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JUNE, 1930. Vol. 5. No. 12.

EDITORIAL.

We Forge Ahead.

THE pessimists have been proved wrong again. All those who declared the Washington Convention to be the death-knell of Amateur Radio cried before they were hurt. We have had over two years now to become accustomed to operating under comparative difficulties, as they once appeared to be ; but these difficulties have slowly vanished, chiefly due to the successful way in which we tackled the major problem of increased interference in narrowed bands. The average amateur of to-day possesses a transmitter which is far and away better than that in general use two years ago. His transmitter may be as a mouse to a lion when compared with some of the high power commercial stations of to-day, but it is effective in its own province ; further, many of the commercial stations are operated in a condition such as no amateur would tolerate.

At the present time, therefore, instead of seeing the amateurs of the world tottering on the brink of an abyss, we see them firmly settled in an excellent position, attracting more and more enthusiasts to their ranks and daily communicating with each other at such great distances, such that the limited size of the earth is already being felt by those desirous of finding new fields to conquer. We hope that this Society has at least done its share in this work, and we consider that we have scored many successes in the past year or so, the two most recent, and important, concerning 3,500 KC operation and the handling of official Society traffic between this country and the Empire.

The healthiness or otherwise of Amateur Radio as a whole should be discernible in any particular section ; we refer here to the various national societies scattered throughout the

world. As far as this Society is concerned, we can say that ever since we have regarded ourselves as a National Transmitters' Society our position has never been better. A small percentage of the transmitters in this country found they were unable to conform to the new licensing regulations, and, as a result, relinquished their licences and slowly lost touch with the Society and all that it stands for. These members were, however, lost to us during the year 1928 to 1929, but their places on the membership roll have been filled many times over. Besides having a steady, though slowly, mounting membership, we know very definitely that the percentage of really active members is considerably greater than was the case prior to 1928, when many holders of transmitting licences were quite inactive, though continued as members of the Society. The influx of new members is traceable as much to Mr. Watts' untiring work in bringing the Society before the eyes of our Colonial friends as to the general desire, coupled at times with a little helpful persuasion, of anyone in this country to become a member when he finds Short Wave radio a new fascination to him. There is only one society in England to assist the latter; there is only one journal to tell him the things he wants to know; there is only one body of Radio Amateurs to whom he wishes to attach himself. It is not, as a general rule, necessary to bring the Society right before their eyes; they usually see us a long way off, and no further inducement is then required in order to enrol a new member.

We are frequently asked questions by members and prospective members regarding the position of the Society, and we think that the above remarks may be taken as an indication that we ourselves are well set on the road to prosperity, and that Amateur Radio as a whole is in a more flourishing state than it ever has been. We cannot go back now; we are here to stay and a force to be reckoned with in the world of radio communications of the future.

(*Continued from next page.*)

4 mfds. at each end and this feeds the power amplifier for the three amateur bands. On 7 M.C. an S/W1 valve is used, but for 14 and 28 M.C., T250A's are in use, and one of these may be seen behind the panel of the 14 M.C. amplifier just above the power transformer.

The tuning coils are of ¼" lacquered copper tube mounted on Claude Lyons standoff insulators, and are five in number for each power amplifier. They are clearly shown in the photograph, and are as follows: The centre coil of the top three is the plate coil and the one immediately below the grid coil, to which is coupled three turns connected to the output of the frequency doublers. The two remaining in the top row are in reality one which is split into two portions—one at each end of the anode coil. The two portions are joined by the variable condenser shown between the meters at the top of the panel; the two free ends being connected to the aerial feeders, which are tuned by means of the variable condenser. In order to ensure that the two feeders neutralise each other to the greatest possible extent, the lines have been twisted from one side to the other every few yards, and this appears to prevent any radiation from the transmission lines themselves. The aerial itself, which is over 60 ft. high, and points from N.E. to S.W., is used for both 14 and 7 M.C. bands, with, of course, the necessary adjustments in the method of aerial tuning, and seems to be directional for the U.S.A., and South Africa, but results in South America are not quite so good, and although G5ML has been reported at QSA5 R9 from all continents, it seems that there is a definite peak of signal strength and reliability in the places mentioned above. During the 1928 A.R.R.L. tests, G5ML was able to work something like 100 American stations in ten days, and succeeded in getting the second place with 277 points.

Returning to the apparatus once more, you will notice in the centre of the picture a long panel and cabinet containing the crystal oscillator and frequency doublers from 3,500 K.C. up to 28,000 K.C., which are used to lock the amplifiers previously described, and are switched on the various P.A. stages as required. The power supply for this unit is kept under the table beneath the cabinet, and consists of 450 volts of rectified and smoothed current from a transformer and U8 rectifying valve. Special care is taken to smooth the supply to the crystal oscillator, so that A.C. hum is eliminated from the carrier. Keying is accomplished by breaking the connection between the grid resistance and the filament centre tap, as it has been found that this avoids sparking at the contacts, and consequent key-clicks. The key, a Vibro-plex, will be seen at the left hand end of the F.D. panel.

The receivers in use at G5ML are two; a screened grid 3-valve set with a tuned L.F. unit, and a standard Eddystone 2-valve set incorporating a detector and one stage of L.F. Standing on the former is a Claude Lyons type 558P frequency meter, and on the right of that the station monitor box, which G5ML assures me is a very useful adjunct to the station, as it provides a constant check on the quality and stability of the note.

An enthusiastic R.S.G.B. member, G5ML has a W.B.E. certificate on his wall alongside of the W.A.C., and has in addition been nominated as an Official Empire Link Station to handle traffic between H.Q. and the outposts of B.E.R.U.

In conclusion, I need hardly mention that Mr. Miles is anxious that any R.S.G.B. member who happens to be in Coventry at any time will make a point of visiting G5ML's shack for a handshake and a ragchew.

Station Description No. 6.
G5ML.

By "WANDERLUST."

G5ML made its debut on the air early in 1927, and since that day has succeeded in keeping a position in the front rank of amateur radio all over the world. There is little need to tell readers of the performance and reliability of G5ML, as these are already bye-words amongst R.S.G.B. members, but as the following facts will show, Mr. Miles has every reason to be proud of his station and its achievements.

Situated on the outskirts of Coventry in flat, open country, the station has an excellent locality as far as radio is concerned, whilst screening effects from trees and buildings are negligible, making G5ML's 60 ft. mast quite the most important object on the landscape, and a convenient landmark for visiting amateurs. The Zeppelin-fed aerial is favoured for use on the 7 and 14 M.C. bands, and an aerial with a flat top, of 67 ft. voltage fed at the set end by the usual Zeppelin feeders, is in use. The same aerial is used for both bands of frequencies, but the method of tuning the aerial is different in each case. For 28 M.C., a 65 ft. bent "AOG" aerial has been erected, and if results are anything to judge by, it is working very satisfactorily. This aerial is end-fed by direct tap on to the anode coil; about two turns from the filament end.

On ascending to the "shack," which is situated at the side of the house, about 20 ft. from the ground, we find ourselves in a small room literally crammed with apparatus that it does the heart good to look at. It is easy to see that G5ML is no believer in the "Haywire" methods of construction, and yet from results we know that his station is not one of those "pretty-pretty" outfits which are designed for looks rather than efficiency.

The photograph below gives a general idea of the station with the lay-out of the apparatus in the room, and shows the care that G5ML has taken to make his gear pleasant to the eye, and yet sound from a technical viewpoint.

Separate power amplifier units are employed for each of the amateur frequency bands, and may be seen on the right-hand side of the picture; the 7 M.C. and 14 M.C. (right to left) being in the foreground, whilst the 28 M.C. set is, unfortunately, obscured by the 14 M.C. outfit. The two former are constructed of polished oak, and are about 5 ft. in height, whilst the 28 M.C. amplifier is still in the experimental stage, and is built in the "bread-board" style. Each of these amplifiers consists of a plain T.P.T.G. circuit, which is locked in oscillation by coupling to the frequency doubling units, and is supplied with high tension from a 1500 volt transformer, which also supplies the filament current for the two rectifier valves seen on the front panel of the left-hand transmitter. These valves are of the gas-filled type, being very satisfactory for passing large currents at a high voltage, and are American products, known as Rectobulbs. The smoothing employed consists of a "brute-force" filter comprising a 30 Henry choke with

(*Continued at foot of previous page.*)

Some Problems in the Design of Condensers.

Abstract from a Lecture Delivered before the Radio Society of Great Britain on April 15, 1929.

By P. A. Sporing, M.Sc., A.I.C.

THE energy losses which occur in a condenser when subjected to an alternating potential may conveniently be divided into three types, as follows :—

(1) Losses due to the conductance of the dielectric which may be represented by a resistance shunted across the condenser.

(2) Losses due to the resistance of the metallic electrodes which may be represented by a resistance in series with the condenser.

(3) Energy losses in the dielectric of the condenser due to the alternating electric field, which will be a nearly constant proportion of the electrical input per cycle. This loss is commonly called dielectric hysteresis.

The *power factor* ot a condenser may conveniently be defined as the ratio of energy loss in watts to the electrical input in volt-amperes. The lower the power factor the less the proportion of electrical energy converted into heat, i.e., the better the condenser, other things being equal.

Considering the variation with frequency of the power factor due to these three types of losses, it appears that at constant voltage the power factor due to loss (1) will vary inversely as the frequency ; that due to loss (2) will be directly proportional to the frequency ; that due to loss (3) will be approximately independent of the frequency.

Hence at all frequencies low dielectric hysteresis is desirable ; at low frequencies a high insulation resistance is especially necessary, while at high frequencies it is important that the resistance due to the electrodes and their connections shall be reduced to a minimum.

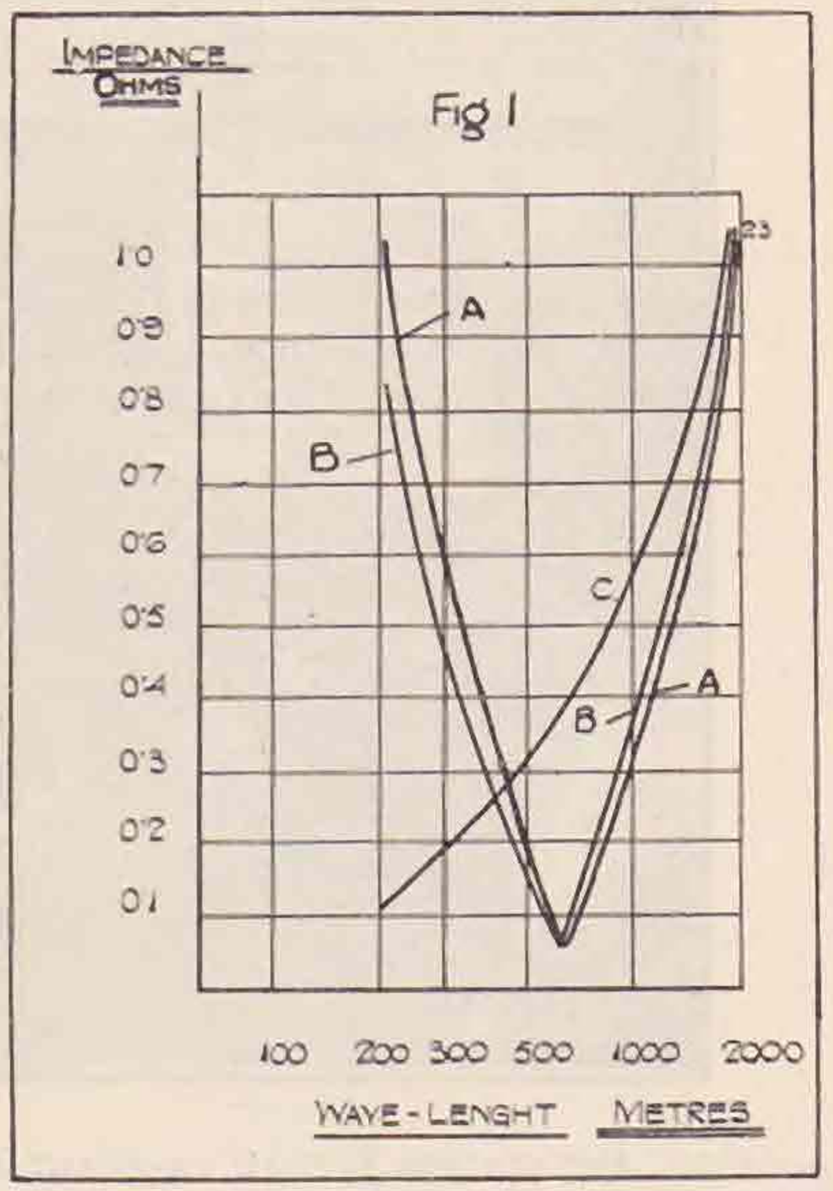
Paper condensers of a capacity of one microfarad are now commonly used to bring the screening grid of a screened grid valve to the same radio frequency potential as the filament, while allowing a definite D.C. potential to be maintained.

For this purpose it is essential that the condenser shall have a very low impedance over the wave-band used, otherwise a radio frequency potential will appear on the screening grid, which may cause spontaneous oscillation.

It has been suggested that since the current led into rolled paper condensers travels along the spirally rolled electrodes, some considerable inductance will be introduced, and that it is preferable to project the foils at the ends of the condenser and lead in the current so that it does not take the spiral path.

Some measurements to test this point reveal interesting results. Two condensers differing in the construction mentioned above, but otherwise identical, had their impedance measured over a range of of from 2,000 to 200 metres. The resulting impedance—wave-length curves showed a pronounced minimum at 640 metres for both condensers, indicating that both possessed inductance, and this resonated with the capacity at the wave-length mentioned. Further measurements showed that these two condensers were practically identical and equivalent to a circuit consisting of a resistance, an inductance and a capacity (of values .06 ohm., .12 mH, and .93 mfd. respectively) connected in series.

The results are shown in Fig 1, in which A represents the usual construction ; B that in which the foils project at the ends, and C the calculated impedance curve of a perfect condenser of the same capacity. It will be noticed that between 2,000 and 400 metres the impedance of these inductive condensers is less than that of a perfect condenser of the same capacity. It will be observed that the type of winding has affected neither the inductance nor the effective resistance.



The "T.C.C." have developed a special construction to reduce the residual inductance to a minimum. A typical result is shown in Fig. 2. The values of the equivalent circuit of this condenser are .06 ohm resistance, .02 mH inductance, and 1.08 mfd. capacity ; i.e. (comparing with values previously given), the inductance has been reduced to one-sixth and the resonant wave-length from 640 to 270 metres.

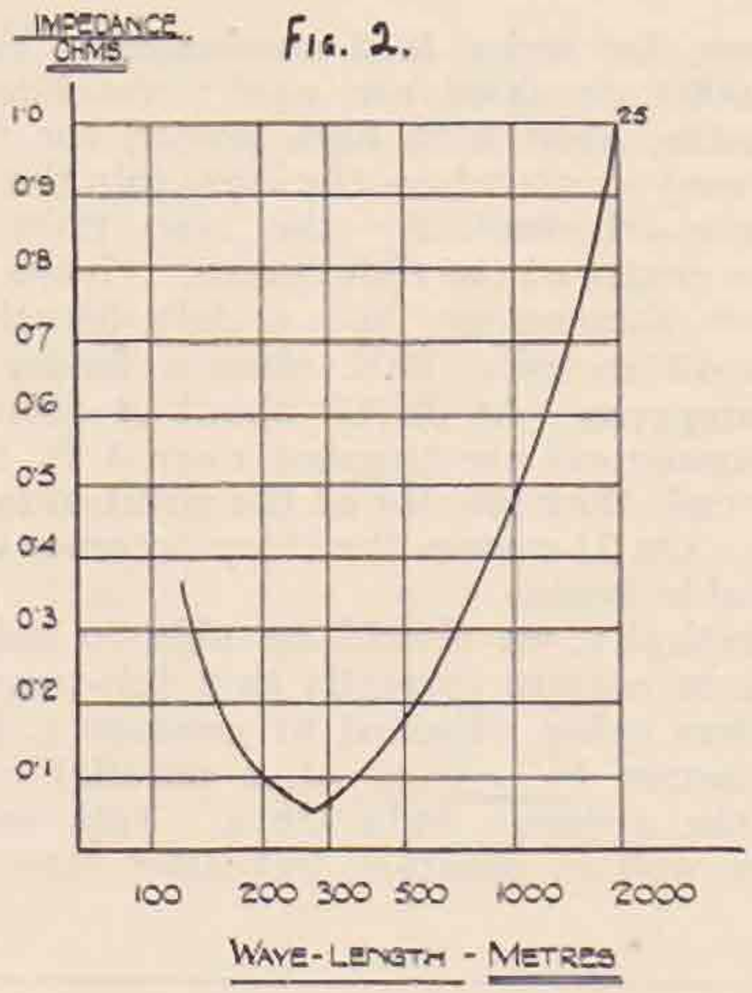
Paper Condensers for Low Frequency.

These include condensers for power factor correction on low-frequency circuits, and at frequencies up to 2,000 cycles for use with induction furnaces.

The successful manufacture of these condensers depends on the prevention of electrical discharges or "ionisation" in gas pockets left in the dielectric. It is obviously impossible to remove absolutely

all the air that is contained in the paper fibres, oil, etc., of which the dielectric is composed, but a method has been developed by the "T.C.C." whereby, notwithstanding this fact, ionisation and subsequent damage to the dielectric leading finally to breakdown may be completely prevented.

FIG. 2.



This takes advantage of the fact that there exists a minimum sparking potential for air (at atmospheric pressure approximately 250 V.R.M.S. on a sine wave voltage) below which it is impossible to cause a spark to pass through air, no matter how close together the electrodes may be.

Therefore, by arranging that the dielectric shall be sub-divided by means of isolated conducting sheets into an appropriate number of sections electrically in series, it is possible to ensure that at the working voltage no more than 250 V.R.M.S. are applied to each series section; and prevent ionisation with its attendant damage to the dielectric.

