THE T. & R.

BULLETIN

THE INC. RADIO SOCIETY OF GT. BRITAIN

AND THE BRITISH EMPIRE RADIO UNION

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THE INCORPORATED

RADIO SOCIETY OF GREAT BRITAIN

AND THE

BRITISH EMPIRE RADIO UNION

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

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

Forthcoming Conventionettes.

May 27. District 16, Larkfield.

June 3. District 1, Manchester.

June 17. District 14, Southend.

June 24. District 7, Weybridge.

July 1. District 2, Leeds.

July 8, Districts 8 and 12, St. Albans.

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Vol. 9

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No. 11

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THE R.S.G.B. AND UNLICENSED TRANSMITTERS

THE Society owes an expression of appreciation to the Editor of *The Wireless World* for his recent comments on the Unlicensed Transmitters Menace. In the issue of that journal, dated April 20, the view was expressed " that it would be deplorable if the Amateur community were made to suffer for the offences of one or two misguided individuals whose very actions would preclude them from membership of the Radio Society of Great Britain."

We feel that in fairness to our members we should state that immediately our attention was drawn to the paragraphs in the *Daily Telegraph*, and elsewhere, referring to a suggestion that the G.P.O. intended to tighten up the regulations governing amateur transmitting, we took steps to discover whether the statements were made with the approval of the G.P.O.

As a result of these enquiries we are authorised to state that the G.P.O. have no intention of placing further restrictions upon our work as amateurs. It is pointed out by the G.P.O. that the sins of a few unlicensed pirates have no bearing upon the question of amateur facilities.

We, in company with *The Wireless World*, deprecate the fact that one or two persons who have been caught in the act of operating unlicensed transmission stations should have been turned into " heroes for a day " by certain sections of the National Press. By such actions a slur has been cast across the work carried out by genuine amateurs, but with the knowledge that drastic steps are to be taken to put down this type of nuisance we can at least rest assured for the future.

The pirate transmitter, whether he uses the Broadcast or the Amateur bands, is a person who should be dealt with as severely as the law demands. Hardly a week passes without a complaint being received from a member that his call is being misused. In all such cases we advise the member concerned to communicate with the G.P.O., giving full details of the complaint; at the same time we endeavour by judicious and private enquiries to obtain some additional information which will assist the G.P.O. in their efforts to locate the offender. It is seldom that these are successful, for the reason that once a pirate obtains an inkling that he is suspected he either closes down or changes his call.

We feel, however, that if prompt action were taken by local members there would be more chances of success. It is realised that difficulties arise in attempting D.F. work on 7 and 14 mc. signals, but we are of the opinion that if members made concerted efforts to track down pirate stations known to be operating locally this would help matters considerably.

The construction of D.F. gear is a comparatively simple matter, especially for local work, and providing one or two cars are available surprisingly accurate bearings can be obtained.

In making this suggestion we realise that we are inviting members to act as policemen of

(*Continued on page* 382.)

56 Megacycling on Foot

By R. H. Hammans (G2IG) and J. L. Nixon (G6XO)

WITH the approach of summer the attractions of 56 mc. work will once more be felt. Accordingly, it is hoped that a few personal reminiscences concerning the writers' experiences will be of interest—especially as they first experimented on this band as long ago as 1931, before it had become generally popular.

Just previously to this date, American amateurs had shown that, by using aeroplanes, distances up to one hundred miles could be covered; consequently, British enthusiasts set out to break that record, with results that are by now well known. However, as there are numerous stations better equipped than those of the writers to deal with long-distance work, it was felt that some other aspect of the subject might more profitably be investigated. Attention was therefore turned to research into (1) propagation over terrain not apparently suitable for distant work and (2) the determination of the range over which communication could be established while still retaining a signal strength of commercial value.

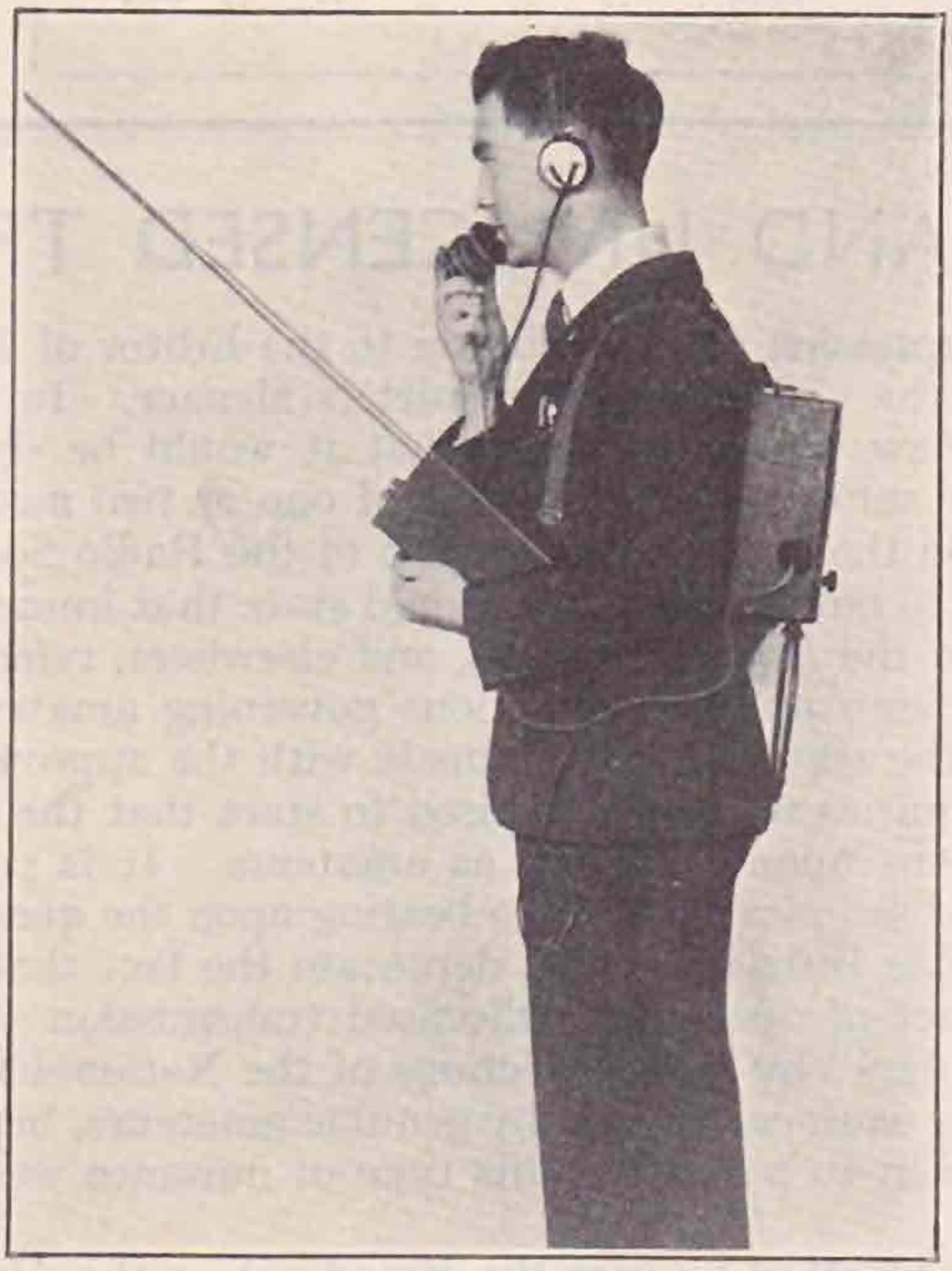
The initial step was to erect a transmitter at one of our stations, which were 300 yards apart in a crowded residential distrct. A detector and one L.F. receiver was built at the same time. The first tests were carried out between two rooms at the same station, using an unmodulated carrier. Our ambition next was to receive the signal at the other station. As we could not do so, we set out to find where the signal was lost. The transmitter (consisting of two D.E.5 valves in a push-pull circuit with 120 volts H.T.) was mounted on a dinner wagon and hauled through the streets. The signal on this momentous occasion lasted 150 yards and then disappeared. Aerials were then fitted to the transmitter and receiver for the first time, and signals were at last received between the stations.

The transmitter was then keyed, and a signal received over 100 yards, acknowledgment being made by flash-lamp. During this test an unaccountable variation in signal strength was noted, which had considerable bearing on subsequent work. It was observed that reception on one side of a lamp standard was 60 per cent. greater than on the opposite side. Screening by buildings was obviously a handicap, so tests were next made in open country, signals being obtained at R7 over three-quarters of a mile and acknowledged by klaxon horn.

Duplex Telephony.

Further apparatus was built, including a super-regenerative receiver, and a regular schedule by duplex telephony was successfully kept between the two fixed stations, inputs to both transmitters being from .5 to .7 watts. During these tests it was found possible to dispense with all aerials yet still maintain contact.

Now that two-way communication had been established, we turned our attention to field strength measurements in the locality. For this purpose a new 3-valve super-regenerative receiver was built, with particular attention to light weight. The set weighed less than two pounds and measured 10 by 4½ by 3 ins.



The complete station as worn when taking field strength measurements. Duplex telephony is used by the authors on these occasions.

Next, a large map of the district was obtained, having a scale of 6 inches to the mile, and with one of the stations as a centre, circles were marked off at a radii of 300 yards. The transmitter was then modulated by a pendulum clock which emitted two clicks per second. In order to produce some variety into the clicks, the oscillator circuit was designed to produce two separate notes, alternatively selected by the pendulum.

Some remarkable effects were noted, and the results could not be correlated. Inside a radius of 200 yards the signal was extremely strong, variations in strength being undetectable. Outside this range large fluctuations were experienced. It was observed that considerable change in signal strength could be effected by altering the direction of the receiving aerial, in fact, at one point on the 600 yards line strength varied from zero to R9. The proximity of a metal window frame was ultimately found to be responsible for this effect. On approaching the frame, signals immediately increased in strength. Further tests revealed that signals could be "picked up" from any metal object, particularly vertical ones. Lamp standards, house railings and gutter pipes were found to be responsible for variations in strength, and in this connection we would suggest that buildings themselves are not responsible for screening; it is the metal objects in them that cause signal-strength fluctuation.

When tests were made to prove this point, the

transmitter, the receiving aerial and the metal object were all in the same straight line, and the receiver was on the transmitter side of the object, as shown in Fig. 1.

Trees also possess similar absorption properties, but to a lesser extent.

A Portable Pack-Station.

Having established that the effective range of a 5-metre wave in a residential area was 600 yards in our particular case, we now turned our attention

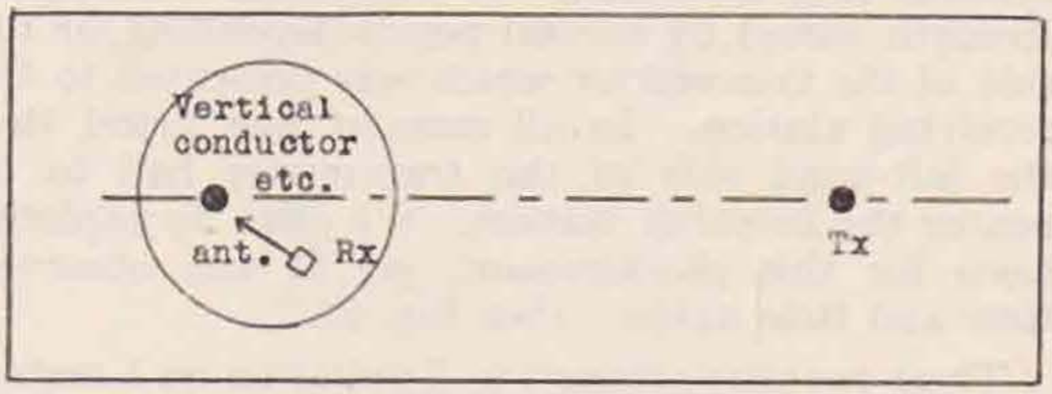


Fig. 1
Signal strength plotted against displacement of receiver, while pointing aerial towards the source of reflected signals.

to comparative tests in open country. Portable transmitters were constructed with push-pull circuits and grid-modulation. The transmitter case housed the power supply for both transmitter and receiver. All valves were of the 2-volt class and a 100 volt H.T. battery was used. For carrying purposes webbing was used, upon the lines of army equipment, consisting of a padded belt and shoulder straps which buckled on to the transmitter case. The weight of the transmitter and batteries was approximately 10 lbs., the total apparatus for a complete telephony station thus weighing less than 14 lbs. No inconvenience was experienced in carrying this load, owing to the design of the webbing. A long period of tests showed that a maximum "commercial" range of a quarter a mile could be relied upon with the outfits described. Only 100 per cent. duplex telephony was tolerated, that is to say, two-way speech must not be less than R6, and the quality must be at least equal to the average land-line telephone. Furthermore, these results must be achieved when both stations are moving about.

The apparatus as constructed produced these results, and the operators not only had their hands free but were able to move about at a normal walking pace, climb over gates and so on, without any discomfort. To this end, no aerials were

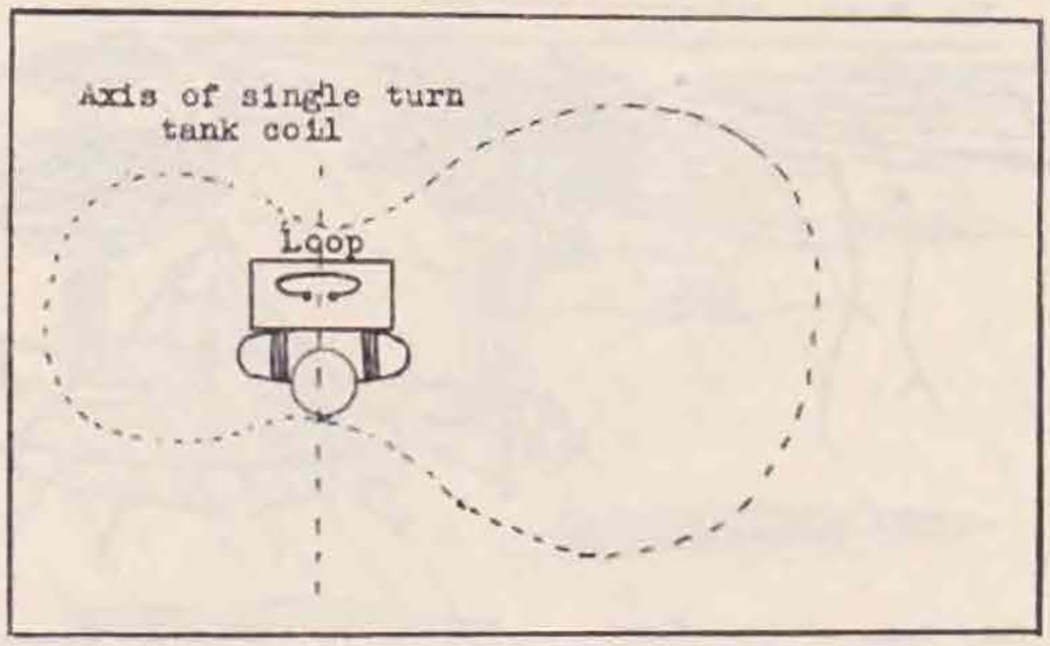
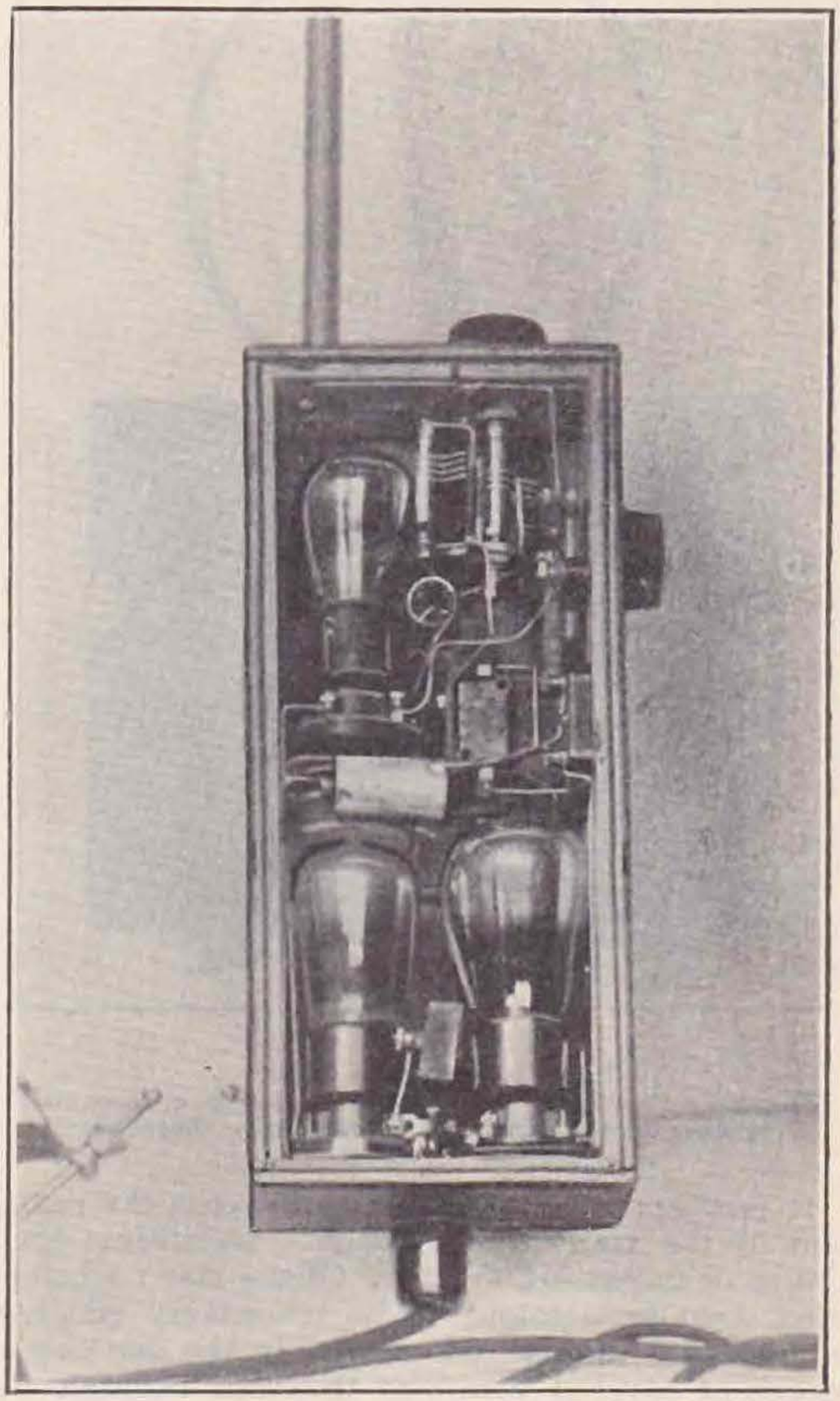


Fig. 2.
Plan view of operator with transmitter, showing diagram of field strength.

carried on the transmitters, while for each receiver a short rod 20 ins. long was used. No reaction was employed, as this would have involved another tuning control on the receiver. The input power never exceeded one watt, in fact the average was below half a watt.

The external construction of the sets was of necessity very robust, consisting of half-inch mahogany which would stand a good deal of rough treatment. The equipment was taken out in all weathers, but never failed to function when called upon. For simplicity of operation the tuning of the transmitters was arranged so that oscillation over the whole of the dial was obtained.

At the outset some difficulty was experienced in rendering the receivers sufficiently selective to eliminate the companion transmitter, but after some experiment this difficulty was overcome by the use of a lower frequency and more power on the quenching valve. With this arrangement it was possible to use a 66 ft. aerial on the receiver without loading it up unduly—an important point, as no reaction control was employed.



View of Receiver Unit and Telescopic Aerial Mast.

The tuning coils are to the right of the top (detector) valve. The valve socket which is used to connect the input power cable from the transmitter unit can be seen at the bottom of the photograph. The series aerial condenser for controlling reaction is on the right. The grid bias battery is built into the case.

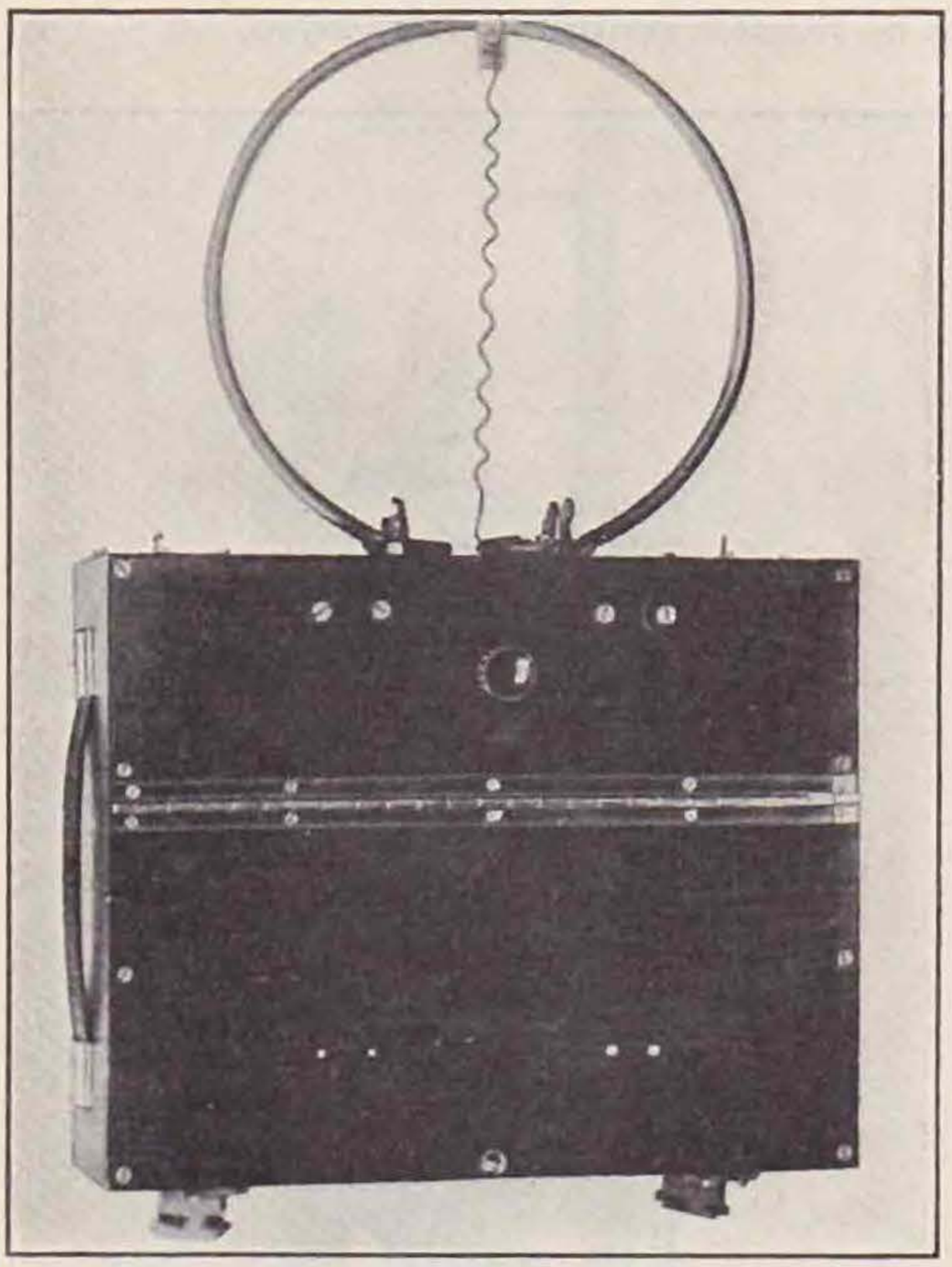
Enlarged Special Birthday Issue Next Month

A Field Day

In May of last year tests were recommenced with similar equipment, and a field day was organised, opportunity being taken to make comparisons with less portable equipment.

