metal disc about the size of a penny. Each disc has a 4BA bolt soldered to its centre for connecting purposes, and incidentally this enables the discs to be handled more easily, as the bolt (with a nut screwed on



first) can be held in a pair of pliers so that the truing of the surface is comparatively easy. In the writer's case the discs were first of all filed as flat as possible with a semi-rough file and then touched up with a smooth file and the scores taken off by rubbing on a piece of unpolished ebonite. After this the plates should be polished on a steel plate using grade 00 emery powder.

The bottom plate is fastened to the valve base by passing the bolt through the small hole which is left in the centre and running a nut on same, and this can also be used to take a short lead to one of the valve pins. The lead to the top plate is taken on the outside of the valve base and passed through a small hole bored near the top, the wire being given a touch of cellulose to retain it in position.

A cap for the holder can easily be made by cutting a piece of thin cardboard to fit the valve base above the top plate and pouring in hot paraffin wax to fill up the gap.

Unorthodox Crystal Control.

By J. H. Cant (G6FU).

The writer being blessed with "no volts gas mains," and a conscience, spent much time and thought in evolving a circuit arrangement which would produce a pure C.C. note without resort to a separate C.O. The idea to be described may not be brand new, but as it has not appeared in this Journal for at least some years (if ever) it is felt that other QRP members may be interested.

The crystal is inserted in series with the low potential line from the grid circuit of an orthodox T.P.T.G. and is shunted by a 40,000 w. resistance and .0002 mfd. condenser.

The transmitter is then tuned to a frequency which is slightly higher than that of the crystal, and the grid circuit tuning altered until the plate milliamps fall. Tuning slightly past this position, two more "dips" are noted, the overall fall in current being in the neighbourhood of 5 milliamps. The third "dip" gives the steadiest control, and with this arrangement 10 watts can be handled with ease. The "dips" coincide with slight "plops" in the monitor, which should be used for checking frequency.

The first 14 contacts established with this system produced 10, T9 and 4, T8 reports.

Is your subscription due?

HIC ET UBIQUE.

"T. & R. Bulletin" Back Numbers—Slow Morse Practice—B.E.R,U. Contests——Are You a Cartoonist?—R.S.G.B. Reception Tests.

Mr T. A. St. Johnston and Mr. V. M. Desmond Co-opted to Serve on Council.

At the January meeting of Council, Mr. T. A. St. Johnston (G6UT) was co-opted to serve on that body during 1934 as chairman of the Awards Committee. It will be remembered that Mr. St. Johnston has for some years rendered a valuable service to the Society in this capacity.

At the same meeting, Mr. V. M. Desmond (G5VM), Representative for District 3 (West Midlands), was co-opted to represent the provinces, in succession to Capt. G. C. Price (G2OP), who recently resigned.

Headquarters Correspondence.

Attention is drawn to the fact that all correspondence intended for headquarters must be addressed to the Secretary (or other officer concerned), *R.S.G.B.*, 53, *Victoria Street*, London, S.W.1. We have, during the past few weeks, noticed an increase in the number of incorrectly addressed letters, the majority of which have been forwarded to *Queen* Victoria Street. It is necessary to include the letters "R.S.G.B." in the address, otherwise correspondence may be delayed through being delivered to secretaries of other organisations located at 53, Victoria Street.

"T. & R. Bulletin" Back Issues.

We have for disposal a limited number of back issues of the T. & R. Bulletin. These can be obtained, price 6d. each post free :—

1927 : July (1), September (1), October (1), November (1), December (10).

1928 : January to May (1 each), June (3), July (3), August (2), September (1), October to December (2 each).

1929 : January (2), February (2), March (1), April (50), May (2), June (3), July (1), August (2), September (2), November (1), December (1).

1930 : January (1), February (1), March (30), April (6), May (6), June (2), October (40), November (2), December (1).

1931 : January (15), February (1), April (40), May (25), June (4), July (15), October (12), December (6).

1932 : March (12), April (8), June (1), July (3).

1933 : May (8), June (100), July (20), August (46), September (50), October (40), December (100).

Many of the early issues contain articles of historic interest and newer members anxious to bring their files up to date are urged to apply at once. The more recent issues contain important articles which cannot be reproduced elsewhere, therefore if you are short of an issue fill the blank space in your library NOW.

Reduced Prices for American Publications.

As from February 16 the following reduced prices for Handbooks and Callbooks become effective :—

Handbooks : Members, 4s. 6d. post free ; non-members, 5s. post free.

Callbooks : Members, 5s. 6d. post free ; non-members, 6s. post free.

The prices to callers at 53, Victoria Street, will in all cases be 6d. less than the above figures.

Slow Morse Practices.

As the P.M.G. has authorised "Slow Morse" sending under the auspices of the Society the following service has been arranged, and if found to be of utility a schedule will be published each month. Practice will be for ten minutes' duration, commencing from the times given below. The test matter will be taken from past issues of the Bulletin, and at the end of each test the page and issue will be given to enable a check to be made by those interested. No tests are permitted between the hours of 18.00 and 22.30 G.M.T. Reports on this service are requested in order to ascertain areas covered by the various frequency bands. Will any transmitter willing to assist communicate with Mr. T. A. St. Johnston, G6UT, 28, Douglas Road, Chingford, E.4 ?

Schedule of Morse Practice Transmissions.

Date. 1933.		G.M.T.	Frequency.	Station.
Feb. 17	...	15.00	7190.2 kc.	G2CY
,, 19	...	22.30	3.5 mc.	G6LL
,, 26	...	22.30	3.5 mc.	G6LL
Mar. 2	...	22.30	3.5 mc.	G6LL
,, 3	...	15.00	7190.2 kc.	G2CY
,, 4	...	10.00	1828.3 kc.	G2II
,, 9	...	22.30	3.5 mc.	G6LL
,, 11	...	10.00	7828.3 kc.	G2II
,, 18	...	10.00	1828.3 kc.	G2II
,, 25	...	10.00	1828.3 kc.	G2II

A Warning.

Our attention has been drawn to the fact that certain overseas amateurs (particularly in Australasia) are using the initials W.B.E. on QSL's and correspondence without authority. In all such cases the persons concerned are non-members of the B.E.R.U., and as a consequence may not be aware that they are claiming recognition of an award to which they are not entitled.

The fact that they have worked the British Empire is not disputed, but until their claim, as an individual member of the B.E.R.U., has been approved, they have no right to use the letters W.B.E.

Our object in drawing attention to this malpractice is because we believe that our overseas members can help us by directing non-members' attention to this warning.

B.E.R.U. Contests.

In order to prevent confusion in preparing Contest entry forms, we wish to make it clear that the bonus points claimed for the initial contact with a specific prefix zone, can only be claimed once, irrespective of frequency band used.

For example, a G can only claim an extra 10 points for working the VK6 zone, although he may have worked stations in that zone on both 7 and 14 mc.

Second 1.7 MC. Transmitting Contest.

In view of the support given to the January Contest, it has been decided to organise a second event during the week-end March 24 and 25. The rules for this Contest remain as before (see page 112, October, 1933, BULLETIN) except that the duration of the contest will be from 22.00 G.M.T. March 24 to 22.00 G.M.T. March 25.

The premier award for the year will be held for six months by the leading station in each half of this Contest. Certificates of merit will be presented to the leading stations in each event.

Entry forms must be obtained from Headquarters prior to March 24.

The report of the two contests will be published in the May BULLETIN.

R.C.C. Contest.

We are advised by Mr. R. A. Fereday (PAOFY and G6FY) that the R.C.C. have arranged another two-band contest for the week-end of March 17 and 18. Stations will call test on 1.7 mc. and listen for replies on 3.5 mc.

The object of the contest is to arouse interest in 1.7 mc. work on the Continent.

STANDARD FREQUENCY TRANSMISSIONS.

SUNDAY, FEBRUARY 25th, from G6NF London.

0930 *GMT.* 3525 *KC.*
0940 *GMT.* 3625 *KC.*
0950 *GMT.* 3725 *KC.*

Accuracy within 0.01 per cent.

Note.—The Quarterly Transmission from the N.P.L. will be on a frequency of 1780 kcs. at 2100 GMT., March 6.

Harmony House.

Not content with publishing the address of this firm incorrectly in our December issue, we aggravated the error last month by stating that Mr. Johnson's establishment is situated in Stockport. The correct address should read Harmony House, 116, Cambridge Road, Southport, Lancs. We apologise to our advertiser for any inconvenience caused.

Super-Heterodyne Four-Valve A.C. Receiver.

We are indebted to Mr. Bryan Groom, G6RG, for drawing our attention to two errors in the wiring diagram (Fig. 1) for this receiver as printed on page 219 of our last issue. The connection from C8 to C14 should join the cathode lead from C10 to R12, whilst C11 should be joined between the lead C8—C14 and the A.V.C. line.

Mr. Groom states that as far as CW work is concerned effective A.V.C. is a nuisance, as the noise between dots or dashes is excessive. Telephony reception is quite satisfactory.

Mr. Armstrong, the designer, however, advises us that CW reception is clean and pure, although the reception of CW was not particularly considered when designing the receiver.

Are You a Cartoonist?

Can you sketch? If so, here is your chance to do your bit for the BULLETIN. With the approach of conventionettes and field days, numerous opportunities will occur for those who can wield the pen to depict in humorous vein some incident which has been noticed.

Cartoons must be drawn on stout paper in indian ink and be framed to give a width not exceeding 5 ins., and a length not exceeding 7 ins. Except in the case of conventionettes, the subject or subject-matter treated must have more than local interest. Cartoons will not be returned unless requested.

In order to encourage members, the Editor will be pleased to present a copy of "Ladner and Stoner" to the member who, in his opinion, has submitted the best and most original cartoon during the year ending December 31, 1934.

Get busy now, and let us have your contributions.

R.S.G.B. Reception Tests.

A list giving dates, periods and bands for the next series of Reception Tests is given below, and new participants are referred to the September issue of the BULLETIN for full details. All logs in this series should reach Mr. T. A. St. Johnston, G6UT, 28, Douglas Road, Chingford, E.4, by March 20, when the Budget will be circulated.

SERIES 25.

Test Letter	Date 1934			Period G.M.T.	Band M.C.
A	Sun.	Feb.	18	00.00—01.00	7
B	Sun.	,,	18	10.00—11.00	56
C	Sun.	,,	18	11.30—12.30	28
D	Wed.	,,	21	20.00—21.00	3.5
E	Sun.	,,	25	09.00—10.00	1.7
F	Sun.	,,	25	11.30—12.30	14
G	Sun.	,,	25	23.00—24.00	7
H	Thur.	Mar.	1	20.00—21.00	14
I	Sun.	,,	4	00.00—01.00	1.7
J	Sun.	,,	4	09.30—10.30	3.5
K	Sun.	,,	4	11.30—12.30	56
L	Wed.	,,	7	20.00—21.00	28
M	Sun.	,,	11	08.00—09.00	7
N	Sun.	,,	11	09.30—10.30	1.7
O	Sun.	,,	11	11.00—12.00	56
P	Sun.	,,	11	18.00—19.00	28
Q	Wed.	,,	14	20.00—21.00	3.5
R	Thur.	,,	15	19.00—20.00	14

QSL Section.

Manager, J. D. CHISHOLM (G2CX).

At the request of several members the section is at present investigating the question of postage payable on QSL cards passing direct between British stations, and it hoped that it will be possible to publish a definite ruling from the Post Office in the next issue. Some amateurs are in the habit of stamping the cards with ½d. only but as these cards are sometimes charged for excess postage by the Post Office, it is thought that definite information on the point would be of use.

On the occasions when the unclaimed cards are removed from the files it is painful to see the enormous number that are consigned to the flames, simply because the owners have not bothered to claim them after six months have elapsed. One is constantly hearing complaints regarding the failure to QSL, and it is sometimes suggested that our own Section and those of other countries is somewhat to blame for this state of affairs, although we cannot state too definitely that every card is dealt with as speedily as possible. Too often the fault lies nearer home and it behoves those who want their cards to see that H.Q. is kept supplied with envelopes in which to forward them.

By far the worst offenders against "ham morality" are those who *never* collect cards and fully half of the unclaimed cards are addressed to well-known amateurs who obviously do not want QSL cards. Surely it would be only fair to inform the other man at the time of the QSO that no QSL's are wanted, and so save him the trouble and expense of writing and the QSL section the waste of time and money in sorting, etc.

We would remind listeners that the rules of the section will not allow us to handle cards bearing political propaganda and that such cards will be returned to the senders—irrespective of the colour of their shirts!

Calibration Section.

Manager: A. D. Gay (G6NF).

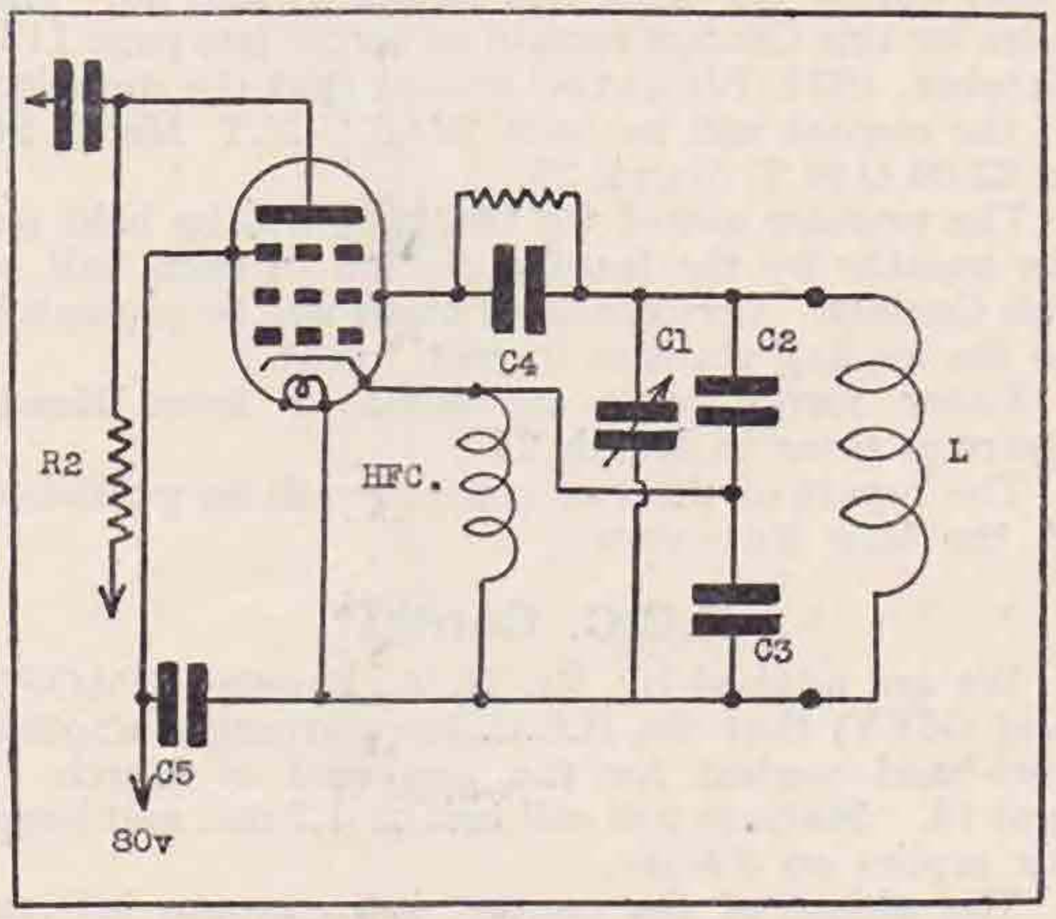
An E.C. Oscillator Circuit for Plug-in Coils.

The electron-coupled oscillator circuit with which most readers will be familiar, requires the use of a tapped coil for the production of oscillations. The use of a tapped coil is a disadvantage over which the dynatron oscillator scores every time. We have, however, been able to devise a circuit suitable for a multi-range frequency-meter or laboratory oscillator which employs ordinary two-pin plug-in coils. This feature gives the E.C. oscillator with its inherently stable characteristics, and economy in H.T. consumption, a much wider range of utility.

It may not be generally realised that the E.C. oscillator is much more economical than the dynatron oscillator and much simpler to adjust. With any ordinary screen-grid valve and 100 volts H.T., the consumption is usually less than 1 milliamp, while the dynatron circuit may require ten times more current, with a proportionate reduction in valve and battery life. The dynatron circuit is particularly fussy about having an excess of capacity across its tuned circuit, whereas the E.C. circuit will permit almost any liberty being taken with it.

From the above considerations it will be appreciated that this new circuit offers several possibilities over its predecessors. The diagram shows the cathode connected to ground through an H.F. choke, and through the medium of two condensers, a 500 m.m.f and a 250 m.m.f., connected in series, the cathode is connected electrostatically to the optimum position on the inductance, which is tuned with the usual variable condenser. The H.F. choke must be of high inductance such as a *Varley* Dual astatic type, or may consist of a 1,500-turn *Igranic* plug-in coil; but whatever component is used, it must obviously be free from instability due to loose windings, etc.