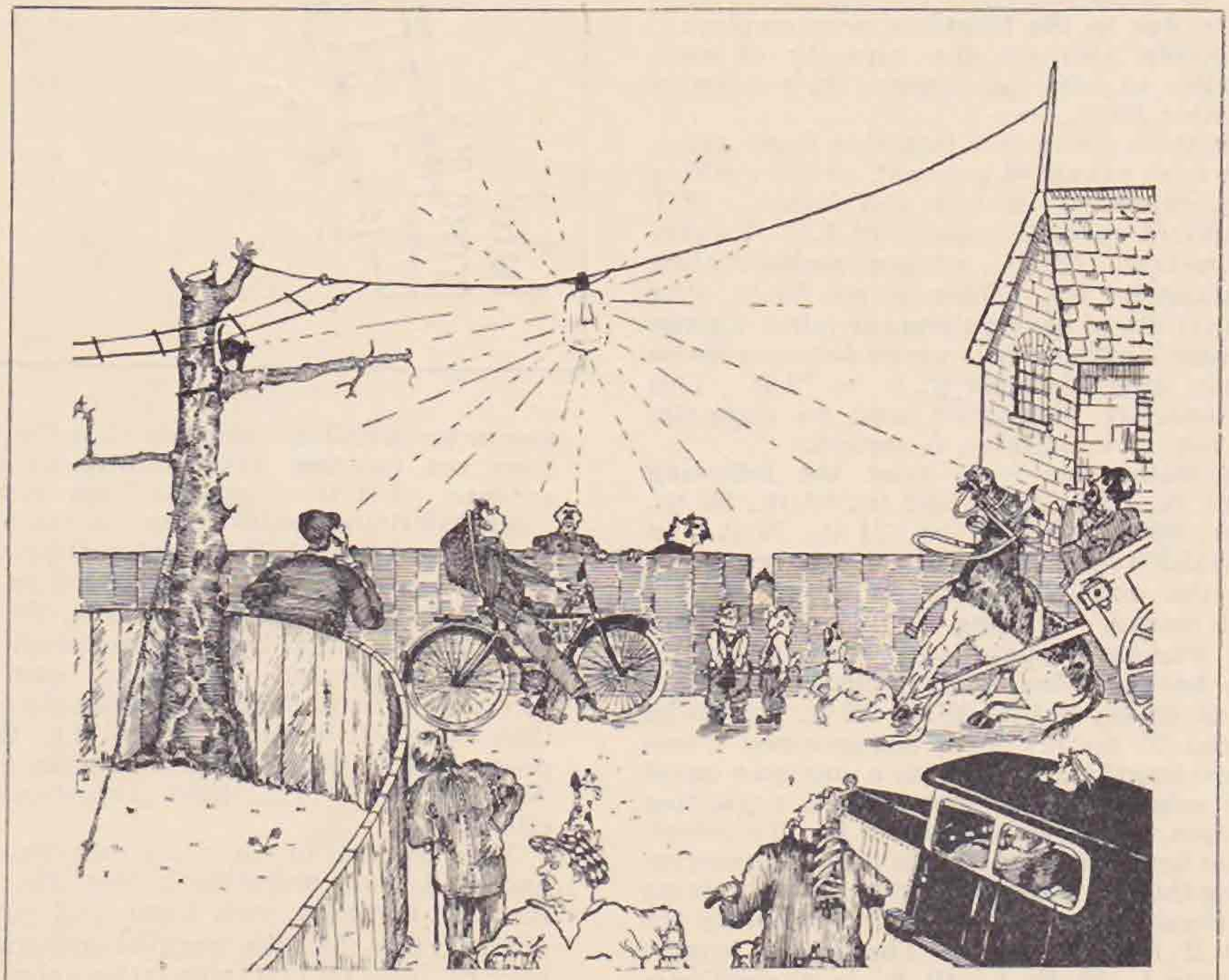
This special construction has been used very extensively in "T.C.C." condensers during the past three years and has proved a marked advance.

Electrolytic Condensers.

The dielectric of these condensers consists of an exceedingly thin film (roughly 10^{7} ins. thick) of aluminium oxide. One electrode is the aluminium foil on which the oxide layer is deposited, and the other consists of a conducting electrolyte making contact with the oxide film and a second metallic foil which serves merely to carry the current to the electrolyte. Actually these condensers, although constructed in this manner, are practically dry, and there is no danger of any electrolyte being spilled. By this means it is possible to build condensers of a very large capacity with small bulk.

The latest development of this type has a capacity of 250 microfarads working at 100 volts D.C. These are suitable for series connection, so that electrolytic condensers of several hundred microfarads are available for working at 200 volts and over.

The production of those high capacity high voltage condensers of very moderate size may well modify profoundly the smoothing arrangements of H.T. eliminators.



The "Zeppelin" Voltage-Fed Antenna—Its Erection, Operation and Performance.

By G. G. Livesey (FO3SRB) and R. A. Hill (FO3SR).

THESE notes on the voltage-fed system are intended to give some help to those of our readers who have not yet used the particular system, and who may have been deterred by lack of practical information.

The theory was dealt with in an excellent article by Mr. Secretan (G5LF). Our remarks go to provide some data on what occurs in practice, because theory and practice definitely diverge on one or two points. Before dealing with our results, we most particularly wish to say that we are not intending to pull to pieces the article by our good friend, Mr. Secretan, and we hope he will quite understand this.

We should also like to acknowledge useful advice received from Mr. L. E. Green (ZT6G, ex A4V).

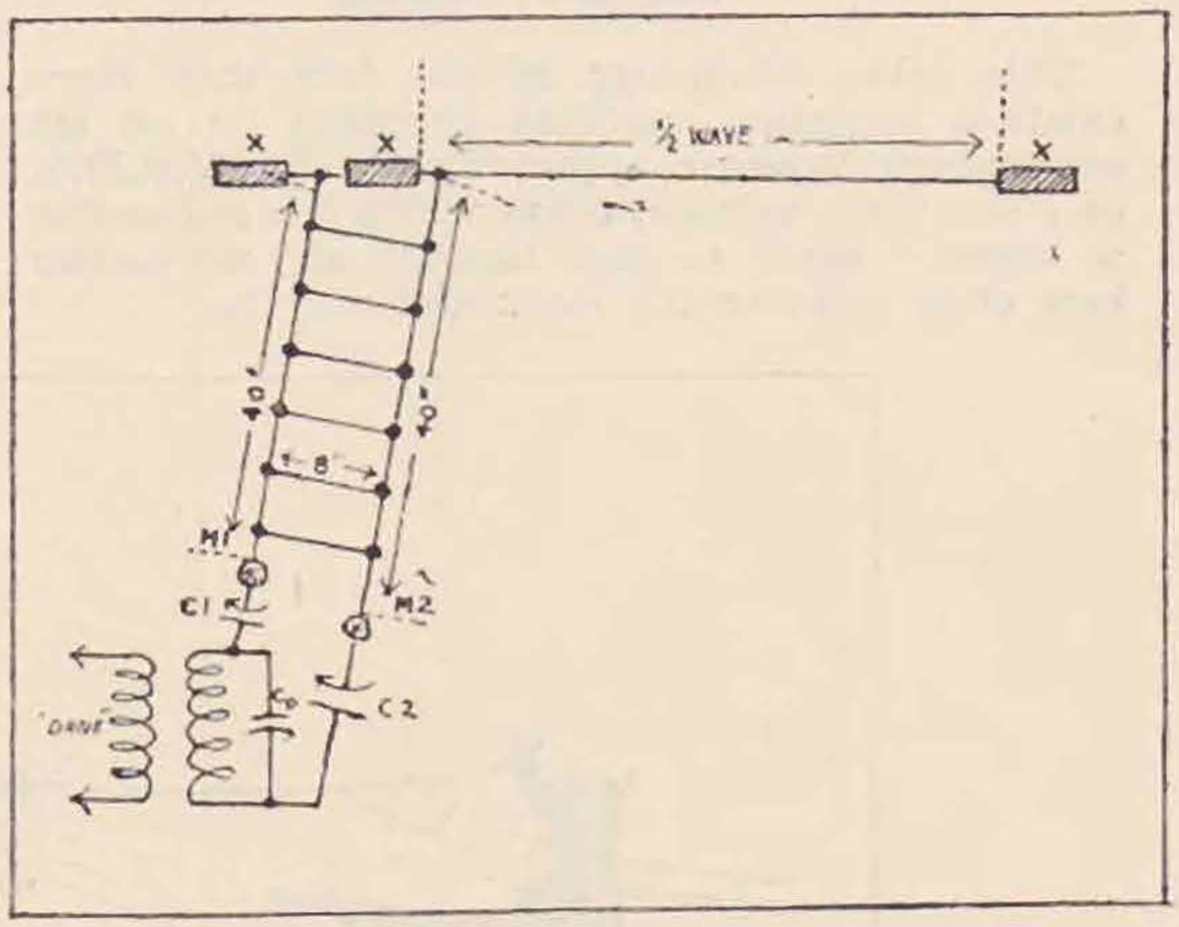
It is assumed throughout that the antenna must be designed to perform on both 7 and 14 M.C. The transmitter at FO3SR (Salisbury) is loose coupled "Hartley"; high C/L ratio; BTH/B12 valve (20,000 Ω gridleak is most suitable); input on 7 M.C. is 600 volts 50 milliamperes R.A.C.; on 14 M.C. 600 volts 40 milliamperes. The note is reported pure chirpless D.C.

The main trouble in the erection of the antenna is undoubtedly the length to which the top span, on actual radiator, should be cut. Authorities diverge widely on the correction factor, which has to be used to make allowance for the inductance and capacity due to the length of wire employed, and presumably also for the capacity of such earthed bodies as may be situated in proximity to the radiator itself.

G5LF quotes a correction factor of 6 per cent., i.e., the top span equals 44 per cent. of the working wavelength, expressed in feet and inches. QST gives a standard correction factor of 1.56 X wavelength in metres. G6MU advises multiplication by approximately .98. There is no doubt that the individual site of each antenna requires a given and particular length, which varies between limits of 10 ft. from approximately 62 ft. to 72 ft. This we have definitely discovered, and no dogmatic length, to suit all conditions, is correct.

At each station we have tried the following lengths: 61 ft., 61 ft. 9 ins., 62 ft., 65 ft., 66 ft., 67 ft. 6 ins., 68 ft., 69 ft. 6 ins., 71 ft., 72 ft. In each case G5LF's span, 61 ft. 7 ins., gave resonance far below the amateur bands on approximately 19 and 40 metres. Raising this to 66 ft.—considered a standard span—still gave resonance below the bands. Finally 3SR obtained correct resonance at 68 ft., but at 3SRB 72 ft. had to be used (42 and 21 metres being our assumed transmitting wavelengths). Assuming a top span equal to exactly one-half of 42 metres, and neglecting any correction factor, we have 68.89 ft. Therefore, between the limits mentioned, it is purely a question of observing the two feeder ammeters, and obtaining optimum resonance in the band by adjusting the top about 2 ft. at a time. The feeder lengths are not critical—38 ft. to 40 ft. is a good safe measure. They are reduced to ¼ W/L when on 42 metres, by series feed condensers. For these either .0003 or .0005 are used; receiving types are suitable, even with high power, for the R.F. voltage zero occurs where the leads join the antenna inductance—theoretically the zero point should be in the centre of the inductance. Given our own respective dimensions, the aerials function very well on 42 metres. 3SR obtains feeder current of 1.1 amperes. At 3SRB about .4 ampere, but as the ammeters are situated over 3 ft. from the pick-up coil, they are not at the point of maximum current. On 21 metres the story becomes different, and trouble begins.

Theoretically, we should be able to induce this antenna to radiate correctly as a full-wave aerial; the feeders being adjusted to contain ¼, ¾, 5/4, etc. of 21 metres by means of a parallel condenser across the antenna inductance. This works out passably well in practice, but after many experiments we definitely maintain that the "Zeppelin" does *not* function satisfactorily as a two-band antenna. Let the "experts" say what they will.



At 3SRB the feeder series condensers were first shorted out on 14 M.C.; later they were left in, and results appear to be identical in either case. Theoretically, as far as we know, they should be unnecessary, since by adjustment of the parallel variable condenser, the feeders can be brought to either ¼ or ¾ working wavelength; it is found that when left in circuit on 14 M.C. the resonance point is only broadly effected by their adjustment, whereas on 7 M.C. their adjustment is highly critical.

They appear to serve no purpose on 14 M.C., and it is not understood how the system can function correctly with them, but yet it does so.

The value for the parallel antenna condenser may be .0003 to .0005, the latter valve being rather too high—a coupling coil of 6 to 7 turns, 3ins.

diameter, spaced 3/16 in. to ¼ in. is suitable for 7 M.C.

For 14 M.C., if the series condensers are shorted out, it has been found necessary to reduce " pick-up" coil to about four turns, 3 ins. diameter. At both stations, on 7 M.C., results appear very good indeed, but skip is sharply defined.

On 14 M.C., when the top span is a full-wave radiator, results are not so satisfying. 3SR has some extremely good long-distance work to his credit, but is not satisfied.

He says: " Upon cutting out the dead-ended feeder, and substituting a 10-ft. indoor counterpoise, DX resulted immediately in quantities. Previously on the correct arrangement, it failed, and although the feeders showed large and equal currents, yet in practice something was wrong. I used this counterpoise two years ago when working from the Cape, with equally good results on 14 M.C.

" There is practically no difference between the Æ-Cpse and standard ' Zeppelin,' as far as Brazil is concerned—for the U.S.A. the Zeppelin is best, also for Australia; yet for the Northern Countries the Æ-Cpse proves best."

It evidently comes to the fact that the angle of radiation is altered, and the alteration depends for its effect entirely upon the various heights of the ionised layer between the stations, according to the time of day or night, also.

With regard to tuning the antenna—set the transmitter to desired frequency, assuming it to be on the 7 M.C. band, by wavemeter, keeping your parallel antenna condenser Cp at zero capacity—then adjust series condensers for the maximum readings on the ammeters; the readings must be equal. It is advisable, when this is done, to increase Cp capacity a little, dropping anode milliamperes and detuning the antenna slightly from the oscillator. Unless this is done the note will have a bad chirp. The aerial puts a heavy load on the valve, resonance is shown by heavy increase in plate current, and a milliammeter connected in series with the gridleak will show a decrease in grid current when the antenna is in resonance.

Assuming a good steady source of H.T., a correctly adjusted gridleak and the antenna circuit detuned somewhat, a very fine note results. It is advisable to check the transmission by listening to a second harmonic, or first overtone, on your receiver, thereby one obtains good notes.

The antenna feeder ammeters should be as close to the series condensers as possible, since the maximum R.F. current is to be obtained as near the ends of the pick-up as possible coil.

The feed-lines may be spaced anywhere between 18 ins. and 4 ins.; a separation of 6 ins. to 8 ins. is generally used in most stations.

Among stations in South Africa using the " Zeppelin " are: ZS6D, ZS5C, FO3SR, ZT6G, FO7SRB, ZU1J (ex G6UO), ZS4M, ZS4E, FO3SRB, ZU6B, VQ2NC, FK2LR (in Tanganyika), ZT5X, ZT5V, ZS5N, ZS4T.

In making the necessary " pruning " adjustments to the top span, we advise that the tests for resonance be made with the transmitter working on 14 M.C.—the resonant point is very critical here, and on 7 M.C. it is not so.

If the correct length be obtained for 14 M.C., then the system is automatically perfect on 7 M.C. band, but reverse the procedure and you will probably have much trouble. Why so, we fail to understand, but there it is. We would strongly advise any members, however, who want a good antenna, and who have not tried the " Zeppelin," to put one up. Like other systems, it has its faults, but is essentially a scientific arrangement, and in particular shines on accouut of there being no losses where the feeder lines enter the transmitting room.

Its behaviour as a two-band system we admit ourselves puzzled over, but more investigation may clear this up.

Possibly our attempt to discuss the arrangement may give rise to some interesting controversy.

Aerials.

By A. Cross, G6XC.

The above title has no doubt been given to a great many aerials in the past by individual hams, mostly applied to systems which are concoctions of the moment. There is, however, one particular A.O.G. aerial which I think deserves especial mention, and that, together with an editorial request for dope—be it ever so humble—has inspired me to this effort, which I hope will be of interest to someone.

The writer was first introduced to the A.O.G. in 1927 and has used it, on and off, with considerable success ever since. The credit for its development, though, goes to Mr. Allen, G6YW.

It consists of a single wire ½ for 7 M.C. and full wave for 14 M.C. voltage fed, and its length is exactly 21 metres from where it taps on to the plate coil of the transmitter to the free end.

The results obtained from this very simple " sky wire " are really too good to be true, and it cannot be put down to local conditions because it is thought that a good percentage of our star DX men in London are using it at the moment and have used no other since the days of 45 metres.

Those whose licence conditions forbid the use of a directly coupled aerial need not despair; the same aerial can be used by them, but the length, including coupling coil, should be 21 metres in this case, and the coil should be *closely coupled* to the tank circuit of the TX, this arrangement being equally efficient.

The possibilities of this A.O.G. system are also great on 28 M.C., and although it has not been used by the writer on this band I think I am correct in saying that it has been used in two-way communication with ZS on that frequency by G2CX, and a similar system is in use at G6DH, except that there it is bent at right angles a third of the length from the TX end, making the flat top 14 metres long and a sort of 7 metre feeder.

The writer has tried as many different types of aerials as local circumstances permit, including Zeppelin and current fed systems, but none of these have excelled the simple A.O.G., and, in conclusion, I advise those of you who are looking out for a good aerial to give it a trial.

More Articles, Please!

The Transformer in Action.

By "INCONNU."

ARTICLES appear from time to time in this and other radio journals on the design and construction of power transformers, but little has been said about the behaviour of transformers on load—and that is not an unimportant side of the subject.

It will be unnecessary, therefore, in this short article to go into the design, and it will be assumed that the reader knows, or can easily refer to back numbers of THE BULLETIN, for knowledge of the voltage equation and the turns-ratio. It can also be safely assumed that the principle of the transformer is well known to most readers.

A transformer without anything connected to its secondary terminals is acting merely as a choke across the source of supply. It has a low resistance and a very high reactance, so that the most of the opposition to flow of current comes from the back EMF of self-induction, and only a very small amount from the drop due to the resistance of the primary windings.

The magnetic flux set up in the core will have a normal value if the applied voltage and frequency are normal; it can be seen from the EMF equation that this is so.

