THE T. & R.

BULLETIN

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OF GT. BRITAIN

AND THE
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THE INCORPORATED

RADIO SOCIETY OF GREAT BRITAIN

AND THE

BRITISH EMPIRE RADIO UNION

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

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

R.S.G.B. CALENDAR.

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

Feb. 24. Lecture by L. H. Bedford, Esq., Messrs. A. C. Cossor Ltd., on "Cathode Ray Oscillographs" at the I.E.E.

March 5. District 8 Conventionette at Cambridge.

March 19. District 3 Conventionette at Birmingham.

March 31. Film Lecture by Bakelite Ltd. "The Story of Bakeloid Resinoid" at the I.E.E.

April 26. "Recording Sound on Film," by J. Paddon, Esq., A.R.I.E. at the I.E.E.

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Vol. 8 No. 8

OPERATION ON THE 1.7 MC. BAND.

THE ink is barely dry on that voluminous document which will be known to history as the Madrid International Radio Telegraphic Convention. To those whose interest in Amateur Radio lies in channels higher than the mere working of local or long-distant stations, it will have been apparent that the holding of our present amateur frequency allocations at the Conference was no mean achievement. From the first it was clear that the greatest trouble would be experienced in retaining the use of our 1.7 mc. band, because it is there that most of the small boat and point-to-point work is due to take place. That we were able to hold the band in spite of strenuous opposition is now common knowledge, but, reading between the lines of Mr. Watts' recent reports, it should be obvious that our activities will be watched carefully during the next five years.

Fortunately, few words of criticism are necessary regarding the speech quality of British 1.7 mc. Amateur transmissions, but to those unenlightened few who continue to make noises resembling a dentist's patient recovering from the effects of an anæsthetic, we would indicate the two excellent articles on Modulation which have recently appeared in the columns of THE BULLETIN.

For some time it has been our considered opinion that many British stations who use 1.7 mc. for telephony experiments are carrying out their work in a manner likely to prejudice our cause at a later date. We refer specifically to those who seem to forget that a correct operating procedure is still required by the terms of their licence. Because the station being worked is operated by a personal friend, it does not justify the omission of either his or your call sign when commencing and concluding a transmission. Furthermore, it should be remembered that all British calls commence with the letter "G." The numerous complaints we receive regarding the "pirated" use of licensed call signs can often be attributed to the failure of the receiving station to decipher the spoken call of the other station. We think, too, that attention should be directed to those who discuss "over the air" matters which are not in any way connected with their experiments. It is important that we should bear in mind the fact that many of our transmissions are being intercepted by Government departments, whose duty it is to report on the work carried out by our stations.

May we therefore appeal to all who use this band to confine their conversations to *radio matters*, to give all call signs in full, to pronounce them clearly, and to keep their transmitters tuned as sharply as possible?

FREQUENCY METER DESIGN AND OPERATION.

By H. C. Page (G6PA).

In the December issue we published a description of the new R.S.G.B. Frequency-Meter designed by Mr. A. D. Gay, G6NF. This instrument is rather more elaborate than the average amateur requires, though it will prove to be invaluable to the Society. Below Mr. H. C. Page, G6PA, describes his frequency-meter, and the method of calibrating and checking it. The agreement between this instrument and the Society's instrument is exceedingly close and members will do well to follow, in general, the construction of Mr. Page's meter.

I MAKE no apology for bringing up this subject once more. While off wave operation may be said to be practically non-existent where English amateurs are concerned there is still far too little time and experiment devoted to the design and use of the Frequency Meter. One has only to listen on any of our bands for a few hours to become convinced that a good many of the stations working have no really accurate means of frequency measurement.

In this article I propose to try and outline the fundamental requisites for a reliable frequency meter, and the means for calibration, and checking the same. From conversations with quite a number of stations, which do possess frequency meters, it has become quite apparent that they believe that once a frequency meter is calibrated they can forget all about it, and merely use it as and when required. Very few people seem to be aware that temperature variation is a very important factor in the operation of a frequency meter. A change of a few degrees in the room temperature may cause a change of several kilocycles in the calibration of the meter. Therefore I want to try and show how this state of affairs may be obviated by quite simple means. There are several ways in which temperature variation may be overcome. For the purposes of this article I will only deal with a few of them. The first method is to design a meter which has negligible temperature co-efficient. This sounds easy, but after much experiment I have found that it is an extremely difficult task with the apparatus at the disposal of the average amateur. This, then, we will consider out of the question. The second, and probably the best method is the use of a temperature oven, with thermostat control. This again is beyond the means of most of us. These two methods both require that the meter shall retain its calibration within very close limits. Now suppose we do not worry about these variations in calibration, so long as we are able to measure them accurately, and can allow for them when taking a reading. In other words we use the meter in conjunction with some standard of known frequency, such as a crystal oscillator. This is very much simpler. This method can be divided into two sections. Firstly we can just make allowances for the variation by adding or subtracting it from the reading obtained from our graph, or, better still, we can incorporate some means of adjusting the meter to accuracy. This is the method employed by the writer, and is one which has been found to work very well indeed.

In parallel with the ordinary variable condenser, which is the calibrated variable in the frequency meter, is a small vernier condenser, with micrometer adjustment. The condenser here has two plates about the size of a farthing. One plate is fixed, and the other can be advanced or withdrawn from the fixed one by means of a screw thread. While this type of condenser is desirable, it is not absolutely necessary, and any small vernier condenser will work quite well. It will be obvious that any small error caused by temperature or battery variations can be allowed for by adjusting the condenser, without upsetting the curve of the graph.