With the components specified, oscillations were obtainable up to 14,400 kc. and as low as 50 kc., using coils ranging from 2 turns up to 700 turns. As might be expected, by substituting any type of independently heated valve, such as the *Mazda*



E.C. oscillator circuit with plug-in coils.

C1	***300 mmfd. variable.***	***R1***	***50,000 ohms.***
C2	***500 mmfd. fixed.***	***R2***	***100,000 ohms.***
C3	***250 mmfd. fixed.***	***H.F.C.***	***Varley dual astatic***
C4	***300 mmfd. fixed.***	***L***	***2-pin plug-in coil.***
C5	***5,000 mmfd. fixed.***		

AC/HL or *Marconi* MH4 for the screen-grid valve, similar oscillations can be produced with the same independence of variation in supply voltages. With this type of oscillator however, no means of external coupling is afforded, due to the absence of a fourth electrode, but by leaving part of the oscillator unscreened, such as the inductance, sufficient coupling to a receiver is secured for calibration purposes.

These circuits are suitable for frequency-meter or monitor design and where a screen-grid valve is employed, the circuit can easily be adapted for transmitter control by tuning the output circuit in the usual way. For driving frequency-doublers, etc., the anode resistance is replaced by a tuned circuit which may be 2 x.*f*. or 3 x.*f*., etc.

Strays.

Mr. L. Scholefield, G5SO (ex 2BBA), will be pleased to receive reports from B.R.S. He is transmitting on 7,123 kc. with c.w. and 'phone every Sunday between 11.00 and 12.00 G.M.T.

QRA Section.

Manager : M. W. PILPEL (G6PP).

NEW QRA's.—JANUARY.

G2GC.—W. FIELD, 10, South View, North Biddick, Washington, Co. Durham.
G2HD.—A. HARPER, Cropwell Butler, Nottingham.
G2NS.—N. P. SPOONER, 18, Warwick Road, Boscombe, Hampshire.
G2RV.—S. HIGSON, "Arvie," Ford Road, Upton, Birkenhead.
G2SB.—J. W. B. BAKER, c/o Halliday, 19, Brisbane Street, Greenock.
(This was erroneously printed as G2SP in the December BULLETIN.)
G2SD.—R. H. STREETE, "Waverley Lodge," Haven Baulk Lane, Littleover, Derby.
GI2SP.—R. A. SPROULE, "Ardavon," Garvagh, Co. Londonderry, N. Ireland.
G2SX.—F. E. WOODHOUSE, 20, Hoodcote Gardens, London, N.21.
G2VC.—A. L. GOSLING, "Rivington House," Clarence Road, Horsforth, Leeds, Yorks.
G2WV.—J. B. KERSHAW, 6, Quentin Road, Lewisham, London, S.E.13.
G5GD.—D. G. SAINSBURY, "York Lodge," Barton Road, Torquay.
G5JG.—J. DEMPSEY, jun., 40, Harrowby Road, Seaforth, Liverpool 21.
G5JH.—J. W. HAMILTON, Abloads Cottages, Sandhurst, Gloucester.
G5LB.—L. G. BLUNDELL, 45, Monivea Road, Beckenham, Kent.
G5NW.—E. J. ALLAN, "Red Oak," Forthill Road, Broughty Ferry, Dundee, Scotland. (Portable G5AP.)
G5SG.—E. A. SPRINGETT, 10, Princess Road, Regents Park, London, N.W.1.
G6AO.—A. OATES, 12, Tolson Street, Dewsbury, Yorks.
G6CY.—A. S. CLACY, 490, Winwood Road, West Hove, Sussex.
G6FO.—A. E. FORSYTH, 21, All Saints Road, Clifton, Bristol.
G6LJ.—S. K. LEWER, 17, Norval Road, North Wembley, Middlesex.
G6YU.—J. HANSON, 11, Clara Street, Stoke, Coventry.
2AYZ.—C. J. H. HARDING, 21, West View Road, Keynsham, Bristol.
2BGK.—E. W. DEAN, No. 3, Swinshaw Hall, Love-Clough, Rossendale, Lancs.
2BGT.—D. B. PIPER, 65, Glendale Avenue, Edgware, Middlesex.
2BII.—V. T. VICKERY, 274, Mount Pleasant Road, London, N.17.
2BLN.—D. MACADIE, 50, Kilmorie Drive, Bankhead, Rutherglen, Scotland.
2BPI.—E. A. MACKAY, 9, Napier Road, Edinburgh, Scotland.
2BPU.—R. S. FALLOWFIELD, 11,Buckingham Road, Tue Brook, Liverpool, 13.
2BPY.—H. N. D. BAILEY, 163, Newland Park, Hull, Yorks.
2BQY.—C. A .W. OLIVE, 138, Woodland Road, London, S.E.19.
2BTA.—W. H. MYERS, 63a, High Street, Yeadon, Leeds, Yorks.
2BTP.—A. SIMMONS, 13, Gopsall Road, Hinckley, Leicester.
2BVH.—C. C. ALGAR, 63, Margery Park Road, London, E.7.

The following are cancelled :—G5AD, G6XP, 2AJA, 2ANV, 2AWK, 2AYY, 2BAJ, 2BGS, 2BRF.

NEW QRA's.—FEBRUARY.

G2AX.—N. BLACKBURNE, 19, Sea Road, Bexhill-on-Sea, Sussex.
G2JR.—R. E. JAMES, "Braemar," Elmhurst Avenue, Westdale Lane, Mapperley, Nottingham.
G2KO.—J. A. NORTH, School House, Garton-on-the-Wolds, Driffield, East Yorkshire.
G2RU.—H. C. HALL, 39, Archdale Road, Manor, Sheffield 2, Yorks.
G2SN.—R. W. HALL, "Newholme," Llwyn Mawr, Sketty, Swansea, Glam.
G2VB.—V. S. BUTLER, 57, Park Road, Ramsgate, Kent.
G5AL.—A. B. MAY, 177, Claremont Road, Pendleton, Salford 6, Lancs.
G5HL.—H. LAWSON, 77, Kermington Avenue, Loanhead, Scotland.
G5SO.—L. E. H. SCHOLEFIELD, 2, Balmoral Road, St. Annes-on-Sea, Lancs.
G6IN.—J. B. Inglis, Northfield, Hawick, Roxburghshire.
G6OW.—J. TENNANT, Lindean, Bridge of Allan, Stirlingshire, Scotland.
2AZT.—G. ROBINSON, 44, Grove Lane, Didsbury, Manchester.
2BPI.—E. A. MACKAY, 51, Mardale Crescent, Edinburgh.
2BQQ.—A. HARRISON, 2, Westfield Avenue, West Monkseaton, Northumberland.
2BUB.—H. DUCKWORTH, 175, Oldham Road, Royton, Oldham, Lancs.
2BVN.—K. B. ROULSTON, 22, Saville Street, Leicester.
2BVV.—L. KNIGHT, "Ourome," Madeira Walk, Reigate, Surrey.
2BWP.—C. J. GREENAWAY, 24, Percy Road, Leigh-on-Sea, Essex.
2BXC.—J. V. WARNER, 41, Blyth Road, Worksop, Notts.
2BYC.—T. J. BROWN, Manor House, Nettlebed, Henley-on-Thames, Oxford.
2BYG.—A. N. LAWS, 192, Heaton Road, Newcastle-on-Tyne, Northumberland.
2BYP.—J. W. MACKAY, 12, Royal Crescent, Glasgow, C3.
2BZT.—H. NORTON HARWOOD, Woodland Villa, Roundhay, Leeds, Yorks.
2BZZ.—H. R. HEAP, 76, Wimbledon Hill, London, S.W.19.

The following are cancelled : 2ABS, 2APL, 2BBA, 2BRF.

NEW MEMBERS.

JANUARY.

HOME CORPORATES.

F. N. EVANS (G2KL), 114, Singlewell Road, Gravesend, Kent.
H. L. WILLIAMS (G2KX), 335, Staines Road, Twickenham, Middlesex.
J. E. C. McCLURE (G6JM and G6MJ), 50, Manor Way, Ruislip Middlesex.
V. V. SUTTON (G6VS), 448, St. Ann's Road, Tottenham, N.15.
C. HAMPSON (2AOU), 73, Smedley Road, Cheetham, Manchester 8.
F. T. MAY (2AYX), 24, Russell Road, London, N.W.9.
L. SANDERSON (2AZP), 104, Croxted Road, W. Dulwich, S.E.21.
H. E. GILL (2BIW), 53, Grove Park Road, N.15.

NEW MEMBERS.

J. VARLEY (BRS1298), 13, Rushton Villas, Thornbury, Bradford, Yorks.
J. SMITH (BRS1299), 111, Watt Street, Glasgow.
J. MAWBEY (BRS1300), c/o Wells, 94, Garnet Street, Glasgow, C.3.
H. N. HARWOOD (BRS1301), Woodland Villa, Roundhay, Leeds, 8.
L. W. PEGLER (BRS1302), British Radio Service, Station Parade, Shortlands, Kent.
W. R. JONES (BRS1303), Bryn-Helyg, Palace Avenue, Rhyl, N. Wales.
C. E. BARON (BRS1304), Messrs. A. Bird & Sons, Ltd., Deritend, Birmingham.
M. W. SHADFORTH (BRS1305), The Gables, Harrow Drive, Romford, Essex.
D. A. MURRAY (BRS1306), 137, East Trinity Road, Edinburgh.
K. A. CAMERON (BRS1307), Lammerlaw, Helensburgh, Dumbartonshire.
H. L. CLOUT (BRS1308), 49, Thanet Gardens, Folkestone, Kent.
W. E. CHEETHAM (BRS1309), 79, North Road, Clayton, Manchester, 1.
T. L. GILL (BRS1310), 37, Peasholm Crescent, Scarborough.
N. T. HODGSON (BRS1311), Mareham-le-Fen, Boston, Lincs.
A. L. FINCH (BRS1312), 8, South Street, Redhill, Surrey.
R. T. REED (BRS1313), 9, Leigh Street, Russell Square, W.C.1.
G. A. JESSUP (BRS1314), 11, South Avenue, Rochester, Kent.
C. R. THOMAS (BRS1315), 77, Nicolas Road, Chorlton-cum-Hardy, Manchester.
H. WIGGINS (BRS1316), 1, Tindall Street, Scarborough.
G. BECKITT (BRS1317), 24, Alfred Street, Grimsby, Lincs.
R. ROBARDS (BRS1318), 36, Frenches Road, Redhill, Surrey.
D. H. PREIST (BRS1319), 32, Cromwell Avenue, Bromley, Kent.
G. W. NORTH (A), 474, Merton Road, Southfields, S.W.18.

DOMINION AND FOREIGN.

H. E. J. SMITH (CT2BK), Calcoda Macara, 23, Ponta Delgado, Azores.
H. HODGENS (EI5F), The Bungalow, Clonasleigh, Shankill, Co. Dublin.
R. STACEY (VK2HY), 14, Hume Street, Crows Nest, N.S.W., Australia.
L. A. DEANE (VK5LD), 40, Tusmore Avenue, Tusmore, S. Australia.
E. S. HOLDEN (VO8H), Box 650, St. John's, Newfoundland.
R. E. M. DE LA POLE (VS7RP), Tamaravelly Group, Dolosbage, Ceylon.
C. MATTHEWS (W6EAK), 4434, Gainsborough Avenue, Hollywood, Calif, U.S.A.
R. R. HEIGES (W6EXQ), 1572 W. 48 Street, Los Angeles, Calif, U.S.A.
E. DON HUDSON (W6FAL), 2916, West 78th Place, Inglewood, Calif, U.S.A.
LAC G. LEWIS (YI5GL), No. 1 A.C.C., R.A.F., Hinaidi, Baghdad, Iraq.
CORPL. A. E. TOMPKINS (BERS203), Wireless Experimental Section, N.W.F.P., India.
L. WATT (BERS204), c/o Marconi Coy., 40, Rector Street, N.Y.C., U.S.A.
R. G. PERCY (BERS205), at 49, Highdown Road, Hove, Sussex.
L. H. VALE (BERS206), 48, Albion Street, West Brunswick, N.10, Victoria, Australia.
G. COOK (BERS207), P.O. Box 1188, Nairobi, Kenya Colony.
S. A. MINKLEY (BERS208), Netraconda Estate, Durgadbetta P.O., Kadur Dist., Mysore State, S. India.
F. JOHNSTONE (BERS209), Station H.Q., R.A.F., Hal Far, Malta.

FEBRUARY.

HOME CORPORATES.

W. S. BOGLE (G2QD), 33, King's Road, Chelsea, S.W.3.
W. J. EDWARDS (G2TY), Ty-yn-y-Wain Farm, Llansamlet, Swansea, Glam.
W. S. HEBDEN (G5FO), Officers' Mess, E. & W. School, R.A.F., Cranwell, Lincs.
E. T. PETHERS (G5QC), 17, Tufton Road, Rainham, Chatham, Kent.
E. J. JARVIS (G6AW), 89, Westborough, Scarborough, Yorks.
G. E. WARDLE (G6FA), 61, College Road N., Blundellsands, Liverpool, 23.
M. A. P. Palmer (G6OZ), Kenmore, Park Road, Staple Hill, Bristol.
P. VARNEY (G6PV), Beverley, Upper Hale, Farnham, Surrey.
J. S. GINGELL (2AAM), 22, Derby Road, Swanwick, Derbyshire.
H. FAIRBANKS (2ACM), 14, Thirsk Grove, Blackpool, Lancs.
D. L. MATTHEWS (2AQI), 134, Cwm Road, Swansea, Glam.
R. F. A. POTTINGER (2BNS), 10, Red Lion Road, Tolworth, Surrey.
T. DENWOOD (2BZA), 25, Snaefell Terrace, Seacliffe, Whitehaven, Cumb.
H. MEE (BRS1320), Kirkfield, Cross Street, Long Eaton, Derby.
P. B. Briscombe (BRS1321), 48, Fieldside, Northstead, Scarborough.
B. SMITH (BRS1322), 2, Crosland Terrace, Helsby, Warrington, Lancs.
T. B. WIMBUSH (BRS1323), 7, 8, C. Squadron, E. & W. School, R.A.F., Cranwell, Lincs.
L. H. FENNER (BRS1324), 27, Foulden Road, Stoke Newington, N.16.
D. A. J. HOGG (BRS1326), 74, Hawthorn Crescent, Highbury Estate, Cosham, Portsmouth, Hants.
E. COOPER (BRS1327), The Cottage, Broomfield Hall, Kidderminster.
H. J. BARNWELL (BRS1329), V3 " A " Squadron, E. & W. School, R.A.F., Cranwell, Lincs.
E. A. A. HARDWICK (BRS1330), Providence Cottage, Misterton, Som.
W. H. SEGROTT (BRS1331), 61, Co-operative Street, Derby.
A. J. FRISBY (BRS1332), 41, Kingsbury Parade, Edgware, Middx.
A. E. FOSTER (BRS1333), 74, Victoria Gardens, Horsforth, Near Leeds.
R. HEALEY (BRS1334), 37, Broomhill Road, Bulwell, Notts.
H. EYRE (BRS1335), 32, Locke Avenue, Barnsley, Yorks.
G. W. HEROD (BRS1336), 48, Repton Road, Bulwell, Notts.
C. BURTON (BRS1337), 1, Torrington Road, Wallasey, Ches.
D. W. MORGAN (BRS1338), 15, Grange Road, Kenton, Middx.
H. G. SNELL (BRS1339), 5, Lisburne Terrace, Aberystwyth.
H. S. CHADWICK (BRS1340), 100, Frederick Road, Stechford, Birmingham, 9.
E. A. PERKINS (BRS1341), 40, Calton Road, Gloucester.
W. N. LANDLES (BRS1342), 205, Albert Drive, Glasgow, S.1.
M. H. WYNTER-BLYTH, " Dent," South Close, Woodhall Gate, Pinner, Middx.
W. WOLFSOHN, 27. Broughton Drive, Wollaton Park, Nottingham.
J. G. L. KITSON (A), 24, Warton Avenue, Grovehill Road, Beverley, E. Yorks.