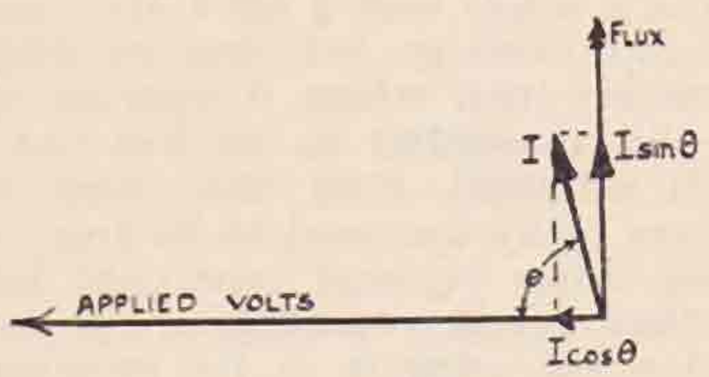


FIG. 1.

The core losses consist of eddy current losses which depend upon the square of the flux density and the square of the frequency, and the hysteresis losses which depend upon the flux density raised to the power 1.6 and also upon the first power of the frequency.

The frequency is usually fixed by the supply, but the flux will decrease with the applied voltage; ordinarily, the transformer will be connected across constant voltage mains whose frequency is fixed, and under these conditions the eddy current losses and the hysteresis losses have a normal value. What is more, these core losses may be assumed to remain constant with all values of load, unlike the losses due to the resistance of the windings. These resistance losses or "copper losses," will depend, as in any resistance, upon the square of the current.

The result is that on no-load we are supplying the core losses and an almost negligible copper loss. The condition of no-load can be seen from the vector diagram, Fig. 1, and it will be noticed that the current is lagging behind the applied voltage by almost a right-angle. The component of this current, which is in phase with the applied voltage (Icosθ) is the energy component of the no-load current which, when multiplied by the applied voltage, gives the power taken to supply the core losses.

The other component (Isinθ) is the idle current, representing no power, but responsible for the setting up of the flux in the core. Note that the conventional anti-clockwise rotation of the vectors is used.

It will be comforting to those who have been astonished at the comparatively large reading of the primary ammeter on no-load to know that their energy meters notice only the little horizontal component, and if the angle θ is sufficiently large (representing low core losses) the no-load current can be quite hefty without adding more than a mere fraction to the power consumption.

What is the effect of a secondary current? This question must be answered in several cases; loads differ not only in magnitude but in type. We have resistance loads where the current is in phase with the secondary terminal voltage, and we have both capacitive and inductive loads where the current leads and lags the voltage respectively.

Assuming that the secondary winding has neither resistance nor reactance, a pure resistance load will carry a current which will be in phase with the induced secondary voltage. This current following in the secondary turns will, at the moment of switching on the load, tend to decrease the flux in the core by setting up an opposition flux; but such an effect reduces the reactance of the primary winding and an increased current flows. This larger value of current brings the flux back to its normal value.

It will be obvious from this that the secondary ampere-turns which are responsible for the back flux must be balanced by an increase of primary ampere-turns of the same value. As the primary has a different number of turns the primary current increase will be different in value to the load current; the two currents will be related by the turns-ratio.

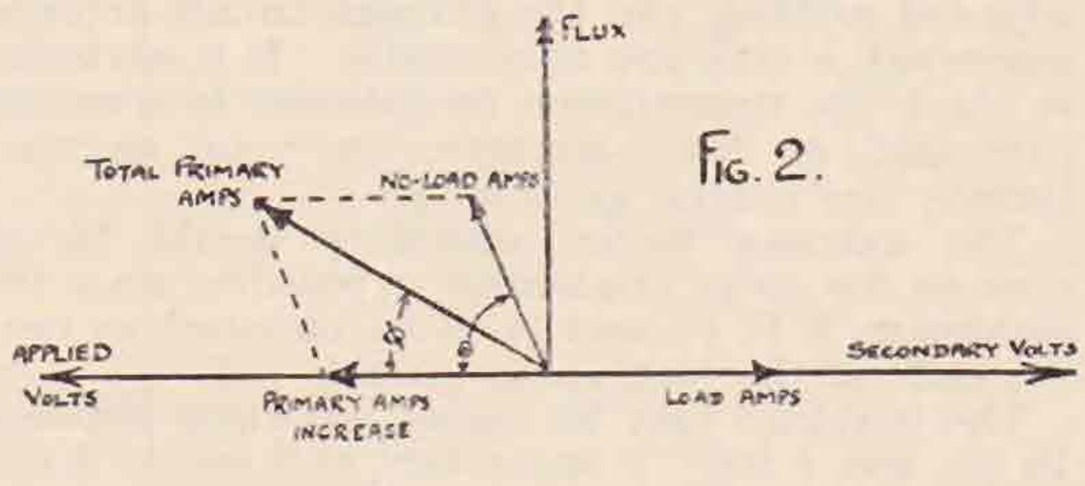


FIG. 2.

The primary current increase must be added vectorially to the no-load current to give the total primary current. This is shown in Fig. 2, but the assumptions must not be forgotten. In drawing the figure a turns-ratio of 1.1 has been used for simplicity.

The power to the primary circuit is now due to the horizontal component of the total current, and it will be seen that this is the algebraic sum of the no-load energy current and the increase of primary current to balance the load current. It will also be noticed that the primary current is not now lagging so much behind the applied voltage, in other words, the power-factor has been improved,

being now cos φ which is greater than the previous cos θ.

Still making the same assumptions, which, though not satisfactory, are good enough to present an elementary picture of what is happening, we will investigate the effect of an inductive load. In this case the current will lag in the secondary, but it must still be balanced by an equal number of ampere-turns in the primary, as shown in Fig. 3.

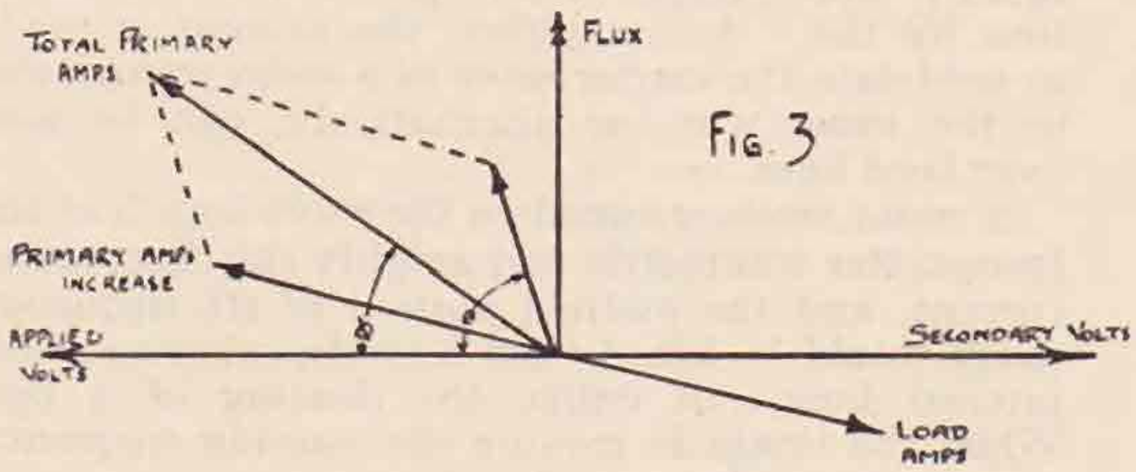


Fig. 3

It will be seen from the figure that the primary power-factor is lower than the secondary, as was the case with the resistance load, but that in this case there is not such an improvement in the power-factor when the inductive load is connected.

The energy component of the total primary current is now the algebraic sum of the no-load energy current and the energy component of the increase in primary current necessary to balance the secondary ampere-turns.

Fig. 4 shows the effect of a capacitive load. The secondary current is now leading the secondary voltage, and the secondary power-factor is cos α.

It will be noticed that the effect of the leading current in the secondary is to bring the total primary current more into phase with the applied voltage, and therefore improve the primary power-factor. This is true up to certain limits; if the secondary current leads by a sufficiently large angle it will make the total primary current lead the applied volts, and the primary lead will increase with the increase of secondary lead. In such cases the no-load current makes the primary power-factor better than the secondary one, and a certain value of secondary load will produce unity power-factor in the primary. For small angles of secondary lead the primary power-factor will be worse than the secondary power-factor, but in all other cases the primary power-factor is better than the power-factor of the secondary.

Changes in the value of the load in any of these three cases, Figs. 1, 2 or 3, represented by changes in the lengths of the current vectors, will alter the primary power-factors, and the reader is advised to sketch several diagrams and study the changes so caused.

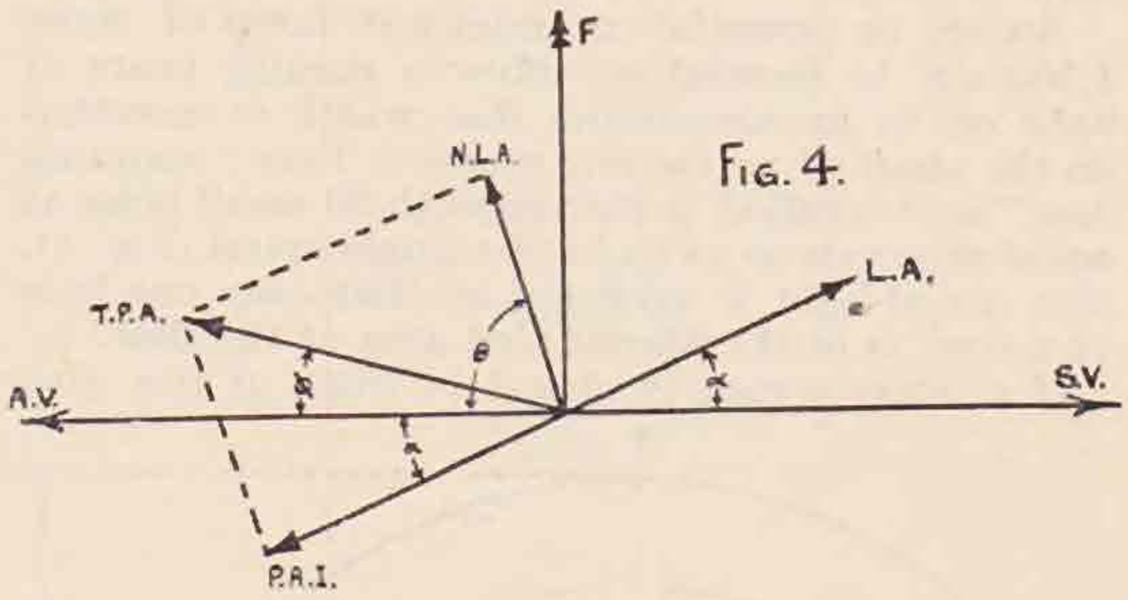


Fig. 4.

The diagrams shown in this article are not strictly accurate; the assumptions must be dropped and the resistance and reactance of the windings accounted for. This will mean that the terminal voltage will not be the induced voltage, and the diagrams must be modified with this in mind. Also, the no-load current has been shown much greater than it would be—another dodge to get clear diagrams—but "all will be revealed in the next postmortem" (as the puzzled doctor told the patient)—"if any" (interjects the Editor, making a rapid diagnosis!)

Visit to HB9G, Lausanne.

By O. B. Kellett (G5KL).

During the month of March this year I spent a few days in Lausanne, Switzerland, and having worked HB9G earlier this year, I thought it would be interesting to visit this station.

HB9G is owned by Monsieur Weruer Schueeberger, of Fleurettes 20, Lausanne. He is a German Swiss, and is a member of the staff of the Criminal Research and Investigation Laboratories of the Suisse Institut de Police Scientifique at the Ecole de Chimie, Place du Château.

His station is small but efficient, and works on the 7,000 K.C. and 14,000 K.C. bands, using between 5 and 10 watts input on a Phillips B.405 valve. The H.T. supply is 300 volts R.A.C. to a Hartley circuit, which feeds a Zepp. aerial 21 metres long. With this he has worked world-wide DX, including New Zealand on C.W. and England on 'phone. He experiences considerable difficulty during his QSO's, due to QRM from electric trams and trains, Switzerland now being almost entirely electrified throughout for every use.

I heard many stations whilst at HB9G, both broadcasting and amateurs. 5GB London is received very well on the loud-speaker, using the screened HF-D-1LF, and the absence of fading is very marked.

There are only eight licensed Swiss amateur stations, and some of the qualifications necessary may be of interest. In addition to a good deal of technical knowledge required, applicants must be able to send in Morse code at the speed of 50 letters per minute for a period of two hours continuously, and to receive at the same speed for four hours continuously, only four mistakes being allowed. The regulations governing licensed stations are very similar to those existing in England.

HB9G and I have arranged a schedule and should any other amateur require information, I shall be pleased to do all I can if they will get into touch with me. Monsieur Schueeberger is always very pleased to work G stations, and hopes to see any hams who may visit Switzerland. He sends his kindest regards to all.

Television.

PART I.

By P. D. Walters (BRS273).

THERE has been an excellent series of articles on Television already published in these pages, and so the writer only intends to deal with the more practical side of this new science, with special reference to the Baird process which is daily being transmitted via the Brookman's Park stations.

Before giving more detailed information, a brief outline will enable the reader to grasp the method employed.

An arc or powerful incandescent lamp of some 1,500 c.p. is focused to throw a parallel beam of light on to an aluminium disc which is mounted on the shaft of an electric motor. This "scanning disc," as it is called, is pierced with 30 small holes at equal intervals so as to form a single spiral (Fig. 1). The ray of light is arranged so that only one hole at a time is in the illuminated area of the disc.

If a white screen is placed in front of this disc

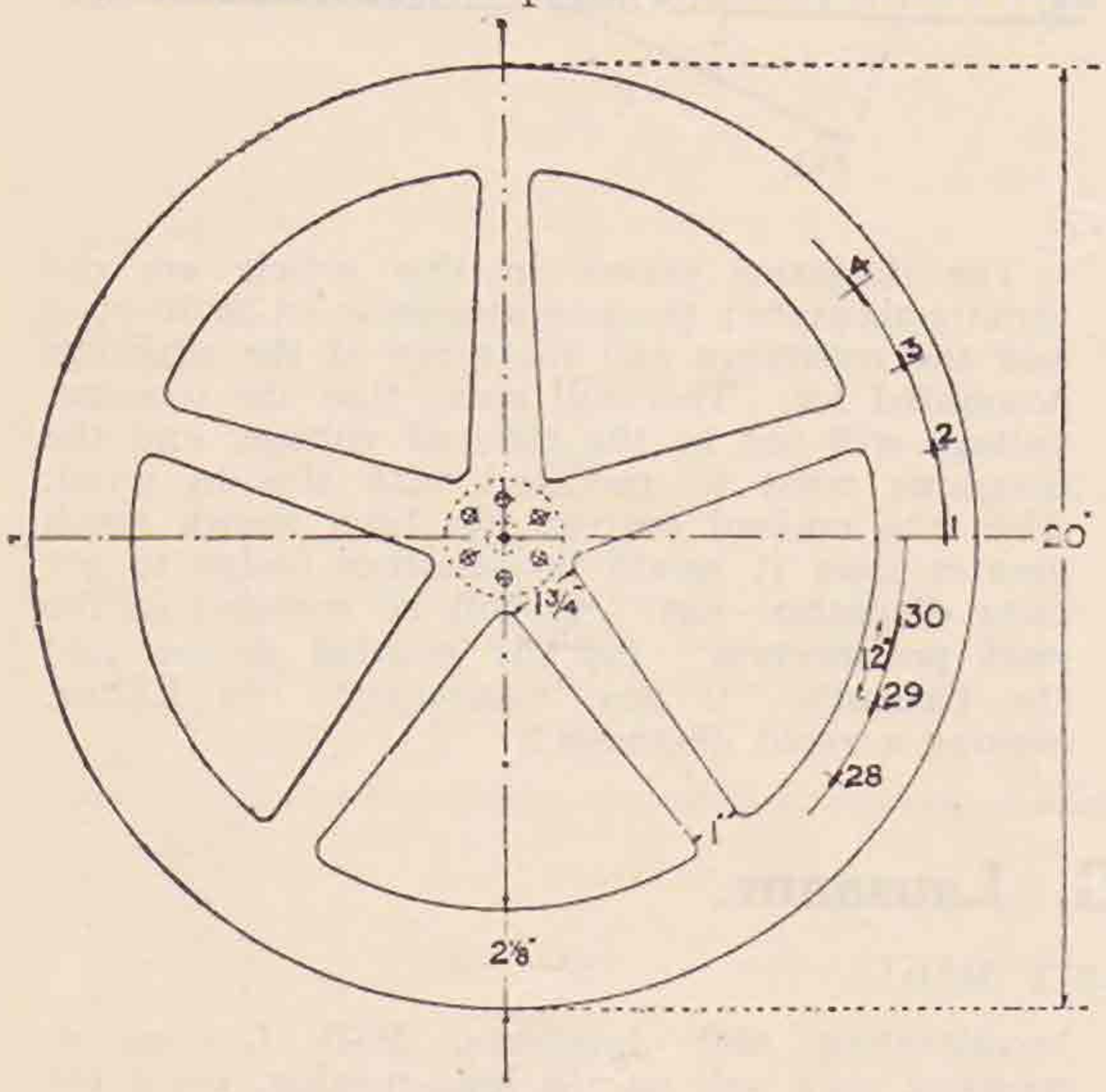


Fig. 1.
Diagram of scanning disc, showing how the positions of the 30 holes are determined. (Only first and last three holes are shown here.)

and the latter revolved, a spot of light will be seen to traverse the screen in a path composed of slightly curved vertical lines (Fig. 2). Now if an image is placed in the illuminated area in front of the screen, the light reflected from it, due to the rapidly moving spot of light, will vary in intensity according to the relative light and shade of the image.

The speed at which the disc revolves (in the case of the Baird transmitter) is kept constant at 750 revs. per minute by an electrically driven tuning fork, and as each revolution scans the picture once, the number of complete pictures transmitted per second are $750/60 = 12\frac{1}{2}$, this being the minimum optical number to give a steady moving picture. The modern cinematograph actually runs at about 14 to 16 per second.

The reflected light already mentioned is utilised to generate a very feeble current in a bank of photo-electric cells placed above the image being televised. Since the disc is revolving fast, the current is rapidly alternating. After considerable amplification by the "A" amplifier, the current is made to modulate the carrier wave of a radio transmitter in the usual way, or alternatively, can be sent over land lines.

A radio receiver tuned to the wave-length of the transmitter will rectify and amplify this fluctuating current, and the audible portion of its frequency range would be heard from a loudspeaker as a low pitched burr, not unlike the droning of a bee. When the image is moving the varying frequency can easily be detected by the ear.

