THE T. & R. BULLETIN

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CONTENTS

PROBING THE UNKNOWN

WITH greater interest than ever being taken in ultra-high-frequency DX experiments it may appear incongruous to think of such work as being of an unknown character, but a moment's consideration will show that to-day we are very little nearer to a solution of the problem than we were ten years ago.

One important step forward in our knowledge has, however, been made in recent weeks ; we refer to the frequent reception of the B.B.C. Alexandra Palace television transmissions at such distant places as New York and Johannesburg. True, the frequency used for these transmissions is some 15 megacycles lower than the frequencies allotted to amateurs interested in 56-60 Mc. propagation, but having studied the contribution which appears in this issue from the pen of one of our leading 28 Mc. workers, Mr. D. W. Heightman, we are of the opinion that sooner or later the " cut-off " frequency for long-distance work will increase to some point beyond the present assumed limit of about 45 Mc.

THE RADIO AMATEURS OF THE BRITISH EMPIRE TENDER LOYAL GREETINGS TO THEIR KING AND QUEEN.

When the amateurs of an earlier generation " made the headlines " by working DX on short waves, new theories had to be evolved to explain why such contacts were possible ; is it then unreasonable to suggest that the time is opportune to test out new theories on 56 Mc. ? As an example some recent experiments extended through the night simply because it was desired to study the effects of darkness.

The difficulty of obtaining a constant frequency output when using reasonably high power has been overcome, thanks to certain valve manufacturers, but we are still far from convinced that the receiving devices have progressed as fast as ultra-high-frequency transmitters.

The A.R.R.L. are sympathetic to a proposal made by the R.S.G.B. that a carefully arranged series of trans-Atlantic tests should be organised at an early date. Such tests will require a good deal of thought, but the most important feature to be considered is that of selecting a suitable time and period.

Mr. Heightman indicates a way in which this information can be obtained, and in doing so he appeals for more members to study U.H.F. conditions. By intelligent anticipation it should be possible to forecast a period for organised tests which will perhaps enable us to prove whether or not 56 Mc. is a DX communication channel.

J.C.

OBSERVATIONS ON THE ULTRA HIGH FREQUENCIES, 1936

By D. W. Heightman * (G6DH).

A Plea for Co-operation.

WITH a view to obtaining more data on the propagation of frequencies of 28 Mc. and higher, the writer carried out regular daily observations on such frequencies during the whole of 1936. In this article it is endeavoured to provide a summary of the results obtained, suitable for reference and comparison with observations in future years. It will be obvious that they are rather incomplete, since in order to obtain a comprehensive record a number of observing stations are required, and it is hoped that in the future there will be far more co-operation in this respect.

Before commencing on the main object of this article, the writer would like to say, quite candidly, that in his opinion the average amateur could be doing a good deal more than he is at present to forward the knowledge of U.H.F. propagation generally. With the co-operation of other amateurs and regular observations and schedules much useful work can be done with comparatively simple apparatus. Admittedly to most amateurs the radio game is merely their hobby, but if at the same time as enjoying their hobby they were a little more systematic in logging results and observations, keeping schedules and publishing same, there would certainly be a lot more for them to show, in favour of their existence, to the powers that be !

The Need for Schedules.

Work on any particular frequency is of equal importance to that on any other—that is to say, the 7 Mc. man's work is just as necessary as the one on 1.7 Mc. or the other on 56 Mc. If we notice a certain effect on one frequency it is essential to know what is happening on both higher and lower frequencies at the same time. It is not necessary for such work to take up much time, say only a quarter or half an hour per day, and, here again, many hands make light work. The amateur who likes to make a good job of his equipment (*i.e.*, not "hay-wire") can do so, because obviously for transmitting signals for observation purposes everything including the aerial should be of the "stay-put" type. At present the man with a receiver only, can do more useful work in obtaining data, because the BRS can observe commercial signals in the knowledge that they will be on according to schedule !

It is suggested, therefore, that the transmitting amateur interested in propagation work should decide on what frequency (or frequencies) he would like to work, get his transmitter and receiver working satisfactorily thereon, then agree on a regular daily or weekly schedule, according to the time he has to spare. This schedule would be published in The Bulletin, and the BRS men could make regular observations, noting signal strength, fading, echo and other characteristics. Each month summarised reports could be sent to the R.E.S. Propagation Section for comparison and reference. After all, what's the use of keeping a log, such as the average amateur does, if no one sees it ? Then again, the help of amateurs abroad is essential, and the writer is sure there are many who would be glad to co-operate, given sufficient encouragement.

There are many questions on which prolonged observation and investigation, such as outlined above, are essential—so what about it ? You have the organisation—the R.S.G.B. (particularly R.E.S.)—The Bulletin to let people know what you are doing—the equipment necessary—it is, therefore, up to you !

1936 *Observations.*

The writer's observations last year were confined mainly to reception, since it was difficult to find anyone who would report regularly on transmissions. Again, on the receiving side, the number of stations that could be observed was limited to a few commercials as most of the amateurs only worked spasmodically. This was rather unfortunate, because there are no commercials (with harmonics near 28 Mc.) working in Australia, South Africa or South America. The reception of the stations observed was recorded daily in the form of a graph, as this method has been found by far the simplest for comparison and reference. Graphs of reception were kept of WQP, East U.S.A. ; HJO, Colombia ; RIS, Tiflis (Southern Russia) ; RPA, Moscow ; TDC, Manchuko ; JNJ, Japan ; SPW, Poland ; HAS2, Hungary ; and EAM, Spain. In each case it will be noticed that the signals were harmonics (as there were no fundamentals available), but this is of no consequence, since it has been shown by experience that if harmonics get through funda-

Test 28 Mc. de G6DH

*R.E.S. Member.

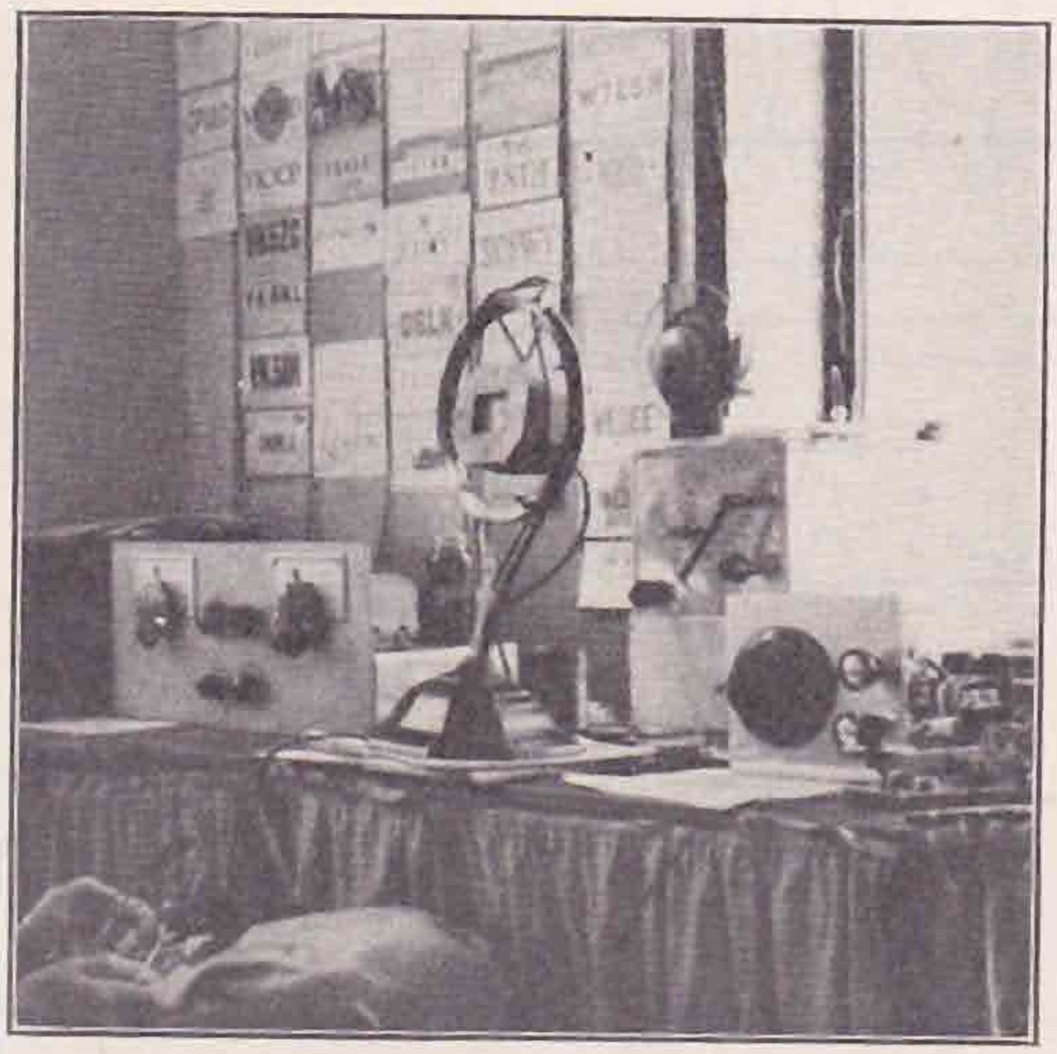
mentals will also. The strength of these stations was noted at various times each day between 06.30 and 24.00 G.M.T., according to the time of year. However, in the graphs accompanying this article, for the sake of simplicity, only the average signal for each day has been shown. The graphs of HAS2 and EAM are not shown, owing to lack of space, but taken generally they differ very little from that of SPW. That of TDC has also been omitted for the same reason.

America.

Inspection of the graphs will show that the mid-winter months were most suitable for consistent contact with America. Around the equinoxes signals from this part of the world were often better, but not so consistent, from day to day. Soon after March, U.S.A. signals became less reliable and entirely vanished during the summer months, reappearing again in late August. On a good day in spring and autumn W's came through from 12.00 to 22.00 and in the mid-winter from 13.00 to 18.30.

South Africa.

Signals from South Africa were heard throughout the year, peaking at the equinoxes, and contacts



Receiving Position, G6DH.
The 28 and 56 Mc. Receiver is on the right.

ith this part of the world were the most consistent f any on 28 Mc. In other words, on 28 Mc. long-istance working north and south is much more eliable than east and west. South African signals ere heard at any time between 07.00 and 18.00. n the winter months they were best around mid-day it with the approach of summer, peaked once the morning around 10.00 and again in the ternoon about 16.00.

Far East and West Coast U.S.A.

Far East signals on the one side and West oast U.S.A. on the other were best in March d October, nil during the summer and poor ring mid-winter. The same remarks applied signals from New Zealand. On a good day r East and New Zealand signals could be heard from 07.00 to 10.00, whilst on a poor day for a short time only, around the peak period, *i.e.* 08.30. West Coast stations were heard as early as 15.00, but were generally best between 16.00 and 18.00.

South America.

Unfortunately South American stations were not very active on 28 Mc., otherwise contacts with them would have been practically as reliable as those with South Africa and possible throughout the year. When working they could be heard on an average at times varying from 12.00-18.00 in winter to 09.00-22.00 in the summer.

Australian signals were fairly consistent, except during mid-summer, and did not peak at any particular period. On some days they were heard as late as 15.00, particularly during spring and autumn, but usually they were best from 08.00 to 10.00.

Europe.

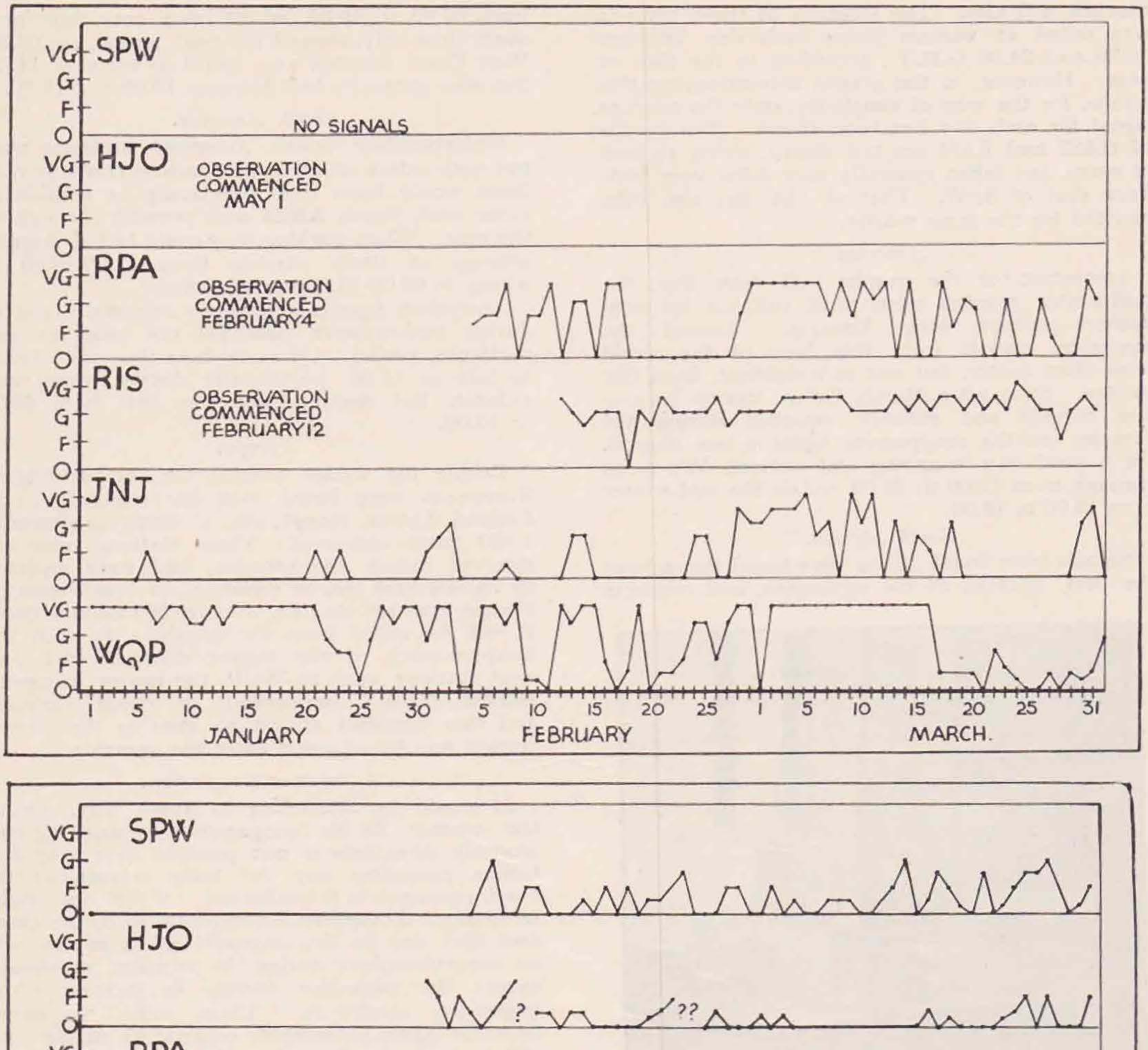
During the winter months the further distant Europeans were heard with fair regularity, *e.g.*, Finland, Latvia, Russia, etc., at distances generally 1,000 miles and over. These stations were not received during the summer, and were replaced by signals from shorter distances, such as Germany, France, Austria, etc., *i.e.*, average 500 miles distant. It will be noted from the graphs that with the disappearance of the longer distance east and west stations, such as WQP, the nearer European station, SPW, commenced to come through, and this vanished almost as soon as the former station was heard again after the summer.

A Summer Conclusion.

It would be interesting to know why, during the summer, 28 Mc. propagation in easterly and westerly directions is not possible over long distances, exceeding, say, 700 miles, whereas north-south propagation is unaffected. At first one would be inclined to suppose the opposite to be the case, and that due to the increased effect of the sun on our atmosphere during the summer, we should expect the ionisation density to increase, thus improving conditions. There must, therefore, be some agent, presumably originating on the sun, which tends to neutralise the ionisation due to ultra violet radiation.

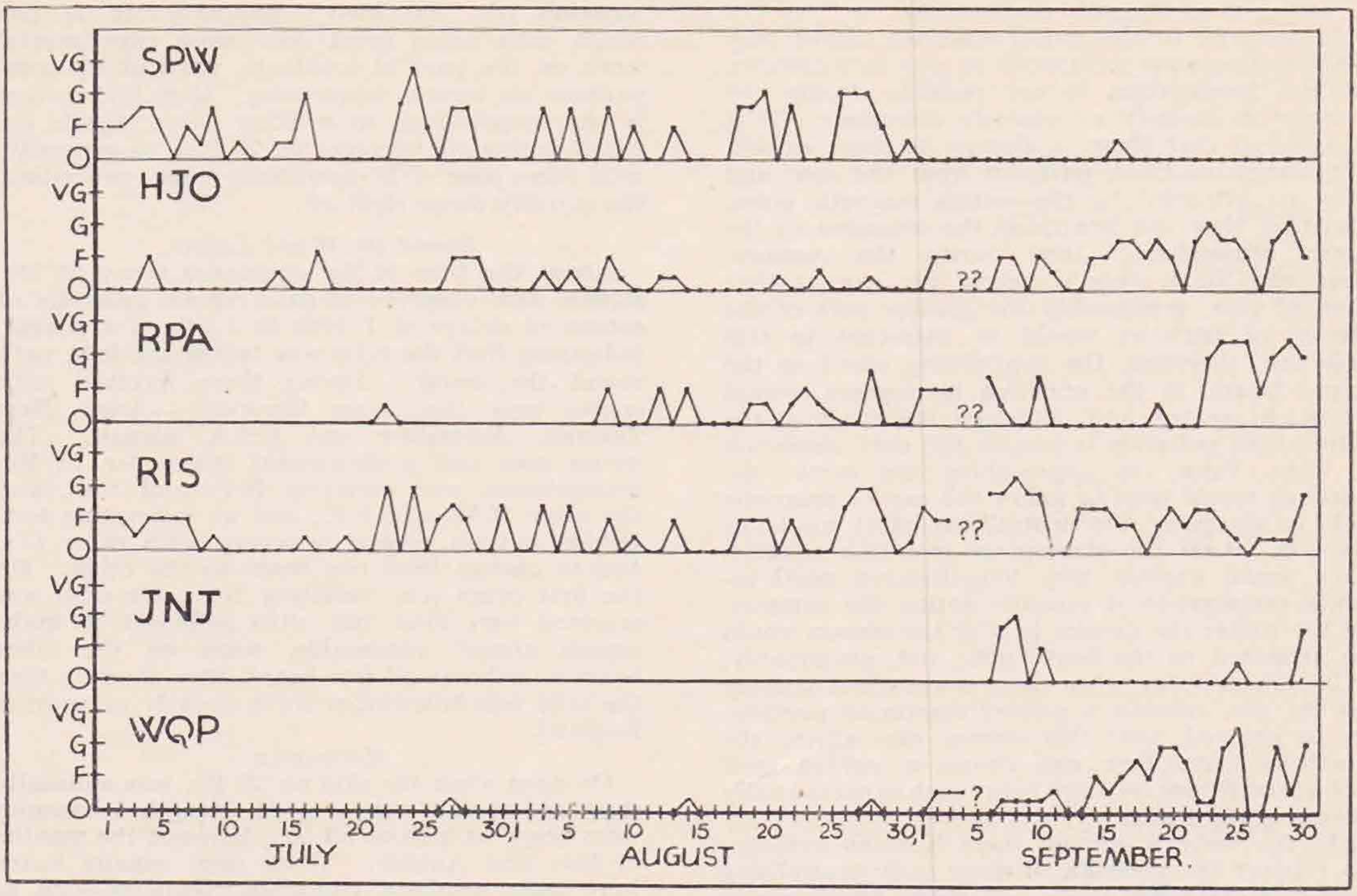
The "Hiss" Phenomenon.

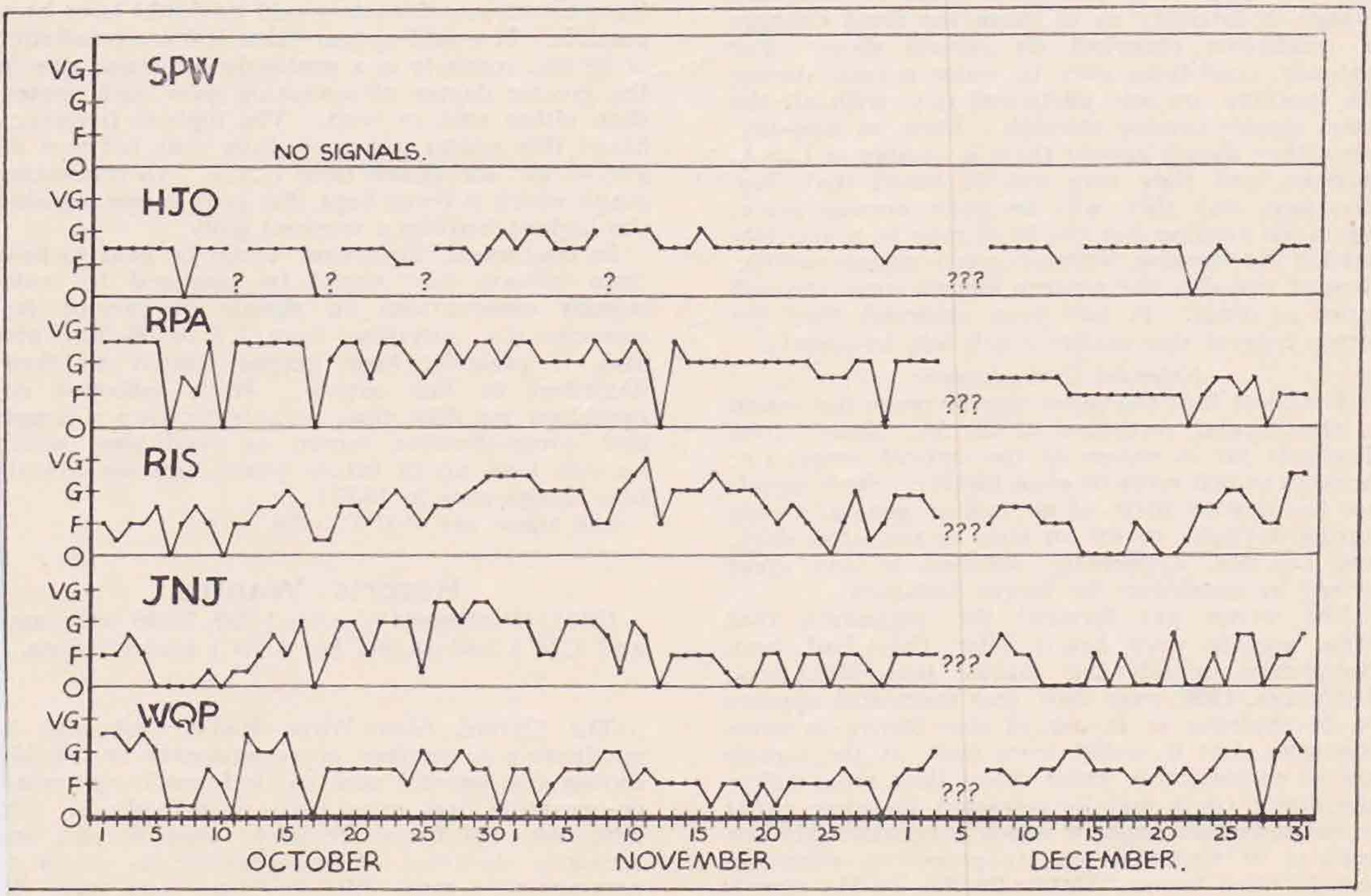
A strange phenomenon, first observed by the writer in late 1935, was the appearance, at irregular times, of a radiation which took the form of a smooth hissing sound, when listened to on a receiver. It was pointed out by G2YL that on the days when hiss was heard that there had frequently been fade-outs or poor conditions on the high frequencies. G2GD has also noted that when the hiss has been received magnetic storms are also reported. On one day the hiss may only last for a few seconds and not be heard again that day. On other occasions it will last as long as five minutes, then disappear and reappear again within a few minutes, repeating the process several times. It invariably starts at a weak strength and gradually builds up to a maximum, then gradually fades away again. The phenomenon apparently originates on the sun, since it has only been heard during daylight, and it has been suggested that it is caused by a stream of particles shot off from the sun during abnormal activitv.



Figs. 1 and 2.

Graphs showing the average daily 28 Mc. reception conditions for various stations from January 1 to June 30, 1936. O indicates No signals, F Fair, G Good, VG Very Good.





Figs 3 and 4.

As Figs. 1 and 2, but for the period July 1 to December 31, 1936. For details see text.

A Possible Explanation.

It occurred to the writer that the above may possibly give some solution as to why long-distance 28 Mc. propagation is not possible during the summer in easterly or westerly directions. If it is assumed that there is always, to some extent, a radiation of these particles from the sun, and they are attracted by the earth's magnetic poles, also that they can neutralise the ionisaton of the upper atmosphere; then during the summer, since the North Pole is nearer the sun at that time of year, presumably the greater part of the stream of particles would be attracted to this pole and, therefore, the neutralising effect on the upper layers, in the northern hemisphere, would be much greater, and, although the effect of the ultra-violet radiation is greater the nett ionisation is less. Since, on approaching the earth, the particles would tend to follow the earth's magnetic field to the poles, the neutralising effect would be least or nil on the atmosphere over the equator. This would explain why long-distance north-to-south propagation is possible during the summer. In the winter the greater part of the stream would be attracted to the South pole, and, presumably, it is only on a day when there is abnormal activity on the sun, causing a greater shower of particles to be emitted, that this shower also affects the northern hemisphere and causes a sudden spell of bad conditions for a few hours such as occasionally occurs in the winter.

In the writer's opinion there is much evidence to support the presence of some such neutralising agent as described above. It seems unreasonable that the ultra-violet radiation could so suddenly change in intensity as to cause the great changes in conditions observed on certain days. For instance, conditions may be quite normal during the morning, on any particular day, with all the usual signals coming through. Then, at mid-day, when they should appear there is no sign of U.S.A. stations, and they may not be heard that day. The next day they will be quite normal again. Again, on another day the band may be practically dead in the morning, with no eastern signals audible, then at mid-day the western signals come through quite as usual. It has been observed that the latter type of day occurs much less frequently.

Extended Ground-waves.

A subject that has given rise to much discussion is the regular reception of 28 Mc. signals over distances far in excess of the optical range, *i.e.*, from 25 to 300 miles or even further. Such signals are heard with little or no fading, generally only during daylight, or for an hour or two after dark, and are not, apparently, affected to any great extent by conditions for longer distances.

The writer put forward the suggestion that these signals were heard after they had been completely round the world (see BULLETIN, December, 1936, page 265), and there still appears to be evidence in favour of this theory in some instances, but it would seem that, as the signals are so consistent in most cases, they must follow the direct route and be refracted by some agent in the lower atmosphere which is considerably less subject to variations in its properties than the usual ionised layers. Unlike 28 Mc., 56 Mc. signals are apparently not refracted in this way and are not heard far in excess of the optical range. This question of "extended" ground-waves is one which calls for a great deal more experimental work on the part of amateurs, particularly comparisons on various frequencies. More information is also required as to whether these signals are heard during the summer on 28 Mc., as generally, with the poor DX conditions then prevailing, the activity drops right off.

Round the World Echoes.

About the time of the equinoxes many 28 Mc. signals were observed to have echoes, generally of estimated delays of 1/10th to 1/5th of a second, indicating that the echo was taking the long path round the world. Among those received with echoes were the nearer Europeans—Asian, New Zealand, Australian and U.S.A. signals. The writer uses two bi-directional beams for 28 Mc. transmission, one radiating N.E. and S.W. and the other N.W. and S.E., and an interesting test, carried out on several occasions with other G's, was to change from one beam to the other. On the first beam (*i.e.*, radiating N.E.) the echo was reported very loud and often sufficient to make signals almost unreadable, while on the other beam no echo at all was heard, thus showing that the echo was following a north-easterly route from England.

Harmonics.

On days when the skip on 28 Mc. was unusually short and signals were of good strength, harmonics were heard as high as 58 Mc., between the months of May and August. Those most usually heard were from southern European countries such as Italy and Spain, and, had there been activity in these countries, contacts would no doubt have been possible. It would appear there is more possibility of 56 Mc. contacts in a southerly direction, due to the greater degree of ionisation over such routes, than either east or west. The highest frequency heard this winter, on good days, was between 40 and 45 Mc. for signals from U.S.A. An interesting graph which is being kept this year is one showing the highest frequency received daily.

In conclusion, the writer would be glad to hear from readers who would be prepared to make regular observations on signals of various frequencies (*i.e.*, anything from 1.7 to 56 Mc.) and also, if possible, keep graphs similar to those described in this article. With sufficient co-operation we shall thus be able to keep a simple and comprehensive record of conditions, which we can look up in future years, and see exactly how things were in 1937!

[All times are G.M.T.—ED.]

Reports Wanted

G8LO (Portsmouth) on his 1,795, 7,146 (telephony and C.W.) and 14,292 kc. (C.W.) transmissions.

* * *

The Oxford Short-Wave Radio Club will be conducting a number of experiments on 56 Mc. during the summer months, and would appreciate co-operation from other clubs or individuals. The first test will be on Sunday, June 6, and any amateur desirous of co-operating is asked to communicate with 2BHP, Hon. Secretary, 13 Walton Well Road, Oxford, when details will be forwarded as available.

EFFECTIVE 28 Mc. TRANSMISSION

By P. Pennell (G2PL)

THIS article has been written in the belief that there are still a few amateurs who are experiencing difficulty in coaxing their transmitters to work in a satisfactory manner on a frequency between 28 and 30 Mc. Even those more fortunate people whose gear performs efficiently may find difficulty in contacting distant stations, because their aerial systems are unsuitable. It would seem prudent to begin by giving a few particulars in connection with transmitter design for this particular band.

Doubler or Amplifier for the Final Stage?

Nearly every transmitter which works on 14 Mc. can be persuaded to function on 28 Mc. by using the final stage as a power doubler; but care must then be taken to raise the bias. During the period when only a comparatively few stations were radiating on 28 Mc., and interference was small, this type of transmitter was used by many with success. At the present time, however, there are so many stations active, that such an inefficient method meets with but little success when it has to battle its way through the QRM. Hence it is now essential to use a power amplifier of some form or other.

Valves.

Before considering amplifiers in detail, it might be wise to say a few words on the type of valve to be employed in this stage. The chief qualification would seem to be that it must have low inter-electrode capacities, an essential factor for high frequency operation. When the inter-electrode capacities of a valve are reasonably low it is possible to obtain a ratio of high value of inductance to low value of capacity in both the tank and grid tuned circuits, which results in a higher overall efficiency, and so of course an increase in output. It would be synonymous to say that valves with large anodes, especially those supported by girders, should be avoided. Valves of this kind such as the 210, 211 and TZ260 have all been tested, and it must be admitted that they will certainly function but the R.F. output is very disappointing, and often great difficulty is experienced in exciting them properly. Even if sufficient drive has been obtained after much struggling, there is still the problem of neutralisation. If the method of locking the final power amplifier to the previous stage is favoured, the problem of drive and neutralisation disappears, but as many are forced to admit, to lock a P.A. on 28 Mc. is no mean feat, for by the time this state has been reached, the amount of R.F. taken from the previous stage would amply drive a normally neutralised P.A. Furthermore, if there is not sufficient R.F. to lock the power amplifier properly, it may come out of lock, and the multitude of carriers so produced will hardly meet with the approval of either local stations or distant listeners! Valves with low inter-electrode capacities such as the Eimac 35T and Taylor T55, are very suitable. They neutralise easily and are extremely easy to drive, for the amount of R.F. required is really very small. The efficiency one can obtain is very high with the result that a large amount of R.F. output is available for transfer to the aerial system.

Design of the Power Amplifier.

Perhaps now is an opportune moment to consider the actual design of the Power Amplifier. Many advocate the use of push-pull on these high frequencies, and while it must be admitted that greater efficiency is obtained in this way, two valves are much harder to drive than one. It is a difficult enough problem to get sufficient drive from a simple driving unit (not employing a buffer stage) in order to excite a single-ended 28 Mc. neutralised power amplifier fully, but when double that excitation is required to excite a double-ended power amplifier the problem becomes very serious.

It need scarcely be mentioned that at this frequency it is practically essential to link-couple the driving stage to the final amplifier. Those who try to capacity-couple these two stages will find great difficulty in neutralising this amplifier, and moreover the R.F. excitation will be inadequate. Great care should be taken in adjusting the link coupling, as this is one of the vital factors. The most satisfactory results can be obtained by coupling the link through one turn to the "cold" section of the coil in the driving stage, and then *via* twisted flex (flex has been found to be as good as twisted solid wire!) to two crocodile clips, one of which is tapped on to the dead end of the coil, and the other tapped towards the hot end, until sufficient drive has been obtained. One turn from the dead end is adequate. Some difficulty may be found in neutralising this stage, but tapping the aerial on the tank coil seems to assist matters, and there appear to be no adverse results from taking this step.