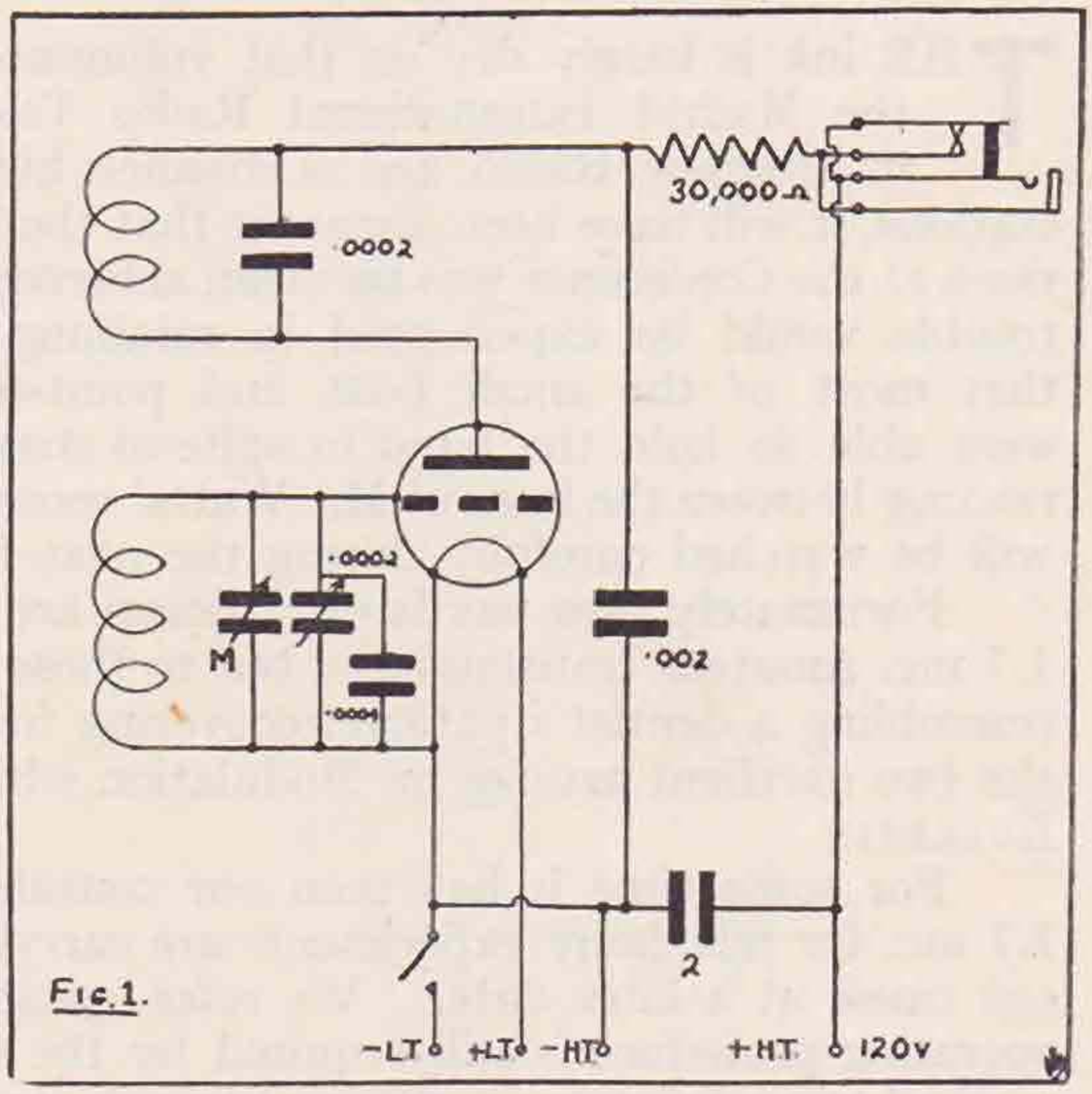


Fig. 1.

One merely moves the whole graph either up or down, according to the way the condenser is adjusted. Therefore if one switches on the meter, and checks it against a crystal oscillator, and finds that it has increased its frequency say two kilocycles, it is only necessary to increase the capacity of the small compensating condenser slightly to to bring the whole meter graph back to its original accuracy.

It will be seen from the foregoing paragraphs that this type of frequency meter is really nothing more than a very stable oscillator, where the calibration can be altered at will, and in which the change in calibration at any given point produces a corres-

ponding change at all points of the condenser scale.

A glance at figure 1 will make it quite evident that there is nothing very complicated about the meter circuit. It is merely a single valve oscillator. However, there are one or two things to be considered when building such an oscillator.

The first point, and perhaps the most important of all, is to choose a really reliable variable condenser, for on the accuracy of the mechanical design of the calibrated condenser depends the whole success of the meter.

If the condenser is not sound mechanically, although you may adjust the meter to accuracy at one point on the scale, there will probably be points elsewhere on the scale which are not accurate, owing to slight variation of the relative position of the plates, or to play in one of the spindle bearings. The condenser used at the writer's station, which has proved very satisfactory is a Cyldon Square Law, having a capacity of .0002 mfd.

The next important point is the design of the coils. The use of plug-in coils for each band is not satisfactory. The better method is to use one coil, and make use of the meter harmonics for the higher frequency bands. The meter works on the 1.7 mc. band, and its harmonic on 14 mc., is ample for all purposes. Now there are two ways of coupling the grid and plate coil. One is to couple them very loosely so that slight variations in one will not affect the other, or to couple them very tightly indeed, so that there shall be a minimum leakage of inductance, and consequently very little frequency variation cause by battery voltage changes. The latter method is used by the writer, for it is very unlikely that either coil would alter while the meter is in operation, while, on the other hand, the battery voltage might quite easily drop. With a well-designed coil a frequency change of only a few cycles takes place when the battery voltage of the H.T. is increased 100 per cent., while alteration of the L.T. only causes appreciable variation when the valve goes out of oscillation due to too low a filament voltage !

It will be noticed that there is a 30,000 ohm resistance in series with the H.T. circuit. This is so arranged that it is always in series, with the phones, or without them. The effect of this resistance is to cause the insertion of the phones to have no effect on the calibration of the meter. Across each coil there is a fixed condenser. These are absolutely necessary as they help to make the oscillator stable, while the one across the grid coil spreads the condenser scale, so that, in the case of the writer's meter, here it only covers from 1705 to 1865 kc. While this is desirable as it allows stations on the 14 mc. band to be measured accurately, it is not absolutely necessary, and a smaller fixed condenser across the grid coil, allowing the whole of the 1.7 mc. band to be covered, will be quite in order, though, of course, the other bands will be rather crowded. The best fixed condensers for these two positions are those made by Messrs. Loewe Radio, as they are sealed in glass tubes, and evacuated.

The valve used in the meter is a Mullard PM1HF. This particular type of valve has proved to be the best, as it heats up very quickly. At the end of 15 seconds it is quite steady.

The other component on the meter which needs some attention is the dial for the calibrated condenser. If one does not require to read to accurate parts of a kilocycle on 1.7 mc., an ordinary Igranic Indigraph dial will do quite well, as it is possible to estimate a tenth of a degree on these dials, with the aid of a good magnifying glass. However, this is scarcely good enough for accurate work, and a better plan is to get some good firm of instrument makers to make you one. The one in use by the writer was made by Messrs. H. W. Sullivan at a cost of 19s., and has proved an excellent investment. By its means one is able to read to a tenth of a degree, which is much to be preferred to estimating it.