In order to reproduce the image at the receiving or "Televisor" end the characteristic orange glow of a Neon lamp is modulated by the television "signals" as delivered from the output of the receiver. A scanning disc, similar to that used at the transmitting end (i.e., same relative number and size of holes, etc.), revolving at exactly the same speed as the transmitting disc, reforms the image, whether it be moving or still, which is placed in the scanning area at the transmitting end.

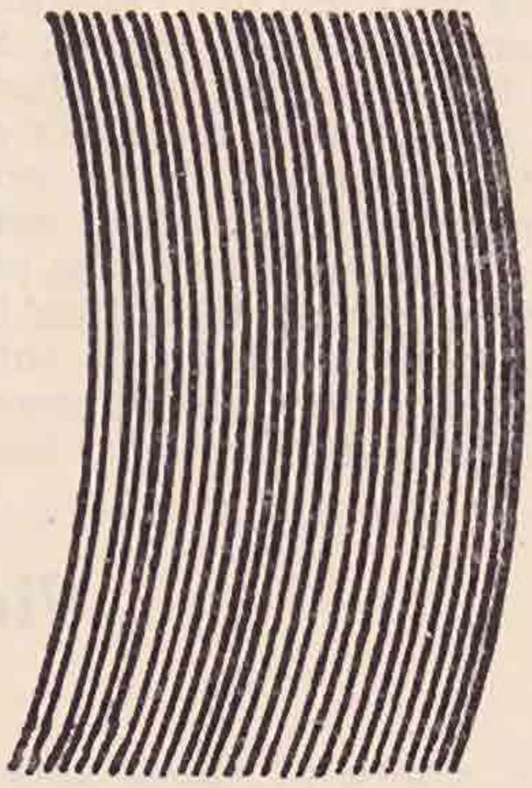


Fig 2.

Now this sounds fairly simple, but actually there are many difficulties which have to be surmounted both at the transmitting and at the receiving end before a satisfactory picture is obtained.

One of the most common faults at the receiving end is the production of a negative image similar in appearance to that obtained in photography, or in other words a complete reversal of light and shade. This is due to a phase change of 180 degrees which has taken place in the intermediate apparatus. With the present system of transmission from the Baird laboratories, the phase is adjusted so that a positive picture is obtained at the receiving end from an anode bend detector followed by three resistance-capacity coupled stages of low frequency amplification. A negative picture would result if leaky grid rectification were used with this same amplifier,

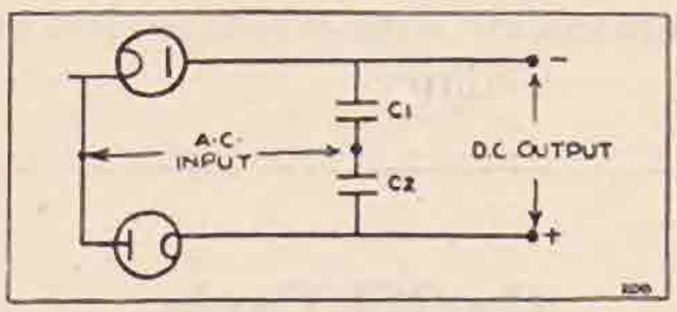
(*Continued at foot of col.* 1, *next page.*)

Voltage Doubling in Valve Rectifiers.

By E. L. Owen (G2OW).

THOUGH most of us who have to deal with A.C. mains are familiar with the various forms of electrolytic rectifier, and many have used them in the well-known voltage doubling circuit with varying degrees of success, yet, so far as the writer is aware, no one until recently has used valves in a voltage-doubler.

The idea was first suggested by G6XN, tried out by the writer, and has been adopted with great success by G6XN, G2OW, and G2OL. The figure shows the simplified circuit. The D.C. output on no load is very nearly 2.8 times the alternating input voltage. The drop on load will depend upon the characteristics of the rectifier valves, the value of the bridge condensers (which should, of course,



have equal capacities) and on the subsequent smoothing arrangements. Some actual figures obtained from the writer's V.D. may be of interest.

Valves : Two Triotron G.A.24 full-wave rectifiers.

Bridge condensers : Two 2mf. in each arm (C_1 and C_2).

Smoothing circuit : Three 500 ohm ex-Govt. chokes and three 2 mf. condensers.

Input voltage : 180 v., 50 cycles.

Output voltages :

On open circuit : Above 450 v.

Output current 15 ma., 440 v. ; 30 ma., 410 v. ; 50 ma., 350 v.

Since these values include the drop in the smoother, they could be improved upon by the use of larger condensers in the bridge arms and lower resistance chokes. Referring again to the figure, the valves are, of course, heated by A.C., and it will be noted that one filament is at the same potential as one side of the mains. Consequently, this transformer need not possess anything extra in the way of insulation (any bell type transformer capable of supplying 1 amp. at 4 or 5 v. according to valves used, should suffice). In the case of the other transformer, the insulation between primary and secondary must withstand the full output voltage and should, therefore, be sound. It will be noticed that no high-tension centre-tapped transformer is used. In the writer's case, the mains are actually stepped *down* to obtain a comfortable 10 watt input of 400 v. 25 ma. to the transmitter, while at G2OL, a 600 v. supply is obtained without any H.T. transformer.

It has been found advisable to insert fuses in the plate lead of each valve as a protection against short circuits ; 3.5 v. flashlamps bulb have been found very suitable. A good feature of this circuit is that if the filament of one valve becomes faulty, or a fuse blows, the whole device stops operating, and no high voltages are set up across the other valve. Another advantage is that the D.C. output has a double-frequency ripple which is easy to smooth, and, if not completely eliminated, gives a pleasant note to copy. The whole arrangement has proved very satisfactory during a number of months' use, and can be strongly recommended for those who are contemplating the use of A.C. mains for input powers up to 25 watts or so, though there seems no reason why much larger powers should not be handled by this method.

The writer will be glad to hear of improvements, or points of interest arising from the use of this rectifier. In conclusion, we venture to prophesy that no one who gives this system a fair trial will ever revert to chemically rectified A.C., with or without voltage doubling.

(*Continued from previous page*).

or if one L.F. stage were added or removed. In amplifiers incorporating a transformer, whether of the inter-valve or output type, the phase can be changed at will by reversing one of the windings of the transformer.

(*To be continued.*)

Obituary.

It is with very profound regret we have to record the passing of Doctor Wilhelm Titius—who had since its inception been editor of the German amateur monthly publication, "CQ."

Dr. Titius was one of the mainstays of German amateur radio, and his sudden death has created a gap in the ranks of European amateur circles which will be hard to fill.

Messages of condolence have been sent to D.A.S.D., but we take this opportunity of publicly sympathising with them in their great loss.

To Herr Brey, we offer our best wishes for a successful tenure of office as the new editor.

Forthcoming Events.

July 4.—Lecture at I.E.E. by the Igranic Co., Ltd., on Neutrosonic Short-Wave Receivers. Commence at 6.15 p.m., tea at 5.30 p.m.

July 5.—Summer Outing to Dorchester Beam Station ; see particulars elsewhere.

The "Southern Cross" Trans-Atlantic Flight.

The pilots of this plane will carry with them a transmitter working on a wave-length of 33-31 metres, using the call-sign VMZAB. The flight will commence from Ireland at 03.00 B.S.T. during the early part of June. No receiver will be carried, but reports of progress will be given almost continuously during the flight. R.S.G.B. members are especially asked to listen for the T5 signals from this plane and to report immediately to Croydon Aerodrome. It will be remembered that whilst the Southern Cross was flying the Pacific Ocean it received much assistance from American amateurs, and it is hoped that prevailing conditions will make it possible for British amateurs to render the same signal service.

SPECIAL NOTE.

Please note alteration of dates in Forthcoming Events, page 315.

Summer Outing.

Owing to the fact that the original date chosen for our summer outing to Dorchester and Somerton clashed with the R.A.F. Pageant, it has been decided to postpone the visits until Saturday, July 5.

Final arrangements will be made immediately we receive names of persons who wish to travel from London by train, but provisionally it is anticipated that the London party will leave Waterloo at 12.30 p.m.; arriving at Dorchester 3.50 p.m. The return fare will be approximately £1, but if sufficient persons travel together we hope to have this reduced to 17s. single fare for the return journey.

The visit to Somerton can only be made by car parties, but it is absolutely essential that names be sent in immediately, so that the necessary permits may be issued.

It is the express wish of our President that as many of our members as possible avail themselves of this unique opportunity to visit these stations, and therefore it is requested that everyone interested should communicate with Headquarters at once.

Correspondence.

Can You Help, Please?

To the Editor of T. & R. BULLETIN.

DEAR SIR,—In the above-named College a small radio society has been formed, the object being to help us to know a little about the working of a radio receiver, and to aid any who may later wish to learn about the same. You will, no doubt, quite understand that it is rather difficult for us, for we have not the text-books at our disposal that an ordinary sighted person has.

We wondered if you might be able to help us in any way. We have a sighted member, who will be very pleased to read any articles that would help us.

There are one or two in the College, and members of the club who know a little about the working of a receiver, and I have managed to secure their services to give little talks, but, of course, this is *not* like expert knowledge. I wondered if it might be possible to link up with your Society, and should be very pleased to receive your advice on the matter. —I am, yours sincerely,

ARTHUR E. WILSON.

Royal Normal College for the Blind,
72, Westow Street, Upper Norwood,
London, S.E.19.
May 14, 1930.

[We have pleasure in publishing the above letter, and feel sure some of our London members will volunteer to assist the Royal Normal College for the Blind.—ED.]

On QSL Cards.

To the Editor of T. & R. BULLETIN.

SIR,—In the QSL remarks of the BULLETIN for March the following appears :—" There is little to report this month, except that all seems to be running smoothly." Although I have the greatest admiration for the excellent work performed by the QSL Section, I fear that unless the subject of the ignoring of QSL cards despatched to various European and overseas amateurs is fully ventilated, things will go from bad to worse, and the real object of QSL cards will eventually die for lack of support.

The following is my experience and, I believe, is typical of many others. I have recently finished the despatch of another 100 QSL cards to various amateurs throughout Europe and beyond, and have received about thirty cards in return for them.

I have always understood that it is the duty of an amateur who sends out a test or CQ call to forward a QSL card to the station with whom he has been in communication; indeed, in many cases I have been particularly asked to send a card with a promise that one will be sent me in return, but am sorry to state the promise has not always been fulfilled; this, I think, you will agree is not showing a true team spirit—and is not " playing the game."

Perhaps a circular letter to the various QSL agencies asking for their co-operation might result in an improvement; failing this the amateur, of course, always has the alternative of insisting on a QSL card being furnished by the amateur who sends out the test or CQ call before a card is sent to him.

I should like to hear the opinions of the amateurs whose cards have been ignored and what steps they would suggest to improve matters.

Yours faithfully,
" TRANSMITTER."

Where is your Article?

ARE YOU WEARING THE SOCIETY'S BADGE?

A Step Forward.

We are pleased to be able to draw the attention of readers to a new type of variable condenser that is being placed on the market by Messrs. Wingrove and Rogers, Ltd. This Polar Condenser has been designed for short wave reception and is, we think, the first of its type to appear on the British market. The condenser really consists of two condensers built into one. Designed for panel mounting with the conventional single hold fixing method, one condenser, known as the tuner, is controlled in the usual way from the front and has a maximum capacity of 20 mmfds. The other condenser, having a maximum capacity of 100 mmfds., and known as the tank, is controlled by a small knob and dial at the back of the condenser, and therefore inside the receiver : this dial is a small celluloid one with 10 equal divisions marked on it. It is so arranged that the setting can be read by means of a pointer when viewed from the front. The assembly is similar to the "Q.J." type, but is fitted with plain bearings at the ends and special phosphor bronze single ball bearings at the centre.

The use of a condenser of this type allows one to work on a considerable band on the higher frequencies on any single coil and yet be able to take any particular portion of the band and cover it slowly and carefully. On test this condenser was used to replace a standard 50 mmfds. S.W condenser. The minimum capacity of the new Polar was found to be well below that of the 50 mmfds., and it must be realised that the capacity of the Polar is really 120 mmfds. Further, the 7 and 14 M.C. amateur bands were spread out approximately three times more than they were on the 50 mmfds. The exact amount to which the bands are spread out will, of course, be directly proportional to the capacity of the tank condenser in use. The condenser is silent in action and the bearings appear to be good.

We think that this type of condenser should find a very ready use in all short-wave receivers, and we understand that a smaller type, more suited to 28 M.C. work, will soon be available, when possibly wə shall have an opportunity of referring to it in these columns.

We are grateful to Messrs. Wingrove & Rogers for having given the Society the first opportunity of referring to their new condenser through the medium of the Radio Technical Press.

Trade Notices.

Microfuses.

Microfuses are cheaper than valves, although the very low capacity fuses have had to be increased in price slightly ; the higher capacity ones, on the other hand, have been reduced from 2s. to 1s. 9d. Fuses are made to operate from 5-1,000 m/as at prices ranging from 4s. to 1s. 9d. They are rapid in action, have a practically constant resistance, and will not depreciate with time.

"Multitest."

Gambrell Radio, Ltd.'s "Multitest" meter should be invaluable to every amateur. The meter is a moving-coil, dead beat type with fifty even-scale divisions. It can be used to measure from 5 m/as to 5 amps., from 5 volts to 250 volts, and also as a resistance meter and as a general testing instrument. No external shunts are required, the various ranges being obtained by altering the position of a plug in the case. The internal resistance values are 200 ohms/volt, and the price is £3—C.O.D. if desired.

The new address of Messrs. Gambrell Radio, Ltd., is 6, Buckingham Street, Strand, W.C.2.

Clix.

The engraved insulators on various Clix specialities can now be obtained without extra charge. That is to say, the price of the engraved insulators has been reduced by ½d. per unit. Spade, hook, and ring terminals come within this category, and also some of the plugs, such as parallel and spring-screw.

We have recently examined specimens of the new Clix plugs, covered by Provisional Patent 36,544 of November, 1929. These are hollow, solid-ended pins provided with helical slots down the length of the tube. The pins make a very good fit in the socket with more spring than was possible with the older type of contact, and thereby more evenly distribute the contact pressure round the wall of the socket. By virtue of the helical slots, the combination of plug and socket is to a large extent self-cleaning. These pins should be particularly suitable for valve contact, and in fact for any connection where perfect contact is essential.

Ferranti Anode Feed Units.

With reference to the R.S.G.B. Universal 3 described in a recent issue, we have received from Messrs. Ferranti some literature concerning the use of the above units in that set. It is recommended that unit Type 3 be used in conjunction with resistances of 25,000 and 20,000 ohms which are suitable for use with the valves specified for the R.S.G.B. Universal 3. Maximum H.T. voltage 180 volts. This particular unit has been tested under the above conditions and it was found to increase the stability of the set very materially in addition to removing any tendency towards "motor-boating."

The price of the unit, complete with resistance shorting bar and instructions, is 17s. 6d.

Tuning Graphs.

We have received from Messrs. Wingrove and Rogers, Ltd., a useful tuning graph, printed on stout cardboard, with a convenient piece of silk attached for hanging on to the wall. The graph is marked horizontally with 180 divisions and labelled "Condenser degrees." Vertically it is marked with 140 divisions and labelled from 200 to 550 metres on one side and 1,050 to 1,750 metres on the other side. Thus, as it stands, it is only useful for the broadcast band, but if the vertical markings are erased we have a very useful little graph for the wavemeter, or the receiver. They may be obtained

price 2d., from most dealers, or through Messrs. Wingrove & Rogers.

A New Mullard Product.

A new Mullard super-power valve has just been introduced to the market, namely, the PM256A. With an impedance of 1,400 ohms and an amplification factor of 3.6 (giving a mutual of 2.6 ma/volt), it is capable of handling large signal voltages without overloading, and will deliver sufficient power for moving-coil speaker operation. It is priced at 15s.

The S4VA.

A new Mullard screened grid valve has made its appearance on the market, the S4VA. This is an indirectly heated valve with a mutual conductance of 3.5 mA/volt (anode impedance 430,000 ohms, amplification factor 1,500). The heater is the usual type of 4 volts 1 ampere. The characteristics of this valve appear to be a great improvement on existing types, though special care will have to be taken to ensure stability if the maximum stage gain is to be obtained.

Book Reviews.

REPORT OF THE RADIO RESEARCH BOARD for the period ending March 31, 1929. (Department of Scientific and Industrial Research.) Published under the authority of H.M. Stationery Office, 1930. 166 pages. Price 3s. 6d. net. Copies obtainable at H.M. Stationery Office. London: Adastral House, Kingsway, W.C.2. Manchester: York Street. Cardiff: 1, St. Andrew's Crescent. Edinburgh: 120, George Street. Belfast: 15, Donegal Square West.

It has been decided to issue each year a separate publication of the progress of the work carried out under the Board instead of including a summary in the Department's Annual Report, and this is the first of the yearly series. Such a step must be welcomed by all interested in experimental radio, and the present report should be carefully read by every amateur worthy of the name. It is immensely interesting and so packed with information that the reviewer must be excused if his few descriptive remarks appear rather kaleidoscopic.

The main sections of the Report are:—Propagation of Waves, Directional Wireless, Atmospherics, Radio Frequency Standards and Precision Measurements, The Study of Antennæ, Performance of Amplifiers, The Measurement of Interference caused by Radio Transmitting Stations, Preliminary Work on Short Waves.

The section dealing with Prof. Appleton's work in obtaining a direct experimental proof of the existence and effect of the Heaviside layer is perhaps the most important one, and the experiments carried out to discover the effect of trees, densely populated districts, and numerous receiving aerials on the attenuation of waves has a very immediate interest to amateurs.

A full account is given of the investigation of the height and variation of the layer, and it is proposed to employ the same experimental methods with waves down to 5 metres length. Experiments have already been made with 100 metre waves and the reflection of these waves at almost vertical incidence has been proved. A beam reflector will be used for ultra-short waves and thereby the angle of incidence on reaching the layer will be varied. The results of these experiments will be eagerly awaited by amateurs.

Direction finding errors have been studied with waves between 300 and 19,000 metres at distances up to 3,000 miles. It has been definitely established that variations on the ordinary direction-finders are caused by a horizontally polarised component of the down-coming wave. Certain work is in progress with a direction-finder which will eliminate errors due to this cause.

Automatic recorders of atmospherics have been in continual service in England, Shetland, Egypt and India for four years and have given valuable data. Cathode ray oscillograms of specimens of 50,000 observed atmospherics are shown, and much interesting information is given about the direction of arrival of atmospheric disturbances.