Some readers will wonder why the pentode class of valve has not been mentioned, for it need be neither neutralised nor driven to any high degree. For a given input, more output will be obtained when a triode is employed than a pentode, provided that the former is fully excited, and remember, it is difficult to over-excite a triode. For the purpose of doubling, it is hard to beat valves such as the RK20 or RK25, and it is a good plan to employ a valve of this type as a doubler to 28 Mc. For those who are forced to use a triode as a 28 Mc. doubler the regenerative type can safely be recommended as far greater output can be obtained by this means

Fig. 1.
Suggested Layout of 28 Mc. Power Amplifier.

than with a normal doubler. A few words about the actual construction of this stage would not come amiss. It is of paramount importance when working on this frequency to keep the leads from condenser to inductance as short as possible; it might even be wise to mount the coils on the condensers themselves. Every effort must be made to keep the stray capacities in the circuit as low as possible. This can be facilitated by mounting the valve horizontally, thus ensuring short grid and anode leads. On 28 Mc. it has also been found advisable to wire that portion of the circuit (other than the connections to the neutralising condenser) with 14SWG copper wire, and not copper tape, which still seems popular at many stations. It

There seems to be a tendency for amateurs to erect a directional array for 28 Mc. work. Is this the right policy to adopt for this particular band? We cannot as yet be so sure of conditions as to be able to say that a certain part of the world will be audible at a certain time, hence it seems unreasonable to erect a beam on Australia, when one finds that America is "pounding through" and cannot be contacted on this aerial. If we were as fortunate as our Californian friends and had the space to erect directional systems for each portion of the world with which we desired communication, then directional arrays would be ideal, but the majority of us are so situated that an aerial of modest dimensions can be erected in one direction only. For

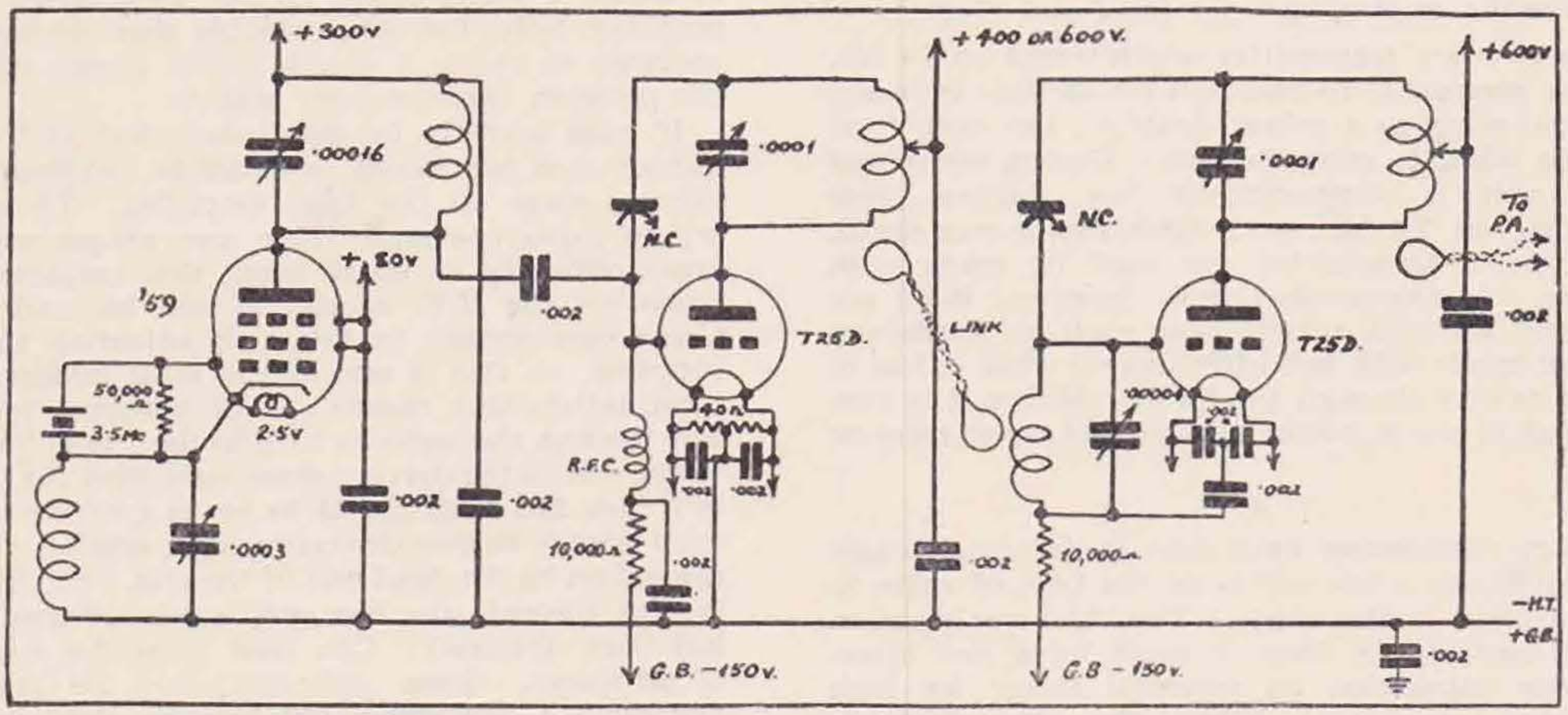


Fig. 2a

The C.O. and doubler unit. For 1.7, 3.5 and 7 Mc. the third stage is shorted out and the transmitter then becomes Tri-tet, Buffer and Power Amplifier. On 14 Mc. the transmitter operates as a Tri-tet, Doubler, Buffer, Power Amplifier. On 28 Mc. the third stage operates as a doubler.

need hardly be mentioned that the components should be mounted as high as possible from the baseboard if one is employed. Fig. 1 shows how a power amplifier of this type may be laid out for good results. Fig. 2 shows a circuit of the complete transmitter employed at G2PL. Simplicity has been the keynote of the design, and that it is no exceptional transmitter is proved by the fact that it is also operated on all of our allotted frequency bands from 1.7 to 56 Mc. On the last-named band the final stage works as a power doubler.

There are many alternative valves to those stated, and results might be improved by using a 28 Mc. buffer, although the most gratifying performance seems to be obtained by using as few a number of stages as possible. Those who wish to use a transmitter based on this circuit can use lower powered valves than those illustrated, for the Power Amplifier has been designed to operate on high power.

Aerial Systems.

The most efficient transmitter in the world will not radiate successfully unless a reasonably efficient aerial system is available, for it is the last link between the transmitting station and the receiving post. Furthermore a good aerial will often make up for a poor transmitter.

this class of person the solution must lie in an omni-directional aerial which gives good results in all directions and not particularly good results in one direction. Furthermore, it should be capable o

(*Continued on page* 556)

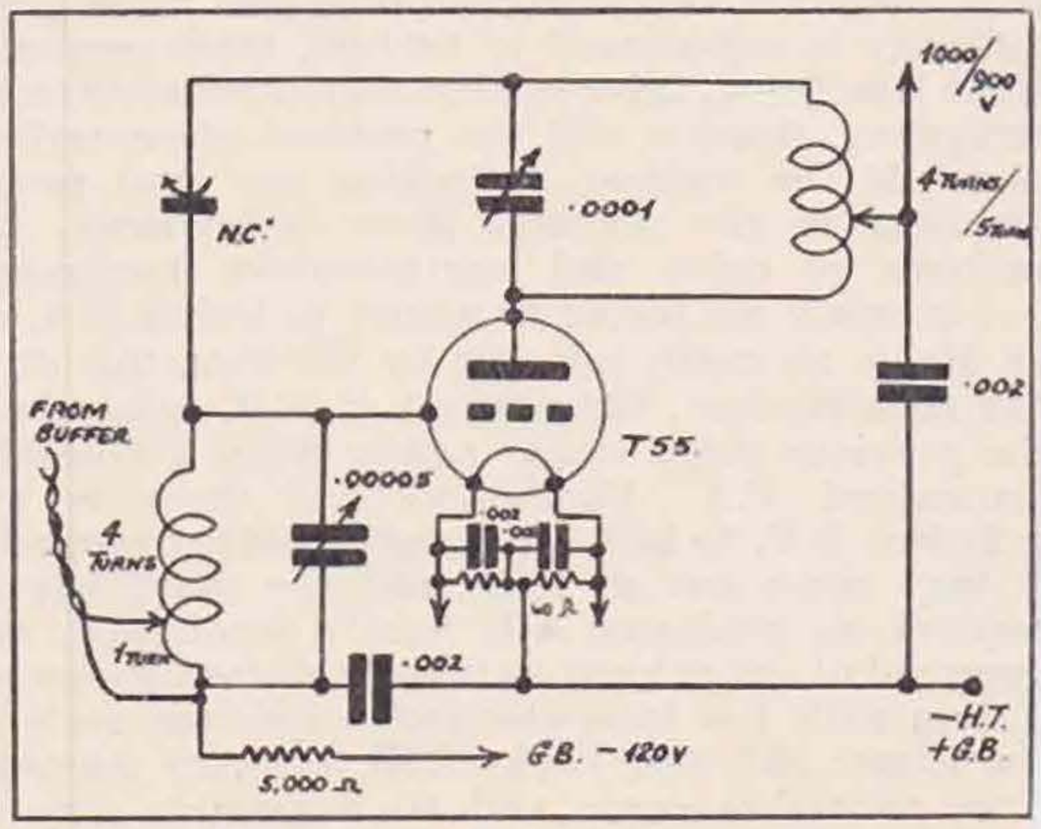


Fig. 2b.

The Power Amplifier Stage. N.C. consists of two moving and two fixed vanes, capacity about 8μμF.

THE R.K. 34 VALVE

By J. N. Walker (G5JU). *

IN these days of ever-increasing interest in the ultra-high frequencies, associated with which is the problem of building a transmitter giving a frequency stabilised output with economy, particulars of a valve which is specially made to give high-efficiency should be welcome,

This valve is the R.K.34, manufactured in the U.S.A. by *Raytheon*, and it is a matter of regret that there is no similar valve at anything near its price available from a British manufacturer.

As a point of fact, this valve is an improved (and very much improved) version of the now fairly well known 6A6, it being a high Mu type twin triode in one envelope. As the details given herewith show, the heater and anode voltage ratings are similar to the 6A6, but the construction is rather different, since the anode leads are brought out to two "horns" on the top of the glass envelope, whilst the grid leads are well spaced in the pinch and brought out to an Isolantite base. This both reduces losses and inter-electrode capacities to a marked degree, as will be immediately noticed on putting the valve into radio frequency service. The construction of the valve allows of efficient operation up to 240 megacycles. Above 56 Mc. the input should be reduced so that the rated dissipation of 10 watts is not exceeded.

The characteristics are given in the accompanying table, and it will be seen that the valve can be used as a Class B audio amplifier, but we are not concerned at the moment with audio frequencies, besides which it would not be an economical proposition (as regards first cost) in this service.

Before turning to practical examples and circuits in which the R.K.34 can be used, one or two points should be borne in mind. The grid bias required is fairly low—36 volts as a Class C amplifier—and therefore the grid leak, when used, should not exceed 2,000 ohms. When the bias is obtained from either a battery or a small-power pack, the resistance included must be low, otherwise the working bias will be much higher than the theoretical one. It is advisable to include 12 to 15 volts negative bias from a battery, whatever other method may be in use, in order to prevent damage to the valve should oscillation or excitation cease.

The valve is such a ready oscillator that precautions must be taken to prevent parasitic oscillation. If the leads from the valve base to the grid circuit and from the "horns" to the anode circuit are kept extremely short, no trouble will be experienced with very high frequency parasitics, whilst the use of two chokes of greatly differing types in the anode and grid returns will prevent low-frequency parasitics. Actually a grid choke is hardly necessary.

Advantages at 56 *Mc.*

The reasons for the benefit obtained by using the R.K.34 at the ultra-high frequencies are several. The valve is fitted with a uni-potential cathode, so that the R.F. cathode current (which may be quite high) has no resistance to overcome. The filament of a directly heated valve seldom has a resistance of less than 6 ohms, and this is partly in the R.F. circuit, and very likely represents the major portion of the resistance of it, so that the output can be reduced and wasted through this cause. A condenser (of .0003 μf or so) placed directly across the filament of a valve will short circuit the ends and lower the resistance, as far as the R.F. is concerned.

The input capacity of one triode is only 4.2 μμf, and with the two halves used in push-pull, this is in series across the tuned circuit, and is only 2.1 μμf. Similarly, the output capacity is reduced to the extremely low figure of just over 1 μμf! This means that very small tuning condensers will satisfactorily cover a fairly wide frequency range, whilst the coils can be considerably larger than usual, this again making for increased efficiency.

The valve is rated at the useful figure of 25 watts total input. The man who is licensed for 10 watts will be glad to know that the valve works extremely well on inputs of this figure or less and gives more R.F. energy out than any other the writer has used. When a 25-watt licence is obtained, the input can be run up to this figure, with increased output.

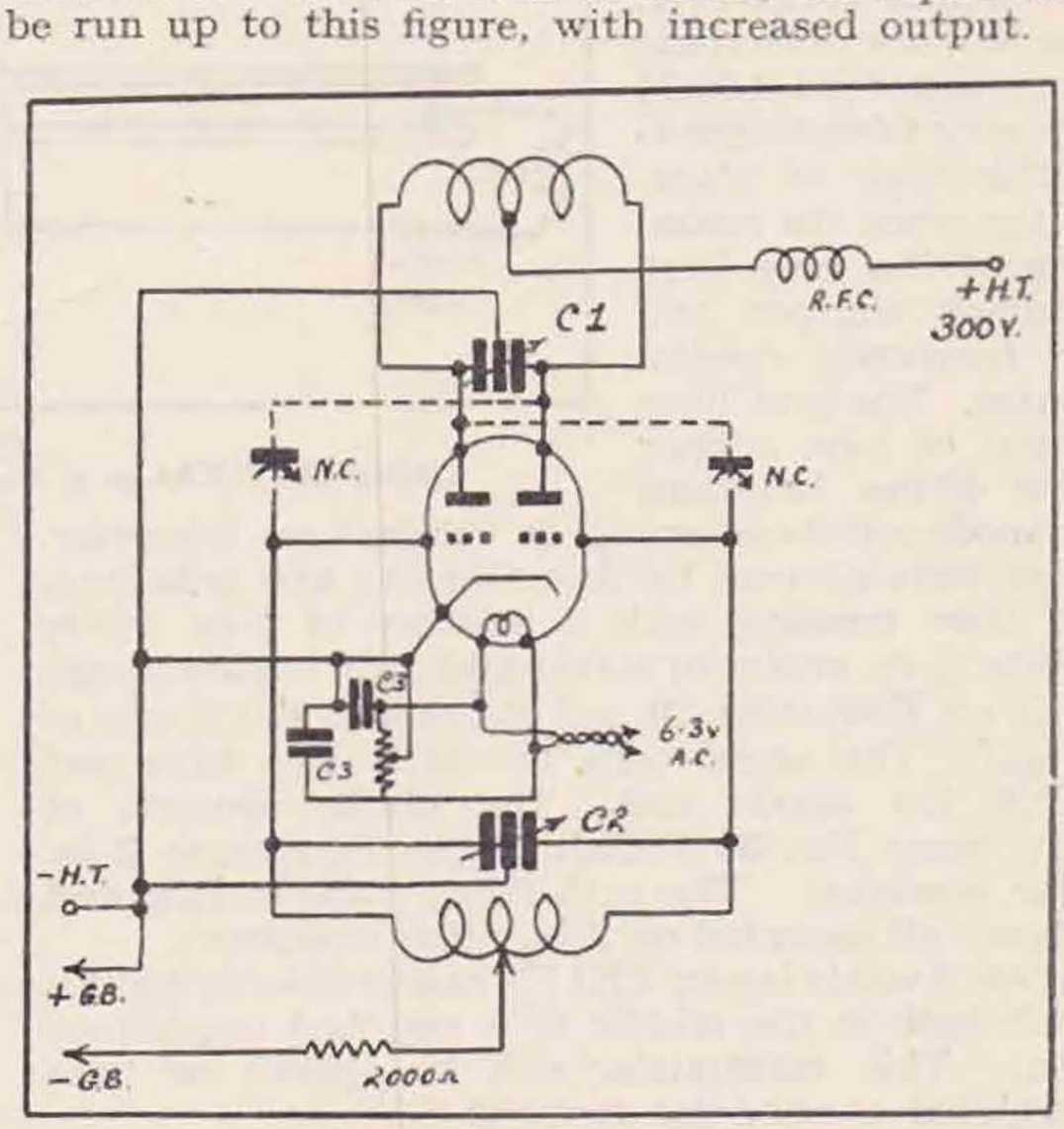


Fig. 1.
A Push-pull Self-excited Circuit.
C1 50 μμF each section.
C2 25 „ „
C3 .0003 μF.

Practical Transmitters.

In Fig. 1 is given the circuit when the R.K.34 is used in the normal tuned-grid tuned-plate self-excited transmitter. The grid tuning condenser can be omitted if desired, but this is not recommended, as the output will tune very sharply to a peak at the resonant grid frequency, and will not hold over a fairly wide band, as is usually the case in "resonant grid" circuits. The coil sizes

*R.E.S. 56 Mc Transmitter Design Manager.

are five turns 16 s.w.g. $\frac{3}{4}$-in. diameter grid, and three turns $1\frac{1}{4}$-in. diameter silver-plated 14 s.w.g. anode, both centre tapped. The tuning condensers must be physically small and have low minimum capacity, high r.f. insulation and no surplus metal used in their construction. This applies throughout this article, and *Messrs. Jackson's* " J.B. Midget " series are recommended as fulfilling these conditions.

This circuit is a good one for a portable transmitter, and the note resulting is so sharp and clean, with D.C. as the heaters and anodes, that it is possible, with careful adjustment of the aerial load, to use C.W. and obtain a T8 note. Incidentally, whatever circuit is used with this valve the note will be found much sharper than usual. Most amateurs who have used directly-heated valves lit with raw A.C. know the very rough note that results. With the unipotential cathode, raw A.C. heating produces no modulation of the note, and a very clean signal still results.

Using this circuit, with 200 volts on the anode, and an input of 6 watts, it is possible to strike a neon lamp on the output tank fairly brilliantly, and the actual output is nearly 3 watts. The energy fed to the aerial is considerably greater than is usually the case with this input.

Fig. 2 gives a circuit of a long lines transmitter using this valve, and is due to ZE1JN. The low inter-electrode capacities of the R.K.34 are very advantageous in this type of transmitter, since the resonance of the long lines is much sharper and the frequency control greater. The grid lines consist of $\frac{1}{2}$-in. copper tubes 40 ins. long and the anode coil three turns $\frac{3}{16}$-in. tubing 2-ins. diameter. These were silvered by first cleaning and polishing, and then treating with a mixture of $\frac{1}{4}$-oz. silver nitrate, $\frac{1}{4}$-lb. cream of tartar and $\frac{3}{4}$-lb. common salt. C1 is an *Eddystone* 20 $\mu\mu$f microdenser, C2 one of 40 $\mu\mu$f. The aerial coils are each one turn and match the anode coil. The choke consists of forty turns No. 30 D.S.C. on an Eddystone 2-in. pillar insulator. The grid lines, valve-holder and coils are all mounted on 2-in. pillar insulators.

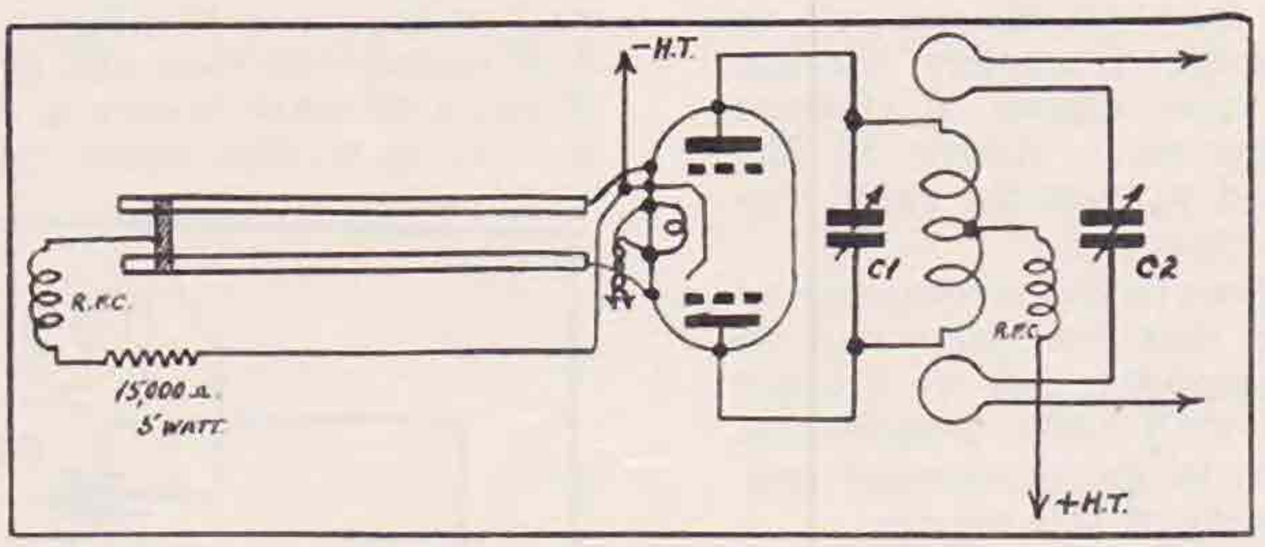


Fig. 2.
Using the RK34 as a Neutralised Power Amplifier.

With 9 watts input, ZE1JN can brilliantly light a 6-volt bulb in the middle of a matched impedance aerial. This transmitter can be speech or tone modulated or used for straight C.W.

Driven Circuits.

Turning to driven circuits with their greater frequency stability, the R.K.34 removes a lot of the trouble attending these when used at the ultra-high frequencies. Valves possessing high inter-electrode capacities by-pass a considerable proportion of the energy fed to the grid, and consequently more power must be supplied than is theoretically necessary, whilst the power gain is often little more than unity. These high capacities also make it necessary to use small coils, resulting in low L/C ratios in the tuned circuits, with consequent low efficiencies.

The same circuit as given in Fig. 1 is correct when using the R.K.34 valve as a straight push-pull power amplifier, but with the addition of neutralising condensers, as shown in dotted lines. These latter can conveniently be made from cut-down 15 $\mu\mu$f, as the capacity required is very small. The insulation must be high, and the capacity to the chassis reduced to a minimum.

The drive is best applied *via* a link to a single turn fixed in the centre of the grid coil. This drive can be derived from a crystal oscillator followed by a series of doublers, or from an electron coupled oscillator. A very satisfactory arrangement is one R.K.34 driving another, the resulting signal being very sharp.

The grid bias required will depend on the driving power available and will be a matter for experiment, between 20 and 36 volts being suitable. Neutralisation must be carried out carefully to maintain good circuit balance, and a valve voltmeter coupled to the output tank is useful in this respect.

The rated maximum voltage is 300, but the writer has used up to 400 with, of course, increased bias and reduced plate milliamps, with some increase of output. The capacity of C1 should be reduced to a value of 20 or 25 $\mu\mu$f per section, and the coil increased to five turns.

Push-Pull Doubler.

It is in this service, with the circuit shown in Fig. 3, that the valve will prove of the utmost value. Many amateurs already have available a controlled 28 Mc. output, and it is only necessary to apply this *via* a link to the grid circuit of the R.K.34, the coil now being one of nine turns, 1-in. diameter, and increase the bias somewhat to obtain a very effective 56 Mc. transmitter.

It is absolutely essential that the grid input condenser be of the split stator type, with the rotors earthed.

Neutralisation is also very necessary, as the whole circuit will go into self-oscillation if this is omitted, despite the difference in the size of the grid and anode coils.

The output is much more than when using a single valve, due to the fact that the output tank receives an energising impulse every half-cycle instead of every cycle.

Whilst this article has been written from the point of view of the 56 Mc. enthusiast, it is emphasised that an improved performance will be obtained on the lower frequency bands. For instance, the anode circuit can be arranged for use with the anodes in either push-pull or parallel, and the valve used as a straight amplifier on, say, 14 Mc., and a doubler on 28 Mc., with extremely satisfactory results.

The R.K.34 is obtainable from *Eves Radio*, of Wolverhampton, the price of 26s. being very reasonable for a 25-watt valve possessing distinctive characteristics.

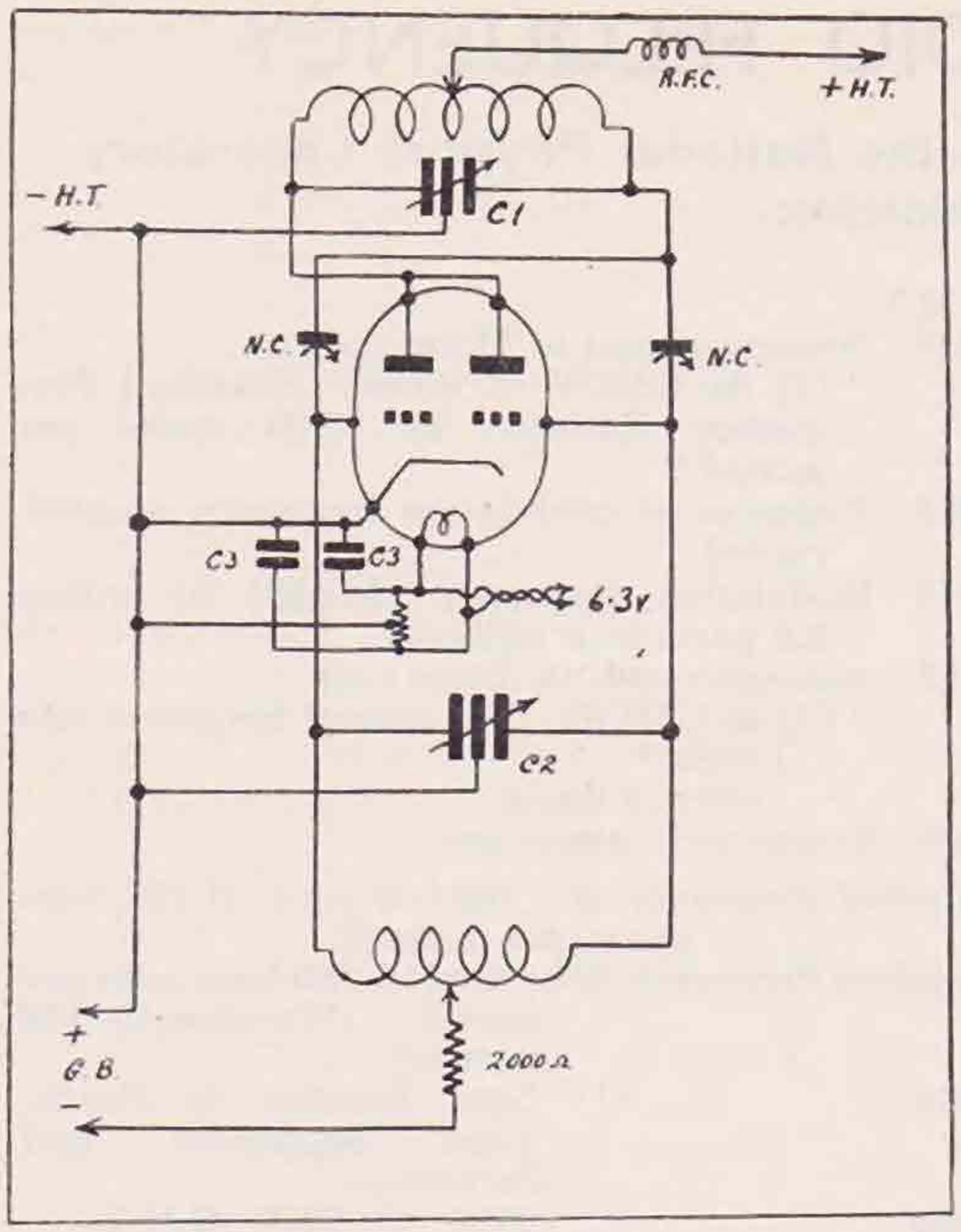


Fig. 3.

Connections when Push-push Doubling
Values of C as for Fig. 1

R.K.34 Characteristics.

Heater Rating :

Voltage	...	...	6.3 volts.
Current	...	...	0.8 ampere.

Inter-electrode Capacities :

Grid to plate	...	...	2.7 μμf.
Input	...	...	4.2 ,,
Output	...	...	2.1 ,,

"Class B" (Power Amplifier) :

Plate voltage	...	...	300 volts (max.).
Peak plate current	...		125 mA. (max.).
Average plate dissipation			10 watts (max.).

Typical "Class B" Operation :

	(a)	(b)	
Plate	180	300	volts.
Grid	—6	—15	volts.
Static plate current	15	15	mA.
Load resistance	6,000	10,000	ohms.
Nominal power output	7.2	12	watts.

(For 100-v. peak input, grid to grid.)

"Class C" (Push-pull Amplifier or Oscillator) :

Plate	...	...	300 volts (max.).
Grid	...	...	—36 volts.
Average plate current	...		80 mA.
Plate dissipation	...	...	10 watts (max.).
Grid current	...	...	18 mA.
Grid resister	...		2,000 ohms.
Power output	...	...	14 watts.

The fixed bias should be at least 15 volts to protect the valve in case of failure to oscillate.

Determination of Frequency in the 56 Mc. Band

By A. C. Gee (G2UK).

NOW that television transmissions can be received over a wide area in and around London, a simple method of determining the frequency of a transmitter operating in the 56-60 Mc. amateur band becomes available.

The only apparatus required is a crystal oscillator working between 7000-7300 kc. capable of producing harmonics at sufficient strength to be used for calibration purposes.

Assume the fundamental crystal frequency to be 7140 kc. (approximately 42 metres), then :—

2nd harmonic is	$\frac{42}{2}$	= 21	metres
3rd ,,	$\frac{42}{3}$	= 14	,,
4th ,,	$\frac{42}{4}$	= 10.5	,,
5th ,,	$\frac{42}{5}$	= 8.4	,,
6th ,,	$\frac{42}{6}$	= 7	,,
7th ,,	$\frac{42}{7}$	= 6	,,
8th ,,	$\frac{42}{8}$	= 5.25	,,
9th ,,	$\frac{42}{9}$	= 4.65	,,

If, now, the 56 Mc. receiver is switched on and tuned across the band, the 7th, 8th and 9th harmonics should be picked up, assuming, of course, that the coverage is sufficient for the purpose. (This means that the receiver must cover from approximately 6.1 to approximately 4.5 metres.) Providing these three harmonics can be definitely identified, it is a simple matter to fully calibrate the receiver. The method of achieving this is outlined below :—

First tune in the vision and/or sound transmission (the vision is on 6.67 metres and the sound on 7.23 metres). Now, by tuning down from the sound channel a strong harmonic should be encountered just before the vision signal is heard, this is the 6th harmonic which, in the case quoted, falls on 7 metres. Passing through the vision channel, the 7th harmonic will be heard on 6 metres. Proceeding further, the 8th harmonic will be logged on 5.25 metres, which is well in the amateur band. To complete the calibration, the 9th harmonic on 4.65 metres should be found as this will enable an accurate calibration curve to be prepared.

This method has been found to work very well in practice, the 56 Mc. transmitter being tuned right on to the 8th harmonic of the 7 Mc. crystal.

The reader is referred to a recent article dealing with harmonics written by Mr. D. Gordon Bagg and published in the June, 1936, issue of this journal.

Copying Contest

As only eight members signified their interest we do not feel justified in arranging a Copying Contest.

STANDARDS OF RADIO FREQUENCY

Emission of frequencies of reference from the National Physical Laboratory, Teddington, Middlesex.

THE National Physical Laboratory undertakes the emission of two types of frequency of reference for standardising purposes under the call-sign G5HW. One is in the form of a modulation of 1 kilocycle per second and the other a radio frequency of 1,780 kilocycles per second.

Frequency of 1 *Kilocycle per second* (1,000 *Cycles per second*.

This standard frequency emission takes place at 1040 G.M.T. on the second Tuesday of each month as a modulation of a carrier wave of a length of 758 metres (frequency 396 kilocycles per second).

The modulation frequency is derived from an oscillator in continuous operation at the Laboratory which has a nominal frequency of 1,000 cycles per second. The accuracy with which this frequency is maintained is about two parts in 10 million, but during the emission the exact frequency will be measured and its correct value to one part in 10 million will be announced at the end of the programme.

After the preliminary announcement in Morse code the standard modulation frequency will be sent out for one hour continuously. This frequency will then be changed by an amount of about – 2.5 parts in a million and the emission will be continued for a further ten minutes. The object of making this change is to enable those receiving it to decide whether their own frequency of 1,000 cycles per second is above or below that of the Laboratory standard.

At the end of the emission an announcement will be made in Morse code giving any corrections that may be necessary.

Frequency of 1,780 *Kilocycles per Second*.

The second standard frequency emission is primarily intended for amateur experimenters, and in this emission the radio frequency is the standard of reference. It has a value of 1,780 kilocycles per seond, i.e., wave-length approximately 169 metres. This programme is emitted on the first Tuesday in March, June, September and December, commencing at 2100 G.M.T. The programme consists of an announcement in Morse, followed by a continuous dash, the whole lasting fifteen minutes. This procedure is repeated for three similar periods, the whole programme lasting one hour. In this case no correction to the frequency will be announced but it is expected that the frequency emitted will not be in error by more than one part in a million.

The following time-table gives the details of the programmes of standard frequency emissions described above :—

Standard Frequency of 1,000 *c.p.s.*

Standard Frequency to be used : 1,000.000 cycles per second.
Carrier Wave Frequency (nominal only) : 396 kilocycles per sec. (wavelength 758 m.)
Date : Second Tuesday in month.
Time : 1040 to 1200 G.M.T.

G.M.T.
1040 Announcement in Morse code.
"CQ de G5HW (3 times). Standard Frequency Emission at 1,000 cycles per second."
1045 Emission of modulation frequency uninterrupted.
1145 Modulation frequency changed by minus 2.5 parts in a million.
1155 Announcement in Morse code.
"CQ de G5HW. The correct frequency was
(.999x)*
(.000y (3 times)."
1200 Programme terminates.

Standard Frequency of 1,780,000 *c.p.s.* (1,780 *kilocycles per second*).

Standard Frequency to be used : 1,780 kilocycles per second. (Wavelength 169 metres.)
Date : First Tuesday in March, June, September and December.
Time : 2100 to 2200 G.M.T.

G.M.T.
2100 Announcement in Morse code.
"CQ de G5HW (3 times). Standard Frequency Emission at 1780 kilocycles per second."
2102 Continuous dash.
2115 Announcement as at 2100.
2117 Continuous dash.
2130 Announcement as at 2100.
2132 Continuous dash.
2145 Announcement as at 2100.
2147 Continuous dash.
2200 Programme terminates.

Members making use of these services would help us by sending a postcard to Headquarters.

* In this announcement of the correct value the figures before the decimal point are omitted. Thus .999x indicates a frequency of 999.999x cycles per second, and .000y indicates a frequency of 1000.000y cycles per second.

Another Knock Answered

With reference to last month's query, Mr. A. J. Forsyth, G6FO, informs us that nickel chrome wire can be obtained from *Lumen Electric Co., Ltd.*, Scarisbrook Avenue, Liverpool, 21. This concern also issue a comprehensive catalogue giving useful information regarding the home construction of transformers and chokes. It also lists "hard to get" material such as ebonite rod, sheets of press-pahn, bakelite panels, paxolin tubes, brass and aluminium in sheet, rod and strip. Useful wire tables are included.

Mr. Williams, G8DP, gives the name of *Leucos*, Church Road, Leyton, London, E.10, as a source of supply for No. 2 nickel chrome wire. No. 26 gauge of this wire has a resistance of 6.006 ohms per yard and will carry 1.23 amps for a temperature rise of 100° C., and 3.5 amps for a rise of 300° C.

Bright Ideas

Those who use a D.C. Model Avo-Minor and require a higher reading than the 300 volts maximum, can, by moving the positive plug to the 6 mA socket, obtain a new maximum of 600 volts. All three of the voltage ranges are doubled this way, and are quite accurate.

* * *

Belling-Lee type C Eliminoise cable is ideal for all screen leads. All trace of hum can be eliminated from a carrier by fitting this to the modulator input and output, and also from the microphone transformer to the microphone itself.

* * *

Drawing pins and many forms of steel clips tend to mark QSL cards. To avoid this fix the cards on to battens of wood by means of paper strips 1 in. long by ½-in. wide, folded in the middle. The one half is stuck on to the wood, and the other to the card in much the same way as stamps are mounted into an album.

* * *

Those who use any form of carbon microphone know how easy it is to forget to switch off the energising supply. A small lamp across the battery takes very little current, and will stop the waste. It can also be wired to give a visual indication when the station is " on the air."

* * *

Those who use link coupling and find they obtain feed-back from the modulated P.A. to the buffer or first stage can usually cure it by reversing the connections to one of the coils providing the link. This actually reverses the phase relationship.

* * *

A motor-car type clock can sometimes be picked up quite cheaply from the local car dump or small garage. Fitted into the transmitter panel, it looks very attractive. If a paper ring is mounted round the outer edge, the time in various parts of the world can be noted. Also best DX times can be shown by marking off on the disc the prefixes of likely countries to be heard at each period of the day.

G5OH.

* * *

No doubt many amateurs who decide to run 2.5 volt American valves from existing 4-volt tappings on their mains transformers resort to some form of resistance. This method is wasteful, and unsatisfactory because it is difficult to get the necessarily low value of resistance correct.

The following hint may be useful.

An old L.F. transformer is first obtained (the larger the core the better) and the windings removed. It is then rewound to step the 4 volts A.C. down to the required 2.5 volts ; 18 s.w.g. enamelled wire being used for outputs up to 4 amps. Eight or ten turns per volt are satisfactory for a fair-sized core such as is found on the old-type Pye L.F. transformers. There is no reason why the secondary should not be wound to give 6.3 volts or any other required voltage. The two points to remember, are :—(1) use the largest obtainable core, and (2) never use cores of the high permeability (" Mu-metal ") variety.

2BDG.

Trade Notes

TRAVEL FIRST WITH H.M.V.

When a hardened amateur writes in a eulogistic strain about the performance of a broadcast receiver it is fairly safe to assume that the instrument in question is something above the ordinary.

We recently had the opportunity of testing the new *H.M.V.* Model 482 Receiver, and as a result have no hesitation in recording that its selectivity, sensitivity and tonal quality are of the highest order. This is a 7-valve A.C. all-wave superhet, employing fluid light tuning, and a large vernier scale which rotates as the two-speed tuning knob is revolved. The latter device permits a note being made of the precise tuning position of all stations logged on the short wave band.