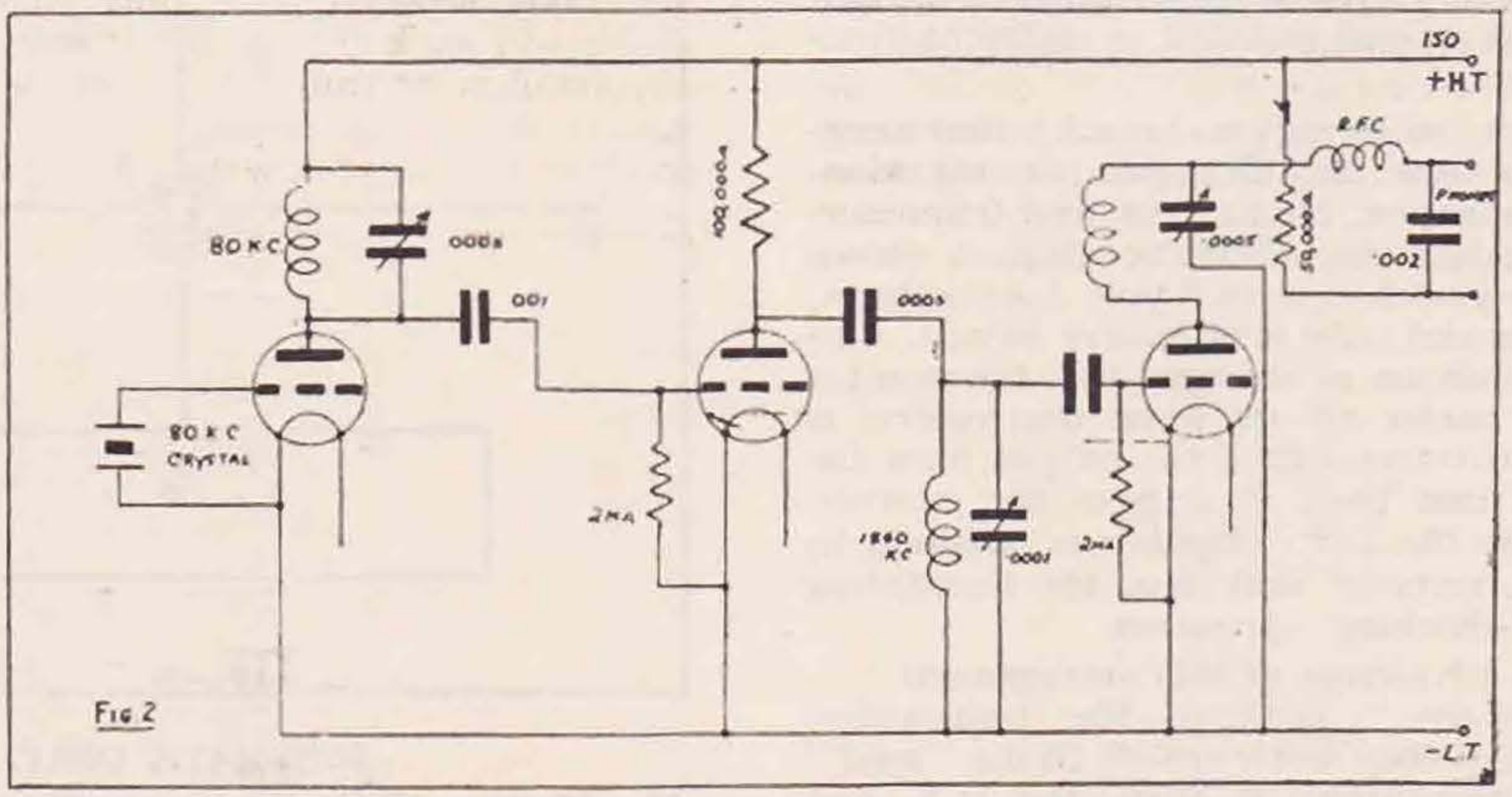


FIG 2

The foregoing should be sufficient description of the actual meter, and I now propose to give some details of the method of calibrating, and checking the meter.

There are several ways of calibrating a frequency meter, but for the purposes of this article the only method to be discussed is the use of an eighty or hundred kilocycle crystal. For most people a hundred kilocycle crystal will suffice, but I happen to have an eighty kilocycle one here. By means of the harmonics of the crystal, and a 14 mc. receiver, it is possible to obtain points every ten kc. in the case of the eighty kc. crystal, or every 12.5 kc. in the case of the 100 kc. crystal. However, the harmonics of the crystal are very weak on 14 mc.,

(*Continued foot of col* 1, *page* 249).

THE RECEIVING SIDE.

By Austin Forsyth (G6FO).

By observation, one is forced to the conclusion that the most neglected feature of the design and construction of the average amateur station is that connected with the receiving side. Much time and care is lavished on the transmitter, and its auxiliary apparatus, probably rather less on the radiating system, but least of all on the receiving gear.

In point of fact, it is obvious that the over-all efficiency of the station will only be at a maximum when every section is as efficient as it can be made. The receiver is not less important than the transmitter, or the transmitter than the aerial. They are all links in the chain of efficiency, for to work DX, one must have a set capable of pulling it in, just as much as it is necessary to be able to put out a " reaching " signal, while the pleasure of ordinary working is increased considerably with good apparatus for reception.

These remarks might well appear to be so obvious as to be scarcely worth making, but they form the preface to the following short description of the new receiving gear at present installed or underconstruction at this station.

Now, the term "receiving gear" is not meant to imply the receiver alone, but all apparatus used inconnection with reception, monitoring, and frequency-checking. Consider the schematic diagram shown at Fig. 1. The switch S is an 8-pole double-throw, and is the main and only send-receive switch. The circuit connections are so arranged that the monitor and frequency meter are off when the receiver is on, while, when transmitting, the output from the monitor is fed into the L.F. stage of the receiver. In other words, the L.F. amplifier is common to both the S.W. receiver unit and the monitoring and frequency-checking apparatus.

What is the advantage of this arrangement ?

In the " receive " position, the transmitter, monitor, and frequency meter are off. In the " send " position, the transmitter is alive, the R.F. and detector stages of the receiver off, and the monitor output connected into the L.F. stage of the receiver. In other words, with the switch in the " receive " position, the signal of the station being worked is heard, while at " send," the monitored transmitter signal appears in the headphones. No other connections or switching circuits are required, and constant monitoring is possible without it being necessary to fiddle with knobs and loose wires.

That, then, is the basis of the arrangement. It will be noticed that the monitor and frequency meter are " tied. ' That is, they are on and off simultaneously. The reason for this is that it was decided to use the most accurate and stable frequency meter it was possible to construct and calibrate, so arranged that there was no danger of variations due to changing of coils, handling, and so on. This was to be used in conjunction with a monitor, which, being simply a stable one-valve receiver in a state of continuous oscillation, actually reproduces the transmitted signal in the headphones, the frequency meter not being made to rectify, be it noted.

When the switch S is at " send," monitor and frequency meter are both oscillating, so that a beat note is produced when they are brought into tune. This beat is heard in the headphones, as the output of the monitor is taken into the L.F. stage of the receiver, as previously explained. The result of this arrangement is that when it is desired to set the frequency of the transmitter, the frequency meter dial is adjusted to the appropriate reading, and the monitor brought accurately into tune with it (zero beat). The transmitter is then tuned to this setting in its turn ; in effect, the monitor has the frequency meter on one side, from which it picks up the required frequency, and the transmitter on the other, which is tuned to it. Any frequency drift is immediately noticeable, therefore, whether it is in the monitor or the transmitter.