The Report is very largely descriptive and should be on every amateur's shelf—and well "thumbed." T. P. A.

THE THEORY OF ELECTRICAL ARTIFICIAL LINES AND FILTERS. By A. C. Bartlett, B.A. Chapman & Hall. 1930. 152 pages. 160 diagrams. Price 13s. 6d. net.

There is no doubt that repeated networks are becoming more and more important, and the author has endeavoured to give "a general introduction to the theory" and "to put the reader in a position to enter into the literature of the subject."

The subject is necessarily mathematical, and of the mathematical processes employed not all are included in the equipment of graduate engineers. It would seem a pity, therefore, that the author relies solely upon mathematical treatment and neglects the valuable physical conceptions which, even in this subject, make American technical literature so easily assimilated.

In Chapter 3 the author is considerate enough to give a brief explanation of continued fractions and continuants, and a similar treatment of difference equations in Chapter 1, rather than a reference, would have been helpful.

Chapter 1 deals in detail with the theory of T and π Section artificial lines, and Chapter 2 gives the general theory of repeated networks and the more general type of artificial line. Some generalisations of the T and π sections are given in Chapter 3. The other chapters deal with line balances, the coil-loaded telephone cable, high-pass and low-pass filters, phase-shifting networks, the homographic transformation and circle diagrams, and the general theory of the multi-stage thermionic valve amplifier. The treatment of the last depends on an extension of the artificial line methods, and it was noted that the author uses "m" to represent amplification constant, and ρ to represent the internal resistance of the valve. T. P. A.

CALIBRATION SERVICE.

The R.S.G.B. Calibration Service (Standard Frequency Transmission) will be transmitted from station G5BR on the first and third Sundays in each month and by station G5YK on the second and fourth Sundays according to the following schedule :

9.55 a.m. Series of X's, followed by a telephonic announcement that the calibration service is about to be transmitted.

10 a.m. Transmission on 7,050 K.C. (nominal).

10.5 a.m. Transmission on 7,250 K.C. (nominal).

The actual transmission will consist of the call (in Morse) "RSGB DE G——" (repeated), followed by a two-minute dash and the frequency used. The frequency of the preliminary announcement will be the same as that used for the first transmission : at the close of the second transmission a further short telephonic announcement will be made. Times are G.M.T. or B.S.T. as in force at the time.

CALLS HEARD.

By W. LOCKERBY, H.M.S. "Dahlia," Red Sea Patrol, c/o G.P.O., London (40-metre band), in the Red Sea :—au7av, cn8rux, ct1db, ct1ac, d4gk, d4afa, d4aq, ear37 *, ear97, ear94, eu2ih, eu9al, eu4aw, eu3kay, f8dt, f8dgq, f8nor, f8hcl, f8jq, f8gdb, f8lgb, g2vq *, g5zm *, g6gx, g5sn, g6pa *, haf9ad, haf2c, i1ail, i1llf, i1lla, pa0na, pa0ma, on4gw, on4kb, oz1jo *, oz1kg, oz1pp, oz1k, sm7rv *, sp1ak, sp3fy, sp3mb, sp3li, uo1cm, uo1jh, uo1yb, w2amr, w4al, w4we *, w8aq, w3aqo, w3ado, w9cek, w3ans, w2qf, w8cte, w4paa *, kfr6. All stations QSA5. Those marked with an asterisk have been heard several times and are "1930" stations. Call sign GMOR.

* * *

By A. M. RAHIM (VS7AP), Wellawatte, Colombo, Ceylon :—G : 2ao, 2ax, 2cj, 2dh, 2dw, 2dz, 2gf, 2gm, 2kf, 2lz, 2ma, 2nh, 2nl, 2vq, 2zp, 5bd, 5bj, 5fs, 5is, 5jf, 5ml, 5ms, 5pj, 5rq, 5tz, 5wk, 5yg, 5yk, 6bd, 6dh, 6dw, 6fy, 6gh, 6gs, 6hp, 6ll, 6nf, 6nx, 6qb, 6rb, 6vp, 6xb, 6xn, 6wt, 6wy ; gi5nj; ei8b.

IMPROVING THE BULLETIN?

HIC et UBIQUE.

A Query and Reply Section

It has been suggested to us that a Query and Reply Section be instituted in the BULLETIN. We shall be very pleased to commence such a section if contributions are received to help fill it, and we are confident we can rely upon some of our more technical members to supply answers. Names will not be published unless desired, though all communications must bear the name and address of the sender for record purposes.

* * *

Annual Convention, 1930

The Annual Convention will be held in London on Friday, September 26, and Saturday, September 27. Suggestions for improving the scope of the Convention and names of members offering or requiring accommodation should be forwarded promptly to the Hon. Secretary.

* * *

First Contacts

South Africa to New Zealand on 21 metres lodged by W. H. Heathcote ZT6X for a contact at 06.45 NZST on February 6, 1930, with ZL1AA.

G2CC disputes the claim of G2ZC mentioned on page 286 of the May, 1930, BULLETIN, and claims a contact with A7JB, Tasmania, on October 8, 1925, at 5.15 p.m. S.M.T. Tasmania.

* * *

A 56 M.C. Competition

Mr. E. T. Somerset has very kindly offered to award a General Radio 56 M.C. frequency meter to a member of the Society for the best design for a 56 M.C. receiver. Council have gratefully accepted the offer, and hope to see many designs for such a receiver submitted to them during the coming months. The award will be made at the Annual General Meeting in December, and all entries must be received before the first day of December next. Full details of the best designs will be published in the BULLETIN.

It is now up to the members of the Society to get down to work and produce a receiver which will be a credit to themselves and a joy to handle. Two points worth mentioning are (1) that a super-regenerative receiver should not be despised, and (2) that the band is a large one, and possibly more than 180° may be required to cover it.

* * * * *

QRA Section.

NEW QRA's.

G2HZ.—N. I. BOWER, Royal Signals Mess, Aldershot.
G2KO.—J. A. NORTH, Thorndale Farm, Wetwang, Malton, Yorks.
G2MR.—W. J. THOMPSON, 22, Portman Road, Kingston-on-Thames.
G2OI.—W. LUCAS, 64, Worsley Road, Winton, Patricroft, near Manchester.
G2PC.—A. G. DAVIES, " Rose Field," Hullen Road, Elland, Yorks.
G2VL.—G. A. VANDERVELL, 88, Victoria Road, London, N.W.10.
G2WJ.—R. L. ROYLE, " Cholmeleys," Beech Hill, Hadley Wood, Middlesex.
G5CL.—M. SHAW, 24, Ashcroft Drive, King's Park, Glasgow.
G5GY.—T. B. GREGORY, 60, Lea Road, Wallasey, Cheshire.
G5JW.—P. COX, 29, Claremont Avenue, Chorley, Lancs.
G5KU.—R. POLLOCK, 58, St. George's Avenue, London, N.7.
G5LF.—K. SECRETAN, 407, Upper Richmond Road, London, S.W.15.
G5RG.—A. G. BURGESS, 189, Gunnersbury Lane, London, W.3.
G5RR.—Portable station of G2WJ.
G5RV.—R. L. VARNEY, 64, Marconi Road, Chelmsford, Essex.
G5YN.—E. Y. NEPEAN, " Westleigh," Warminster, Wilts.
G6BT.—C. A. JAMBLIN, 121, Queen's Road, Bury St. Edmunds, Suffolk.
G6IL.—J. H. ROSCOE, 31, Ashlea Road, Ponsley Wirral, Cheshire.
G6LF.—J. H. GOODLIFF, 609, Queen's Road, Sheffield.
G6QA.—T. A. WHITELEY, 82, Molyneux Street, Rochdale, Lancs.
G6SC.—S. H. CHAPPLE, 9, Ryfold Road, London, S.W.19.
G6SV.—M. SAVAGE, 6, Roseneath Avenue, London, N.21.
G6WY.—H. A. M. WHYTE, " Killiney," Worsley Bridge Road, Beckenham, Kent.
G6XC.—A. CROSS, 14, Victoria Road, Swindon.
2ABA.—K. C. RADBURN, 16, Tavern Street, Ipswich.
2BBQ.—J. R. BOOTE, 1, First Avenue, St. Anne's Park, Bristol.
2BJR.—G. A. SWINERTON, 109, Shireland Road, Smethwick, Birmingham.
2BMZ.—D. L. C. CREEDY, 75, Canterbury Road, Harrow, Middlesex.

The following are cancelled :—G2KG, G2MM, G5OX, G6AY, G6YI, 2ABQ, 2AUT, 2BQQ, 2BRB.

QRA'S wanted :—G2AZ, G5HO, PY9AD.

M. W. P.

QSL Section.

Amongst the correspondence columns this month you will find a letter signed by " Transmitter," who complains that QSL cards are likely to die out for lack of support unless something is done to stop the present attitude of transmitters towards QSL, and it seems that some comment is called for from the Section.

First, we must try to decide why it is that we do not receive a card for a card and a photo for a photo every time, and there seems to be two possible answers to the question : (1) The cards do not reach their destination either in one direction or the other. (2) Replies are not made to the cards by the transmitters concerned.

Dealing with (1) first. I can assure you that all cards received at H.Q. for foreign destinations are forwarded at intervals of a week or so to the QSL agency concerned and, although little is known of some of the more distant agencies, particularly in S. America, it is certain that 99 per cent. of the QSL agencies of the world are active and reasonably efficient.

Having decided to acquit the QSL agencies of the major portion of the blame, we have still to consider a further reason why cards may not reach a particular amateur although his agency may have done its best for him. There are a large number of transmitters who, although active, do not trouble to renew supplies of self-addressed envelopes at H.Q., and as a consequence cards coming into the Section for them are held up indefinitely until envelopes arrive—if ever.

This latter difficulty does not arise with regard to cards addressed to W stations, as the A.R.R.L. makes it a rule to post every card coming into their hands direct to its destination free of charge ; unfortunately R.S.G.B. cannot accept such financial responsibility at present. In other countries, however, the envelope system is in use, and probably explains why some, at least, of your cards remain unanswered.

Turning to possibility (2), as mentioned above, we will examine the case of an amateur who does not reply to QSL cards sent to him. In many cases carelessness is at the root of the trouble, and although a transmitter may be quite sincere when he promises to QSL at the end of a QSO, it is more than probable he forgets all about it ten minutes later and by the time the other man's card arrives he has quite forgotten whether a card was sent or not, and in those circumstances usually gives himself the benefit of the doubt. Then there is the man who doesn't care a rap for QSL cards and the one who cares only for cards relating to DX QSO's.

" Transmitter's " grouse is directed chiefly against such as the above, and it must be very discouraging to send out hundreds of cards and receive a miserable twenty or so in reply ; on the other hand, I think our imaginary amateur has quite a definite point of view and might well say that, in his opinion, the QSL has lost all of its original value as a confirmation of contact, and that in the year of DX, 1930, it is about as logical to ask for confirmation of a local QSO as to expect to receive a receipt for your penny when you buy a paper at the station in the morning. He might point out that he has no desire whatever to go on collecting an unlimited supply of French cards when, if he cares to get up early enough, he can work Australia and New Zealand, and will tell you that if he wants a card from a transmitter there he will send a QSL card without waiting for the other man.

Taking into account all the foregoing, I think we are safe in assuming that amateurs do not reply to their QSL's because, in the majority of cases, local cards are not wanted, for if they were, people would surely have QSL'd in the first place and, as " Transmitter " points out, there are about seventy amateurs in every hundred who have not sufficient interest in card collecting to make certain of being first with a card.

The " Non-QSL's " being in such a large majority, it seems that the ardent collector's best safeguard against waste of his cards is to make *certain* during the QSO that the other man understands definitely what is required of him and undertakes to carry this out. It isn't enough to say " Please QSL " at the end of a QSO, but something emphatic and to the point will show the amateur that you do really mean what you say.

Finally, it should be a matter of common courtesy amongst amateurs to answer every card received, especially if the card happens to be from a BRS station, as sending report cards is about the only way our BRS and AA men can show that they are interested in our transmissions, and the least we can do in order to show our appreciation of this interest is to make sure that their cards do not go unanswered. Members would do well to remember that a QSL card means a great deal more to the receiving station than the average transmitter, and it would be interesting to know how many R.S.G.B. members obtained their first introduction to the society because of a few cheery words on the bottom of a QSL card.

Whether you send cards to other people or not, it's up to you to answer those sent to you at all events.

J. D. C.

Contact Bureau Notes.

By H. J. Powditch (G5VL).

SUMMER is said to be coming. I hear that there have been recorded officially 63 gales and five hurricanes in this " Sunny South-West " during the past winter. Just at present it is reminiscent of a summer day near the North Pole, and soon the rainy season usually associated with the holiday months may be expected. All this is nothing to do with C.B. directly, but, looking back over the radio season with its mixed conditions, there seems to be some indirect connection. It's certainly been a " Curate's eggish " kind of season. Now we have a suggestion of worse to come contained in an article printed later. If Group 2B have any further cheery prognostications to fire off, let's have them all and get the agony over !

Against this there is proof from the tests that the 2 M.C. band will be capable of keeping us in touch over Great Britain. A report of these tests is shown elsewhere, and even our evil prophets. . . . Sorry. Prophets of evil it should be—seem to think that this band will be available.

YOUR SUBSCRIPTION MAY BE DUE—IS IT?

Congratulations to G6YL, who takes the prize for reception, and to G6ZH, who is highest on transmitters, and a personal word of thanks in each case for the very clear reports sent in by both.

Without desiring to imply any reflection upon the above-mentioned seers and future conditions, we have decided that next year's 28 M.C. tests will be held in January, 1931. It is long notice, but in view of the general interest excited here and abroad, and in order to " book the date " in good time, the announcement is now made.

For those who only read the headlines : JANUARY, 1931, IS 28 M.C. MONTH.

The band usually gets busy in late autumn, and should give time for DX trial work even if the summer proves again dud. The A.R.R.L. tests may give a line upon summer possibilities, and as G.C.'s have already heard, I would ask all members to let C.B. have their reports before these go to A.R.R.L. They will be forwarded from here.

From the South African *Ultra Bulletin*, dated April 16, I take a list of G stations heard and worked by VQ2BH in March : G—6LL *, 6WT, 6HP *, 5ML *, 5YK, 6OO, 6DH *, 2CX *, 5CJ *. Also a sketch of his transmitting circuit. VQ2BH was heard by everyone here, and the gear will probably be of interest. Some of our QRM sufferers will sympathise with ZT6C, who started to listen to NKF in a shack with a galvanised iron roof. Shortly afterwards an African hail storm occurred !

Mr. Maxwell Howden, Director of Research, Wireless Institute of Australia (Victorian Division), VK3BQ, gives details of activities " down under." As you know, no G's were heard, and the VK/XU contact mentioned last month was the best DX. The ZL/W6 contact was heard in VK, but they failed to raise W6 from there. VK3WG, VK3HK and VK4RB were heard in U.S.A. Many other inter VK and VK/ZL contacts are reported. VK3BQ was in touch with XU again several times. The latter station also worked VK5HG, whose sigs were not audible in VK3. J2BY was worked last year, but has not been heard lately.

From ZL1FW also comes news of the ZL/W6 and ZL/XU contacts. The latter is said to be R6 at Auckland. During the tests close watch was kept for our sigs, but N.D. ZL1FW, ZL1AB, ZL1FT and others are willing to keep up the watch on sked if G's will advise them of dates.

The ZL's are on from 21.20 Saturday till 04.20 Sunday (G.M.T.). It would appear that this misses best times in England, as we have found so far. In fact, with the difference of times it is hard to see when is likely to prove the best.

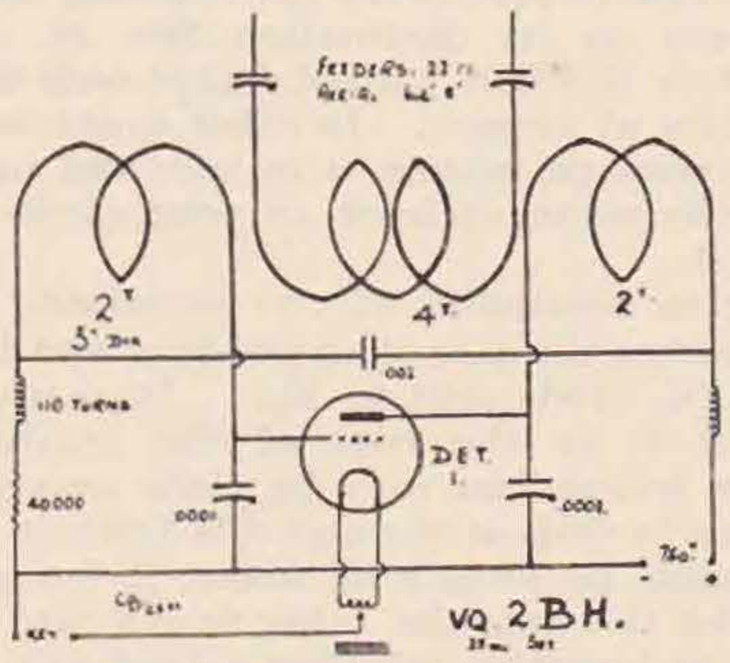
VK3BQ thinks that between 07 and 11 G.M.T. is the most likely time, and especially asks our 28 M.C. stations to " Keep on trying." I omitted to mention previously that he is a strong supporter of indirectly heated A.C. valves, and has used them for the past year. G6LL, G6VP and others seem to be following in the same tracks here.

SM6WL tells me that he is commencing some tests with beam antenna on 28 M.C. band. These will be working about June 15 and continue to August 5. Calls will be SM6WL and SM6ZB, and reports are wanted from any receiving stations. The band has been dead at Gothenburg since early May, SU8RS being the last station heard. 56 M.C. sigs may also be radiated, and out groups are asked to keep an ear open.

From a letter to G2DT from ZS4M it seems that a nucleus of 56 M.C. stations is forming there. If they do as well on the ultra-ultras as on the 28M. C. band we will have to look to our laurels.

W1ZL is able and willing to carry on 28 M.C. tests. He worked G6LL and heard G2DH. G2OD has been copied previously and also ZS4M.