In the case of the fluid light indicator the ends of the two arcs are wide apart when the receiver is not tuned to a station, but as the desired station is brought into tune the arcs converge, thus ensuring exact adjustment.

The performance on the short-wave band (16.7 to 54 metres) would satisfy the most critical purchaser, for every worth-while station can be brought in at full entertainment value. Using a short indoor aerial, the American programmes can be guaranteed to provide a full evening's entertainment, whilst more distant stations can be obtained at excellent strength. The selectivity is of a very high order, and the vexatious second channel interference feature common to many short-wave sets has been entirely eliminated.

On the medium and long-wave bands, using the same aerial, excellent entertainment is possible from upwards of sixty stations.

As a point of amateur interest the receiver would prove a most useful stand-by for 'phone work on 7 and 14 Mc. if the normal amateur bands receiver was for some reason not available.

It is recommended by the makers that an *H.M.V.* all-wave Anti-Static aerial be used with this instrument, but from our own tests we do not feel that this is necessary in an ordinary house, although when installed in flats and in premises adjacent to busy traffic routes, it would be invaluable. We can recommend this receiver with every confidence to those who desire to *Travel First* across the ether.

Correction

In the article entitled *A Simple Carrier Suppressor*, published in our last issue, the values of C2 and R1 beneath Fig. 3 should be 8 μF and 3,000 ohms, respectively. C2, R1 mentioned in the text refers to Fig. 1.

In Fig. 2 the condenser C1 should have been shown across the output of the rectifier bridge.

THE SECOND INTERNATIONAL 28 Mc. CONTEST

HOW often have the Tests and Awards Committee lamented the fact that certain persons who enter R.S.G.B. contests fail to submit a log because they have discovered that their score has been exceeded by others? The Second International 28 Mc. Contest has provided further proof of this contention, much to the regret of those who organised it on behalf of the Society.

Those of us interested in 28 Mc. work knew months before the Contest concluded that Mr. George Shoyer (ZS1H), of Capetown, held a commanding lead over his nearest opponent, Mr. D. Heightman (G6DH), but we did not imagine that this information would hold back literally hundreds of amateurs from sending in an entry.

The returns are even more disappointing to the organisers because they are conscious of the fact that it was due to their incentive that the recent activity on 28 Mc. reached such a high level.

Looking over the meagre list of entrants, one is compelled to observe that the names of most of the well-known British DX operators are missing, and yet we are certain that these same persons enter for other DX Contests knowing quite well that their score will be far below the leaders.

After expressing our disappointment let us avail ourselves of the opportunity of most heartily congratulating Mr. Shoyer on his amazing performance which overshadowed the splendid score put up by Mr. Heightman, of Clacton. Practically throughout the year the call ZS1H broke through to Great Britain when every other station seemed to have retired. Tenacity, plus efficiency, contributed to Mr. Shoyer's success, and although he had few serious competitors, we feel sure the work he achieved will do much to prove to the authorities and others that communication between South Africa and England (to mention only one case) is infinitely more reliable at certain periods on frequencies around 28 Mc. than on any other. We hope at an early date to publish a detailed account of Mr. Shoyer's observations.

Already the Council have demonstrated their appreciation of Mr. Heightman's efforts by awarding him the Powditch Trophy for the current year. Seldom has a trophy been more deservedly won. In this issue we publish Mr. Heightman's personal account of his year's work, and in doing so we are confident that his contribution will be read with considerable interest by amateurs and professionals alike.

It is unnecessary in this report to discuss "Conditions" because this aspect of the subject has been admirably covered by Miss Corry in her monthly commentaries, but it may be of interest to others if we record brief details of the gear used by some of the competitors.

Equipment Used.

ZS1H employed a C.O. F.D. F.D. F.D. P.A. arrangement with an input around 50 watts. Numerous aerial systems were used, but the two in general operation were :—

(1) Vertical array without reflectors giving a gain of from four to five dB, and

(2) A horizontal beam array with four reflectors giving a gain of about nine dB or eight times power. This array produced reports two points higher than the first-mentioned system.

Array No. 1 invariably gave a 4-point increase in the S scale over a good 14 Mc. aerial when used on 28 Mc. The power gain was approximately four.

Array No. 2, which consisted of four half-wave aerials, two being half-wave above the other pair was fed from the centre, and resembled an H sideways. Both systems were designed for low angle radiation, and in particular No. 1 in which the main lobe was between 15 and 17 degrees, with good radiation as low as 10 degrees.

Two bi-directional aerials were used earlier in the year, one consisting of four, and the other of twelve phased half-wave aerials. The same aerial was used for reception and transmission. A National FBXA with two preselectors was in service.

Order of Merit.

Name.	Call.	Location.	Pts. Scored.
G. Shoyer	...ZS1H	Capetown ...	147,861
D. Heightman	...G6DH	Gt. Clacton	48,431
H. E. Jacobs	...PA0AZ	Hilversum ...	37,786
R. L. Belstead	...VK4EI	Townsville ...	29,624
H. F. Eliæson	...SM6WL	Motala ...	7,567
H. V. Wilkins	...G6WN	Hanwell ...	6,815
J. Clarricoats	...G6CL	Palmers Green	6,293
E. J. Williams	...G2XC	Portsmouth	6,057
A. G. Parker	...G6QZ	Norwich ...	5,185
L. Kiss ...	...HA8C	Budapest ...	3,996
E. Zavadil	...OK2HX	Ostrava ...	3,924
R. H. Jackson	...G6ZU	Stockport ...	2,666
L. E. Crabbe	...G6VF	Bristol ...	2,631
J. N. Walker	...G5JU	Bristol ...	2,090

Mr. Shoyer's log ran to no less than 70 pages of typed fooscap, and allowing 30 contacts per page, it was seen that during the year he worked approximately 2,100 stations, giving an average of about 40 contacts per week. No attempt has been made by the compiler of this report to discover the number of *individual* stations worked by ZS1H, but it is fairly safe to assume that the total was well in excess of 1,000. Is it to be wondered, therefore, that the organisers were disappointed to find that only 14 amateurs had retained sufficient interest in the Contest to forward a log?

A description of Mr. Heightman's gear appears elsewhere in this issue, but some comments concerning his log are included here for the purposes of record.

Under the R.S.G.B. method of scoring (i.e., fixed points for Canadian and U.S. stations worked) Mr. Heightman amassed 48,431 points, but when his score was computed accurately on the basis of one point for every 100 miles of Great Circle distance worked a total of 57,790 was obtained. As was

explained at the time when the fixed scoring system was introduced, the change was made for the convenience of European and North American competitors. It will be noted from the table that although Mr. Heightman lost nearly 10,000 points by the introduction of fixed scoring, his total is still far above his nearest competitor. His best month was November, when 10,975 points were registered. October gave him 9,626, whilst March was the third best month, with 7,787. Only 122 points were scored in August, and 134 in July. Mr. Heightman's log occupied 47 pages, with 30 entries per page, giving a grand total of some 1,400 contacts for the year.

Herr Jacobs (PA0AZ), of Hilversum, Holland, with a total of 37,786, had 939 contacts, each QSO averaging 40 points. His transmitter employed an 860 in the final working with an input of 50 watts. The aerial used was of the semi-vertical, full-wave 14-Mc. Zepp. type, 50 ft. high, and running E.S.E.-W.N.W.

Mr. Roy Belstead (VK4EI) put Australia on the map by scoring 27,624 points. His transmitter employed three or four stages, and the input varied from 30 to 100 watts. A four valve T.R.F. electron-coupled detector receiver was employed, whilst his aerials were a full-wave 7 Mc. Zepp. and an 8-wire beam trained on U.S.A. His station is located at Townsville, Queensland. He had 250 European, 225 North American, 135 Oceanic, 45 Asian, 15 South American and 10 African contacts; but he was seldom on the air during the best times for contacts with U.S.A., although from his observations he considered conditions were less favourable in Queensland than in the Southern States of Australia.

Mr. Wilkins (G6WN) used a Tritet C.O. with 7 Mc. crystal, followed by an MPT4 acting as a 28-Mc. doubler, link-coupled to an RFP60, giving an input of between 60 and 100 watts. The aerial was an end-fed Hertz, 68 ft. long, coupled to the tank circuit by means of a Collins' network. The receiver was a 2-valve all mains job, coupled to the transmitting aerial.

G6CL employed similar gear as G6WN, except that a pair of RFP60s were used in the final stage, which was either link or directly coupled via a Collins' network to 16-ft. feeders, and a 66-ft. top. The aerial was approximately S.S.W-N.N.E. An *Eddystone* Ham Band 2 receiver with indoor aerial was used.

G2XC employed an input of 45 watts to a PX25 with either a 7 Mc. Zepp. or a 28-Mc. matched impedance aerial.

Conclusions.

In concluding this account we desire to express our thanks to those who entered. The special Trophy presented to the winner is being forwarded direct to Mr. Shoyer, and it is hoped that this recognition of his prowess will prove of some compensation to him for the tremendous amount of time and study he devoted to the contest. J. C.

Correction

Mr. Parker (G8FL) has kindly drawn our attention to a printer's error in the article on Decibel Standards on page 443 of the April issue.

$\frac{10}{1} \div \frac{2}{15}$ to 1, should read $\frac{10}{1} \div \frac{2}{1} = 5$ to 1.

AROUND THE EMPIRE—No. 7.

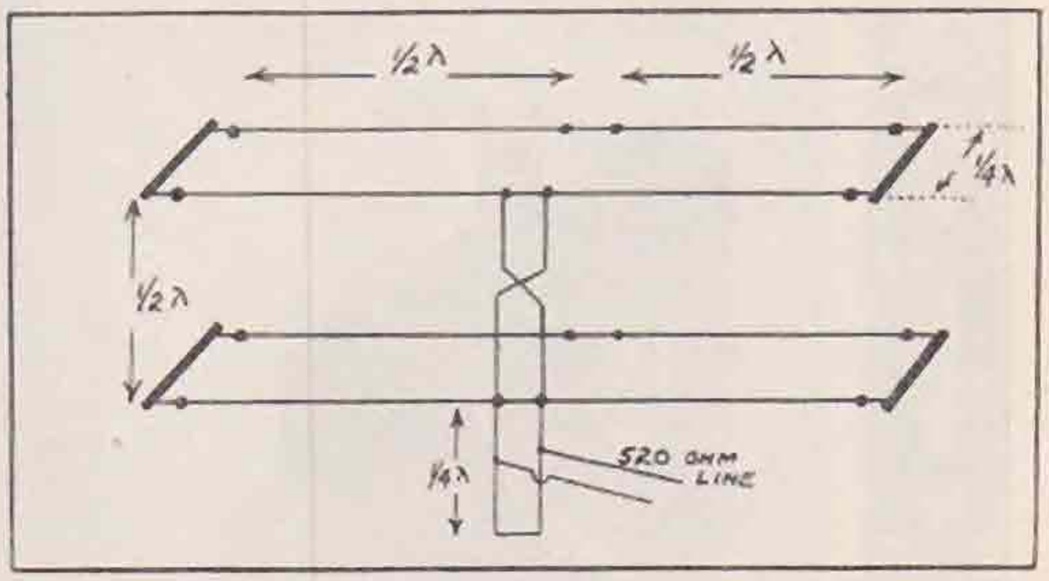
ZS1H, Winner of 1936 International 28 Mc. Contest.

ZS1H commenced operation on 28 Mc. during May, 1935, when the 14 Mc. transmitter was partly reconstructed to give a final line up which consisted of CO, FD, FD, FD, PA, with valve keying in the first doubler stage.

Home-made band-spread coils were used in the *National* FBXA, to which was added two pre-selector units. The 14 Mc. beam array was dismantled, and a vertical Franklin co-linear array with matching stub and 120-ft. twin impedance line was erected in its place. In addition, a horizontal aerial was cut for 1½-wave operation on 28 Mc. The Franklin array proved to be definitely superior to the horizontal aerial, both for transmission and reception, due no doubt to the lower angle of radiation and power gain. Further experiments were conducted with low angle radiators varying from 4 to 12-phased elements, but the latter array proved disappointing on account of tapering current towards the end elements. This could have been cured by arranging for two or three feed points, but as ZS1H did not possess an impedance meter for matching purposes, the idea of large arrays was abandoned. The final arrangement consisted of 4 phased horizontal elements and four reflectors as shown below.

Mr. G. A. Shoyer, ZS1H, of Rondebosch, Cape Town, winner of the 1936 28 Mc. International Contest, at the base of his mast.

This array proved to be a useful low angle radiator, and, according to Southwell, has a gain of 9dB, or eight times power over a half-wave aerial.



A diagrammatic sketch of the 4-phased horizontal array with 4 reflectors used by ZS1H last year.

In addition, it is excellent for reception due to good signal to noise ratio.

Each array was connected through a separate impedance line *via* double-throw double-pole switches to the transmitter or receiver, thus enabling quick change-over of direction, etc., to be made as required.

The transmitter has recently been entirely rebuilt for operation on 56 Mc., using C.W., the arrangement being CO, FD, FD, Buffer, FD, PA output. The FBXA and preselector units have been altered for 56 Mc. operation, using the second harmonic of the 28 Mc. oscillator. Small coils have been soldered direct on to the detector and radio frequency tuning condensers.

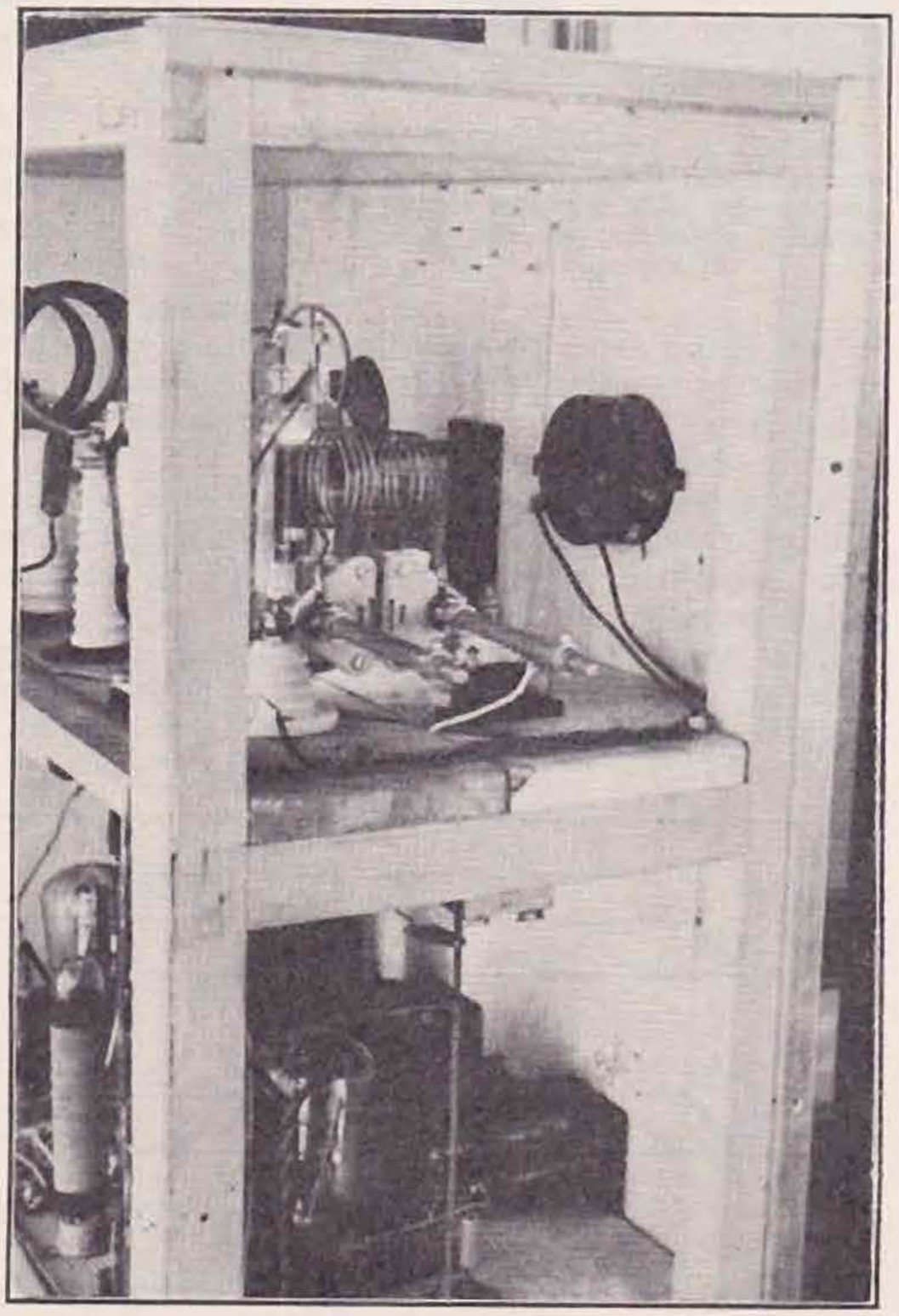
The 28 Mc. arrays have been dismantled, and at present a folded Franklin uniform current array is in use, but no DX has been heard so far.

An electron coupled oscillator cum monitor, 100 kc. quartz bar oscillator, typewriter, switchboard and an electric automatic sender comprise the balance of the apparatus.

The 28 Mc Gear at G6DH

By Dr. G. Bloomfield.

BURRS ROAD, Great Clacton, Essex, is about three miles inland from the better-known seaside resort, Clacton-on-Sea ; it is a rather long and winding road, in which town planning as applied to systematic numbering of houses appears to have run completely amok ; however, the presence of several neat aerial arrays immediately indicates the home of G6DH.



Final Amplifier and 28 Mc. Doubler on top shelf. CO and 7, and 14 Mc. Doublers on lower shelf.

Inspection of the log confirms the reputation which this station has gained of being one of the most efficient DX stations on the higher frequencies —if further confirmation is needed, the " Powditch " Trophy displayed on top of the transmitter furnishes sufficient evidence.

Activity first commenced early in 1928, at which time equipment was rather diminutive, consisting of a 2-valve receiver and 3-watt self-excited transmitter. However, in March signals were logged from U.S.A. and Russia and in October of that year G6DH was heard by W2JN, after which several contacts with U.S.A. were effected.

The present transmitter is of rack and panel construction, capable of operating on 7, 14, and 28 Mc., with inputs up to 50 watts c.w., and 40 watts telephony ; the final amplifier is an " Eimac " 50T presented by W1DMV as a token of appreciation of his visit. Other evidence of visits by a number of well-known amateurs is suitably recorded in the Visitors' Book, of which Mr. and Mrs. Heightman are justly proud.

The receiver at G6DH is worthy of special mention, combining maximum efficiency with minimum size, the overall dimensions are only 7 in. by 6 in. by 7 in. Until recently an O-V-Pen was exclusively used, but an R.F. amplifier has now been added and proves a useful addition even at ultra-high frequencies. Such is the design of the receiver that no lead carrying R.F. has any length worth mentioning !

A number of aerials are available, but those used on 28 Mc. are a 66 ft. wire for reception and two bi-directional arrays of the horizontal four half-waves-in-phase type for transmission. One array radiates north-east for Asia, Australia and New Zealand and south-west for South America, while the other radiates north-west for U.S.A. and Canada and south-east for Africa ; in this way all parts of the world can be covered by a single change-over switch.

G6DH attributes his successes first to careful attention to design of transmitter, receiver, and aerials, second to regular operation, third locality, and fourth Mrs. G6DH. These notes would be incomplete without mention of Mrs. Heightman, who in addition to being a charming hostess is herself a radio enthusiast.

In addition, an ingenious home-made automatic sender is available to take charge of test calls and schedules, Should circumstances demand it (and the G.P.O. permit it !) unbroken 24-hour operation is possible at G6DH.

Empire Calls Heard

J. M. Kirk (G6ZO), 205, Great North Way, Hendon, London, N.W.4. January to March, 1937.

14 Mc., CW. : vu2ba, au, da, dy, cq, 7fy, vk2ae, bz, dg, fm, hp, oc, px, ny, ti, tv, xl, xv, zh, 3bj, cx, dd, eg, jk, jt, oc, ng, qr, rw, mr, zz, 4el, yl, 5gf, hd, ml, qa, wk, wr, 6fo, sa, 7ab, zl1ak, dm, fe, ke, hy, 2ci, cw, fa, gn, mm, mn, hb, oq, qm, qt, 3gn, ab, jr, 4ac, af, ao, bq, ck, fs, gg, zt1r, 2q, 5z, 6n, zu1v, 6af, zs1ah, 2x, 6am, vs6ag, ah, vs7jw, ra, rf, vs8aa, vs9al, ze1je, jf, jv, vo3o, p, x, vp1aa, 5ad, 5pz, 6mr, 8b, zc6aq, st2lr, ve5gi, 9al, vq4cri, vq8aa, ab, af.

7 Mc. CW. : vp5pa, vo4y.

Rx : O-V-Pen. Indoor aerial 14 ft. long.

The 28 Mc. Band

By Nelly Corry (G2YL).

CONDITIONS during April were again very similar to those of a year ago, and definitely showed no improvement. Up to the 12th they were fairly good, but from then until the 27th (the last day covered by this report), the band was often dead for hours on end. On several days, viz., April 13, 14, 20, 21, 26 and 27 nothing was audible except a few commercial harmonics.

VK2GU was the only Oceanic signal heard, and during a QSO with G2XC on April 25 he reported that conditions in VK had been very poor recently, and though he had heard many W's they were all weak. Asiatic signals came through on nine days, and included J2CF, J5CC, PK3ST, VS6AH, VU2CQ, and harmonics of VS6AB and VU2BQ. On April 25 VU2CQ reported that he works on 28 Mc. from 14.00 to 16.00 G.M.T. daily, but his harmonic has been heard at all hours from 09.30 to 19.00 G.M.T. 2BFL heard VS6AB's 'phone harmonic up till 17.00 G.M.T. on the 11th, and G6DH heard JNJ at 21.40 G.M.T. on the 9th, and at 20.15 G.M.T. on the 22nd. Presumably the latter signals had travelled "the long way round."

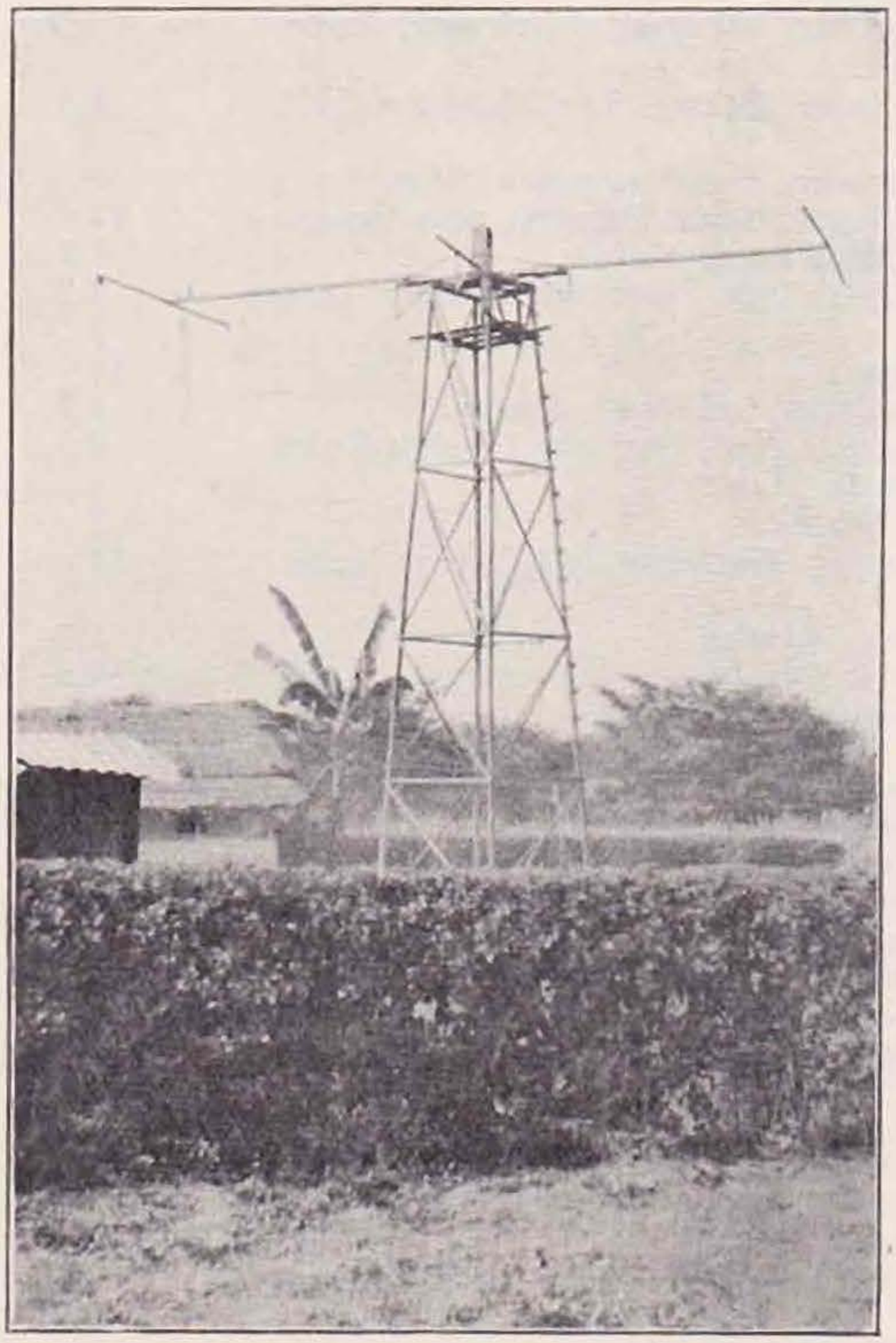
Africans were heard on ten days, as compared with 24 in 1936, but this difference can easily be accounted for by the fact that ZS1H has migrated to 56 Mc. Those heard included a record number of Southern Rhodesians, viz., ZE1JF, 1JJ, 1JR, 1JS and 1JU, and also SU1SG, ZS1C, ZS6AJ, ZS6Q, ZT6AU and ZU6P.

Northern Americans were heard daily from April 2 to 12, then again from the 15th to 17th and 22nd to 24th inclusive, but their signals were much less consistent than at any time during the last six months. On some days only East Coast stations were heard, while on others only a few weak W6's came through. On March 10 at 19.30 G.M.T. BRS25 logged all W districts in 18 minutes, but anyone wishing to beat this will have to wait till next autumn! Central and South Americans were audible on 12 days, and included CM7AB, FM8AA, HI7G, K4DDH, K4EPO, K5AY, LU7AZ, PY2AC, PY2HQ, PY3AB, PY3BP, VP2AT and VP5PZ.

On nearly every day skip distance was too long to allow European signals to be heard, and the only ones reported were from F, OH, YL, YR and U. G6DH, who worked stations in J, K5, PY, SU, VE, VP5, VS6, W, ZE, ZT6, only had one European QSO, with U5YB; and G2XC, who was W.B.E. during the month, only heard three Europeans.

In reply to G6CL's queries of last month, ZB1L was working on 14 Mc., and the only "theory" about the predominance of 'phone over c.w. signals, which seems to be generally accepted, is that a large number of amateurs have discovered that, when conditions are good, 28 Mc. is the best band on which to work DX with QRP, or QRO, 'phone.

A curious atmospheric condition, christened the "Hissing Phenomenon" by the 28 Mc. Propagation Groups, was first reported by G6DH in March, 1936, and has since been commented on by at least a dozen G's. This takes the form of a sudden increase of background noise over the whole band, and usually lasts from ten seconds to two or three minutes. The QRK may be anything from R1 to R9 and is subject to violent fluctuations, but when very high it blots out everything but the loudest signals. It has been heard on battery O-V-1 receivers and S.S. Supers, in various parts of England, and on 56 Mc. as well as 7, 14 and 28 Mc., but it is usually strongest around 28 Mc. It is definitely due to some form of intense solar activity, and on at least seven occasions has been heard on the same day as a Dellinger Fade-out, though not necessarily at the same time. Last month it was heard on April 3, 4, 14, 21, 24, 25 and 26, and on the 25th was a steady R7 from 06.45 to 07.00 G.M.T., at G6DH, who unfortunately had to QRT at the latter hour. It is significant that during the same 24 hours Baldock had a complete fade-out of U.S.A. signals for three hours, and the Aurora Borealis was visible in the South of England. All three phenomena were presumably connected with the unusually large sunspot group which suddenly developed a few days previously.



Our photograph shows the rotating beam in use by VU2DR.

Break-in

Mr. W. D. Ingle, GM2BD, uses break-in on 7192, 7065, 14384 and 14140 kc. Keying is in the common centre tap, thus avoiding a spacer when the key is open. A s.s.s receiver without an audio stage is used.

NATIONAL FIELD DAY, 1937

THE rules for this event were published in the March issue of this journal.

All official British portable stations will call "Test N.F.D." and will suffix their calls with the letter "P." Members of the Society who wish to operate private portable stations during this event are asked to suffix their call with the letter "P," but to prevent confusion with the official stations they should refrain from calling "Test N.F.D." We recommend that the operators of these private stations either reply to "Test N.F.D." calls, or send "Test Port."

No information has reached us regarding the possible support from overseas, except that we understand the Alexandra group will again operate under the call SU1A and the Cairo group under the call SU1C.

We publish below a full list of call signs and locations of official British Isles stations taking part in the event.

District.	Call Sign.	Site of Station.	Bands to be used. Mc.
1	G2OA	Clegg Arms, Heswell, Cheshire	1.7
	G2JT	Frodsham Hills, Frodsham	3.5
	G2OI	Grant's Farm, Walmsley, Nr. Bury, Lancs.	7 and 14
2			1.7
	G5HK	The Lodge, Lodge Lane, Lodge Moor, Sheffield.	3.5
	G5CX	Cockburn High School Sports Ground, off Dewsbury Road, Leeds 11.	7
	G6AZ	Soil Hill, Queensbury, near Bradford.	14
3	G5VM	Birds Farm, Rubery, near Birmingham.	1.7
	G6UI	Barr Beacon, near Birmingham.	3.5
	G5BJ	Birds Farm, Rubery, near Birmingham.	7
	G5GR	Dirty Gap Farm, Burton Green, near Coventry.	14
4	G2WS	Creichstand, Creich, near Matlock, Derbyshire.	1.7
	G6VD	"Charity" Field, Rotherby Cross Roads, near Melton Mowbray, Leics.	3.5
	G6MN	Meadow Farm, Kirklington, near Southwell, Notts.	7
	G2IO	Kirklington, near Southwell, Notts.	14
5	G5JU	Southlea Farm (owner Mr. Watson), Birchwood Lane, Pensford, near Bristol.	1.7
	G5BM	Mink Farm (owner Major Morse), Leckhampton Hill, Cheltenham.	3.5
	G2HX	Paradise, Painswick Beacon, near Painswick, Glos.	7
	G6RB	Russells Farm, Chew Magna Road, Dundry, near Bristol.	14
6	G6LQ	Hutton Hill, near Weston-super-Mare.	1.7
	G6GM	Featherlands Farm, Chilsworthy, near Holsworthy, Devon.	3.5
	G8AW	Near Penryn.	7
	G5SY	Sandy Bay, near Exmouth.	14
7	G6NA	Stoke Hill Farm, Stoughton, Guildford, Surrey.	1.7
	G6NZ	The field of Messrs. Brigg & Sons, Builders, London Road, Purbrook, Portsmouth, Hants.	3.5
	G6LK	Pitch Hill, Ewhurst, Surrey.	7
	G5AO	Nash's Farm, Junction of Southcote and Circuit Lanes, Reading.	14
8	G5JO	Mustills Mill, Swavesey, Cambs.	1.7
	G5JO	Mustills Mill, Swavesey, Cambs.	3.5
	G5PU	Wilkinson's Farm, Madingley, Cambs.	7
	G6WA	Hill Farm, St. Ives, Hunts.	14
9	G6FB	Lamsey Lane, Heacham Beach, near King's Lynn, Norfolk.	1.7
	G5QO	Whitehouse Farm, Blundeston, Suffolk.	3.5
	G6UA	Boundry Park Stadium, Boundry Road, Norwich.	7
	G6TI	Reavells Sports Ground, London Road, Ipswich, Suffolk.	14
10	G2JL	Penyrheal Farm, Wentwood, near Newport, Mon.	1.7
	G2OP	The Burrows, Freshwater East, Lamphey, Pembs.	3.5
	G2NG	Ty-Isaf Farm, Blackwood, Mon.	7
	G5KJ	Llangennech Park, Llangennech, near Llanelly.	14
11	G6KY	Prestatyn Mountain, Flintshire.	1.7
	G6KY	Prestatyn Mountain, Flintshire.	3.5
	G6AA	Llanelian Mountain, Denbighshire.	7
	G6AA	Llanelian Mountain, Denbighshire.	14
12	G5UM	Welwyn Heath, Herts.	1.7
	G6XN	Post Office Stores Dept., Sports Ground, Barnet Gate, Arkley, Herts.	3.5
	G6ZO	Mote Mount Park, Mill Hill, N.W.7.	7
	G5BO	Woodcock Lodge Farm, Tylers Causeway, near Hertford, Herts.	14

District.	Call Sign.	Site of Station.	Bands to be used. Mc.
13	G2RC	Westerham Heights Guest House Grounds, Westerham Hill, Kent.	1.7
	G2TH	Great Norman Street Farm Grounds, Ide Hill, Kent.	3.5
	G5PY	Dulwich Hamlet Football Club Ground, Champion Hill, S.E.	7
	G2WV	Westerham Heights Guest House Grounds, Westerham Hill, Kent.	14
14	G6LB	Rails Farm, East Hanningfield, Essex.	1.7
	G6QK	Cleeve Hall, Manuden, Essex.	3.5
	G5UK	Thundersley Glen, Thundersley, Essex.	7
	G6UT	Rookwood Hall, Abbess Roothing, Essex.	14
15	G6WN	Rush Green Farm, Denham, Bucks.	1.7
	G5VB	Pond Farm, Wisley Hut, Surrey.	3.5
	G6CJ	Mr. Hatt's Farm, Speen, High Wycombe, Bucks.	7
	G6YK	Mr. Hatt's Farm, Speen, High Wycombe.	14
16	G6SY	Colliers Hill, near Broad Oak, Mersham, near Ashford, Kent.	1.7
	G2UJ	Pococks Farm, Frant, Sussex.	3.5
	G21Z	Chalk Field, Edwards Farm, Chalk Road, Gravesend, Kent.	7
	G5JZ	Brightling Needle, Brightling, Sussex.	14
17	G8FC	Cranwell, near Sleaford, Lincs.	1.7
	G8FC	Cranwell, near Sleaford, Lincs.	3.5
	G2VY	Humberstone Foreshore, near Cleethorpes, Lincs.	7
	G6GH	Old Hall Close, Baumber, Horncastle, Lincs.	14
18	G6UJ	Garton-on-the-Wolds, near Driffield, Yorks.	1.7 and 3.5
	G6CP	Oliver's Mount, Scarborough, Yorks.	7
	G5GC	Southwold Farm, Elloughton, E. Yorks.	14
19	G2LD	Near Tynemouth Castle, Tynemouth, Northumberland.	1.7
	G5WZ	Whiteleas, South Shields.	3.5
	G8GL	Hylton Grange, Northallerton, Yorks.	7
	G2FO	Hylton Grange, Northallerton.	14
Scotland,	GM5TY	Temple House, Baldernock, near Torrance, Stirlingshire.	1.7 and 3.5
A. & E.	GM8AH	Parklea Farm, Carmunnock, Renfrewshire.	7
	GM6MS	Lickprivick Farm, near East Kilbride, Lanarkshire.	14
B.	GM2OX	Bucklerburn, Peterculter, near Culter.	1.7
	GM6VO	Post Office, Netherley, by Stonehaven, Kincardine.	3.5
	GM6BM	Oldtown Farm, Aboyne, Aberdeenshire.	7
	GM6IZ	Bucklerburn, Peterculter, near Culter.	14
C.	GM5SC	Downiebank Farm, Monikie, Angus.	1.7
	GM6RI	Downiebank Farm, Monikie, Angus.	3.5
	GM6RT	Monikie, Angus.	7
	GM8CF	Monikie, Angus.	14
D.	GM5YX	Seton Mains, Port Seton, East Lothian.	1.7 and 3.5
	GM2TM	Mayshade House, Loanhead, Midlothian.	7 and 14
G.	GM5FT	Marchmont Estate, Greenlaw, Berwickshire.	1.7 and 3.5
	GM6RG	Marchmont Estate, Greenlaw, Berwickshire.	7 and 14
H.	GM8MQ	East Lomond Hill, near Falkland.	7 and 14
Northern	GI5HV	Knockinagh Farm, Cloughfern, Co. Antrim, N.I.	1.7 and 3.5
Ireland.	GI2KR	The Farm, Stormont, Belfast.	7
	GI6XS	Port Kennedy Estate, Rockport, Co. Down.	14
Irish	EI6J	Co. Wicklow.	1.7 and 3.5
Free State.	EI9D	Co. Dublin.	7 and 14

EMPIRE CALLS HEARD.