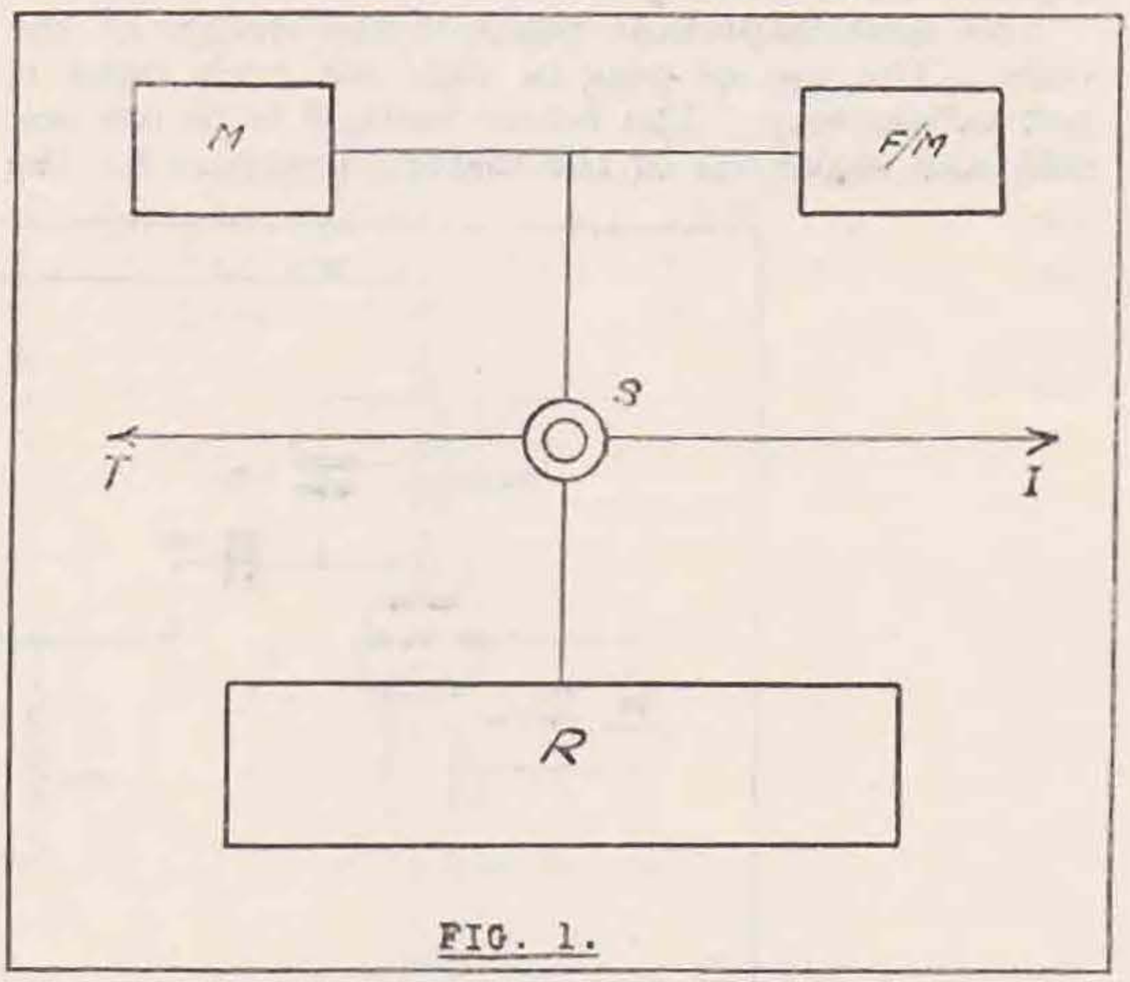


FIG. 1.

SCHEMATIC ONLY.

***M* = Monitor. *F/M* = Frequency Meter. *R* = Receiver.**
***S* = 8-pole change-over Send-Receive Switch.**
***T* = Leads to Transmitter Relays. *I* = Input Leads.**

The actual design of the frequency meter may be of some interest. Using a battery-type screened-grid valve, it is an adaptation of the " electron-coupled " oscillator circuit described recently in " QST " of the ARRL. The degree of stability is such that there is no discernible frequency-change through very wide variations of supply voltages, and, in fact, the only way to alter the frequency is to move the tuning-condenser dial. There are no changes of coil necessary, as the meter works on the harmonic principle, and the constants of the grid circuit are such that full coverage of the 1,750 kc. band is obtained which, of course, gives complete coverage of all other amateur bands. The fundamental of the frequency meter is in the 3,500 kc. band, which ensures that sufficiently strong harmonics are generated at the high-frequency end of the amateur range. The bandspread on 14,000 kc. is naturally somewhat restricted, but as the dial used is the " Utility " micro-dial, permitting very close and accurate setting, this is not a serious disadvantage.

The fundamental of the monitor is in the 7,000 kc. band, the size of coil and condenser being so arranged that coverage of the entire 1,750 kc. band is obtained, as before. The circuit of the monitor is the "High-C Hartley," in which small fixed capacities are used to shunt all possible variables, with a battery-type triode as oscillator. Very good results have been obtained previously by using this arrangement as a combined monitor-heterodyne frequency meter. With careful attention to construction and calibration, and the instrument so designed that no coil-changing is required (achieved by arranging for full-band coverage for the whole amateur frequency-range and the adjustment of reaction to a point at which strong harmonics are generated), a frequency meter of this particular type will give results well within the requirements at the average amateur station, and the accuracy of calibration maintained through all normal variations of supply voltage. Moreover, the calibration can be checked easily by reference at any time to standard frequency transmissions.

It was necessary to arrange that the fundamentals of the two instruments should not be in the same frequency-band, as the resultant beat-note would have been extremely strong unless special screening was employed. If the monitor is screened beyond a certain point, depending on its position with regard to the transmitter and the degree of coupling through stray capacities, the pick-up is not sufficient to give a good signal in the headphones when monitoring.

With the arrangement outlined above, a strong pick-up is obtained on all bands from 1,750 to 28,000 kc. As the transmitter for the 3,500 kc., 7,000 kc., and 14,000 kc. bands is a 100-watt set, it might be supposed that the valve in the monitor would be completely "blocked." It happens, however, that the output stage of the main transmitter is about six feet from the monitor, resulting in a signal which is only comfortably loud coming through to the headphones. On 1,750 kc., where a low-power 10-watt transmitter is used, the pick-up is sufficient to produce a signal nearly as loud, as the oscillator coil is only about two feet from the monitor.

The calibration of the frequency meter was carried out by reference to a "sub-standard" oscillator, utilising a low-frequency quartz bar (116 kc.), which gave a sufficient number of points to plot an extremely accurate curve. Having obtained one curve, it is easy to extract a family of curves from it, one for each frequency-band. Using accurately ruled centimetre-squared paper for plotting, direct readings can be obtained to 1 kc., and to 500 cycles by interpolation. The accuracy of the meter is checked from time to time from this oscillator, which was installed for the purpose.

Another instrument of some interest and extreme value is a modulation meter, constructed on the lines indicated by Corfield (G5CD) in his recent very interesting article on "The Measurement of Speech and Music Frequencies." The results given by this meter are sufficiently accurate to provide a very valuable direct instrumental check on the degree of modulation which is being obtained on any band. In the modulation meter, it is necessary to have a grid coil of the appropriate value for each frequency-band, while it is also essential to use a high-grade voltmeter and milliammeter for adjusting the bias voltage and plate current.

As it is not required that the sub-standard oscillator and modulation meter be on continuously, they are controlled through separate switches, while provision is also made for having the frequency meter in operation with the receiver on, so that it can be used for measuring the frequencies of received signals, and also as a separate heterodyne for the reception of C.W. signals through heavy interference. It is also possible to check the calibration by beating against transmissions of known frequency within its frequency-range.

The monitor, frequency meter, modulation meter, and standard oscillator are mounted on a shelf running the length of the operating table, and within easy reach of the operating position. All the receiving apparatus is built on to this table, and screwed down, while H.T.-L.T. is common to all instruments. This lead is earthed through a large fixed condenser, so that everything is as stable as possible. The transmitting equipment and power supply is entirely separate, both electrically and physically.

A few notes on the design of the station receiver may possibly be of interest. The set is a three-valve arrangement, with an untuned R.F. stage (S.G.), S.G. detector, and pentode output, using Mazda indirectly-heated A.C. type valves. The receiver can be run either entirely from the mains (230 v., D.C.) or from heavy-duty Ni-Fe batteries, when it is desired to get the quietest possible background for DX work. For ordinary operation, the mains H.T. supply is used, with battery-supplied L.T. The D.C. unit installed gives 70 m.a. at 220 volts, there being 26 mfd. of smoothing used, and two chokes of generous dimensions. This rather lavish equipment is made necessary owing to the archaic quality of the local D.C. supply.

The receiver has been designed essentially for amateur-band work. The detector grid circuit is tuned with one of the new Cyldon midget series-gap condensers, and the 14,000 kc. band occupies about 120 degrees of the dial. A .00025 mfd. variable condenser is in parallel with this, which makes it possible to listen outside the amateur bands at the higher frequencies, while on 3,500 kc. and 1,750 kc., this condenser is used for tuning and the series-gap as a vernier. The coupling between the R.F. and detector stages is through a small neutralising condenser, so that the signal input and selectivity are under control. Previous experience has indicated the importance of close adjustment of the screen-grid voltage when using an S.G. valve as a detector, so that this is controlled by a 50,000-ohm 10 m.a. wire-wound potentiometer with a 60,000-ohm resistance in series. This arrangement gives the required fine control of the screen-grid potential, and the potentiometer can be used as a reaction adjustment, though actually a .0003 mfd. condenser is used for controlling reaction. The best setting for the potentiometer is found for each band, and tuning is then carried out in the usual way.