One 56 mc. transmitter was installed in an aeroplane and was heard by several stations taking part in the field day. No opportunity was afforded for receiving this transmission over a greater range than eight miles, but up to this distance signals were very strong, although an input of only 0.25 watt was used. Another portable was installed in a motor-boat on the River Medway, and results achieved compared favourably with those obtained by semi-fixed stations. It was quite apparent, due to past experience, that much more efficient equipment had been built.

Tests were also carried out after midnight over a large expanse of grassland, and distances of half a mile were easily covered.



The Transmitter Unit.
The section below the hinge contains a two-volt accumulator and a 60-volt dry battery.

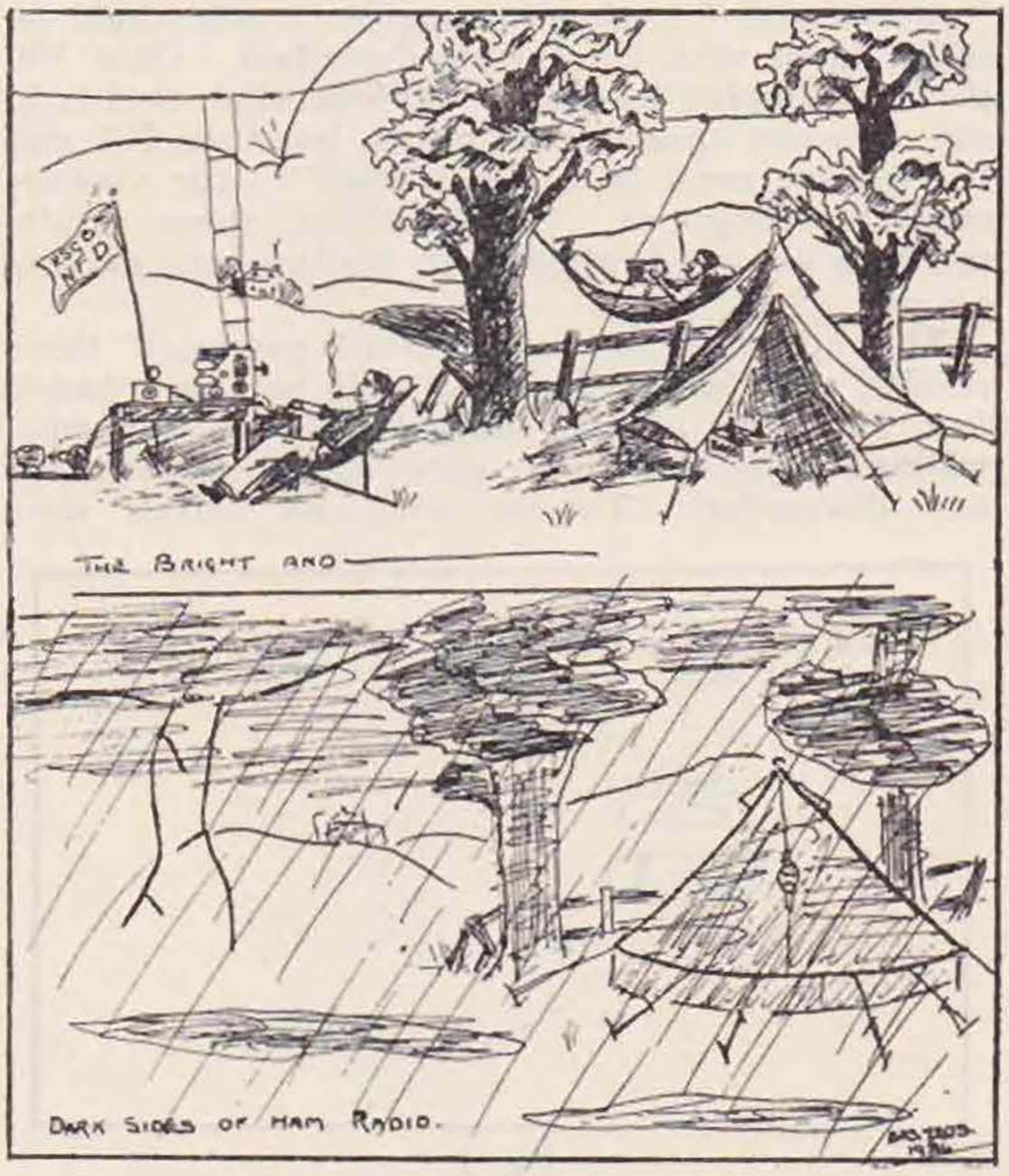
It now appeared desirable to increase the radiation of the transmitters without sacrificing portability or increasing weight. Of the many schemes tried, two were found to be reasonably effective in achieving the desired result. In the one case a length of covered wire was threaded through the tank coil, the ends projecting some 4 ins. at each extremity. The other system utilised a two-turn coil suspended in the field of the tank coil and carefully cut to a length which brought it nearly to resonance with the transmitter frequency. Both schemes imposed an additional current load of about 25 per cent., but radiation was definitely increased, and communication over more than a mile was now made possible.

During the course of subsequent experiments considerable development work was done and some peculiar effects noted. For instance, between two points a quarter-a-mile apart, R9 signals were obtained, yet at two other points parallel to, but distant from the original line by 50 yards, R3 was only obtainable with difficulty.

Another very curious effect concerns the radiating systems first described. It was found that signal strength varied by several points depending, on the side of the transmitter which was presented to the receiving station. In all cases it was found that the left-hand side of the transmitter had to be nearer the listening station. We offer no explanations for this phenomenon, yet it was observed time and time again. (See Fig. 2).

These peculiar properties of radiation on 5 metres enabled us to enjoy many fascinating games of blind-man's buff, using telephony. Very often these tests were carried out in the darkness, contact being made between two man-borne stations walking along a road quarter-a-mile apart. The experience gained, both as regards the technical and the operating sides has resulted in the evolution of many new ideas for improving range, quality and portability.

Later on it is hoped to present a constructional article for a 5-metre station, possibly using specially small H.T. batteries of high voltage. It is our intention, then, to give such details as circuit constants, components, etc. Meanwhile, we shall be pleased to hear from others who have carried out experiments of this type, in order that co-operation may hasten the advancement of knowledge of 56 mc.



Which will it be ?

Technical Articles are Wanted

ALUMINIUM ELECTROLYTIC CONDENSERS.*

By N. C. MOORE, M.Inst.Met.

Introduction.

SINCE the discovery by Charles Wheatstone, revealed in a paper " On the Position of Aluminium in the Voltaic Series," published in 1855, concerning the polarisation effects of aluminium, it has become known that various metals, when made anodes in a suitable electrolyte, become coated with a non-conducting film having remarkable electrical characteristics.

Bluff first observed this film formation in the nature of a dark skin formed on an aluminium anode in the electrolysis of a sulphuric acid solution. From the development of these discoveries, first wet and later dry rectifiers and electrolytic condensers have been made possible.

Construction.

The construction of an electrolytic condenser, like the ordinary paper or mica static condenser, consists of two electrodes separated by an insulator. The insulator in this constitutes an oxide film which forms on the anode electrode surface, and offers a very high resistance, with high capacity per surface area.

Thus the condenser is built up having an aluminium anode electrode on one side of the film dielectric, and the electrolyte on the other side to form the two electrodes. A cathode foil is, however, added merely as a means of making electrical contact with the electrolyte solution.

In Fig. 1, A represents the anode electrode, and O the high resistance film dielectric. E the cathode electrode in the form of an electrolyte solution, C being the cathode plate for conducting the current.

Principles.

The formation of the non-conducting film follows in the first instance the principles of electrolysis, in which two electrodes, in this case of aluminium, are immersed in an electrolyte solution and a potential applied. The anode begins to dissolve, producing metal ions capable of combining with the ions of the electrolyte. The solution of the metal, however, is arrested by the deposition of a film on the electrode surface, which eventually increases the current density of the anode, and the current flow is reduced to practically zero. There is always a small current leakage depending on various factors, but it is only approximately 0.1 MA per microfarad, that is when the electrode is made positive. If the electrode is made negative, a current flow is possible, and in this way it can act more or less as a valve, in one direction arresting the current, and in the other allowing it to pass. Metals which behave in this manner are known as valve metals, and due to this property alone, they have been made use of in the manufacture of rectifiers. In the case of electrolytic condensers, it is usually only necessary to use the singly directional characteristic, since their main application is for direct current use. A suitable condenser, known as a double polarised condenser, can be made for alternating current work, having two formed electrodes of film-forming metal in the same solution. The electrical relation between the formed electrodes is as two series-opposed asymmetrical cells, where in either case one or the other of the film-forming electrodes opposes the flow of current during each half cycle.

It is interesting to note that if a direct current electrolytic condenser, that is, a cell having a non-forming cathode, is placed in an alternating current circuit, it will act rather as a rectifier than a condenser, unless two similar units are connected in a series-opposed relationship.

This valve action is a characteristic of many metals such as iron, nickel, aluminium, tantalum, cadmium, tin, bismuth, magnesium, and many others, but only aluminium and tantalum have been found suitable commercially in the manufacture of electrolytics, mainly due to cost or electrical characteristics.

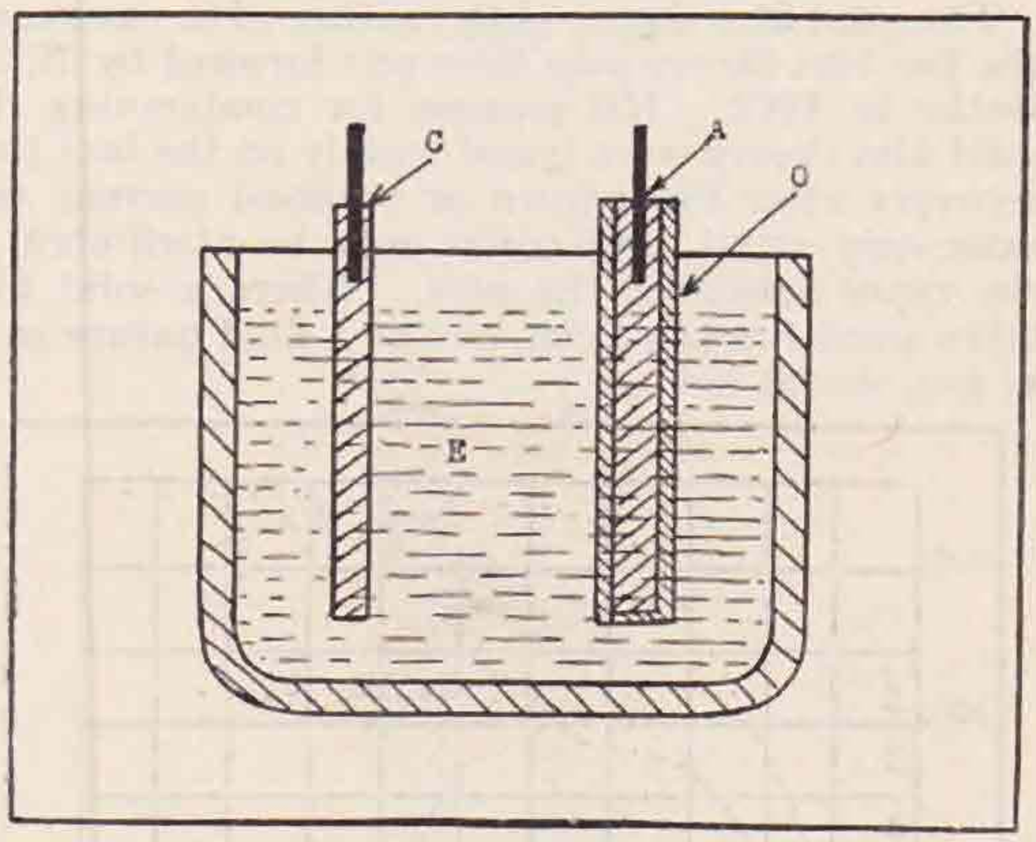


Fig. 1.
Construction of an Electrolytic cell.

Anode Film.

The non-conducting film which is formed on the anode surface has been the subject of considerable research, and various theories have been established in regard to the chemical construction of the film. Although a film of oxide undoubtedly forms on the aluminium surface, it has been proved that it is not responsible for the rectification properties which I have already outlined, but an inner and much thinner film is the active one, and that the oxide film, being exceedingly porous, is permeable to the electrolyte.

A. Gunther-Schulze considers this active inner film to consist of gas, namely oxygen, and this gas film to be held in position by the porous oxide film. His theory is that the electrons from the aluminium are able to cross the gas film, but the ions which carry the current in the electrolyte are not able to do so.

However, J. Slepian does not agree with this hypothesis, because he says it is difficult to see how a gas film which has a low dielectric constant and lack of structure could possibly lower the work

* Read before the Incorporated Radio Society of Great Britain January 26, 1934.

function sufficiently for the escape of electrons from the metal at ordinary temperatures.

Further, he considers the possibility of there being a solid active film consisting of a transition or dehydration product of aluminium hydroxide, which is produced during forming.

A. H. Taylor more or less combines the two theories, and believes the gas film to be held in position by aluminium hydroxide, and that the gas partially combines with the aluminium surface to form aluminium oxide.

Messrs. J. E. Lilienfeld, L. W. Appleton, W. M. Smith, and J. K. Nieh have done extensive research on this problem in America, and consider the film on the anode to consist mainly of aluminium oxide Al_2O_3, but to be permeated to a small or a large extent by the OH ions of the electrolyte. They came to the conclusion that the changes of the oxide layer under different conditions were to be attributed to changes in the relation of OH ions to the Al_2O_3 molecules, as well as to the geometrical alignment of these molecules.

These theories can be grouped under two distinct headings :

(*a*) The Solid Film Theory.
(*b*) The Gas Film Theory.

The solid film theory is the earlier of the two, and the gas film theory was later put forward by K. E. Guthe in 1902. His reasons for condemning the solid film theory were based mainly on the fact that recovery after breakdown or reversed current was extremely rapid, and could only be attributed to the rapid action of the film. Where a solid film takes some time to form, one of a fluid nature such as gas, would not.

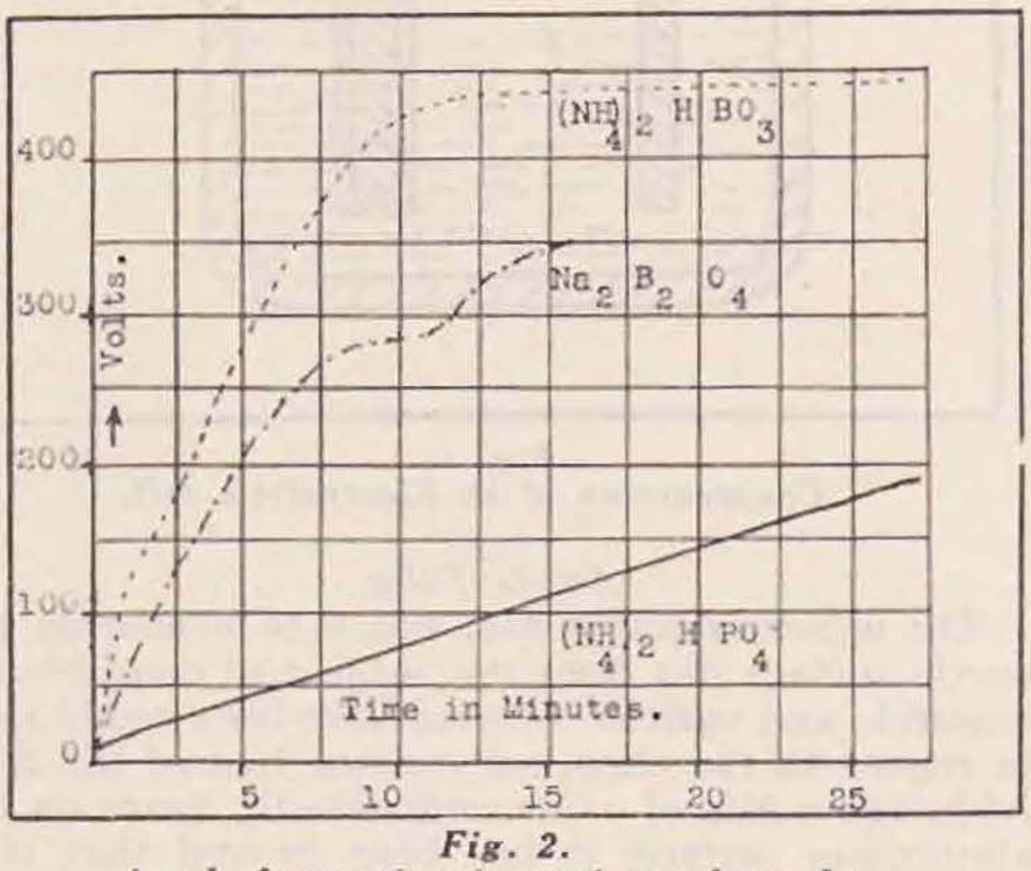


Fig. 2.
Anode formation in various electrolytes (Gunther-Schulze).

Formation.

The formation of an anode refers to the first preparation of the clean aluminium plate, and has considerable bearing on the quality of the finished product.

Formation can take place on either alternating or direct current, the former taking much longer than the latter. Thus the time of formation is dependent on the frequency.

The temperature and composition of the electrolyte also effect the time of formation. Gunther-Schulze gives times of formation in various electrolytes for aluminium electrodes at constant current and temperature (Fig. 2).

Current density has also an effect on formation time. The greater the current density, that is the smaller the surface area of the anode, the more rapid will be the process.

Thickness of Anode Film.

The film appears to be quite transparent, but under favourable illuminated conditions, a distinct colourisation can be observed. This colour depends on thickness, which can be actually determined in the order of length of light waves.

Thicknesses of films have been estimated in this manner, and found to vary between 0.001—0.0001 mm. This, however, may only be the thickness of the oxide layer. The inner active layer can be estimated by measurements of electrostatic capacity, for this, as in the case of static condensers, is mainly dependent on the dielectric thickness per surface area. In the case of an electrolytic condenser, other factors slightly affect the capacity, and will be dealt with in due course.

The thickness of the active film is dependent on two features: (*a*) the type of the valve metal, and (*b*) the maximum voltage to which it has been formed.

With higher maximum voltage, the film thickness will increase, and consequently the condenser will exhibit a higher breakdown voltage at the expense of lower capacity per unit area.

Dielectric Strength of Anode Film.

The dielectric strength of the film depends on the valve metal used, and on the ionic concentration and nature of the electrolyte.

C. I. Zimmerman gives some comparative figures which he obtained for films of various thicknesses on aluminium anodes. For 0.00006 cm. thickness of film he obtained a dielectric strength of 6,000,000 volts per cm. For 0.00002 and 0.00003 cm. thickness, he obtained approximately the same dielectric strength of 5,000,000 volts per cm. For comparison, the dielectric strength of mica is approximately 1,000,000 to 2,000,000 volts per cm. for a thickness of 0.01 cm.

It appears that the actual thickness of the layer has very little effect on the dielectric strength, whereas the concentration and nature of the electrolyte have a considerable bearing. This is observed in formation on an aluminium anode where the forming voltage will reach a definite critical value. At this point sparking on the anode surface will take place, but beyond this value, formation is impossible.

Electrolytes of various salts give different critical values. Gunther-Schulze obtained critical values for the formation of aluminium in different electrolytes using N/10 solutions of the salts. He found the critical value for borax to be 480 volts, potassium cyanide 295 volts, sodium sulphate 40 volts.

This critical value fixes the highest possible working voltage of a condenser, and it is probable that with development of electrolyte solutions, even higher voltages will be obtained than are at present marketed.

Capacity.

The capacity values of anode films are dependent on the maximum forming voltage to which the film has been subjected. This is due to the increased thickness of the anode film with increased voltage. Thus aluminium anodes formed at 100 volts maximum have approximately 0.04 microfarads per

square cm., at 250 volts 0.02 microfarads, and at 500 volts 0.008 microfarads measured at 20° C.

It will be seen, therefore, that the capacity decreases with increase of the maximum forming voltage, and varies approximately inversely with the maximum voltage.

When the applied voltage is higher than the maximum to which the film has been formed, it will immediately build up to adjust itself to the new voltage.

Similarly, if the applied voltage be kept below the maximum, the film will reduce in thickness and the capacity value will increase. This reverse action is very much slower than is the case with voltage overload, as the rate of change is influenced by the conductivity and temperature of the electrolyte. With high temperatures, the action is more rapid, and when a condenser unit is overloaded, the temperature of the unit increases due to high leakage current across the electrodes.

Leakage Current.

As I have already explained, an electrolytic cell always has small current leakage, and its effect is similar to a resistance in parallel with the cell.