D. Westwood (BRS2487), 31, *Godley Street, Royston, near Barnsley, Yorks. March* 19 *to April* 4. *O-V-2.*

14 Mc. C.W.: ve5ld59, vk2ae58, 2bz34, 2dg55, eh46, 2px57, 2qe47, 2rx44, 2ss45, 2zh58, 3bj44, eo45, 3hy34, 3iw44, 3jk56, 3lx57, 3ns57, 3td55, xu46, 3zb44, 4rt46, 5cm44, 6sa35, 7cl46, 7kv56, q4cri57, 4ksl58, 4ktb57, vs1af46, 7gj35, vu2cq fone)34, 2dy58, 2jb45, ze1jc35, 1jg34, 1jz56, l1jy57, 1ly34, 2cw45, 2fa46, 2fy34, 2fs45, 2gn58, ha45, 2mn34, 2pk35, 2pm57, 2qa55, 2sm55, bz55, 3ca34, 3fz55, 3ja46, 3jr57, zs1ac45, 1ah58, b57, 6au57, zt2b57, 6ak45, 6al45, zu1d45, 1v58, 134, 6e55.

The two-figure group with each call indicates S values.

Reciprocation

Herr H. Grupe (DE-3058/D), of Hildesheimer-strasse, 70 st, Braunschweig, Germany, would like to hear from an English amateur, preferably London or Southern Counties, who is willing to exchange a visit with him. Herr Grupe wishes to be in England from the 1st to the 30th of June. He will take his English host back with him to Germany until July 30. Herr Grupe speaks English. Those interested should write direct to him at the above address.

Stray

VK4EL, working at the low frequency end of the 14 Mc. band, is particularly anxious to contact G stations between 20.00 and 21.30 G.M.T. He will be on at the times stated every evening. He is also keen to arrange a schedule with any EI station.

THE MONTH ON THE AIR—APRIL, 1937

By John Hunter (G2ZQ).*

I HAVE received a note signed "Uncle Tom," with an indistinguishable postmark, saying that he is too busy to write his notes this month, but has been hearing several "phoney" calls. He can't identify the prefixes, and thinks they may be rare DX. Heard around 7200, and on the 14 Mc. band, these calls are ED-DIE, TE-DDIE, BE-RTIE, JO-HN (a Japanese boat?), FR-ANK (surely a French aircraft?), etc., etc. Why is it that our pseudo-American phones can't use the perfectly good call-signs that the G.P.O. grants them?

A lot more reports have arrived which are nothing more than long lists of calls heard, with no frequencies or other information. Much as I should like to publish them, I do not think they would be of much general interest, so please give only the rare ones, with their frequencies and tones.

G5IU with a portable on the South Coast feeding 7 watts into a 15-ft. high AOG raises VK, CX, FQ5AA and a W6, and finds DX easier than with his home aerial, 120 ft. up. He and many others confirm that OQ is the new prefix for Belgian Congo. ON4CGW is OQ5AA, and ON4CSL, OQ5AE. An interesting report comes from BRS1681, an Empire builder at Mong Hsaw, but don't ask what country it's in; 1681 doesn't know himself. He is on the Burma-China boundary commission, and at the time of writing they hadn't tossed up to see who was to have Mong Hsaw. He heard many Gs on 14 Mc. c.w. during B.E.R.U., while G6GO was heard on phone. G6CJ was heard on 7 Mc. He agrees with VK3EG that G2YL and G6MS come in first of the Gs, but do not peak as loud as some of them. He suggests that his may be the first report from Mong Hsaw, as no one has visited it since 1900. (A.D. or B.C.?—Ed.)

G6WY raises AC4YN 14180 for his 39th zone. This station is operated by VU2DR and G5YN, and the QRA is British Political Mission, Lhasa, via Gyantse, Tibet. G6WY, after putting 100 per cent. phone across, handed the AC to G2ZQ, making him WAZ. Is this the first British WAZ? W6-SWL, by name Ken Moore, doles out photos of film stars and North Mongolian stamps with his QSL.

G2YL, one of the first to work ZA1D, has had her card returned via Lesh, Tirane and Milan, is now convinced that this station is bogus. G2PL's fist has magic in it, even when he's away from home. Staying with G8LT, he raises S7 reports from K7FYI, K5AC, and also works VO3Z of Labrador. At his home station he repeatedly works VE1EA and W1BB on five bands in succession.

G5QY works three goods ones in VP8B, FY8C (both rac-H.F. end of 14 Mc.) and K6OJG 14280 in Guam, the last two being also heard by G6ZO. Another QSO made by QY was with XU2ZA, whose QRA he can give to anyone requiring it, but which must not be published. He has heard HZ1AA signing HZ1AA/W6LBM. A look in the call book tells one a lot. Nevada is the State that is keeping QY and many other Gs from getting their WAS. Will any stations in this State volunteer to sked Gs, *and* QSL? G5XG gets S8 from W4DAY with his 20-watt phone, and decides to QRP. At 2½ watts he is still RS54; not satisfied, down comes his power till nothing is reading on any of his meters, and W4DAY is still copying him at RS53/4. These low-power experiments were also heard at R5 by W9YGC and W2JT.

BRS2292 hears FQ5AA T6 L.F. end of 14 Mc. QRA? A S7/9 signal from ZS5U at 09.50 on 14 Mc. is unusual. Who is FZ1H T9 on 7 Mc.? 2AUB listens to both ends of a QSO between PZ1PA and W5BB, during which the PZ says that all three amateurs in Surinam, 1AB, 1AL and 1PA, are unlicensed and fear detection by the authorities. QSLs should go via G. I. Miranda, Box 279, Paramaribo, Surinam, D.G., under plain cover, or else via ARRL or PA0AZ. In the same direction the QRA for FY8A T7 14320 and FY8C T8 14340, heard by G6ZO, is simply Cayenne, French Guiana. BRS2339 is doubtful about the *bona fides* of ET8ADC. All W districts are heard by BRS2594 in 2 hours 40 minutes on 28 Mc. phone. Is ZC4AR 14340 genuinely in Cyprus, asks BRS1535.

BRS1766 hears the R.M.S. *Queen Mary* GBTT broadcasting in the middle of the 14 Mc. band. In September ZU6L is visiting G, care of G5RI. ZE1JS comes the next month.

VK7YL 14295 is one of the Empire's newer YLs. G6ZO discovers that she wants to work G, so G6QB obliges. ZB1P used to be 2AFP, and is looking for G, GM, GI QSOs between 17.00 and 19.00 G.M.T. daily. He suffers badly from ZB1H's 100-watt phone only 100 yards distant. MX2B, 35 years old, works in the power house of a cement works. He uses anything from 400 to 1,000 watts input.

A few useful frequencies: FB8AH 14290, VP6TR* 14130, K6MTV* 14220, OA4AI* 14100, OA4AQ 14175, K4ENY* 14200, K6OJI 14020, K6KSI 14045, K6MAW 14340, AKP 14140, K6MXM 14300, EL2M T7 14105, EL2A T9 14370 (with a new op.), ST2B 14340 (bogus?), VP2LD 14120. Those marked with an asterisk are phones. These were given by G6QB, G6ZO, BRS2138 and 2601.

G6QB called VP8B and was galled to hear him come back to G6QX. What a difference a dash makes. XU7Y 14400, worked by G2ZQ, is Mr Man Fai Young, Yunnan University, Yunnanfu, China. Iraq is not as common as it used to be so G6ZO's QSO with YI5KG T6 14200 is of interest. QSL simply to YI5KG, Baghdad. CX7G, worked by G5SR, gives QRA as Ageratum, as imaginary as the call sign. BRS2178 asks who is CK2B and why does CO2QQ call CQ on CW? HR2A is an unusual one heard by BRS2317, but he gives no details.

ZD8A had great difficulty with skeds, as after he had called G6CL and gone over to him, the whole band came back solid at him, and he had a hard time finding which was G6CL. His solution was simple—he had G6CL repeat his own call-sign nearly all the time, only putting in ZD8A occasionally. (ZD8A is now no "more"—watch him coming up under a ZE call very shortly.—G6CL

63, Hervey Road, London, S.E.3.

Movie-Making for the Radio Amateur

The increasing use of the Sub-standard Cine Camera for the purpose of documentary recording is of particular interest because it provides an excellent means of placing before the wide circle of amateur radio enthusiasts a means of personal contact.

A few simple precautions before making a successful film of your station or your activities are advisable. First, carefully read the instructions given by the makers of the cine camera to be used, taking particular care to familiarise yourself with the method of loading the camera. In exposing the film, greater care is necessary than with the "still" type of camera, as the latitude of the film is not so great, and since the exposure is controlled by the varying of the aperture of the lens, the helpful exposure guide given in most film cartons should be studied. Before "shooting," see that the camera is fully wound and if the lens is of the focussing type, measure *exactly* the distance between the camera and the object, particularly if a large aperture is to be used. Hold the camera steady or, better still, use a rigid tripod, fitted with a smooth working "pan" and "tilt" head. Avoid as far as possible panoraming the camera, but if unavoidable, move the camera very slowly and evenly.

A careful selection of your angle of view should be made before "shooting," and your "shots" should not be less than 5 nor longer than 12 seconds in duration.

In taking pictures of aerials, the use of a filter in front of the lens will "hold back" the sky and so give a better photographic rendering of the tracery of the wires.

For interior work, lighting should be supplemented with the new over-run type of lamp, such as Photoflood, Nitraphot, etc., which, when used in reflectors, provide a very intense photographic light. It should be remembered that since the cine camera is made to portray motion, it is essential to successful movie-making that there be movement in the picture.

In planning your film, individual facilities and lay-out of apparatus will suggest where this essential can be effectively introduced.

F. G. S. W.

Editorial Note.

The author of this contribution is at present engaged upon the task of filming well-known London amateur stations. This work is being gratuitously undertaken by the Finchley Amateur Cine Society, and it is hoped to present at Convention a documentary record of considerable interest. Arrangements are also being made with the F.A.C.S. to film as many London and near-London N.F.D. stations as time will allow.

Provincial members desirous of filming their local N.F.D. stations should arrange for the film to be sent to Headquarters not later than July 15, but *please note*, 16 mm. film only can be accepted.

Things We Want to Know

Is it true that Eddystone's aeroplane photograph was taken at great risk by G5BJ when G5VM was flying him back from the Bristol Convention? Or did G6XJ take it as relaxation from aerobatic landing practice?

56 Mc. National Field Day

We publish below a copy of the rules for our first 56 Mc. National Field Day to be held between the hours of 10 a.m. and 8 p.m. (10.00-20.00 B.S.T.), Sunday, July 4.

We would remind transmitting members that application for a special permit must reach us by May 23 (see rule 5).

Rules.

1. Members or groups of members will be permitted to install portable 56 Mc. apparatus at any *fixed* point in the open air.

2. In the case of transmitting stations the input to the valve or valves delivering power to the aerial must not exceed 10 watts.

3. Transmitting stations must be equipped with frequency measuring apparatus or the transmissions must be frequency stabilised by means of a crystal.

4. The site of each transmitting station must be given in an application to Headquarters for permission to be granted a special portable permit.

5. Applications for these permits must reach Headquarters not later than May 23, 1937.

6. Only members holding a G.P.O. licence to use the 56 Mc. band may apply for the special portable transmitting permits.

7. The station call will be suffixed by the letter P.

8. The event will be open only to fully paid up members of the R.S.G.B. and a declaration must be signed by the licensed operator in charge of each transmitting station, stating that the terms of the licence have been strictly adhered to.

9. Official entry forms will be sent to all contestants prior to the event.

10. Certificates of merit will be awarded to the licensed operators in charge of the three transmitting stations who submit the best logs and technical descriptions of the gear used and observations recorded.

11. Certificates of merit will also be awarded to the operators in charge of portable receiving stations submitting the best entries judged on the basis of Rule 10.

12. Council reserve the right to amend or alter these rules at any time prior to the commencement of the event, and their decision will be final in all matters connected with its operation.

13. Entries must reach Headq'ters by July 19, 1937.

Members will appreciate that the arrangements for this event are of an experimental nature, therefore suggestions for future improvements will be welcomed after its conclusion.

A full list of call-signs and sites will appear in the June issue of this Journal.

EMPIRE CALLS HEARD

BERS265, H.M.S. "Delight," China Station, during March, 1937 :—

14 Mc. : Ei3j (359), 8g (349), G2oa (579), od (469), pu (568), xn (358), yb (358), 5iw (568), ka (568), km (579), 6bq (369), gh (567), rb (349), rn (349), wy (459), 8fz (359), Gi2uo (358), 5qx (559), 6tk (359), Su1wm (359), Ve5gi (599), vq4ksl (359), vs7gj (577), jw (349), mb (359), zb1e (359), ze1je (459), jf (359), jv (459), zl1ak (358), ar (359), dv (569), gx (359), 2fa (469), fs (579), 3jr (459), 4ck (359), zs4h (579), 5u (359), zt5v (349), 6y (569), zu2b (579).

7 Mc. : Ze1jo (359), jy (359), zs2x (469), 4d (359), zt5p (359), 6aq (358), zu5b (369).

The 56 Mc. Band

By L. G. Blundell (G5LB).

April produced nothing of interest in the way of DX or semi-DX signals, and although commercial harmonics were expected to reappear some time during the month, they failed to materialise in any form.

However, things are not completely at a standstill, as there has been a noticeable increase in local CW activity during the later evening hours. As far as the writer can see (or, rather, hear !) there is no lack of CW activity in London and surrounding districts, and it is hoped that this happy state of affairs will continue for a long time.

In addition, we have to record the first " big " CW DX test which was staged for May 1 and 2, commencing at 1300 B.S.T. on the first day, and continuing until 2300 B.S.T. on the second day.

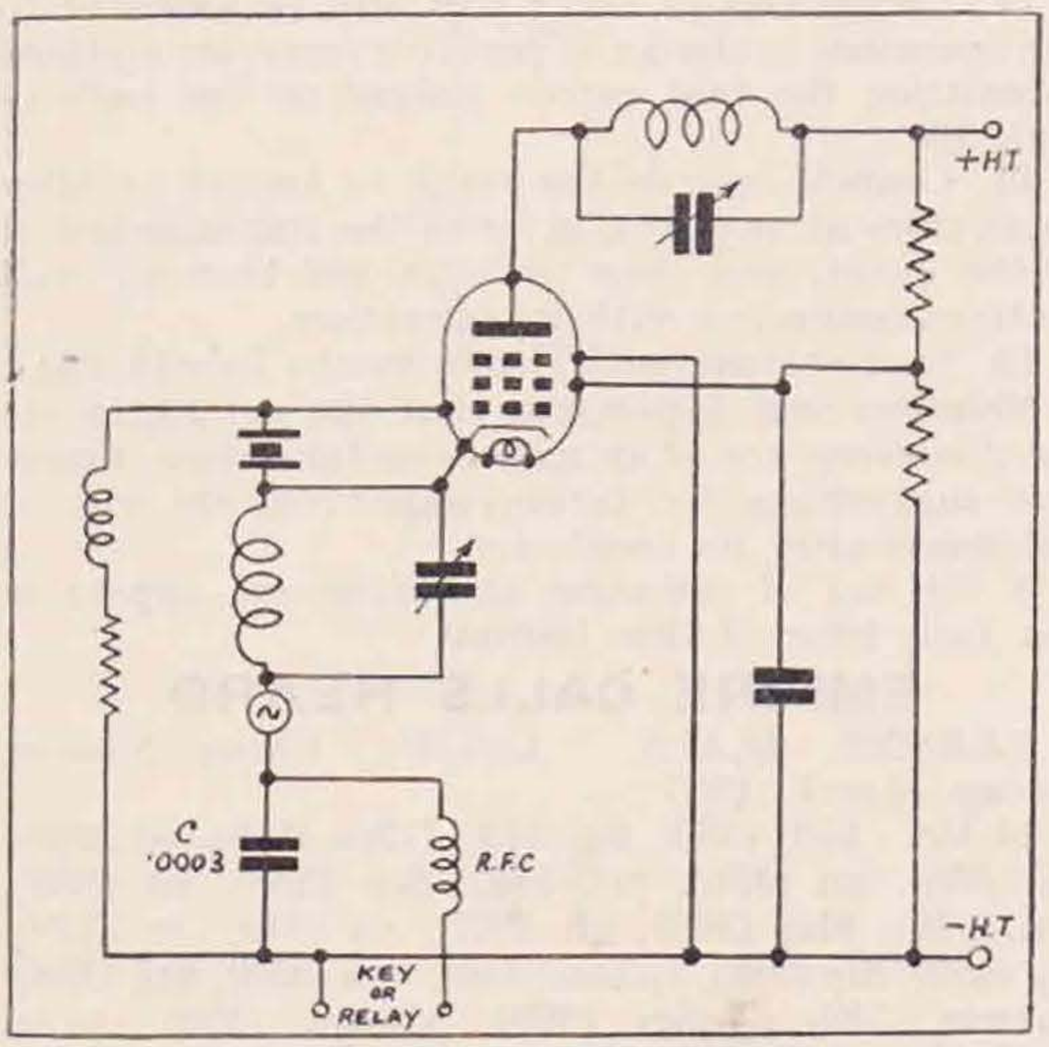
G2HG and the writer advised 24 known CW stations in all parts of the world of this test, and it is hoped that all the stations concerned were able to be active at very frequent intervals throughout the whole period. In next month's notes we shall give details of the results and observations.

On May 2 also the relay test organised by G5JU took place, and as this coincided with part of the DX test, activity at that particular time must have been a record breaker for once.

So we can but wait and hope that our combined efforts will effect some increase in our progress toward that champion " teaser "—DX, and may the next issue contain something in the way of DX news.

Break In

Apropos the very interesting article by G5JH in the February Bulletin. There is a circuit not

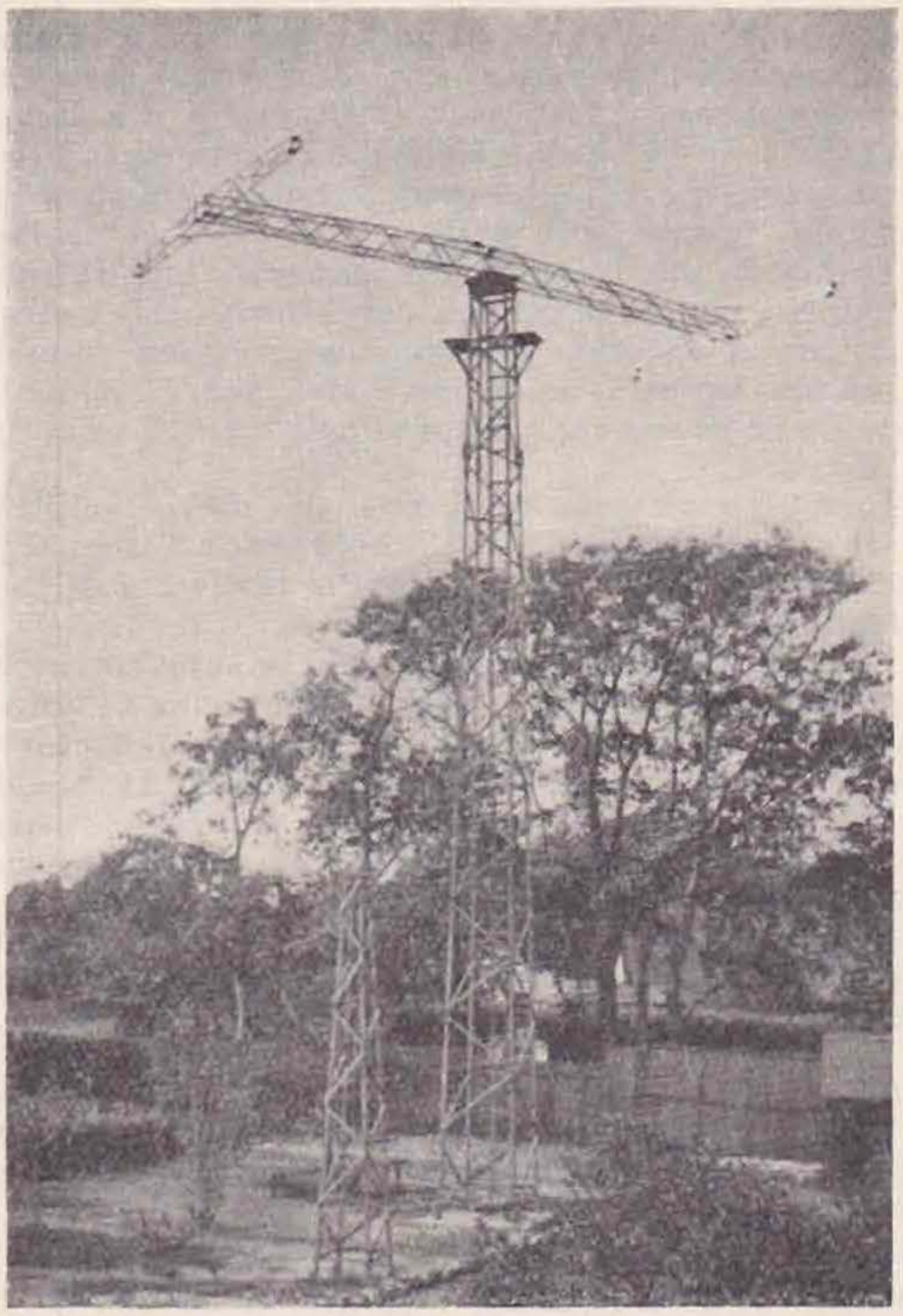


mentioned which might be of interest to those using tri-tet oscillators. The method used is to key in the cathode lead as shown on the diagram. This method cuts off the oscillator completely and is fairly free from clicks. Any clicks which are apparent can be cleared by a simple filter. The condenser C may be about .0003 μF, and it is often advantageous, when no keying relay is used, to place a similar one across the key contacts.

The ideal way to use this system is to mount a keying relay inside the transmitter in order to keep the cathode return lead short. The writer has found, however, that with straight keying, the key leads may be as long as eight feet without causing trouble provided all tuning of the oscillator, etc., is done with these leads in position and not, as is often done for convenience, short circuited at the transmitter.

This circuit has the advantages of the clickless keying provided by screen keying coupled with the elimination of that bugbear of tri-tets when using break-in within a kilocycle or so of the crystal frequency—blocking of the receiver.

" TY."



A view of the Beam array used so successfully by ZS1H

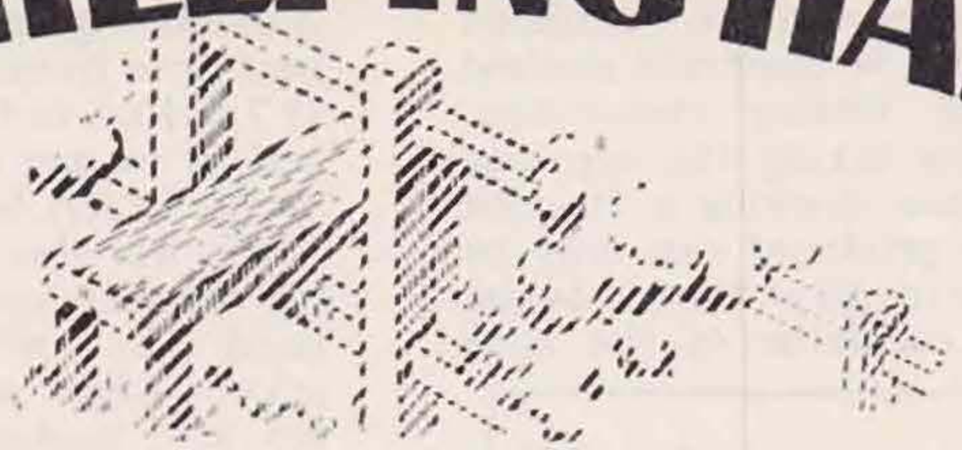
A New Oscilloscope

Arrangements are being made to test one of the new oscilloscopes marketed by Furzehill Laboratories, Boreham Wood, Herts. We hope to include a report in our next issue.

The Southport P.D.M.

Just as we go to press Mr. J. Davies, G2OA, the organiser of this event, informs us that ladies will be very welcome at the luncheon. Arrangements will be made for them to see the sights of Sunny Southport during the afternoon.

THE HELPING HAND



By Austin Forsyth (G6FO)

PART III—FREQUENCY MEASURING EQUIPMENT AND MONITORING

NOT only beginners, but even more experienced transmitters, seldom appreciate the importance of having available some form of calibrated oscillator which can be operated in conjunction with the receiving apparatus.

The reason for this is not far to seek; it is because the Post Office accept crystal control of the transmitter as sufficient evidence that the frequency or frequencies used will be kept within the bands allowed. From their point of view, this is all that is necessary, and from it has sprung during the last few years a belief that if one is using CC, neither a heterodyne frequency meter (which may or may not be accurately calibrated) nor any form of monitor is required. Consequently, there are literally hundreds of stations operating without even a simple monitor.

Since we are trying to stress the importance of having at least a monitor in the station, it would be as well if we explain why. In the first place, monitoring enables one to keep a continuous check on the transmitter while it is in operation, and its chief value lies in the fact that keying and the quality of the CW signal generally are constantly under observation. And one of the quickest ways in which we can improve our sending is to be able to listen to it all the time. We all know, or should do, that passing the G.P.O. morse test is no criterion of operating ability. It is only necessary to listen on the "nursery band"—7 Mc.—to realise the truth of this, though many of the new operators, with their adopted Transatlantic accents, do not give us much chance of finding out what their firsts are really like.

What, then, is the best thing to be done about this business of monitoring the transmitter output?

The apparatus required need consist of nothing more than a simple single-valve oscillator, which can be quickly produced from the average amateur's spare parts supply. The circuit, using a valve of the HL210 type, can be a replica of the detector in the receiver, with a fixed instead of a variable reaction condenser and approximately the same coil-condenser values; the band-setter can be cut out and a capacity of about 50-75 $\mu\mu$F used for tuning in the monitor. This, built up as a separate unit and connected to the receiver power supply, constitutes an outside oscillator which, as a little consideration will show, can be made to perform several functions.

First, it will produce an audible signal in the receiver, due to the heterodyne between the monitor valve and the receiver detector circuit, both of which are oscillating. This means that a rough calibration from the receiver can be obtained on the monitor with little difficulty. Supposing the receiver is set at the top of the 7 Mc. band and the heterodyne or beat-note from the monitor tuned to the same frequency, the monitor dial-reading then being noted, we immediately have a calibration, albeit rough, which will always locate the top of the 7 Mc. band whatever alterations are made to the receiver. In the same way, the bottom can be referred to the monitor, and if an SLF ("straight-line-frequency") tuning condenser is being used in the monitor circuit, a straight line joining the two points, plotted on squared paper, will give a rough check on the 7 Mc. band.

Now that we have this graph, what use is it? Well, apart from always enabling us to find the top or bottom of the 7 Mc. band on any receiver which will tune over this particular range, we are also able, by the reverse process, to give the other man a rough check on his frequency and also obtain our own position in the band relative to other signals. If a station is tuned in and it is desired to check his frequency, all that need be done is to switch on the monitor, swing the dial till the beat-note from it is heard in the receiver, take the reading, and then look at the graph to see what that frequency is.

Similarly, by putting a pair of 'phones in the plate circuit of the monitor valve, we can tune in our own transmitter signal on the monitor and get a point from the crystal to check the monitor graph and can tell by referring this frequency to the receiver exactly where we are in the band; this is done by tuning the receiver to the monitor beat-note, the great value of the latter operation being that it is thus possible to judge what the QRM is like on and near one's own transmitting frequency and also to find out what stations are in that part of the band.

Having got to this point, it is a small step to arrange for the 'phones to go into the monitor plate circuit whenever transmission is taking place, thus getting the all-important continuous check on the quality of signal and the keying.

Another valuable feature of such an oscillator is its use as a separate heterodyne; when QRM is bad, a CW signal can be picked out by tuning it in on the receiver in the ordinary way, then backing off reaction and using the monitor to heterodyne it, thus obtaining a considerable increase in selectivity.

Purists and the more technically minded who have read thus far will probably have been getting ready to write us a long, critical letter ere now, because there are certain points in the discussion above—which is only intended to illustrate method and principle—that require further elaboration. For instance, calibrating by taking the top and bottom of the band and then drawing a straight line between the points so produced can only be described as rough, and very rough at that. Again, an absolutely elementary oscillator of the type

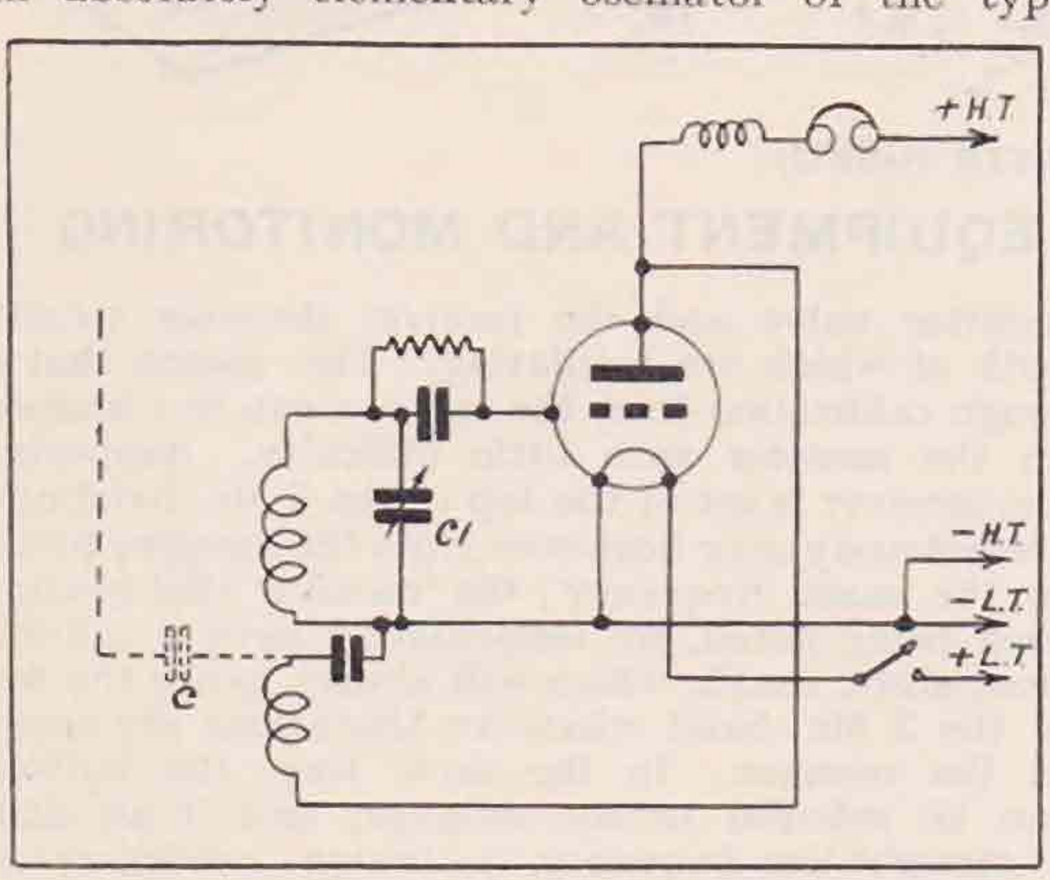


Fig. 1.
Elementary Oscillator Circuit for a CW monitor. Condenser C and the dotted line indicate a small capacity and a short lead, which may not be necessary, to radiate a beat to the receiver and to pick up the transmitter. C1 is about 50 μμF. This circuit is not recommended for calibration purposes.

shown in Fig. 1 herewith—the curve which might be obtained to go with it being given in Fig. 2—would have a very low order of stability. That is, its calibration would not " stay put " well enough or long enough to make it worth while trying to get a more accurate curve, nor would frequencies read off from the graph of Fig. 2 be sufficiently close to warrant starting an argument about the exact frequency of so-and-so's crystal. Such a curve would, in fact, be no more than an indication. The reasons why the accuracy would be low are (1) because the top and bottom of the band would not be obtained closely enough in the receiver unless known " marker stations " were used (more about this later), (2) the curve would be more likely to have a slight bulge at the centre than to be a straight line, even if an SLF condenser were used, and (3) such an oscillator as is shown in Fig. 1 would be very susceptible to changes in plate and filament voltages.

From this, it is evident that the main value of a simple oscillator is as a monitor only, where it is used to check keying and signal quality alone, with a secondary application as a separate heterodyne for the receiver.

Harmonic Operation.

There is still another point, probably the most important and interesting in the principle of operation, which requires discussion. This is the fact that in such an oscillator we can make use of harmonics to good effect. In other words, it is not necessary to change the monitor coil for each band if it is properly designed such that the frequency spread obtained on one coil-condenser combination allows the harmonics produced by the oscillator to fall in all the other bands. Going more deeply into this, we know that if our monitor is oscillating at, say, 3,582 kc. in the 3.5 Mc. band, a beat-note from it can also be heard in the receiver at 7,164 kc. in the 7 Mc. band, 14,328 kc. on 14 Mc., and (if we are lucky) on 28,656 kc. and 57,312 kc. in the 28 and 56 Mc. bands as well. Not only this, but it will also be possible to get a beat-note *above* the monitor fundamental at 1,791 kc. in the 1.7 Mc. band. In case someone raises the point, this latter effect—where a 1.7 Mc. beat-note is heard from a 3.5 Mc. fundamental—is due to the second harmonic (3.5 Mc.) from the *receiver* detector valve, oscillating on 1.7 Mc., picking up the 3.5 Mc. fundamental of the monitor. Sorting this out, what it comes to is that the receiver detector valve is also generating harmonics, and so we are left with the very convenient, if somewhat confusing, result that an oscillation on 3.5 Mc. can be heard all the way from 1.7 to 56 Mc. In practice, however, these beat-notes get weaker the further one gets from the fundamental, and if stray coupling only is relied upon, they are very hard to find on the receiver above 14 Mc. It is therefore best to design the frequency-meter-monitor (as we can now begin to call it) to give proper coverage of the normal communication bands 1.7 to 14 Mc., treating 28 and 56 Mc. separately.

Principles of Design.

The design of such a frequency-meter-monitor is a fairly straightforward matter, but a little further discussion under this heading of Design may be helpful.