The pentode output stage is transformer coupled, with choke-filter output matched into the load, and variable automatic grid-bias is also fitted, with an R.F. stopper and volume control in the grid circuit.

The audio output can be controlled by the variable automatic bias resistance, so that from input to output, the whole set can be adjusted for either maximum or minimum sensitivity and signal strength.

The receiver is operated through a small switchboard; which also controls the auxiliaries described previously, carrying the main on-off switch for H.T. and L.T. for the receiving gear, L.T. ammeter and H.T. milliammeter, thermal-delay switch, main change-over switch, output jack, and pilot light. As the H.T. and L.T. are switched on simultaneously and indirectly heated valves are used, the H.T. is applied through a thermal delay relay, which is in the H.T. positive lead. This is of Bulgin manufacture, and has a 30-second delay, which can be either increased or decreased. The valves are, therefore, allowed to heat up fully before the H.T. comes on. The heaters are run continuously while the station is in operation, and the total L.T. consumption is nearly five amperes on the receiver side with every-on. The total H.T. current for maximum audiothing output is about 50 m.a., but for normal reception purposes this is reduced to 25 m.a. by increasing the bias on the pentode. All H.T. leads are de-coupled, and the supply voltage to the gear on the receiving side is 220 volts from the D.C. unit mentioned, or a Milnes H.T. Ni-Fe battery, giving 180 volts. The full voltage is applied to the plates of all valves, there being a negligible voltage drop across the de-coupling resistors used in these leads, while the voltages for the screen-grids and pentode auxiliary grid are obtained by dropping across series resistances in the usual way.

Under conditions of normal working, the loud-speaker is used both for reception and monitoring, except when telephony is being transmitted, when feed-back between microphone and loudspeaker makes that impossible. For DX work, and when conditions are bad, headphones are used; hence the output jack on the switchboard. In order to prevent damage to the pentode when changing over from speaker to headphones, the contacts of this jack are so arranged that the H.T. supply to the receiver is cut off before the load is removed.

Though a volume control is fitted and used, signal strength on the headphones is extremely loud, and a form of "tone-filter" is used in the headphone circuit. This consists simply of a .001 mfd. variable condenser in series with one lead. The effect of this is much the same as the device described previously by the writer, where a high-inductance choke with a variable capacity in parallel was put in series with the H.T.+ lead in the 'phone circuit. Background noise, A.C. notes, and such-like disturbances are blocked, the condenser passing only signal-impulses corresponding to higher-frequency sounds. Signal-strength is reduced considerably, but the QSA is improved to the same degree. For example, without the filter, a signal might be QSA3, R9+, accompanied by the usual roar of QRM and QRN, supposing it happened to be on 7,000 kc. The effect of bringing in the condenser is to make the signal, probably, QSA5, R5, with all the noise reduced to a negligible level. As QSA is the most important consideration in any amateur-band receiver, this device ensures it when reception conditions from the point of QRM and QRNarebad.

The only feature not hitherto mentioned is the coils, which are of valve-base form, but actually considerably smaller. They are wound on ribbed ebonite rod 1 in. diam. by 1¼ in. long, with the "solid" in the centre drilled out. The wire used is No. 32 S.W.G. Enamelled for the grid and aerial windings, and No. 40 of the same for the reaction sections, while a coil to cover the medium-wave Broadcast band has actually been wound on a former this size (rather smaller than a valve-base), using No. 40 S.W.G. Enamelled for both windings. The formers are fixed to a small piece of ebonite carrying valve-pins, and are plugged into a Clix valve-holder in the set. Being so small, the fields of these coils are very restricted, so that the stability and general control of the receiver are all that could be desired. The arrangement of the windings is perhaps unusual, and is shown at Fig. 2.

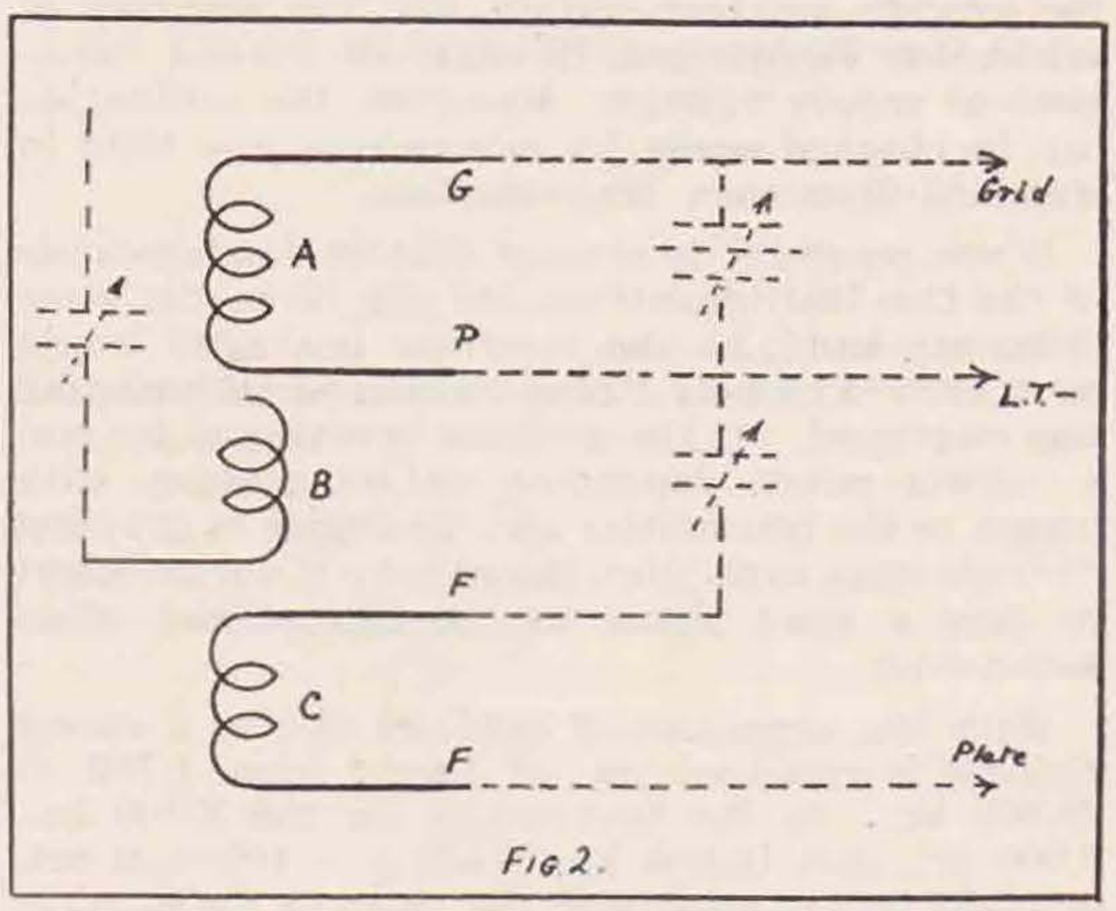


FIG 2.

SHOWING ARRANGEMENT OF COIL WINDINGS.