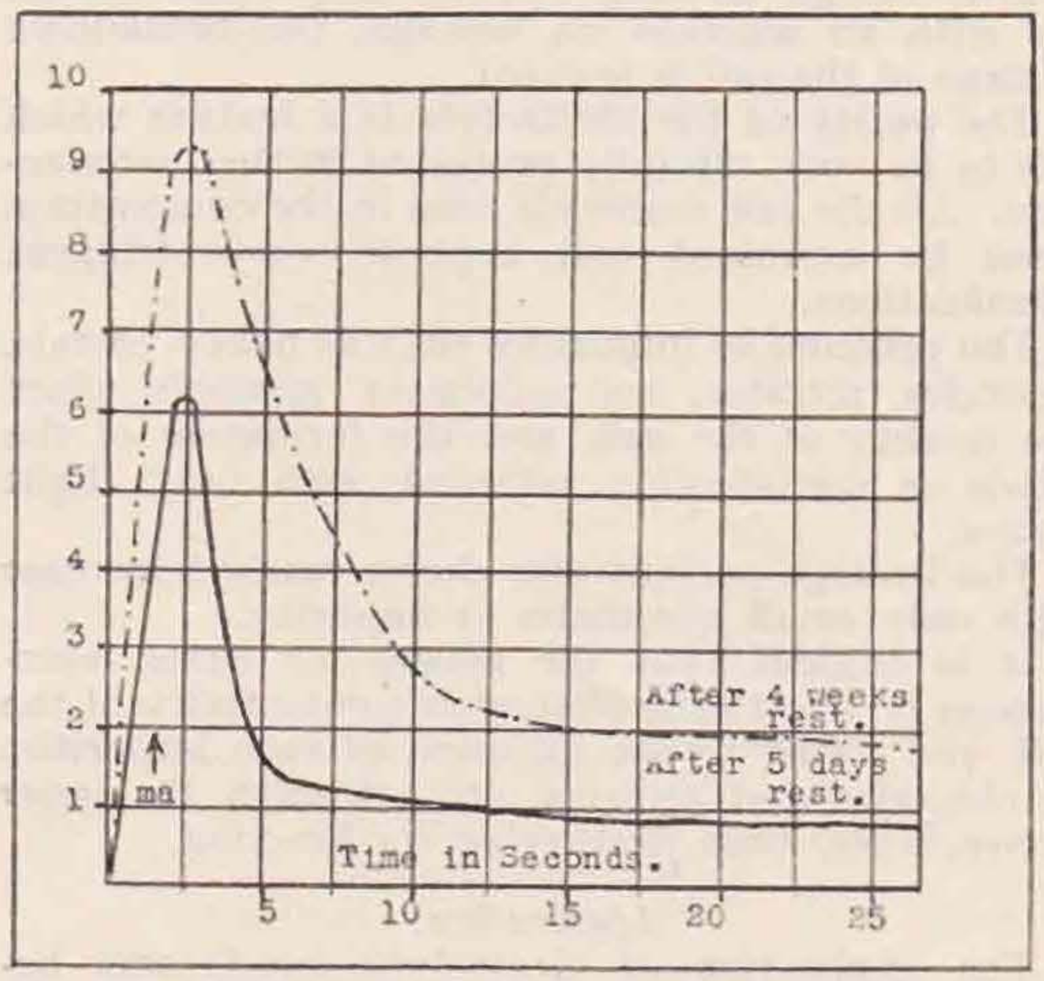


Fig. 3.
Leakage current variation depending on time at 500 volts (8 mfd. Condenser).

Under normal working conditions, this loss is negligible, and has been explained to be partly due to minute local breakdown of the film, and partly to the conduction of the film, the latter giving rise to an apparently uniform passage of current through the high resistance.

This leakage will increase with increased pressure, and thus if the applied voltage is taken beyond a certain point, known as the " breakdown " point, a shorting will ensue, which can be prevented by lowering the pressure, and thus allowing the cell to return to normal.

Further, the leakage current will increase after the cell has been at rest owing to the chemical action of the electrolyte on the aluminium anode film. This action is merely the dissolution of the film to form aluminium hydroxide in the electrolyte solution, and with impressed potential, new film forms rapidly under the influence of the increased leakage current to replace that which has become dissolved.

This is very noticeable after a condenser has been at rest. On being replaced in the circuit, the leakage current at first shows a considerable rise, but after a period of approximately one minute, it returns to the normal value. The longer a condenser has been at rest, the longer it will take to recover to its normal working efficiency (see Fig. 3).

The leakage current loss of the cell will also increase with a rise in temperature owing to the change in conductivity of the film and the electrolyte. (Fig. 4.)

The Electrodes.

The aluminium electrodes should be very carefully selected, as purity is of great importance.

In the case of the anode, even small percentages of impurities have an effect on formation, life, and working efficiency of the cell. Only a slight increase of impurity retards the formation time. *It has been shown that a material containing 99.1 per cent. of aluminium takes approximately twice as long to form to 50 volts, using a current density of .078 MA per sq. cm., as a material formed under the same conditions containing 99.6 per cent.aluminium.

Two similar electrolytic cells with formed anodes of the above-mentioned materials have proved to exhibit a considerable difference in regard to their leakage current, after a period of rest.

The material containing 99.1 per cent. aluminium had approximately six times the leakage of the purer quality when tested at the forming voltage, after standing for 24 hours.

It is, therefore, obviously important that the aluminium used for the anode electrode should be of the highest possible purity, and a very careful control has to be exercised by the laboratory to make sure the material keeps within specified limits.

The cathode electrode, although it acts merely as a means of electrical contact with the electrolyte, is liable to be affected by a film formation either when the condenser is on discharge, or when subjected to reversed current. This will affect its capacity, but small percentages of certain metals alloyed with the aluminium, act as inhibitors to such a formation.

Electrolyte.

The choice of a suitable electrolyte is, perhaps, the most important feature in the production of electrolytic condensers, and the following points must be carefully considered :

(*a*) The effect of change in temperature of the electrolyte on the electrical characteristics.
(*b*) The specific resistance of the solution.
(*c*) The effect on the dielectric strength of the film or on the maximum critical value of the forming voltage.
(*d*) The purity of the solution and the rate at which it becomes saturated with aluminium hydroxide.

The effectiveness of an electrolytic condenser depends on the rapidity and perfectibility in reformation of the film after destruction, and on its maintenance when the cell is at rest.

Some electrolytes are objectionable because they attack the valve metal, and others because their action of repolarisation is slow.

Film formation on aluminium can take place in either acid or alkaline solutions. The presence of acid ions in the electrolyte help to maintain the

*H. O. Siegmund.

Coming of Age Issue Next Month

non-conducting layer, whereas the presence of alkali ions tend to remove it, more so when the polarity of the cell is reversed—that is, when the electrode is made cathode.

However, it has become evident that the most suitable electrolytes are obtained from solutions of alkali salts of the weaker acids, such as oxalates, borates, tartrates, carbonates, etc.

Electrolyte solutions of these compositions can be prepared, having an excess of either free acid or alkali, such as sodium hydroxide or boric acid, with an electrolyte of sodium borate. The excess of either component is important in its effect on the specific resistance of the cell, as it has an influence on its life. The lower the specific resistance, the more rapidly the solution becomes saturated with aluminium hydroxide.

It has been explained that the life of a condenser is governed by the rate at which the electrolyte becomes saturated with aluminium hydroxide.

H. O. Siegmund gives actual figures of the life of similar condensers, having electrolytes of various specific resistances. A condenser having an electrolyte of specific resistance at 25° C. of 75 ohms per

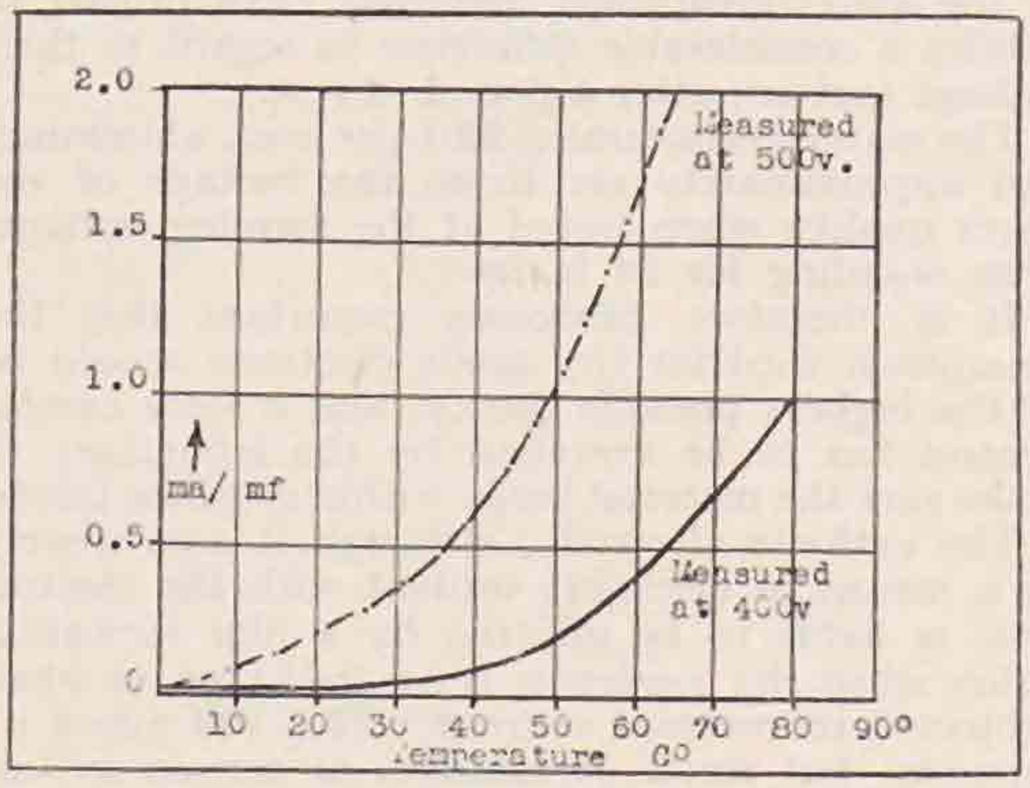


Fig. 4.
Leakage current depending on temperature.

cc. has an approximate life of six months to one year, one having 150 ohms per cc. has about one to three years, and one of 300 ohms per cc. has about five years.

From these results, the advantages of a high resistance become obvious, but actually there is a limit beyond which an increase will produce objectionable additions to the electrical impedance of the condenser, because of the high internal resistance set up in the cell. Siegmund found that the most satisfactory electrolyte was composed of ammonium borate having a specific resistance of 225 ohms per cc.

Electrolytes which have a low specific resistance giving alkaline reactions are advantageous in regard to quicker formation time and rapid recovery after breakdown. In these respects the addition of small amounts of free alkali in the electrolyte solution improves it.

One of the most important points which concerns the user is, perhaps, the effect of local temperature on the electrical qualities of the cell. Temperature changes influence the capacity, leakage and breakdown voltage, and it may be said that the quality of the electrolyte is entirely responsible for the amount of variation in this respect.

The reason for these fluctuations with temperature is, however, chiefly due to the consequent change in the specific resistance of the electrolyte.

The capacity of an electrolytic condenser is not entirely dependent on the thickness of the non-conducting film, since the resistance of the electrolyte behaves as a resistance in series with the condenser and affects its impedance.

Fig. 5 demonstrates the decrease in capacity caused by interference of the high internal resistance at low temperatures.

Should the cell be required to work efficiently at lower temperatures a suitable electrolyte can be prepared having a lower specific resistance. Similarly, should it be required to work at high temperatures, the reverse applies.

I have already demonstrated that with increased temperature the leakage current will accordingly increase. This is mainly due to the change in specific resistance. With high temperature the resistance of the electrolytic decreases, and therefore puts increased pressure to bear on the film.

This brings forward another important factor, for with an increase in leakage, the breakdown voltage of the cell is lowered.

The purity of the electrolyte is a feature which has to be very carefully protected in the manufacture. All the raw materials used in the composition must be examined and kept to very stringent specifications.

The presence of impurities such as heavy metals, chlorides, nitrates, and sulphates seriously affect the quality of the cell, and the formation of the anode is considerably retarded with only slight excess.

The leakage current also shows marked increase with only small quantities of impurity.

It is evident that the reason for these intererences is due to the change in conductivity of the cell, and owing to the diffusion of such impurities as chlorides and nitrates, etc., through the inner active layer, thus destroying its function.

Application.

The application of electrolytic condensers became developed as low-pass electric wave filters in telephone systems, these filters being placed in the supply circuit to eliminate noise-producing ripples and pulsations. Later, with the development of radio their use has become important as filter condensers in the smoothing net work of the main part of receivers and amplifiers, and they are used as decoupling units across batteries and in low frequency amplifiers.

In comparing the electrolytic condenser with the ordinary paper or mica static condenser, it may be said that electrolytics can take the place of static condensers for direct current use, in circuits where the applied voltage does not exceed approximately 500 volts, and the capacity of the condenser is not less than approximately one microfarad, depending on the requirements.

The working voltage of electrolytic condensers is set at a maximum of approximately 500 volts because the development of those of higher voltage are not yet commercially practicable. Electrolytic condensers cannot take the place of the low capacity static type as the power factor of electrolytics is much higher than that of the latter, being approxi-

mately 5 to 10 per cent. for electrolytics compared to 0.1 to 0.4 per cent. for paper condensers measured at 800 cycles. In circuits where it is possible to use electrolytics, many advantages will accrue.

(1) The cost per microfarad is considerably less than that for a static condenser.

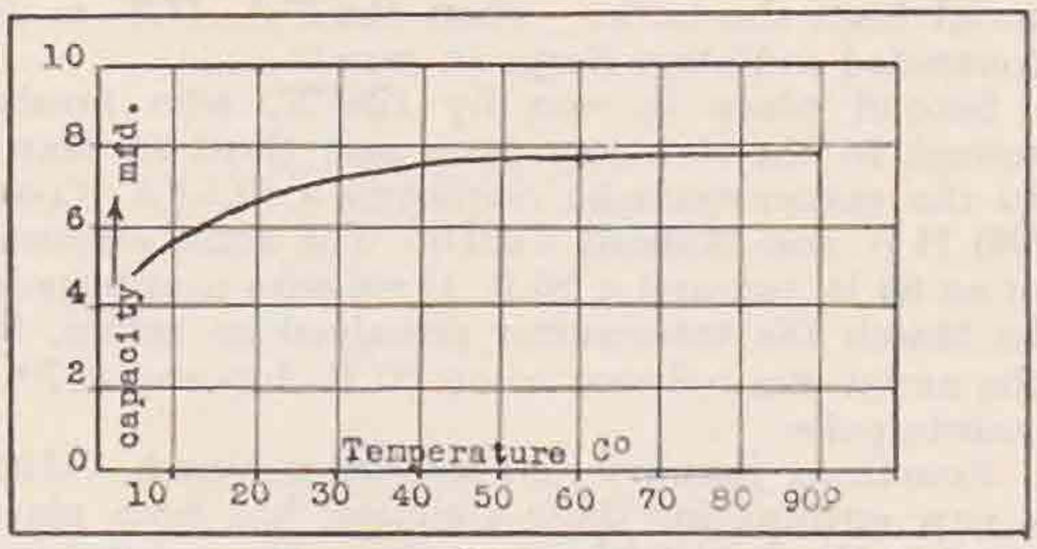


Fig. 5.
Capacity depending on temperature (8 mfd. condenser, 500v. D.C. Peak).

(2) The high capacity per unit area of plate surface gives small size and compactness.

(3) After momentary overloading, an electrolytic will immediately recover, providing it is not kept on overload for too long a period. Thus, where a static condenser is ruined after breakdown, an electrolytic will recover to its normal condition without any of its qualities being impaired.

Acknowledgments.

In conclusion, I wish to thank the Directors of the British N.S.F. Company for the facilities they have afforded me in preparing this paper, and their permission to publish it.

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THE PENTODE AND THE PORTABLE.

By R. A. Fereday, B.Sc., Ph.D., F.Inst.P. (G6FY, PA0FY).

THE use of a pentode in the crystal oscillator of a multi-stage transmitter is becoming almost standard practice, and has been described in a number of recent publications.

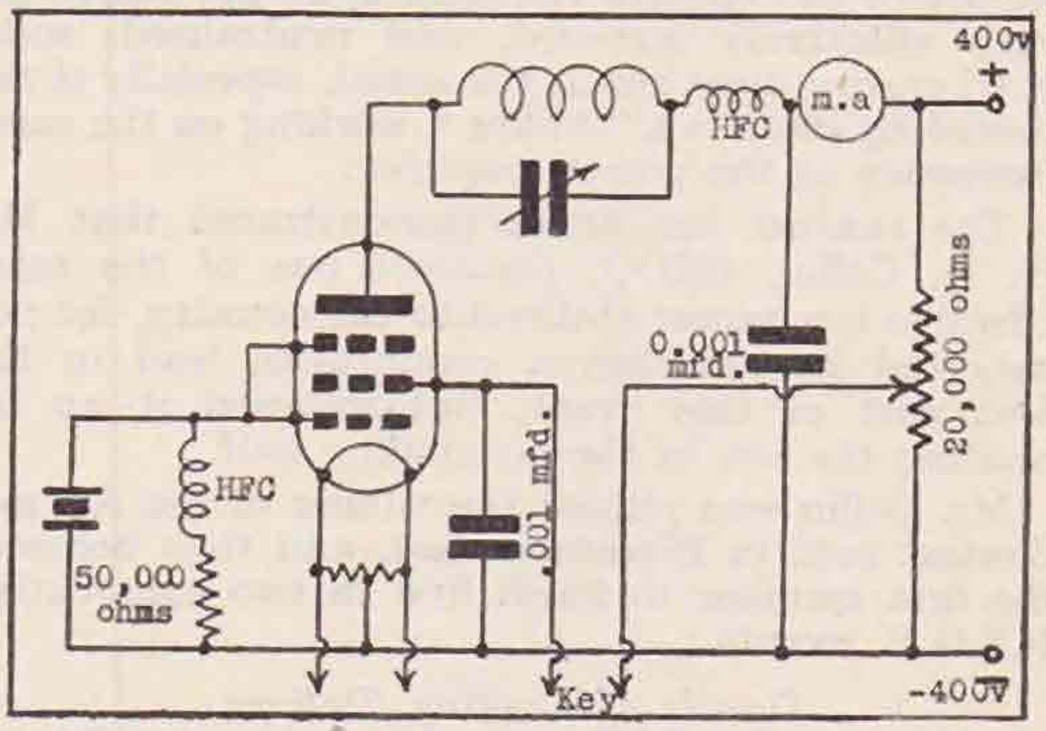
When faced with the problem of designing a really compact portable transmitter, the writer decided to endeavour to use such an oscillator to feed the aerial directly ; complete success came with the very first tests, and the system also proved to possess some considerable advantages which had not been anticipated.

The circuit used is shown in the figure, the valve being a Tungsram PP4100, which is of the directly heated 400-volt 10-watt dissipation class. It will be seen that the circuit is precisely that of the usual triode C.O., to which is added a source of keyed polarising voltage for the screen-grid.

One of the unexpected advantages of the system proved to be connected with this method of keying ; the current interrupted is only a few milliamperes, and possesses no H.F. component ; further, the mechanical inertia of the quartz crystal " rounds off " the starting and stopping of the oscillations ; not, however, to the exaggerated degree which usually results when attempts are made to key a normal C.O. The net result is that keying is almost entirely free from clicks. It would be interesting to see whether a system comprising such a keyed oscillator driving one or more amplifiers would solve the difficult problem of clickless keying of a high-power transmitter, but the writer has not yet had an opportunity to try out such an arrangement.

Except when the valve is loaded up to maximum input, oscillation stops completely when the key is up ; this fact, combined with the absence of serious clicks, makes the system perfectly satisfactory for " break-in " working. In fact, it represents an ideal solution of that difficult problem—" break in " with crystal control.

The arrangement is so simple that success would seem to be assured ; careful attention to details is, however, necessary if its full advantages are to be realised. In the first place, a good, well mounted, crystal is essential, the output available being almost entirely decided by this factor. With a



Circuit used by PAOFY in a Portable Transmitter.

good crystal an input of 15 watts at 400 volts is easily handled with good efficiency. In order to reach maximum efficiency, a low-C tank circuit is necessary ; this, however, results in the generation of rather strong harmonics, so that some sort of harmonic filter in the aerial circuit becomes desirable.

It is essential that the screen-grid be fed from a voltage source of good regulation, *e.g.*, from a separate battery, or over a potentiometer of fairly low resistance, as shown in the figure. If care is

(*Continued on page* 382.)

THE 1934 1.7 MC. CONTESTS

Another Win for G2DQ

IT will be remembered that in view of the interest shown in the initial 1.7 mc. Contest held in January, the Awards Committee arranged for a second event to follow in March.

The first part of the Contest was held over a 36-hour period, whilst the operating times for the latter were reduced to 24 hours. The reduction was brought about in order to meet the wishes of members who considered a 36-hour spell excessive.

The response shown has more than justified our belief that 1.7 mc. is still one of the most interesting bands for local contests.

Before reporting upon the results, we feel it desirable to state that certain members have drawn attention to the fact that by the rules of this contest, entrants could, if they so desired, use considerably more power on intermediate stages than on the final amplifier, and still be within the rules. In other words, 20 watts or more could be used on a buffer stage providing the stated input of 10 watts was adhered to on the final.

Council and the Awards Committee have carefully considered this point, and whilst agreeing that it was their intention to restrict operation to 10 watts throughout, they feel that they must accept scores which have been obtained under the conditions mentioned above.

It is, however, their intention in future to specify clearly the maximum input which may be used for any stage. The question as to whether preceding stages influence the radiated signal, is one which the Technical Committee intend to investigate, but we are of the opinion that unless all pre-stages are very effectively screened, and neutralised, some R.F. energy must reach the aerial, especially if the preceding stage is a " buffer " working on the same frequency as the power amplifier.

The contest has again demonstrated that Mr. H. G. Collin, G2DQ, possesses one of the most effective low power stations in the country, for not only did he establish a comfortable lead in the first part of this event, but followed it up by heading the list in the concluding half.

Mr. Collin was judged the winner of the 3.5 mc. Contest held in November last, and thus becomes the first member to finish first in two consecutive R.S.G.B. events.

Details of Leading Stations.

G2DQ in the January tests used a CO-BA-PA arrangement with 350 volts at 28 mils to two PV625A's in the final. The aerial system was a Marconi and counterpoise giving a radiation current of 0.7 amp. In the March tests an electron coupled oscillator followed by three buffer stages, and a power amplifier (300 volts at 33 mas) was used, whilst the previously mentioned antenna system was employed. Quoting from his covering letter, Mr. Collin said : " All reports were T9, although an electron coupled oscillator was in use. My power was as near 10 watts as it was possible to get it, and was monitored with moving coil metres all the time. There is no power getting into the aerial from the buffer ; when the P.A. H.T. is disconnected radiation drops to zero."

Second place is won by G6FN, who finished second in the January tests and third in March. In the earlier tests he employed a CO-PA (Cossor 680 H.F. and Mullard T25D). The aerial consisted of an 85 ft. top and a 50 ft. three-wire counterpoise. In March the transmitter remained as before, but the aerial was reduced to an 80 ft. top and a 70 ft. counterpoise.

Fourth in January and second in March, G2KV, a new entrant for these contests, has been placed third in the final table of results. His input during both tests was 8 watts from a CO PA using HL2 and P240 valves. The CO was keyed to save power ! The aerial was 66 ft. long, whilst the gas mains were used as an earth. Mr. Todd was in hospital recovering from measles the evening before the March tests commenced !

G5RX, second with G2KV in March and fifth in January, used 9.5 watts to a locked T.P.T.G. from a c.o. His antenna system was 99 ft. long 40 ft. high and 30 ft. lead-in. A north-south aerial was used in January and an east-west for the March tests.

Mr. Ingram, G6IZ, who finished second in the first tests, was a non-entrant in March. He used a screened electron coupled oscillator, and P.A. fed into an aerial system 100 ft. long and 40 ft. high, with a similar length counterpoise.