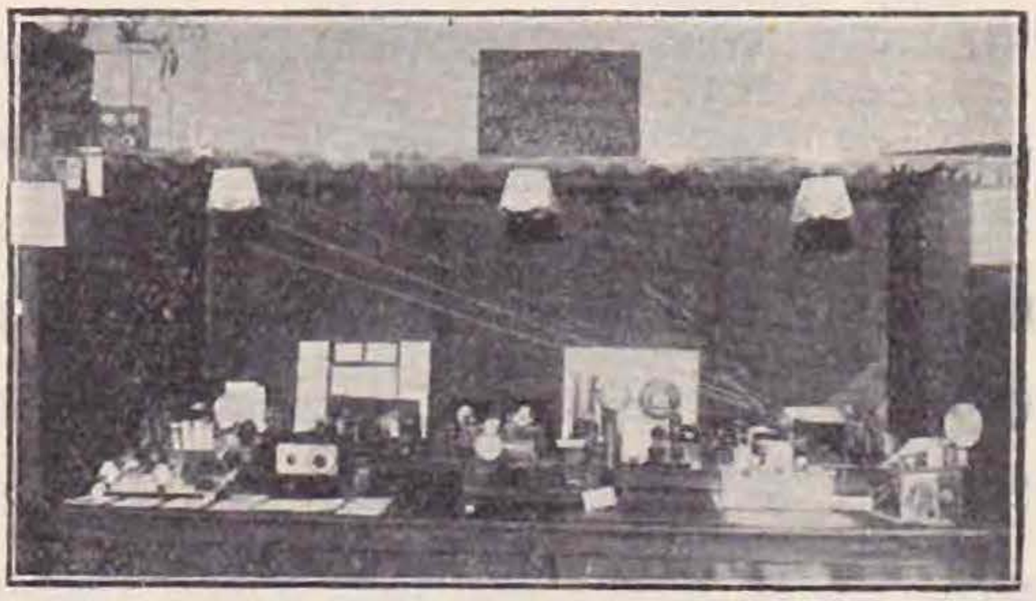
DOMINION AND FOREIGN.

J. MAHIEU (ON4AU), Le Manoir, Peruwelz, Belgium.
R. MCKNIGHT (SU6RM), R Signals, Helmieh, Cairo, Egypt.
H. J. COLLINS (SU2NP), 216 (BT) Squadron, R.A.F., Heliopolis, Cairo.
D. H. JOHANSON (VQ4NSA), P.O. Naivasha, Kenya, Colony.
H. Y. SASAKI (W6CXW), RT.2, Box 1085, Long Beach, Calif, U.S.A.
A. H. ELSNER (W6ENV), 1606, S. Orange Grove Avenue, Los Angeles, Calif.
Leading Telegraphist J. H. HAYES (BERS210), H.M.S. " Bryony," c/o G.P.O.
H. G. WILLSON (BERS211), Central Wireless Station, R.A.F., Ambala, India.
J. A. ESSLEMONT (BRS212), Bungalow 12, Pointe-a-Pierre, Trinidad, B.W.I.
W. G. GILLAN (BERS213), c/o Wireless Experimental Station, Pishin, Baluchistan, India.

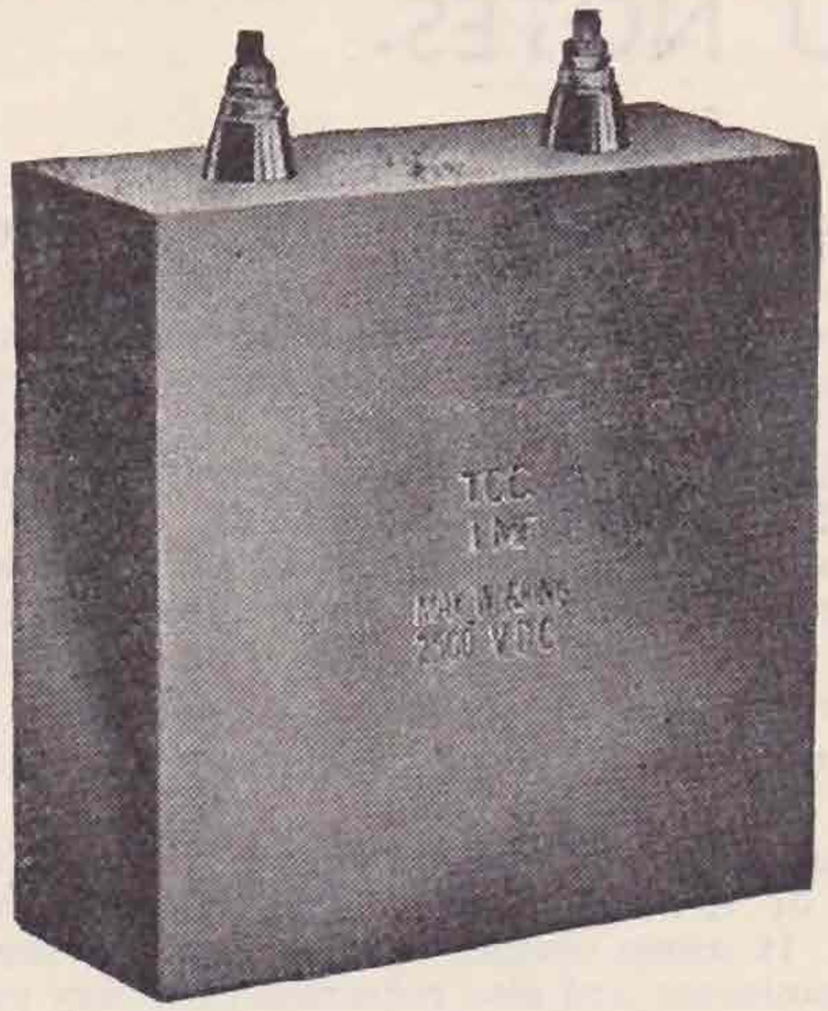
W.B.E. Certificates.

The following W.B.E. Certificates have been awarded :—

Name.	Call Sign.	Date.
J. F. Stanley	G6SY	December 2
W. A. Scarr	G2WS	,, 6
W. A. Nokes	G2ZJ	,, 8
S. W. Rowden	G6SR	,, 8
E. D. Hudson	W6FAL	,, 13
C. Matthews	W6EAK	,, 13
S. A. Rance	YI2DS	,, 18
G. E. Bull	G6BU	,, 29
M. E. Tapson	G6IF	,, 29
C. L. Ward	G5NF	,, 29



The Burton-upon-Trent Amateur Radio and Television Society Stand at the recent Burton Radio Exhibition organised by that Society.



Here is illustrated Type 141 Condenser for maximum working voltage of 2,500 peak value (tested 5,000 V.D.C.). Price 28/-. Made also in 2 and 4 mfd. Prices 50/- and 97/6 respectively.

SAFETY.....

that costs so little extra

IT is worth something to ***know*** that the condensers you use will function as "per specification"—that they will not fail and jeopardise other components in circuit. That is to know true safety—and T.C.C. Condensers are your safeguard. Twenty-seven years' reputation is at stake with every T.C.C. sold, and repeated test assures that the reputation is maintained ..... With their cost so very little more it is worth buying T.C.C. and to ***be sure.***

T.C.C. CONDENSER
ANTI-INTERFERENCE UNIT

Noisy mains, motors, generators, and other electrical apparatus can cause havoc with reception. In nine cases out of ten this interference can be reduced by fitting this Unit at the house side of your main switch.
Bad cases may need individual attention at source, but whenever the remedy is "two condensers across the mains and centre point earthed" this Unit provides an efficient solution.

10/6 Complete with instructions.

T.C.C.

ALL-BRITISH

CONDENSERS

THE TELEGRAPH CONDENSER CO. LTD.,
Wales Farm Rd., N. Acton, W.3.

♡ 4374

CONTACT BUREAU NOTES.

By H. C. Page (G6PA).

THERE are two alterations to be noted this month with regard to Group management. In the first place, G5UM returns to take over the 1.75 mc. groups; secondly, the A.A. group has now been formed under the leadership of G2KV.

28 M.C. Groups (No. 1).

G6VP (Manager).

All Groups report active, although again no long-distance data can be recorded. Conditions consistently remain very poor, only local G work seems to be possible, but judging from the number of local harmonics that have been reported, members must have spent considerable time on the band.

G6ZV is now fully licensed and requires information with regard to the most suitable valves to use and circuit. It is proposed to attach him to Group 1F.

G6BC seems to be putting in some useful work with pentodes as C.O.'s. He is endeavouring to produce a strong fourth harmonic, but using a 7 mc. crystal states that oscillations are erratic and that only individual valves seem to work. Can anyone loan him an assortment of pentodes to enable him to carry out this useful work?

The most interesting report to hand this month comes from G6YL. On page 183 of the December Bulletin I remarked that it seemed a pity that no logical conclusion could be extracted from G2FN's "Notes," nor could any connection be made between his observations and the behaviour of other frequencies during the period under review. G6YL states that although no 28 mc. work has been done from her station, nevertheless she has followed with interest the reports of the G, HAF, and F, 28 mc. enthusiasts.

For the last three years she has observed that "skip" becomes extraordinarily short on 14 mc., commencing in the early days of May and continuing to September. Local G signals on 14 mc.—and by local, she means places as comparatively near to her QRA (Felton, Northumberland) as Sheffield, the Midlands, etc.—begin to come in at R8/9 QSA 5. She states that even her QRP (8/10 watts) signals are reported of equal strength. The Southern English Stations are equally strong, of course, but in this case "skip" is round about 300 miles. *Now this is her point.* It is from May to September that the 28 mc. groups say that the band becomes lively, and her theory is that some connection *does* exist between 14 mc. and 28 mc. so far as conditions are concerned.

A comparison of her log with G2FN's 28 mc. Notes for June and July, 1933, proves that many of the dates which were good on 28 mc. were extraordinarily so on 14 mc.

It has also been observed that these conditions prevail mostly with a falling barometer, cloudy days seeming best, often accompanied by QRN. This, again, tallies with G2FN's remarks. A long list of G Stations heard during these short skip periods is sent in support of her observations.

I think we should be very grateful to G6YL for the result of her work.

A further study of my own log shows a rather startling sequel to the above, viz., that on the unusually short skip days, when here in the South of England, we can hardly work for the bombardment by English, Belgian, Dutch and French stations on 14 mc., that quite suddenly, often within 30 seconds or less, R9 signals fade completely out and a few minutes afterwards quite the best DX comes in at good strength.

One case was a W6 at R8/9 who reported my signals R10.

It makes one wonder whether the connection is height or density of the Heaviside and which layer? It seems certain that attenuation must be at its minimum and also reflection of a very perfect order. Can anyone elaborate on this?

[Co-operation with Group 2 seems very desirable if a solution is to be found to the problems mentioned above.—Ed.]

Atmosphere and Fading Groups (No. 2).

G2GD (Manager).

As expected, all work during December was largely at a standstill, owing to festive activities, and consequently there is little of general interest to report, but this does not mean that the group is stagnating! Far from it, for at the moment a "furious battle" is being waged between 2*C* members as championed by G5JH and G5AM as to whether the Troposphere or Ionosphere is to be blamed for variations in reception from day to day and hour to hour.

All this is the outcome of the scheme by which all G.C.'s contribute in rotation, snowball fashion, to the G.C.'s Letter Budget, which has met with very enthusiastic reception.

The "trouble" started by a bombshell dropped from 2*C*, which exploding upwards nearly shattered the Heaviside layers, and it was only by the timely arrival of G5AM with his heavy artillery of mathematical analysis that H.L. is still in existence to-day!

All of which means that there is very intense interest in the various subjects under discussion, and all groups are hoping to be well away with their observations again by the time these notes appear in print.

Turning to individual group reports, 2*A* are continuing observations on "Fronts." 2*B* are hoping to tackle ultra-short-wave propagation in the near future. 2*C* are dealing with electricity in the atmosphere, and various theories are put forward, but these are all very much "in the air" at the moment. 2*E* are continuing with the Isobar theory, and other theories involving the moon, barometer and clouds are put forward.

An interesting contribution from G5AM points out the possible effect of a cloud charged with electricity to an amount very much below what

would be called a thunder cloud; he shows that sparking and ionisation may occur some 7 kms. below the HL.

3.5 M.C. Groups (No. 4).

G6OM (Manager).

May we be allowed to congratulate G2DQ upon winning the 3.5 contest? There is one question I should like to ask him: Why 17.5 watts on his buffer stage to drive his PA to 10 watts; has he some special reason? Perhaps he will reply in due course.

BRS207 is anxious to arrive at some theory as to the relationship between WX and DX results on 3.5, and to this end would like all interested to make a note of barometric pressure and air temperature at time of making contacts. BRS207 will then have some data to work on.

Conditions, so far as members have reported, have not come up to either calculations or anticipations this season so far. At the full moon, towards the end of October, conditions were good for DX on 3.5, and at the same time good conditions ruled on the broadcast band, but at the November full moon, while conditions on 200/500 metres were good, they were only mediocre on 3.5, which as 6LI puts it, "completely dislocates my full moon good DX theory on 3.5." The G.C., incidentally, would like to have the views of others on this subject, that is, if they have made any definite observations.

Furthermore, if these notes should catch the eye of any DX stations, he would be glad if they would take a note of the strength of G6OM now, as compared with two months ago, as a Zepp is being tried out, which should give better low-angle radiation, according to G6LI, than the aerial counterpoise system formerly used.

No other points have been brought up during the last two months which merit attention.

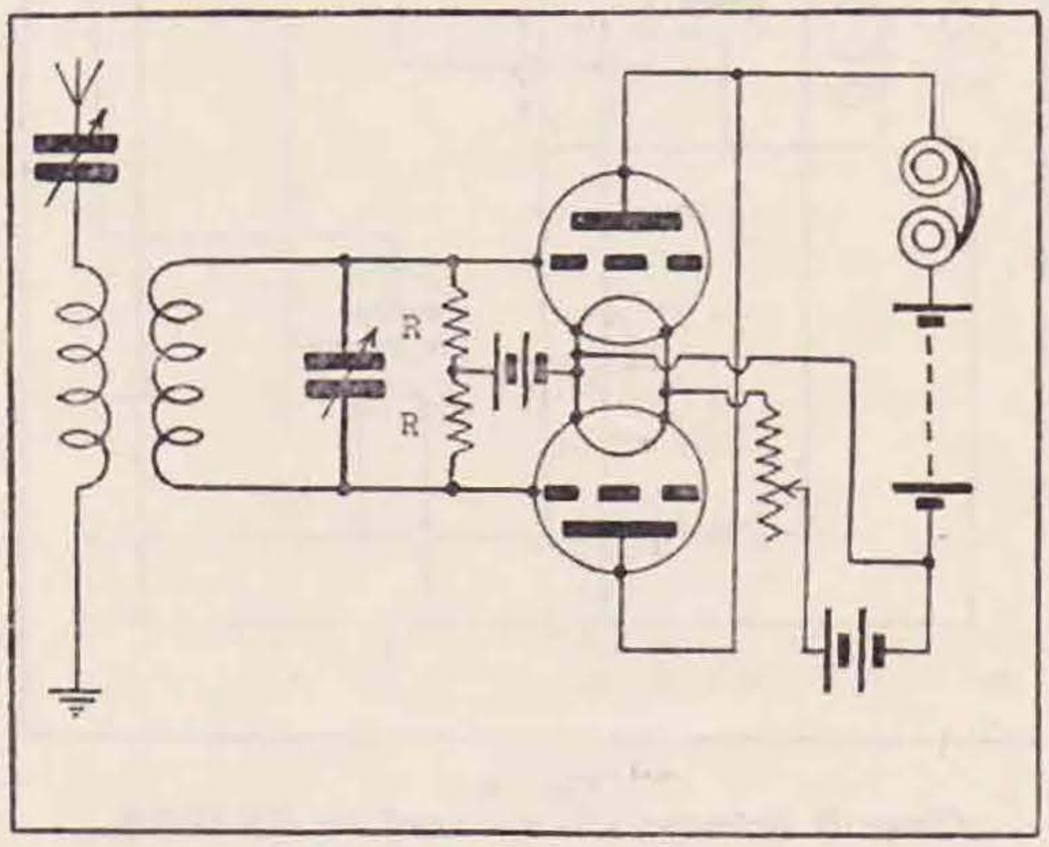


Fig. 1.
Push-pull detector circuit without reaction.

Receiver Design Group (No. 5).

BRS981 (Manager).

Although recent work has in the main been of a theoretical nature, the results will probably prove of interest to most members.

Detection Without Reaction.

The factor claiming our greatest attention has recently centered around an investigation of reaction, and the possibility of its elimination, for every member of the Group has at some time or other experienced trouble from this source.

G2NK summed up his results by saying that the disadvantage of grid detection lies in the fact that it imposes more damping than does anode bend. This appears to be due, not entirely to the grid current which flows during rectification, but also to the Miller effect. This is an anti-reaction effect, resulting from feed-back at H.F., due to inter-electrode coupling between grid and anode.