As we intend using a self-oscillating circuit for the instrument, it follows that its stability as an oscillator, which is a matter of the first importance, will be better the lower the frequency used for the fundamental. In other words, though we could get " back-beats " on 1.7, 3.5 and 7 Mc. from a 14 Mc. fundamental, at such a high frequency the circuit would obviously be less stable than on, say, 3.5 Mc. Slight disturbances which would not

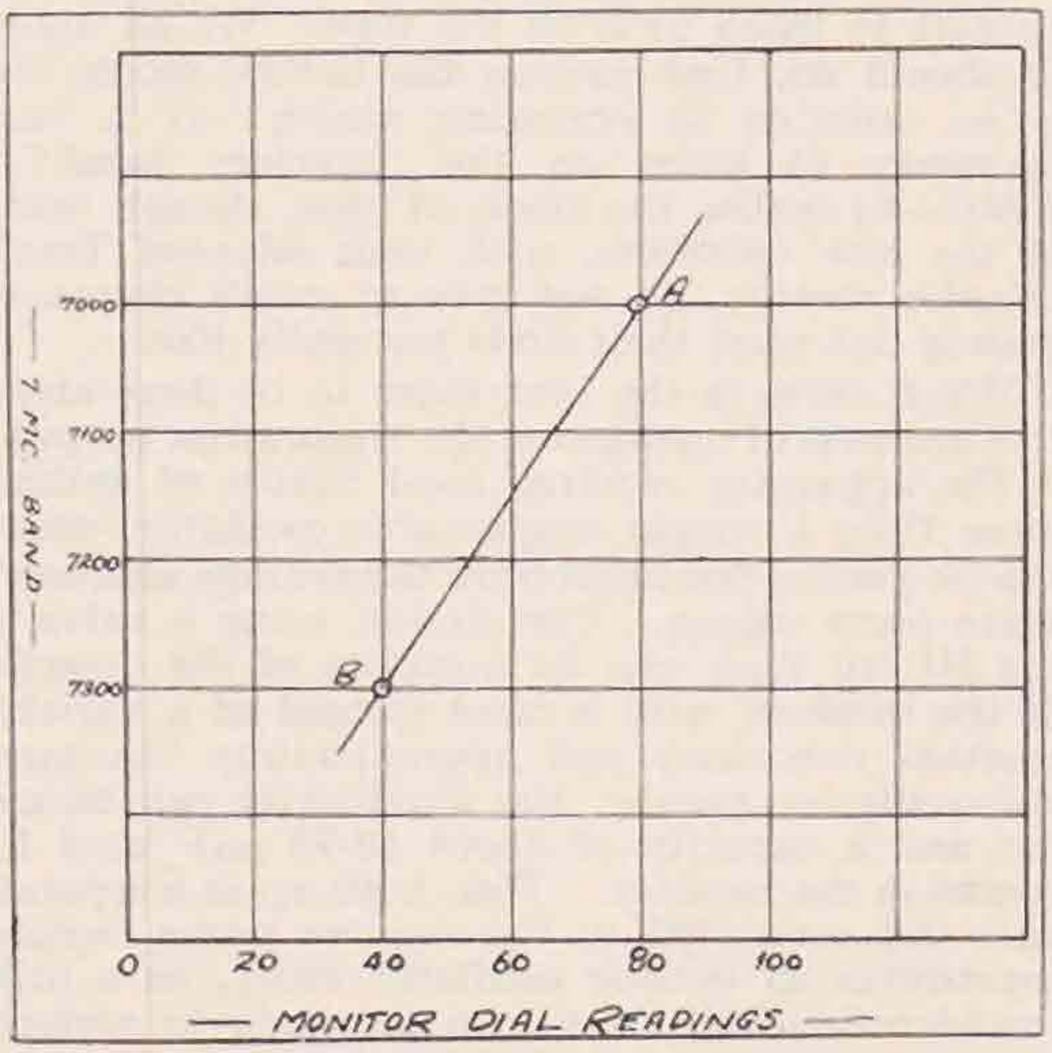


Fig. 2.
A is the L.F. end of the band and B the H.F. A calibration such as this is only a guide.

matter on the latter band would make the oscillator almost uncontrollable on 14 Mc., while as we saw when considering receiver band-spread in Part II (April BULLETIN), this side of the question would also give rise to difficulties. Under practical conditions, therefore, we have to compromise—as is nearly always the case in radio as in life—arranging that a lower frequency band is used for the fundamental, improving the harmonic pick-up on the higher frequencies by providing a little extra coupling—other than that produced by the inter-connecting wiring and the field from the oscillator—between frequency-meter-monitor and receiver.

The best band to use for the fundamental is 3.5 Mc., as this gives both good harmonics on the higher frequencies and also stability in operation. The next problem of design is how to arrange the frequency spread such that the best use can be made of these harmonics.

Now, we are all accustomed to think of the amateur bands as being in harmonic relation; that they double themselves all the way down. Actually, however, there is only a small family of frequencies in *true* harmonic relation. Fig. 3 shows this quite well.

It will be clear from Fig. 3 that it is not too simple a matter to design a coil-condenser combination which will give full and complete coverage of the range 1.7 to 14 Mc. in the way we want. For instance, if coverage is complete on 1.7 Mc., taking 80 degrees of a 100-degree dial, it is plain that while harmonics will fall on all bands, 14 Mc. will only appear over about 14 degrees of the meter-tuning dial, which means that the accuracy on this band will be correspondingly lower. Looking at it another way, if 80 degrees cover 300 kc. on 1.7 Mc., the calibration spread on it will be 300/80, or 3.75 kc. per dial division; if our curve is carefully drawn on good squared paper, with a well-designed dial on the meter, it should be possible to read to a quarter of a degree, giving us on 1.7 Mc. an accuracy better than 1 kc., which is quite near enough for all practical purposes.

But consider what happens on 14 Mc. This band, 400 kc. wide, occupies 14 degrees only. The calibration-spread is therefore approximately *29 kc.* per dial division, which means that the accuracy will be just over 7 kc., assuming as before that quarter divisions can be read by interpolation on the meter dial.

So we have to come back to the usual compromise. The frequency-meter-monitor is designed such that while its fundamental is on 3.5 Mc., the frequency-coverage is adjusted so that it falls between the dotted lines PQ and XY in Fig. 3. Observe that this brings in all that is really necessary, the only band not completely covered being 1.7 Mc., while calibration-spread is also much increased.

Once again, for the purists, let it be said here that it is possible to design an instrument which will give practically full spread on all bands, *but* it is a tricky job for the beginner for one thing, while for another we find that in practice entirely satisfactory results are obtained along the lines set out above. However, readers who want full spreading on all bands, and having grasped the essential considerations set out here, should be able to work out the tuning circuit required by further delving into the Receiver article which appeared in the April BULLETIN.

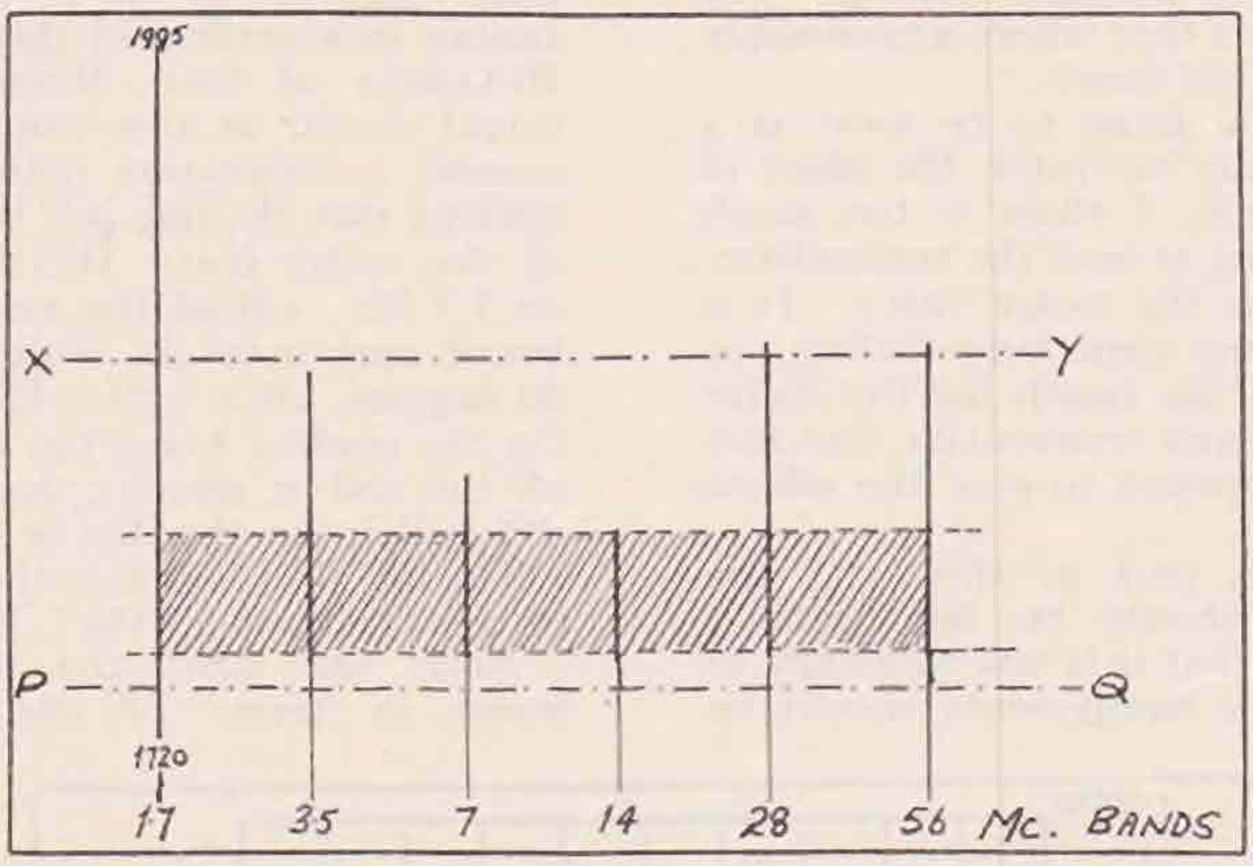


Fig. 3.
Showing the frequency relation of the Amateur Bands. Shaded portion between the middle dotted lines is the frequency range in true harmonic relation. The calibration spread of the Frequency-Meter-Monitor is arranged to fall between PQ and XY. The drawing, which is accurately to scale, also shows how crystals should be chosen to double into different bands.

A Suitable Circuit.

It should now be clear that the requirements of any frequency-meter-monitor from which a fair degree of accuracy is expected are (1) stability, which implies not only accuracy of calibration being maintained over long periods but also that there should be immunity from supply-voltage variations; (2) that it should be arranged in such a way that it can be operated as a monitor; and (3) that for this it is obviously going to be better if the instrument can be wired in on the receiving side.

For a circuit arrangement which makes all the above possible, we cannot do better than recommend the electron-coupled oscillator shown and described in Fig. 3 on p. 81 of the 1936 *Guide to Amateur Radio*. The fundamental of this instrument with the values given is in the 3.5 Mc. band. Further, it can be operated from the same source of supply as the receiver, and either mains or battery valves can be used. Note the point about the H.F. chokes. The circuit is inherently stable, while a good degree of accuracy can be obtained, and maintained, in the calibration.

We make three definite suggestions regarding this or any other type of frequency-meter-monitor readers may construct. First, parallel C1 in the circuit mentioned with a *very small* variable capacity—not more than 10-15 μμF. The "J.B." 15 μμF midget U-S-W condenser is very suitable. The object of this is to provide a trimmer to take up any alteration in calibration, as will be described later. The second suggestion is that the "J.B." Short-Wave Slow-Motion Dial be used for the tuning condenser. This dial, reasonably priced, is one of the best we have seen for amateur work, and it is possible to read directly to a quarter-degree.

The third suggestion is to provide some coupling between the monitor and the receiver. This is a point on which it is rather difficult to give any precise information, as the degree of pick-up will

vary widely in individual cases. If one depends on stray coupling of the type already described, the beat-note will be loudest on 3.5 Mc., the meter fundamental; it will be good on 1.7 Mc., fair on 7 Mc., but distinctly weak on 14 Mc. In order to improve this, it is best to run a lead from "somewhere near" the instrument to "close to" the receiver detector circuit. This lead, the object of which is to transfer some of the RF from the meter into the receiver, need not be connected to anything at either end unless pick-up is still poor. If this is the case, it can be taken from the earthy end of C3 in the circuit we are discussing through a very small fixed condenser, about 50 $\mu\mu$F. The other end of the lead should then be fixed down in such a position that a beat-note of not more than about R5 is obtainable on 14 Mc. It follows that if a good strong heterodyne is present on 14 Mc., the pick-up on the other bands, particularly the fundamental, will be overpowering and far too strong to be comfortable or to allow accurate tuning. The state to aim at, therefore, is that where a reasonably good signal is present on all bands.

Since the instrument is going to be used as a monitor, it is also necessary to watch the effect of transmitter pick-up, which, if there is too much lead exposed or if the meter is near the transmitter, may be sufficient to block the meter valve. It is therefore advisable to spend some time finding not only the best position on the bench for the meter in relation to the receiver and transmitter, but also the degree of coupling required to give the effects described.

Screening will play its part in this, and the frequency-meter-monitor should be built into a screening box. We hope that it is not necessary to add that the best possible components should be used and the construction made solid and lasting.

Calibration.

As the ultimate value and utility of the instrument as a frequency meter depend entirely upon the accuracy of calibration, this part of the work must be carried out as carefully as possible. It can be done in three ways.

Through the Society's Calibration Section, as announced regularly in the BULLETIN; by means of a 100 kc. quartz bar (this method being described in detail on pp. 82-83 of the 1936 *Guide to Amateur Radio*); or, thirdly, at home in the station by reference to standard frequency transmissions and signals of known frequency which come within the tuning range of the meter.

As this latter method will probably be the one most readers will want to adopt—it is also the most interesting and instructive—we propose dealing with it in detail, since in our experience amateurs, having built a good meter, often stop short at calibration and simply use the instrument as a monitor because they quite unjustifiably feel that calibration is a highly technical process beyond their abilities.

Assuming, then, that we have our frequency meter all ready for calibration, we should first make sure it covers the required frequency range, the territory lying between the lines PQ and XY in Fig. 3. Furthermore, if the dial specified is being used—it is graduated 0-100 degrees—the turns on the tuning coil should be carefully adjusted so that the H.F. end of the range, XY in Fig. 3, starts at about 20 degrees or thereabouts. This checking for spread is best carried out by reference to the receiver, and to do it find a frequency on or near 1,870 kc. in the 1.7 Mc. band, locating it by tuning in a station in this region. The list in the BULLETIN of Slow Morse Transmissions will be found useful in this connection. This is not, of course, a calibration point, but only a means of making sure the line XY is coming near the bottom of the meter dial. Having thus set the receiver on 1.7 Mc., adjust the meter till the heterodyne is heard and note its scale reading. If it is near 20 degrees, all is well. If not, vary the coil turns. On the reading being too low, a turn or two taken off the coil or spacing the windings a little at one end will bring the dial setting where it is wanted.

The line PQ is found in the same way, by tuning the receiver just outside the L.F. end of the 3.5 Mc. band.

Now, see what the tuning range is on the meter in terms of dial degrees between XY and PQ. With the coil turns and condenser capacity specified, it should be about 50 degrees, i.e., from 20 to 70 degrees on an 0-100 degree dial. If these figures are, in fact, obtained, it is clear that the spread—which we want as wide as possible—can be improved somewhat by using a smaller tuning condenser; 60 $\mu\mu$F. would be worth trying, which would make the readings about 30-90 degrees, giving a satisfactory spread.

For the sake of the Manager of the Society's Calibration Section, it would be as well to say here that if any reader is thinking of sending his meter in for calibration, the process of adjusting the spread described above should be carried out beforehand.

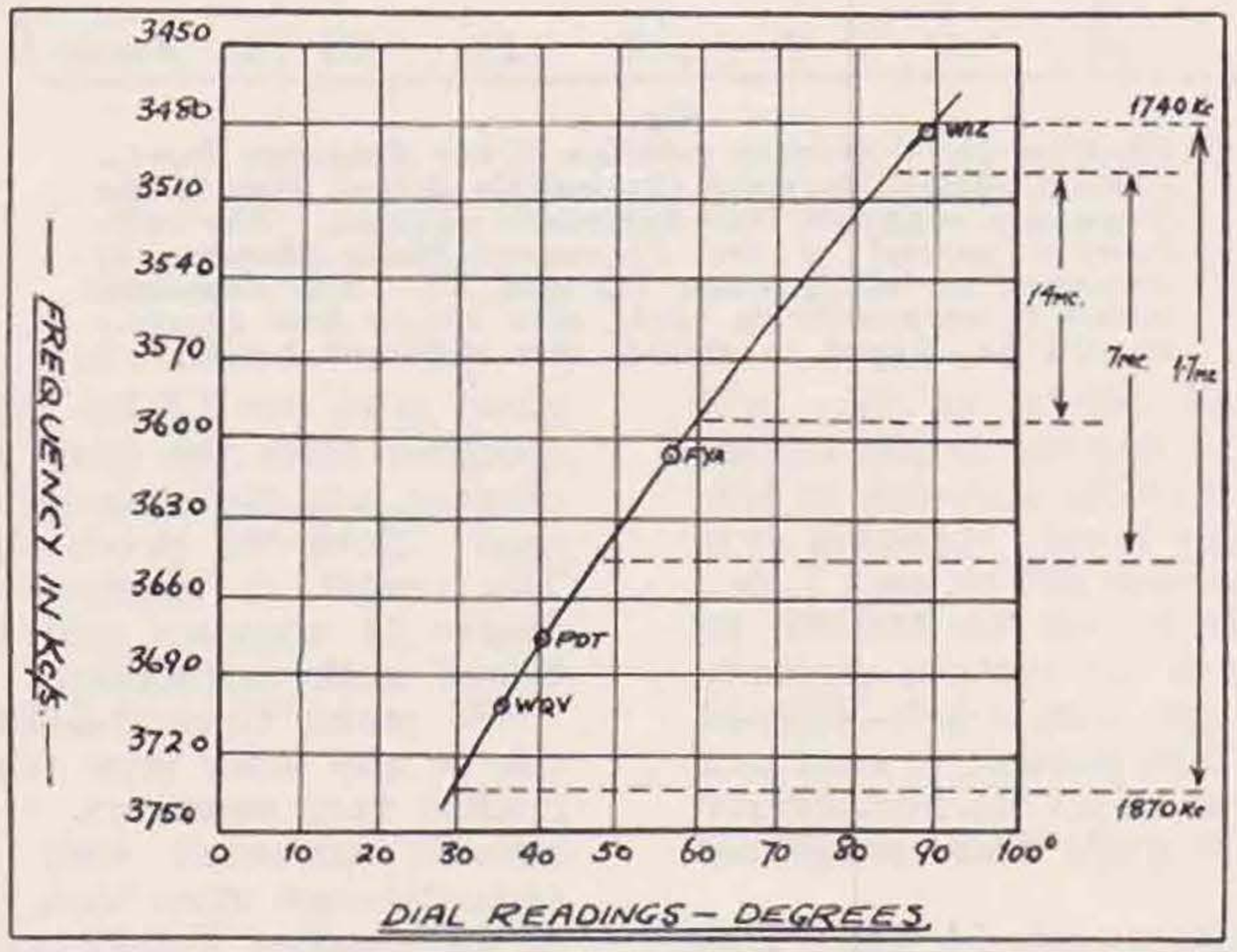


Fig. 4.

Specimen of the type of calibration curve which is finally obtained. Its actual shape depends on the plate-shape of the tuning condenser used. With centimetre-squared paper, each degree vertically represents 3 kc., each degree horizontally 1 graduation of the condenser dial. It is better to work with even numbers for the frequency scale, as this makes interpolation easier. The calibration spread for the various bands in this example are as below:—

1.7 Mc.	*2.17 kc.*	*per dial division*	*(for section*
3.5 Mc.	*4.3 kc.*	*,, ,, ,,*	*covered).*
7 Mc.	*7.8 kc.*	*,, ,, ,,*	
14 Mc.	*15.6 kc.*	*,, ,, ,,*	

Having reached this stage, we are ready for the calibration proper. This is carried out largely by the aid of the *Amateur Call-Book Magazine*, pp. 16-20 of the Spring, 1937, Edition. On these pages are listed the call-signs and frequencies of a number of dependable commercial stations, many of which can be heard in this country at all times of the day and night. Obviously, all these signals cannot be used for calibration purposes as our meter tuning range, from Fig. 3 and the discussions and explanations thereon, covers only the following frequencies on or near each band :—

1,740	to	1,870 kc.	...	1.7 Mc.
3,480	,,	3,740 kc.	...	3.5 Mc.
6,960	,,	7,480 kc.	...	7 Mc.
13,920	,,	14,960 kc.	...	14 Mc.

As the stations listed near 1.7 Mc. are outside the tuning range, the first useful calibration signals will be found at the L.F. end of 3.5 Mc.—HAP and UHJ on 3,490 kc. The H.F. end of the international 3.5 Mc. band extends to 4,000 kc., and we have no commercial stations in this region as the limit of our range is 3,740 kc. However, near 7 Mc. there are over 50 stations given between 6,960 kc., our L.F. limit on the meter, and 7,000 kc. Those most likely to be heard are WKP, WEO, JAN, WIZ, XDA, CNB, ZEB, SAP and IDY. On the H.F. end of 7 Mc., between 7,300 and 7,480 kc., there are another crop—DFK, PDT, WBS, KEQ, WEN, WEG, HBQ and FTB are only a few which are on practically continuously. Getting down to 14 Mc., between 13,920 and 14,000 kc., we have DLJ, WIK, SUC, JNJ and LCO, and at the H.F. end of this band there are GMR, FYA, DZH, WML, WKB, WKI, WKE, WEB and WQV, all between 14,400 and 14,800 kc.

All the stations mentioned work on fixed frequencies, maintained at a high order of accuracy ; for the benefit of those who may not possess the latest Call-Book, from which this data is taken, a list is given herewith. As a matter of interest we might mention that we used most of these stations to calibrate our own meter nearly nine years ago.

Now, about the method of calibration. It may appear puzzling at first that it is possible to use all sorts of stations on *different bands*, even though their frequencies are known. To explain this, let us go back to the harmonic idea again. As we saw then, our meter, with its fundamental on 3.5 Mc., gives us a beat note on 14 Mc., as well as all the other bands. Reversing the process, a signal on or near 14 Mc. can be referred to 3.5 Mc. by simple arithmetic, thus : If we tune in WEB on 14,770 kc. and beat against this station with the meter, we are actually tuning the latter to a whole range of frequencies in harmonic relation, i.e., 29,540, 14,770, 7,385, 3,692.5 and 1,846.25 kc. Note that of these frequencies, the two lowest are within the tuning range of the meter.

It follows that any signal of known frequency which comes anywhere between the lines PQ and XY can be referred to a particular band, or any band. This means that if we decide to plot our calibration curve to cover the 3.5 Mc. band, all these known-frequency signals can be worked back to 3.5 Mc. Owing to the overlap of the low-frequency amateur bands with the high-frequency commercial allocations, as is shown by Fig. 3 notice what an enormous range of commercial frequencies the overlapping parts of 3.5 and 1.7 Mc. do cover) we are very conveniently left with the fact that a great many of the H.F. commercials can be referred back to 3.5 or 1.7 Mc., as we have seen already in the case of WEB, which is actually 370 kc. outside the H.F. end of 14 Mc. !

A very good curve—meaning a large number of points for it—can therefore be drawn based on commercial stations alone, and right in the harmonic range of the amateur bands (where the only commercial stations which might be received are " pirates ") the curve can be checked from accurate crystals or crystal-controlled stations, to say nothing of certain standard-frequency transmissions radiated by the Society, the N.P.L. and from America.

Now, as to the practical points in connection with getting the readings for the curve. First, make up your mind to do the job thoroughly and carefully—a good meter is worth that. Second, do not draw anything till at least 15 checked points have been obtained. Third, calibrate the meter in the position and with the valve and supply voltages which will normally be used. Fourth, regard the meter as a piece of scientific apparatus which requires careful treatment.

The process of getting points is as follows : Set the trimmer across C1 at half-capacity and keep it there. Tune in, say, WIZ on the receiver, and adjust to zero-beat or " silent point." Then swing the frequency meter dial till the heterodyne is heard in the receiver and likewise set it " dead on." The dial reading on the meter, perhaps 75 degrees, now corresponds to a frequency of 6,965 kc.—or 3,482.5 kc. Tabulate dial readings against frequency in this manner till about 15 points have been obtained. Then plot these points on squared paper, this preliminary plotting being just to see how the curve is to look. If it is smooth and easy, the fair copy can be made. For this it is best to use, if possible, centimetre-squared paper, which can be obtained at or by good stationers. Inch-squared paper does not give sufficient sub-division to allow each degree on the meter dial a line on the paper, unless an awkwardly large piece is used, while the frequency range is equally cramped.

Fig. 4 shows a specimen curve, though in the fair copy the calibration points should not be marked permanently. Use fine pin-holes for plotting, encircled with a faint pencil mark for spotting them. If good quality squared paper is used the curve can be finished in Indian ink (drawing ink), and all the pencil marks erased with a soft rubber. The completed graph should not be left to blow about the bench, but should be mounted in some manner. A good way is to paste it to a piece of heavy cardboard, with a transparent cover of thin celluloid.

The accuracy of the meter can be maintained by periodical reference to one or two of the marker stations used for the original calibration. If the meter dial readings for these markers have altered, the curve can be corrected by adjustment of the trimmer across the tuning condenser. This is the idea of the small parallel capacity, and the reason why it should be set mid-way when first calibrating the meter is because the subsequent variation in the curve may be either plus or minus. For instance, if both WIZ and DFK are reading two degrees too low after the meter has been in use some time, it is only necessary to reduce the trimmer

capacity a little to bring the main dial reading on to the curve again.

In the process of calibration, drawing the curve and subsequent checking, it is essential to make quite sure of the logging of the various stations used and also to discard any points which do not fit in the curve through the majority. That is, if two stations of the 15 are not in the sweep of the curve, they are either off-frequency (commercials do that sometimes) or have been incorrectly logged. By the same token, if on checking the curve—it is as well to do this at least once a month—it is found to be out a little, make sure that several others of the marker stations are also producing the same effect before touching the trimmer.

There are one or two points to notice about the curve itself. As is shown in Fig. 4, and as we have explained in the discussion about harmonics, the calibration, though it is referred to 3.5 Mc., of course holds good for the other bands as well. That means that if we are on 14 Mc. and wish to take off a frequency, the figure on the graph which corresponds to the meter dial reading is multiplied by 4 to obtain the required 14 Mc. frequency from the 3.5. calibration. In the same way, it is multiplied by 2 for 7 Mc., readings are direct on 3.5 Mc., and are divided by two on 1.7 Mc. This brings out an important point. As we have to multiply by either 4 or 2 for the H.F. bands, *any error in calibration or reading is also multiplied*, which is another reason why the greatest possible accuracy should be aimed at in the logging, drawing and reading of the curve. For this reason also, on 1.7 Mc., where the figure is divided by two, any error will likewise be divided and so the accuracy will be improved on this band.

Though a clean inked curve will cover practical requirements, good draughtsmen will be able to dress it up with different-coloured inks and so on, to show the limits of all four bands, and the position in them of their own signals.

General Notes.

The completion of a frequency-meter-monitor of the type we have been discussing will provide the station with a useful and valuable piece of apparatus which, as we have shown, is at once a reasonably accurate frequency meter and a faithful monitor. In the latter capacity it gives the operator an exact indication of how his signal sounds at the other end. All transmitter adjustments involving signal quality and checking can therefore be carried out with its aid, and the only feature of the transmission for which the other man's report is required is the readability-strength—RS or R, QSA. If a European tries to shake you with a " T6rac " report, there is no need to worry if the monitor says T9. The monitor is always right.

With electron-coupled oscillators, or any other form of variable-frequency master-oscillator, the frequency meter will be absolutely invaluable, as without it there is no way in which the working frequency can be checked. Here a word of warning. The frequency-meter-monitor has its limitations. Beat-notes will be found not only on the amateur bands, but between them, and harmonics and sub-harmonics play strange tricks if one gets outside the amateur frequency range. The reason for this is that the meter valve and the receiver detector circuit, both oscillating, produce between them a whole family of beat-frequencies. Accordingly, when operating some of the trick exciter circuits, involving the necessity of picking out the right harmonic, the only safe and certain method of finding it is to use an absorption wavemeter, keeping the meter for accurate setting of the frequency. The well-equipped station will therefore have installed not only a frequency-meter-monitor, but also an absorption wavemeter. Useful information on the latter is given in the " Guide " article already mentioned, while a practical design for such a wavemeter is dealt with very fully on page 11 of the BULLETIN dated July, 1936.

Another operating point worth mentioning here is that the frequency-meter-monitor can not only be fed from the receiver power supply, but can also be so arranged that its output as a monitor is coupled into the L.F. stage of the receiver through the change-over switch. This results in the action of changing over automatically bringing in either the station being worked or an amplified heterodyne of one's own signal, without it being necessary to plug the 'phones into the monitor each time or to touch the receiver tuning. We strongly advise readers to adopt this plan, for which details and wiring data will be given in the article on Station Lay-out. However, the necessary inter-connection can be devised quite easily, and will be a test of ingenuity in the meantime.

Nothing has been said about the monitoring of telephony signals because " side-tone " for checking speech output is quite easily arranged by wiring up an ordinary crystal detector circuit, using one of the semi-permanent detectors still available at about a shilling each, and placing the unit such that its tuning inductance couples closely enough with the transmitter output tank to give comfortable headphone reproduction of the speech.

Although we have tried to cover the subject of Frequency Measuring Equipment and Monitoring as fully as possible, we do not suggest that there is not a lot more to be said about it, nor that our own ideas are the final word. In this connection, much useful information can be found in back-issues of the BULLETIN and in the *Radio Amateur Handbook*.

We should like to hear how you get on.

LIST OF SUITABLE CALIBRATION FREQUENCIES.

Station.	*Freq. in kc.*	*Station.*	*Freq. in kc.*
HAP	3490	WEG	7415
UHJ	3490	HBQ	7444
WKP	6950	FTB	7490
WEO	6957.5	DLJ	13925
JAN	6960	WIK	13930
WIZ	6965	SUC	13940
XDA	6976.74	JNJ	13945
CNB	6977	LCO	13980
ZEB	6977	FYA	14423
SAP	6977	DZH	14460
IDY	6980	WML	14680
DFK	7325	WKB	14695
PDT	7350	WKI	14710
WBS	7355	WKE	14725
KEQ	7370	WEB	14770
WEN	7407.5	WQV	14800

These are only a few of the stations which can be heard and used for calibration purposes. A very complete list is given in the latest issue of the *Amateur Call-Book Magazine*.

To The Editor

MORE ABOUT WINDOMS.

To the Editor T. & R. Bulletin.

Dear Sir,—I was very glad to see that Mr. Sheargold is at last questioning the validity of the Windom formulæ; now that he has started the ball rolling, perhaps a few further remarks will help to clear the air a little.

Although not such an old-timer as Mr. Sheargold in the use of Windoms, I have put in a good deal of solid work to see what really happens with them, and have been forced to the conclusion again (as with many other published formulæ and generalised tips) that my case must be unique in that it would not work right unless things were adjusted well away from the formula lengths.

Feeling disappointed, the original article on the Windom (Proc. I.R.E., Oct., 1929) was examined, and it produced the welcome result that no formula for the tapping point could be more accurate than 30-40 per cent., or more. Messrs. Everitt and Byrne, who wrote the article, even remark, "the termination may at times vary with the weather," and if that is so, how much more should it vary with the more primary parameters like height, direction and wire gauge of aerial and feeder. Another remark also goes against the grain of most amateur ideas of the Windom :—"It has even been found with the single wire feed that by selecting the proper height of antenna to adjust the radiation resistance, a single physical construction could be secured in which the single wire feeder was properly terminated for both the fundamental and second harmonic."

The method they used to adjust the aerial was as follows :—An approximation to the Windom was erected and two ammeters were placed in the aerial, one on each side of and immediately adjacent to the feeder. The aerial length was then adjusted till these meters were reading the same. This gives the correct aerial length. To find the correct feeder termination, they ran a trolley up and down the feeder and adjusted for no standing waves, but they also recommend that a meter be placed in the middle of the aerial and the feeder be wiggled about till this reads a maximum. The curve they give is quite sharp but it wasn't so sharp here!

There is still something rather puzzling, and I would be very obliged if someone would explain it. The surge impedance of a line is $\sqrt{L/C}$. Now, owing to the varying height and length of a Windom feeder, L and C are also varying in such a way as to keep their product nearly constant, but certainly not their quotient. How then can a single wire feeder have a definite impedance?

It is hoped that these few remarks will be a warning to take all formulæ and tips with a pinch of salt—unless one knows exactly how they have been obtained. Two glaring examples are Windoms and link coupling respectively—neither will work properly first time except by a fluke. It is necessary to experiment with all the parameters till it looks like being correct. Radio is full of approximate formulæ and tips and any particular case, though having a solution fairly near to that published, can only be trimmed exactly by intelligent hit and miss.—Yours faithfully,

J. K. Todd (G2KV).

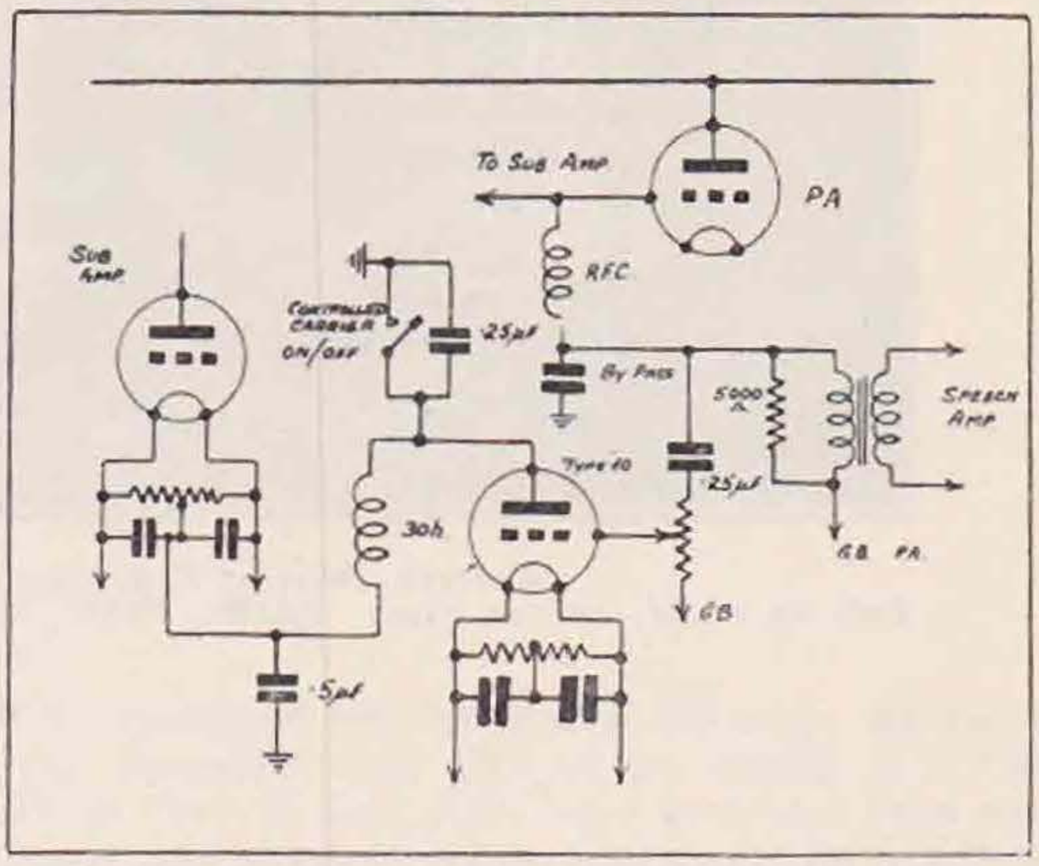
CONTROLLED CARRIER TELEPHONY.

To the Editor of The T. & R. Bulletin.

Sir,—Much has been said recently, both in print and "over the air," on the subject of interference from stations working duplex. I am enclosing a circuit diagram for Carrier Control using Grid Bias Modulation.

Whereas nothing revolutionary or out of the ordinary is claimed in the use of this circuit, it definitely is something that has been tried and found to work, and may be of interest to readers who are still continuing experimental duplex work. The circuit requires the minimum of components and has been under test in this station for the past few weeks. Component values are not very critical and those given are those in actual use here.