Competitors' Comments.

G2KV says : " It was my first contest ; up to the start I had been using 3 watts and this seemed to QSO everything heard. During tests a 100 v. H.T. battery was added to normal 150v. accumulator supply." G5FI reported dud WX conditions, " when WX is wet signals from my station fall off at least two R strengths on regular schedules." G6UJ only worked four stations during the last 14 hours of the January tests ; he suggests this was due to severe " blanketting." He asks : " Where do all the stations go after these tests ? "

G6RB reported bad trawler QRM. G6YJ considered conditions were poor, especially at night. His mains dropped from 220 to 110v. at one period. This explains why certain QSO's were missed in the " wee sma' hours." He heard HB9AD and FM8ALA and also a few trawlers !

G2JN reported that conditions in January were excellent ; strange how they varied over a few miles ! No QRN was noticed, but trawlers were his " bête noire." The loudest signal heard emanated from a non-entrant G6YL. An input of 6 watts was used and a full watch was kept. Conditions during March were not good and non-amateur QRM worse than before.

G6FJ sent several suggestions with his January entry, most of which referred to contest hours ; his wishes were met as far as possible in March. He suggests the 1.7 mc. R.E.S. groups study the contest logs—an excellent idea. (G5UM please note.) G5ZX was hindered by a B.C. harmonic in the first test.

Technical Articles are Wanted

G5MP was unable to enter for the March contest owing to illness; if this had not intervened he would undoubtedly have been placed high in the list. He contacted SM7YG at QSA 5 R5. He also made certain suggestions regarding contest hours, but unfortunately these could not be adopted in their entirety.

Check Logs.

The Awards Committee desire to thank the following for useful check logs:—M. Grossin, F8RJ, Rene Olivier, F8XF; Herwart Wisbar, D4BHF; C. R. Ponting, G6ZR; and D. A. Dyer, BRS727.

TABLE OF RESULTS.

Position.	*Name and Call.*	*Points.* *January.*	*March.*	Total *Points.*
*1	H. G. Collin, G2DQ	59	44	103
*2	S. A. French, G6FN	55	38	93
*3	J. K. Todd, G2KV	50	39	89
*4	S. Newell, G5RX	48	39	87
5	G. R. S. Farnie, G5FI	45	34	79
6	A. Watson, G6UJ	43	35	78
7	R. A. Bartlett, G6RB	45	31	76
8	F. R. Canning, G6YJ	38	33	71
9	J. G. Stonestreet, G6JN	42	27	69
	J. M. S. Watson, G6CT	41	28	69
11	A. C. Webb, G6WQ	37	29	66
12	H. J. Harding, G6RQ	35	29	64
13	E. T. Pethers, G6QC	34	25	59
14	W. H. Glen Dobie, G6DO	32	26	58
15	A. Dellbridge, G6KV	31	26	57
16	W. Griffen, G6FJ	36	20	56
*17	E. G. Ingram, G6IZ	54	—	54
18	J. P. Stove, G5ZX	29	19	48
	M. Brooks King, G2CI	26	22	48
20	B. W. F. Mainprise, G5MP	46	—	46
	M. H. Munroe, G6MF	23	23	46
22	W. A. Scarr, G2WS	20	21	41
23	M. Buckwell, G5UK	40	—	40
24	J. F. Stanley, G6SY	37	—	37
25	A. H. Radford, G6YA	36	—	36
	R. F. Hilton, G6QK	36	—	36
27	A. O. Milne, G2MI	—	35	35
28	J. Witty, G5WQ	34	—	34
29	J. W. Moorhouse, G5XJ	—	33	33
	T. Woodcock, G600	33	—	33
31	F. A. Holmes, G6AI	—	31	31
32	A. M. Hardie, G5FP	—	30	30
	D. Low, G5WU	30	—	30
34	R. V. Allbright, G2JL	28	—	28
35	R. E. Griffin, G5UH	27	—	27
36	F. E. Woodhouse, G2SX	—	26	26
	J. N. Walker, G5JU	13	13	26
	J. W. Hamilton, G5JH	26	—	26
39	E. J. Allan, G5NW	25	—	25
40	F. H. Jackson, G2KZ	—	24	24
41	O. H. Relly, G2AO	21	—	21
42	J. R. Wilson, G2XT	15	—	15
	H. J. Long, G5LO	15	—	15
44	R. W. Peel, G2CT	14	—	14
45	H. Hornsby, G5QY	—	13	13
46	I. Auchterlonie, G6OM	—	12	12
47	C. H. Young, G2AK	8	—	8
48	H. Baker, G2SB	6	—	6

*Certificate winners.

G6OO gave a list of 67 stations heard in January, of which total 33 were worked. He mentioned a blanketing effect similar to that reported by G6UJ, also of Yorkshire. He heard F8CZ calling CQ on his patented "fly power" transmitter. G5FP reported excellent conditions in March. He heard U3BZ, OZ1ZG, PA0ASD.

M. Grossin has for four years in succession taken an active interest in our 1.7 mc. contests, and contributed in no small measure to their success. His input was 20 watts R.A.C. He mentions that FM8ALA is anxious to receive reports on his 1.7 mc. transmission (G6YJ note). Mr. Wisbar forwarded

(*Continued on page* 382.)

Special Issue Next Month. Many Original Contributions

"SOLILOQUIES FROM THE SHACK."

By Uncle Tom.

(Firmly believing himself to be the Wise Old Man of amateur radio, our bearded friend continues his running commentary on current events.)

WELL, well! Likewise dear, dear! Who'd have thought it? The day after the last Bull was published, my friend and colleague "Little Tom" received four entries for "Technical Topics," all dated to make it look as if they'd been written before the 15th, and all arriving on the 17th. Dear, dear! I didn't know we had such crafty ones among our membership—there *is* some grey matter floating about, after all.

Some nice sympathetic letters have arrived this month, showing that there are people about who agree with some of the nasty things that I am reluctantly compelled, as it were, so to speak, to say.

Let me quote—I don't often get such a chance as this—"You surround yourself with the mists of a *nom-de-plume*, but from the atmosphere of your writings I imagine you to be a gentleman (Up, Guards!) of about 40 (Down, Towzer!) having a fair amount of radio technology (whoopee!) but above all a great sense of humour and general good-will."

The gentleman who writes these kind words adds, later, "my imagination may, quite excusably, be entirely at fault."

Now *I* was under the impression that my ramblings would convey the opinion that I was an apoplectic and possibly dyspeptic old cogger of 85 (which I ain't). It looks as if I must start being rude again and give up the light, sylph-like ethereal tone that I have cultivated of late.

Let me give away a secret. I am the living spit of Strube's "Little Man"; I stand five feet four in height, have a walrus moustache except when I've had porridge for breakfast, am kind to animals, and of a quiet, retiring disposition.

Forgive all this rambling, Mr. Editor. Now to business. This very same gentleman who calls *me* a gentlemen (Up, Guards!) wants me to put up the following suggestions.

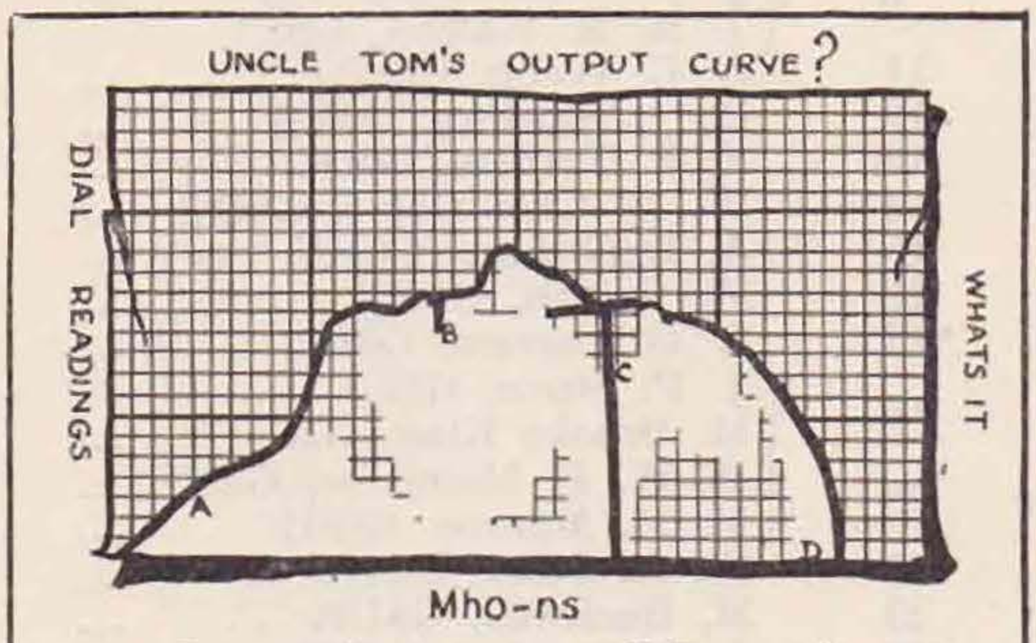
(1) When testing out the transmitter (should that be necessary) before a transmission, *don't* sit on the key. Send a few V's (note that word "few"—not a hundred, as I once heard), add your call-sign, and send AR as soon as possible.

(2) Even if you can't work break-in, a little intelligence in calling will help matters. Don't call that DX station for a solid five minutes, but give him a short call, with a tentative "K." Change over like lightning, and if he isn't replying to you within ten seconds have another go at him.

(3) In *re* all this "dr ob dr om" slobber. Don't use it, and don't believe the other man when he uses it. We are all hams together and all (we hope) friends, but we aren't *really* as fond of each other as all that. As my friend says, "Who ever heard a ham say to the 'bus conductor, "Penny, please, *dr* ob?"

(4) Possibly the most heinous crime in the whole long list that may be attributed to hams is to say "RR All OK all OK dr ob dr ob," and then fail to produce an intelligible answer to a single question that was asked. Don't start getting Liars' Contests mixed up with your QSO's. They're all very well for a dull half-hour at a hamfest, but keep them off the air, *please, dr* (!!!!? Ed.)

Now here's another dyed-in-the-wool ham who wants me to say something on his behalf. He doesn't perjure his soul by calling me a gentleman (far from it, as a matter of fact), but he has some nice ideas. I recently said that the one thing that was good in the average ham's shack was his transmitter. This man says he hasn't noticed even *that*.



Scrounging around U.T's cabin this was picked up — apparently the contour of the curve has altered a lot, for the many rubbings-out has removed most of graph-ruling.

A. (for apple) appears to be affected by the input at B. (b... is best). The perpendicular to C., is to C. C? There is a very serious falling off at the end of the of curve, in fact it becomes dead at D.

But what a peak!

G. Juice de
call sign D-BUNK

Next whack goes to all hams who send "th" as "6." As my friend says, it's most disconcerting to have what is apparently a number chucked at you in the middle of a sentence. It quite puts one off, until one realises that the bloke t'other end is one of those peculiar people.

The next one's another whack at formula-QSO's, with the additional question, "How can we stop them?" It's just as often the man at the other end who is to blame. One way is to go on 3.5 mc. and work G's. Then if the man at the other end starts oozing formulæ from every pore, you can tell him what you think of him (in plain language—see licence). Another way out, of course, is our dear old friend 56 mc., although I *have* even heard formula QSO's going on down there.

One would have thought SU1EC had put the tin hat on the formula-merchant with his "74-cum-75" sign-off. But no! Someone asked me the other day what "74" meant!

(*Continued on page* 382.)

Technical Articles are Wanted

INTERFERENCE ELIMINATION.

Part 3.—Co-operation with the Broadcast Listener.

In this, the final section of the article prepared by the Interference Committee, co-operation with broadcast listeners is stressed. Although the work of the Committee is for the time being finished, we wish to emphasise the fact that further information of a technical nature, aimed at assisting members to operate their stations with a minimum amount of interference, is welcomed.

In an early issue of this Journal, we shall publish details of a new 10 *watt crystal controlled transmitter which has been especially designed to overcome broadcast interference on the* 1.7 *and* 3.5 *mc. amateur bands.*

IN the first two sections of this article various methods of curing interference at both the amateur transmitting and broadcast receiving ends were thoroughly discussed. It now remains to draw attention to the *importance of co-operation between the respective parties*, in order to give the greatest freedom of action to each, with the smallest amount of friction.

In a preliminary announcement on page 82 of the September, 1933, BULLETIN, it was recommended that a transmitting amateur when he receives a complaint from a neighbour should :—

1. Verify that his transmitter is suitably adjusted for transmissions during broadcast hours ; and
2. Endeavour to assist the complainant to improve his receiver.

In the event of the complainant refusing to co-operate, he should state his case in writing to the Engineer-in-Chief, Radio Section, G.P.O., London. A copy of this letter should be sent to Society headquarters.

It is felt that these original suggestions should certainly be borne in mind when occasion arises, but a few words in amplification thereof will not be amiss.

In the first place, it would be well for every transmitter to verify that he is not causing unnecessary local interference. For those living in populated areas such a precaution is of paramount importance, unless all transmissions are restricted to non-broadcasting hours. A portable broadcast receiver of not too selective design will be found very useful here as a test set.

The main points to watch for are : (1) absence of key clicks ; (2) absence of hum ; and (3) (when modulating) absence of harsh gutteral noises due to over-modulation. The elimination of key clicks was discussed from a number of angles in Part 1. A properly-designed stable oscillator, whether crystal or otherwise, with a well-smoothed H.T. supply, should not cause trouble from accidental modulation at mains frequency. The cure for over-modulated telephony transmissions should be obvious. It is again emphasised that interference from key clicks or over-modulation cannot always be cured at the receiving end ; attention is drawn to Part 1, sub-sections *Thump Filters* and *Telephony Interference Elimination*.

Upon receipt of a complaint and verification that the transmitter itself is in order, a visit to the complainant is the first step. The Committee will be the first to admit that occasionally visits have not been treated in the friendly way intended by the transmitting amateur ; nevertheless, *it is absolutely necessary to endeavour to co-operate with the complainant.* Part 2 of this article dealt very fully with all suggested remedies, and the amateur will be able to decide on possible remedies when the type of receiver in use and the form of interference suffered have been studied. Transmitting amateurs, although possibly not very interested in broadcast reception, would do well to make themselves acquainted with the more general types of receivers in use.

It is felt that nothing can be said regarding anonymous complaints of interference, except that they should be ignored ; in such cases the interference is usually very slight. It is natural to expect that, when severe, and of frequent occurrence, the complainant will take steps to inform the amateur concerned or the licensing authorities. When a complaint is received from the Post Office giving insufficient information for the transmitting amateur to attempt co-operation, it is recommended that he should take the matter up with the authorities, and report the facts to Society headquarters.

Transmitting amateurs may rest assured that the Post Office officials are, as a rule, favourably disposed towards them. The Society would, however, be pleased to receive details from any member who considers himself to have been unjustly treated. When reasonable co-operation is refused by the complainant, the amateur is advised not to wait for him (the complainant) to report to the Post Office, but to advise the Post Office himself. He should make quite certain that his station is being properly worked in the best traditions of amateur radio, and he will invariably find the Post Office sympathetic.

In conclusion, it should be remembered that of the total number of broadcast receivers in use, the relative number which encounter interference by amateur stations is exceedingly small, and likewise of the amateur stations in operation, those which cause interference to broadcast receivers are very few.

STRAY.

VU2BL advises us via G5BD that he is transmitting on 28 mc. every Sunday at 11.30 G.M.T. He listens for replies at 11.40 and 11.50 G.M.T., and completes his transmission at noon.

HELPFUL HINTS.—No. 6.

VARIATIONS WITH AMPERES, VOLTS AND OHMS.

MOST readers will already be aware of the great importance of understanding the relations which exist between pressure, current and resistance in a direct-current circuit, but a number, who believe that radio can be bungled along without the use of certain elementary figures, are those who think that these can never be memorised without great mental strain, contenting themselves with the fictitious security of the system of " hit and miss."

The laws connected with alternating current are those which impose difficulties, and the matter below concerns only direct current circuits.

Ohm's Law.

This fundamental law, connected with every D.C. circuit, states that :—

$$I = \frac{E}{R}$$

when I is the current flowing, in amperes, through R the resistance in Ohms, and E is the pressure across the ends of the resistance, in volts.

The expression is said to follow the straight-line law. If a graph is plotted, using any two of the terms as ordinates and the third term is maintained constant, the slope of the graph is also constant and the curve is a straight line — the simplest form of equation and graph.

By transposition of the terms, we can produce three identities :—

$I = E/R$ ..... 1 and $R = E/I$ 3
$E = I \times R$ 2

Hence, given any two of the terms, we can always find the third, no matter which of three equations are used.

In radio work, the " I " term is often in milliamperes, so that it must always be shown as divided by 1,000 before insertion into the formula. If the " R " term is in megohms, it must be put into the expression as " R " divided by 1,000,000.

Example.

A current of 10 milliamperes is flowing when a pressure of 100 volts is applied across the ends of a resistance. What is the value of the resistance ?

$R = \frac{E}{I} = 100$ divided by $\frac{10}{1000}$ so that R is 10,000 ohms.

Voltage Drop.

We have seen that $E = I \times R$. This is the voltage *dropped* in the resistance and must be remembered.

Example.

A valve electrode passes a current of 50 milliamperes at 250 volts. What value of resistance is required to drop the applied voltage to the correct value if this is delivered from a 500 volts generator ?

The difference between the supply and the desired pressures is 250 volts—the voltage to be dropped. This is equal to $I \times R$. Hence :—

$250 = \frac{50}{1000} \times R$ which makes $R = 5{,}000$ ohms.

Watts.

Watts = volts × amperes = voltage dropped across × the current flowing through the resistance = watts dissipated in the resistance itself.

This is the same as saying $W = I.R \times I$.
or $W = I^2R$.

Example (1).

How many watts are dissipated in the resistance in the last example ?

The figure is $I \times I \times R$ or $\frac{50}{1000} \times \frac{50}{1000} \times 5{,}000$ which gives 12.5 watts. So that a resistance rated at 10 watts would probably burn out.

Example (2).

Two valves are rated 4 volts at 1 ampere in the heaters. Would there be any saving to connect them in series rather than in parallel ?

In parallel, each valve takes 4×1 or 4 watts. Total power 8 watts.

In series, each valve drops 4 volts across it, and the total current is one ampere. The total voltage drop is therefore 8 volts, and so the power used is still 8 watts.

D.C. Mains Problems.

The users of D.C. main supplies are often unable to find suitable dropping resistances for such items as filament current, usually through ignorance of the application of simple rules. Here is a common problem :—

Example (1).

A transmitting valve requires 10 volts at 5 amperes on the filament. How should the dropping resistance be estimated so that it can be obtained from 200 v. D.C. mains ?

For the purpose of rough working, the voltage drop may be ignored, providing that an ammeter is on hand to measure the current flowing through the filament—if this is correct, the voltage drop across the ends will automatically adjust itself. Since 5 amps. flow from the main, 1000 watts will have to be dissipated, and a 1 KW heater element in series with the filament and the main will pass a little less than 5 amperes, and the balance can be easily adjusted with a bank of lamps and the use of the ammeter.

By exact calculation, the voltage which has to be dropped is the difference between the mains and the rated filament pressure—namely, 200 — 10 volts 190 volts.

So that $R = \frac{E}{I} = \frac{190}{5} = 38$ ohms.

The filament resistance is obviously $\frac{10}{5} = 2$ ohms

So that total resistance in circuit will be 40 ohms.

By using the formula $I = E/R$ we get :—

I (the total current flowing) $= \frac{200}{40} = 5$ amperes.

In a case like this, it might be advisable to check back and find the watts dissipated in the resistance.

They would be $I^2 R$, or $38 \times 5 \times 5$. That is 950 watts ! The filament itself is of 2 ohms resistance, so that it dissipates 50 watts. This evidence shows the appalling inefficiency of voltage dropping !

Example (2).

An M.L. type motor-generator is rated 50 volts input, 500 volts 100 milliamperes output, efficiency 50 per cent. No meters are available. It must run at full speed and load from 250 volts mains. What external armature resistance is needed ?

(*Continued on page* 382.)

Technical Articles are Wanted

NATIONAL FIELD DAY, 1934.

WE have pleasure in announcing that a special certificate will be awarded to the overseas portable station contributing the largest number of points to British N.F.D. stations taking part in that event. Claims for this award must reach Headquarters prior to June 30, 1934.

Advice has been received from Lieut. E. S. Cole, SU1EC, to the effect that the Egyptian B.E.R.U. Group intend to operate a portable station from a site near Alexandria, whilst Mr. Stuber, Communications Manager, U.S.K.A., reports that a number of Swiss portable stations will also be in action using calls commencing XHB9—.

A full list of the British portable calls, together with details of their approximate locations, follows :

ENGLAND AND WALES.

District	Station	Call	Site
1	A	G2OI	Haslem Farm, Smithill, Bolton.
	B	G2OA	Quarry Road, Woolton, Liverpool.
2	A	G2LD	Cockle Park, near Morpeth.
	B	G5HK	Lodge Moor, Sheffield.
3	A	G2AK	Barr Beacon, near Sutton Coldfield.
	B	G5VM	Bird's Farm, Rubery.
4	A	G2VQ	St. George's Hill (between Calverton and Dorket Head, North of Nottingham).
	B	G6JQ	Ratcliffe Aerodrome, nr. Leicester.
5	A	G2HX	" Paradise," Painswick Beacon, Glos.
	B	G6RB	Dundry Hill, Dundry, near Bristol, Glos.
6	A	G6XD	Near Sheepstor, S.Devon.
	B	G5SY	Little Haldon (between Ideford & Teignmouth).
7	A	G6GZ	Farnham Park, Surrey.
	B	G2NH	Jones Farm, High Street, Walton-on-the-Hill.
8	A	G6BS	The Dingle, Houghton Road, St. Ives, Hunts.
	B	G2TH	Heath Lane, Hemel Hempstead, Herts.
9	A	G2XS	Knight's Hill, South Wootton, near King's Lynn, Norfolk.
	B	—	—
10	A	G5WU	Leckwith Hill, near Cardiff, Glam.
	B	G2XX	Wentwood, nr. Newport, Mon.
11	A	G6IW	Prestatyn Mountain (Golden Grove Estate).
	B	G2II	Near Bryn-y-Maen.
12	A	G5CD	Welwyn Heath, North Welwyn, Herts.
	B	G6WU	Dugdale Hill Farm, Potters Bar, Middlesex.
13	A	G6QB	Roverdene, Chalden, near Caterham, Surrey.
	B	G6HP	Same site.
14	A	G6UT	Rookwood Hall, Abbess Roothing, Essex.
	B	G6CT	Rettenden Tile Works, Rettenden, Essex.
15	A	G6WN	Rush Green Farm, Rushey Green, Denham, Bucks.
	B	G6YK	Allens Barn, Mantles Green Farm, Amersham on the Hill, Amersham, Bucks.
16	A	G2MI	Burham Downs, Bluebell Hill, Kent.
	B	G2IC	The Leas, Folkestone.
17	A	G2LR	Cranwell Aerodrome, Lincolnshire.
	B	G5GS	Stenigot Hill, near Donnington - on - Bain Lincolnshire.
18	A	G6UJ	Black House Farm, Sherburn, Yorkshire.
	B	G5FV	Clarke's Field, Keyingham, near Hull, Yorkshire.