Turning to lower frequencies. In place of the usual Group description there is an account of G6PP's views on the trend of high-frequency transmission during the coming year or two. If his conjectures are correct not only will a total change take place in DX and local communication,



but also it seems that the best times for such communication as may be possible will vary from the past periods. The G.C. of 2B asks very earnestly for any data affecting conditions and changes that have been noticed on 1 M.C. to 3 M.C. during the past few years. Further, any future facts will be collected by the group and used. Notes of such happenings to G2ZC, please. Possibly the commercial stations will serve as markers for any one who cares to observe consistently for a long period, and G2ZC adds that S.W. commercial communication is likely to suffer if the theory advanced by G6PP is substantiated.

* * * * *

G6PP writes : I will start off by asking a question, namely, what has happened to conditions lately ? If anybody thinks he can give a really satisfactory answer I shall be most interested to hear what he has got to say.

In case conditions have been quite different to those prevailing here, and for the benefit of anyone who has been unable to take any observations recently, I'll give a short account of what I, in common with G2ZC, G6YL and G2IM have been experiencing.

In the past we have always regarded 7 M.C. as being a band on which short-distance contacts could be accomplished with ease in daylight, with occasional spasms of DX, and at night anything up to 10,000 or 12,000 miles could be bridged. In view of this, the G2ZC-G6YL-G6PP Monday schedule came into being, and was carried on for nearly two years with but a single break. Now all this has changed, and the sked has failed, as far as three-way communication is concerned, for three weeks in succession.

It was not the fault of the apparatus used, for neither G2IM nor I could hear the faintest sound of either of the other two stations in question, nor they of me.

Instead of that, it has been comparatively easy to work over distances of 500, 600 or even 1,000 miles in the mornings, but impossible to do anything less than that, circumstances one would associate with 14 M.C., but hardly 7 M.C. At night it has been extremely difficult to get anywhere at all, or to hear much either, except for a few high-power commercials, which seem to cut through anything, but even they were much below normal strength, and generally hollow in tone. (Make a note of this, I'll mention it later on.)

Now there must be a very good reason for all these freak (?) conditions, and I've been puzzling my head trying to find a feasible solution and think I have succeeded.

I am going to presume the existence of the Heaviside layer, because, without that, my theory would fall to pieces.

We know that sun-spots occur in cycles, and our astronomical friends tell us that the minimum of activity in that direction takes place every eleven years. As the last minimum occurred in 1922, it needs but little calculation to prove that the next one will be in 1933, which year we are rapidly approaching. Unfortunately, 7 M.C. was a veritable "No Man's Land" in 1922, and even in 1924 to a lesser extent, so I can make no comparisons as far as conditions go, and must work entirely on supposition.

I suggest that the sun in general attracts the Heaviside layer and pulls it towards itself, thus making it more or less elliptic, and I furthermore suggest that that gravitational pull, for such it is, is less during a sun-spot maximum than it is during a minimum.

This distortion and possibly consequent surface irregularities seem to explain why it has been possible to hear stations 1,000 miles away at night on 7 M.C. on a few rare occasions during the last week or so. But these signals have invariably been accompanied by very bad fading, which suggests a varying surface on the layer. As regards the high-power commercials, and their hollow notes, it seems very likely that the signals go round the world once or twice, rebounding off the layer possibly more than once before reaching the receiver, and they don't get absorbed owing to the high power used. Low-power amateur signals quickly get swallowed up, and that's why they are so scarce at night now.

It strikes me as being a possibility that, as the sun-spot minimum approaches nearer, the layer will become more and more distorted in shape, until on the "night" side it will be only a comparatively few miles above the earth. Exactly what will happen then I can't say, but probably complete fade out of all signals except locals after dark, and for contacts of 20-300 miles or so we shall, as G2ZC has already suggested, have to emigrate back to 1·7 M.C.

Group Reports.

28 M.C. Work.

Group 1*B*.—From memory G.C. 5SY breaks a record by failing with a report. (I shall not be able to use this piece of padding again, 5SY.)

Group 1*C*.—G.C. G6VP has been held up by BCL's with groundless complaints. Only locals have been worked, but opportunity has been taken to make the CO and FD's as "hot as possible." He regrets to announce two crystals as casualties during these operations. G5YK worked SU8RS on sked R7/8 each way on April 13. He is using a DET1SW to modulate a SW/50 PA, and proposes to follow G6LL (and VK3BQ) with A.C. valves in receiver. G6WN are rebuilding QRO and report good results from RAC (Tannoy) on receiver. G6DH has been touring the provinces, but reports SU and VQ heard on April 1, the last DX. He recommends an article on TH recently published in *Experimental Wireless* to the attention of all hams. 2BIV finds adverse conditions, but is sticking to receiver. BRS190 drops out, unfortunately, but I hope YI6HT will take his place.

Group 1*F*.—G.C. BRS25 finds the band dead now. His change of QRA leaves him little time for any special work. W2BWX is said to be coming to 28 M.C. with 500 watts behind him. Other members of the group do not report.

Group 1*H*.—G.C. G6OO finds his group unenthusiastic, but is himself keeping on the band. G6UJ is erecting a "rotatable" aerial under roof and G6OO will be supporting his tests. The latter is busy with a beam aerial (NKF type). Both stations want help from others at a distance, as their own stations are only 10 miles apart. As G6OO reached VQ and G6UJ VH lately, some Colonial stations may care to collaborate.

Fading, Blanketing and Blindspotting.

Group 2*B*.—The group are discussing the subject of absorption this month, and until all reports are in, and a summary made, there is little to offer. The subject of the recent fade out of nearby signals on 7 M.C. is also under review, and any of the members of 2B will be glad to receive co-operation from other members of the R.S.G.B. Roughly, the position is that we are all experiencing a difficulty in receiving nearby signals, and the area seems to be spreading. G.C. G2ZC first noticed this starting in July, 1929, and reports are coming in from all quarters showing that we are approaching a time that is going to upset all known ideas of DX. G2IM, G2ZC, G6PP and G6YL have been conducting tests, and it is found that a mid-day QSO between the two most distant ones can be effected, without the ones in the middle hearing them, or of their being heard by the distant ones. We are awaiting a report from our two CT members to see if Portugal is likewise affected, and a report has been received from the R.T.U.N.I., who have kindly collected information, that the same conditions are holding good in Ireland. Owing to the lack of information during 1922 to 1925 regarding short waves, it is difficult to compare results, but at the same time two members of the group are under the

impression that the sun spot cycle theory is now going to be put to the test, and as we are approaching the peak (1933) it might easily account for the irregularity of SW's. If it functions as it is expected to, in theory, the use of the ultra short waves may indeed become useless during the peak period, and in future we may have to not only adopt certain bands for night and day work, but actually adopt different bands to suit the sun spot cycle. It is, perhaps, a little early to lay anything down, but the group will be glad to receive information from hams who, with regular experience of the different bands, can offer a definite improvement report on the lower frequencies, and a falling off on the higher ones. Reports on the I M.C. band will be particularly worth taking note of.

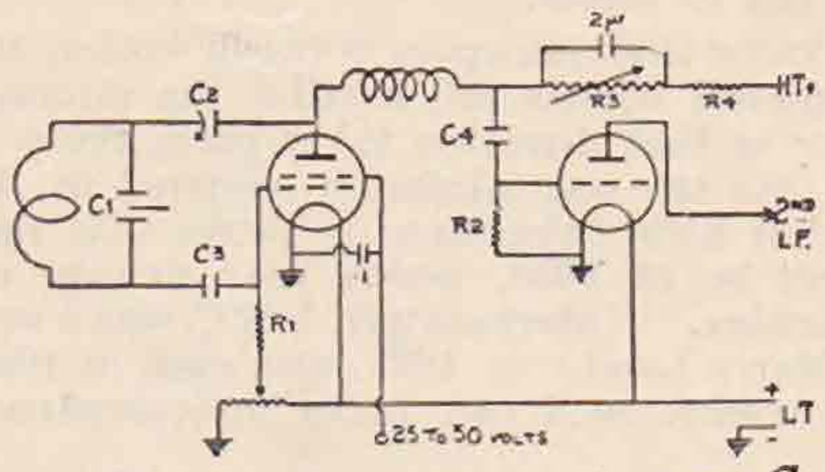
For the next two months G2IM is acting as G.C. during the absence of G2ZC.

56 M.C. Work.

Group 7A.—G.C. G2DT has been experiencing a lot of trouble in attempted modifications of the usually accepted standard type of receiver so decided to break away, and is engaged upon perfecting a S.G. receiver using the ultraudion circuit as shown in the theoretical diagram. As this receiver was only completed the day before going to press it is impossible to express an opinion on it, but it can be stated, with much joy, that it possesses two virtues, ability to oscillate readily and freedom from microphonic noises. The valve used is a Mazda SG215, and it will be found that SG valves vary individually as regards their requirements, but between 35 and 50 shield grid volts will be near the mark. The plate resistance is of 25,000 ohms, as this is found to be more satisfactory than the suggested $\frac{1}{4}$ megohm which, of course, means vastly higher applied potential in view of the fact that the plate of the SG215 is drawing 0·5 m/a. Reaction control by means of the 50,000-ohm variable resister is delightfully smooth and silent if shunted by a 2-mfd. fixed condenser as shown at C3. The bypass capacity variable condenser consists of two $\frac{1}{8}$-in. strips of copper measuring $3\frac{1}{2}$ ins. high by $1\frac{1}{4}$ ins. wide, mounted $\frac{5}{8}$ in. apart on two GR stand-off insulators, and the movable portion is two brass square law plates $2\frac{1}{2}$ ins. long soldered one $\frac{1}{2}$ in. apart by means of narrow strips of brass at two points just to keep them rigid. They are then clamped to an extension handle, which is held in position by an inverted U mounted on a stand-off insulator and so placed that this movable portion rotates within the fixed vanes. G6TW is arranging for SW (sweet wife) to operate his transmitter whilst he disappears complete with receiver to plot strength at various distances. This should prove to be very interesting. He has been experimenting with ethereal adornments and finds for a half-wave voltage-fed Hertz with single transmission line that the juncture of the latter to the horizontal should be at exactly 4 ins. from the home end for a frequency of 57,000 K.C. G6TW undoubtedly designed a VFB transmitting circuit, and the GC can second his statement that he considers it "takes some beating." (Diagram in BULLETIN of April, 1930.)

G5WK is, glad to report, just ready to enter the arena and push out full-blown xtal control signals. (Congrats! but won't they be too "sharp" to be picked up, OM?—G.C.) Dr. Stoye—known to most—believes that three metres holds out more hope owing to his recent successes over short distances upon that QRH, but is now standing by for G6TW and G2DT as per schedule published last month. He recommends a vertical transmitting aerial.

G6XN has built a satisfactory portable receiver of the tube base variety. He appears to have had a very successful field day on May 4 with Group 7B, and is now all in favour of a half-wave vertical antenna, as recommended by Dr. Stoye. It appears that G6CO in London undoubtedly picked up a fragment of the transmission made on the Hog's Back as details and time tally with the transmission being sent out by G5YC—one of the field day participants. (VFB, OM's—G2DT.) G6XN will be running the following additional schedule on approximately 5·2 metres:—Sundays: Transmit 14.00 to 14.10 and 15.00 to 15.10 B.S.T.; receive 14.10 to 14.20 and 15.10 to 15.20 B.S.T. Please take note of the schedules in operation by G6TW, G6XN and G2DT as between 14.00 and 15.00. The following will also be on the air between 5·2 and 5·3 metres: G6CO, G2OW, G2OL and G5QB.



EXPERIMENTAL S-G 56-Mc RECEIVER AT G2DT. (6)

C1	Bypass capacity.	R1	2 to 4 megohms.
C2	200 to 300-mmf.	R2	100,000-ohms.
C3	100-mmf.	R3	50,000-ohms.
C4	0.01-mf.	R4	25,000-ohms.

Group 7B.—G.C. G2OL sends in an account of the field day held on April 16. The object was to investigate the effects of hills and open air reception generally. G6XN ran transmitters at G2OL and G2OW. The former station used a $\frac{3}{4}$ wave 20m. plus 1m. aerial screened by trees and the latter a $\frac{3}{4}$ wave 20m. plus a $\frac{1}{4}$-wave CP. G2OL's aerial was N. to S., with lead-in at N. G2OW aerial, E. to W., with lead-in at E. The tests were made in afternoon. First was on Hosenden Hill, 2 miles from transmitters. The portable aerial was 12m. long and some 5 to 6 ft. above ground. A.D.1LF set connected to end nearest transmitter gave 2OL sigs at R4/5 and 2OW at R3, the power used being roughly 10 and 6 respectively. Height of receiver on this test was 160 ft. above M.S.L. At $2\frac{1}{4}$ miles, with a height of 120 ft. and the hill directly between receiver and transmitter, signals rose to R6 and R3/4. This reading was made with aerial in line with transmitter and receiver at further end. Leaving the receiver in position, the free end of aerial was swung round through about 160 degrees, and with it at approximately right angle to transmitter (lengthways on) sigs. fell to R2. At $4\frac{1}{4}$ miles, behind Harrow Hill, with an altitude of 240 ft., sigs. dropped to R3/4 and a doubtful R2/3. Rotating the aerial in this position gave only a small drop, R3/2, still at approximate right angle to transmitter. At Northolt, 3 miles, another trial was made, but time did not permit definite results. No fading was noticed. A study of car QRM was however made. Other reports from the group tell

GET THAT "BULLETIN" FEELING AND TELL US ABOUT IT.

that BRS310, the latest member, takes hold at once and uses the receiver mentioned in the 28 M.C. tests report last month with about 68 ft. of aerial. Beside the EU signal (? harmonic), several weak sigs. have been heard. A 30-ohm filament rheostat makes a good H.F. choke. G6WN are expecting to use the new QRO 28 M.C. transmitter for 56 M.C. when completed. G6SO has been QSO G2OW and G2OL. He cannot hear G2XN at 1½ miles, but the latter's sigs. are heard at 5 miles by G2OW. G2BY has heard G2OL, G2OW and G6CO, all R7/8 without aerial. A reduction of strength happens with aerial connected, and as it may mean that a very short aerial is better G.C. wishes to know length between switch and set. G2OW has also worked G6CO and G2OL with " break-in " fone to latter. He suggests an adaptation of the Lecher wire system for measurement of wave-length. In place of the usual lamp indicator he finds it quite satisfactory to run a finger along the aerial of receiver until a position is found where the set is not affected. Another similar point is located further along, and the distance between the points is half wave as usual. This is stated to give correct results within very small limits. It obviously locates current, but the hand capacity seems to me liable to affect results. G2OL finds standing waves in everything, H.T. leads to fone cords. He keeps a nightly sked with BRS310, and contemplates experiments with parabolic reflectors. Finally, G.C. G2OL adds confirmation of the 7A report that G6CO picked up signals from a XG5YC when the latter was " field-daying " at Guildford, some 30 miles from receiver. 10 watts gave R4 reception. FB, OM's.

QRP Work.

Group 8A.—G.C. G2ZN has had only local contacts, and also some set trouble. G5RV is at new QRA, but " under the shadow of G5SW." Work on 14 M.C. is difficult. A quick change set for QRO/QRP tests is in use. G5FA has a W QRP report, and finds a CF Zep better than AOG with less feed. Note improvement is also apparent. 2AUT is all set for radiating ticket. 2AZR reports all other members of the group. He prefers wind and driving rain for reception of QRP stations. (Why ?) G.C. suggests arranging a tornado when required to get that last continent for QRP WAC. A test with G2ZN showed drop from R7 to R5 at dusk at 2 miles.

Group 8B.—G.C. G2VV has, in spite of unsettled conditions, had good European contacts. ES and YM make 32 countries. 14 M.C. has been found bad. Reports with 4 watts range up to R8 from 1. G2VV is No. 2 of Group to try 2 M.C. band, and gets out there. G5CM, G6SO, also shift out of the din on Sundays, and hope to take the other members with them. G6SO was No. 1 to get going on 2 M.C., and took part in tests there. G2OA finds his " modulated note " better read. A W1 QSO and W8 report, but still thinks conditions bad. G5CM also says poor. He is another 2 M.C. worker. G.C. says the new T.P.T.G. receiver is very good. G2RT is still QRT, aerial crash. G5JF covers all Russia and is heard in Siberia. His 5 watts reach VS, VE, ships off Africa, etc. A 70-ft. high aerial makes some difference, says G.C. Fone to SM, EAR, OK, etc., is good going.

Group 8D.—G.C. G2XB has only a little 2 M.C. work to report. G2GA reports EU on 3½ watts, and also tried 2 M.C. Conditions again erratic. G6HK is interested in the directional powers, if any, of ½ wave V.F. Zep. A CC carrier refuses to accept fone modulation so far. G2SA finds contradictory results when trying to fit results to lunar phases. 7 M.C. has carried him to EU, EAR and Crimea. G2YU is starting another world tour with 6 watts on 14 M.C. So far W, VE and PY are reached. G6GL is a defaulter, but has been located as on 2 M.C. G.C.'s of all other QRP groups are requested to accept this, the only intimation, that 8D intend to leave them in the cold soon. (That is the spirit.—G5VL.)

Will the QRP Groups note G2ZC's request for notes of conditions. I fancy they could assist 2B a great deal, as they are bound to notice lesser variations than QRO stations.

2 M.C. Work

Group 10A.—G.C. G6OT says that he had two very interesting days for the first two of tests. Unfortunately he had to be off the air later. The third week he could not work at all, and only for a short period on fourth Sunday. G5UM unfortunately has also been off for a time. G5RX is in the same position, rebuilding. G6QC was bust and used a CC set working into a PA with loose coupled aerial. He notes the trouble of heavy QRN, which usually seems to arrive after dark.

I hope that more of the 2 M.C. people will now work in with 10A and get organised tests on this band in trim. After all, there must be something to be picked up by correspondence with other 2 M.C. enthusiasts as against ploughing a lonely furrow.

The 2 M.C. Band Tests.

AFTER the 28 M.C. test report, I expected that the 2 M.C. would be an easy job. But—it's by far worse. There is so little upon which one can lay hands and say THIS is the reason for such results. We set out in these tests to show that 2 M.C. with only the permitted 10 watts was good enough (and then some over) to cover the local traffic now squashed into 7 M.C. band. We said we would transmit a whole string of figures relating to weather as test messages and so ensure that a good contact was made in every QSO. And—we would not use more than 10 watts. The only thing that has spoilt our efforts is that so few stations troubled to try out the idea. Detailed reports came in from eleven only for the period. Other stations had a go for perhaps one day. Many others joined in the fun, but did not waste the requisite energy to send us an account of their results. However, we know that we have a nucleus interested and keen—and sincerely hope they got some profit and amusement out of the business. But where are all the BRS stations ? Not on 2 M.C., that's certain. And now, before I go further, let me give the stations who are interested

in 2 M.C. They are : G5AV, G2GG, G6MN, G6OO, G6OT, G6QC, G6SO, G5UB, G6UJ, G6ZH, G6FO, G2ZN, G2AX, 2BHK, BRS317. Last, and in a class by herself, G6YL. The log of reception sent by Miss Dunn obviously represents real listening and ability to handle a set such as few of us bother to acquire. It's too like work—but the results that can be obtained, and have been in this case, should make it plain that it's well worth work to get the knack.