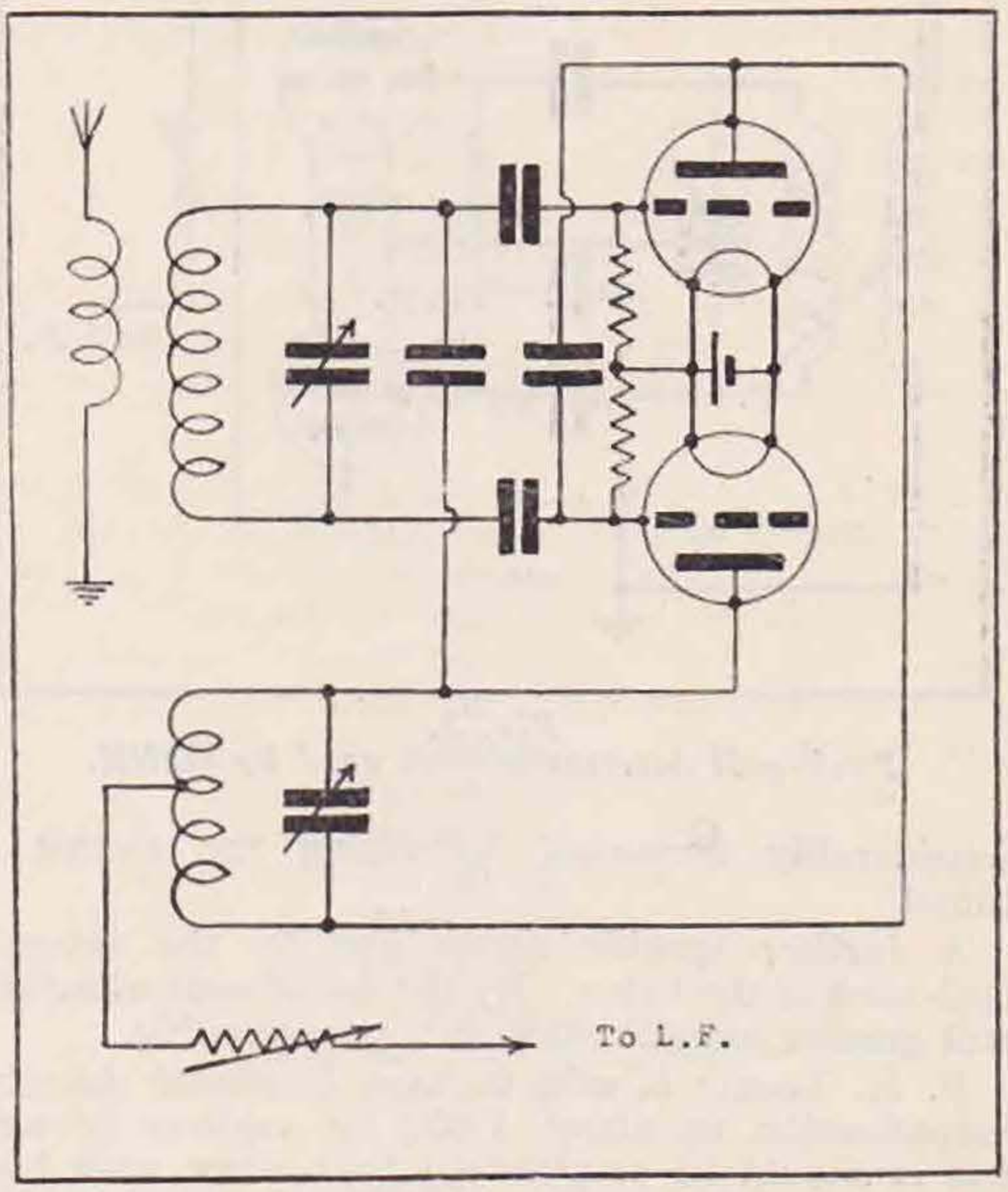


Fig. 2.
Neutralised push-pull detector circuit.

One method of overcoming this form of damping is to use two valves with anodes in parallel and grids in push-pull. With this arrangement there is no difference in potential between the anodes, each being in effect at earth potential to H.F., and consequently no feed-back can take place. If the reaction coil is omitted, only desirable features remain.

The circuit evolved by G2NK is shown in Fig. 1, the resistances R being 0.5 megohms each.

This investigation follows out the results obtained by Greenwood, and published recently in *World Radio*.

BRS865 has also conducted some useful experiments with push-pull detectors designed to overcome the need for normal reaction methods. He points out that in theory it is possible to push reaction to such an extent that the effective resistance of the stage becomes zero, and the amplification therefore infinite. By still further increasing reaction a condition of negative resistance arises at which point the circuit gives power, and is then doing no useful work. Oscillation will occur as a consequence.

The reason why infinite amplification is never obtainable (40 to 50 is about usual) is because oscillation occurs before the resistance of the circuit can be cut down to any appreciable extent, and is brought about by virtue of the fact that the reaction coil is not tuned to the received frequency. If a condenser is connected across the reaction coil, then the amplification should be

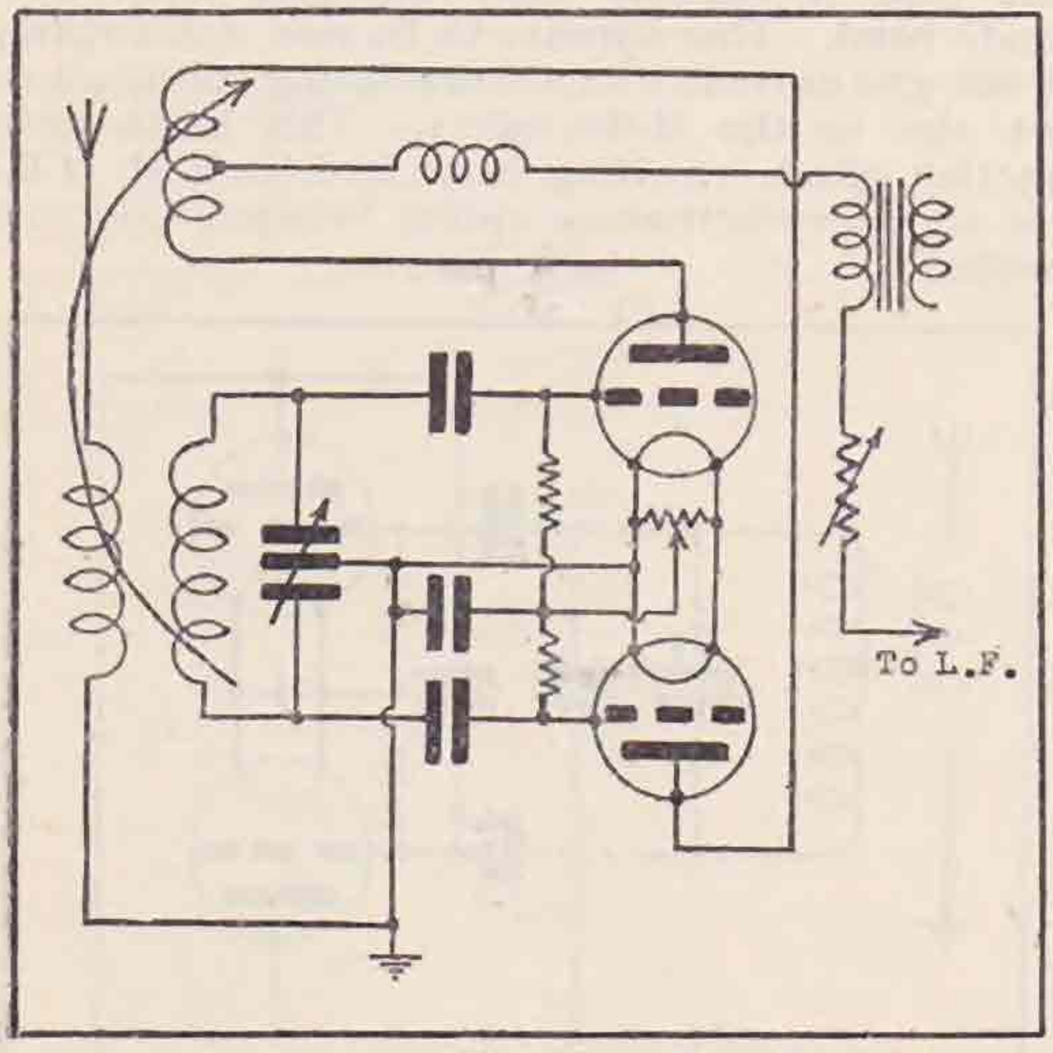


Fig. 3.
Push-pull detector circuit used by G2NK.

considerably increased, providing the circuit is tuned.

A further trouble arises due to the internal feed-back of the valve. By the use of neutralisation, still greater amplification becomes possible.

P. K. Turner is said to have increased detector amplification to about 1,000 by various devices, but it should be emphasised that when such high gains are attempted, "pulling" between the tuning condenser and the reaction circuit condenser is likely to occur. Furthermore, neutralisation can only be arranged to hold good for each frequency by using an additional control.

The solution, therefore, seems to lie in the use of a push-pull arrangement, and the circuit used by BRS865 to achieve this end is shown in Fig. 2. In this, neutralising condensers have been arranged between the grid and anode of opposite valves.

From these remarks it will be seen that in theory a push-pull detector device appears to be the solution of our detector problems, but in order to put theory to a practical test, two widely differing circuits were carefully built up, for the purpose of making a direct comparison with orthodox one-valve detectors.

The first developed by G2NK is shown in Fig 3, and with this arrangement definitely better results were obtained on all bands, particularly 14 and 28 mc.

The second designed by BRS1006 is illustrated in Fig. 4. In commenting on this arrangement, the designer mentioned that damping is considerably reduced, thus giving greater selectivity and sensitivity. Distortion is more easily avoided than is the case with normal detectors.

Ultra High Frequency Groups (No. 7).

G6XN (Manager).

My apologies are due to *7C* for omitting to pass on their report for last month's notes; owing to pressure of work and seasonal activities, the matter was overlooked till too late. No reports (except from G5MG and G5VY) have been received by the G.C.'s of *7A* and *7B* during the last two months, but *7C* continues to receive splendid support, all but one member reporting last month. May I appeal to the other groups not to let them have it all their own way?

No letter budgets have been possible for some time in *7A* and *B*, and some person (or persons) unknown in *7A* has the last four budgets in his possession. The International Budget has been more successful, having now completed the first round. It includes welcome contributions by PA0QQ, EAR12, and OZ2P, and it is proposed to give a brief résumé of the contents. Contributors in counties not yet represented are urgently desired.

Great enthusiasm exists in Holland, in spite of the absence of hills. Activities started in 1931, when PA0BL/0BP received signals from their transmitters at 14½ miles, using aerials in the roof of their car. In 1932 about a dozen stations were on 56 mc., and field days were held. PA0OF and 0QQ conducted ambitious tests with a parabolic

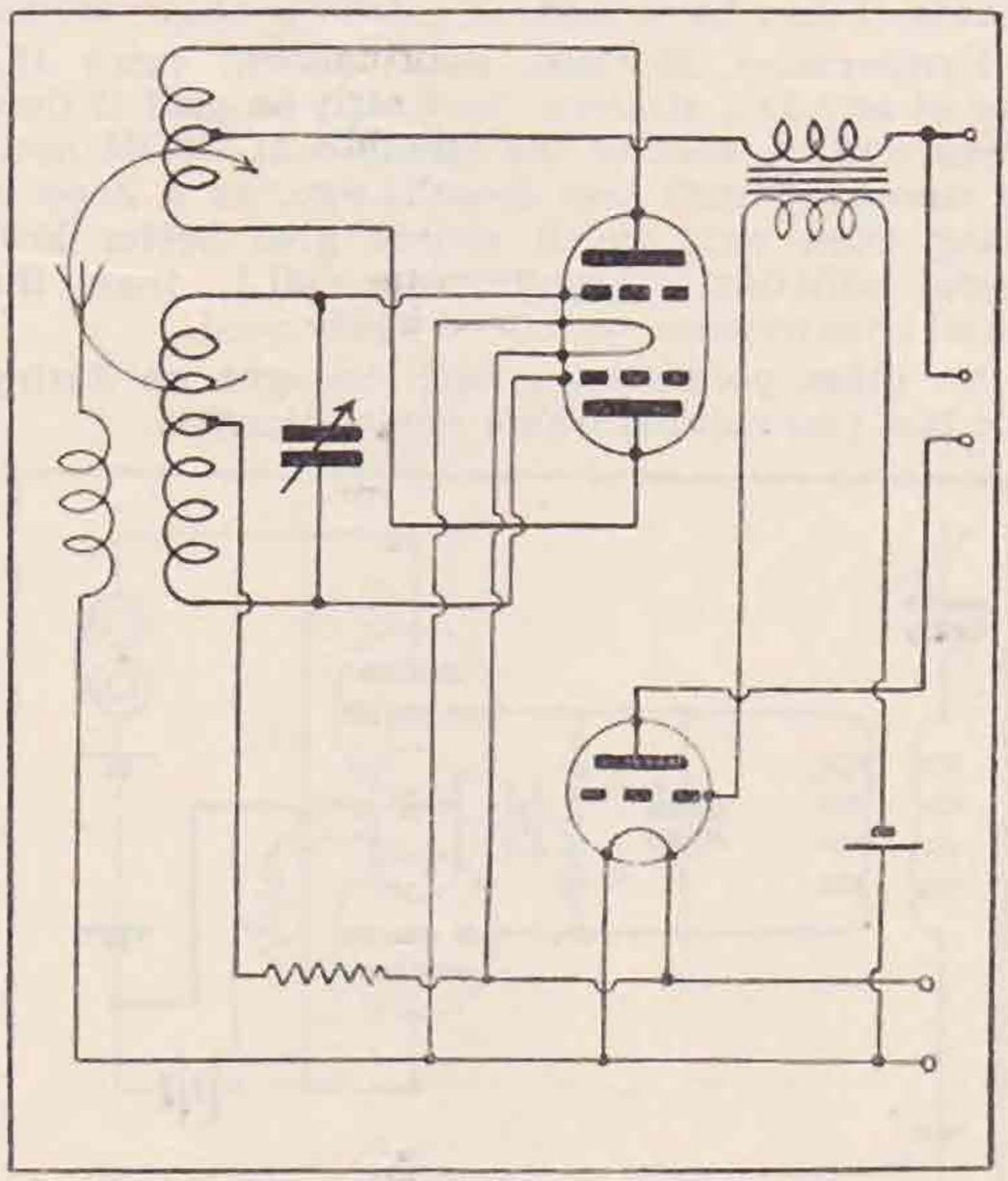


Fig. 4.
Class B detector circuit used by BRS1006.

reflector, which increased signal strength from R3 to R8! The antenna and eleven reflector wires were each half-wave vertical. Three reflector wires only, one quarter wave behind, the others half-wave either side of the antenna, were found nearly as effective. Transmissions were conducted by XPA0QQ from a 240 ft. high gas container, and received at 23 miles with 30 ft. high BCL aerials; also with a 2 ft. aerial inside a car driving at 40

m.p.h. at a distance of 15 miles. PA0DO, on a church tower 135 ft. high, was worked at 37 miles with R8 signals. These are the most outstanding results obtained, but much local phone work has been carried on. All this seems to prove that hills are not as essential as is generally supposed for reliable work on 56 mc., or if DX is proportional to height, we should cover 500 miles at R8 from, say, Snowdon.

There is as yet no activity in Spain, but EAR12 is expecting to arouse interest.

In Denmark several stations have gear in operation, but only short-distance work has been attempted, and interesting experience gained of screening by houses, etc.

7*A*.—An interesting report is to hand from G5VY and 5MG, who mention that VK2ME, broadcasting on 7 metres, has been heard in Auckland, N.Z. (*vide* Australian Radio News). Another interesting item is that VK2NO and VK2SA (Sydney) have observed a peculiar echo attributed to reflection from the Sydney Harbour Bridge. G5MG has been experimenting with aerial couplings, and finds no difference (given correct adjustment), between 1 turn 6 in. diam. coils for plate and tank, and a 5-turn tank and 1½-turn coupling coil of 1¼ in. diameter. It was necessary to keep the L/C ratio as high as possible, the values given being correct for SP55R and PV610 valves.

The G.M. has had no opportunities for activity of late, but hopes to resume early in March. In the meantime it is hoped that other members in the group will, even if in like case, forward their views.

7*C*.—The letter budget still continues to receive good support. BRS686 using an 0-v-1, plus quench receiver, finds that by making the two quench coils variable it greatly reduces the interfering noise level. The daily schedules between G6MF and 6SR were not satisfactory, as strength varied from R1 to R7 for no apparent reason.

BRS1082 has heard G6ZX at R7 (distance approximately 2 miles), and gives particulars of a triplex fone QSO between G6ZX, 6YG, 6ZU. G6DO reports active again and with the co-operation of G6OM and 2AGT has completed an MO.PA transmitter.

BRS877 has been working on a scheme for collecting data on 56 mc. work. G.C., GI6TK, is building a 1-v-1 quench receiver; he also wishes to thank the members of the group for their support of the Letter Budget, and to remind them to send in their reports by the 14th of each month.

A.A. Group (No. 8).

G2KV (Manager).

Out of 7 members applying for formation of this group, 3 have so far replied to a prospectus and questionnaire sent out! It is hoped, when sufficient members are forthcoming, to form sub-groups semi-specialising in :—

1. A.A. design : The L.C.R. network.
2. H.F. measuring devices.
3. Transmitter stage experimental work.

It is thought that section (1) would be best carried out by G members, who could carry out the necessary comparative tests. Those interested in the Group are requested to communicate with G2KV, whose temporary address is 12, St. John's Road, Cambridge.

1.7 M.C. Groups (No. 10).

G5UM (Manager).

(Now that G5UM has returned to active amateur radio, he has resumed the Group Managership of the No. 10 groups. During his absence from the ether, G6FO was to have carried on, but he, too, had to give up for business reasons. Until G5UM returned, the good work had been continued by G5VT, who has now gone back to Group 10*C*.—G6PA).