SCOTLAND.

A.	A	G5DK	Eaglesham Moor, Renfrewshire.
	B	G2MA	Same site.
B.	A	G5FP	Cults, near Aberdeen.
	B	G6IZ	Same site.
C.	A	G5AP	Amulree, Perthshire.
	B	G6KO	Monikie, Angus.
D.	A	G6MF	Goschen Farm, Musselburgh.
	B	G6FN	Macbiehill, Lamancha, Peeblesshire.

N. IRELAND.

A	Gi5MO	Cloughfin, Islandmagee, Co. Antrim.
B	Gi6YW	Killenican, Killinchy, Co. Down.

Changes or additions to this list will be communicated to all D.R's in a circular letter from Headquarters.

The Swiss stations which will be taking part are as follows :—XHB9AG, 9AM, 9AX, 9AY, 9P and 9V.

National Field Day Rules

The following additional rule regarding the operation of stations during the above event, has been approved by Council.

24. *Persons operating a portable station which is competing shall be holders of a G.P.O. transmitting licence.*

BAGS ! !

Uncle Tom, in one of his ugly moods, referring to the photograph on page 337 of the April BULLETIN, asks, " Who needs a trouser-press most ? "

It is understood that the owner of a sporty M.G. is arranging to instal the necessary impedimenta to enable his " distinguished patron " to remove the creases prior to his arrival at future Provincial " cocktail parties ! "

Stray.

We understand that accommodation for the Dutch trip arranged by Mr. M. Buckwell, G5UK, can be reserved up to May 20.

RESEARCH AND EXPERIMENTAL SECTION

MANAGER :

H. C. Page (G6PA), Plumford Farm, Ospringe, near Faversham, Kent.

GROUP MANAGERS :

No. 1 : 1.7 and 3.5 MC. WORK
J. B. Hum (G5UM), 68, Bridge Road East, Welwyn Garden City, Herts.

No. 2 : 56 MC. WORK
E. A. Dedman (G2NH), 63a, Kingston Road, New Malden, Surrey.

No. 3 : ARTIFICIAL AERIALS
J. K. Todd (G2KV), 12, St. John's Road, Cambridge ; and Orchard Place, Wannock, Polegate, Sussex.

No. 4 : ATMOSPHERE AND FADING
J. C. Elmer (G2GD), Aethelmar, Seabrook Road, Hythe, Kent.

No. 5 : TELEVISION
C. W. Sands (G5JZ), Springfield, Heathfield, Sussex.

No. 6 : CONTEMPORARY LITERATURE
R. A. Fereday (PAOFY), Reinkenstr, 40, The Hague, Holland.

No. 7 : RECEIVER DESIGN
E. N. Adcock (G2DV), 31, Churchill Road, Little Bromwich, Birmingham.

No. 8 : TRANSMITTER DESIGN
A. E. Livesey (G6LI), Stourton Hall, Horncastle, Lincs.

No. 9 : AERIAL DESIGN
F. Charman (G6CJ), The Cottage, Park Way, Hillingdon, Middlesex

No. 10 : VALVE RESEARCH
D. N. Corfield (G5CD), 10, Holders Hill Gardens, Hendon, N.W.4.

No. 11 : 28 MC. WORK
(Manager to be appointed.)

THE organisation of the Section is making steady progress, but it will probably be a month or two before things settle down comfortably. I feel I must offer some apology for the delay in sending out the certificates of membership. However, all arrears have now been made up and all future applicants can expect theirs within a few days of applying for membership.

A number of letters of acknowledgment of receipt of the certificate have already been received, but *I feel that I should draw attention to the second part of Rule* 6.

Now a few words with regard to the individual members. After due consideration it has been decided that these should report on anything of interest to the Group Manager concerned. He will include a summary of their report in his own notes. In the case of an individual member studying some branch of research not catered for by the groups already formed, the report may be sent direct to the R.E.S. Manager, who will deal with them at his discretion. In addition to this a list of all R.E.S.I. members, together with the subjects they are interested in is being prepared, and will be published in a future issue. This will enable individual members to get into touch with one another direct.

It has been suggested that the allotment of numbers to everyone will cause a loss of individuality. I can assure you that in all cases outside R.E.S. H.Q. a call-sign will be used in place of the number. There is no intention, and never has been, of conducting the Section on the lines of a convict establishment ! The numbers are solely for use in record-keeping.

1.7 and 3.5 MC. Groups (No. 1).

Group 1*A* has been formed with all the original Group 10A members, except G2YI. BRS1245 (Enfield Wash) takes his place.

Although news of the Group's transatlantic tests is rather belated now, it is interesting to note that G5WU worked W1DBM for the third time on March 3, and W1CHV on the same day, being QSA3 R4 average. The Americans were using 400 watts and 75 watts respectively, and were R7 and R4. On March 4, conditions suddenly slumped, and even W1DBM was only R3-4. March 10-11 was also a poor period, only W1DBM being heard, averaging R3. Conditions seemed to favour easterly transmission and reception, as SM5XR, with 6 watts, was R3-4, and was worked by G5UM. March 17-18, despite mild weather, was very good, and many weak C.W. stations were heard. Once again G5WU showed his mettle by working W1BR (a newcomer, who was R7) and W1DBM.

Mention must be made of the feat of BRS727, Cardiff, who co-operated with the Group. He heard five U.S. phones on 1.7 mc. on February 25.

Four other No. 1 groups are in process of formation. Those interested in work on 1.7 or 3.5 mc. should join R.E.S. at once.

Artificial Aerial Group (No. 3).

Eight members have, up to the present moment, joined the group, and another certain member is in the offing.

Two sub-groups have been formed with G2KV, 2BYP, 2BWT and 2BFQ representing 3A ; G2LR, G2AZ, 2BVH and BRS1303 represent 3B. These members have been allotted the R.E.S. Nos. 1, 20, 68, 106, 54, 107, 9 and 39 respectively.

Two intercommunicating budgets have been started.

Receiver Design Group (No. 7).

As no group reports are yet available, I should like to address a few personal comments to the group members.

It appears to me that our main job of work is definite—*to improve the standard of receiving equipment in use in this country*. While the regenerative detector with optional L.F. amplification may have been commensurate with the transmitting gear employed ten years ago, it is quite out of date today. L.F. selection, moreover, is not an adequate solution of our difficulties—*high frequency selectivity is required*, and the only convenient means of obtaining this at present appears to be via the intermediate stages of a good superheterodyne receiver. I should like the group to produce a series of receivers of this description, battery and mains operated, for articles in this journal. With the belated appearance of frequency stability in the average 56 mc. transmitter, a carefully designed superheterodyne will be adequate for reception on all amateur bands.

HIC ET UBIQUE.

Technical Information Bureau—The 1.7 mc Translantic Tests—R.S.G.B. Reception Tests—Special National Field Day Log—Slow Morse Practices.

July 5th, 1934.

We are pleased to announce that our President, Mr. Arthur Watts, G6UN, will broadcast from London a short address in the National Programme, at approximately 1715 GMT on July 5th. On this date we shall celebrate the 21st Anniversary of the founding of the Society, and we hope that as many as possible of our members will endeavour to listen in at the time specified.

TECHNICAL INFORMATION BUREAU

We have to announce that a Technical Information Bureau has been formed, with Mr. Eric Adcock, G2DV, as manager, the purpose of which is to give technical advice to members who are unable to obtain the information they require from other sources.

The rules governing the operation of the Bureau are set out below :—

1. The Bureau is only available to fully paid-up members of the Society.

2. Advice will only be given on short wave queries. In no case can the rival merits of commercial products be discussed, or disputes settled between members and advertisers.

3. Before sending in a query all available literature should be consulted. The Bureau is not intended to avoid trouble in doing this, and should only be consulted where all other sources of information fail.

4. Each query should be written at the top of a separate sheet of paper, with the sender's call or B.R.S. number in the top right-hand corner. It is intended, where possible, that the query shall be answered on the same sheet to economise the time of the Bureau in replying.

5. *Two* stamped envelopes must accompany each set of queries, *one* only being addressed to the sender, the other being for the use of the Bureau.

6. All queries should be addressed to T.I.B. Manager, c/o R.S.G.B., 53, Victoria Street, S.W.1.

Radio Society of East Africa.

We have pleasure in announcing that the above Society have been granted Honorary Affiliation with the B.E.R.U. We learn from their official handbook that His Excellency the Governor of Kenya, His Excellency the Governor of Uganda, and His Excellency the Resident of Zanzibar, are the distinguished patrons of the Society. The honorary secretary is Mr. R. J. Fittall, P.O. Box 380, Nairobi.

The 1.7 mc. Transatlantic Tests.

Further news of successes in the 1.7 mc. Transatlantic tests have come to hand from G5UM.

On March 3, G5WU, of Penarth, worked W1DBM of North Falmouth, Mass., for the third time, and on the same morning also contacted W1CHV. The Americans were using 400 and 75 watts' input respectively, while G5WU had exactly 10 watts. On March 17, a newcomer to the air (on this side of the ocean at any rate), was W1BR, who was R7-8. Not only did G5WU work him, and learn that he had 1,000 watts' input, but he again raised W1DBM, his average signal strength being R3 at QSA2.

During this series of tests just concluded, G5WU has had six contacts with U.S., and been heard by VE1AO. No other members have been so successful ; they have, however, heard ten different U.S. amateurs on C.W., while BRS727, of Cardiff, heard five Americans using telephony on February 25. Most of them were in the Third District. BRS727 uses a 3-valve S.G. set.

(We congratulate Mr. Low on his excellent work.—Ed.)

E.L.S. Please Note.

Our representative for the Canadian Fifth District, Mr. A. L. Cusden, VE5HJ, 1465 17th Avenue, New Westminster, B.C., is anxious to arrange E.L.S. and other regular schedules with British and New Zealand stations.

He is working on 7,020, 7,068, 14,040 and 14,136 kc.'s using an input of about 400 watts. We hope that as a result of this notice a reliable route between VE5 and this country will be inaugurated.

Golders Green Radio Society.

An advance notice has reached us from the above Society regarding their Annual Direction Finding Competition.

This popular event will take place on May 27, and is open to all members of a Radio Society.

A fixed transmitter will operate under the call G5RD on 157.7 metres, whilst a hidden transmitter will be operated under the call G5CD on 164 metres.

Valuable prizes are being offered.

Final details will be sent on application to the Hon. Secretary, Mr. F. P. Hillier, 8, Denehurst Gardens, Hendon, N.W.4.

W9USA and W9USB

We are advised by the World's Fair Radio Amateur Council that the above stations will again be in operation during the 1934 World's Fair at Chicago.

These stations are directed at showing to all visitors to the Fair the importance of the Amateur movement.

Technical Articles are Wanted

N.F.D. Films

With reference to the notice which appeared in our last issue, Mr. G. E. Jones (G6XB) advises us that Pathescope do not supply cameras suitable for 16 mm. film. In view of this, it is suggested that standard 9.5 mm. film be employed. The 16 mm. size was recommended for the reason that we considered the smaller size would produce rather small pictures, a disadvantage if the film is shown at Convention.

G.P.O. Check on R.S.G.B. Calibration Service.

The G.P.O. advise us that their check on Mr. Gay's standard frequency transmissions sent out from G6NF on Sunday, April 29, were as follows :—

09.36 B.S.T., 3524.98 kc.
09.47 B.S.T., 3624.99 kc.
09.56 B.S.T., 3725.05 kc.

Author Wanted !

Captain G. Martin (G5MJ), Stanhope Lodge, Aldershot, wishes to get in touch with the author of the anonymously contributed article entitled "Note Selection," which appeared in the November, 1933, Bulletin.

"World Radio" Research League

It will be remembered that *World Radio*, the official B.B.C. publication, recently gave publicity to a scheme whereby B.C.L.'s and other interested parties could assist Professor Appleton in his echo researches. As a result of comments which appeared in the *Daily Herald*, the Society has now been approached with a view to members offering their services for this work.

We understand that full details will be forwarded to those making application to the Hon. Sec., W.R.R.L., Broadcasting House, London, W.1.

Thames Valley Amateur Short-Wave Radio and Television Society

The above Society is arranging a visit to the Heston Airport Radio Station, to take place (Airport authorities permitting) on Sunday, May 27.

Visitors will be cordially welcomed, and those who intend coming are asked to advise the Hon. Secretary, Mr. Richard K. Sheargold (G6RS), as soon as possible.

Full particulars of the outing will be sent on application.

R.S.G.B. Reception Tests.

Dates and periods for the May-June Tests will be found below together with a special log in connection with National Field Day. New participants for details of these Tests should consult page 84 in the September, 1933, issue of the Bulletin. At the conclusion of the Tests all logs should be forwarded to Mr. T. A. St. Johnston (G6UT), 28, Douglas Road, Chingford, E.4, when the Budget containing logs, letters, etc., will be circulated to all participants.

Series 28.

Test Letter	Date, 1934			Period B.S.T.	Band M.C.
A	Sun.,	May	20	00.00—01.00	1.7
B	Sun	,,	20	10.00—11.00	56
C	Sun.	,,	20	11.00—12.00	28
D	Sun.	,,	20	22.30—23.30	14
E	...Mon.	,,	21	08.00—09.00	7
F	Mon.	,,	21	09.30—10.30	3.5
G	Sun.	,,	27	07.00—08.00	1.7
H	Sun.	,,	27	09.00—10.00	7
I	Sun.	,,	27	11.00—12.00	56
J	Wed.	,,	30	21.30—22.30	28
K	Thur.	,,	31	21.30—22.30	14
L	Sat.,	June	2	15.00—16.00	3.5
M	Sun.	,,	3	08.00—09.00	14
N	Sun.	,,	3	11.30—12.30	56
O	Sun.	,,	3	18.30—19.30	1.7
P	Tues.	,,	5	22.00—23.00	28
Q	Wed.	,,	6	21.30—22.30	7
R.	Thur.	,,	7	21.00—22.00	3.5

Special National Field Day Log

To add additional interest to National Field Day, all members not participating in the work at their local N.F.D. stations are invited to forward a log covering the following information :—

(*a*) N.F.D. Stations heard.
(*b*) Stations calling or working N.F.D. stations. Time, band, signal strength and tone should be specified.

A list of the British and overseas N.F.D. stations appear elsewhere in this issue.

All logs should reach Mr. T. A. St. Johnston (G6UT), not later than June 30.

Slow Morse Practices

The following is a list of slow morse practice stations with details of their transmissions. Test matter will be taken from the recent issues of The T. & R. Bulletin, and page number and month of issue will be given at the end of each test. Reports will be appreciated by those transmitting the practices, or may be sent direct to Mr. T. A. St. Johnston (G6UT), 28, Douglas Road, Chingford, E.4.

No practices will be transmitted during N.F.D. week-end.

Schedule of Transmissions.

Date, 1934.			B.S.T.	Frequency. kc.	Station.
May	20	Sun.	00.30	1820	G2OI
,,	20	Sun.	09.30	1854	G6FJ
,,	20	Sun.	10.00	1828.3	G2II
,,	26	Sat.	15.00	7119	G2CY
,,	27	Sun.	00.30	1820	G2OI
,,	27	Sun.	09.30	1854	G6FJ
,,	27	Sun.	10.00	1828.3	G2II
June	2	Sat.	15.00	7119	G2CY
,,	3	Sun.	00.30	1820	G2OI
,,	3	Sun.	09.30	1854	G6FJ
,,	3	Sun.	10.00	1828.3	G2II
,,	16	Sat.	15.00	7119	G2CY
,,	17	Sun.	00.30	1820	G2OI
,,	17	Sun.	19.30	1854	G6FJ
,,	17	Sun.	10.00	1828.3	G2II

Rules Governing the Issuance of W.B.E. Certificates.

In response to numerous requests we reproduce herewith the rules governing the issuance of W.B.E. certificates.

It will be noted that Rule 2 has been amended to read " The signal reported shall in no case be less than QSA3." An additional rule relating to power has also been added.

1. *The W.B.E. certificate shall be awarded by Council to Corporate members of the R.S.G.B. or the B.E.R.U.*

The Open Season.

2. *The W.B.E. Certificate shall be awarded in accordance with Rule* 1 *to those persons who have effected two-way communications on amateur frequencies, with at least one station in some part of the British Empire located in each of the other four continents. The signal reported shall in no case be less than QSA* 3.

3. *In forwarding a claim a member shall give a guarantee that his licensed power has not been exceeded in effecting the QSO's upon which the claim is based.*

4. *All applications shall be made in writing to the Secretary of the R.S.G.B., and shall be accompanied by documentary proof, in the form of letters or postcards, that the claim is justified.*

5. *For the purpose of differentiating between the five continents, Council shall approve a map* of the world showing clearly certain arbitrary datum lines. A copy of this map shall be held at the Headquarters of R.S.G.B., and arrangements made to publish a reproduction in the Society's Journal.*

6. *All claims shall be judged in conjunction with this map.*

7. *Members to whom the W.B.E. certificate has been issued shall be permitted to use the letters " W.B.E." on personal correspondence during the time they are members of the R.S.G.B. or the B.E.R.U.*

8. *Communications with ship stations sailing under the British flag and British mobile stations will be considered as Empire contacts.*

9. *British mandated territory and Protectorates shall be considered as forming part of the British Empire.*

The above rules were initally approved in Council January 22, 1930, and amended March 21, 1934.

*This map was reproduced in the T. & R. Bulletin dated February, 1930.

W.B.E. Claims

We wish to emphasise that evidence in the shape of *letters or cards* is required before a certificate can be issued. In order to save time overseas members may forward their cards to their local B.E.R.U. representative, who has our mandate to approve claims. Advice can then be forwarded to London via the E.L.S. Network.

In approving claims, representatives are requested to note the changes to the rules which appear above.

In future, holders of these certificates are requested to use the term " W.B.E.(C.H.) " on correspondence and cards; this will serve to indicate that the person concerned is a W.B.E. certificate holder.

W.B.E. Certificates.

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

Name.	*Call sign.*	*Date,* 1934.
W. Lucas	G2OI ...	March 1
F. Charman	G6CJ ...	,, 2
R. M. Vickary	VK4RV ...	,, 6
W. J. H. Kempton ...	G2AI ...	,, 16
S. Partington	G2GQ ...	,, 19
C. C. Anderson ...	W6FFP ...	,, 23
R. Stanton	ZL3AC ...	,, 26
R. Holmes	G6RH ...	,, 29
R. S. Woodford ...	ZS3D ...	April 3
J. W. Gill	G6OS ...	,, 5
Dr. Ing. M. Santangeli	I1ER ...	,, 9
G. Featherby	G5FB ...	,, 13
H. M. Roberts	VK5MY ...	,, 18
J. N. Smith	GI5QX ...	,, 18
E. W. Rawlings ...	G5RS ...	,, 24
E. Howell	G2HN ...	,, 25

A Correction

In Mr. Clacy's article dealing with " A method of determining ultra short wavelengths," published last month, the final figure shown in the column headed " Differences " should have read 5.6 not 6.6.

Technical Articles are Wanted

Centenary Contest.

During the Melbourne Centenary Celebrations to be held in October, the Victoria Division of W.I.A. are to organise an International DX Contest. The rules which follow have been based as far as possible upon those governing B.E.R.U. and A.R.R.L. International contests.

1. *There will be two Contests* (a) *Transmitting* (b) *Receiving.*
2. *The Contest Committee's ruling will be binding in case of any dispute.*
3. *The nature of the Contest requires the "world" to work with Australia.*
4. *The Contest is to be held from* 00.01 *G.M.T. Saturday, October* 6, *till* 23.59 *G.M.T. Sunday, October* 7, *and will be continued over the four week-ends in October at the times stated above on each occasion.*
5. *The Contest is open to all licensed transmitting amateurs and receiving stations in any part of the world. Unlicensed ship and expedition stations are not permitted to enter the contest. Financial members of the W.I.A. and its affiliated societies only will be eligible or an award in Australia.*
6. *Only one licensed amateur is permitted to operate any one station under the owner's call sign. Should two or more amateurs operate any particular station, each will be considered a competitor, and must enter under his own call sign and submit in his log the contacts established by him. This debars persons without amateur licences from taking part.*
7. *Where more than one amateur operates one station each entry must be signed by each competitor, as a declaration of the above statement.*
8. *Each participant will assign himself a serial number of three figures as detailed in the contest description. When two or more operators work at one station each of them will allot himself a separate number.*
9. *All amateur frequency bands may be used.*
10. *Only one contact with a specific station will be permitted on each wave band during each week-end.*
11. *Contacts may be repeated on each of the succeeding week-ends with the same stations in accordance with Rule* 10.
12. *To count as a contact, each QSO must consist of an exchange of serial numbers as well as signal reports using T, QSA and R Systems.*
13. *Scoring : One point will be scored by each station for every* 1,000 *miles between the Capital Cities of the States (or Countries?—*Ed.*) of the contacting stations, measured by a Great Circle line. Points claimed are to be stated on the entry form.*
14. *Australian stations will multiply their points' score by the number of countries worked. Stations outside Australia will multiply by the number of Australian Districts worked, there being eight all told, viz., VK*2, 3, 4, 5, 6, 7, 8 *and* 9.
15. *No prior entry need be made for this contest, but each contestant is to submit a log at the conclusion of the test showing Date, Time (G.M.T.), Band, station worked, "in and out" signal reports, "in and out" serial numbers, distance between stations and points claimed for each QSO.*
16. *Foreign entries will be received up till January* 31, 1935.

We heartily commend this event and trust that our home members will give it the same support as our VK friends give to our B.E.R.U. Contests.

To encourage British entrants, a certificate of merit will be awarded to the R.S.G.B. G station placed first by the W.I.A. Awards Committee.

Calibration Section.

Manager, A. D. Gay, G6NF.

The calibration transmissions on 3.5 mc. from G6NF will be suspended during the months of June, July and August. Transmissions will recommence on September 30. The Calibration Service for members' crystals and frequency meters will continue as usual.

It has been suggested that a transmission on 3,600 kc. will be welcomed by members possessing 100 kc. crystal oscillators, for the purpose of directly comparing the accuracy of these crystals. Will those interested please let me have their comments on this matter? The 30 kw. transmissions made from WWV each Tuesday evening on 5,000 kc. should meet the requirements of most experimenters who desire to check their 100 kc. bars direct.

QSL Section.

Manager : J. D. Chisholm (G2CX).

Since last month's notes were written I have received a letter which affords a striking illustration of what happens when members neglect to collect their cards from H.Q. W8AKX has written to say that he has sent over 20 cards to Great Britain during the past year and of that number he has received only one reply—and that from a non-R.S.G.B. member! The probability is that a large percentage of those cards never reached the stations for whom they were intended because the latter were too slack to send envelopes to the QSL Section. If G stations are to avoid a bad reputation for discourtesy they should see to it that they say they do not want QSL's, or take the trouble to collect those that arrive for them.