A = Grid. B = Coupling from S.G. valve. C = Reaction.
G = Connection to grid pin.
P = ,, ,, plate pin.
K = ,, ,, cathode pin.
FF = ,, ,, filament pin.
Connections to valve-holder shown dotted.
Approximate Coil values for 7000 KC Band:
A = 14 turns; B = 6 turns; C = 8 turns.
Coil Former: Ribbed Ebonite Rod, 1" diam. by 1¼" long.
(N.B. Owing to an error in drawing the circuit the letter K was omitted from the lower end of coil B; further, the upper end of coil B should be connected to the lower end of coil A.)

The set will bring in amateur signals at comfortable headphone strength without any aerial under normal conditions, though usually an aerial 45 ft. long by 45 ft. high is used for reception on all bands.

It may be said that a receiver of the type outlined above is unnecessarily elaborate for ordinary amateur working, but the writer believes that it is better to use a set which has an ample reserve of power, and will actually bring in DX on the loud-speaker, rather than to use a "hot" form of one- or two-valve straight circuit, which will probably not "find" a lot of the DX that is to be heard; the advantages of simplicity, cheapness, and a quiet background are easily obtained with the normal types of amateur receivers, but the set is always being worked to the limit of its capacity. Quite the most important factor when considering the design of the new receiver for this station was based on

the consideration that loudspeaker reception was necessary, as when taking part in tests, etc., involving sixteen-hour sittings, it is essential to be able to work from the loudspeaker to prevent undue fatigue, to say nothing of the strain on the nervous system caused by wearing headphones for long periods. The ease of working is increased considerably, and tiredness lessened correspondingly, when it is possible to use the loudspeaker for reception.

Visitors have remarked on the "number of knobs," there being eight in all. A short demonstration shows, however, that in point of fact, the set is "one-knob control," on any amateur band, as there is a "best" setting, which need scarcely ever be interfered with, on the other variables. The band-spread is such that on the higher frequency-bands, the series-gap condenser itself gives complete coverage. By virtue of the fact that an untuned R.F. stage is used, there are no "dead spots" and the reaction setting is practically constant, so that tuning is carried out on the one condenser, while, with a very large factor of safety, it is possible to adjust the sensitivity of the set to practically all conditions of reception.

No attempt has been made in this brief article to describe the actual construction of the receiver and the associated apparatus on this side, nor are any circuit diagrams given, for the reason that every amateur has his own ideas as to what constitutes the "best" arrangement, while the subtleties of switching are a matter of personal preference, and a little work with pencil and paper. The object of the writer has been merely to show that the gear for reception is worthy of a little consideration, and, in describing his own latest arrangement, hopes that it may interest the transmitter and BRS man alike.

FREQUENCY METER DESIGN AND OPERATION

(*Continued from page* 245).

and in most cases points every 25 mc. will be ample. Therefore the receiver should be set in the 7 mc. band, where the harmonics will be quite strong.

Figure 2 shows the arrangement used by the writer for checking the meter once it is calibrated. This will be seen to consist of a crystal oscillator, buffer stage, and a single valve 1.7 mc. receiver. The buffer stage serves to isolate the crystal oscillator from the receiver, and also to strengthen the harmonics to a certain extent, but primarily it is intended to isolate the C.O. and receiver. Little need be said about the construction, or design of such an instrument, as it is quite straightforward. The purpose of the receiver is to receive harmonics of the C.O. against which the meter can be set, while the small compensating condenser is adjusted. To do this the harmonic should be found on the receiver, and the reaction condenser set so that the receiver is just off oscillation point. When this has been done the meter should be switched on, and the calibrated condenser set to where the meter should be dead beat with a crystal harmonic. Probably a hetrodyne note will be heard. This will be due to the meter calibration having altered, and the compensating condenser must now be adjusted until the beat note disappears, and the meter, and C.O. are dead beat once more. Now, without touching the receiver, swing the meter condenser round, until another beat note appears. Tune to dead beat, and you should find that the meter has come to rest at one of the original calibration points. If it has not one so you can be sure that your calibrated condenser is a poor specimen mechanically. With a good condenser, such as the Cyldon, the calibration points should always come in at the same positions, once the meter has been adjusted for accuracy by beating it against one point, and adjusting for dead beat by means of the trimmer.

The construction and calibration of an accurate frequency meter is not a job to be done in a few hours. It takes some time to make a really good instrument, but I believe that anyone who does succeed in doing so will agree with me that it is well worth the trouble involved. Personally, I get just as great a thrill out of a successful check of my meter against a station of known frequency, as I used to do in the good old days, when I could work ten or twelve W stations at a sitting with a power of about four watts, only they were not W stations in those days!

Simple Crystal Control.

By R. C. Ashton (G5YB).

It is thought that many amateurs do not use crystal control of frequency on account of the extra expense of frequency doublers, etc. The object of this short article is to show how crystal control may be achieved on three bands with the minimum of expense. With a 7 mc. crystal, and two stages only, c.c. operation on the 3.5, 7 and 14 mc. bands is possible.

The well-known Goyder Lock circuit forms the basis of the scheme. The plate coil of a crystal oscillator is coupled inductively to the grid coil of a TP-TG stage, and it is found that, with a 7 mc. crystal, the TP-TG is controlled on the three bands mentioned above. In each case the output is superior to that obtained from a self-excited TP-TG transmitter. At this station the note on any band changes from very rough and chirpy RAC to T9, the transmitter being run entirely from the mains.

The coupling between the two coils should be fairly tight. With a ratio of CO input to TP-TG input of 1-10, the coils can be 1 in. apart, and tuning will be easy on all bands. With a lower power ratio the tuning of the system is naturally easier.

In tuning the transmitter it is essential to listen to the signal either in a monitor, or in the receiver. In the case of tuning on the two lower frequency bands, 7 and 3.5 mc., listening on 5 mc. will provide a comfortable signal with inputs to the transmitter up to 15 watts, while for 14 mc. tuning, either the 5 mc. or 10 mc. overtone can be used. At the writer's station the transmitter is 18 inches above the 2-valve receiver, and the above method of tuning is entirely satisfactorv. All transmissions can therefore be checked without resorting to a separate shielded oscillator.

The substitution of a resonant grid coil for the tuned coil of the TP-TG will greatly simplify tuning, while efficiency is unimpaired, provided the number of turns is carefully adjusted.

STATION DESCRIPTION No. 29.

G5SZ

G5SZ first came on the air at Baildon, Yorkshire, with a radiating licence in 1922 ; the aerial, which was slung between two masts 50 ft. high, was the first ever seen in the district, and was an object of much curiosity. At that time electric supply was not available and a start was made on 200 metres by using large quantities of flash-lamp batteries connected in series ; these were not satisfactory, so a Ford coil was tried, using the output of the secondary straight on to the plate of the valve; on 200 metres this arrangement gave an aerial current of 110 mas., the signals being reported very loud by G2VO at a distance of about 18 miles. The output from the Ford coil was later rectified and smoothed and used for telephony. At this time the circuit used was a direct-coupled Colpitts, which gave very good results.

On August 31, 1923, using dry batteries for the H.T. supply, Duplex telephony was successfully worked for 1½ hours with G2DR, using a protected receiver and a wave-length separation of 42 metres.

In October, 1923, a T.V.T. unit was installed, and with 12 volts on the primary and using an Ediswan A.R. valve as the oscillator, an aerial current of .3 amp. was obtained, which was considered high in those days. However, at the end of October, 1923, an M.L. rotary converter with an output of 500 volts was installed ; this increased the aerial current to 0.5 amp., and the next day the first foreign QSO was made with F8BF. The next day the Dutch station PC11 was worked, after which continental amateurs could be worked practically every night, the wave-lengths used being between 150 and 200 metres.