10*A* is concentrating on the DX propagation of 1.7 mc. waves, with particular attention to aerial design. G5FI ,of South Wales, fills the place vacated by G6FO, while G6YJ, of Newport, has added his strength as supernumerary to 10*A*. G2YI hopes to erect a full-wave 160-metre antenna. (Sounds interesting. More information later, I hope—G5UM), while G5RX seems to have solved the aerial problem, having worked numerous European countries, including Sweden and Norway. He reports a very definite skip effect on the band. "The further my signals go, the louder they get," he remarks.

G5WU is rebuilding, but hopes to do some interesting aerial tests. G5UM has a half-wave 80-metre Zepp, and expects it to do good things on 1.7 mc.

10*B* is also interested in DX propagation and aerial design, as well as in the problem of keying 1.7 mc. sets without interference to BCL's. G6UJ and G6OF are rebuilding, while G.C. (G600) now has a driven outfit for 3.5 mc. and 1.7 mc. G6FJ, of Chingford, joins the group.

10*C* has been engaged in discussions on microphones. The G.C. (2AQW) describes a simple but efficient Reisz type, about which he hopes to write a description for the BULLETIN. Considerable interest has been shown in a carbon microphone, described in *Practical Mechanics*, in which a cellophane diaphragm is used. The experience of most of the members of the group is that this material is ideal for use as a diaphragm, but unfortunately, owing to its moisture absorbing propensities, it will only "stay put" for a very short time.

G5JV continues work with his moving-coil microphone. He says : "If a very light diaphragm could be constructed so that there would be a fair output in the upper register, and providing that the diaphragm resonance could be made somewhere in the middle of the range and be of a simple form, tone correction could be used to advantage. Mechanical damping of the resonance seems to be of no avail."

G2XP submits some very interesting material on ribbon microphones, and G5JV promises some further information on the subject next month.

Stray

The Austrian yacht "Ikaros" will shortly be sailing on a cruise of the Eastern Mediterranean. She will carry both long and short-wave apparatus, and the operator will be the well-known Austrian amateur F. Haas (OE1FH). He is taking his own gear with him and hopes to get into touch with amateurs in this and other countries. The call-sign on S/W will be XOE1FH, and the official call, OEAK. The exact date of sailing has not yet been decided upon.

Let your D.R. hear from you.

NOTES and NEWS from the BRITISH ISLES

DISTRICT REPRESENTATIVES.

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

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

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

DISTRICT 4 (East Midlands).
(Derby, Leicester, Northants, Notts.)
MR. W. W. STORER (G6JQ), 28, Blanklyn Avenue, Leicester.

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

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

DISTRICT 7 (Southern).
(Berkshire, Hampshire, Surrey.)
MR. E. A. DEDMAN (G2NH), 63a, Kingston Rd., New Malden, Surrey.

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

DISTRICT 9 (Eastern).
(Essex, Norfolk and Suffolk.)
MR. F. L. STOLLERY (G5QV), Beaumont Hall Hotel, Clacton-on-Sea, Essex.

DISTRICT 10 (South Wales and Monmouth).
MR. D. Low (G5WU), "Nantissa," Westbourne Road, Penarth, Glamorgan.

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

DISTRICT 12 (London North).
Mr. S. BUCKINGHAM (G5QF), 19, Oakleigh Road, Whetstone, N.20.

DISTRICT 13 (London South).
MR. H. D. PRICE (G6HP) 12, Hillcrest Road, Sydenham, S.E.26

DISTRICT 14 (London East).
MR. T. A. ST. JOHNSTON (G6UT), 28, Douglas Road, Chingford, E.4.

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

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

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

DISTRICT 18 (East Yorkshire).
(East Riding and part of North Riding.)
MR. T. WOODCOCK (G6OO), 8, George Street, Bridlington.

SCOTLAND.
MR. J. WYLLIE (G5YG), 31, Lubnaig Road, Newlands, Glasgow.

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

DISTRICT 1 (North-Western)

THE new D.R. takes this opportunity of congratulating the C.R.s responsible for the healthy condition of activities in and around the Manchester and Liverpool areas. Especial thanks are due to Mr. Davies (G2OA), the late Cheshire C.R. The D.R. will shortly be recommencing work on 7 mc. and hopes to regularly contact district members. News from Westmorland and Cumberland is required.

The usual monthly meeting was held in Liverpool on January 17, at which 17 enthusiasts were present. The new appointments of D.R. and C.R. were discussed and full support promised by all members. The National Field Day was mentioned and after some further discussion G2OA,, 2RF and 6CX were asked to take in hand the preliminary arrangements. After disposing of these matters the meeting considered the question of B.C.L. interference and many interesting views were expressed. G5MQ gave a résumé of the experiments he has been carrying out in connection with a 100-watt 'phone and C.W. transmitter, and explained that a simple wave trap tuned to the frequency of the interfering transmitter and connected in the aerial circuit of the broadcast receiver has been found to cure the trouble in all cases, and even in the case of a receiver having its aerial only twenty yards from the transmitting aerial. Several members gave particulars of their own experiments in this direction, and it was generally agreed that frequency stability (preferably by crystal control) was essential, that over-modulation of the transmitter must be avoided, and that in such circumstances no trouble should be experienced by B.C.L. listeners in curing interference by simple and inexpensive means.

A debate with the Manchester group has been provisionally arranged for the next meeting on February 21, the subject of the debate being "160 metres *v.* 5 metres."

The Liverpool meetings are held at 56, Whitechapel at 7.30 p.m. on the third Wednesday in every month, and all who are interested, whether R.S.G.B. members or not, will be welcomed.

An attendance of 17 was recorded at the Manchester meeting at Brookes' Café, 1, Hilton Street, off Oldham Street, on January 3. These meetings are held on the first Wednesday in each month.

At the February meeting, G6JN gave a talk on direction finding, whilst on March 7, G2DH will open a debate on the value of H.F. amplifiers in short-wave receivers. G5YD will reply.

For the benefit of members who are unable to attend these meetings, G2OI will transmit on 1,820 kc. at 00.45 G.M.T. on February 18 to give details of visits arranged and other items of local interest. This transmission will be repeated fortnightly at the same time.

Members interested in a letter budget are asked to communicate with G2OI immediately.

G2DH, 2DF, 2RA, 2WQ, 5AL (ex BRS767), 5CT, 5WR, 5YD, 5ZT, 6AX, 6GV, 6JN, 6QA, 6ZS, 6ZU, 2AOG, 2AOU, and BRS770 are active. G2OI has raised his first VK and first W5. He has now worked all U.S.A. districts, and by his VK QSO qualifies for W.B.E. He thanks all members who elected him C.R.

DISTRICT 2 (North-Eastern).

The next meeting in the Sheffield area will be held on February 16 at 8 p.m. in The Angel Hotel. Morse practice is given at these meetings.

There is little to report from the Middlesbrough and South Durham area, but regular fortnightly meetings continue to be well supported. A suggestion has been made that a District Letter Budget should be started. Interested members should communicate with G6CV.

Twenty-five members were present at the January meeting of the Newcastle local Society (N.E.A.T.S.). In order to still further improve the usefulness of the Society an active committee has been appointed, with G2PN chairman, G2TJ vice-chairman, G5QY hon. secretary and treasurer, and 2AWA, BRS1057, G2CO members of the committee. The membership of the Society is now 42.

All areas report interest in N.F.D. plans, and it is hoped to have two stations in active participation.

DISTRICT 3 (West Midlands).

Mr. G. Brown (G5BJ) reports considerable activity in Warwickshire. Several stations have completely rebuilt for the B.E.R.U. Contests, including G6DL, 5VM and 5BJ. G5ML has a constant impedance aerial on 7 mc. and a Zepp on 14 mc. G6XJ finds 1.7 mc. poor, so is building a 56 mc. outfit. He reports receiving £6 from the M.A.R.S. annual dinner, which sum has been handed to the Toc H Christmas Toy Fund. G2AK entered for the 1.7 mc. contest, but had little success. G5BJ is building a "ham" band all-mains super, using 7-pin H.F. pentodes ("BULL." article please, OM!—ED.). G6KI has been running a schedule with VK, whilst G6AS is willing to make schedules with any station on 7 mc. He will appreciate reports. Staffordshire members are asked to report their activities to G6NJ, the new C.R.

Full details of the Annual Conventionette will be found in the district calendar.

DISTRICT 4 (East Midlands).

The D.R. is pleased to note an increase in interest on the 3.5 mc. band amongst District members. This is an ideal band for local work and for limited DX. Those desirous of obtaining permission to operate on 3.5 mc. are requested to forward an application, setting out technical reasons for requiring same, to the D.R. Regular schedules between members in No. 4 will do much to keep us all in touch.

The District was well represented in the Senior B.E.R.U. Contest, and by the time these notes are published all will be set for the Junior event. Rumour hath it that Nottingham intend to bring the trophy to their town. Good luck, OM's.

From Derbyshire, G2SD reports an increase in activity and that meetings are well supported. BRS1328 and 1331 are welcomed as new members and the active list includes G2GU, 2SD, 5HT and 2BOW.

G5VN reports that the Leicester Amateur Radio Society continues to make excellent progress, an average attendance of 58 being recorded over the past few months. At the time of writing the membership of this virile society has reached 70. Numerous instructive lectures have been given recently by representatives of commercial firms. G2CZ, 2JW, 5VH, 6JQ, 2AFM, 2BVN and BRS884 are active.

G2IO reports much activity in Notts with G2IO, 2OC, 2VR, 2CX, 5YP, 6DS, 6KQ, 6PZ and 6MN on the air regularly. 2BFF awaits his call. BRS1155 is now 2BXC. From Northants. G5YF advises that BRS1018 is 2BXG and 2APT is applying for a full call. The Kettering Society continues to make good progress.

SPECIAL NOTICES.

The annual dinner and dance of the Kettering Society will take place on February 22 at the Royal Hotel. Tickets, 4s. 6d. each, from G5YF. Dress optional.

The annual dinner of the Leicester Society will be held at The Turkey Café, Granby Street, on April 10. Further details will appear next month.

DISTRICT 5 (Western).

The D.R. hopes to report each month upon the activities of the members in each of his counties. It would greatly assist if all members would kindly report to their C.R.'s by the 20th of each month, and the C.R.'s to the D.R by the 25th. Special late news of general interest may be forwarded direct to the D.R. up to the 28th.

The annual Gloucester county dinner was held at the Full Moon Hotel on January 20, when Capt. G. C. Price, G2OP, late D.R., was entertained as the guest of the evening. There were over thirty present and a most enjoyable evening was spent

At the January meeting of the Bristol Section, Mr. J. N. Walker, G5JU, was elected C.R. for Gloucestershire.

At the next meeting on March 1 Mr. W. A. Andrews, B.Sc., A.I.C., G5FS, will lecture on "The Story of Matter," illustrated by experiments. The C.R. trusts all members will attend this special lecture.

The Bristol section will supply and operate the necessary apparatus for N.F.D. on the 7 and 14 mc. bands.

The Gloucester section now hold their meetings at The Talbot Inn, Southgate Street, Gloucester, on the first and third Wednesdays of each month at 7.30 p.m. This section will supply and operate

the necessary apparatus for the N.F.D. on the 1.7 and 3.5 mc. bands, and all their members have promised to assist. All members in this area are active on all bands, and the B.E.R.U. and low-power contests are occupying their time and minds. Mr. J. W. Hamilton, G5JH, has kindly consented to act as sub C.R. for Gloucester, this being necessary owing to the members being definitely located in two distinct centres.

The Wiltshire members are also active and pool the results of their experimental work through the medium of their Letter Budget. This Budget shows that the dozen contributors thoroughly understand the research work they are now collectively carrying out and great credit is due to G2BI for such an excellent effort.

The Oxfordshire membership under their new C.R., G5LO, have brightened up considerably, and most of the members are either on the air or rebuilding. The following have been very active and have done good work :—G2CL, 2OU, 5LO, 6QQ and BRS1140, 1230 and 1284.

No report was received from the North Somerset section, as this being a new section to this District, no C.R. has yet been appointed.

DISTRICT 6 (Western).

The budget is still going strong and all books are keeping well up to time. Well done, OM's! It seems that practically all the members in the district are active and interested in some branch of radio. Naturally, with its chances of DX comparatively free of QRM, 14 mc. is the chief centre of interest, but the other bands and other lines of research are attracting quite a lot of attention. The 3.5 band seems to be increasing in interest, and the D.R. expects that very soon it will be possible to hold many District QSO's on this band. At present, however, fading, even at short distances, is troublesome.

One of the outstanding events of the month was the tea rag chew held at Exeter on January 21. This is intended to be the first of a series of informal meetings held in different parts of the district at various times. The meeting was well attended and a very enjoyable and profitable evening spent. A large number of points were dealt with, and of these the most important was that raised by G5QA, that in matters affecting the general policy and conduct of the Society the D.R.'s should hold voting power in proportion to the number of members in the district. It was also considered that a more definite lead should be given by Council, through the medium of the Bulletin, in matters of research. It is hoped that at Conventionette these points will be further discussed. N.F.D. was also very fully considered and a line of policy suggested. Final arrangements will be made at the Conventionette.

The crystal register is still in process of compilation. Will those members who have not already done so please send in their crystal frequencies ?

The following are known to be active :—G5GD, 5WY, 5QA, 6RP, 5YR, 5SY, 5VL, 6II, 2HF, 6XD, 6KC, 5YB, 2FN, 6QH, BRS638, 1089, 958, and 836.

DISTRICT 7 (Southern).

The D.R. takes this opportunity of apologising to those who were misled by the meeting notice that appeared in last month's Bulletin. The "February" meeting was held at Farnborough on January 28 instead of the first Sunday in February. This alteration was made to enable those entering the Senior B.E.R.U. contest to have the full time on the air. All regular attendants were notified by post of this alteration.

The January meeting was held at G2YL's QRA and attracted a record district attendance of 49 members and friends. Mr. R. Weston gave another interesting cathode ray demonstration on measuring percentage modulation. Unfortunately the experiment was carried out on G2YL's 14 mc. transmitter, and it was found very difficult to exclude H.F. currents from the tube. Luckily the fault was soon noticed, and the early demise of the tube prevented !

A discussion on N.F.D. followed, and it was decided to run the 7 and 14 mc. stations at Walton-on-the-Hill, as last year, but to cater for the members in the southern half of the district the 3.5 and 1.7 mc. transmitters will be situated in the Guildford or Farnham area. A committee was formed to develop the plans further, and due notice of the exact venues will be given later.

The March meeting will be held at the Hand and Spear Hotel, Weybridge. Surrey, on March 4, starting at 2.30 p.m. This venue is adjoining Weybridge Station, and suitable trains leave Surbiton and Guildford at 2.10 and 2.8 p.m. respectively.

The April meeting will be held at Guildford on April 8, instead of April 1, as this latter date is Easter Sunday.

Fuller particulars will appear in the next issue of the Bulletin.

DISTRICT 8 (Home Counties).

A pleasing feature this month is that all C.R.'s have sent in reports. Although they contain nothing of outstanding interest they show that there exists a certain liveliness in the district.

The D.R. is glad to find the few Hunts members taking part in the district's activities and are undertaking the RX side of one of our N.F.D. stations. The proposed rules for this latter event contain one or two important innovations which have already aroused criticism in certain quarters. If any member has any pet ideas on the subject, write to the D.R. at once. Don't wait until the rules appear in print and then start to grouse.

By the time these notes appear in print the first meeting in the Watford area will have taken place. May it be the first of many.

Mention must also be made of the Herts-Bucks letter budget, No. 2 of which is now circulating. This looks like playing a great part in keeping up the enthusiasm of our somewhat scattered membership and with the prospect of more contributors it should get considerably more bulky.

In these notes for December the D.R. urged the Cambridge group to ginger up their letter budget. It has not turned up at his QRA yet. Why ?

DISTRICT 9 (Eastern).

A meeting is being arranged at an early date in Norfolk in order to get together the outlying members in this county for a discussion and rag-chew. Will those interested please drop a line to

G2XS giving their views and ideas as to the day of the week most suitable ? Fakenham has been suggested as a meeting place.

G2XS and 5UF are only awaiting QSO with VK or ZL to compete for W.B.E. G2JS (King's Lynn) is operating on 3.5, 7 and 14 mc. A welcome is extended to BRS1291. There are a few active transmitters in the county who have not yet reported. Please send a card to the C.R. before the 25th.

G2TO, one of the very early transmitters, may recommence activities shortly at Bury St. Edmunds. G6BT is active, but has heard little of any other stations in this county.

From Essex G5UK reports that 56 mc. tests were carried out on Boxing Day, but there was little support ; G2DQ, 5UK and 2BWP being the only active stations in Essex, whilst we have to acknowledge with thanks the assistance of the Kentish stations G2IG, 5MM and 2OV. Unfortunately only G2IG was heard and no Cross-Thames QSO was effected.