STANDARD FREQUENCY TRANSMISSIONS.

SUNDAY, MAY 27th, from G6NF London.

0930 BST.	3525 KC.
0940 BST.	3625 KC
0950 BST.	3725 KC.

Accuracy within 0.01 per cent.

Mr. Heathcote complains that although he is not the QSL agent for South Africa, he is receiving large numbers of cards to forward to African stations, and he asks me to point out that all cards for this destination should be addressed to the S.A.R.R.L., or to R.S.G.B., who maintain a regular service to ZS.

"Radio" and "R9"

Special subscription rates for home members have been fixed by the publishers of the above periodicals. These are as follows :—

"*R9*"—8s. per annum, 12 issues.

"*Radio*"—16s. per annum, 12 issues.

"*R9*" and "*Radio*"—16s. per annum (combined subscription for 12 issues of each).

Specimen copies will shortly be available from the Secretary, 1½d., post free. Subscriptions will be accepted by Headquarters in a similar way to those for *QST*

Vielen Dank!

We understand from Mr. J. de Cure, VK3WL, that the German Short Wave Society (D.A.S.D.) have presented him with a batch of specially printed QSL cards in token of their appreciation for the support he has given to their D.E. members.

"A pretty gesture," as de Cure puts it, and we agree.

NEW MEMBERS.

HOME CORPORATES.

F. F. Bolton (G2OV), 3, Harvey Road, Rainham, Kent.
H. J. Eaves (G6UQ), 31, Oak Road, Cheadle, Cheshire.
J. A. Prince (2AKV), 87, South Parade, Cleckheaton, Yorks.
C. P. Elliott (2ALX), Marine House, Marine Road, Prestatyn, N. Wales.
B. E. P. Sadler (BRS1399), 40, Loxley Road, S.W.18.
W. Begg (BRS1400), 423, Castlemilk Road, Glasgow.
E. W. Burgis (BRS1401), St. Ann's House, King's Lynn, Norfolk.
E. S. Green (BRS1402), 24, Beresford Drive, Southport, Lancs.
C. C. Whitehead (BRS1403), 5, Clarendon Road, Putney, S.W.15.
R. M. McDougall (BRS1404), 348, Gladsmuir Road, Glasgow, S.W.2.
D. A. Gray (BRS1405), Bonrowan, Glenfarg, Perthshire.
W. B. A. MacFarlane (BRS1406), Burscough Town, Ormskirk, Lancs.
J. Armstead (BRS1407), 26, Ashburton Road, Stockport, Lancs.
H. G. Greenstreet (BRS1408), 6, Edenvale Road, Mitcham, Surrey.
G. B. Neale (BRS1409), 18, Vainor Road, Sheffield 6.
W. Blyth (BRS1410), 17, Elgin Terrace, Edinburgh.
C. W. Thayne (BRS1411), 11, Corie Road, Norwich, Norfolk.
L. G. T. Mitchell (BRS1412), 44, Birrell Road, Sherwood Rise, Nottingham.
A. S. Macnab (BRS1413), 30, Elton Road, Bishopston, Bristol 7.
Lance-Corpl. H. Swift (BRS1414), W/T Station, Bally Kinler Camp, Co. Down, N.I.
E. O. Byrne (BRS1415), Ulster Bank, Ltd., Clogher, Co. Tyrone, Ulster, N.I.
I. D. Bruce (BRS1416), 54, Bloomfield Road, Darlington, Co. Durham.
G. F. Wakefield (BRS1417), 67, Southwark Park Road, Bermondsey, S.E.16.
C. F. Ranft (BRS1418), 59, Beresford Road, Cheam, Surrey.
A. Nicoll (BRS1419), Castle Street, Blairgowrie, Perthshire.
A. Edwards (BRS1420), 8, Swan Hill Road, Scarborough, Yorks.
W. A. Dix (BRS1421), 18, Harvey Lane, Norwich, Norfolk.
E. Bridge (BRS1422), 13, Moss Lane, Burscough Bridge, Lancs.
J. H. M. Goodacre (BRS1423), The White House, Ashby Parva, Rugby.
P. F. Johnson (BRS1424), 4, Branksome Road, Norwich, Norfolk.
A. W. Lawson (BRS1425), "Makora," Kinghorn, Fife, Scotland.
A. C. L. Jotcham (BRS1426), 68, Ashley Road, Bristol, Glos.
W. P. Kempster (BRS1427), Forge Cottage, Rosside, Ulverston, Lancs.
T. Caldicott (BRS1428), Police House, 14, Hardwick Road Worksop, Notts.
F. De Burgh Whyte (BRS1429), Eastbourne, Glenageary, Co. Dublin, I.F.S.
J. P. Manning (A.), 35, Wonford Road, Exeter, Devon.

DOMINION AND FOREIGN.

J. C. Lagercrantz (SM5SV), Djursholm, Sweden.
J. P. Thomas (SU5NK), 3, Sharia Muhrani, Cairo, Egypt.
D. C. McDonald (VK3DM), 16, Railway Avenue, Malvern, S.E.4 Victoria, Australia.
F. A. Adams (VK2ER), 26, Neil Street, Carlingford, via Sydney, N.S.W., Australia.
A. Fairhall (VK2KB), Box 300, P.O., Newcastle, N.S.W., Australia.
M. Campbell (VK3MR), 194, Oheas Street, Coburg, Victoria, Australia.
H. M. Roberts (VK5MY), 58, Fourth Avenue, Alberton East, South Australia.
R. Ohrbom (VK3OC), 22, Gordon Street, Coburg, N.13, Victoria, Australia.
A. J. Savarimuthu (VU2AK), 24, Tallakulam, P.O., Madura, S. India.
J. L. Nettleton (BERS224), H.M.S. *Sandhurst*, c/o G.P.O., London.
H. Hayne (BERS225), 1 Coy., Egypt Signals, Cairo, Egypt.
R. V. Grimwood (BERS226), Luccombe Estate, Maskeliya, Ceylon.
W. Acquroff (BERS227), R.A.F. Station, Amman, Transjordan.
A. S. Din, P.O. Box 376, Kampala, Uganda, B.E.A.

QRA Section.

Manager: M. W. Pilpel (G6PP).

NEW QRA's.

G2AZ.—L. Grech, c/o G6QP, 282, Easter Road, Leith, Edinburgh.
G2CT.—R. W. Peel, 6, Fishpond Drive, The Park, Nottingham.
G2FS.—L. K. Winsor, 158, Algernon Road, London, S.E.13.
G2KL.—F. N. Evans, 186, Upper Wrotham Road, Gravesend, Kent.
G2RQ.—A. Maxwell, 1, Mountjoy Terrace, Musselburgh, Midlothian.
G2WX.—S. J. Borgars, 47, Arbour Lane, Chelmsford, Essex.
G5GY.—T. B. Gregory, 16, The Mount, Wallasey, Cheshire.
G5HB.—H. Biltcliffe, Foresters Arms, Durkal, near Wakefield, Yorkshire.
G5MJ.—Capt. G. St. J. Martin, Stanhope Lodge, Aldershot, Hampshire.
G5QU.—C. S. Brown, 16, Canterbury Road, Redcar, Yorkshire.
G5SD.—A. M. C. Christian, 11, James Road, Castletown, Isle of Man.
G5SZ.—J. W. Riddiough, No. 4 "Rosse-Lyn," Frizinghall, Bradford, Yorkshire.
G5WZ.—S. Smith, High Dock House, West Holborn, South Shields, Northumberland.
G5YY.—W. A. Mead, 189, Burton Road, Burton-on-Trent, Staffordshire.
G5ZD.—C. K. Drew, 16, Badminton Road, Balham, London, S.W.12.
G6HF.—M. H. Wynter-Blyth, Dent, South Close, Woodhall Gate, Pinner, Middlesex.
G6IN.—J. B. Inglis, c/o Menzies, 63, Warrender Park Road, Edinburgh.
G6KM.—S. Kember, "Oimara," Sycamore Avenue, Upminster, Essex.
G6LH.—Rev. L. C. Hodge, 2, New York Villas, Robin Hood's Walk, Boston, Lincolnshire.
G6TI.—A. G. Wood, 33, Lattice Avenue, Ipswich, Suffolk.
G6TR.—T. F. Rendall, 2, Kings Avenue, Seaburn, Sunderland, Co. Durham.
G6UK.—T. Gentleman, "Corlane," Netherpark Avenue, Netherlee, Renfrewshire.
G6WS.—S. T. G. Weston, 2, Outram Road, Southsea, Hampshire.
2AQP.—B. D. Young, Berwick Hill, Berwick-on-Tweed.
2AVN.—F. R. Freeman, 47, St. John's Road, Tunbridge Wells, Kent.
2BAV.—F. C. Blake, 6, Berkeley Road, Tunbridge Wells, Kent.
2BAW.—E. T. L. Hare, 17, Park Road, Southborough, Tunbridge Wells.
2BDA.—G. Hutson, 11, Wide Bargate, Boston, Lincolnshire.
2BPJ.—R. S. G. Bartle, 46, Goods Station Road, Tunbridge Wells, Kent.
2BPR.—D. C. Jardine, 7, Colne Road, London, N.21.
2BRB.—J. Butcher, "Kentaun," Hookwood, Horley, Surrey.
2BUB.—H. Duckworth, 1, Sunningdale Drive, Prestwich, Manchester.
2BVO.—F. J. C. Hood, 20, Bideford Gardens, Monkseaton, Co. Durham.

The following are cancelled: G2LH, G2UA, G5IB, G6JK, G6YQ, 2BRQ.

Ham Parodies.

No. 3.

(*With Apologies*)

D'ye ken "TEN Z" or his QRA,
D'ye ken "TEN Z," for he works all day,
And he's R9 plus, 'cause he's not far away,
With his blah-bliddy-blah in the mornings.

How he works a soul is a mystery,
For his fone sounds just like a saw to me,
And he swings from 1 down to 8 mc.,
With his blah-bliddy-blah in the mornings.

Yes, I ken "TEN Z," and he gives me the blues,
Many a contact he's caused me to lose,
And how oft have I prayed that his mains would fuse,
So that he couldn't work in the mornings.

For the thought of DX brought me from my bed,
But alas for my hopes when I heard "TEN Z,"
And he drove all ideas of VK from my head,
With his blah-bliddy-blah in the mornings.

Did ye ken "TEN Z?" Once he thought that he
Could treat umpteen volts with impunity,
Now, alas, poor lad, he's a "Silent Key,"
Ne'er again will he work in the mornings.

When I work ZL and I work VK,
And a lot more DX that comes my way,
I look back with a smile on each fruitless day,
When "TEN Z" used to work in the mornings.

"Pips."

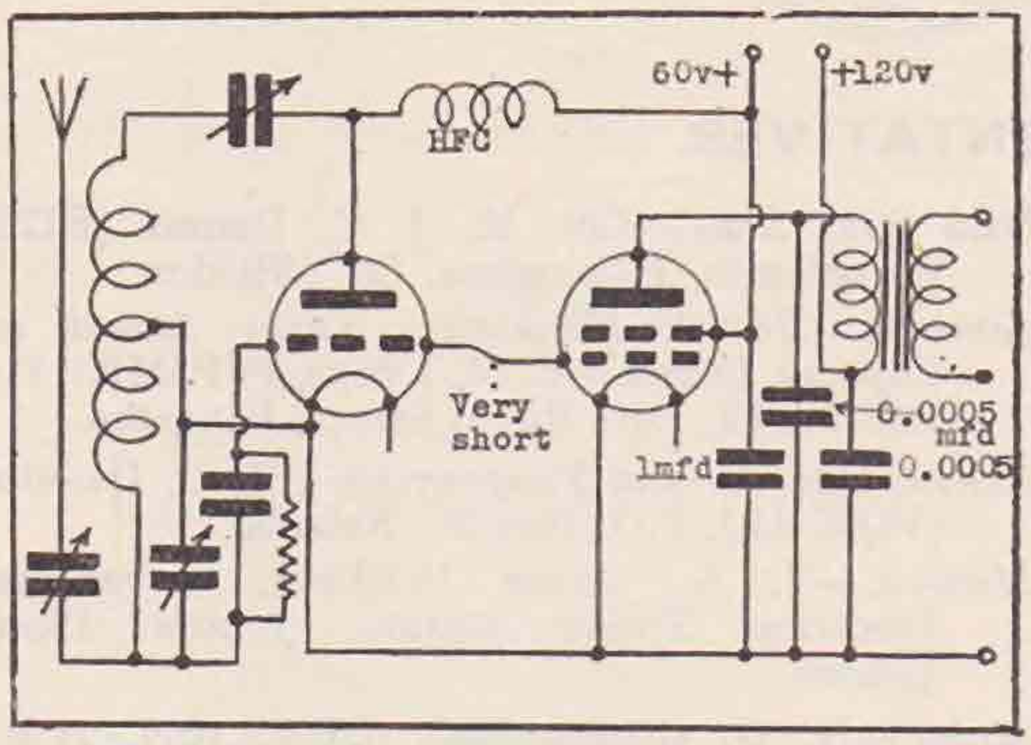
Technical Articles are Wanted

CORRESPONDENCE.

IMPROVING RECEIVER DESIGN.

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

Dear Sir,—Having read your Editorial in the February Bulletin, I would like to draw your attention to a special arrangement in connection with the use of S.G. valves in short-wave receivers, which was developed by myself some years ago.



This arrangement will improve any ordinary short-wave receiver using a regenerative detector, and will give much stronger signals without increased background noise.

Occasionally threshold howl will occur, but this is easily remedied by means of a de-coupling condenser from either side of the transformer primary.—Yours very truly,

H. T. Petersen (OZ7Z).
Norresundby, Denmark.

BETTER RECEIVERS.

To the Editor of T. & R. Bulletin.

Sir,—The truthful but vitriolic utterances of Uncle Tom seldom fall upon barren ground, and the evolution of the new R.E.S. sections of the Society impresses upon my mind his urge for better receivers.

I have one personal request to place before the members who will be responsbile for receiver design, and one which our worthy friend did not stress.

Lately, we seem to have aimed well in the world of receivers, but the aim has been, I maintain, rather too high. Quality of reproduction has been neglected in the struggle for selective C.W. signals from weak, long-distance stations.

One finds most of our listening stations equipped with two-valve receivers of the screen-grid detector and Pentode type. Generally, no attempt is made to match the telephones to the output valve. It is sheer torture to listen to telephone signals on such a contraption, whilst it is rough luck on telephony stations that they should have to be content with reports recorded on this type of receiver.

My personal suggestion is that attention should be given to the development of such receivers as are capable of rendering a moderately good telephone signal as well as selecting the very faint C.W. from long-distance transmissions.

Yours faithfully,
A. E. Livesey (D.F.H.),
(G6LI).

TRADE NOTICES.

New Eddystone Components.

We have had the opportunity of examining a sample of the new screened cabinet and dial drive, which are now being marketed by Stratton & Co., of Birmingham.

The cabinets, which are made of an aluminium alloy, provide perfect screening when closed, and will undoubtedly prove a boon to amateurs desirous of housing receivers and frequency meters in a compact space.

Two minor points of criticism, when the dial drive is used as a frequency meter condenser control, are worthy of attention by the manufacturers. First, the hair line indicator could, with advantage, be reduced in thickness; secondly, the dial plate needs additional support at the ends. For all normal receiver work, however, the present dial is perfectly satisfactory, as it gives a full open 100° reading over an arc of 6 ins., a big improvement over earlier types. The gear ratio is 22 to 1.

The addition of a mica transparent window would prove an advantage in amateur stations where dust is prevalent.

The cabinet can be supplied with or without escutcheon gap at a price of 27s. 6d., and the dial drive with a black or walnut finished handle at 10s. 6d.

A further useful Eddystone component has also been examined; this was a sample of their new Microdenser, which has been especially designed for band spread work, the maximum and minimum capacities of the sample viewed were 15 and 1 mmfd. respectively. When used with an Eddystone Type Y coil, this condenser will spread the 14 mc. band over 30° on a 180° dial; using an R coil, the 7 mc. band is covered by 60° on a similar dial. Isolex has been used for insulation, and all metal parts are made of solid brass. The spacing of vanes is accurate, and to ensure perfect contact, the ends of the fixed vanes have been soldered to the main spindles. This is in every way a midget job, and measures only 2 ins. from the back to the bottom of the centre spindle.

Similar condensers are made in 25, 40, and 100 mmfd. sizes.

All of the above components can be obtained from Webb's Radio Stores, 14, Soho Street, London, W.

Empire B.E.R.U. News.

B.E.R.U. REPRESENTATIVES.

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

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

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

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

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

Channel Islands.—Capt. A. M. Houston Fergus (G2ZC), La Cotte, La Moye, St. Brelades, Jersey.

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

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

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

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

Kenya, Uganda and Tanganyika.—R. O. Davidson (VQ4CRL), P.O. Box 31, Nairobi.

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

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

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

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

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

North India.—J. G. McIntosh (VU2LJ) Baghjan T. E. Doom Dooma P.O. Assam.

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

Australia.

By VK3WL *via* ZL4AO and G5YH.

Mr. Ray Carter is enjoying a brief holiday after a strenuous summer; VK3WL therefore fills the gap. Most of the leading VK stations took part in the A.R.R.L. Contest, VK3MR, 3WL, 3CX and 4GK all finishing close together. The 7 mc. band was used almost exclusively. The Spanish stations taking part in their contest came through well last month, but VK QSO's were few and far between. G signals have practically disappeared and will probably remain out until August.

VK2NR is now on his way to England, where he hopes to meet many of the men he worked whilst in VK.

Canada (Fourth District).

By VE4CJ.

The Calgary Radio and Electrical Club are preparing for a Low-Power DX Contest which will extend throughout the month of May. Power is limited to 5 watts. Hopes are running high that some contacts with G will be made during this event. All DX bands will be used.

VE4CJ appeals to VE4 amateurs to send him notes for the BULLETIN.

Ceylon and South India.

By VS7GJ.

VU2FY reports that 7 mc. has been good for early morning work, but conditions on 14 mc. have been very poor. VU2JB, 2LZ, 7RA and 7GJ have carried out some good telephony tests recently. VU2JP has a letter budget in operation and invites all VS7 and S. India members to contribute.

Egypt.

By SU1EC *via* G6QC.

Conditions during April have been almost identical to those existing during April, 1933. Eastern DX disappeared except for a very occasional ZL on 7 mc. at about 05.00 G.M.T., otherwise 7 mc. was dead, except for heavy QRN and French fone. The 14 mc. band was excellent for medium DX (G, and for all W districts, except W6 and W7), no W6 or W7 have yet been heard on 14 mc. in SU, though both "Hammarlund" and "National FB7's" are in use. Most SU amateurs are active in Alexandria. SU1SG has made abortive efforts to make his cc. TX work, and is now using self-excited TPTG with two T25D's in push-pull. He has an excellent QRA, and his signals are getting out well. SU1WEM has built an A.C. S.G.-Pen.

Technical Articles are Wanted

receiver, but is doing no transmitting owing to heavy local QRM. SU1SJ is working on 7 mc. only. SU1CH has moved his QRA from Alexandria to Cairo, and hopes for activity soon. SU1TM finds no improvement with vertical antenna. SU6HL is re-building his P.A. for A.C. SU1EC has been cricketing, and, as a result, active for brief periods only.

Station Descriptionette
VQ4CRL

RADIO Station VQ4CRL is situated on the outskirts of Nairobi, Kenya Colony, and made its first appearance on the air in June, 1932.

The first outfit was a T.P.F.G. transmitter with a power input of approximately 25 watts, and results were very satisfactory, although considerable trouble was experienced in erecting suitable aerial owing to heavy screening by trees around the station location. After months of experiments with various types of aerials it was decided that only a change of QRA would solve the problem and the above location was considered suitable, and the change was made with pleasing results.

About the end of 1932 it was decided to go in for Crystal Control, and a low power outfit was built, which was used during the B.E.R.U. Contests, 1933. After the contests higher power was indicated and the present transmitter is the result. This outfit is, with a few minor alterations, similar to the medium power transmitter described in the June, 1933, issue of the BULLETIN.

A Mullard PM24M valve is used as crystal oscillator, followed by a Marconi LS5B valve as frequency doubler, which drives a Marconi DET1 with a power input of about 50 watts. Two crystals are in use with fundamental frequencies of 7058 and 3531 kc.

Several type of aerials have been tried at this new location, including that evolved by G2BI, and the present system consists of a voltage fed Hertz with Zepp feeders, the top being 33 feet and feeders 37 feet long, parallel tuned for 14 mc. On 7 mc. the dead feeder is left out and the live one is used as a 70 foot A.O.G. clipped straight on to the tank coil of the power amplifier.

The receiver is an Eddystone Amateur Band Two, with one or two minor alterations to give increased band spread.

The station is WBE and WAC and 70 countries in all have been worked, since coming on the air in 1932.

The lay-out of the station is very neat and business-like. During the station visits in connection with the recent East African B.E.R.U. Convention the owner-operator was congratulated both on the lay-out and the construction of the equipment.

VQ4CRH.

Iraq.

We have received advice from Mr. Goodinson (YI5KM) that he has been transferred to Heliopolis, Egypt, consequently Iraq is again without a representative. Mr. Knowles (YI7RK) is, we understand, back in England, whilst Mr. Lewis (ex-YI5GL), late of Baghdad, has been transferred to Risalpur, thus has one of our largest B.E.R.U. Groups of yesteryear faded into obscurity. Mr. Goodinson hopes to return to the air as SU5KM, and Mr. Lewis intends to operate under a VU call.

At the time of reporting, YI7NN operated by Mr. Willis, is believed to be the only active Iraq station, although a newcomer, Mr. Cunningham, hopes to use the gear left behind by YI7RK. Mr. Cunningham has offered to take over the duty of QSL Manager for Iraq, his address being No. 70 Squadron, R.A.F., Baghdad.

Irish Free State.

By EI2B.

May I again remind EI members that all reports should reach me not later than the 20th of the month, and that unless these are sent it is impossible to compile Notes or to know which stations are active? Reports of individual activities can only be included in cases where new ground has been broken or some really outstanding achievement has taken place.

The I.R.T.S. Contest, organised somewhat on the lines of the recent Spanish Contests, took place at the end of March, but, so far, I have not heard the result. We welcome BRS1348 as a new member since my last Notes were written. He hopes soon to have his full ticket.

The only stations which have reported this month are EI9D and EI5F.

Kenya, Uganda and Tanganyika.

By VQ4CRO *via* SU1EC and G2GQ.

VQ4CRL is working on 28 mc. and will be pleased to have reports on his signals. He has now obtained W.A.C. and W.B.E., but awaits final cards. VQ4CRH has been awarded the Davidson Trophy for the 1933 East African Contest held last November. (Mr. Lane is now in England and was a welcome visitor to H.Q. on April 27.—J. C.) VQ4CRL will act as E.L.S. until 4CRH returns.

via G6NJ.