The transmitters' results are shown later in detail, but early in the day it became obvious that G6ZH meant to hold my cup if his valve stood the strain. It did—and he scored 89 points ; G2GG being runner-up with 61 points. The former station worked each one of the stations who reported consistently. His QRA is Swindon, Wilts, and test messages were exchanged with Berks, Mon, Staffs, Glos, London, E. and W. Yorks, Denbigh, Lancs, Wilts, Notts, and Devon. Bearing in mind that there are, at present, only a limited number of stations working on the band, the possibilities of its use for local work with a greater number of users are proven. There is only one drawback, and this is a mild form of QRM as compared with 7 M.C. Several stations in tests complain of what one calls "persistent gramophone grinders." It's a pity that inoculation against this complaint cannot be made before a radiating permit is granted. Most of the reporting stations seem to be CC, and new stations who may start up should be able to find free channels clear of the frequencies already covered, providing a little observation is first made.

In short, the tests prove conclusively that with 10 watts or less the whole of England can be covered comfortably both in light and dark.

The general results appear to show little difference for the days. If anything, April 13 gave the best results, April 27 being second. April 20 was unreliable for comparison owing to holiday period, and April 6 was fair only, although communication was possible in all directions. These differences are so small as compared with the other bands that (as I said earlier) it is difficult to make comparisons.

On the receiving side, G6YL collected 186 points. No one else comes within a long distance, and the receiving trophy will find a home in Northumberland for 1930. The feat is made more difficult by the fact that the QRA is the furthest point from London as regards England, and signals from southern stations have to traverse the country.

Both G6ZH and G2GG were in a rather better geographical position for bringing in signals from all directions. G5UB and G6FO were not so well placed.

The actual numbers of contacts made are shown below :—

STATIONS WORKED (WITH FULL WEATHER DETAILS EXCHANGED).

G6ZH (Swindon).—6th : Day 5, night 7. 13th : Day 10, night 9. 20th : Day 7, night 5. 27th : Day 9, night 6. Points, 89.

G2GG (Newbury).—6th : Day 4, night 4. 13th : Day 6, night 4. 20th : Day 7, night 2. 27th : Day 6, night 5. Points, 61.

G5UB (W. Yorks).—6th : Day 0, Night 2. 13th : Day 5, night 9. 20th : Day 2, night 4. 27th : Day 6, night 7. Points, 48.

G6FO (Mon).—6th : Day 3, night 4. 13th : Day 5, night 4. 20th : Day 3, night 1. 27th : Day 5, night 0. Points, 42.

Other stations who sent in consistent reports are : G6UJ (E. Yorks), with seven stations on 6th, 12 on 13th, and 11 on 27th ; points, 39 for three weeks. G6OT (London), with 12 on 6th, 13 on 13th, and two on 27th ; total points, 35 for three weeks. G6OO had seven on 6th, six on 13th, three on 20th, and two on 27th ; points, 29. G5AV worked two on 6th, seven on 13th, four on 20th, and five on 27th ; total points, 22. G6SO (Tamworth) worked four on 13th, three on 20th, and four on 27th. G6MN (Worksop) had one on 6th, four on 13th, and four on 27th. G6QC (London) returned two on 6th, four on 13th, two on 20th, and one on 27th.

Unfortunately all four weeks were so much alike as regards weather that it seems impossible to form any opinion of the influence exerted by conditions. Cloudy weather with, in some instances, rain was the most common condition and, taking the results into consideration, we have so little deviation that no day stands out concerning which it can be said there is anything out of the usual to investigate.

Even the moon (on which so many theories have been based) fails to show any decided effect. My opinion is that general reliability over a fairly long period is the only conclusion we can draw. I do not expect the technical members of Group 10A to agree with this, for they will quote variations noted at their stations on other days, but probably they will admit that their 2 M.C. band is the least susceptible to variation of any in regular use. If they would care to go through the detailed log sheets, I will let them have these.

G6ZH, the winner, seems to agree roughly with me. He cannot find that results show any relation to weather conditions, although, if anything, he prefers a large depression with rain and W. to S.W. wind. This preference does not appear to be very definite. Yorkshire stations seemed the most consistent at Swindon. It will be noticed that stations in other parts do not agree with this ; probably there is the usual optimum distance. The distance in this case is about 175 miles. The set used by G6ZH was a T.P.T.G. with 360 volts to LS5 ; aerial, inverted L, 82ft. long, with three wire CP ; receiver is a standard SG D LF.

G2GG found reception easier during the day for DX owing to lack of QRM and background. Below 100 miles, day seems best providing QRM is not too bad. Short ranges are easy at night, but daylight is preferred. A station in Essex was worked, who stated his power was under one watt. G2GG worked nine out of the ten reporting stations, besides many contacts with other stations not taking part in the tests.

G5UB, although situate in W. Yorks, exchanged messages with stations in Wilts, Devon, Somerset, Berks, London, Hants, Notts, Mon, Lancs, Denbigh, and E. Yorks. Eight out of the ten regular stations were worked.

G6FO (Newport, Mon) notes that local stations are usually weaker at night than in daylight ; but, on the other hand, distant stations not audible in daylight can be heard and worked after dark. On April 13, signals from G6FO appeared to reach all stations, but signals reaching there from other parts of the country were weak and difficult to copy. Weather seemed to be similar in other districts.

This day gave the best results for other parts of the country as shown by the returns, and the peculiarity noted here does not seem to have been observed elsewhere.

G6FO is on the extreme West, and apparently suffered from local conditions. He also agrees that weather apparently does not affect results.

G5AV (Old Colwyn) was unfortunate in that he had a breakdown on the 6th. Fone QRM seems to be virulent, and many stations from S.E. England replied to him, but the QRM prevented contacts. EI7B was worked well on the 13th.

G6MN (Worksop, Notts) seems to have effected a quick change from 28 M.C. to 2 M.C. He worked London and many other stations. Cloud appears to have been very heavy on the 27th—his best day.

G6OT (London), as would be expected, pushed messages to all parts. His transmitter is a CO on 915 K.C., FD 1,830 K.C. (both LS5B), and LS5 as PA; a three-stage amplifier feeds a DET1 as modulator. Mike is a modified Riesz carbon type. The aerial is 55ft. twin, 38ft. above ground, and two-wire CP 10ft. above ground. Receiver is a neutralised HF, 1LF set working on indoor aerial. It is a pity that this station was off for the holiday week, as both the 6th and the 13th showed good results.

G6OO (Bridlington, Yorks) had no particular results. He worked over the whole country and, like the previous stations, effected a quick change from 28 M.C.

G6QC (London) found QRN and fone QRM his chief trials. However, contact was kept with Yorks, Bristol, and Newport amongst others.

G6SO (Tamworth, Staffs), using 4.8 watts, worked Bristol, Newbury, etc., in daylight.

G6UJ (Driffield, Yorks) worked eight of the ten stations reporting. In his case the 13th and the 27th seemed better than the 6th. Cloud seems to have been fairly persistent with little wind on those days.

G2AX did a bit of work on the 6th. Newbury seems to be the furthest contact.

2BHK (Belfast) sends in details of G6ZH and G5AV messages heard on the 20th at 00.12 and 15.00 respectively. On the 27th he heard both G6UJ and G6ZH in very early morning (dark), and G6UJ and G6MN at night, together with other stations.

BRS317 logged a few calls on the 6th. G2ZN started off but encountered troubles.

G6YL (Felton, Northumberland) spent the four days apparently on receiver. Her log is far too long to reproduce, but during the time the receiver was in use it is rare to find a ten minute period without a ham signal recorded. Other of the stations complain that many stations which were heard did not take part in the tests, and G6YL's log supports this view. It also rather emphasises the trouble of harmonic QRM, a SOS call on 600 and 750 metres being included in the bag. The London stations appear to reach Northumberland at R5-6 in dark and R3-4 in day. A note is made that G6QC (London) was R5, while G6FO (Newport) only gave R2 at 19.14. This point is rather interesting as regards the passage of sunset from E. to W. coast. The receiver used is only D. 1LF.

I do not think the response to these tests justifies a full list of calls heard (which would take a large space). Enough has been said to show the range possible and that contacts were made and held regularly for each of the four weeks. G6FO suggests that we should start a slogan, "Use 2 M.C. Band for Local Contacts." QRP is quite reliable and the gear is simple. No special aerial dimensions are required. By the time we have a further set of tests to carry through on the band, I hope his advice will have been taken widely.

I would like to thank the stations who sent in a vast quantity of detail. Probably they will be disappointed that more is not published. On the other hand, the results shown gave such an astonishing similarity and regularity in contact that to itemise them would have been merely a repetition of contacts with mild growls at QRM and QRN. Which all proves once more that the 2 M.C. band is reliable and worthy of greater use.

NOTES & NEWS FROM THE BRITISH ISLES.

DISTRICT No. 1.

Representative: D. J. Beattie (G6BJ), 14, Rosehill Mount, Manchester Road, Burnley (Tel. 3659).

G2DH has been almost inactive, due to the failure of a filter condenser. BRS161 has now passed the Morse test, and will have received his call-sign by now. He will be using 5 watts harmonic c.c. on 7 and 14 M.C. G5JF has another list of DX worked, which includes two PY's, K4AKV and YI1CD, all on 5 watts, and takes the star position for the third successive time. G6RH also sends a good list for his first month on the air, including W and FM. He uses an antenna 42 ft. long and a 20-ft. counterpoise. G5ZN is active, but has nothing of importance to report, except that several people are getting good results with his key filter. G5RX is trying out a new half-wave Zepp. Found harmonic c.c. useless with a 1,760 K.C. crystal. G5CI has little to report, though active. G6ZS is using harmonic c.c. on 7 M.C., but hopes to be on CO-PA with the G6QA circuit shortly. G2OI has worked fourteen countries during his first month. G2XB is trying 2 M.C. G2KL has had trouble with parasitic oscillations when his CO is biased with battery and choke, but when operated with grid free the CO works O.K. G6LY is trying G5ZN's key filter, but is unfortunate in that the B.C.L. aerial is only 6 ft. away, though the filter greatly improves matters. BRS274 is inactive at present through being transferred to Bolton. G2KY has restarted and worked twelve countries on 7 M.C. G6LY tried C.C. QRP, but couldn't obtain oscillations when coupled to antenna. G6BJ has little to report bar the erection of a slightly better antenna than the 9-ft. one. This one is 15 ft. high!

The Budget has so far been an unqualified success, and the District seems to be becoming quite lively. There is room for one or two more letters each month

and these should reach me by the 20th. G5JF seems to be getting an unassailable position as regards QRP DX, and as he is now ready for 28 M.C. it's up to some of you fellows to get there first.

DISTRICT No. 2.

Representative : T. Woodcock (G6OO), " Santos," George Street, Bridlington, Yorks.

G6YL, although not transmitting during the 1.7 M.C. Tests last month, put in good work on RX, and sends me a useful log. Says conditions very freakish again on 7 M.C. QSO'd CT2AD, Azores ; also A4. Hopes these notes are not dropped in favour of a Budget. G5QY reports very bad conditions this month on whole. On 7 M.C. many Europeans QSO'd with 2 to 3 watts. Had better results with Ultraudion series fed than similar T.P.T.G. using $\frac{1}{4}$ λ antennæ (Window). Success obtained with harmonic C.C. G6BW obtained new DE5B and LS5B, and spent two hours with xmitter, which gives promise of successful xtal control on 14 M.C. G6LF (late 2AUT) becomes active on 7 M.C. to commence with. Looking forward to reports and QSO's on his 1 to 2-watt sigs. 2BIV finds things very bad on 28 M.C., though the band receives attention each Sunday. Television experiments are now going strong, though it is only five days since the motor and cardboard disc were procured. G6SK has rebuilding well under way for 28 M.C. Going to concentrate on 28 and 14 M.C., chiefly 28. BRS336 is evidently busy on 28 M.C. or with his new S.W. portable. G6NG has practically closed down owing to business QRM. G5DR is still too QRL to do any S.W. work. G6UJ is erecting (under roof) small directional aerial for 28 M.C. work. G6OO took possession of new shack outside, and finds quite contrasting conditions after working under the roof. This move was necessitated so that the beam antennæ for 28 M.C. work could be used. Progress is slow, however, and it will be a month before three masts are erected and transmissions commence on this aerial system. An interesting Ultra Bulletin No. 24 *re* 28 M.C. work just been received from ZT6C.

DISTRICT No. 3.

Representative : Joseph Noden (G6TW), Coppice Road, Willaston, Nantwich.

I am very sorry and surprised, but the only reports this month are from two in my Area. Very many thanks to G5FC and G2VP for your report ; that is all, and it looks as if your Representative will be amongst the unemployed, so there is no need for G6TW to add his report.

DISTRICT No. 4.

Representative : A. C. Simons (G5BD), Lynwood, Mablethorpe, Lincs.

Again there is nothing outstanding to mention during the month. Conditions on 7 M.C. are improving, as also is QRN. 14 M.C. appears to be pretty much the same as usual, the North American stations being conspicuous by their absence, while South America is coming in well.

The date for our Babe Convention will be between June 29 and July 27. You will all be notified later.

G2AT has new TX, RX and aerial, and his QRP is doing well. Poland on 7 M.C. with 1.7 watts bext DX. G2OC is now going well. Six countries worked on 7 M.C. with 2.5 watts. Owing to ground shortage is using $\frac{1}{4}$ wave VF Hertz. G5CY has had all the usual Europeans on 7 and 14 M.C. G5BD added Kenya to his DX on 14 M.C. and has done little else. G6LI working QRP pending power installation. QSO Canary Islands on 5 watts on 7 M.C. G6HK has commenced new series of directional tests with QRP harmonic C.C. ; QSO CT2AA (Azores) on 7 M.C. with $4\frac{1}{2}$ watts input. Report also received from AU (Omsk) on same band.

DISTRICT No. 6.

Representative : R. C. Horsnell (2ABK), " Hepani," Wickford, Essex.

I regret I can give no information regarding the district budget ; it has not yet arrived back, but I trust it has not been held up by anyone. G6QX has been putting in a generator for QRO and fitting up the necessary power lines to " shack." G5RV has been busy changing QRA again. Two transmitters now in use, both 10 watts. Busy with chemical rectifiers again. 2ABA is in this district temporarily; if he stays, he hopes to get active. BRS77 is at Cambridge, and without his RX this term ! 2BVR says there is little difference between valve base and 3" diam. coils. Amplifiers of RX are now one unit, and any detector stage can be used as preceding unit ; these are various, and take shape on arrival of new " Bulls." G2SA has been over to Germany, and again hospitably entertained by D hams. A monitor has been built, and a visit paid by G2MR. G5YK has been busy with phone on 7 and 14 M.C., SU8RS being worked on the latter band. ; 28 M.C. produced a QSO on C.W. with SU8RS and phone to G6CR at 1 mile. G6CR has been busy on 7 M.C. with C.W. and phone, and QSO VS7TD of Malay. G2XV is busy getting station in order before he starts up. G5YX has given up altogether. BRS191 has scrapped 1—V—1 S.G. set, and now uses 0—V—1 with S.G. as detector. BRS233 is still busy on 7 and 14 M.C., and has several DX reception feats. 2ABK has done very little listening, 1.7 M.C. has been tried, and best DX heard was G6FO, Newport, Wales. If any guilty one has our budget hidden up and forgotten, please forward it as directed inside. Tnx.

DISTRICT No. 7.

Representative : H. C. Page, Newgardens Farm, Teynham, Kent.

Greeting to our new members. I know there are quite a number of you, and as I cannot write to all of you I am taking this opportunity of explaining about the " Budget " we run in this area. The " Budget " consists of a collection of letters written by members. Each member writes a letter telling us what he has been doing. These letters have to reach me by the fifteenth of each month. The letters are collected together and are sent round the area. If you do not write a letter one month you do not get the " Budget " for that month. In other words—no letter, no " Budget " ! I hope all of you will let me have a letter by the fifteenth of the month. I am sure that you will find the " Budget " worth while. If there are any points you would like to know, just drop me a line. You have my address before you. Now for the area notes.

G5CM is working on all of our three lower frequency bands. He reports conditions fair. Most of Europe was worked with an input of five watts. He has just started up on the 1.7 M.C. band. G6GS is working on 14 and 1.7 M.C. He reports conditions poor on 14 M.C. Difficulty is being experienced with fone on 1.7 M.C. G6LK is still sticking to the 14 M.C. band. He seems to

work everything he hears! G2VV has been working on 7 and 1.7 M.C. with fair success. He reports conditions poor on 14 M.C. He wants reports on his 1.7 M.C. fone, as he has just started up there again.

DISTRICT No. 9.

Representative: G. COURTENAY PRICE (G2OP), 2, St. Anne's Villas, Hewlett Road, Cheltenham.

The first letter budget has now been despatched, and is most interesting. It is suggested that monthly letter budgets shall replace these reports, and that this space be used for notices and announcements of general interest. I think that in circulating monthly letters in budget form, a more complete account is read by everybody, and personal contact is much greater, and the whole thing generally much more satisfactory. There is also a great saving of time as it takes three weeks for this to appear in print. Please, therefore, send your reports for June to reach me not later than July 3, when the next letter budget will be made of them and circulated. At the same time, please let me know when and where you are taking your holidays so that I may put you in touch with local members.

G2CJ has been putting over some good fone on 40 M. Best DX on 14 M.C., VQ4CRE. PY1AH LU3DH. Is on week-ends only.

G2IP has now W.A.C. and has got Xtal going on 14 M.C., has also been carrying out tests with BRS310 on 56 M.C.

G2OP has been away and found conditions bad on return. Hope to get going on fone on 3.5 M.C. soon.

G2OZ is QRP on 7 M.C. Higher wave-lengths useless on account of Channel spark QRM.