The percentage of carrier controlled can be varied by adjusting the bias on the control valve. On test an R9 'phone carrier was put out. The control switch was then thrown over and the carrier dropped to R1. On modulation, the speech strength was still reported as R9 and the quality did not seem to be impaired. On reducing the "idle carrier" to zero slight distortion was noticed at modulation peaks, due to the "lag." With a little experimenting, doubtless this could be overcome.



In the circuit under test, the sub amplifier consisted of a T55, with 500v. on the anode. The grid-modulated amplifier was a T61D, and the control valve was an American Type 10.

The only disadvantage to Controlled Carrier Transmission appears to be the liability to upset certain types of receivers employing A.V.C. causing slight distortion. Controlled Carrier Transmission definitely assists duplex working in that the receiver does not tend to "Block" and one can work very much closer to one's own frequency.

Yours faithfully,

T. H. Beaumont (G6HB).

(*Continued on page* 534)

THE WESTERN P.D.M.

THE Western Provincial District Meeting was held at the Grand Hotel, Bristol, on Sunday, April 11.

The weather on the Saturday was atrocious and those travelling to Bristol by road did not have very pleasant journies. Sunday itself was a bright, sunny day and V. Desmond (G5VM) and G. Brown (G5BJ) made the trip from Birmingham by aeroplane in good time.

What amounted almost to a preliminary meeting took place at the QRA of G5JU in the morning, those present including G5AR, 6CL, 6RB, 2WO, 2SN, 6XC and 2BMT, and some interesting telephony contacts on 3.5 Mc. were made with G6PA, 6NF, 5FJ, and 6FO.

Thirty-five members sat down to dinner, twenty of these being visitors from towns over 60 miles away by road, the President and Secretary of the R.S.G.B. honouring us with their presence. Why the local members gave such poor support to what is the most important social event of the year (to the Districts concerned) is an unexplained mystery, and was a great disappointment to the D.R. and the Committee, after the time and energy expended to make the P.D.M. a really successful one.

The business meeting, preceded by a photograph, was held in the Beaufort Room and "Clarry" held his audience for over an hour whilst he gave them the latest information on matters pertaining to amateur radio. He laid stress on the importance of the work being done by the Band Occupancy Check group, under G5WI, and made a request that greater use be made of those bands which are, at present, comparatively quiet.

After various questions had been asked and answered, a discussion took place on the venue for next year's P.D.M. It was thought that a complete change would be desirable and Weston-super-Mare was suggested as being accessible from most parts of the two Districts, the majority approving of this choice.

After tea, a miniature edition of the well-known Convention "swindle" took place. *Messrs. Stratton's* had kindly arranged a very interesting display of Eddystone components, including their latest products, and three of the latter were drawn for, G6RB, 2GQ, and 8AM being the lucky recipients of some useful gear.

Two parties were later conducted over the Bristol Automatic Telephone Exchange and were much impressed by the efficiency of the testing arrangements. Other parties made visits to the stations of G5KT, 6RB and 5JU and it was late before the members finally dispersed.

All those who attended the function voted it a most enjoyable one.

Photographs, as reproduced on this page, are obtainable from the D.R., the prices being 1s. 5d unmounted, 2s. 2d. mounted, post free.

Western District Provincial Meeting at the Grand Hotel, Bristol.
Left to right, centre row: 2AIW, 2BSU, G5AR, G5JU, G6CL, 2BQB, G5BJ, G5VM immediately behind G5BJ.

BOOK CONVENTION DATES

SEPT. 2nd, 3rd, 4th, 1937

R.S.G.B. SALES DEPT.

53, VICTORIA STREET, LONDON, S.W.1

PUBLICATIONS

RADIO AMATEURS' CALL BOOK

(Published quarterly in U.S.A. on the 15th of March, June, September and December.)

Contains Call-Signs, Names and Addresses of all Transmitting Amateurs.

PRICE : To Members, 6/- ; Non-Members, 6/6

RADIO AMATEURS' HANDBOOK

(Reprinted at frequent intervals by the American Radio Relay League.)

A Manual of Amateur High-Frequency Radio Communication.

PRICE : To Members, 5/6; Non-Members, 6/-

LOG BOOKS

Five types are available. Each book contains 400 sheets bound between stiff cloth covers. Sample sheets free on request.

PRICES from 3/9 to 5/9

LOG PADS

Two types are available. Each pad contains 100 leaves punched at the top for filing purposes.

Type LP16, *price* 1/4, or three for 3/6.
Type LP17, *price* 1/9, or three for 4/-

HINTS AND KINKS FOR THE RADIO AMATEUR

(Published by the American Radio Relay League.)

A Symposium of Practical Ideas of Value to the Radio Amateur.

PRICE : To Members, 2/6 ; Non-Members, 2/9

RADIO ANTENNA HANDBOOK

(Published by Radio Ltd.)

An up-to-date treatise of Amateur Antenna Design.

PRICE : 2/6 post free.

CALCULATORS

(Published by the American Radio Relay League.)

These calculators are great time-savers for all who are engaged in engineering problems.

Type A. Frequency, Inductance and Capacity.
Type B. Current, Resistance, Voltage and Power
Type C. Wire data.
Type D. Decibel Calculator.
Type E. Resistances in parallel, and condensers in series.
Type F. Measurements of Resistance.

PRICES : Types A and B, 4/6 each ; Types C, D, E and F, 2/3 each.

FOR MEMBERS ONLY

NOTEPAPER

Members' Correspondence Headed Notepaper. A good quality quarto paper with heading in black.

PRICE : Per 100 sheets, 2/6

CAR PLAQUES

Plain Type (with Emblem).

PRICE : 3/6 each.

Call Sign Type (with Emblem).

PRICE : 4/6 each.
(Delivery 14 days.)

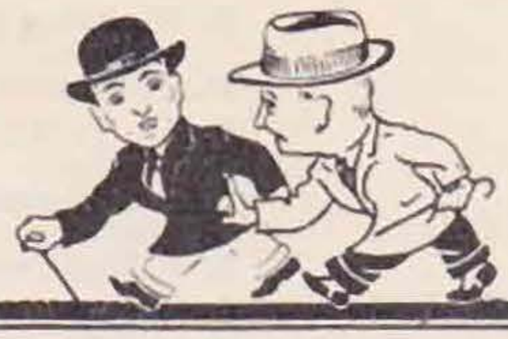
LAPEL BADGES OF EMBLEM

PRICE : 1/6 each.

CALL SIGN BROOCHES

PRICE : 2/6 each up to 5 characters ; 3/- each over 5 characters.
(Delivery 10-14 days.)

ALL ITEMS LISTED ARE POST FREE, BUT A REMITTANCE MUST ACCOMPANY EACH ORDER

BETWEEN  OURSELVES

N.F.D. Rules

Council, acting on advice from the Tests Committee, have decided to make an alteration to Rule 14.

The new rule reads :—

14. In addition to the N.F.D. Trophy, which will be awarded to the District obtaining the highest combined score, a miniature replica will be awarded to the stations scoring the highest number of points on 1.7, 3.5, 7 and 14 Mc.

This modification has been made at the request of several districts who are unable to run four separate stations.

New Member's Notepaper

We are pleased to announce that a new and more distinctive type of member's notepaper is now available. The design is illustrated in a Sales Department announcement which appears elsewhere in this issue.

The price remains as hitherto, 100 sheets 2s. 6d., 500 sheets 10s. post free.

25 Watts Permits

We desire once again to remind members that these permits can only be recommended after a person has been licensed for six months or more.

Applicants need give no technical reasons for requiring the increase in power but they must forward a formal request in writing to the Secretary, *via* their D.R.

The annual licence fees were published in the March, 1937, BULLETIN.

The Jones (Radio) Handbook

We are glad to announce that the publishers of *Radio* have now purchased the entire book publishing business of the *Pacific Radio Publishing Company*. This means that in future we shall be able to guarantee delivery *without delay* of the well-known Jones Handbook.

Copies of the 1937 edition will be available almost immediately, price 6s. post free to members.

Town Representatives

The following T.R.'s are additional to previous lists.

District 2.
Ilkley: Mr. J. Hemingway (G8ID).

District 9.
Lowestoft: Mr. R. Tunney (G8DD).

District 18.
Hull: Mr. J. Hay (BRS1948).

District 19.
Sunderland: Mr. T. F. Rendall (G6TR).

Visit to Paris

Mr. Buckwell, G5UK, who is organising the trip to Paris during the August Bank Holiday week-end, asks us to mention that owing to the crowded state of the hotels in Paris due to the Exhibition, all those intending to join the party must communicate with him by May 31. A deposit of 30s. must accompany the reservation.

W.B.E. and H.B.E. Awards

The following certificates have been issued :—

W.B.E.

Name.	*Call Sign.*	*Date.* 1937
O. A. F. Spindler ...	VU7FY ...	Jan. 29
C. R. Elsbury	VK6JE ...	Feb. 2
P. W. Moores	VQ8A ...	,, 11
R. W. Rose	VK4RQ ...	,, 24
E. Ingleton	G5IL ...	Mar. 2
J. D. Pinchbeck	G5DF ...	,, 16
Gunnar Jansson	SM6VX ...	,, 18
R. W. Rogers	G6YR ...	,, 25
E. R. Cook	ZS6AQ ...	Apl. 7
J. Scholefield	G2TR ...	,, 7
A. Reid	GM5YN ...	,, 7
C. C. Newman	ZB1J ...	,, 8
J. Heine	VK4JX ...	,, 13
A. Tibbits	VP2AT * ...	,, 22

H.B.E.

H. J. Dent	BERS274 *	Jan. 27
J. Stephen Gingell ...	2AAM ...	Mar. 3
A. H. Mackenzie... ...	VK4GK ...	,, 13
A. Guildford	VK4AP ...	,, 13
R. J. Beatson	VK4BB ...	,, 13
P. H. Hellier	BRS1668 & 2BXH ...	,, 17
G. Brown	G5BJ ...	,, 20
W. L. Ely	BRS1535 ...	,, 21

28 Mc. W.B.E.

F. J. Towell	VU2AU * ...	Feb. 6
F. H. Pettitt	SU1SG * ...	,, 8
S. Partington	G2GQ ...	,, 17

W.B.E. Telephony

S. R. Green	SU1KG ...	Jan. 12
Miss D. D. Hall ...	W2IXY ...	Mar. 10
D. R. Tibbetts	W6ITH ...	,, 18
V. Plascott	G5PT ...	Apl. 8
C. R. Rogers	VE1CR ...	,, 13
G. W. Korper	W2HMD ...	,, 13
J. Butcher	G5XG ...	,, 16
H. A. M. Whyte ...	G6WY ...	,, 19

* First awards.

QRA Section

Manager: M. Williams (G6PP).

G2GV.—H. A. Moston, Bryn Estyn, Cadwgan Road, Old Colwyn North Wales.
G2JN.—J. G. Stonestreet, 2, Paradise Row, Street End, near Canterbury, Kent.
G2LT.—A. Walker, 2, Harbord Road, Sheffield, 8, Yorks.
G2XC.—E. J. Williams, Rochdale, London Road, Purbrook, Portsmouth, Hants.
GM5JB.—J. S. Bamford, Sunnyside, Pencaitland, East Lothian, Scotland.
G5JI.—J. F. Isaac, 16, Northfield Estate, Moor Lane, Maidenhead, Berks.
G5NP.—Lieut. E. C. Bayldon, H.M.S. *Inglefield*, c/o G.P.O., London, E.C.1.
G5YP.—J. H. Wood, 6, Castle View, Underdale Road, Shrewsbury, Salop.
G6LH.—Rev. L. C. Hodge, 4, Thorold Street, Boston, Lincs.
G6LV.—H. Wright, 2, Garland Place, Helston Road, Penryn, Cornwall.
G8DY.—H. I. Popay, "A" Flight, 61 (B) Squadron, R.A.F., Henswell, Lincs.
G8IW.—F. G. Whinfrey, 37, John Calvert Road, Woodhouse, Sheffield, Yorks.
G8KC.—H. T. Longuehaye, 96, Barnmead Road, Beckenham, Kent.
G8MF.—T. de Putron, Les Hubits, St. Martins, Guernsey, C.I.
G8MK.—H. M. Campbell, 204, London Road, Twickenham, Middlesex.
G8ML.—L. W. Lewis, 117, Fairview Road, Cheltenham Spa, Glos.
G8MS.—K. Holloway, 38, Australia Avenue, Maidenhead, Berks.
GM8MZ.—F. Y. Henderson, 43, Victoria Street, Dundee, Scotland.
G8ND.—N. Dalby, 183, Showells Green Lane, Sparkhill, Birmingham, 11.
G8NH.—W. O. Bretherton, Carrig Lodge, Tower Road North, Heswall, Wirral, Ches.
G8NM.—H. S. McLintock, 30, Lingard Street, Barnsley, Yorks.
GM8NT.—J. Thompson, 14, Monteith Row, Glasgow, Scotland.
2ARR.—This call-sign was incorrectly published as 2AAR in the April Bulletin.
2AVG.—M. M. Williamson, 69, Dovedale Road, Mossley Hill, Liverpool, 18.
2AYA.—J. H. Farrer, 114, Sutton Passeys Crescent, Wollaton Park, Nottingham.
2BBI.—L. F. Steel, 9, Wickwood Court, Woodstock Road, St. Alban's, Herts.
2BBP.—P. Elms, 28, West Hill, Hitchin, Herts.
2BLL.—W. Layton, Jun., Plot No. 2, Gravelly Lane, Erdington, Birmingham.
2BMV.—D. F. Waddington, 21, West Shrubbery, Redland, Bristol, 6.
2BUH.—J. P. Hawker, "Redfields," White Cross Lane, Minehead, Somerset.
2CKM.—M. N. Salmon, 1, Finch Lane, Bushey, Herts.
2CKP.—H. Fisher, 10, Rawlings Road, Bearwood, Smethwick, Staffs.
2COT.—H. T. Stott, 17, Sylvan Avenue, Mill Hill, London, N.W.7.
2COY.—Mrs. G. N. Salter, Ferbi, Dry Sandford, Abingdon, Berks.
2CPA.—P. R. Jenkins, 56, Pantbach Road, Birchgrove, Cardiff.
2CPB.—W. J. Butler, "Walcot," Pilkington Avenue, Sutton Coldfield, Warwickshire.
2CPS.—N. K. Sunter, 148, Manchester Road, Manchester, 16.
2CPW.—L. H. Weber, 18, Jesmond Crescent, Crewe, Cheshire.

The following are cancelled: G5MJ, 2AIB, 2ANB, 2AOH, 2AWQ, 2BHM, 2BUP, 2BXO.

Please send all new QRA's, changes of address, etc., to QRA Section, R.S.G.B., 53, Victoria Street, London, S.W.1.

NEW MEMBERS.

Home Corporates.

M. Eskdale (G2SU), 330, Manchester Road, Bradford, Yorks.
P. Freeman (G5FZ), 63, Clarendon Road, Fulwood, Sheffield, 10.
F. Haworth (G6BH), 26, Furthergate, Blackburn.
R. J. Cooper (G8BX), "St. Margaret," Princes Avenue, Sanderstead, Surrey.
L. E. Baxter (G8HG), 4, Saltney Avenue, Withington, Manchester, Lancs.
R. J. T. Morton (G8HN), "Cranbrook," Hampton Road, Twickenham, Middlesex.
E. J. Kentsbeer (G8JB), 2, Chelmsford Road, North End, Portsmouth, Hants.
S. L. Hill (G8KS), Barfield House, Fielden Park, West Didsbury, Manchester, 20, Lancs.
R. W. Addie (G8LT), Boscombe Lodge, Pembroke Road, Woking, Surrey.
H. J. Wadley (G8LV), 30, Market Square, Bicester, Oxon.
P. G. James (G8MG), "Chilgrove," Headley Road, Woodley, Berks.
F. H. M. Anderson (2AMW), 9, South View Terrace, South Shields, Durham.
S. S. Macilwain (2ART), 38, Ashburton Road, Glasgow, W.2.
J. Bramhill (2BMI), 10, Orchard Waye, Uxbridge, Middlesex.
R. Cowden (2BZV), Carnmoney, near Belfast, N.I.
C. J. Fish (2CBS), 5, McKinley Terrace, Washford, Somerset.
G. R. Snowden (2CCY), 21, Seymour Grove, Heysham, Morecambe, Lancs.
T. H. Eyre (2CFM), "Kelso," Keyingham, near Hull, E. Yorks.
J. H. Caldwell (2CGA), 5, Myrtle Gardens, Bideford, Devon.
N. T. E. Dunkerton (2CGL), Commercial Hotel, 86, Old Street, Ashton-under-Lyne, Lancs.
P. J. Broom (2CGO), 54, Gilbert Road, Cambridge.
J. Fairley (2CIY), 19, Francis Avenue, Narborough Road, Leicester.
T. Kennedy (2CKC), 22-24, Main Street, Spittal, Berwick-on-Tweed.
H. R. Boutle (2CLP), 74, High Street, Gravesend, Kent.
A. Southgate (2CLX), "Dewerstone," Kingsway, Woking, Surrey.

CALIBRATION SERVICE

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

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

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

All communications should be addressed to:—

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

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

W. G. Money (2CNG), 48, Hilton Avenue, Hall Green, Birmingham, 28.
F. J. Lucas (BRS2849), "Breaklands," Fivehead, near Taunton, Somerset.
A. A. F. Mordey (BRS2850), Fernhill, Llantarnam, near Newport, Mon.
C. H. Cox (BRS2851), 17, Links Road, Blackpool, Lancs.
J. P. Stevenson (BRS2852), 115, Murray Street, Montrose, N.B.
W. Jardine (BRS2853), c/o Harley, 19, Monmouth Road, Hayes, Middlesex.
K. Davin (BRS2854), Rutland Street, Mansfield, Notts.
W. R. Gogzell (BRS2855), 5, George Street, Warminster, Wilts.
H. M. S. Green (BRS2856), Links View, 76, Barnet Way, Mill Hill, N.W.7.
J. Sinclair (BRS2857), Radio Agent, Lamlash, Arran, Scotland.
J. W. Snelling (BRS2858), 25, Denmark Grove, Islington, N.1.
V. Spence (BRS2859), 22, Mandale Road, Thornaby-on-Tees, Durham.
A. E. Campbell (BRS2860), 14, Parkside, Alkrington, Middleton, Lancs.
R. B. Wannop (BRS2861), Edina, Uddingston, Glasgow.
G. H. Smith (BRS2862), No. 4 Wireless Company, "A" Corps Signals, Mons Barracks, Aldershot.
F. A. Cooper (BRS2863), 7, Ribble Road, Coventry, Warwickshire.
G. I. Steel (BRS2864), 29, City Road, Brechin, Angus, Scotland.
N. K. Sunter (BRS2865), 148, Manchester Road, Manchester, 16.
G. Wain (BRS2866), The Hayes, Penrhyn Bay, Llandudno.
W. L. Baillie (BRS2867), 10, Holly Road, Handsworth, Birmingham.
E. V. B. Wilson (BRS2868), 67, Belmont Church Road, Strandtown, Belfast, N.I.

T. H. Mallett (BRS2869), "Rest-Harrow," Cambridge Road, Histon, Cambs.
R. R. Priestley (BRS2870), 49, St. George's Avenue, Anchorsholme, Cleveleys, Blackpool, Lancs.
I. A. Hennell (BRS2871), 47, Princes Way, Wimbledon Park, S.W.19.
M. L. Quartermaine (BRS2872), 9, Princes Gate Court, S.W.7.
G. Petch (BRS2873), 31, Kenneth Road, Brislington, Bristol, 4.
A. R. Drake (BRS2874), 44, Woodville Gardens, Ealing, W.5.
C. R. Thompson (BRS2875), The Chestnuts, Orford, Woodbridge, Suffolk.
K. Thompson (BRS2876), 8, Holland Park, Belfast, N.I.
F. Sutton (BRS2877), 194, Shaw Road, Royton, Lancs.
F. N. Shelley (BRS2878), 54, Avon Road, Bitterne Park, Southampton, Hants.
T. C. Parry (BRS2879), 8, Reepham Road, Norwich, Norfolk.
J. D. McGirr (BRS2880), 181, Ashley Terrace, Alloa, Scotland.
S. A. C. Mayor (BRS2881), 31, Basin Road, Chichester, Sussex.
S. E. Histed (BRS2882), 56, Huntingdon Road, Cambridge.
S. C. Hart (BRS2883), 2, Arundel Road, Harold Wood, Essex.
J. Gouck (BRS2884), 40, Cairns Street, Kirkcaldy, Fife.
W. J. Chalk (BRS2885), 30, Ripon Road, Ansdell, Lytham St. Annes, Lancs.
C. J. H. Blunt (BRS2886), Marlin Gate, Goudhurst, Kent.
L. H. Rowley (BRS2887), Montclare, West Drive, Bracklesham Bay, Chichester, Sussex.
W. Rogers (BRS2888), No. 1, South Bridge, Northampton.
D. Bond (BRS2889), 8, High Street, Hucknall, Notts.

TECHNICAL ENQUIRY BUREAU

The service is free to members except that a nominal charge of 6d. per query is made to cover clerical and postage expenses.

The Rules governing the service are :—

1. Questions must be written legibly and concisely on one side of the paper.
2. A sixpenny postal order must accompany each question.
   The postal order must be made payable to the R.S.G.B., and the letter addressed to Technical Enquiry Bureau, R.S.G.B., 53, Victoria Street, London, S.W.1.
3. The service is only available to fully paid-up members of the Society.

H. Broadbent (BRS2890), 7, Hilda Street, Goole, Yorks.
H. Munro (BRS2891), 36, Strowan Street, Sandyhills, Tollcross, Glasgow, E.2.
R. J. Gilbert (BRS2892), Churchtown, Ludgvan, Long Rock, Cornwall.
R. M. Jones (BRS2893), 39, Cranbrook Road, Handsworth, Birmingham.

Dominion and Foreign.

J. C. Rosenlund (LA3G), Temporary address, 45, Drewstead Road, Streatham Hill, S.W.
M. W. Simonsen (PY2GJ), P.O. Box, 2134, Sao Paulo, Brazil.
Sten Wahlin (SM5YU), Storgatan 18, Orebro, Sweden.
N. F. Joly (SV1RX), 78, Odos Menelaou, Kalithea, Athens, Greece.
C. R. Rogers (VE1CR), 55, Milton Street, Sydney, N., C. Canada.
D. J. M. Adams (VK2AE), 1658, Pacific Highway, Wahroonga, N.S.W., Australia.
F. O'Laughlin (VK4OL), 37, Kennedy Terrace, Red Hill, Brisbane, Queensland, Australia.
F. J. Lubach (VK4RF), 90, Prince Street, Thompson Estate, South Brisbane, Queensland, Australia.
P. Hubsher (VK4UL), 98, Commercial Road, Bulimba, Brisbane, Queensland, Australia.
Dr. M. V. Gopalswami, B.Sc., Ph.D. (VU7MC), Akash-Vani, Vontikoppal, Mysore City, Mysore State, India.
W. C. Gee (VS2AB), P. & T. Dept., Kuala Lumpur, F.M.S.
W. E. Rice (W1IKT), Blackinton Cross Roads, R.F.D. Williamstown, Mass., U.S.A.
G. W. Korper, jun. (W2HMD), 23, West 73rd Street, New York, U.S.A.
J. C. Scott-Allan (ZU5L), 104, Westview Road, Red Hill, Natal, S. Africa.
R. E. Petersen (BERS396), 3933, North Oak Park Avenue, Chicago, Ill., U.S.A.
S. N. Banerjee (BERS397), Hemanguinea Villa, Gondalpara P.O. Chandernagore (French), Bengal, India.
R. W. Spencer (BERS398), H.M.H.S. "Maine," c/o G.P.O., London.
A. W. Blow (BERS399), 6th Infantry Brigade, Signal Section, Lucknow, U.P., India.

R.S.G.B. Slow Morse Practices

Details will be found below of the slow Morse practices organised by the Society for those members wishing to learn or improve their code. As usual, test matter will be taken from recent issues of The T. & R. Bulletin. The page number and month of issue will be given at the end of each test—by telephony. A telephony announcement will also be given at the commencement of each test to assist those interested in tuning in the sending station. It is emphasised that reports will be appreciated and are desired in order to ascertain useful range of transmission and numbers utilising the service. If, however, a reply is desired, a stamp should be sent. Will stations in areas not at present served offer their services to Mr. T. A. St. Johnston (G6UT), 28, Douglas Road, Chingford, E 4. (Telephone: Silverthorn 2285) G5DY, of Dalston, will discontinue service for a while during rebuilding of transmitter. G6ZQ, of Cheltenham, reports that his service is being widely used.

Schedule of Slow Morse Transmissions.

			B.S.T.	k.c.	Stations
May	22	Saturday	2300	7145	GI5QX
,,	23	Sunday	0915	1775	G6ZQ
,,	23	Sunday	0945	7155	GI5UR
,,	23	Sunday	1000	7260	G5JL
,,	23	Sunday	1015	1825	G5SU
,,	23	Sunday	1330	7180	G2YV
,,	24	Monday	2300	1741	GI6XS
,,	25	Tuesday	2200	7184	G6UA
,,	26	Wednesday	2300	1775	G6ZQ
,,	26	Wednesday	2315	1741	GI6XS
,,	27	Thursday	2200	7184	G6UA
,,	29	Saturday	2300	7145	GI5QX
,,	30	Sunday	0915	1775	G6ZQ
,,	30	Sunday	0945	7155	GI5UR
,,	30	Sunday	1000	7260	G5JL
,,	30	Sunday	1015	1825	G5SU
,,	30	Sunday	1330	7180	G2YV
,,	31	Monday	2300	1741	GI6XS
June	1	Tuesday	2200	7184	G6UA
,,	2	Wednesday	2300	1775	G6ZQ
,,	2	Wednesday	2315	1741	GI6XS
,,	3	Thursday	2200	7184	G6UA
,,	5	Saturday	National Field Day		
,,	6	Sunday	National Field Day		
,,	7	Monday	2300	1741	GI6XS
,,	8	Tuesday	2200	7184	G6UA
,,	9	Wednesday	2300	1775	G6ZQ
,,	9	Wednesday	2315	1741	GI6XS
,,	10	Thursday	2200	7184	G6UA
,,	12	Saturday	2300	7145	GI5QX
,,	13	Sunday	0915	1775	G6ZQ
,,	13	Sunday	0945	7155	GI5UR
,,	13	Sunday	1000	7260	G5JL
,,	13	Sunday	1015	1825	G5SU
,,	13	Sunday	1330	7180	G2YV
,,	14	Monday	2300	1741	GI6XS
,,	15	Tuesday	2200	7184	G6UA
,,	16	Wednesday	2300	1775	G6ZQ
,,	16	Wednesday	1315	1741	GI6XS
,,	17	Thursday	2200	7184	G6UA
,,	19	Saturday	2300	7145	GI5QX

Strays

G5UI, of the Isle of Wight, has arrived in Hong Kong, and his new QRA is J. Perkiss, L.T.O., H.M.S. *Suffolk*, c/o G.P.O., London.

N. F. D.

We have just been advised that the following Swiss stations will operate as portables during N.F.D.

Geneva : HB1V, HB1AM.
Berne : HB1C, HB1BM.
Basle : HB1BY.
Schaffhausen : HB1BU.

Several others will also be active.

The U.S.K.A. will give diplomas to the five British portables working the most Swiss portables.

We are asked to mention that all HB stations now use the numeral " 1 " after the prefix.

Holidays in Germany

We understand from Herr Wolf Franckzog, D4GZF, of the German State Broadcasting System, that he will be glad to arrange for R.S.G.B. members visiting Germany to view any of the transmitters of the network. D4GZF is anxious to get into touch with British amateurs who would be willing to co-operate in a scheme of holiday exchanges with German transmitters. Any interested member should write to him c/o German State Broadcasting System, Post Box 22, Berlin-Charlottenburg 9, Germany.

ANDREW ROBERT DELLBRIDGE,
G6KV

It is with very deep sorrow we have to record the passing of Andrew Dellbridge (G6KV), of Laindon Hills, Essex, one of the best-known of the little group of amateurs resident in Eastern England.

A striking tribute to his memory was paid by the Egyptian B.E.R.U. Group, who, immediately they heard of his death, arranged for a wreath to be despatched by air from Alexandria.

Mr. Dellbridge was always willing to give assistance to those in trouble and he held an ever-open door for those interested in radio.

He was a keen telephony operator and his call, " G6KV Laindon Hills Essex " will be missed by many hundreds of amateurs at home and overseas.

Mr. Dellbridge in his younger days was a keen bowls player and in 1916 was Divisional Champion in the Essex and Norfolk Division in the English Pairs Championships. He also represented England in a Bowls Test Match during the War.

At the funeral, which took place at East Ham, several Society members were present and floral tributes were received from the President, Council and staff of the R.S.G.B., as well as from many other members and organisations.

We offer our deepest sympathies to Mrs. Dellbridge and her family. G6KV will long be remembered as an amateur with a generous heart and cheerful voice.

J. C.

Correspondence—(*Continued from page* 527).

PROMOTING INTERNATIONAL FRIENDSHIP

The Editor, T. & R. Bulletin.

Dear Sir,—There is one aspect of Amateur Radio which does not appear to be given the attention it deserves, and that is, the opportunity we have of establishing more friendly relationships with our fellow amateurs in other parts of the world.

As a nation we are notoriously bad linguists, and this fact becomes more apparent to anybody who has lived abroad. Many of us have, no doubt, wished we were able to return the compliment, when some foreign amateur, ignoring the stereotyped " Radiese," has carried on a friendly QSO entirely in English, whereas, few of us are able to say " Cheerio," in any language but our own, unless it be " au revoir."

I feel sure, that if British amateurs concluded their QSO's with a salutation in the language of the country they were working, the gesture would be much appreciated by our foreign friends.

The following is the equivalent of " Cheerio," or, to be more correct, " Until we meet again," in French, German, Italian, Portuguese, Russian and Spanish :—

French	...	Au revoir.
German	...	Auf wiedersehen.
Italian	...	A rivederci.
Portuguese	...	Até á vista.
Russian	...	Do sveydanya.
Spanish	...	Hasta la vista.

In addition to the above, may I suggest that some of our members with linguistic abilities, supplied us with a list of phrases in the principal European languages, which could be used to promote International goodwill, such as :—

(1) " British Radio Amateurs desire to promote International Friendship—will you help us ? "

(2) " Will you correspond with me in English ? "

(3) " I regret that I do not speak your language, so that we could understand each other better," etc., etc.

The World Friendship Society of Radio Amateurs, which was started in the United States a short time ago, originates a movement, which, in these days of International tension and misunderstanding, deserves the support of all those who have the Spirit of Amateur Radio at heart.

F. C. Crocker,
G2NN.

Our Next Issue

We hope to publish in our next issue several important contributions dealing with the design and construction of super-heterodyne receivers suitable for operation on all amateur bands up to 60 Mc. The June number will conclude the current volume and an Index will appear in the July issue.

SHORT-WAVE AMATEUR RADIO IN EUROPE

By Mrs. Sheldon Wilkinson.

TO meet those with whom they have conversed by means of amateur radio must surely be one of the greatest delights of all who practice our hobby.

The writer, an Associate of the R.S.G.B., recently set off to visit the studios of various European countries, and in particular to discuss film-making in Turkey. The chance of meeting radio amateurs *en route* presented an opportunity not to be missed.

At the outset one can, as a newcomer to amateur radio, say with certainty that amateurs generally are the most friendly people in the world, always anxious to extend hospitality and to hear at first hand, news concerning technical developments in other lands.

Progress in certain countries is only retarded by the thought that amateurs may, when granted a licence develop into secret propagandists !

There are to-day no active transmitting amateurs in Turkey, but the writer was shown a very modern installation at the Ecole Technicale, Istanbul, whilst in Ankara a gigantic broadcast station is in course of construction.

On arrival at Budapest a visit was made to M.R.A.E., the Hungarian National Society, where Herr Bibo; HAF4A, is on regular duty supervising the workshop, wherein new types of transmitters, etc., are constantly under construction. HAF4A is an amplifier expert.

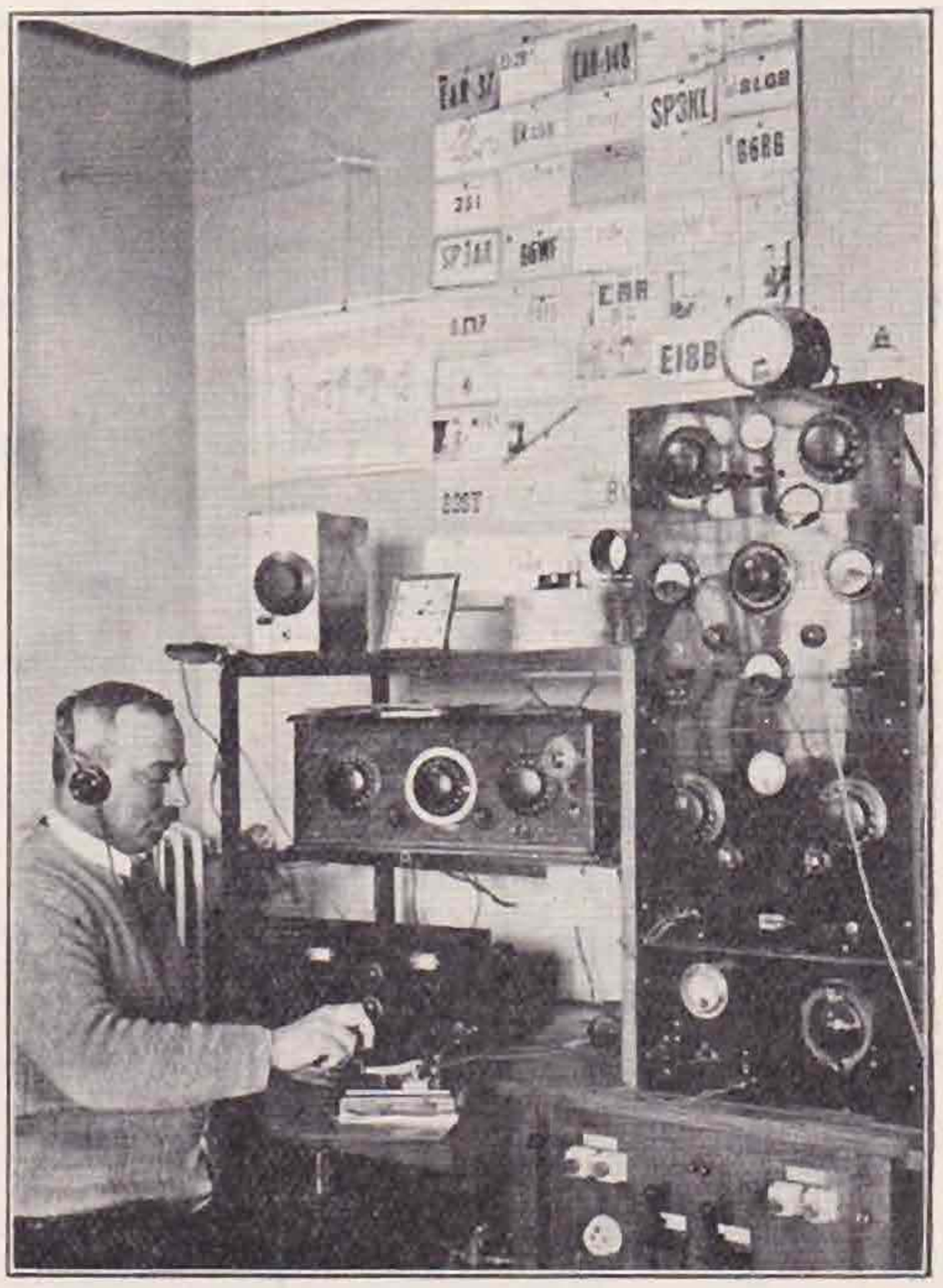
The Secretary of M.R.A.E., Herr Bela Kiss, HAF7D, is engaged professionally as an architect. Both he and Herr Bibo's charming wife speak excellent English. Herr Tabacs, HAF5O, who was also met, provided the writer with much interesting technical information concerning modern HAF stations.