Late Report.—Rain has fallen at last, and is very welcome after the long spell of dry weather we have experienced. Conditions on 14 mc. have been excellent lately for QSO's with G and Europe generally, but QRN on 7 mc. has been very bad, consequently this band has been used mainly for local daylight QSO's.

Several of our members have either gone on leave, or are going shortly, among them being the following: VQ4CRH, VQ4CRM, VQ4CRR, VQ4KTA and BERS191, so VQ4 should be well represented at the next B.E.R.U. Convention. VQ4CRL is back again on the air. The following are active: VQ4CRE, 4LMA, 4KTA, 4CRL and 4CRO.

Malaya.

By VS3AC.

The Medan Broadcaster, which has troubled us on 7 mc., has now been removed, but other stations of a similar type are still "cluttering up" our precious 300 kc. One of the worst culprits is a station operated by the Penang Radio Society, but as a result of correspondence with B.E.R.U. Headquarters it is hoped that this so-called "amateur" station will go the way of Medan.

VS2AF has been doing excellent work with low power, and although a newcomer to *our* field is an "old-timer," for during the war he captured a 2 kw. transmitter from the Turks. VS1AB (operated by Mr. Earle, of Singapore) will soon be heard again.

The high licence fees demanded from Malaya amateurs undoubtedly prevents rapid progress. £3 10s. a year for 30 watts is hardly good enough these days. VS3AC will be pleased to have details of the fees paid in other parts of the Empire.

Malta.

By BERS201.

Due to fleet exercises only one transmitter was in operation here during the early part of April. BERS201 and 209 kept a log of conditions during the month, but noticed that DX was scarce except for short spells on 7 and 14 mc. The 3.5 mc. band seems to be the most reliable and is surprisingly free from static. (Some G-VP3 QSO's on this band are long overdue.—Ed.)

New Zealand.

By ZL4AO, via G5YH.

European signals are now making an appearance on 14 mc. between 21.30 and 23.00 G.M.T., but no ZL contacts at these times have yet reported. Good contacts with most U.S.A. districts can be had on this band between 01.00 and 06.00 G.M.T. The usual early winter conditions on 7 mc. are now in evidence, peak contact hours for Europe being 05.30 and 19.00 G.M.T.

Keen competition during the A.R.R.L. International Contest last month resulted in several of the leading ZL's participating, scoring over ten thousand points.

Northern India.

By VU2BM.

VU2BM is now in the hills and expects to effect some good DX, as the QRA is 7,600 ft. above sea level. A weekly schedule with VU2NH is being maintained. VU2BM was recently visited by G5YN and BERS173, and hopes to meet all local members during his stay in the Murree Hills; his address is c/o W.T. Station, Murree. (Are you the only VU active, OM. ?—Ed.)

Northern and Southern Rhodesia

By ZE1JE.

During the past few months there has been a drastic curtailment of activities in Rhodesia owing to the unusual presence of exceptionally severe static, which was, no doubt, due to the very erratic and prolonged rainy season which was experienced this year. However, there are indications now (April) that conditions are returning to normal as Eastern DX signals are beginning to come in on the 7 mc. band between 1600 and 2200 G.M.T., but, so far, with the exception of J and VK, all attempts to connect have proved futile. Northern DX signals have not been heard for some weeks.

Foreign commercial stations operating in the 7 mc. band are causing very bad QRM, the latest addition is CDKA, who calls CQ and RFON for hours on end.

ZE1JH (I. de B. C. Fynn, Bulawayo) reports activities chiefly confined to daily schedules with ZE1JN, Salisbury, on meteorological matters, with occasional week-end phone QSO's with amateurs in the Union of South Africa. During the recent R.A.F. visit, he made some very interesting contacts with GEZHR (the radio-equipped Fairey bomber), while the flight was operating in Rhodesia. ZE1JH leaves for England on long leave by the *Winchester Castle*, arriving in London on May 27.

G. E. King (ZE1JF) is still inactive pending arrival from England of the necessary components to QRO.

It is anticipated that as soon as conditions return to normal, general activities will be resumed.

Around Europe.

Switzerland.

By HB9T.

The annual Convention of the U.S.K.A. was held on April 8, in Vienna, when the following officers were elected or re-elected :—

President : Mr. A. Anderegg (HB9S).
Vice-President : Mr. Jeanneret.
Hon. Treasurer : Mr. Villars.
Hon. Secretary : Mr. Baumgartner.
Hon. Editor : Mr. Petermann.
Communication Manager : Mr. R. Stuber (HB9T).
QSL Manager : Mr. W. Frey (HB9AC).

The Convention proved a great success, 80 members participating. It was decided to continue the monthly relay tests on the 3.5 mc. band, whilst a series of short-distance propagation tests will be organised on 1.7, 3.5, 7 and 14 mc. The "Coupe des Alpes" contest will be held for the second time in September next. The weekly U.S.K.A. broadcast will not be given during the summer months, but will restart in October.

We should like to point out that the U.S.K.A. is not able to forward QSL cards and other correspondence to unlicensed Swiss stations. As these stations are working against the law, and the rules of our Society, everything is done to discover their whereabouts. Every serious amateur applying for a licence in Switzerland obtains it, therefore there is no reason for the existence of such pirates. The last call sign issued by the Post Office is HB9AW. After HB9AZ, the series HB9BA-HB9BZ will be issued. All other two-letter or three-letter calls, such as HB9DD, HB9LT, HB9RR, HB9MA, etc., belong to pirates. Cards for unlicensed Swiss stations will not be returned to the senders, but will be retained at headquarters of the U.S.K.A.

(*Continued on page* 381.)

Technical Articles are Wanted

NOTES and NEWS from the BRITISH ISLES

DISTRICT REPRESENTATIVES.

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

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

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

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

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

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

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

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

DISTRICT 9 (East Anglia).
(Norfolk and Suffolk.)
MR. H. W. SADLER (G2XS), Redways, Wootton Road, Gaywood, King's Lynn, Norfolk.

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

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

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

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

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

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

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

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

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

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

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

DISTRICT 1 (North-Western).

THE first item to draw attention to is the Conventionette, which will take place in Manchester on June 3, the full programme for which appears in the Calendar. Please let G2OI have a card stating that you will be present. The following week-end N.F.D. takes place; the C.R.'s appeal for help, especially from BRS men. Those intending to assist at the "A" station should be at Haslams Farm at 12 o'clock. Members who propose staying the night should advise G2OI as soon as possible, so that he can make arrangements. Remember our success depends upon the whole district; don't wait to be asked, please come.

Mr. Lucas (G2OI) states that an attendance of 23 was recorded at the last Manchester meeting, when G5YD gave a very interesting talk on the value of H.F. amplification in short-wave receivers; he laid particular stress on the screening arrangements when using H.F. on the higher frequencies, and described suitable arrangements in detail; a discussion followed.

A site on Belmont, three miles from Bolton, has been picked for the location for our "A" station in the National Field Day Contest. Full details are available from G2OI.

The following stations report active:—G2BK, 2DF, 2DH, 2HL, 2HM, 2OI, 2RA, 2WQ, 5CH, 5TC, 5MB, 5OZ, 5VN, 5WR, 5XF, 5XJ, 5XM, 5YD, 5ZT, 6AX, 6GX, 6GV, 6QA, 6ZS, 6ZU, 2ACP, 2AOB, 2AZT, 2BGK, BRS770, BRS1114, BRS1212, BRS1270, BRS1360, BRS1389 (?)

A talk on meters and their uses will be given at the June meeting by Mr. Fairhurst, of Ferranti, Ltd. See District Calendar.

Mr. Clacy (G6CX) reports that about twenty members attended the last meeting in Liverpool, and it is very gratifying to find that interest is so well maintained. The Committee appointed to take in hand the N.F.D. arrangements reported the result of their visit to the proposed site, and we have been fortunate in obtaining permission to have the use of a field situate on high ground on the outskirts of the town. A schedule of operating duties is in course of preparation and the C.R. will be glad to hear from all those members who have not yet reported whether they will be able to attend, and if so what duties can be assigned to them.

The meeting concluded with a 56 mc. discussion, but the majority of members interested in this field are restricted on account of B.C.L. interference. Most of the local work so far attempted has been with self-excited oscillator transmitters, and for this reason experiments have been confined to non-B.B.C. hours. Reports from members dealing with the prevention of B.C.L. interference with this type of 56 mc. transmitter will be greatly appreciated.

The C.R. will be glad if all members active will report every month, specifying the principal band in use. These reports will then be classified and published for the benefit of members in other districts wishing to arrange schedules on any particular band.

The final arrangements in connection with N.F.D. will be discussed and operating duties assigned at the May meeting, and all members are asked to make a special effort to attend.

DISTRICT 2 (North-Eastern).

A meeting of the Sheffield group will be held at G5HK on May 18 at 7.30 p.m. From Bradford BRS1298 reports the reception of W1BBM, W1DDM, YU7UU and AC2RT on 28 mc. BRS1333, "Glenholme," Victoria Gardens, Horsforth, Leeds, wishes to compile a crystal register. All members are invited to send him details of their crystal frequencies. G6KU reports that interest in 56 mc. work is again increasing in the Bradford area, G6BX, 5YV, 6PL and himself all being active. G5SZ has changed QRA, but will soon be heard again. Inter-station visits will be arranged during the summer.

At the first April meeting, held in Middlesbrough, G6CV reports that G2FO gave a talk on series and parallel resistance problems. This was followed by a discussion on portable transmitters and receivers opened by G2HZ. On April 20 the lecturer was G5RC, who explained the theory of valve oscillators.

Interest in 56 mc. work is also on the increase in this area. The Transceiver described in the March issue of the BULLETIN has been built and excellent results obtained by G2HZ and 5XT, who kept in touch with G6CV from a moving car.

The usual activity is reported by G5QY in the Newcastle area. N.F.D. plans are being advanced, as the "A" Station will operate in that neighbourhood. G6TR is welcomed.

DISTRICT 3 (West Midlands).

A "phone bug" seems to have got astray in the district recently, for G5ML, 5BJ, 6DL and 5VM all appear before the "mike" at frequent intervals, whilst G6XQ continues his telephone transmissions. G5BJ reports having worked VE5 and several W6 and 7 stations during the afternoon. D4BPU will be spending his summer holidays with G6XJ.

The arrangements for N.F.D. are well in hand and all who propose to assist are asked to send in their name and address to the D.R., so that they can be advised of the final details.

Active stations are: G5BJ, 5ML, 5NI, 6KI, 6NJ, 6XQ.

DISTRICT 4 (East Midlands).

G2SD reports that the members in Derbyshire are 100 per cent. active, 56 mc. is claiming the attention of several, including G2SD and 5HT, who are preparing for extensive experiments on this band, 2BOW now awaits his G call. BRS1320 is applying for an A.A. licence.

DISTRICT CALENDAR
May/June, 1934.

May 16.—District 8. Woodford Tea Rooms, Watford, at 7 p.m.

May 18.—District 2 (Sheffield Group), at G5HK, 55, Mona Road, Crookes, Sheffield, at 7.30 p.m.

May 22.—District 14 (East London Group), at G6UT, 28, Douglas Road, Chingford, at 7 p.m.

May 23.—District 15. At B.R.S.909, 28, Ranelagh Gardens, Hammersmith, W.6.

May 27.—District 7. Visit to the Isle of Wight. Meet at Clarence Pier, Southsea, 10.30 a.m.

***May 27.**—District 16. Conventionette at The Road House, Larkfield, Kent. Tickets 4s., from G2MI. Assemble 12 noon. (The Larkfield Road House is 4 miles the London side of Maidstone on the Arterial Road.)

May 29.—District 12. The Ark Café, Temple Fortune, at 7.30 p.m.

May 30.—District 8. Woodford Tea Rooms, Watford, at 7 p.m.

***June 3.**—District 1. Conventionette at The Grand Hotel, Aytoun Street, off Portland Street, Manchester. Tickets 5s., from G2OI. Assemble 12 noon; lunch 1.15 p.m.; meeting 3.15 p.m.; tea 5 p.m.

June 6.—District 1 (Manchester Section). At Brookes Café, 1, Hilton Street, Manchester, at 7 p.m. Talk, "Meters and Their Uses," by J. Fairhurst, Esq., of Messrs. Ferranti, Ltd.

June 7.—District 5 (Bristol Section). At Full Moon Hotel, Bristol, at 7.30 p.m.

June 9 and 10.—National Field Days.

***June 17.**—District 14. Conventionette, at Palace Hotel, Southend-on-Sea. (Full details in the next Calendar.)

* The Secretary will represent Headquarters at these meetings.

G5VH reports that the Leicester Amateur Radio Society held their first annual dinner on April 10 at the Turkey Café. Over 60 members and visitors were present, including Mr. E. D. Ostermeyer, Mr. J. Clarricoats, Dr. W. H. Marston (District Commander R.N.W.A.R.), G2ZW, 2VQ, 5OW, 2SD and 5HT. During the course of the evening the gathering was addressed by Mr. Clarricoats and Dr. Marston. Films of G5ML and the Rugby Station were also shown.

Technical Articles are Wanted

G5YF states that the members in his county are active but have no outstanding events to report. A 1.7 mc. field day is being held in the near future.

G2IO reports that the last monthly meeting held at the Reform Club, Notts, was only attended by six members. The members in Notts appear to prefer to stay at home and work DX rather than give their support to these meetings. Now, you "Notting-Hams," pull your weight and give your county meetings your support. If you appreciate the efforts of your C.R. you will attend the meetings he goes to the trouble of arranging.

In the last notes members were asked if they were willing to support a 56 mc. field day if one was arranged, but as no replies have been received it is assumed that no one is interested in an event of this kind.

Details of the locations of the stations taking part in N.F.D. will be found elsewhere in this issue.

DISTRICT 5 (Western).

An excellent attendance was recorded at the last Bristol Section monthly meeting, when N.F.D. arrangements were completed. It was decided that Station B shall be situated at Dundry, and use the call-sign G6RB. The personnel will be G6RB, 5JU, 5UH, 5XV, 6JG, 6TO, 6VK.

There is great 56 mc. activity in Bristol, and G2FC, 5JU, 5XV, 6JG are working regularly on Sunday mornings from 12.00-12.30 B.S.T.

At the Gloucester meetings held in April, arrangements for Station A were settled. This will be situated at Painswick, as last year, and the call-sign G2HX will be used. The personnel being G2HX, 2BL, 2CJ, 2OP, 5HC, 5JM, 6LM. The fortnightly meetings held by this section will be discontinued from now until September, meanwhile members will meet at various local QRA's. The Wiltshire members are mostly active. The letter budget continues to be well supported with contributions well up to the usual high standard.

The Oxfordshire C.R. reports all members active. This section have formed a short-wave Club to foster local interest in amateur radio. Regular meetings are to be held and morse lessons given by senior members.

The District as a whole is very active, particularly on 56 mc. work; to encourage this interest, field days are being arranged. The Conventionette was held on May 6, at Bristol, full report of which will be given next month.

DISTRICT 6 (South-Western).

The chief item of interest to report this month concerns the Annual Conventionette. This was held at Plymouth, in order to give the Cornwall and Plymouth members a better chance of attending. Prior to the event, about forty reply-paid post-cards were sent out asking for information regarding attendance; of these about a dozen were *not* returned, although the cards had been stamped! However, having regard to the extent of the district, there was a very satisfactory attendance, including members from Devon, Cornwall, and Somerset. The meeting took place at Williams' Café, Plymouth, where luncheon and tea were served. After luncheon, a business meeting was held, at which many points were discussed. The D.R. first of all reviewed the work of the past year, and considered it generally satisfactory, especially with regard to the successful way the Budget has been maintained. It was felt, however, that as there are undoubtedly many radio enthusiasts in the district who would make good members, who probably only need to have the advantages of membership brought to their notice, everyone should keep a look-out for new blood.

National Field Day was discussed at some length, and a line of policy agreed upon. Other districts please look out!! Among other things, it was decided to erect the 7 and 14 mc. station at Haldon, and the 1.7 and 3.5 mc. station on the moors near Plymouth.

A re-arrangement of the Budget was also made; owing to the fact that the present method prevents any new members from contributing, and also because it takes roughly two months to pass round, it was agreed to divide the Budget into three parts. In future, therefore, a separate Budget will be circulated by each of the three C.R.'s. These should get round in about a month, and they will then be forwarded to the D.R., who will insert carbon copies of his contribution in each. He will also make comments in individual Budgets, regarding items discussed in the other Budgets, and in this way each county will be kept up to date with what is going on elsewhere. When the Budgets have been round their own counties again for comments, they will be circulated among the other members.

It was also agreed to endeavour to fix up regular meetings in some of the larger centres. It is realised, of course, that these will only be small gatherings of a few members, and the D.R. suggests that a fair arrangement could be made by changing the QRA for each meeting, thus adding interest to the visits. Those present at the meeting expressed the opinion that a member of Council should have been present in an official capacity. It was felt that in a district where a small band of enthusiasts were doing their best to keep the Society alive, there was more need for such attendance than at some of the bigger Conventionettes, where representation is considered almost a matter of routine.

[It is a rule of Council that Headquarters can only be represented at Conventionettes when an attendance of at least 25 is guaranteed.—Ed.]

DISTRICT 7 (Southern).

The March meeting, held at G6GS (Guildford) attracted the usual large attendance. Conventionette and N.F.D. matters were discussed, and after tea a demonstration of 56 mc. tranceivers proved most interesting.

Will those members who propose attending the Conventionette at Weybridge please inform their C.R. not later than the end of May? *This is most important*, as we have to give the caterers some idea of the probable attendance.

Arrangements for N.F.D. are now complete. Station A will operate at Farnham Park, on a site which is just north of the Avenue football pitch. This is reached from the main Guildford-Farnham Road (East Street) by turning off at Messrs. Arnold and Comber's showrooms.

The B station will operate at Mr. Jones' Farm, High Street, Walton-on-the-Hill, near Tadworth, Surrey. The station will be erected in the field immediately behind the farm, and on the same site as that used last year.

In view of the fact that our Conventionette and N.F.D. both take place in June, the ordinary monthly meeting for that month will not be held, but a social meeting to visit the Isle of Wight members will take place on Sunday, May 27. Meet at Clarence Pier, Southsea, at 10.30 B.S.T. Members possessing portable 56 mc. gear are asked to bring it along, as it is hoped to carry out tests between the I.O.W. and the mainland.

DISTRICT 8 (Home Counties).

This district will hold a conventionette in conjunction with District 12 at St. Albans on July 8. The D.R. is pleased to announce that he has received permission from the Engineer-in-Chief of the Post Office for those attending this meeting to be conducted over the Post Office Radio Station at Smallford. It is hoped that members will appreciate fully this unique privilege and give to the event the success it deserves. Full details will appear in the June issue.

The actual sites of both N.F.D. transmitters are published elsewhere, and the D.R. urges all members who possibly can to lend a hand with one or other of the stations.

G2XV has recently rebuilt his gear with a view to working DX telephony. He is to be congratulated on achieving his object, for during March he had a solid 1½ hours ragchew with U.S.A.

The letter budget is in a very healthy state, thanks to the kind attentions of G2HJ. In the current number it is proposed to hold a "district QSO" on 1.7 mc. at week-ends, a scheme which has the D.R.'s good wishes.

DISTRICT 9 (East Anglia)

The first of what we hope will be a series of meetings was held on Easter Sunday at the QRA of G5UF, of Cromer.

After lunch a visit was made to the Power Station, and afterwards to the Coastguard Station, where we were enabled to hear telephony being used to the lightships along the coast.

Tea was followed by an informal discussion, during which it was decided to try and get the active stations of the district on to 1.7 mc. as the skip on 3.5 mc. causes this latter band to be of very little use for local work.

Altogether a very interesting day was spent and thanks are due to the new C.R. for making many of the arrangements.

Those present included G2MN, 2XS, 2ZJ, 5JO, Mrs. 5JO, 5MI, 6MN, 6BS, 6ZJ, 2BRQ, BRS1291, 1401, and several friends.

We are very glad to welcome two new members in Norwich and BRS1401 of Lynn.

The D.R. hopes to establish a station near King's Lynn for N.F.D. and will be very glad to hear from any who can give any assistance in the matter; please write him at once if you can help.

DISTRICT 10 (South Wales and Monmouth).

It is with pleasure that we place on record the excellent support given to the event of the month, our Conventionette, held at the Queen's Hotel, Newport, on April 8. Twenty-nine were present, including our worthy Secretary G6CL, representing H.Q., Col. C. L. Isaac, chairman Swansea Short Wave Club, and W. W. G. Pond, chairman Blackwood and District Radio Society. We also had the pleasure of extending a welcome to our late D.R., G6FO, and two other members from Bristol.

An excellent lunch was served, and following some very appropriate and interesting remarks by Col. Isaac in proposing the toast of the R.S.G.B., supported by G6FO, our Secretary delivered a most inspiring address, which was heartily appreciated by all.

The time allotted for the visit to the Repeater Station proved far too short. From beginning to end members were keenly interested and the success of the arrangement was established by the fact that a number of those present expressed the wish for a further opportunity of spending more time at the Station. Our appreciation is extended to the authorities and officials.

Tea was served at 5 p.m. and followed by a most interesting discussion on 5 metre work, opened up by G6YJ and 2BPG.

These notes cannot be concluded without your D.R. expressing his sincere appreciation to G2XX for his untiring assistance which contributed so largely towards the success of the event.

The monthly meeting was held at the Queen's Hotel, Newport, on April 18, and although there appears to be little support for a local Letter Budget, it is very pleasing to note that the majority of the members have joined R.E.S. It is suggested that those members who have not applied for membership should give the question further consideration; your D.R. would like to record 100 per cent. support from this District.

National Field Day arrangements have now been completed.

DISTRICT 11 (North Wales).

There is little to report this month. G2II has worked F and OZ with an input of only .6 of a watt.

The locations of our stations for N.F.D. are as follows:—*"A" station:* On top of Prestatyn mountain, under the call G6IW; *"B" station:* 8 miles south of Colwyn Bay, under the call G2II.

DISTRICT 12 (London North).

Cathode Ray Oscillographs and their application to amateur radio problems formed the basis of an instructive and interesting technical discussion at the April District Meeting, attended by 26 members.

In opening the discussion, Mr. A. T. Mathews (G5AM) gave a résumé of the development of the cathode ray tube, and proceeded to show how useful they can become when used for measuring the percentage modulation in telephony transmitters. Details were also given of their application in tracing sine wave curves and for obtaining pictorial B-H curves.

In the subsequent discussion which followed, the "brains" of the District augmented by Mr. F. Charman (G6CJ), proceeded to give additional information on the subject. Mr. D. N. Corfield (G5CD) explained at length the results he had obtained when measuring modulation percentages with their aid. Mr. H. Clarke (G6OT) contributed information relating to cathode ray television. Mr. Charman (G6CJ), straight from a visit to the Radio Research Board, explained the methods in

use there for measuring layer echoes, whilst Dr. Bloomfield (G5MG) described their use for direction finding.