The December meeting was held at G2KT, Rayleigh, when G2LZ, 2YI, 2WG, 5UK, 5VQ, 6CT, 6IF and 2BWP (ex BRS1011) were present. The January meeting was held at G2YI's, when we were able to congratulate in person G2DQ for his achievement in the 1.7 mc. contest. Speaking of the 1.7 mc. contest, we wish to mention the sportsmanship of all but one of our local members in keeping off phone during the contest.

The next meeting is to take place on Wednesday, February 21, by courtesy of G5VQ, of Westcliff-on-Sea. Here is a chance to see the gear and the op. who has so many 14 mc. W's on his conscience !

May we dispel a misunderstanding ; these meetings are for *all members* of the R.S.G.B. ; it does not matter how many figures or letters your call has !

The C.R. has noted the following stations on the air :—G2DQ, 2LZ, 2KT, 2WG, 2YI, 5VQ, 5VS, 5QV, 6CT, 6IF, 6KV, 6OA, 6WG.

DISTRICT 10 (South Wales and Monmouth).

The usual monthly meeting was held on January 17 at the Queen's Hotel, Newport, and it is very satisfactory to note that the District was represented by all members other than one, of those able to attend. For information, please note that future meetings will be held on alternate Wednesdays and Thursdays at the Queen's Hotel, Newport, at 7.30 p.m. Unless members are advised to the contrary, the date selected will always be that Wednesday or Thursday nearest the 15th of the month. It is hoped the members unable to attend on previous occasions will take advantage of the new arrangement.

Swansea members appear to be particularly silent this month, and it is hoped some useful reports will be received in time for the next issue.

Reports from Monmouthshire indicate considerable activity. The most interesting is from G6GW, who is evidently the most successful member on QRP work in the District. He reports working SM7YG at 00.10 G.M.T. on January 15, with an input of 0.7 watt, the signals reported, W4, R3, T9, SM7YG using 60 watts, being received W5, R5, T9. A peculiar incident in connection with this contact was the fact that SM7YG's signals were completely wiped out at 00.20 by what appeared to be a local static storm, also observed by G5BI. Is there any connection between these two incidents ?

Your D.R. would like to specially mention that he is anxious to use these notes for items of interest, and in particular items of practical help and value to members. Reports giving results obtained with new gear or any particular line of experiment would be appreciated.

Please note, however, that your C.R.'s in any case would like a line from you by the 25th of each month.

DISTRICT 11 (North Wales).

Owing to lack of general support, the meeting proposed for February 2 was cancelled. BRS1060 and 1211 are joining the 1.7 mc. C.B. Group, following remarks in the group notes regarding the lack of BRS support. G2II is taking part in the Senior and Junior B.E.R.U. contests, while BRS1060, 1211, 1156 and 1303 are entering the Receiving Contests.

G2II is preparing for N.F.D. on 7 and 14 mc., while G6IW and the Prestatyn group will soon be starting the construction of their " A " station.

Ragchews are held regularly at G6IW on Sunday evenings at 19.00 G.M.T., and the D.R. would be very glad if all members would endeavour to put in an appearance (newcomers, the *dog* is safe if you come to the front door !).

DISTRICT 12 (London North).

Over twenty members were present at the January meeting, when Mr. and Mrs. Radford, G2IM, acted as host and hostess. In the absence of the D.R., G6CL conducted the business side of the meeting during which it was decided to arrange the February meeting on the 27th at a local café. This decision was reached because it is generally felt that with increasing attendances, it is unfair to trespass on the generosity of a few members who in the past have volunteered to entertain the district. In the event of a suitable venue not being found, Mr. W. E. G. Brigden, G6WU, 13, Winchmore Hill Road, has offered to act as host. Advice as to final arrangements will be sent to all who *regularly* attend these meetings. Mr. D. N. Corfield, G5CD, will give the technical talk on this occasion.

Following the business discussion G6CL briefly described the history of his station and gave information of interest to those newly licenced. Several new members were welcomed, and Mr. Reid, G5DV, congratulated upon obtaining his full call.

The District Letter Budget for January was fairly well supported, but more contributions, especially from new members, are invited. Closing date is the first of each month.

DISTRICT 13 (London South).

It is understood that by the time these notes are read Council will have appointed Mr. H. D. Price (G6HP) as the successor to Mr. A. Gay (G6NF), the late D.R. We offer our congratulations to G6HP, and hope that his term of office will be a successful one.

We have also had another change in the personnel of the S.L.D.R.T.S. owing to the resignation of Mr. Taylor (2AUG), the Hon. Secretary. Mr. Taylor has been forced to take this step owing to very heavy demands on his time from his business, and we should like to take this opportunity of wishing him all success in his new venture and of thanking him at the same time for all that he has done for the local Society in a year of progress. Mr. Cullen (G5KH) has kindly consented to take over the arduous duties and may be assured of the whole-hearted support of all the members.

We are also unfortunate in losing G6NF as chairman of S.L.D.R.T.S, for his term of office comes to an end in March next. He has been of great help to the Society and to the committee, and we hope will continue to give us the benefit of his advice in the future. G5IS is to take over the office.

The annual dinner took place recently and was well supported by all. Mr. Bevan-Swift was present and entertained us with some yarns of pioneer days in Radio and Motoring.

Visits have recently been made to the Ongar station and to the B.B.C. stations at Brookmans Park and the district may well be proud of the organisation which exists in South London to keep the amateurs of the district together. Can any other local society beat our membership of 56? (See District 4 Notes.—Ed.)

As regards individual activities we have, as usual, to perform the uncovering of bushels from shy (or lazy) lights. G6HP now has a "pretty-pretty" station as befits a married man, and is promising all B.E.R.U. candidates a run for their money. G6QB has rebuilt (also as usual). G6NF is busy with calibration work, but it is hoped may unbend for B.E.R.U. contest. G2JB with 5 watts is doing good work on 7 mc.—so far DX is Egypt. G2JB would like to hear from a district man who has worked DX on low power. G2QD, a new-comer to the district, is heard working all Europe on low power, and G2HG is doing wonders with QRP in Sydenham.

The need for my existence as a temporary scribe will have vanished with the advent of the new D.R., so I will say adieu, and disappear into the obscurity from which I came!

DISTRICT 14 (London East).

At our last meeting held at G6LL the usual business was rather late in starting owing to our esteemed secretary giving an impromptu treatise on Philately; it is anticipated that at our next meeting "swapping" will be indulged in! The D.R. received many promises of apparatus for N.F.D. gear; members not at the meeting are asked to get in touch with him at an early opportunity.

G6CL announced that Slow Morse sending has been kindly authorised by the P.M.G.; for details see elsewhere in this issue. It is hoped that as many members as possible will join in the B.E.R.U. contests. Our next meeting will be held at 7.30 p.m. on Tuesday, February 27, at 28, Douglas Road, Chingford, E.4.

DISTRICT 15 (London West and Middlesex).

In spite of one of the worst fogs of the year and a local railway smash, fourteen members showed their enthusiasm by turning up to the January meeting.

This month's only written report has arrived from G2NN, who held a licence in 1914. His letter describes his activities at cable stations on lonely islands since that date. He is at present busy with phone experiments. G6LJ reported *via* the ether that he has worked VU, W and ZD on 7 mc., while G6VP has managed some DX. G6WN have raised VPU2 on 7 mc. and a few of the more nearer stations. We are sorry to lose 2BFQ, who leaves us to take up residence in Croydon, but we hope he will find time to visit us occasionally.

DISTRICT 16 (South-Eastern).

Activity in Kent is increasing. From Folkestone G2IC (Kent C.R.) states that he has been unsuccessful with his VU2FY schedule, although BERS74 has heard his signals in Quetta; 2ASC, 2BAX, and 6XB are active; BRS1308 (Mr. Clout) is welcomed as a new member. The C.R. visited 2AZJ at Ashford recently and regretted missing 2AXY.

G5MP is using two 4211 valves in push-pull and finds they need very little drive, although showing a tendency towards parasitic oscillation. Two .01 condensers across the filaments with centres earthed overcame this trouble. Both he and G2JN did well in the 1.7 mc. contest, scoring 42 points each. G2JN with an input of 5 watts, has worked VK, 2C, SU and FM. G6PA has been testing microphones when C.B. business has permitted.

From Tunbridge Wells G5OQ reports working KA1AA (Kabul) with 7 watts. 2BAW, 2BPJ, BRS1146 are active; the latter and 2BAW are experimenting with television. Nine members were present at the last North Kent meeting, when a discussion took place on the theory of calculating transmitter and rectifier efficiencies. In this area, G2GB, 2QR, 5LB, 5OJ, 6WY, 2AWT and BRS1142 are active. G2GB has received a 14 mc. reception report from VK when testing on 7 mc.

From other parts of Kent G2KL, 6AI, 6NS, 2BPQ and BRS584 report.

The Medway area is still one of the "hotbeds" of amateur interest with G2MI, 6VK, 2IG, 5FN, 6QC, 6NU, 2CS, 5MM all busy. G2IG has been in phone QSO with SU1EC and VU2DX.

The Sussex C.R. (G5JZ) reports an increase of interest in his county. G2AO's new aerial mast is complete with a ladder inside; he is building a television transmitter for films. G5JZ hopes to build a Minon screw receiver for television shortly. BRS1173 has logged numerous W's on 3.5 mc. G2AX and 2KV are active.

Forthcoming Contests

February 17, 18, 24 *and* 25.
Junior B.E.R.U.

March 3, 4, 10 *and* 11.
Low Power.

March 24 *and* 25.
1.7 mc. Transmitting.

Will members please note that the District Conventionette will be held on Sunday, May 27, at Larkfield Road House, Larkfield, near Maidstone? Full details will be published later, but here and now open your diary and reserve the date.

DISTRICT 17 (Mid.-Eastern).

The members of the reorganised District met for the first time this year on January 21 at Cranwell.

Through the courtesy of the Commanding Officer they were permitted to inspect the Wireless and Electrical Training School of the Royal Air Force and to observe fully equipped planes.

DISTRICT CALENDAR

February/March, 1933.

February 21. District 5. At Talbot Inn, Gloucester, at 7.30 p.m.

February 21. District 9. At G5VQ, 125, Westbourne Grove, Westcliff-on-Sea, at 7.30 p.m.

February 22. District 4. Dinner and Dance organised by the Kettering Radio and Physical Society, at Royal Hotel, Kettering, at 7.15 p.m. Dress optional. Tickets, price 4s. 6d. each, from G5YF.

February 27. District 12. Venue to be announced by postcard. Talk by G5CD.

February 27. District 14. At G6UT, 28, Douglas Road, Chingford, E.4, at 7.30 p.m.

February 28. District 15. At G2LA, 303, Staines Road, Twickenham. At 7.30 p.m. Discussion on a recent BULLETIN article.

March 1. District 5. At Full Moon Hotel, Bristol, at 7.30 p.m. Lecture, "The Story of Matter," by G5FS.

March 4. District 7. At Hand and Spear Hotel, Weybridge, at 2.30 p.m.

March 7. District 5. At Talbot Inn, Gloucester, at 7.30 p.m.

March 18. District 3. Annual Conventionette, at Hope and Anchor Hotel, Edmund Street, Birmingham. Assemble 11.45 a.m.; lunch, 1 p.m.; business meeting, 2.45 p.m.; tea, 4.30 p.m. Tickets from Mr. V. M. Desmond (G5VM), 199, Russell Road, Moseley, Birmingham.

Under the leaderships of G2LR and G5FO, the members commenced a tour at 14.00, which did not conclude until almost 18.00. It is hoped to write later of some of the fascinating equipment which was shown and demonstrated in working order and of the many interesting departments visited, the "ensemble" making up perhaps the most popular outing in the history of the District.

Later, the members repaired to Sleaford for tea and business discussions at the Bristol Arms. (The bread and butter machine is now being overhauled on account of slightly seized bearings.) The following members were present:—G2LR, 5FO, 5XL, 5CY, 5BD, 2AT, ex-VP3SRB, 6LI, 2BSR, 103, 406, 426, 1044, 1246, 1311, and 1323; some 60 per cent. of the District membership. Representatives from the north were unable to appear owing to transport difficulties.

National Field Day plans were discussed, and it was decided that Cranwell and district would take the "A" station and the northern members "B" as last year. Suggested amendments to the rules were approved.

Another meeting was proposed for the beginning of April.

Licence facilities were discussed, as was the possibility of being able to form a new club upon the foundation of the old Lincoln Wireless Society, which was formally associated with R.S.G.B.

Active members not amongst those at the meeting are:—G2QH, 5LQ, 6AK, 6RN, 2BIH, 2BCM. This is an activity of 75 per cent.

It has again been decided that the members of the district stand by on 3.5 mc. between noon and 13.00 each Sunday if they wish to test with one another.

No applications for the renewal of the letter budget have arrived, so that this will not be recirculated.

The D.R. extends the best of wishes to all members taking part in the B.E.R.U. tests this year and hopes that some of the active receiving stations will not forget that there is also a receiving trophy.

DISTRICT 18 (East-Yorkshire).

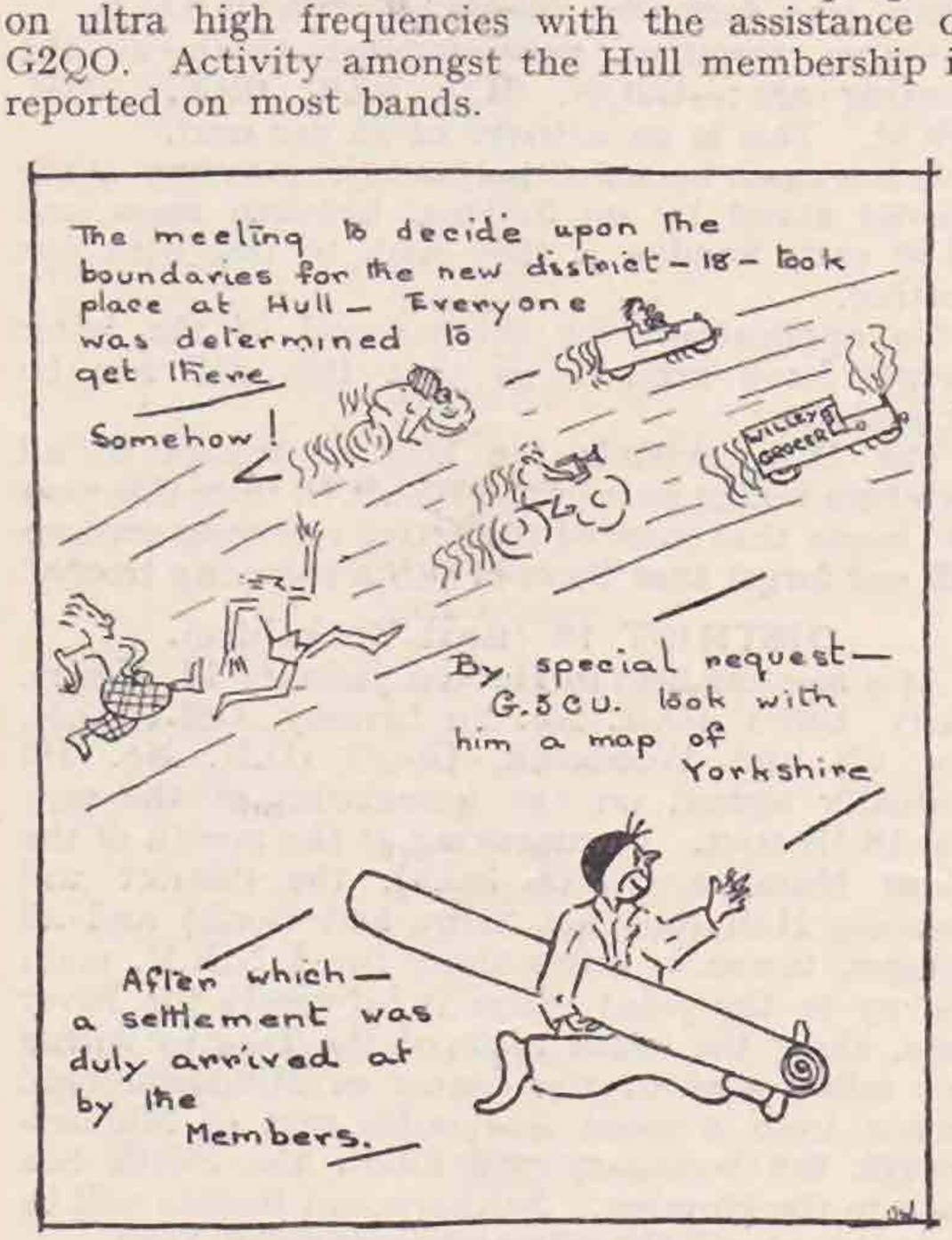
At a meeting held in Hull on January 14, Messrs. Parry, G6PY (D.R. No. 2), Livesey, G6LI (D.R. No. 17) and Woodcock, G6OO (D.R. No. 18) mutually agreed on the boundaries of the new No. 18 District. Commencing at the mouth of the River Humber (North bank), the district will embrace Hull (but not Selby and Goole) and all villages, towns or cities along the L.N.E.R. main line up to the point where it intersects the River Tees, along the south bank of the Tees to within five miles west of the centre of Middlesbrough, thence from a point five miles east of Middlesbrough the boundary will follow the North Sea back to the Humber. Saltburn and Redcar will be included, as will the city and environs of York.