General Keysersheim, the Club's President, who joined us at dinner in the Buda Hills, mentioned that he is to-day tired of sending morse messages because during the war it was his job to teach the code !

That dinner party, to the sound of Czigane music, will long be remembered, as will the kindly gesture of our Hungarian friends who made the writer an honorary member of M.R.A.E. The "diamond" pin presented on that occasion will bring back may happy memories of amateur radio in Hungary.

Vienna, city of music, the next call, provided an opportunity to meet Herr Carl Martin, well known to British amateurs as OE1CM. Herr Martin is now President of the Austrian National Society, and is one of the leading technicians in his country. He met his wife through amateur radio, but we understand she has since lost an interest in the hobby, a statement we doubt !

Dinner was taken at the home of Mr. and Mrs. Jaap de Heer, OE1JH, located on the Billrothstrasse, in the outskirts of Vienna. Herr de Heer showed us his gear, which unfortunately is seldom used these days, in spite of the fact that he has one of the most modern stations in Vienna. Herr J. Fuchs, OE1JS, although unable to attend the dinner party, arranged to send the writer a copy of one of his numerous technical handbooks. A very friendly gesture.



Herr Bela Kiss, HAF7D, Secretary of the M.R.A.O.E., Hungary.

Within a short while Herr de Heer's daughter will be visiting England, when it is hoped that many British amateurs will make a point of showing her the same courtesies as have so recently been extended to a British lady amateur travelling abroad.

In conclusion, the writer asks to be allowed, through the medium of this Journal, to convey her grateful thanks to all who extended the hand of friendship during her tour.

Knock, Knock

Mr. A. G. Parker (G6QZ) requires A.C. Mains 4v. screened grid or R.F. pentode valves (non-variable mu), with ceramic base and top grid connection for ultra-high-frequency work. The nearest equivalent known to us is the *Hivac* 2-volt U.H.F. short-wave valve.

New Ceylon B.E.R.U. Representative

Acting on a suggestion from Mr. G. H. Jolliffe, VS7GJ, the retiring representative, we learn that Mr. R. E. M. de la Pole, VS7RP, has been appointed by the Ceylon Radio Club to serve as B.E.R.U. representative for Ceylon. Members in VS7 are asked to report activities to Mr. Pole.

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

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

DISTRICT 4 (East Midlands).
(Derby, Leicester, Northants, Notts.)
Mr. J. J. CURNOW (G6CW), "St. Anns," Bramcote Lane, Wollaton Notts.

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

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

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

DISTRICT 8 (Home Counties).
(Beds., Cambs., Hunts., Rutland and the town of Peterborough.)
Mr. G. JEAPES (G2XV), 89, Perne Road, Cambridge.

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

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

DISTRICT 11 (North Wales).
(Anglesey, Carnarvon, Denbighshire, Flintshire, Merioneth, Montgomery, Radnorshire.)
MR. D. S. MITCHELL (G6AA), "The Flagstaff," Colwyn Bay, Denbighshire.

DISTRICT 12 (London North and Hertford).
(North London Postal Districts and Hertford, together with the area known as North Middlesex.)
Mr. S. BUCKINGHAM (G5QF), 41, Brunswick Park Road, New Southgate, N.11.

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

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

DISTRICT 15 (London West).
(West London Postal Districts, Bucks, and that part of Middlesex not included in District 12.)
MR. H. V. WILKINS (G6WN), 81, Studland Road, Hanwell, W.7.

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

DISTRICT 17 (Mid-East).
(Lincolnshire and Rutland.)
REV. L. C. HODGE (G6LH), 4, Thorold Street, Boston.

DISTRICT 18 (East Yorkshire).
(East Riding and part of North Riding.)
Mr. W. A. CLARK (G5FV), "Lynton," Hull Road, Keyingham, E. Yorks.

DISTRICT 19 (Northern).
(Northumberland, Durham, and North Yorks.)
Mr. H. C. D. HORNSBY (G5QY), "Newlands," 105, Kenton Lane Newcastle-on-Tyne, 3.

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

NORTHERN IRELAND.
Mr. T. P. ALLEN (GI6YW), 62, Balmoral Avenue. Belfast.

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

DISTRICT 1 (North-Western).

LIVERPOOL AND DISTRICT.—The April meeting was devoted to a discussion of plans for the North-Western District Provincial Meeting to be held at Southport on May 23 and of N.F.D. arrangements. As there were 23 members present suggestions were not lacking and several have been adopted in connection with the meeting, so members can expect one or two surprises. Mr. J. Davies (G2OA) is organising the event and by the time these notes are in print all of the 350 members in No. 1 District who are active will have received full particulars from him in the form of a printed circular. Members of other districts supporting this meeting who wish to attend will find a notice published elsewhere in this issue and are asked to get into touch with Mr. Davies at 13, Exeter Road, Wallasey, as soon as possible regarding reservations.

The members in the Liverpool area will operate the 1.7 and 3.5 Mc. stations during N.F.D. It has been suggested that this year the 3.5 Mc. station should be established at Heswall and the 1.7 Mc. station at Helsby or Frodsham. A site at Heswall has been provisionally reserved and details of the apparatus to be used were settled at the meeting Many offers of equipment have been made and fina arrangements are to be settled at the meeting nex month, so all members intending to take part i N.F.D. should make a special effort to attend Southport and Blackpool members are asked t give their support and they will be particularl welcome at the next meeting.

Birkenhead, Wirral and District.—The annua general meeting of the Wirral Amateur Transmittin and Short Wave Club was held in Birkenhea on March 31, when an excellent attendance wa recorded. Mr. Bretherton (G8NH) was electe chairman for the ensuing year, with Mr. Williamso as secretary and Mr. Rogers (2CCO) in charge c publicity. The club is indebted to 2BON for hi work as secretary during its strenuous early day Congratulations are offered to 2CCO and 2BD

who have both qualified for full licences and now await call signs, also to 2BXO, who is now G8NH. 8AA is active on 56 Mc. and it is hoped that more activity will be seen on this band in this area. Active stations include 2FZ, 6HQ, 8AA, 8NH, 6GL, 6CX, 2AHG, 2BDT, 2CCO and BRS1986.

Members visiting this area should get in touch with the T.R., G6GL, who will be pleased to see them.

Blackpool and Fylde.—The Blackpool and Fylde Short Wave Radio Society has decided to hold a 56 Mc. Field Day on July 4 (the date of the R.S.G.B. Field Day) and it is hoped to contact other District 1 stations. G5ZT and 5AD also hope to take part in these tests.

The district has had a spell of intense 56 Mc. activity due chiefly to 6MI and 2CJP and several receivers have been built. 5MS is busy on 14 Mc. and considering 28 Mc. 6VQ is planning another rebuild for 14 Mc. 6MI is busy on 56 Mc., 8AK has had some bother with his 14 Mc. crystal, but is feeling happy about his success in working W3 district on 7 Mc., using crystal oscillator supplied from batteries. 8GG is waiting for a T.20 for 14 Mc. and generally rebuilding, 2ARL is still awaiting his two-letter call, but should be on the air by the time this is in print. A new member is welcomed in Mr. Cox, who has applied for his A.A. licence, also 2ALJ and 2CLR, two new calls.

The T.R. reports that he hopes to bring a party to the District meeting at Southport.

Rochdale.—Ex-ZC6CN is now in England and, as he is living in the Rochdale district, he has recently visited G6QA. He is shortly to go North, but hopes to leave his brother behind as a new member of the Society.

Sunday mornings are still open house to all members who care to visit 6QA.

Stations active include G8DJ, 6AX, 6QA and BRS1152, who reports that on March 21 the 14 Mc. band was very lively between 23.00 and 23.50 G.M.T., and that there was a sharp cut off in signals at and below 20 metres. This phenomena has previously been reported by BRS1152 and if anyone else has experienced it he would be pleased to have further details.

FORTHCOMING EVENTS

May 19.—District 13 (Wandsworth Area), 8 p.m., at the Collingwood, 7, Plough Road, Battersea.
,, 19.—Scotland "D" District, 7.30 p.m., in the R.S.A. Rooms, 16, Royal Terrace, Edinburgh.
,, 19.—Scotland "H" District, 7.30 p.m., at 3a, Bank Street, Kirkcaldy.
,, 20.—District 13 (Anerley, Tooting, Brixton, Kennington and New Cross Areas), 8 p.m., at the Brotherhood Hall, West Norwood.
,, 20.—District 14 (Brentwood Section), 7.30 p.m., at 2BJV., 49, Rose Valley, Brentwood.
,, 21.—District 12, 7.30 p.m., at the "Prince of Wales," Prince of Wales Road, Kentish Town, N.W.5. Combined N. and N.W. District meeting.
,, 21.—District 12 (Watford Area), 8 p.m., at G6GR, "The Nyth," Norwich Road, Northwood, Middlesex.
,, 21.—District 14 (East Essex Section), 8 p.m., at G2UK, Eastwood Lodge, Rayleigh Avenue, Eastwood Road, Eastwood, Southend.
,, 23.—District 4, 3.30 p.m., at "Trent Bridge" Hotel, Nottingham. Final arrangements for N.F.D.
May 23.—Scotland "H" District, 2.30 p.m., at 3a, Bank Street, Kirkcaldy.
,, 23.—North-Western Provincial District Meeting at Scarisbrick Hotel, Lord Street, Southport.
,, 25.—District 14 (East London Section), 7.30 p.m., at G6UT, 28, Douglas Road, Chingford, E.4.
,, 26. *—District 15, 7.30 p.m., at G8DG, 148, Gunnersbury Lane, Acton, W.3. Nearest station, Acton Town on Piccadilly and District Railways, and No. 55 Bus.
,, 26.—Scotland "A" and "E" Districts, 7.30 p.m., in Room "A" in the Institution of Engineers and Shipbuilders, 39, Elmbank Crescent, Glasgow.
,, 30.—Scotland "H" District, 2.30 p.m., at 3a, Bank Street, Kirkcaldy.
June 2.—Scotland "H" District, 7.30 p.m., at 3a, Bank Street, Kirkcaldy.
,, 2.—S.L.D.R.T.S., 8 p.m., at Brotherhood Hall, West Norwood.
,, 4.—District 8, The Fitzroy Arms, Fitzroy Street, Cambridge.
,, 5/6.—National Field Day.
* Sale of disused apparatus at this meeting.

DISTRICT 2 (North-Eastern)

Barnsley.—The winter meetings are now closed, but preparations are being made for the 56 Mc. Field Day. Best wishes to 2BHM, who is now G8NM. The active stations include G2BH, 6PY, 6AJ, 6LZ, 5UA, 5KM, 5IV, 5DW, 8IJ, 8NM, 2AHT, 2AYX, 2BNN, 2BWG, 2CGD, 2CIF and BRS2487.

Leeds.—There is much activity at present, preparing for N.F.D., the Leeds section are running the B1 (7 Mc.) station, the transmitter being constructed by G5CX. The T.R. asks all members to help in making the event a success and would like all those with cars to get in touch with him as early as possible. The Leeds Radio Society have moved into new headquarters at 34, Wellington Street, City Square (next the Majestic cinema). Meetings are to be held at usual every Monday at 7 p.m. and keys are to be provided for each member as the room is to be available at all times. The Secretary is Mr. Webster, 14, Birfed Crescent, Leeds, 4. An interesting demonstration of a 56 Mc. B.K. oscillator,

using Lecher wires, was given at a recent meeting by G6GA. Active stations include 2BLA, 2AHL, BRS2317, 2439 and 2546.

Sheffield.—Most members seem to be active and N.F.D. arrangements are almost complete. The 3.5 Mc. station will be operated by the group, under the call of G5HKP. All members are asked to give every assistance. Active stations are G8IW, 8IO, 8KT, 5TO, 8JP, 6PJ, 2LT, 2JY, 2BGN, 5HK, 3BXA, 2CFA, 2DJ, 2CBQ, 2AS, BRS2282, 2293 and 2CHA. The excellent support which was given to the first meetings has not been maintained and it is discouraging to the members who are trying to run the society in Sheffield. Many of the local members have not attended for months, but are still active on the air, and the T.R. earnestly requests them to come and help to make the meetings a success. Suggestions or any ideas will be welcomed at the next meeting on May 27.

Bradford.—Preparations are being made for running the 14 Mc. station during N.F.D. This will be in charge of G6AZ, and situated at a site on Soil Hill, Queensbury, and, as usual, all offers of assistance will be received with thanks. Most stations are active as usual.

NORTH WESTERN PROVINCIAL DISTRICT MEETING

SUNDAY, MAY 23, 1937

at

SCARISBRICK HOTEL, LORD STREET, SOUTHPORT

Assemble	11.30 a.m.
Business Meeting	12 noon
Lunch	2 p.m.
Lecture and Demonstration by G. Parr, Esq., on "The Cathode Ray Tube" ...	3 p.m.
Tea	5 p.m.
Station visits and visit to the Palladium Cinema	6 p.m.

Tickets 4s. 6d. each.

All reservations to Mr. J. Davies, G2OA, 13, Exeter Road, Wallasey, not later than May 19. Ladies Invited.

DISTRICT 4 (East Midlands)

The meeting held at Nottingham on April 18, 1937, was well patronised, when 40 members were present to hear "Quartz Crystals and Frequency Measurements" and "Tritet Oscillators" talks given by 2NH and 5IS, respectively. The next District meeting is to be held at the Trent Bridge Hotel, Nottingham, at 3.30 p.m., May 23, 1937, to discuss Field Day final arrangements. Owing to a slight misunderstanding that has arisen amongst non-transmitting members, due to previous discussions on Field Day arrangements, the D.R. wishes it to be known that all members are welcome at the field of activity.

Worksop.—Notes are to hand that Worksop is fairly active. Amongst these 2WR is conducting experiments with a new 14 Mc. aerial and has some new ideas for feeders. 8CR is rebuilding with Jones exciter and 2BIC busy with new frequency meters. Others active are 2AII and several BRS members.

Leicester.—The T.R. regrets that no mention was made in last month's notes of the nine Leicester members who supported the Coventry P.D.M. Those members would like to thank the C.A.R.S. and 5ML for the station visit. Activity is fairly high, 8CZ working Ws consistently on 7 Mc. with QRP, 6GF, 2XD and 6VD working VKs on phone and CW. Congratulations to BRS2010, now 2CPG. Will members not in touch with the T.R. let him know well in advance if they wish to stay overnight during N.F.D.; also those who intend to be present should report whether meals will be required, as, owing to unexpected visitors last year, a shortage of provisions was experienced.

In closing, mention should be made that several members from Nottingham and Worksop represented No. 4 District at the Cambridge meeting.

DISTRICT 5 (Western)

The chief event of the month was, of course, the Provincial District Meeting. Those attending had a very pleasant time and details will be found elsewhere in this issue.

At the April meeting of the Bristol members, it was decided to compile a Crystal Register. It is essential that all crystal frequencies used by members throughout No. 5 District be included, so please send details when reporting to your T.R. or D.R.

It was also decided to hold Morse classes to enable A.A. and B.R.S. members to become proficient up to 12/15 w.p.m. and the Committee is proceeding with practical arrangements.

Local activities are: 6VF getting fine results with a 6L6 quadrupling from a 3.5 Mc. crystal to

Vic Desmond, G5VM flies George Brown, G5BJ, to the Bristol P.D.M. The local group with our President and Secretary journey to Whitchurch as a reception committee. Our photograph shows from left to right G5BJ, 2WO, 5AR, 5VM, 6RB, 5JU and 6XC.

14 Mc.; 5KT in trouble with burnt-out filament transformer; 8HU using a batch of 6L6's; 2BMT rebuilding after a thorough spring-clean. G5FS and G5JU have contacted with C.W. on 56 Mc. G8MO is welcomed as a new member—he will shortly be on the air on 7 and 14 Mc.

G5UH gave a lecture and demonstration on a 1.7 Mc. transmitter at the B.A.R.S. April meeting. A special transmitter is being built for installation at the clubrooms.

Arrangements for N.F.D. are well in hand, but more operators are required for both Bristol stations. Will those able to take on a spell please let the D.R. know quickly?

In Cheltenham, activity is well maintained and preparations are in hand for taking part in the forthcoming 56 Mc. events. G5BM has obtained a 3.5 Mc. permit. G8DA and 8LB are busy on 7 Mc. and 8DT and 8ML, on 14 Mc., have worked their first W stations.

G5UH and 6HN, of Bristol, paid a visit to Cheltenham and had personal contacts with most of the local members.

AT BREEZY BALDOCK.

Over 100 members and friends were shown over the Baldock Radio station on Sunday, April 25.

Our staff photographer captures a few of the South of England DX gang with other people's wives! Left to right G5JO, 5KH (avec chapeau), Mrs. G6CL, G6WY, Miss M. G., Mrs. G5AR and G6UT. Peter Pennell G2PL and YL hide in the background.

DISTRICT 6 (South-Western)

There is an old saying which commences: "In the Spring a young man's fancy . . . ." That beginning could go very well nowadays for the young men(?) of District 6, at any rate as far as concerns 56 Mc. outdoor activities. With the rather sudden, but we hope, long to be continued spring weather, the D.R. finds himself almost snowed under with arrangements, requests, etc., connected with this very absorbing side of our activities. Tests have already started and it looks as though there will be many more members using this band. Devon and Somerset will no doubt be well represented and we hope that the Cornish members will make an effort to get going on some organised tests as well. If they do, good support can be promised on the Devon side of the border. The arrangements for Conventionette and N.F.D. are going well ahead. The former will be over by the time these notes appear and N.F.D. will be soon upon us. The 1.7 Mc. station will be near Weston, the 3.5 Mc. station at Holsworthy, and the 14 Mc. station at Sandy Bay near Exmouth. At the moment of writing there is still some difficulty regarding the 7 Mc. station, but no doubt this will soon be put right. It is sincerely hoped that all members living near these stations will give all the support they possibly can.

Taunton.—The April meeting took the form of a very interesting visit to the North Petherton Beam Station. Those present were 2JM, 5AK, 6LQ, 8GB, 8JF, 2BAM, 2BVC, BRS2445, 2782. 5AK reports that the Budget has been found and is now on the way again. He also says he has started up on 28 Mc.

Exeter.—The D.R. was able to attend the first meeting of the month and spent a very interesting time with the local members. There was an attendance of ten. At the second meeting, when there was an attendance of fourteen, the members were treated to a very interesting lecture on electrical interference of broadcast and short-wave reception. The lecture was based on a set of Marconiphone records on the subject.

Bideford.—G6GM keeps going on 14, 3.5 and 1.7 Mc. On the latter band he has recently worked F8AJ, getting a report of R7, and OK1AW, who gave him R5. 2ADJ is rapidly completing his station and hopes to have his two letter call soon. We welcome a newcomer to R.S.G.B. in 2CGA (Bideford), who will also be on the air shortly. G6FO is rebuilding from top to bottom and so is only on 1.7 at present. Active steps are being taken to make the area's N.F.D. participation a real success this year and those who had their first N.F.D. trip last year are all agreed that the 3.5 Mc. band will suit the area admirably.

Torquay.—There was an attendance of ten at the monthly meeting at G5SY. Many things were discussed, but probably members were chiefly interested in the grand change over that the D.R. has been making. During the month all the gear has been moved from one room to another. Formal meetings will now be discontinued until the autumn. Most of the members are interested in 56 Mc., and opportunities should soon come now for the experiments carried out during the winter by 5GD, 6WT, 2CL, 5SY and others to be put to a thorough test.

West Cornwall.—It was reported in last month's notes that, unfortunately, G6LV had to give up his leadership. We are glad to announce that his successor is 2CGC, Mr. J. C. P. Clark, Goonhavern, Near Truro. We wish him all success in his new job and thank him for taking it on. We also hope that the members in this area will rally round and help him as much as possible. Will local members please note two things. First, that 2CGC hopes to start meetings again in the autumn; and secondly, that the area will be known as the West Cornwall area and will take in Truro, Penryn, Falmouth, Helston, Penzance, St. Agnes, Newquay, Perranporth and Goonhavern.

DISTRICT 7 (Southern).

There will be no monthly meeting in June, due to N.F.D. We were sorry to hear that G5XH was in hospital and we wish him a speedy recovery. He wishes to thank all members who kindly wrote, or called and helped to while away the time. It is hoped that all District 7 members who can make the journey will attend the South-Eastern District meeting at the "Rose and Crown," Tonbridge, on Sunday, June 20.

Portsmouth.—At the April meeting of the South Hants R.T.S. over twenty members heard R. E. Blakey, D.Sc., lecture on " R.F. Power Measurements." After stressing the difficulties involved, the lecturer described methods of ascertaining grid driving power using a peak voltmeter and also outlined a rectifier method of measuring the R.F. output from the transmitter. The corrections necessary for various frequencies were discussed and given, together with data for suitable equipment for the amateur. Dr. Blakey also gave many helpful hints on valve voltmeters of various types and was heartily thanked at the conclusion. Arrangements were made for the N.F.D. 3.5 Mc. station at Parbrook.

Reading.—At the April meeting of the R.T. and R.S. some 20 amateurs were present, including G2CL and 2AKB from Oxford. We welcomed to the Reading group two new calls in G8MQ, of Woodley, and G8MS, of Maidenhead. The meeting was entirely given over to Field Day discussion and some interesting points were brought up. Most Berkshire members are active on phone. G2YB, 2IT, 5HH are on 28 Mc. and G2YB has worked CM on that band. G5AO finds the Windom O.K. and has WAC and WBE again since its erection in February. Stations most active during the month were G2IT, 2YB, 5AO, 5HH and 6GT. We are sorry to lose G2NM from Reading and wish him the best of luck in his new QRA. The next Reading meeting will be on May 19.

Southampton.—Few reports to hand, although listening on 14 Mc. shows that most licensed stations are active. With the approach of the summer, interest in 56 Mc. is increasing and several BRS stations are building receivers for that band. Schedules are being arranged with stations outside the town. 5PT is contemplating Johnson Q for 14 Mc. 5OB is rebuilding speech amplifier and erecting vertical zepp. 2IL and 6YI have installed commercial communication type receivers. 8DM has tried ten different aerial arrangements on 14 Mc. and is now using one of his own design. 2ATT has built 3-valve all-mains super regenerative for 56 Mc. and gets very good results. 2AND and BRS207 active.

Kingston.—G6BI is maintaining schedules on 56 Mc. and building portable rig for field days. G8FV is constructing a " super " for 7 and 14 Mc. and active on these bands using grid modulation. G8IX is continuing his tests on 56 Mc. and has been heard in Staines. 2CFW is also on 56 Mc. using a mains super regenerative. G8HN is on 14 Mc., where he has worked all W districts and ZL, also SU on phone. G5JW has increased his modulation on 56 Mc. with greatly improved results. G6RS is working daily on 56 Mc. and has had many reports from listeners up to 25 miles. He is building special Field Day rig. The K.D.A.R.A. 56 Mc. Group recently listened to a very fine lecture by G5JW on 56 Mc. receivers. The first Field Day of the season will take place during the second week-end in May. 56 Mc. schedule cards are still available to members of R.S.G.B. on request. BRS2326, of Morden, reports a great deal of listening on 28 Mc. He notes that conditions have been very erratic on occasions. BRS2760 also reports hearing many W's on 14 Mc. during April. He wants to know who is the owner of the raw A.C. carrier which systematically jams phone stations on 7 Mc. on Sunday mornings.

Croydon.—Activity is still strong in this area. 2MV has constructed a new transmitter to work on 14, 28 and 56 Mc., with which he hopes to produce about 50 watts on 28 and 40 on 56 Mc. 2VA is experimenting with aerials on 14,300 and would appreciate real reports. 5AN, with a vertical dipole and reflectors, has been concentrating on W and VE, working about 200 of them last month. 2KU has also been busy with the Americans, but still wants a South American for WAC. 5XW can still be heard on 7 Mc. when time permits. 2BFQ has completed his Tobe super and is logging plenty of DX. 2CHQ has left for Middlesbrough for business reasons. The Surrey Radio Contact Club, which meets at the Alhambra, Croydon, first Tuesday in the month, will be having a portable station on the air during the N.F.D. and operators are required to help fill the 24 hours duty.

George Brown G5BJ, in an exclusive interview told our camera man that he enjoyed his first flight, but he thinks Vic Emma should provide a transmitter in order that his passengers may work DX.

Cambridge Conventionette

A full report of this event will appear in our next issue, together with the group photograph.

Over 140 members and friends attended the meeting, the largest number ever recorded at a provincial gathering.

DISTRICT 9 (East Anglia)

The meeting held at Norwich on April 18 was exceptionally well attended by members from all parts of East Anglia and consequently was very successful. The chief topic for discussion was N.F.D. arrangements and it is hoped that the decisions arrived at will prove satisfactory to all. The meeting concluded with station visits for some, while others inspected an electric totalisator.

Practically everybody in the District seems to be active. At Norwich 5IX is still working on a new receiver and also preparing for controlled carrier telephony on 3.5 Mc. 6QZ has completed his new receiver with very satisfactory results and has been making observations on 7 Mc. skip in the early morning. 2MN's time seems to have been devoted to erecting and testing aerial systems. DX has been engaging the attention of 6UA, who has been doing good work on 14 Mc. 2UT is also believed to be active.

G8DD at Lowestoft has now settled at his new QRA, is completely rebuilding and hopes to be on the air during May. 2CJF and BRS2395 are rebuilding receivers suitable for portable working. 5QO is testing on 3.5 Mc. phone.

From King's Lynn comes the news that 2XS is still getting out well on 3.5 Mc. with QRP c.w. and he now plans to use phone employing grid modulation. 2ABX, 2JS and Mr. Verry are active. Stations active in Ipswich include 6TI, 8AN and 8IS. It is hoped that reports will be sent from this area so that fuller details may be given next month.

G5QO has been handed the job of district scribe and asks for co-operation in compiling these notes. Reports of activities should be sent not later than the 15th of each month, in order that they may be included. Remember it is the activities that make the notes, so just let the scribe know about them and he will try and do the rest. G5QO's address is 2, Hall Park Villas, Oulton Road, Lowestoft.

DISTRICT 10 (South Wales and Monmouth)

BRS2835, of Ebbw Vale, a new member, is applying for an A.A. licence. G8FJ has moved to London.

Cardiff Club meetings are being held fortnightly. New members should communicate with G5BI. G8NP (ex 2BPN) is on 7 Mc., using an American "Sky-buddy." 5BI is again on 1.7 Mc. Aerial tests are being conducted. 2BSN has applied for a full call. 2BQB and 2CMX are learning Morse with 8AM as instructor. The latter is on 7 Mc., as is also 5XN, who has tried 14 Mc. but without much success. 6ON is heard on 7 Mc. occasionally. 2JL and 2XX are active. 8GN has had BCL trouble. 2APK is now G8NQ and is working telephony on 7,100 kc. 5VX has left 7 Mc. for 1.7 Mc. 6JW and 5PH have been heard on 7 Mc.

All the Swansea stations are active. These include 2IP, 8HI, 5KJ and 2UL. The last two are co-operating on feeder experiments. 5TW awaits confirmation of an Asian contact to claim WAC.

The tendency of certain Swansea stations to use 4 Mc. for street-to-street phone contacts is deprecated by others who wish to work DX. This local work could be easily conducted on 1.7 Mc.

G2WO and 6XC have been heard on 3.5 Mc.

In Blackwood 8CT has worked LU; confirmation is waited for WBE and WAC claims. 5FI, 5TJ and 6BK are also active.

DISTRICT 12 (London North and Hertford)

The April meeting of the District was devoted to general discussion and principally N.F.D. arrangements, the sites for the four stations being definitely fixed. The next meeting will be North and North-west London combined, details of which will be found under forthcoming events. The programme will include a demonstration of a single-signal superhet, followed by an informal discussion opened by G6NR on "QRO v. QRP."

2AKP reports that his call is now G8NV and he will shortly be working on 7 and 14 Mc. with CW and 'phone on 1.7 Mc. BRS2479 has a three-letter call 2CPL. G2AI is continuing experiments with half-wave aerials fed with low impedance cables. He is still working low power as his power-pack is out of action.

After May, meetings will be discontinued until September, but news for district notes should be sent to the District Scribe, A. W. Hartley, 111, Lichfield Grove, Finchley, N.3, before the 25th of each month.

G6CL has been experimenting with suppressor grid modulation to a pair of *362 Company's* new RFP 30's and in less than a week he had worked five continents in 14 countries, with an input of 60 watts on 14,030 or 14,357 kc. The speech amplifier in use is the output stage of a short-wave B.C.L. receiver with a *362 Company* PX25 as modulator. An Adolph microphone, a relic of "dry battery days," has been pressed into service, and in spite of the "primitive" arrangement, quality has been reported excellent. A VK contact is wanted for W.A.C. and W.B.E., on 'phone.

The April meeting of the Watford Group was held on the 27th at Abbots Langley, and was in the form of discussions on the ultra-high frequencies and high fidelity reproduction. G5RD demonstrated his "speaker in the wall" on the A.P. transmissions.

DISTRICT 13 (London South).

Arrangements for N.F.D. are now almost complete and we are glad to say that there will be four South London stations on the air this year. Details of the various locations will be found elsewhere in these pages. There is still a shortage of transport, however, and the D.R. will be very glad to hear from anyone who can offer assistance in this connection.

Anerley, Tooting, Kennington, Brixton and New Cross Areas.—G5PY has everything ready for his new 25-watt power supply and is starting a rebuild. 2UX is active on 14 Mc. and has been trying 'phone on 7 Mc. 2ADY is going all "rack and panel" and is hotting up his receiver. G2LW is rebuilding his gear in preparation for the 56 Mc. link on N.F.D. G5OX and 6OW will provide the other two points in this link. An excellent meeting was held at the Brotherhood Hall on April 22 and the next meeting will be on May 20.

Wandsworth Area.—G2RC has had trouble with PA neutralising, but overcame it by adjusting the link coupling. 5KW, who has recently returned to this country, is active on 7 Mc. and obtaining

good results, although only using an input of 3 watts. 5SH has been heard on the air, but no report has been received from him. 2TH has erected a dipole aerial using a low impedance feeder and found it no good for DX, although excellent reports have been received from medium DX stations. He has now reverted to the old " end on " aerial and finds he can get good reports again from Australia. 2BNL has been constructing experimental transmitting gear and has installed a doublet aerial for receiving which he finds is a great improvement. 2AFA has had a serious illness and we all wish him a speedy recovery and are looking forward to seeing him at the next meeting, which will be held at the Collingwood on May 19.

Blackheath Area.—On April 21 G2ZQ was successful in contacting AC4YN and received an RST 579 report. As this station is situated in Lhasa, Tibet, this is certainly an achievement. This contact makes 2ZQ the first British " W.A.Z." and, we believe, the second in the world (the first being ON4AU). Congratulations, OM ! 2WV is erecting a new aerial, using the Jones twisted pair feed line system. When this is functioning properly he is hoping for some DX again, although he hardly dare hope for a contact with the " Forbidden City " ! G2YG and 8IV are known to be active.

During the last month LA3G has been a very welcome visitor at certain South London stations and meetings and it is hoped to see him present on N.F.D. We also extend a hearty welcome to all the new members of the District and would point out that we shall be glad to see them at the local meetings. It seems redundant to mention that reports should be forwarded either to the T.R. or D.R. by the 20th of the month.

DISTRICT 14 (Eastern)

East London.—There was a good attendance at the April meeting held at G8AB, Loughton, when N.F.D. arrangements were again the chief topic. G2XG is building the 14 Mc. transmitter and the receivers will be supplied by G8JM, 2AJF and 2BPY. A tent is still wanted, also offers of assistance in the way of gear, transport and finance will be appreciated. Personnel is wanted for the 3.5 Mc. station, G6QK, at Manuden. BRS2450, of Loughton, is now 2ANB. BRS2157, of Leyton, is awaiting a three-letter call. Entries for the 56 Mc. Field Day to be held on Sunday, July 4, must reach H.Q. by May 23, so will members interested get in touch with the D.R. at once. It is proposed to run a station near Chingford, but a site has not yet been obtained. At the meeting homage was paid to the memory of the late G6KV.

East Essex.—The passing of G6KV, of Laindon Hills, on April 15 was lamented not only by those who knew him so well in this district, but also by his many friends in other parts of this country and abroad. His cheery voice on the air will be missed by us all. A tribute was paid to him and sympathy for Mrs. Dellbridge and relatives at the April meeting held at G2KT, Rayleigh.

At this meeting there was an attendance of 21. The major topic of discussion was again N.F.D. Permission has now been granted for the use of a portion of Thundersley Glen. Visitors and all who can possibly arrange to help in erecting, operating and dismantling will be welcomed. All details may be obtained from the T.R. The attendance at this meeting of our D.R. and G8AB from the East London area was much appreciated.

At the Southend Radio Society's exhibition, R.S.G.B. members " ran away " with the prizes, G2UK's transmitter, besides winning a first prize, gained the cup for the best workmanship in the show. G2MY, G5UK, G6IF and 2BNR were also successful in receiving awards in various sections.

G6CL, G5AR and G6UT were among the 80 odd present at the Southend Radio Society's annual dinner and dance on April 17.

A welcome is extended to our new members, 2CLN and BRS2830.

Chelmsford.—At the April meeting held at G5RV Chelmsford, a record attendance of 34 was made. Those present included G6DH (Clacton), G6LL (Cuffley), G8AB (Loughton), a party from Brentwood and both T.R.s and D.R. Arrangements were made for the N.F.D. 1.7 Mc. station, G6LBP, to be fielded at Rails Farm, East Hanningfield, near Chelmsford. A most interesting visit was made to the Marconi College, where a television demonstration was made.

Brentwood.—See " Forthcoming Events " for next meeting, where a proposed visit to the Barking Power Station will be discussed.

DISTRICT 15 (London West, Middlesex and Buckinghamshire)

This month we must thank Mrs. Bevan for having catered for the thirty odd members who attended the meeting at G8IH. Many of us envied his available space for aerials.

We are looking forward to a bumper junk sale and collection at the next meeting (see Forthcoming Events) to alleviate any worry concerning N.F.D. finance.

London West.—G6CO built new transmitter, 8IL busy with DX on 14 Mc., 8KZ on both 7 and 14 Mc. telephony, 2CMG built transmitter and building receiver, 2AUB trying telephony, 2CCK constructing new receiver, BRS2746 and 2BWU busy with transmitter and heard their first W6, BRS2842 hearing DX telephony on 14 Mc. BRS2874 reports for first time and is using a TRF receiver, G6WN both on receivers which are nearing completion.

Middlesex.—The new T.R. (G8FA) wants reports. He ran local meeting and had five present. Has worked VE, VK and FA. G5JL found conditions on 7 Mc. phenomenal at times. BRS2142 had receiver blow up. BRS2853 having Morse instruction.

South Middlesex.—BRS2697 busy with aerials and 56 Mc. Others active : G2LA, 2KI, 2NN, 2ZY, 5VB, 8FV, 8HN, 8IP and 8MK.

Bucks.—BRS2498 on all bands from 1.7 to 28 Mc. Hopes to get A.A. soon.

The T.V.A.R.T.S. have arranged a programme in advance which should prove beneficial. A copy of this will be forwarded on application to J. N. Roe (G2VV), 19a, The Barons, St. Margarets-on-Thames, Middlesex. They are holding a field day on May 9 on the 7 Mc. band and another on July 4 on the 14 Mc. band. Why not 56 Mc. that day ?—Ed.

The Southall Radio Society is running an excursion to Paris for the Universal Exhibition on May 22.

DISTRICT 16 (South-Eastern).

It is with deep regret that we learn of the passing of Mr. A. R. Dellbridge, known to so many over the air as G6KV. The M.A.T.S. and the District as a whole have lost a ham and a friend, and our sympathy is extended to his family and relatives.