During the business meeting which followed, final plans were made for N.F.D. The stations will be operated under the calls G5CD and G6WU, the " A " Station being on last year's site at Welwyn Heath, and the " B " Station at Dugdale Hill Farm, Potters Bar.

Thanks to the generosity of G2IM, the District now possesses its own M.L. converter, which has been rewound for use with an L.T. battery.

In order to cover the cost of this work and other incidental expenses likely to be incurred during N.F.D., monthly contributions have been made to a central fund by all attending the meetings. The fund was further augmented at the April meeting as the result of a sale of good apparatus, 25 per cent. of the takings being handed over by the vendors.

The new style District Letter Budget had not been returned to the D.R. at the end of April, due presumably to long delays at odd points along the rota list. Unless budgets are forwarded promptly, and by promptly we mean within 24 hours of receipt, their value is lost. Attention to this point is requested by all contributors.

The next district meeting provisionally fixed for May 19 has been put forward to Tuesday, May 29, it having been established that a poor attendance would be recorded if held during Whitsun. It is anticipated that Mr. Charman, R.E.S. Aerial Group Manager, will give a short talk on matched impedance aerial systems at this meeting, which will be held at The Ark Café, Temple Fortune.

Mr. E. D. Ostermeyer (G5AR) was a welcome visitor at the April meeting.

DISTRICT 13 (London South).

By Uncle Tom.

The responsibility for writing these notes falls on me. The D.R., on one of his rare visits to my shack, asked me what I would do to a district that couldn't muster up one single report from goodness-knows-how-many active members. My reply gave him an unfortunate shock, which caused him to burst a blood-vessel and he is still forbidden by the doctor to see anyone except his own O.W.

South London District is dead. The one bright spot is that *I* don't live in the pestilential district, although I'm too near to be pleasant.

Thank you.

DISTRICT 14 (Eastern).

At the April meetings 17 members were present at G6UT and 28 at G2LZ, the attendance at the latter constituted a record for the district. Just prior to the Wickford meeting, Mr. Mayer received and recorded a message from Mr. Shrimpton (ZL4AO), which he " played back " to the assembled company. The message read : " Greetings from New Zealand amateurs on the occasion of Anzac Day, 1934, to No. 14 District of the Society meeting at G2LZ, 73 Signed ZL4AO." A suitable reply was sent the following day.

In addition to the above, G2LZ " played " records of local amateurs in QSO, whilst later in the evening a record was made to which all present contributed their own announcements. This was heard prior to their departure.

Mr. Collin (G2DQ) was congratulated by all present on his success in the recent 3.5 mc. Contest. He made a suitable response.

The District Conventionette will be held at the Palace Hotel, on June 17, and not on July 8, as tentatively suggested at the Wickford meeting, it having been discovered that District 8 had already arranged their Conventionette to take place on the latter date.

Arrangements for May meetings will be found in the District Calendar.

DISTRICT 15 (London West, and Middlesex).

We had the pleasure of the company of VU2BH and D4BMJ at the April meeting. The personnel of the National Field Day stations was fixed at this meeting, and some of the details discussed. It was decided to reorganize the letter budget to which twelve members have promised to contribute. In its new form the budget will start from G6YK and travel round to each member contributing, who will write his letter and attach it to the rest and pass it on within two days. The letters will remain in the budget for two circuits and then the editor (G6YK) will remove them. If they contain nothing of interest he will remove them when the budget reaches him on the first round. Should any member wish to contribute, will he please notify G6YK ?

The date and place of the next meeting will be found under the District Calendar.

DISTRICT 16 (South-Eastern).

The first meeting of the Tunbridge Wells section proved a great success, an attendance of 12 being recorded. G2JH returned for the occasion, whilst Mr. Morley (G2PQ) (of generator fame) came along with three others, including I1UD. 2BAW demonstrated his transceiver, and several others displayed 56 mc. gear. G2IC and 2ASC arrived just in time to bid the last few visitors good-night ! A proposal was made to form a Tunbridge Wells Radio Club, and as a similar club has already been started by G5JZ at Heathfield, it is hoped that some interesting 56 mc. work can be carried out between the two centres.

The North Kent group held a local contest on April 22, when the following took part : G2GB, 2HG, 2NK, 2QR, 5LB, 5OJ and 6WY. The next meeting will be held at G2GB, 16, St. Mary's Avenue, Shortlands, on Saturday, May 19.

There is the usual activity at Folkestone, where G6XB has started a morse class. Congratulations are extended to 2AXY, who is now G2KJ. This member has promised to take Ashford in hand, the last Kent group which remains to be organised. A welcome to the county is extended to Mr. C. C. Newman (ex ZC6CN), who has started up at Broadstairs, under the call G6NC ; he is co-operating with G6AI. All members join in wishing 2AVC a speedy recovery from his recent serious accident.

The " A " Station during N.F.D. will be operated by the Medway group, but it is a pity that the district as a whole cannot muster more enthusiasm for this important event. In this area G5XB has made some remarkable low-power contacts with North America, several on fone. G6RQ is another QRP station with some excellent results to his credit. G2MI is busy with Conventionette and N.F.D. arrangements ; the demand for tickets for

the former is very gratifying, but there are plenty more still available! Please note that all unsold tickets and remittances should be returned to the D.R. not later than May 18.

As usual, there is no report from Sussex.

DISTRICT 17 (Mid-East).

There were no notes in the last issue on account of reports reaching me after March 25.

Success is being attained in the careful formation of local centres. Grimsby, Lincoln, and Boston now having fairly regular meetings.

Six members met at Lincoln on March 25, and eight on April 22, when the final details of the "A" station for N.F.D. were arranged. This will be directed by G2LR at Cranwell Aerodrome, with G5XL and G5FO in support. Lincoln meetings, attended by the D.R., are held at the George Hotel, Newland, on each Sunday immediately following the publication of the BULLETIN, commencing about 1930 B.S.T.

The "B" station is again to be operated at Stenigot Hill Top, an elevation of some 480 ft. above sea level. This will be directed by the D.R. and C.R's. under the call G5GS.

G2LR writes an interesting account of aerial testing for comparative radiation with the use of a valve voltmeter to plot the field strength. G5XL is one of the few members making television tests.

From the Grimsby area we are glad to note that 2BIH is transmitting under an R.N.W.A.R. call sign. The percentage activity is very high, but the C.R.—G5GS—is not properly at work. Usual meetings continue.

We have great pleasure in welcoming the first call sign in Boston—G6LH (late 2BCM)—who is already on the air on two bands. A meeting of five members was held there on April 19. 2BDA is the new call sign of ex BRS1246.

The following suggestions are offered to those who propose attending N.F.D.:

(1) Bring enough food to last the duration of the stay.
(2) Bring your own crockery, and bedding if you wish to camp out.
(3) Bring your complete receiver if you wish.

The general activity is at present about 60 per cent. Those who wish to take Morse practice should listen for G6RN, of Grimsby, whose schedules appear in other pages of the BULLETIN.

DISTRICT 18 (East Yorkshire).

Activity is shown in connection with N.F.D. since G6UJ and G6OO viewed the proposed site for station "A." A possible rehearsal (on a small scale) will be staged at Whitsuntide.

G6OF has left the District, and unfortunately, possibly permanently, to take up residence in London.

A crystal frequency register is being prepared, with the assistance of the two C.R.'s.

Plans for Field Days, using 56 mc. gear (keeping up reliable communication on 2 mc.) are afoot, using portable callsigns.

The following stations report active:—G6AW, 2TK, 5VF, 5CU, 6UJ, 5VO, 6OY, 6OS, 2KM, 2KO, 6OO, 2QO, 2AMM, 2AAU, 2APU, 2AUN, 2BPY, and all BRS stations.

SCOTLAND

The last regular winter season monthly meeting of "A" District was held on April 25, when there was a very satisfactory attendance which included a large number of new members.

The Scout Exhibition, which took place recently, was responsible for a number of applications for membership, thanks to the good work of G6ZX and 2BLN.

Mr. Campbell (BRS1391), of Glasgow, has been granted a full permit and now awaits his call-sign. The G.P.O. have also granted a full licence to Mr. Mackay (2BPI), of Edinburgh. The call is not yet to hand.

Mr. Millar (G2TM), formerly of "C" District, has now removed to Edinburgh, where his address is: T. W. M. Millar, 103, Dalkeith Road.

A Scottish station has been placed second in the recent 1.7 mc. Contest. The station is G6FN, owned by Mr. French, of Edinburgh.

It is understood that Mr. Marshall (G2MA) has secured the first place among the amateurs of Great Britain in the A.R.R.L. Contest, which took place in March. (Heartiest congratulations, if information is correct.—ED.)

Regular monthly meetings are now being held in "C" District under the guidance of Mr. Allan (G5NW). The notice of the first meeting was short, but there was a good attendance, the main topic being the National Field Day. Arrangements for establishing two stations were made, and the details will be found elsewhere in this issue.

The 56 mc. transmissions in "A" District will be resumed on Sunday, May 6, from G6YG and G6ZX, between 11.00 and 12.00 B.S.T., and possibly from other stations. These transmissions are mainly for the benefit of B.R.S. and "A.A." members, and are for the purpose of facilitating the development of receivers. All reports will, however, be welcomed.

The call in last month's issue for film relative to the N.F.D. operations will at least be met by "A" District, where Mr. Campbell has agreed to make the necessary shots.

Of late, quite a few changes of address have taken place within Scotland and remained unknown at Scottish Headquarters. Might we request anyone who makes such a change to be so good as to advise Scottish Headquarters as well as London, and thereby avert considerable confusion?

Owing to the scattered nature of "C" District, Mr. Allan strongly advocates local contacts among the members. For the benefit of such as cannot attend the meetings, he proposes to transmit either from his own station, G5NW, or from G5IM, on 80 metres, any items of district organisation which ought to be generally known. These transmissions will be made each Saturday at midnight (24.00 G.M.T.) and Sunday at noon (12.00 G.M.T.). Both morse and telephony will be used. The reading of these items transmitted by Mr. Allan should make excellent morse practice for those in the district who desire to improve their speed.

NORTHERN IRELAND.

The advent of "B.S.T." serves to bring to mind the fact that National Field Day is near at hand. The transmitter for Station "A" has been built

and will be tested in the near future. The "B" Station transmitter is also in course of erection, and it is hoped to commence testing by the time these notes appear in print. Section meetings of the two Stations' personnel will be held in ample time to discuss further arrangements.

GI6YW is on the air again and reports that Japanese stations are being heard, while South America, West Indies and VR2VW are also coming in well in the evenings. GI2SP has been very active recently, having completely rebuilt his station, besides erecting a V.F. Hertz; using 5 watts, he has collected quite a bag of contacts, including VE1BV, CT2AP, and CT2BE.

We welcome two new members this month—Mr. W. R. Kerr (BRS1375) and L/Cpl. H. Swift (BRS1414). The latter is willing to assist any member by listening and reporting on 3.5, 7 and 14 mc.

Before purchasing crystals, members should communicate with the D.R., so that a frequency can be chosen which will not clash with those at present in use locally.

We regret to record the passing of Mr. J. A. McKee (GI6MK), after a very brief illness. Your sympathy is tendered to his relatives in their bereavement.

R.N.W.A.R. work in this area is being well supported and many stations are on the air. GI6YW is the Honorary District Commander.

AROUND EUROPE—(*Continued from page* 374).

Belgium

By ON4AU.

Mr. Mahieu, ON4AU, informs us that considerable 28 mc. activity is taking place in Belgium. During April regular schedules were kept with ON4JB (30 miles away) at 08.00, 12.00, 18.00 and 21.45 G.M.T. On the 10th they heard EAIBC, but were unable to establish contact. Mr. Mahieu is using c.c. on this band, doubling down from 85.04 metres. Unfortunately the super-regeneration receiver in use at ON4JB was unable to effectively cope with c.c. signals, but telephony was received satisfactorily.

The following Belgian stations are known to be active on this band :—

ON4JB c.c. 120 watts. ON4NC 100 watts.
ON4AU c.c. 250 watts. ON4JN 25 watts.

ON4AU is on schedule with 4JB at 09.30 B.S.T. every Sunday and again at 18.00 B.S.T. on Wednesdays. They hope to establish regular contacts with British stations.

During June QN4AA, 4AU and 4BJ will commence tests with portable gear which will be used during Strathosphere experiments to be undertaken later in the year by M. Picard's assistant, M. Cosyns, well known a few years ago under the call B9. During the actual ascent ON4AA and 4BJ will follow the balloon by motor car, whilst ON4AU will use his Puss Moth Gypsy III aeroplane.

The 7 mc. band is to be used by all stations taking part in these experiments.

Excellent signals have been received from the Belgian Congo station ON4CSL, which is being operated by a doctor attached to the American Presbyterian Mission located at Lubondai. The input used is only 20 watts.

Finland

By OH2NE *via* G2II.

The annual general meeting of the S.R.A.L. was held on February 18 at Helsinki, when about 60 members from different districts attended. A report concerning internal and external matters was presented by the Secretary, OH2ND. The Treasurer informed the meeting that the Society's financial position was satisfactory, and therefore it was agreed to continue the publication of our official journal "Radio OH." The following officers were elected for the year :—K. S. Sainio (OH2NM), President; K. A. Jaainaa (OH2NC), Vice-President; E. Kairenius (OH2ND), Secretary; also Holger Jolander (OH2NX), Lars Nyberg (OH2OD), R. Jaykka (OH1NS), and M. Vihuri (OH2OH).

Another Pirate.

G5PL advises us that his call is being used by a pirate station giving "Durham" as his address. Mr. Philpot has been licensed for many years and resents this unsporting action. He will be glad to have information which will lead to the discovery of the offender.

EDITORIAL—(*Continued from page* 349).

the ether, an unenviable task for amateurs at the best of times, but when our reputation is at stake we believe that unusual methods are necessary.

The Council of the Society have at all times done everything possible to throw discredit upon persons who break the licensing laws of the country; their efforts will be increased until such time as the air is freed from pirate calls.

THE PENTODE AND THE PORTABLE—

(*Continued from page* 357).

not taken in this respect, the voltage applied when the key is first depressed will be excessively high, and key clicks will result. The value of the S.G. voltage is not very critical, but an optimum value exists. As the voltage is increased from zero, at constant anode voltage, the H.F. output at first rises rapidly; but after a certain point is reached, a further increase results in a rapid rise in screen-grid current, with but a small increase in H.F. output.

The transmitter should always be operated in conjunction with a monitor; if adjustments are made so that maximum output is obtained, it will often be found that the note, or the keying, are bad, but that slight de-tuning of the tank circuit will put matters right.

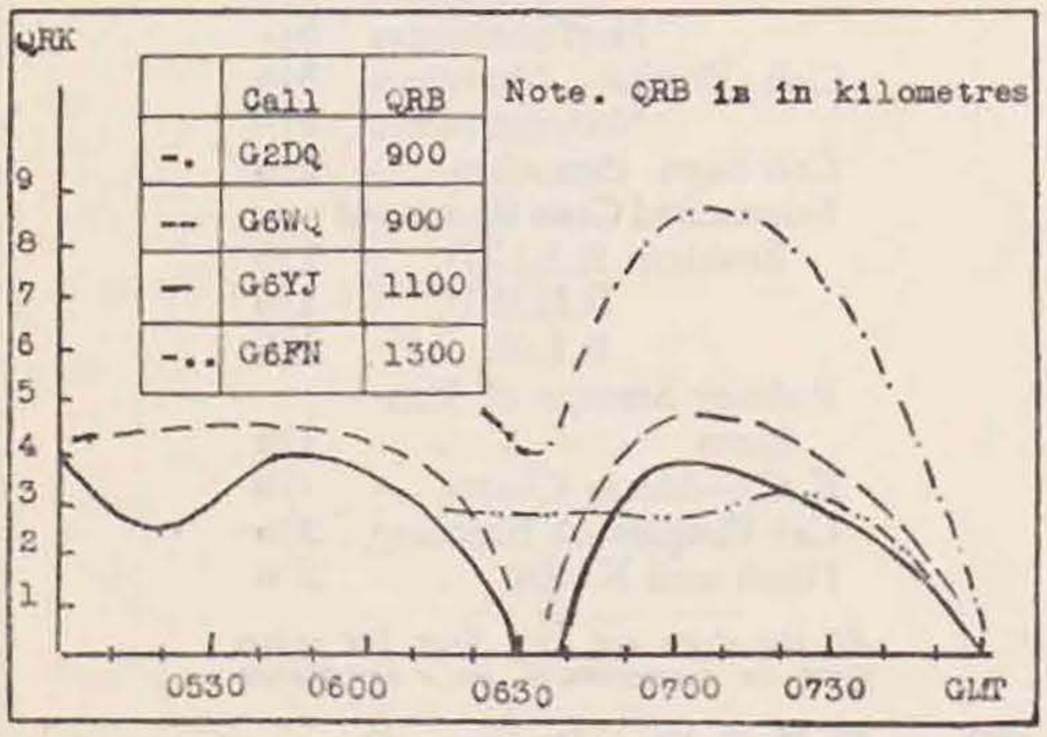
Very satisfactory results have also been obtained with telephony, but as the experiments are not yet completed, their description is deferred.

Within a few days of making a decision to try experiments on these lines, a complete transmitter had been built, and used on the air both in England and Holland; it has since been in continuous use for some six months without alteration. This set is used for all "break-in" work from G6FY, and represents the whole of the transmitting equipment (five-metre gear excepted) at PA0FY. Operation in the 1.7, 3.5 and 7 mcs. bands is secured by the use of plug-in coils and crystals. It is portable in the fullest sense of the word, being contained in a metal box measuring $13 \times 14 \times 15$ cm., and its transport between the two stations presents no difficulty—until the Customs shed is reached!

THE 1934 1.7 mc CONTEST—

(*Continued from page* 358).

much useful data which has been circulated to a number of contestants. The accompanying graph



	Call	QRB
-.	G2DQ	900
--	G6WQ	900
—	G6YJ	1100
-..	G6FN	1300

Note. QRB is in kilometres

shows the variation in signal strength noted by him on four G stations.

Conclusions.

The contest was the best supported local event yet organised by the Society, but it is regretted that although 48 entries were received this does not by any means represent the full activity on the 1.7 mc. band. Over 100 different British stations were heard in operation at some time or other during the two contests. We can but hope that fuller support will be given future events of this type.

Several entrants made the mistake when reckoning their scores, of multiplying the total points by the number of countries worked. The rules should have made this clear.

All entrants are thanked for their support.

EDITORIAL NOTE.

Mr. E. G. Ingram, G6IZ, sent in a late entry for the March contest which could not be accepted as the event had already been judged. Mr. Ingram's total score was 96 points, which would have secured for him second place.

"SOLILOQUIES FROM THE SHACK."

(*Continued from page* 360).

Received by carrier-pigeon from Broadmoor:—

A young B-R-Eth of Blackheath
Built a tranthmitter all in one pieth.
But the whole thing eckthploded
When the P-A wath loaded,
Tho Headquarteth thent a fine wreath.
Ath for thith—(I beg your pardon—as for this)—

There was a young "Ham" down in Beckenham
Who bought bottles and spent his time wreckenham;
When asked why he bust 'em
He said 'twas a custom,
And he never *could* bother with checkenham.

U. T.

HELPFUL HINTS

(*Continued from page* 362).

The output is 50 watts, so that the input is 100 watts at 50 per cent. efficiency.

The input current is $\frac{\text{watts}}{\text{volts}} = \frac{100}{50} = 2$ amperes.

The armature resistance must drop 250 — 50 or 200 volts with 2 amperes flowing through it. Therefore $200 = I \times R$.

Hence R is 100 ohms, and the watts dissipated in this resistance will be $100 \times 2 \times 2$ or 400 watts.

Back-Pressure.

There is one case of problems in simple resistance that does not precisely follow the above. The case of a back E.M.F. or opposing voltage—for instance, a bank of cells being charged by a generator.

In such cases, the pressure doing the work is considered as the difference between the voltages.

Example.

A bank of 50 two-volt cells is being charged at 25 amperes by a 150 volts dynamo. What is the resistance of the charging circuit?

The back-e.m.f. is 5×2 or 100 volts, so that the effective pressure is only 150 — 100 or 50 volts and this $= I \times R$. — the voltage dropped. So that R = 2 ohms.

Technical Articles are Wanted

EXCHANGE AND MART.

B.T H. ½ h.p. 230v. D.C. Motor, coupled 720v. 140 m a. generator in metal cabinet, £6.—DOGGETT, 44, Beresford Crescent, Newcastle, Staffs.

FOUR CYLDON double-spaced, all-brass transmitting condensers, with mounting brackets, .00015 mfd., 15s. each.—G6FN, 65, Alnwickhill Road, Liberton, Edinburgh.

G2WD has for sale Surplus Gear of all kinds, including LS5 and 5B. Send for list. No junk.—33, Bibury Road, Hall Green, Birmingham.

G6VP.—'PHONES, TRANSFORMERS RE-WOUND. Erown's "A" a speciality; any resistance; 24-hour service. Lowest terms in the trade.

G5DF-WE211D UX210, £1 each. 2-DO20, 10s. each. M.a. 0-50, 10s. Ferranti flush 0-50, 18s. 0-100, £1. Trans. 750v750 150 m.a., 25s. 10v3a, 10s. 4v6a, 10s. 500v500 120 m.a., 7.5v2.5a C.T. 7.5v and 6v 4a C.T., £1 15s. 750v. full wave rect., 15s. 500v. ditto, 10s. 2-30H 150 m.a. chokes, 10s. each. 2-2mfd. 2,500 D.C., 7s. 6d. each. 1-1mfd. 2,500 D.C., 5s. 1-4mfd. 1,000v., 2s. 6d. 2-25 watt var. resist Claude Lyons, 0-250.000, 7s. 6d. each. 1-3.5 mc. XTL, 10s. Holder, 2s. White porc. insulators, ribbed 6 ins., 2s. each. 3 in., 1s. 6d. each.; beehive, 9d. each. 4 Pyrex lead-in bowls, 2s. each, 3s. 6d. pair. Cardwell taperplate, .0005, 10s. .0005 and .0003 var., 5s. each. Copper inductances, drilled ends, ⅜ in. and ¼ in. tubing, 3.5 mc., 6s.; 7 mc., 4s.; 14 and 28 mc., 3s. 6d. M. gen. 12v. input, 600v. 120 ma. out, £1. Ham band Rx, with S.G. det. 2 L.F. valves, £2 10s. Dubilier 1,000v. 577 .01 mfd., 1s. 6d. each. Carr. extra.—6, Birchcliffe, Hebden Bridge, Yorks.

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

WANTED.—Amplion Lion Loud Speakers, side spring model.—MOORE, 28, Park Hill Road, Croydon.

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