In June, 1924, the QRA was moved to Morecambe, where A.C. supply was available. A shack was built outside for the transmitting gear and extra land was purchased to allow plenty of room for aerials. A 50-watt permit was applied for and granted, a Mackie generator, giving an output of 800 volts, was installed, the maximum power available being about 35 watts, and G5SZ began to work the world.

QSO's with U.S.A., South America and Canada being obtained practically every week-end ; one of the best days being January 31, 1925, when between 1.56 and 4.15 a.m. W1BGQ, W1OR, W1PL, W2SZ and W4EQ were all worked on 90 metres.

In 1926 the QRA was moved to Menston, Yorkshire, where DX continued to be accomplished, and it was not long before every continent had been worked, the W.A.C. certificate of the A.R.R.L. being obtained in February, 1927. In September, 1929, the QRA was again moved to its present site at Guiseley, near Leeds, DX being kept in mind when the house was purchased. Excellent DX has been done from Guiseley, the best being VK on 21 metres with an input of 25 watts to an LS5B.

G5SZ is now active on 1800 kc. (10 watts) 3600, 3560, 7200, 7120 and 14240 kc. ; telephony can be used on all bands, but is usually confined to the 1.7 and 3.5 bands. The station is licensed for 200 watts on all bands except 1.7 mc.

On 1.7 mc. an M.O.P.A. is used with choke control in conjunction with a well-designed speech amplifier and ex-B.B.C. microphone.

For QRO work on the other bands, rectified A.C. is available up to 2000 volts, rectification being by means of Westinghouse metal rectifier. The QRO

[Courtesy "Yorkshire Observer."

set comprises C.O., F.D., neutralised buffer stage and neutralised P.A., the valves used being :—

C.O.	F.D.	Buffer,	P.A.
D.E.5B	L.S.5B.	Mullard D.O.24	Mullard S.W.2

Owing to the unwarranted expense which would be incurred in attempting to modulate the P.A. stage by the usual method of choke control, an attempt was made to modulate by using choke control to the buffer amplifier. This was not very successful, only a very small percentage of the carrier being modulated, although the results were good when using low power with the aerial coupled to the buffer stage, the power then being 25 watts.

(*Continued on column 2, next page.*)

PUSH-PULL POWER AMPLIFIER.

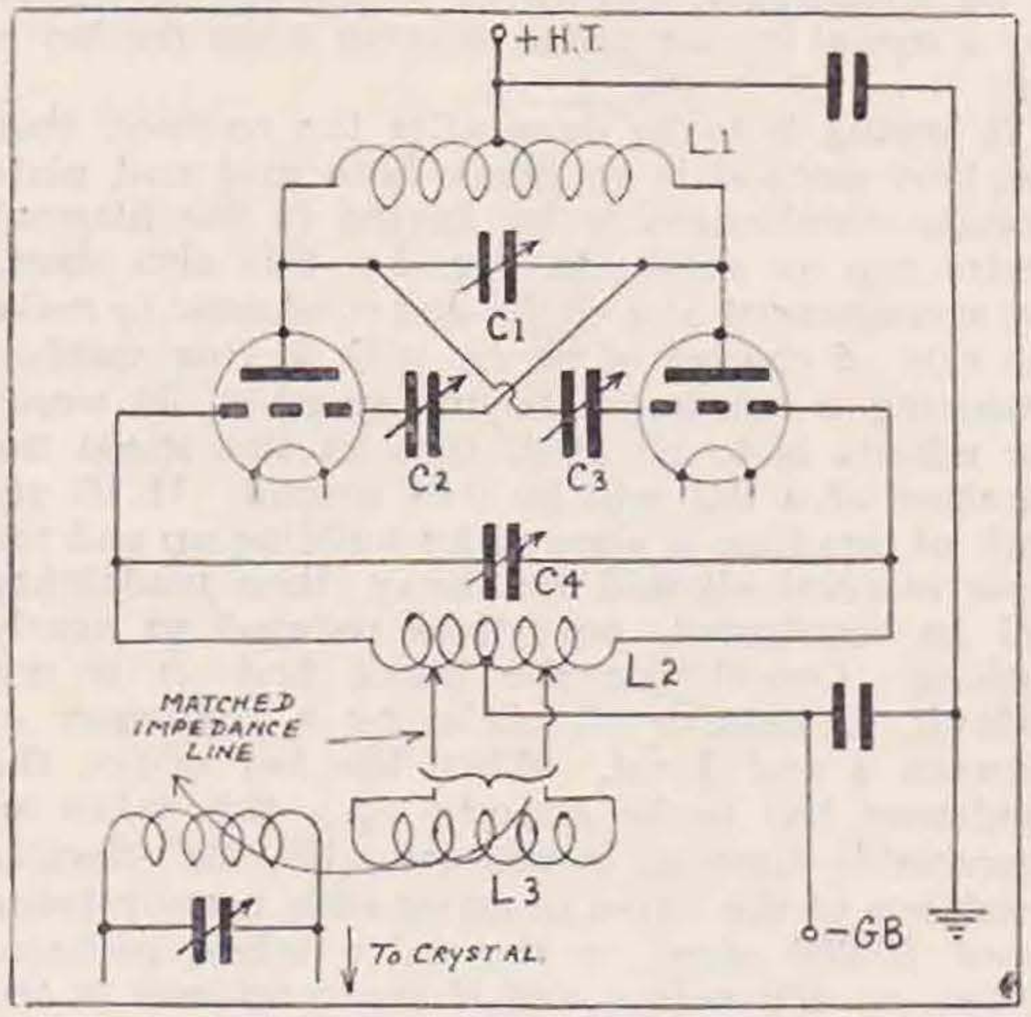
C. J. Paddon, A.I.R.E.

THIS push-pull neutralised power amplifier is designed to give great stability and completeness of neutralisation. The method of driving the grids permits heavy excitation from a low-power frequency doubler.

Apart from the matched impedance line method of excitation, there is nothing unusual about the circuit. The capacities C_1 and C_4 should be small. There is no need for a high-C circuit here, as the crystal provides stability. The mechanical layout can, and should be, as symmetrical as the electrical one. It is well worth the trouble to see that both sides are identical, because it greatly improves neutralisation.

It is worth remarking here that the " bonging " note usually taken as the mark of a good crystal is really due to the fact that the final amplifier is improperly neutralised. With absolute neutralisation the note should be dead steady, pure D.C., but no " anvil chorus " effect.

The matched impedance line has a number of features to commend it. If the line is rigidly built, and the wires kept parallel (one inch is sufficient spacing), it may be of almost any length without loss. Such a line does not radiate, and will not " couple in " with adjoining circuits.



Let us now put the system into operation. The exciting stages (crystal oscillator, doubler, etc.) are switched on, but no H.T. is applied to the P.A., and L_3, consisting of about five turns, is coupled to the tank circuit of the final stage. The opposite ends of the matched impedance line are clipped on equal numbers of turns either side of the centre tap of L_2. We now vary C_4 until a swing of the milliammeter of the exciting stage shows resonance. The valves may now be neutralised in the normal fashion, the neutralising condensers being C_2 and C_3.

Reduced anode voltage is applied to the P.A., and after a little " juggling," a position will be found for the feeder line clip on L_2 and for the coupling between L_3 and the exciting stage. This position will give ample excitation for the P.A. grids, and will not overload the exciting stage. After a general re-check of all tuning, including the Xtal and intermediate stages, we may raise the anode voltage to the P.A. After gradual readjustment of clips and coupling, it will be found that a surprising amount of power may be pushed into the P.A. stage without ill-effect. Needless to say, the P.A. valves are always biased to cut off, and as the anode voltage is increased the bias must also be increased.