Members in the North and East Ridings of Yorkshire are requested to report in future to their correct C.R.

DISTRICT 18 MEETING AT HULL.
Seated, G6FV, 6PY, 6LI, 6OO, 5CU, 5VO.

At this meeting (attended by 23 members) G6LI presented an official appointment certificate to Mr. Eckles, 2ATK, to serve as a B.O.C. station. Discussion took place regarding N.F.D. rules, and recommendations were made to the Awards Committee. A recuiting campaign for the R.N.W.A.R. was followed by a discussion regarding the Scarborough Short Wave Club and the proposed Hull and Bridlington Clubs. Station visits were made to G6OS, 6OY, and 6UJ.

G5FV reports trouble with his PA valves, but replacements will have put him right for the B.E.R.U. Contests. Work has been in progress on ultra high frequencies with the assistance of G2QO. Activity amongst the Hull membership is reported on most bands.



G5CU is busy with club work and active on 7 and 14 mc. 2AMM requests that those members having a negative of their station photograph should forward it to him, as he is building up a collection of slides to be shown at various meetings. Negatives will in all cases be returned if requested. 2AUN is concentrating on television and rebuilding his modulation panel. BRS1139, 1310, 1316, 1321, 1170, 1178, are rebuilding or active in various directions. G6AW is carrying out fone tests on 7 mc. with G5CU. G5VO had recent trouble with his main power pack, but hopes to be active for the Junior B.E.R.U. tests. G6OF rebuilt his 1.7 mc. Tx, but results so far have been poor, although on other bands using higher power, good reports have been received. G6UJ is active on 1.7, 3.5 and 14 mc., and in the 1.7 mc. contest scored 43 points, although blanketing and blind spotting effects were noted for several hours. 2APU is rebuilding his Rx. G6OO has constructed a new Tx on the lines of the medium power job illustrated in the June and August BULLETIN of last year; Goyder lock has at last been set aside! He scored 33 points in the recent 1.7 mc. contest.

Scotland.

At the time of writing these notes, activity in most parts of Scotland is very evident.

In the recent 1.7 mc. contest, the four Scottish Districts were represented. It is pleasing to note this, as it is the first time that Scotland has been fully represented in any contest. Both G6FN and G6IZ are to be congratulated on their excellent performances, their respective totals being 55 and 54 points.

G6OW and G6VI have suffered bereavement in the loss of near relatives recently, and this opportunity is taken of conveying to them the sympathy of all our members.

Owing to preparations for the approaching B.E.R.U. Contests, no 56 mc. transmissions have taken place from G6YG, G6ZX or G6ZV recently, but it is interesting to note that in response to last month's appeal, one B.R.S. has forwarded a report to G6ZX.

This month another "A.A." member, in the person of Mr. Cattanach, of Grantown-on-Spey, has taken out his full licence. Mr. Cattanach has been issued with the call G2TQ.

Mr. Maxwell, BRS964, of "D" District, has also been offered a full permit by the G.P.O., subject to some further information being supplied.

"A" District has elected its officer for 1934, and for this year Mr. A. C. Brown (G6ZX), Amulree, Clarkston, will take charge of the district. The results of the elections in "B" and "C" districts are expected almost at once.

It is understood that G6UK has changed his address, his QRA now being 34, Netherpark Avenue, Netherlee, Glasgow.

Northern Ireland.

By the time these notes appear the first meeting of those who have expressed an interest in National Field Day will have taken place. There is a considerable amount of work to be done before the event, and those who have not intimated their desire to take part by February 20 will be excluded from the arrangements. It is patent that those who do not bear part of the burden of the work and financial liability cannot expect to enjoy the labours of the others.

Quite a number of Gi's are active at present, but strangely enough there is an almost total lack of reports.

Gi2CN has now completed rebuilding operations, and expects to be on the air in the near future, 6TK has been in contact with TF (Iceland) for the first time. The following are also known to be active: Gi5HV, 5NJ, 5WD, 5QX, 2SP, 5UR, 6YW and 2KN.

Stray.

Mr. C. McCormick, ZU6G, of 8, First Avenue, West Dene, Johannesburg, advises us that he has constructed the 56 mc. transmitter recently described by Mr. Noden (G6TW), and is working on that band every Saturday evening from 8 to 10 p.m. S.A.S.T. He is optimistically looking forward to a Q.S.O. with a G station.

Empire B.E.R.U. News.

B.E.R.U. REPRESENTATIVES.

Australia.—H. R. Carter (VK2HC), Yarraman North Station, via Quirindi, N.S.W.

Bahamas, Bermuda and the Eastern Part of the West Indies.—P. H. B. Trasler, (VP4TA) No. 2 Mess, Pointe à Pierre, Trinidad, B.W.I.

Burma.—W. G. F. Wedderspoon (VU2JB), Government High School, Akyab, Burma.

Canada.—C. S. Taylor (VE1BV), Stewiacke, Nova Scotia; R. Prissick (VE2CX), 27, Bellevue Avenue, Westmount, Montreal, P.Q.; S. B. Trainer (VE3GT), 4, Shorncliffe Ave., Toronto, 5, Ont.; A. E. Howard (VE4CJ), 2401, 25th St. West, Calgary, Alberta; and A. L. Cusden, (VE5HJ), 1465, 17th Avenue, New Westminster, British Columbia.

Ceylon and South India.—G. H. Jolliffe (VS7GJ), Frocester, Govinna, Ceylon.

Channel Islands.—H. J. Ahier (G5OU), 4, Roseville Street, St. Helier, Jersey, C.I.

Egypt, Sudan and Transjordania.—Lt. E. S. Cole (SU1EC), Haking House, Abbassia, Cairo, Egypt.

Hong Kong.—A. P. Rosario (VS6AN), P.O. Box 391, Hong Kong.

Iraq.—M. Goodinson (YI5KM), "A" Bungalow, 203 Squadron, R.A.F., Basra.

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

Jamaica, British Honduras, Turks Island and Cayman Island.—C. M. Lyons, (VP5MK), P.O. Box 36, 12, Port Royal Street, Kingston.

Kenya, Uganda and Tanganyika.—W. E. Lane (VQ4CRH), Box 570, Nairobi, Kenya Colony.

Malaya.—T. G. Laver (VS3AC), Government Electrical Power Station, Johore Bharu, Johore.

Malta.—H. G. Cunningham (BERS.161), H.M.S. "Royal Sovereign," c/o G.P.O., London.

Newfoundland.—E. S. Holden (VO8H), Box 650, St. John's, Newfoundland.

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

Nigeria.—Capt. G. C. Wilmot (ZD2A), Depot Nigeria Regt., Zaria, Nigeria.

North and South Rhodesia.—J. W. Mavis (ZE1JE), P.O. Box 160, Umtali, South Rhodesia.

North India.—2nd Lt. T. H. Beaumont (VU2FP) 1st Batt. Beds & Herts Regt. Jhansi, India.

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

Australia.

By VK2HC *via* VK3WL, ZL4AO and G2ZQ.

The conditions on 28 mc. that provided many local contacts seem to have passed, whilst conditions on 14 mc. have been worse than at any time for years.

In the recent Fisk Trophy contest VK3 finished first, followed by VK2 and VK5. The first three individual stations were VK7CH, 6SA and 5JA. Our new journal, "Amateur Radio," has received an enthusiastic send off.

Canada (Fourth District).

By VE4CJ.

The President's message of greetings, which left London on January 7, was received by VE4CJ 30 hours later *via* G5BJ, VE3WA, VE4EU, W7CPY, VE4ID, VE4DC, VE4GJ and VE4KN. This outstanding achievement was favourably commented upon in the local press.

As a result it is hoped to put into operation a reliable E.L.S. network for Trans-Pacific and Trans-Canadian B.E.R.U. traffic.

Canada (Fifth District).

By VE5HJ.

An excellent example of efficient message handling was recently recorded by VE5HJ. An H.Q. official message of New Year Greetings was received by him five hours after leaving G5BJ, and this in spite of the fact that it went via VE3WA, W7CPY, VE4EU, VE4IO, and VE5EH before Mr. Cusden finally received it.

It is hoped to affiliate the New Westminster and Vancouver Short Wave Clubs with the B.E.R.U. in the near future, and already signs are evident that several local amateurs will be joining as individual members of the Society.

VE5HJ reports that he has frequently heard VP5PZ, but has been unable to effect contact. (How's your receiver, John o.m.?—Ed.)

Ceylon and South India.

By VS7GJ.

VU2JP (South India) at an elevation of 6,300 ft. reports conditions very good, although QRN heavy for the time of the year; 76 countries have been logged, including TI, HR and EC. A weekly schedule has been arranged with VK and G for E.L.S. traffic. He has started a weekly letter budget, and hopes to include Ceylon activities. He is also making a graph of crystal frequencies, and will be glad to receive details from all transmitters in this area. VU2JP asks VE stations to look out for him in February at 00.00 G.M.T. onwards on 7 and 14 mc.

In Ceylon VS7GJ has found 7 mc. good, but QRN very heavy, and QRM bad, owing to conges-

tion. We welcome VS7JW (J. J. Watt, Westward HO! Nuwara Eliya), a newcomer on the air. Amongst the VU and VS7 transmitters, good telephony work has been done, and VU2FY with his new rig is putting over good signals.

Medan is broadcasting daily on 41.3 metres, also very powerful commercial stations, chiefly Russians, are infringing on the amateur band, and interfering with amateur progress.

Mrs. L. E. Hutchings (VK3HM) and Mr. Jack de Cure (VK3WL) taken at a recent VK3 meeting at the former's home at Callawadda. Both are holders of the W.B.E. certificate.

Egypt.

By SU1EC *via* G2ZQ.

By the time these notes appear the tests will be going strongly. I hope all British Empire amateurs will tie for first place!!! No news has been received from ZC in spite of promises. Work on the new Egyptian BC station is commencing at Abu Zabal, about 15 miles from Cairo. It will have a 10 kw. output and QRP stations will be erected in the main cities of Upper and Lower Egypt for relaying the programmes. A letter from the Sudan states that an unlicensed station has been heard using the call ST3WT. Should any amateur work him, please remind him that the penalty for unlicensed operation is £50 per day!

SU6HL has rebuilt his power supply and is running two generators from Tungar rectifiers with accumulators to take standing load; at present he is using 25 to 30 watts output. SU1AA has installed his very compact outfit in a 30-cwt. lorry, and is accompanying armoured cars on a long distance reconnaissance into lower Egypt. He will be absent about one month. Call sign is CAA and is working back to SAA in Cairo. SU1AQ has rebuilt MOPA, and is producing a nice clean note. SU2GA has rebuilt TPTG, but is still having trouble over the note question. SU6SW is now CC using about 50 watts input. SU1EC is using 150-180 watts to a new T6ID. In Alexandria SU1CH is using 400 watts to a self-excited rig and is working regular skeds with U.S.A. His FBX receiver is proving excellent. SU1SG is using crystal oscillator, buffer, and pushpull final with 50 watts input. SU1TXM is using oscillator and PA with 10 watts from a generator. SU1J is active. Dr. Ayres, of the Egyptian University, paid a visit to SU1EC recently; he has commenced work with the students on 56 mc. and higher frequencies with special regard to work below 1 metre.

Iraq.

By YI5KM.

Although only three members are active in Iraq we hope to put up a good show in the Contests. DX conditions during the early part of the year were not good, but an improvement is expected, especially from VK and ZL. Yi7RK and 5KM are both active. We hope to record an increase in B.E.R.U. membership in our next report.

Irish Free State.

By EI2B.

Although a number of EI stations appear to be active only a few reports have been received. EI5F forwarded a very full report on conditions on all bands and of excellent work done, mainly on the 7 mc. band, during the past two months. He has now qualified for both W.B.E. and W.A.C. certificates, and hopes to be able to take part in the B.E.R.U. contest. Interest in the 3.5 mc. band, the only one for reliable communication between EI stations or between EI and GI, is improving, the most active stations appearing to be EI6F and EI3C. As permits for the use of this band have been obtained by several other stations there is likely to be a considerable increase of activity in the near future. Useful reception reports would be appreciated.

Kenya, Uganda and Tanganyika.

By VQ4CRH.

No reports have been received from VQ4 stations this month, and only one from VQ3.

VQ3MSN hopes to get going again for the Contests. VQ3BAL reports that 14 mc. is still dead, but on 7 mc. he has managed to QSO a few VK's. VQ4CRL left Nairobi in December for a trip to South Africa, where he hopes to meet many of his Z friends. He will be returning to the key about the middle of April.

VQ4CRE has made a re-appearance on the air again with a temporary TPFG outfit with an input of 15 watts. He has been carrying out a weekly sked with VQ4LMA, who is doing well with his 1-watt rig-out. VQ4CRO is now W.A.C. after a long wait for a VK. His work as hon. treasurer of the newly-formed Radio Society of East Africa keeps him busy.

VQ4CRP is now active with a C.C. outfit, and seems to be collecting a good bag of PY's.

Conditions generally have been very bad, and the majority of stations located in Nairobi have still mains QRM trouble which does not show any signs of abating.

Malta.

By BERS161 *via* G6QQ.

No official licences have yet been issued, but it is anticipated that at least two stations will be active during the Contests. VP3C and VP3S are building a combined QRO station for ELS work. VP3V has taken the BERS group under his wing.

New Zealand.

By ZL4AO *via* G2ZQ.

The Headquarters address of N.Z.A.R.T. is now P.O. Box 277, Auckland.

By all accounts a record B.E.R.U. Contest entry is anticipated from ZL. Conditions up to the end of January were poor on both bands, but an improvement is expected.

Northern and Southern Rhodesia.

By ZE1JE.

The festive season and appalling conditions on all bands were no doubt responsible for the absence of reports for January.

The residence of Mr. I. de B. C. Fynn (ZE1JH), which is situated at the Bulawayo Observatory, was struck by lightning during a recent storm, but we are glad to report that beyond severe shock, ZE1JH and his parents escaped injury.

ZE1JF is again to be congratulated on his recent DX phone QSO with Australia. VK reported him QSA 3R4. ZE1JM has closed down pending going South on four months' leave.

ZE1JE has dismantled and moved to his new residence. Re-erection will be somewhat delayed owing to an extensive deforestation scheme to be undertaken before an aerial system can be erected. He will, however, be on the air in time for the forthcoming B.E.R.U. Contest.

Northern India.

By VU2FP.

Conditions lately have been bad on both bands. Very little has been heard on 14 mc., whilst 7 mc. has been good in the early evening and morning. Many thanks to the many Empire stations who sent Christmas greetings.

Around Europe.

Mr. G. H. Petersen (LA1D), President, N.R.R.L., strikes an optimistic note in his annual report of Norwegian amateur activities. The number of licensed LA stations shows an increase over the year of 27 per cent., the total having reached 74. Tests were well supported, including one designed to assist members in the study of DF problems.

Four LA amateurs are now in possession of W.A.C. certificates, and before 1934 ends we hope that at least one of our Norwegian members will have qualified for a W.B.E. An extraordinary DX feat was accomplished by LA1Y, who W.A.C. with an input of 3 watts from dry batteries.

During October the Society, as represented by its Oslo Section, actively participated in the Radio Exhibition; a complete amateur station arousing great public interest. The Oslo Section have started a Radio School, at which lectures are given by well-known members. The session will conclude with an examination for those wishing to obtain transmitting licences.

The problem of B.C.L. interference has been handled skilfully by the N.R.R.L., in co-operation with their Telegraph Administration. After an amateur has eliminated key clicks and other remediable interference at the transmitter, he is given full liberty to experiment with wave-trap devices at the receiving end.

The annual general meeting will be held in Oslo during August, 1934, when a cordial welcome will be extended to all visitors.

The Swiss National Society, U.S.K.A., advise us that their membership total continues to rise, having reached 180 by the beginning of 1934. Several new transmitting licences have been issued, the latest call being HB9AU.

A reorganisation of the Society has recently taken place, and a District scheme put into vogue on similar lines to that of our own.

In addition to being licensed to use the band, 3,500-3,600 kc., HB. amateurs may now work between 3,600 and 3,700 kc. A successful national relay test was held on this band during December.

The weekly U.S.K.A. broadcast is transmitted on Thursday at 19.00 G.M.T. by HB9AR in French, and by HB9Q in German. The 3.5 mc. band is used.

A welcome is extended to all British amateurs visiting Switzerland for winter sports. Mr. W. Frey (HB9AC), Schutzenweg 17, Neu-Allschwil, near Basle, will be pleased to meet all visitors, if previous advice is received.

TRADE NOTICES.

Messrs. Claude Lyons, Ltd., have forwarded a copy of their new catalogue, which contains much useful information to the radio amateur. We also understand that this Company are the exclusive distributors for Sylvania valves in Great Britain. A copy of their catalogue, and details of all American valves distributed by them, will be supplied free of charge to members writing to either 76, Old Hall Street, Liverpool, or 40, Buckingham Gate, London, S.W.1.