The South of England P.D.M. will take place, as mentioned in the notes last month, on June 20, and the venue will be the "Rose and Crown," Tonbridge. This hotel is situated on the left-hand side of the High Street on entering the town from the London direction by road, while those coming by train will find it about five minutes' walk from the station on the right-hand side of the road.

Eastbourne.—Nothing special to report, but the following are active:—G2AO, 2HV, 5IH, and 2BIU.

Gravesend.—The Gravesend branch of the M.A.T.S. has been given the use of a large club-room in the centre of the town, and meetings are held regularly on Monday evenings. A library has been started with G5SI as librarian. 5SU is getting good reports on his slow Morse schedules, and is covering a wide area. 6VC has been running Morse classes for some time, but is not getting much support. What about it, local BRS and AA men? G2IZ is experimenting with Faraday shields in the tank circuit of his PA as recently described in QST. Several members are joining the R.N.W.A.R. and it is hoped that a local group will be formed.

SOUTH-EASTERN PROVINCIAL DISTRICT MEETING

SUNDAY, JUNE 20, 1937

at

ROSE & CROWN HOTEL, TONBRIDGE

Assemble	...	...	12.30	p.m.
Lunch	...	...	1.15	p.m.
Business Meeting	...	...	2.30	p.m.
Tea	...	...	4.15	p.m.
Station Visits	...	...	5.30	p.m.

Price 5s. inclusive.

All reservations to Mr. W. H. Allen (G2UJ), 32, Earls Road, Tunbridge Wells, not later than June 16.

Gillingham.—G6QC preparing for CC on 56 Mc., 5FN working on directional aerials, and 6NU doing great things on "ten" with QRP. 2CM and 2AFT are also active.

Heathfield.—A meeting was held at G5JZ's QRA on April 26, when several of the Tunbridge Wells group were present. The discussion ranged from N.F.D. preparations to Windom aerials.

Folkestone.—At the last meeting of the F.R.A. Mr. Scudder gave a talk on Television. G2IC and 8BG are working on 56 Mc. with the former's two-valve Tritet/Quadrupler, while 8BG is getting good signals on an O-v-1 straight receiver.

Tunbridge Wells.—N.F.D. preparations are in full swing, and the transmitter built by G5KV for the event is proving most satisfactory. 2UJ is working on a two-way directional beam aerial on 56 Mc., and by the time these notes are in print, hopes to be putting out a stronger signal than hitherto on this band. The aerial should radiate best in a North and South direction, and reports from any distance or direction will be welcomed. 2UJ attended the Cambridge P.D.M. on April 25 and thoroughly enjoyed it. Congratulations to 2XV, who organised it and broke all records with a gathering of 138. Can we equal this on June 20 at Tonbridge?

Whitstable.—The N.F.D. film was shown at the meeting held at 2BUC's on April 10, and was followed by a short talk on the "Kerr Cell" by 2BUC, and a general discussion. Councillor Prangnall, who was 5QJ in the 440 metre days, has arranged for the Whitstable Council to supply QSL cards to members of the WRA.

The D.R., who was also present at the meeting, took the opportunity of visiting most of the stations in the neighbourhood during the week-end, and was pleased to see so much activity, but how about "swotting" Morse a bit and getting some of that excellent gear on the air?

DISTRICT 17 (Mid-East).

The Crystal Register is completed at last and is now in the hands of members. If anyone has been inadvertently missed, the D.R. will be pleased to forward a copy. The duplicating was done by G8AP, to whom all are grateful for his efforts. It is hoped that members will keep the D.R. informed of any change in their crystal frequencies so that the Register may be corrected.

Our preparations for N.F.D. are going well. Incidentally, this District welcomes the amending of rule 14 so that, although we shall only have three stations on the air, we shall be able to compete for the replicas. Although the District is large geographically, its fully licensed members are not numerous. The T.R. in charge of each station will be glad to receive offers of help from members, who should come provided with sleeping equipment and sufficient food for the duration of the Contest. The stations will be as follows: 1.7 Mc. and 3.5 Mc., G8FC, at Cranwell, under G6WC; 7 Mc., G2VY, at Cleethorpes, under G6AK and 14 Mc., G6GH, at Baumber, under G6GH.

Boston.—G6GH has his HRO installed and is most impressed with its performance. He has worked his fourth K6 and also VK7, which makes him entitled to the first HBE in this District. G6LH has moved; he is still minus an aerial but plus a fiancée. 8BQ has been testing an MO-PA, but is reverting to CC.

Brigg.—8AP is looking for an elusive W5 to make all W districts. He is testing a new transmitter, using a pair of RK 23's in the PA.

Grantham.—Welcome to 6PZ, who comes to us from District 4. He is active on 7, 14, 28 and 56 Mc., using D.C. mains, and would be glad to contact District members.

Sleaford.—8GI is rebuilding his power packs on to metal chassis in readiness for a 25-watt licence.

DISTRICT 18 (East Yorkshire)

Hull.—By the time these notes are in print the April meeting and York P.D.M. will be over and

it is hoped that there was a good representation from Hull.

Nearly all reports this month are from AA and BRS members, probably because most transmitting members are inactive and rebuilding. 2AGK has been out of action owing to change over from D.C. to A.C., but has been putting time in on the receiver, having heard K6, XE, EL and PK4 on 14 Mc. 2BRY is building new transmitter—CO, FD, PP. PA. modulated by a 5-watt L.F. amplifier and the frequency will be 7,140 kc. G5HA busy on one-valve 56 Mc. transmitter, using 6L6. 2ARB endeavouring to find perfect modulator. 2CAQ finding A.A. work satisfactory and hopes to have CO. PA rig feeding radiating aerial very soon, frequency is 7,100 kc. G5BP preparing for complete rebuild. G6OY also rebuilding, but starting with receiver, in which will be some unusual ideas. He has promised a talk on it. G5MN has been heard active occasionally, has new power supply, CX and K5 have been worked.

We extend a hearty welcome to BRS2818, 2844 and 2847. It is hoped that it will be possible to run two N.F.D. stations from Hull and Hessle, but this has yet to be decided.

The T.R. thanks all those who were good enough to report and hopes that others will follow their example. A card by the 18th is all that is necessary.

Bridlington.—G6OO having resigned from the R.N.W.A.R., is going all amateur again. He is building a new rig for 3.5 and 1.7 Mc., with 10 and 25 watts, respectively, using 47 CO, 46 doubler and 210 as PA.

Scarborough.—G5MV now licensed on 3.5 Mc. is also experimenting with a 59 driving 53 and RK20 final for 28 Mc. on dummy aerial. G2TK has made a welcome return to the air and has added J, VQ8, K6, W6, etc., to his list of countries. Finds 53 in Jones Exciter very efficient. G6TG has been making initial experiments with screen/plate modulation of his RFP60. Now QRT whilst rebuilding his superhet. G8KU testing aerials and working QRP on 7 and 14 Mc. C.W. only. Will appreciate reports. G6CP testing out apparatus for N.F.D. G6CPP will be the call used on 7 Mc. 2BGO has TX almost completed. Using Skybuddy for RX. 2CIW moving to new QRA. 2BMD hopes to be on the air soon and to be operating at N.F.D.

The Scarborough Short Wave Club will probably use part of the club TX for N.F.D. The 7 Mc. station will be on the top of Oliver's Mount, an ideal position 500 ft. above sea level. About one dozen operators should be available to take turns at the key. Meetings are held at the club-room in Gladstone Lane every Monday at 8 p.m., and members are requested to attend to discuss N.F.D. arrangements at each meeting.

G2CP, who is at present working out of Scarborough, asks that notes for the BULLETIN be given to G6TG or left on the Notice Board at the Short Wave Club.

DISTRICT 19 (Northern).

Stockton.—G2FO moving to a new QRA and busy with N.F.D. gear. 8CL having trouble with his new rig. 8GL has built new receiver and is on 7 Mc. phone. 6DR moving to new QRA. 6ZT active again on 56 Mc. phone. 2CBA having trouble with his vibrator H.T. supply. 5XT has finished new phone rig and active with crystal "mike." Also active are 2BQO and 2AKH, the latter having applied for full licence. BRS2859 is welcomed to the District.

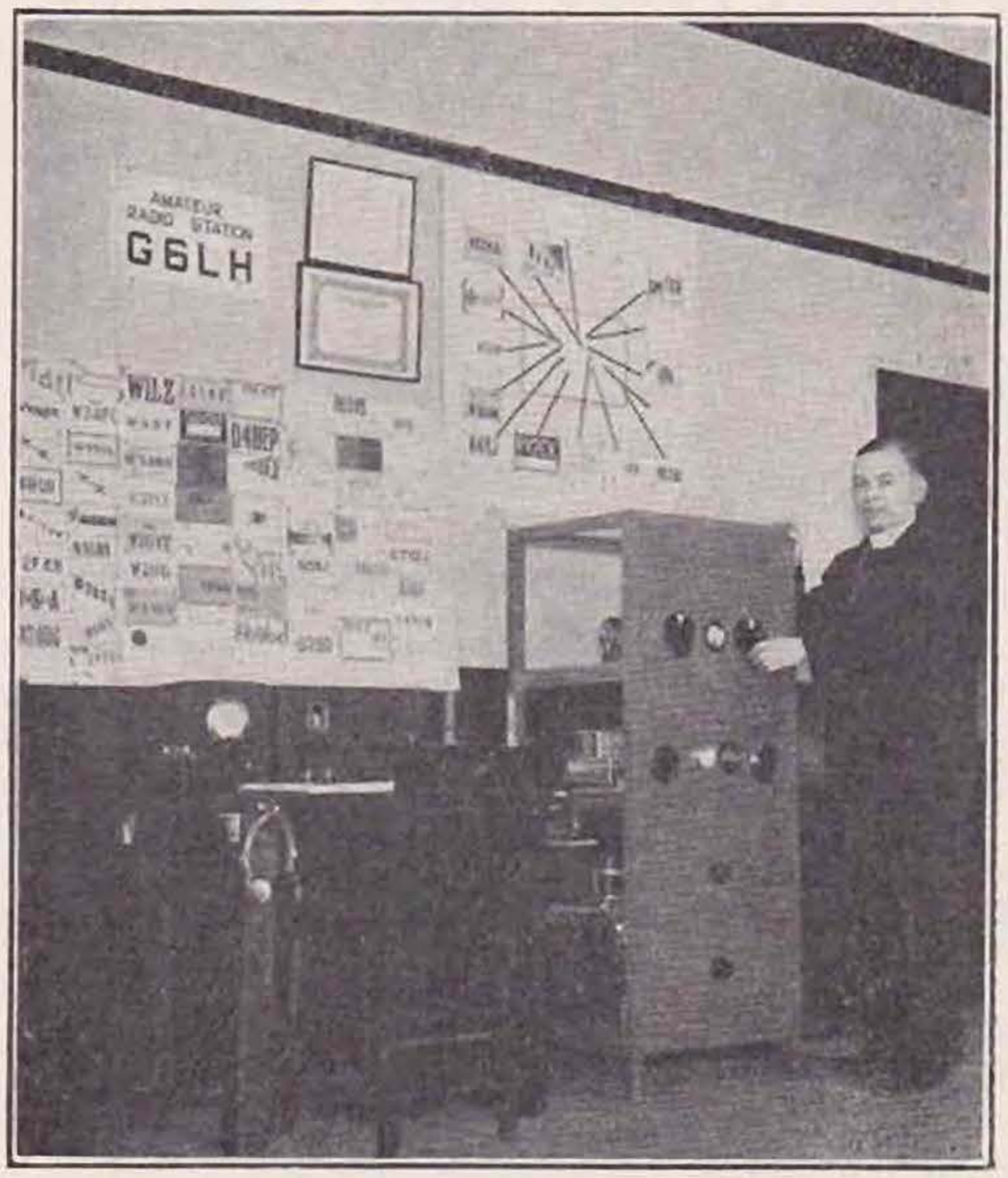
South Shields.—G5YO has a S.S.S. receiver and has finished his Collins multi-band aerial. 8IF on 14 Mc. 8JO experimenting with matched impedance aerials. 8KK made a good start on 14 Mc. with four continents. 5WZ and 6XO are in the throes of rebuilding. 6PB and 5SB are active again.

Sunderland.—G8AR has decided on beam aerials for his new QRA. 6GY on 7 Mc. and hopes to be on 3.5 Mc. phone soon. 6HV rebuilding entire rig around new American tubes. 5NS active on 3.5 and 7 Mc. and has worked plenty of DX. 5AC has rebuilt with 10 in final now and active on 14 Mc. 6TR has tried some new aerials, but has reverted to his old favourite—a full-wave zepp. 6UD putting up directional aerial for VE, as he wants to work VE2GA every day on sked.

Newcastle and District.—G2XT active again with 1.7 Mc. phone. 5QY had visits from 5WZ and 6UD. Reports are scarce this month, but the following stations are all active: G6IR, 2GC, 2PN, 2OS, 6YL, 5ZM, 5RI, 5AY, 8AY. All members extend their sympathy to G2PN in his recent bereavement.

Scotland

Activity in most districts is now centred around preparations for that most popular event in the R.S.G.B. contest calendar, National Field Day. We all hope that the weather clerk will be kind and provide good weather which adds so much to the pleasure of the competitors. Members who wish details of the sites of the stations in the various



Rev. L. C. Hodge, G6LH.
No. 16 District Representative.

districts will find full particulars elsewhere in this issue.

"A" District.—Preparations for N.F.D. are now practically completed. There is little news of individual station activity. The monthly meetings will be suspended after May until September. Mr. Tennant, ex G6OW, is again active under the call GM8MT. Mr. J. Thompson, BRS1807, has been granted the call GM8NT, and Mr. D. A. Gray, 2AGD, is now GM6DG.

"B" District.—There is little fresh in the district except preparations for N.F.D. Most stations who are active are engaged in testing aerials and QRP. After N.F.D. the regular meetings will be suspended until September. GM2SB, who recently arrived in the district, has been transferred again and on this occasion leaves Scotland. SM7QD, operator on the S.S. *Monarch*, who has been a regular visitor to Aberdeen, was QSO GM6BM recently while off Gibraltar.

"C" District.—The District continues very active and the N.F.D. arrangements are well in hand. The return visit of "B" District took place on April 25 in Dundee, and at the Royal Hotel a company of some 30 members gathered. We were very pleased to be able to be present and meet so many members personally. A splendid programme had been arranged and everything went off perfectly. Mr. F. Y. Henderson, BRS2732, has been granted the call GM8MZ.

"D" District.—Two stations will be run by the District in N.F.D. GM2TM was placed third in Britain and first in Scotland for DJDC. Stations are active in the district, but the lack of definite reports makes it impossible to report their activities. The last meeting for the season will take place on May 19.

"F" District.—The decision not to take part in N.F.D. was regretfully taken due to various circumstances over which the district had no control. Activity in the district continues high. GM6RV now awaits a contact with VK to complete his 'phone W.A.C. Meetings are continuing on the first Sunday of each month at 7.30 p.m. in the County Hotel, Stirling. The attendance at the last was very good and it is hoped that the support will continue. GM6TF has rejoined the Society.

"G" District.—The district will run two stations in N.F.D. and preparations are being forced ahead. Tests with Diamond aerial are still in progress at GM6RG, who is working the world. GM5FT had a long QSO with VP2LA and reports that he is anxious to contact "G" stations. GM8CN is also on 14 Mc.

"H" District.—Despite a shortage of operators the district has decided to enter a single station for N.F.D. The dance held recently was a big success. The District has suffered a big loss by the departure of Mr. J. McKenzie, BERS231, and the members of "H" wish him the best of luck and all success in his new appointment.

Northern Ireland

In these, my first Notes as D.R., I want to make a personal request. At times during my period of office it may happen that GI members may feel afflicted by a grievance of some sort. It is not fair to other members, or to me, that they should be asked to help to nurse any such sense of injustice, especially as it may be due to a complete misunderstanding, or, more probably still, a lack of knowledge of all the facts. I ask that any member in this District should first get in touch with me about any such matter, before spreading a sense of discontent, and I shall do my best to remove the grievance or explain the situation. I assume in this that members have read the first paragraph on page 473 of the April BULLETIN.

All GI stations are urgently requested to send me a note of their crystal frequencies for use in compiling a register. A penny postcard is a cheap form of insurance against a new GI being recommended to use your pet spot in the band.

Arrangements for N.F.D. are well ahead, and three stations are proposed: A, B1, and B2. The sites will be Carnmoney, Stormont, and Rockport respectively. The amendment of the Rules was welcomed in GI as, otherwise, a small District such as ours would have been very badly handicapped. GI stations are asked not to call the N.F.D. stations as has happened in other years.

"Gist," the official organ of the R.T.U. (N.I.), is growing apace in quality and popularity. There are indications that Ulstermen in exile are taking an interest in the venture as a means of keeping in contact with home affairs in radio.

The N.F.D. film was shown at a recent meeting of R.T.U., and, despite not being up to the highest technical standards was voted very interesting and quite Grade "U."

The very sincere sympathy of us all is extended to GI6XS in his recent bereavement.

GI5AJ is working DX and hunting a PY who will QSL. 8LF is cutting his teeth with W's on both 7 and 14 Mc., and has worked a PY, getting 567, with a '59 tritet. Is lucky enough to have three fine aerials. GI8PA reports his call being pirated, 8DB rebuilding with 26L6's in PP for 110v. D.C. mains, 5QX, with new SS receiver, has had contacts with all continents on 14 Mc. 'phone; 6TK claims 70,000 points in A.R.R.L. contest, contacting on 4 bands; 2SP is using a new 6A6 and TZO5/20 rig; 6WG working W5 and W6 on 14 Mc.; 5SJ working a W or two during receiver redesign; 2KR working DX. GI2UO, 8GK, 5MZ, 5NJ and 5JN known to be active, but no reports. GI8PA is experimenting with aerials.

GI6YW.

WHAT LUCK!

On 07.00.

07.28	W4BYY	Q5	R8
09.35	XE2N	Q5	R7
10.30	SP1HH	Q5	R5
11.15	W3PC	Q5	R8

Off 11.30.

The above is an extract from my log for the morning, March 26, during the A.R.R.L. Phone Contest. Now the point of interest is that the four stations were the only ones heard on the band (14 Mc.) during the whole 4½ hours' listening, and yet *one call only* was given to each one and contact established immediately. In each case the station faded out a few minutes after the finish of the QSO. The power here was 21 watts and the receiver 1-V-1. Of course, I can hear some fellows say "Buy a receiver!" but my answer is "This is a home-made station" and the 1-V-1 has roped in all continents on phone, so that it is not so bad.

G5PT.

Empire B.E.R.U. News.

B.E.R.U. SECTION REPRESENTATIVES.

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

Bahamas, Bermuda and the Eastern Part of the West Indies :

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

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

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

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

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

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

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

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

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

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

New Zealand : R. T. Stanton (ZL3AZ), 17, Martin Avenue, Beckenham, Christchurch.

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

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

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

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

Australia

By VK4GK, *via* G2LC.

Conditions during the past month have remained fair to good, but with the advent of the cold weather a change can be expected.

VK4RJ was very pleased to receive a report from G per air mail on his 14 Mc. phone. 4BB has moved to 210, Fore Street, Maryborough, but the change will not affect his performance in the DX contests ! 4AP is again using 56 Mc. and Aspro !

Contacts with G portables are hoped for during N.F.D.

Irish Free State.

By EI9D.

At a meeting of I.R.T.S., held on April 16 in Jury's Hotel, Dublin, EI5F, Mr. H. A. Hodgens, delivered a very interesting lecture on "Factors Affecting Long-Distance Communications." A brief survey of modern transmission theory was given and the lecturer dealt with attenuation across a daylight path and refraction from the iono-sphere in relation to long distance communication on 7 and 14 Mc. Shadow charts on which circle tracks are drawn were shown and explained. These charts, which fit a Mercator's projection, showed the diurnal and seasonable changes from which conditions for short wave communication may be estimated. Intensity curves of signals from New York and Japan were used to show the effect of daylight and darkness over these routes. The lecture was very instructive and greatly appreciated by all who were privileged to hear it.

The following new licences have been issued :—

EI2M, Mr. E. Donovan, Thorndale, Temple Road, Rathmines, Dublin.

EI3M, Mr. F. Arup, 8, Elton Park, Sandycove, Dublin.

Malaya and Borneo

By VS1AA.

We have to welcome as new members Mr. W. C. Gee (VS2AB), VS1AN, and Mr. J. F. Barraclough, BERS391, of Singapore. Best of luck to you all BERS295 is now VS2AQ, while BERS382 has become VS2AR. New calls issued are VS1AI, 1AN, 2AM, 2AO, and 2AP.

Both 1AF and 1AL have reported. The latter is extremely busy with service work, while 1AF has also been kept going. He has completed his final amplifier and hopes shortly to be able to take advantage of increased power. He had some good DX last month. 1AA is still busy building his new amateur receiver.

For the benefit of new members, please note that monthly reports must reach 1AA before the 15th of each month. Application for the letter budget must also be made to the same source.

New Zealand.

By ZL3AZ.

Owing to greatly improved business conditions in New Zealand, radio has had to take a back seat lately, with the result that very little news has been gathered. However, some events of importance have taken place. Mr. C. W. Parton (ZL3CP), recent B.E.R.U. Representative for New Zealand, was married at Easter. All readers throughout the Empire will join with the writer in wishing Mr. and Mrs. Parton every success in life.

A pleasant little presentation also took place recently in Wellington, when recognition of the splendid work being done by the Honorary General Secretary and the Honorary Treasurer of N.Z.A.R.T. was made. Branches and individuals throughout New Zealand had contributed to a fund, with the result that the Secretary, Mr. L. G. Petrie (ZL2OV), was presented with a crystal microphone and Mr. F. W. Sellens (ZL2MY) with an electric clock. Two years of hard work have been put in by these two officers, and the response to the appeal showed the esteem in which they are held.

On the air, conditions have varied somewhat. During the B.E.R.U. Contest very unfavourable conditions were experienced in Christchurch, in fact, the writer does not remember such bad conditions prevailing since the inception of the contests —that is, during contest periods, of course. Operation was confined to 14 Mc. No outstanding Empire DX was heard, excepting perhaps ZB1H. ZB stations are not heard here very often. Several calls were made in answer to this station, but without success.

28 Mc. appears to have definitely dropped for a while. This band was fair during March, but at the time of writing, mid-April, the bottom has dropped out. Reverting to 14 Mc., an outstanding day on this band was April 7, when G stations tumbled over each other in an effort to raise DX. Around 07.30 to 08.00 G.M.T. they almost crowded out the W stations, which is saying a lot!

The number of amateurs in the country continues to grow. Latest figures show the total to be well over 1,000. It has been stated authoritatively that this is the highest percentage *per capita* of any country of the world. If so, New Zealand really must be the ham's paradise. Notwithstanding this, we all do a growl about amateurs in other countries working better DX than ourselves, still, this is probably the same the world over. There s no doubt though that we are well separated from any serious QRM in the way of overcrowded bands such as must exist in many countries. It is hoped to give more personal news next month when the writer will have had a chance to devote a little more time to radio.

Northern India.

By VU2LJ.

There is no definite settlement about the question f examination of up-country amateurs for their ransmitting licence, as this is still under the consideration of the authorities, but we hope some ecision will be reached shortly, as most amateurs ave been off the air since the beginning of the year.

VU2AM and 2LJ visited 2DR and had a most njoyable four days' stay with him. As a variation om wireless, a small hunt was arranged, and 2AM id low his first deer. . . . QRB 150 yards!

BERS311 has received his Competency Certificate and will be on the air as soon as his call comes through. He reports conditions excellent on 14 Mc., but the QRN level is higher than during previous months. 28 Mc. has not yielded a signal at Ambala for several weeks.

VU2LJ appears to have cured the creep which has troubled his signals since he went on to A.C. A new crystal holder has been constructed, and the bottom brass electrode alone weighs approx. 10 ozs.! Tests with an A.A. show that, under working conditions, the signals remain steady over long periods.

It is extremely gratifying to note that these notes are being read by others outside VU (thanks, VK6JE, for your interesting letter *re* the suppression of QRM from a DC/AC converter). The QRM on 14 Mc. has been totally eliminated by the simple method of switching off the bungalow lighting from the main switch!

Rhodesia.

By ZE1JB.

The Postmaster-General has declined to countenance any scheme under which the issue of licences would be controlled by anybody other than himself and, what is more, he is not even prepared to refer applications to the Society for their advice or comment.

ZE1JB has been inactive most of the month excepting for the usual contacts on 14 and 28 Mc. He has just completed his Class B modulating unit and hopes to be on with 'phone by the end of April. The modulator is a 56 feeding a 56/46 feeding a pair of 46's in Class B.

ZE1JJ has had two more contacts with New Zealand on 28 Mc. this month and has also worked VK7KV in Tasmania, which is believed to be a first contact. He and JU say that competitions spoil their observations on this band because at those times there are numerous signals, but immediately afterwards most of them have gone. The difficulty is to decide whether the lack of signals is due to conditions or to loss of interest.

ZE1JN is again on the air using a pair of RK25's in the final with 45 watts. He has worked a VE and several VK's, and on April 10, 1937, he heard G2IM at RST 569.

ZE1JU needs only South America for his WAC on 28 Mc. and has worked ZL4 and a number of VK's as well as an F8 and two W's. He uses a 66 foot end fed Zepp.

ZE1JY is hearing ZL's and W6's on the 3.5 Mc. band and particularly wants contacts as he considers these will be the first in Southern Africa. This is certainly the case with ZL's but not W6's. JY is still using the ACR 136.

Several Rhodesian amateurs are receiving reports from ZL stations, amongst those being ZE1JG, who would like full details of any ZE calls heard, to be published in the Bulletin with the time (G.M.T.) and the date.

It is suggested that stations everywhere should adopt G.M.T., because otherwise it means that the station receiving the card must convert the local time to G.M.T. in order to obtain corroboration. Amateurs in a particular country know the relationship of their own time to G.M.T., so there should be no difficulty in this respect.

South Africa

Division 1.—ZS1AX gave a very interesting talk on plate modulation at the last monthly meeting of this Division.

ZS2A is reported to have heard two American stations on 56 Mc. The stations heard were a W2 and a W8. He also reports having heard other stations but they were too weak to follow.

There are a number of stations working on this band, the most active being ZS1H, ZT1B, ZS1B, ZS1AN and ZS1AL.

DX on 14 Mc. appears to be gradually falling off, the G's in particular being very scarce. Static also is on the increase.

Division 5.—Conditions on 7 and 14 Mc. are getting worse daily, wipe-out is making itself conspicuous, and many a QSO ends abruptly with one or both stations fading out without the slightest notice.

The 3.5 Mc. band is again becoming popular, some stations are testing musical frequencies, and the reproduction at times is first-class, ZS5M in particular is putting out a good signal.

ZT5R is building a modulator. ZU5AC found some "monkey-glands" for his RK20, and his 'phone is back to its old standard.

ZU5L is active on 3.5 and 7 Mc. and is getting good reports.

BERS393 has ordered a superhet receiver. ZS5AK is active on 3.5, 7 and 14 Mc.

The following B.E.R.U. members have also been active: ZS5Z, ZS5U, ZS5R, ZT5V, ZU5AF, ZU5D and ZU5Q.

ZU5Q.

RAYMOND COOMBS

We have the unhappy duty of recording the death, on March 5 at the age of 47 years, of Raymond Coombs, one of amateur radio's best-known personalities in South Africa. Ill the preceding three months, he was overtaken by a more serious illness, and passed on after about a week from a complication of physical troubles at the Johannesburg Hospital.

Mr. Coombs was a well-known member of the electrical engineering profession; was in charge of the control section of the Johannesburg Power Station, which position he retained until his death.

During the War he served in the Royal Navy and was in operations off Scapa Flow.

Raymond Coombs was, perhaps, amateur radio's most prominent recruit from the world of industry and one of its best friends. A foundation member of the South African Radio Relay League, he was the Honorary Organising Secretary. His activities in this field earned him the name of HOS. In his later years he devoted his talents to comment on the course of amateur radio in this country. There was no half-heartedness about HOS; he had decided views and he supported them vigorously. He liked a thing or he did not, and in either event one could be sure of action when he was around. He gave greatly of his time and energy to the affairs of the League and during his regime did much to build up the S.A.R.R.L.—we can be proud and grateful that the record of his life is embellished with his work in our cause.

The African Radio Research Union joins with other member-societies in expressing their sincere sympathy to the S.A.R.R.L. upon the loss of their Headquarters Secretary.

"Nation and creed forgotten . . . as man called man his brother."

ZU6V.

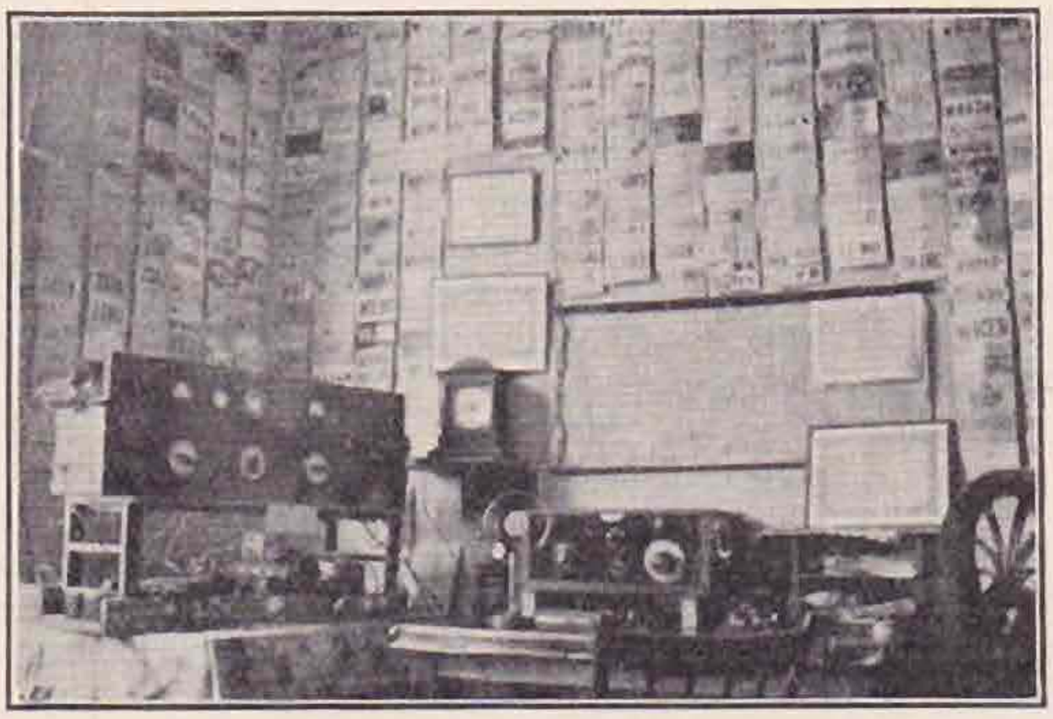
AROUND THE EMPIRE—No. 8

ZE1JS.

LIKE most amateurs, ZE1JS had trouble with the erection of an aerial suitable for his QRA. It was a case of power lines to the east of him, power lines to the west of him, power lines to the north. . . ! However, after testing several types of aerials, the one that proved to be the best for all-round working was a 66-feet Zepp, with 43-ft. feeders. This was 35 ft. high, ran east and west, and was fed at the west end.

The photograph gives a view of the interior of the shack. Less than two years ago the wall displayed a couple of photographs of ZE1JS aged three, but now it exhibits the capabilities of his station! The transmitter, shown on the left of the photograph, consists of a 2A5 crystal-controlled oscillator, a 2A5 frequency doubler, and two RK 23's in push-pull in the final amplifier. The RK 23's are a very recent addition, the original final amplifier using two 46's in push-pull. A Collins coupler is used for coupling the P.A. to the aerial.

Power for the final is obtained from a Westinghouse HT11, which delivers 500 volts, while a Westinghouse HT8 supplies the CO and FD. At present the station can put out quite a strong telephony signal, using suppressor-grid modulation.



The receiver is a TRF-det-2LF circuit which has never failed yet.

On the wall will be seen W.A.C. and W.B.E certificates for both CW and telephony in each

(*Continued on page* 556)

28 Mc. TRANSMISSION (*Continued from page 502*)

being operated on other bands. Many systems have been tested, ranging from a vertical of a half-wave length to a non-phased one of four half-waves. The best results have been obtained with the last-named running North-East—South-West at an average height of barely 33 feet. Reports were very good from all continents, besides which consistent communication was possible over a lengthy period. The most unsuccessful readiator was the half-wave, used in either a vertical or horizontal plane. Almost as disappointing was the full-wave horizontal, which seemed to be very directional. The double-wave aerial was quite satisfactory, although not equal to the four half-wave system. Also a 84-ft. wire seemed to give very promising results.

The method of feeding is immaterial and the most convenient is usually best. In the writer's case the half, full and double-wave were single-wire fed, the four-wave and 84-ft. wire being end fed. Interesting tests can be performed by experimenting with the effect of canting the aerial up or down. Quite often this assists radiation by lowering the angle at which the transmitted waves leaves the sky wire.

It is hoped that the preceding remarks will be of some assistance to those who are launching out into this new sphere of radio, and may even encourage those who have not already done so.

Doubtless many will disagree with the writer's opinions and suggestions, and in reply it should be stated that this short article is based on the experiences obtained during the construction of the transmitter in use at station G2PL. There is still plenty of good work to be carried out on this fascinating frequency. Good luck to all who work on 28 Mc. !

AROUND THE EMPIRE (*Continued from page 554*).

case. These certificates are interesting, as they were won on low power before the RK 23's were installed. At that time two 46's in push-pull were modulated by a 53, using plate modulation, and with 250 volts on the plates of the 46's the input to the final was 7 watts. The station is on the air every day. While ZE1JS spends most of his time on 14,350 kc, he is offering his two RK 23's to the first G station that contacts him on 5 metres !

ZE1JN/G2GB.

Contemporary Literature

THE PROPERTIES OF CHOKES, CONDENSERS AND RESISTORS, AT VERY HIGH FREQUENCIES. (Hartshorn & Ward, *J. Scientific Instruments*, April, 1937, p. 132.)

Experimental data are given showing the behaviour of typical circuit components at frequencies from 30-100 Mc. The chief points of interest to those engaged in ultra high-frequency work are the values of impedance found for various types of chokes and condensers, and the falling off in effective resistance of resistors with increasing frequency due to their self-capacity. In the case of the choke it is a comparatively simple matter to obtain an impedance of at least 1,000 ohms with a simple solenoid of a few microhenries inductance, but great care is necessary in its design to avoid resonances. Condensers of capacity .0005 to 0.1 μF act as inductors, behaving almost exactly as a straight piece of wire of about 1 mm. diameter. Measurement of the effective resistance of a resistor of nominal value, the megohm reveals the rather startling fact that its effective resistance at 60 to 100 Mc. is only about 10 per cent. of its rated value.

This article should receive the attention of all members interested in component design at ultra high frequency.

G. F. B.

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AN INEXPENSIVE 160-METRE 'PHONE FOR LOCAL RAG-CHEWS. WALTER VAN B. ROBERTS, W3CHO. (QST. JANUARY, 1937.)

A simple low-power crystal control telephony transmitter is described using a 76 as crystal oscillator and a 43 as amplifier modulated by a 76 and 43. A transformerless power supply is used. The output of the final 43 being about 2 watts. By substituting one of the new 25L6's for the 43, the output would probably be raised to about 4 watts.

* * *

A TUNING FORK TONE GENERATOR OF SIMPLE CONSTRUCTION. CHARLES W. CARTER (W3EZL). (QST. JANUARY, 1937.)

The author describes the construction of a tuning, fork oscillator which has various uses as a source of standard frequency.

R.E.S. Notes

Owing to pressure of space R.E.S. Notes have been unavoidably held over until our next issue.

EXCHANGE & MART

(*Continued from page v.*)