G5QA has been QRP on 7 M.C. and worked most Europe with 3 watts. G5WY hopes to be on C.C. soon. Has done but little during month. G6RB has gone back to his current-fed Zepp and has some most interesting theories regarding the recent bad conditions.

G6XB has done little on the air during month. Is rebuilding his C.C. outfit and proposes getting on 80 M. fone soon. G6XC finds new QRA very badly screened and hopes to be going by the time this appears in print, C.C. on 7094 KCS.

BRS330 listens on 14 and 28 M.C., and will co-operate with anyone on these frequencies. (Say, OM, your reports should go to No. 7 District.—D.R.)

DISTRICT No. 10.

Representative: J. CLARRICOATS (G6CL), "Ciel," Hartland Road, London, N.11.

The following stations have been active: G6PP, G5UM, G5QF, G6CL and G6UN. The conditions on 7 and 14 M.C. are reported as being poor for the month. G6PP had an interesting low-power test with OZ7JO, his signals being reported R4 with 0.15 watt. G5UM has fixed a new schedule with BRS164 and asks for reports from any distance. The tests are made from 22.30 to 22.45 G.M.T. every Sunday on a wavelength of 172 metres. Signal strength and details of fading are particularly requested. He mentions that the recent 1.75 M.C. tests brought many new calls on the air. G6FI heard two Dutch stations, PA0QQ and PA0XG. A new S.G. receiver has appeared at G6CL, whilst preliminary tests on the 3.5 M.C. show promise of better things. G5QF has been assisting with reconstructions at "Ciel." On 14 M.C. South America has been worked several times. BRS273 has again moved, this time into Mr. Wilkins's district. Most of his time is spent on television experiments. Conditions on 28 M.C. were quiet. His home telephone number is now Chiswick 5982, and his address 45, Fairfax Road, Bedford Park, W.4.

DISTRICT No. 11.

Representative: L. H. THOMAS (G6QB), "Conway," 66, Ingram Road, Thornton Heath, Surrey.

G2AI has been working chiefly on 7 M.C. with a DE5 with A.C. on the filament, and is obtaining good DC reports at last. Reports conditions very freakish on the whole. G2CX has been mostly on 14 M.C., and has had the misfortune to dispose of some of the electrons from his DET1 filament, G2GM has had an excellent month, and has worked, on 14 M.C., most of the world, including S1AA near Barbados. G2UX is now WAC, the missing continent having been supplied by PK3BM. Also doing fone on 14 M.C. and reported QSA5 in Algiers. G5IS is doing occasional fone on 14 M.C. and getting out well. G5SH now has found time to come back on the air again, and has a motor-generator available instead of 220 D.C. mains. G6NF is working on 1.7 M.C., as well as the other bands, but has not been on the air much during the month. G6QB is also working on 1.7 M.C. every Sunday, and finds that low-power signals still get out extraordinarily well on that band. Any offers of help with some tests on that band, please? A C.C. outfit is in use with indirectly heated valves throughout; AC/HL's or MHL 4's apparently make excellent frequency doublers at fairly low anode voltages, and there is no trouble whatever with ripple in the output. A fair number of QSO's (chiefly with South America and VS6AB) on 14 M.C., but conditions variable. G6WY is now happy in his new QRA, and has been working South Americans nearly every night, also VQ3MSN and CT4AD, both new countries. BRS250 still logs everything that is on the air, and has heard several interesting stations, including PXBD (Brazil and British Guiana Boundary Commission, Mahu River, Brazil). BRS300 is active as a "report station" on 1.7 M.C. He reports nothing worth mentioning on 7 and 14 this month. G6QC, BRS316 and BRS317 are also active on this frequency on 1.7 M.C.

As there appears to be considerable interest taken in the area in the 1.7 band, it should be possible to arrange either a "South London test" on this frequency or a letter-budget on the subject among those interested. Will they let me have their views on the subject with the next report, please?

DISTRICT No. 12.

Representative: T. A. ST. JOHNSTON (G6UT), 28, Douglas Road, Chingford, E.4. Telephone: Chingford 118.

G2ZN not exceeding 1½ watts, has now worked FM on 14 M.C., this contact bringing his total of countries worked to 20. BRS314 reports conditions favourable around 16.00 G.M.T. on 14 M.C., particularly in Eastern direction. G6LL is to be congratulated on winning the 28 M.C. tests of the R.S.G.B., and is tuning up for the forthcoming A.R.R.L. tests on the same wave. 2AZR has now applied for full ticket, and is waiting the call for Morse test. G6UT on 14 M.C. has worked CX and Cape Verde Islands for the first time.

At the Monthly District Meeting, "Mr. Blanks" trophy—a genuine Irish "shillelagh," was pre-

sented (unofficially) to G2ZN to hold on behalf of Group 8A of the Contact Bureau, for their work using ultra QRP (maximum 3 watts). The official presentation will be made at Convention in September next.

DISTRICT No. 13.

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

G6VP spent most of the month comparing theory against practice with beneficial results. Has W.A.C. several times, but found VK very poor. Been testing for grid current on P.A. and finds 10 M.A. when fully driven and 6 M.A. self-excited. G5VB found 28 M.C. dull and 7 and 14 very patchy. Worked VQ on 14 M.C., has harmonic C.C. going on 7 M.C. and trying it on 14 M.C. G2OL has at last W.A.C. and puts it down to an A.O.G. aerial. Spent a lot of time on 56 M.C. testing valves and aerials. G2BY had a few 'phone contacts on 7 M.C., getting R8 from Scotland. Raised LCER, a Norwegian motor-ship off Malta. Worked FQ with new end-on 67-ft. aerial on 14 M.C. Has transmitter for 56 M.C. G2OW found 56 M.C. the most interesting wave and took part in portable tests. Finds conditions on this band very variable, mostly bad. G6CO has been on 14 and 56 M.C. and on the latter heard the portable tests from G5YC when he was at Guildford. G6WN is still struggling with unneutralised P.A., built a monitor and done a little DX. Now using grid bias for transmitter and H.T. for receiver from the mains. Only one accumulator now and no dry batteries used in the station. G6XN has been on the four higher frequency bands, done some DX on 14 M.C. and heard a few signals on 56 M.C. His best DX was VS7TD.

DISTRICT No. 14.

Representative: J. WYLLIE (G5YG), 31, Lubnaig Road, Newlands, Glasgow.

The period, April-May, is one which will be remembered for long owing to the consistent bad conditions which pertained on practically all the bands. Excessive fading, paucity of signals and heavy QRN have been prevalent during the whole period, and neither moon nor barometric pressure appear to have had the slightest effect on general conditions. Towards the end of the period the South American amateurs came in well for about an hour after 22.00 G.M.T. on 14 M.C., but proved hard to work from Scotland.

There is, however, one exception which must be quoted. G6NX is working numerous PY, LU and CX stations nightly, and every test call he sends out elicits three or four South American replies. The writer, who is in close proximity to G6NX, and who is usually able to establish contact with all continents on occasion, is unable to get a reply from South America except on rare instances. On these rare occasions, however, the reports are usually R7 or even R8. This has been generally commented upon over the Area, and is leading to the belief that a half-wave C.F. Hertz aerial has properties which are highly directional. The aerial systems at G5YG and G6NX are identical, but whereas that of NX runs NNW—SSE, YG's system lies in the plane NNE—SSW. This seems to furnish definite proof that the maximum radiation from such an aerial system is at right angles to its plane.

It is noted that G6WT is able to work the South Americans practically at will, and information relative to the type and position of his aerial system would be of considerable interest here.

The competition sponsored by G6IZ is now well under way, but nothing special seems to have been achieved so far.

Reports are few and far between, but in the circumstances little else is to be expected.

General satisfaction is felt at the restoration of the 80-metre waveband, and our best thanks are due to Mr. Marcuse for his successful efforts in this connection.

The date for the No. " A " District June rag-chew is a little uncertain at the moment, but will probably be between June 18 and 25. This will be the last meeting till September, and as CT2AA and GI6WG will be present, a large turn-out is requested. You will be notified of the exact date in due course.

I have received another visit from D4CL, and had the pleasure of showing him over the stations of G6MS and G6NX.

I would like to remind you that the time is once again approaching for the annual election of District Representatives. As I am desirous of a rest after being four years continuously in office, I should be obliged if, prior to the election, you will consider whom you wish to nominate.

Now for reports. G2MA built a new Ultraudion TX, but has reverted to T.P.T.G. G5CL has been QRT owing to change of QRA, which, in turn, is due, I understand, to his becoming a Benedict. (Best of luck to you, OM.—G5YG.) G6MS has now received his 28 and 56 M.C. permit, and will be working on these frequencies shortly. Television work is being carried on at this station with considerable success. G6NX is now using a half-wave C.F. Hertz erected with the assistance of G6WL, and is highly pleased with results. G5YG has been very little on during the month, being QRW business, and too tired for radio in the evenings. G5GK is busy with the complete electrification of his TX and RX, and G6UU seems to have taken another lease of life. G5JK is reported still rebuilding at his new QRA, and expects to have something to report next month. G5DK is having trouble with power supply, and anxiously awaits the long promised A.C. mains. G6VO is doing good work on the 7 M.C. band, and with about 3½ watts C.C. has worked all Europe. G6IZ complains of poor conditions on 14 M.C., and is giving his time to the construction of TX to operate on 28 and 56 M.C.

Say, G6WL, G5XQ, G6KO and G2WL, whatever is the matter with you? Have you " passed out " ?

DISTRICT No. 16.

Representative: C. MORTON, " Simla," Glastonbury Avenue, Belfast.

Capt. G. C. Wilmot, Ebrington Barracks, Londonderry, has now got his licence, call sign GI2OO, and I welcome him to the GI gang. He will be " on the air " by the beginning of June, and particularly wants tests and skeds on 14 and 28 M.C. GI2WK has gone to take up a new post in England, and on behalf of all the GI's I wish him success and the best of luck, and hope to hear him soon as G2WK. GI6YW, GI5WD, and GI5MO spent a most enjoyable week-end in Dublin, and thank EI7C for their hospitality. There are no reports of any activity and GI2CN, GI6MG, GI5HN, GI5WD, and GI6YW all send in negative reports this month.

NEW MEMBERS ARE WANTED

B.E.R.U. NEWS.

In the words of a famous advertisement, "This is fighting talk," and we should like to say a word this month about the B.E.R.U. and its relation to *you*. You may not think that B.E.R.U. concerns you very much, but let us assure you that B.E.R.U. is of vital importance to every member of this Society. It stands for the consolidation of British amateurs all over the world, and every new member of B.E.R.U. means that our negotiating power with the Post Office goes up, and the service that we are able to give *you* and every member of R.S.G.B. and B.E.R.U. is increased.

Excellent work is being done by Mr. Watts (G6UN) and by the various Colonial representatives, but by themselves they cannot do everything; they must have your help, and it is our honest opinion that they are playing a lone hand to some extent, as we feel that the general membership is not supporting, as well as might be hoped for, a movement which, when it is completed, will mean the unity of the British and Colonial amateurs.

There are many ways in which you can help, and here are a few :—

Are you putting the letters B.E.R.U. on your QSL card? If not, how can you expect the Colonial transmitters to know anything about us?

Have you applied for your W.B.E. certificate? If not, read up the conditions in the February BULL., and apply at once. When you have received the certificate, don't be afraid to record that fact on your card. You put that you were WAC quick enough. Why not WBE?

Do you mention B.E.R.U. to Colonial amateurs when you work them? You will be doing yourself a good turn if you do. Ask if you can send them particulars, then give the call sign to G6UN, who will see that the particulars are sent.

Have you applied for appointment as an Empire link station so that you can handle Empire traffic for HQ? Do so now.

* * * * *

CANADA.

By C. J. DAWES (VE2BB).

There is but little to report again. The Northern Lights have badly upset matters, and DX here has been practically nil. On May 1 and 2 a number of European countries came through. DX with South America, Australia and New Zealand has been much better. We much regret losing two of our colleagues by death, viz., VE2BC and VE2AU.

IRAQ.

By F. W. HAMBLIN (YI6HT).

I can give you no definite news yet regarding the formation of an Iraq group of the B.E.R.U., but replies to hand so far have been encouraging, and I hope before long to be able to write you that the group is in existence. We are endeavouring to arrange a weekly or fortnightly schedule for all YI's to facilitate reporting, arranging tests, etc., the postal service being very slow, about ten days to get a reply from Mosul. Seven M.C. is excellent for local work in daylight, our local work is rather different from England, the nearest YI is Baghdad, 300 miles, and Mosul, about 590 miles. One has to use a fair amount of power, however, owing to QRN being about r 4/5 throughout the summer on this wave.

EGYPT.

By C. E. RUNEKLES (SU8RS).

That which we hoped would be the best month of the year for 14 and 28 M.C. work has, as far as SU is concerned, turned out really dud. Now and again there has been a workable period, but not many of them. Even the regular G gang have been unheard for days on end, whilst the 28 M.C. band has had nothing at all to say for itself. The only bright spot is the absence of QRM, but of QRN there's plenty always.

SU8RS would like to thank all those BRS stations who so kindly reported on his 28 M.C. sigs during the March tests. Oh, for another month like that. What about it, you chaps? Don't let us lose what little hold we did get on that capricious band. Sundays, from 10.00 to 18.00 G.M.T. are at your disposal if you want skeds with this station on 28 M.C.

No reports to hand from our outlying stations, so take it that they have done about as much as we have.

SU8WY now runs his rx from the mains, and is quite excited about it. It certainly brings 'em in with a bang on all waves. Let's hope he soon lands that VE.

SOUTHERN RHODESIA.

By G. G. LIVESEY (FO3SRB).

The ether in this part of the world is at present completely barren of any activity, as far as other countries go, on 14 M.C.

This has been the case for three weeks—searching on the 14 M.C. band every night, between 18.00 and 19.30 G.M.T., has produced scarcely anything except an occasional "F" using a horrible variety of R.A.C.—G6VP, G6DH, G5YK at R1-2, and sometimes one of the East African stations, in Kenya or Uganda.

3SR is struggling gamely with crystal control, but unfortunately is having a lot of trouble in getting the crystal to drive. 7SRB is now active on 7000 K.C. with a D.C. note.; he may be on 14 M.C. by now. One is very pleased to see that he has started up with a proper 1930 note, thus keeping in tone with our "R.S.G.B." tradition. This station is off the air, but a new small T.P.T.G. is standing on the bench waiting for the wiring up process. Constructed entirely from surplus receiving gear, it should shortly be christened with 10 watts pure D.C.! An H.T. supply of 500 volts from H.T. accumulators, will be used if activities are recommenced.

The following G stations have been heard here during the past month, on 14 M.C., averaging about R3 on 1—V—1 : 6LK, 2CJ, 6VP, 5YG, 2BM, 6DH, 5YK, 6XB, 6WT, 5VB, 5QV, 6HP, 6NF, 6QB

HELP US TO GET THEM.

(specially fine note), 5ML (at R8—the most powerful DX station ever heard on 14 M.C.).

It is desired to pay a glowing compliment to the British stations who are heard here, for their notes, even the non C.C. ones, are all very fine D.C. England remains, as always, head of the list in this respect.

In the near future the P.M.G. may change both the prefix and our actual numerals and letters completely. The present " FO " will be retained until the Post Office make a change.

IRISH FREE STATE.

By Col. Dennis (EI2B).

Conditions on 7 M.C. have been very variable during the past month. At the writer's station three distinct conditions seem to prevail: (1) Dead nights; (2) Eastern European stations only coming in; (3) Southern European and N. African stations only audible. Of real DX there has been little or none. On 14 M.C. conditions are generally reported as very poor.

Of the few active stations, EI8B has been on 1.7, 7, 14, and 28 M.C. On the first he has had good reports from various G stations; on 14 M.C. he has worked VS, VG, and W 1 and 8 dists.; on 28 M.C. he has been experimenting with a " beam " antenna but so far without success. EI7C is getting his new gear for the A.C. mains into working order, and on 14 M.C. has worked VQ, YI and FM with an input of only 3.4 watts. EI2B, EI6C, EI8C and EI4D, the only other stations which appear to be active, have nothing of interest to report.

SOUTH AFRICA.

By W. H. Heathcote (ZT6X).

During the next few months I shall have to confine my report to local activities. The " wipe out " has made its annual appearance, and DX contacts will be far and few between.

The 40-metre band is very busy until about 8 p.m. (18.00 G.M.T.), after which the " wipe out " usually causes very bad QSS. Later on it will be necessary to QSY to 80 M. to effect even local communications.

ZS6D has his C.C. outfit working very well indeed on 40. ZS4M will have his QSL's forwarded by goods train in future if the S.A.R.R.L. Headquarters are to remain solvent; he has certainly made radio history for South Africa. ZU6N left here last month and after a few weeks in Europe (during which he has promised to look up a number of G stations), will go to the States. During the short time he held a South African licence he made himself known in all parts of the world.

Quite a number of our members are on fone, most of it rather poor, but mention must be made of the outstanding fone of Messrs. Innes (ZS6D), Reider (ZS1P), Atkinson (ZU6X) and Auret (ZU6W).

Southern Rhodesian amateurs are using the prefix " VP " and Madagascar " FB8." QRA Section please note.

* * *

European Notes.

Conditions during the last month seem to have been fairly average in Europe. Quite a lot of fone work has been done by Belgian amateurs: ON4WY has had a 7 M.C. fone QSO with PY1AN, using 16 watts, and ON4QS, using 5 watts, has had his 7 M.C. fone reported R7 in Spain. ON4JC has also done some good DX with 20 watts' input.

It is interesting to note that ON4BU is now working from Kalina, near Leopoldville, in the Belgian Congo. He is using the call-sign ON4CAA and has about 100 watts input on 14 M.C.

Japanese stations are reported as being heard in Belgium at full strength after 24.00 G.M.T. on 14 M.C.

Conditions seem rather poor in Portugal and there is nothing of interest to report from that country.

A local section of the Norwegian League has been formed in Oslo and it is hoped that this will stimulate interest between members and non-members alike.

LA1W, who possesses the first licence to be issued in Norway, has just applied for his W.A.C. LA1G is still keeping up his list of good DX and LA1H, the Oslo Sailor School, with 500 watts, is working all the world.

LA1R is now working exlusively on 14 M.C.

Efforts are being made to improve the QSL service in Norway and all hams are asked to co-operate in increasing the efficiency of this service.

We have no reports of 28 M.C. work in Europe except that several Belgian amateurs are preparing for the June tests on this frequency.

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