* * *

Polar Micro-Drive Dial.

Wingrove & Rogers, Ltd., have just introduced a new type of slow-motion dial for short-wave work which is a variation of their standard products known as Arcuate, etc. The new dial has two ratios, one of 12 to 1 and one of 100 to 1. The knob for the standard drive is fitted on a hollow spindle through which runs another spindle for the micro-drive. A smaller knob, tapered to match the larger one, is fitted to this. The micro-drive is obtained by means of an epicyclic ball gear, and the movement is very smooth in action. These new dials will be known by the usual names of Arcuate, etc., with the addition of the word Micro-Drive to distinguish them from the standard products.

STRAY.

BRS207 reports receiving W9QI (Mr. L. C. Barregaoye, of Beadstown, Ill.), and W9ERS recently on the 3.5 mc. band. Both stations will appreciate further reports from this country.

BOOK REVIEWS.

ELECTRICAL TRANSFORMER THEORY. *By S. Gordon Monk, B.Sc., B.Sc.(Eng.), A.M.I.E.E., M.J.I.E. Published by Sir Isaac Pitman and Sons, Ltd.* 140 *pages and* 71 *illustrations. Price* 5*s. net.*

The purpose of this book is to give "a concise exposition of the theory of operation of transformers."

A short first chapter is devoted to fundamental principles and the treatment here is open to criticism. The author assumes, in the preface, that the reader is conversant with the "J" operator method, but in the first chapter explains the vector addition of voltages, while neglecting entirely such fundamental matters as power, hysteresis and eddy current losses. Also, in this chapter the author uses the expressions "1 C.G.S. volt" and "1 practical volt"; there is only one meaning for the word "volt," and it is an exact one. The formula on page 3 contains a misprint, and immediately below this is a statement to the effect that "an exactly similar voltage must be generated in the primary coil," which is incorrect, if read in anything but a very loosely descriptive way; with equal turns the statement would be correct.

The first chapter could be made a very useful one by extending it and making the expression more precise.

The author states in the preface that the treatment of the vector diagram is unusual, and he uses the "equivalent value" obtained from practical test to deal with the leakage reactance in one operation. While this may simplify diagrams and calculations, it should be made quite clear that secondary leakage is an actual fact; the author, after obtaining the "equivalent value," ignores secondary leakage altogether, and the reader might be excused if he were to think that such a thing did not exist. On page 20 there is a surprising statement with reference to leakage flux: "It links with the primary winding only. . . ."

The author's method of using only the equivalent value has a very limited usefulness, and a student without fuller knowledge of the facts would very soon find himself in difficulties. An example of this occurs in the description of the various ways in which windings may be split up; the author does not satisfactorily explain their merits with regard to *reactance*.

The analogies with D.C. circuits are rather tedious and unconvincing.

The chapters on "Testing Transformers" and "Transformers in Parallel" are exceptionally good, especially the vector diagrams in the latter. The method and diagram on page 49 are particularly to be emphasised, and these chapters are exceedingly useful and well set out.

An interesting chapter on "Transformer Cooling" is followed by one on "Three-phase Circuits," in which the treatment of phase sequence is a little too laborious.

"Simple Three-phase Transformers," "Three-phase Interstar Windings," "Scott-connected Transformers," "Auto-transformers," and "Six- and Twelve-phase Transformers," all receive useful and practical treatment.

An explanation of the uses of the different connections would have added to the value of the text.

The criticisms which the writer has made are from the point of view of a reader who will eventually pass on to design work, but, generally, will not be a source of great import to the reader who is engaged only on the testing side of transformer work. For him the book will be most useful and well worth the modest price. It is the usual high-grade production which one associates with the house of Pitman.

T. P. A.

"VALVE OSCILLATORS OF STABLE FREQUENCY." *Radio Research Special Report No.* 13. *H.M. Stationery Office. Price* 1*s.*

The importance of frequency stability is indicated by the publication of a special report by the Radio Research Board. This report consists of 56 pages dealing with the theoretical knowledge and abstracts from all known methods of ensuring frequency stability. It is a preliminary survey, carried out by the Radio Section of the N.P.L., to more intensive experiments on providing frequency stability without complicated or expensive equipment.

It will be appreciated that many of the single-frequency band stations can use apparatus of the piezo-electric or tuning fork type for maintaining exact adjustments to their allocated frequencies, and in order that the Lucerne Plan shall be a success, many of the continental Broadcasting stations will have to adopt some stable form of frequency control. In the case of smaller stations, such as installations used at sea, mobile stations on aircraft, etc., where changes to different frequencies are necessary, this elaboration of equipment is prohibitive, but the need for frequency stability is just as urgent. The work now being undertaken by the Radio Research Board will therefore be awaited with the greatest of interest.

Those who are interested in stable forms of master-oscillator drive circuits will find this critical survey a practical text-book on the subject, with references to all the published papers of importance since 1919.

A. D. G.

Strays.

We learn from G2TK, *via* SM5SV, that Mr. Cornelius, a young Swedish officer, now on his way to Persia, will soon be starting up on 7 mc. with the call RV1GC. He is particularly anxious to get in touch with SU, Yi and G stations and all QSL's should be sent *via* the Swedish Legation in Persia.

* * *

G2TK would appreciate reports on his 7,082 kc. transmissions from B.R.S. and B.E.R.S. All reports will be acknowledged.

* * *

G2DF will be pleased to receive reports on his 14 mc. transmissions. All such reports will be acknowledged.

* * *

Mr. O. Spindler, VU2FY, tells us that on September 13, 1931, he copied telephony from T14NRH "solidly" for 35 minutes. At the time the Costa Rica station was using an input of only 7½ watts. This information is forwarded in connection with ZE1JF's enquiry in the December BULLETIN.

Empire Calls Heard.

BRS822, 63, Tennyson Road, Small Heath, Birmingham. From November 18,1933, to January 19, 1934 :—

7 mc. : su1ch, 1sk, 2np, ve1de, vk2px, 3dm, 3kx, 3to, 5wp, 7rx, vpu2, vp3h, vs6an, vu2bl, 2dx, xzn2b, yi5gl, zd2c, zl3dc.

14 mc. : su1aq, ve1da (fone), 1do, 1dl, 1dr, 1ea, 1eq, 1et, 1fn, 2aa, 2ca, 3si, vo8y, xzn2c, xzn3d, ze1jf, zs2j.

VU2JP. October 14 to December 10, 1933 :—

7 mc. : G2gf, 2iy, 2zq, 5hb, 5pj, 5yh, 6hv, 6nd, 6xx, vk, 2ck, 2hf, 2oz, 2zh, 2zo, 2zr, 3ax, 3ek, 3lb, 3jy, 3ml, 3ny, 3zf, 3zl, 3wx, 3fx, 4rm, 4gk, 5gr, 5gw, 5ld, 5wr, 6ag, 6fo, 6gf, 6hf, zl1gx, 2bz, 2gw, 2hf, 2fi, 2ob, 3bj, vq4crh, 4kta, vq3bal.

EI5F, H. Hodgens, The Bungalow, Clonasleigh, Shankill, Co. Dublin. December and January :—

7 mc. : ve1de, 1dl, vk2px, 3dm, 5wr, 7ch, vpu2, vp5pz, vq3bal, 4cro, 4kta, vu2aa, 2dx, 2fp, yi7rk, zc6cn, 6ff, zd2a, 2c, zs1h, 4m, zt1r, 6d, zu5v.

Gi6TK (Belfast). During October and November, 1933 :—

7 or 14 mc. : su1ec, 1sg, 6hl, ve1dw, ex, ed, dr, ep, bv, ea, fn, 2fe, fr, ex, dr, bd, aa, bg, 3jz, jm, hf, wb, gs, 4js, mv, gd, 5cp, vk2hk, gw, jt, 3wl, hg, dm, kx, 4gk, el, 5xk, rc, 7jb, vo8aw, vq4crp, cro, vu2dx, lx, fp, zz, bn, yi7rk, zc6cn, zd2a, 2c, zl1ai, 1ck, 3bj, zs1h, 2j, zt1r.

G2TK, 41, Newborough, Scarborough. Reports by request. During November and December, 1933 :—

su1sg, 2np, vk3dm, 3kr, 3kx, vq3bal, 4crh, 4cro, 4kta, vu2an, 2bg, 2fp, zl1cn, 1hc, 2bz, 2fi, 2fr, 2go, 3aj, 3jd, 4bq, zs2a, 2d, 3d, 4t, 4x, zt2b, 6d, zu1e, 1j, 5n, 5w, 6e, 6w.

Eric W. Trebilcock (BERS195) Moonta, South Australia. From November 11 to December 12, 1933 :—

7 mc. : ei5f (1), g2bm (9), 2dc (2), 2gq (4), 2ic (1), 2ig (3), 2kb (1), 2ma (1), 2mi (2), 2nm (1), 2nz (1), 2ov (2), 2zq (7), 5ar (1), 5bd (1), 5bz (1), 5cu (2), 5fv (1), 5hb (1), 5la (3), 5ml (5), 5nf (4), 5pl (2), 5rv (1), 5yh (5), 6bu (1), 6cj (3), 6cw (1), 6ki (5), 6py (1), 6rb (3), 6rq (1), 6vp (2), 6xq (1), su1ec (6), 1sg (5), v8ab (1), 8af (1), ve4du (1), 5bi (1), 5eh (1), 5fe (1), 5hs (1), vp1al (1), 1an (1), 1fr (1), vq4crh (2), 4crl (3), 4cro (1), 4kta (3), vs6ab (1), 6ae (3), 6ag (1), 6an (1), 6aq (6), vu2jp (1), 2kh (1), yi5gl (1), 7rk (9), zt2b (1), zs6m (1).

14 mc. : vu2bl (1), 2bm (1), 2dx (2), yi7rk (1), zl1ab (1), 1gx (1), 2bz (2), 2du (1), 2fa (1), 2fi (1), 2gn (1), 2ja (2), 2kk (1), 2lb (2), 2lq (1), 3aj (1), 3dk (1), 4ao (1).

Figures in brackets denotes number of days in above period that each individual station was copied.

ZS1H, Oakhurst Avenue, Rondebosch, Cape, October, November and December, 1933 :—

14 mc. : ve1bv, 1dq, 1ep, 1dr, 2be, 2ca, 2ee, 2dm, 2cx, 2ch, 3hf, 3jz, 3ja, 3wm, 3gt, 3am, 3bk, 3bw (phone r7).

Vu2jt, 2df, 2aa, 2bl, 2fp, 2bn.

Yi7rk.

Vk2ah, 2ba, 2nr, 2xu, 2jt, 2hw, 3ow, 3hg, 4rv, 4gk, 5xk, 5dx, 5hw, 5rx, 5lx, 6fo.

Zl4ao (first zl ever heard).

Su3rx, 2ga, 2np, 6hl, 1ec.

Gi6yw, 6tk.

G2bm, 2jx, 2zq, 2jh, 2mr, 2oi, 2ux, 2hx, 2ao, 2dc, 2dv, 5yh, 5vh, 5wp, 5dm, 5fv, 5vq, 5nf, 5rv, 5sy, 5gd, 5hb, 5bt, 5wy, 5ml, 6vp, 6xm, 6ow, 6rb, 6yl, 6dl, 6sr, 6qb, 6cj, 6wy, 6xg, 6ds, 2zq. 12.40 G.M.T. 3-9-33. R5 (unusual time for G).

2BPY, 163, Newland Park, Hull, Yorks, November and December :—

ve2bg, 2ex, 3wa, vk2fz, 2jt, 2mq, 2nr, 2px, 2vg, 2yl, 3dm, 3gc, 3gq, 3hq, 3kx, 3to, 3uh, 5go, 5ml, 5yb, 6fo, 7jb, vp3g, 3h, 3x, vpu2, vq3bal, 4crh, 4crl, 4cro, 4kta, vs3ac, vu2dx, 2fp, 2jb, 2lx, zl2mr, 4ai, zs1g, 4f, 4m, 6c, zt1r, 4t, 5r, 6d, zu5l, 5n, 6e.

Strays.

Mr. A. H. Wilson (G2WN), of Hanley, Stoke-on-Trent, asks us to mention that owing to illness he has not forwarded QSLs to certain stations worked during 1933. He will be pleased to rectify this omission on receipt of a request from the stations concerned.

* * *

Mr. H. E. J. Smith, CT2BKA (late CT2BK), tells us that the following G's have failed to QSL after QSO's : G2OA (27.8), 2OC (18.9), 5MP (24.9), 2ZQ (12.11), 2TK (12.11), 6TT (13.11), 2DQ (14.11), 6NJ (22.11), 5UR (24.11), 5AY (26.11), 5RK (26.11), 5SA (31.11), 5OU (1.12), 2UX (1.12), 2DI (24.12), 6BF (24.12), 2JG (25.12), 6AY (26.12), 5HC (26.12). Need we say more ?

* * *

Mr. Pemberton (G2JY) would appreciate reports on his 7 mc. signals ; he is using 4 watts c.c. All reports will be acknowledged.

ZT2H (P. G. Pretorius) has changed his address to " Hertz Haus," 27, Smith Street, Port Elizabeth, South Africa.

EXCHANGE AND MART.

RATES.

Private members' advertisements 1d. per word, minimum 1s. 6d. Trade advertisements 2d. per word, minimum 3s., cash wih order. First line, if desired, will be printed in capitals. Copy to reach 53, Victoria Street, or the Advertising Manager, Parrs, 121, Kingsway, W.C.2. not later than the 1st of the month preceding date of publication.

FERRANTI A.F.3's, 12s. 6d. ; Varley P.P. Input and Output Transformers, Pentode Output Choke (both double tapped outputs), 15s. each ; 100 H. and 125 H. Chokes, 3s. ; Westinghouse H.T.10, new, unopened, 15s. 6d. ; B.T.H. Pick-up, £1 ; Lotus 3-gang .0005 screened with trimmers, 4s. 6d. Quotations for Mains Transformers.—2BZT, " Woodland Villa," Roundhay, Leeds.

FOR SALE, M.L. ANODE CONVERTER. Input 12 volts, output 400 volts 30 MA. Excellent condition. £2 15s.—G6KP, 127, St. Asaph Road, Brockley, S.E.4.

FROM DISMANTLED AMPLIFIER, 6 DO 25's U.X. bases, 6s. 9d. each. Weston M.C. Meters, type 301, ranges 10v. 1 amp, 2 amps, 8 amps 14s. each. Dubilier .01 mfd., 1,000 v., working, 1s. 3d. each. Polar Ham Band Condenser, 4s. 9d. All post free.—2BAI, 94, Cambridge Road, Seven Kings, Essex.

G6DS. For neat and snappy QSL Cards, Log Books and Pads. Send for samples. QRA, "Inglenook," Orlando Drive, Carlton, Nottingham.

G6VP.—'Phones, Transformers Rewound; Brown's "A" a speciality; any resistance; 24-hour service. Lowest term in the trade.

GUARANTEED CRYSTALS, any frequency, 1.7 and 3.5 mc. bands, 7s. 6d. Dustproof plug-in holders for same, take crystals 1-in. dia. 3s. 6d.—G6WQ, 10, Aberdour Road, Goodmayes.

NEW Hellesens 8 mfd. Electrolytic Condensers, 440 v., working, 4s. each, post extra. New T.C.C. 2 mfd. 1,500-volt working Condensers, 6s. 6d. each, post extra. Transformers, 300-0-300v., 100 ma.., 6v. 2a., 5v. 2a., 10s., post extra. We still have for disposal some of the Oxford Arctic Expedition Gear (one portable Q.R.P. Transmitter, two Portable 2-volt Receivers). Enquiries to.—LOOMES RADIO (G6RL-G6US), 32-34, Earls Court Road, W.8. Telephone: Wes. 0344.

M.L. ANODE CONVERTER.— 12v.-200v., 40m.a., 8v.-140v., 30m.a., as new, £4. —SWAN, 74, Totley Brook Road, Sheffield.

PROFESSIONAL ENGINEER engaged on geo-electrical research, having financial possibilities, requires Technical Partner assist in field work and share very moderate expenses; capital not required.—Box 068, R.S.G.B., 53, Victoria Street, S.W.1.

TELEVISION. — Members experimenting, send for list of components supplied by JOHN SALTER, 13, Featherstone Buildings, High Holborn, W.C. Pioneer maker since 1927 of Television Apparatus.

Patents and Trade Marks.

GEE & CO. (H. T. P. Gee, Patent Agent for Gt. Britain, U.S.A., Canada, etc., Members R.S.G.B., A.M.I.Rad.E.), 51-52, Chancery Lane, London, W.C.2 (2 doors from Govt. Patent Office). 'Phone: Holborn 1525. Handbook free.

A. MATHISEN, B.Sc. Registered Patent Agent. Specialist: Television and Radio Engineering Invention Patents.—FIRST AVENUE HOUSE, High Holborn, London, W.C.1. Holborn 8950.

Printed for the Inc. Radio Society of Great Britain, 53, Victoria Street, London, S.W.1, by Loxley Brothers Ltd., 50, Southwark Bridge Road, London, S.E.1.