It will be found that as circuit C_4 L_2 is swung in and out of resonance, the plate current increases through peak in a smooth manner, and is at all times clean and under control. By de-tuning this circuit slightly, we have a simple means of reducing power. This arrangement was first used in a rather high-power station. With C_4 L_2 de-tuned plate mils. were zero, and progressed smoothly to 300 as the circuit was brought into resonance.

(Continued from previous page.)

An attempt was then made to modulate the grid of the P.A. by using a 1-1 transformer in the grid circuit, the primary being connected in the plate circuit of the L.S.6A. in the speech amplifier, the usual speech choke used for the choke control being shorted ; this at once gave excellent results, modulation up to about 85 per cent. being obtained without distortion.*

During the first tests with this arrangement on 3600 kc., two Danish, one Dutch and one French station were worked on fone, one reported 95 per cent. modulation, two gave 90 per cent. and one gave 85 per cent. Since then one G station has reported 100 per cent. modulation ! All stations worked report " speech excellent," and the system can be recommended as a very easy and economical method of modulating a QRO outfit for use when fone is desired.

Keying is done in the H.T. lead to the F.D., in which an efficient key filter as recently described in the " Bull," is fitted, no key thump being heard in the broadcast receiving set installed in the house, even when using the full 200 watts.

Two aerials and a counterpoise are available—for 7 mc. a half-wave voltage-fed zepp, with $\frac{1}{4}$-wave feeders, is used. For 3.5 mc. a bent Hertz is used, being current-fed at the centre ; this gives very good results ; also the counterpoise portion of the current-fed Hertz is used as the counterpoise in conjunction with the live side of the zepp for operation on 1.7 mc. A suitable switching arrangement enables either aerial to be used at will on all transmitters and receivers.

Various types of receivers have been tried, including super-hets, but for best all-round results with best signal to background ratio, a simple det. L.F. arrangement is preferred. Screened grid and pentode detectors have also been tried, and while they certainly produce louder signals they also increase the background noises to such a level as to make long periods of operation very trying.

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* This system of modulating a high power set forms the basis of an article by G5SZ, which will appear in a future issue of the T. & R. Bulletin.

THE ELIMINATION OF KEY CLICKS.

By A. E. Wood (G5AW), A.C.G.I., B.Sc. (Hons.), D.I.C.

In this article the author sets out to prove the case for primary keying and describes in detail his own system, which gives very satisfactory results with powers of 50 watts. It should be pointed out that some transmitters in this country have to make use of H.T. generators where no A.C. mains are available, and that they require some other kind of keying system for medium and high power sets. Without wishing to belittle the primary keying system, we think the system of keying the H.T. supply to one of the low power stages on a crystal controlled set has much to commend it. Other amateurs are using grid keying systems with satisfactory results. Now that Mr. Wood has started the ball rolling, we hope other members will come forward and describe keying systems for high power sets—systems that have been well tried and have come up to the exacting requirements of the present day.

THE problem of preventing interference to neighbouring broadcast receiving sets is one that nearly every transmitter has to tackle sooner or later—it is neither fair to the B.C.L.s nor to other amateurs to cause annoyance if it can possibly be avoided. There is a feeling of satisfaction if one is able to transmit just when one pleases without hearing someone at the door a few minutes after switching on, and it is the writer's opinion that all key clicks can be cured at the transmitting end; in the case of wipe-out, *i.e.*, disappearance of signals on the broadcast set when the key is pressed, due to H.F. paralysing the detector valve, the cure must be applied at the receiver as only a reduction in power will achieve the same result from the transmitting end.

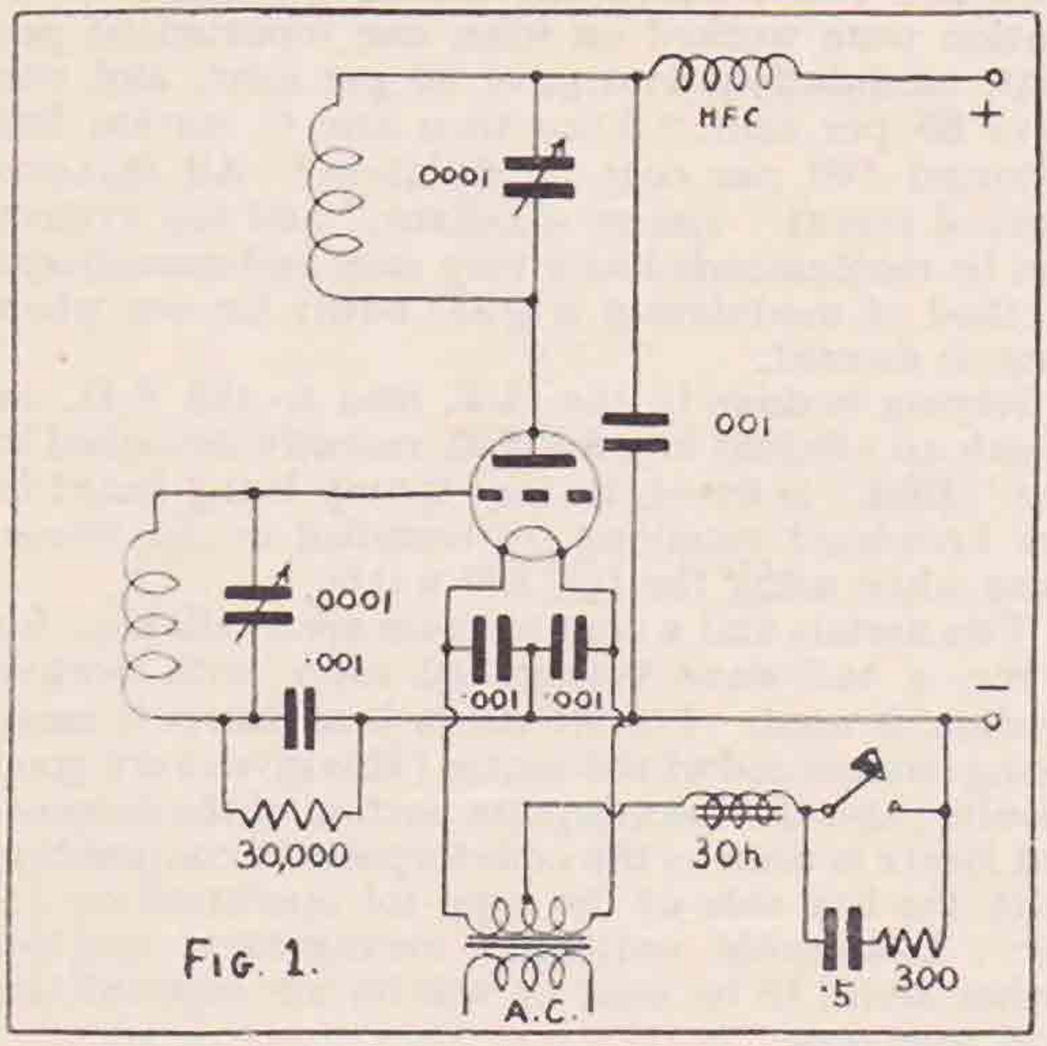


FIG. 1.

When first starting up, the usual thing is to key in the H.T. negative lead. Owing to the extremely rapid rate of change of watts radiated (the plate current is zero at one instant and its full value immediately the key comes down), neighbouring aerials are excited and a thump produced. A similar state of affairs exists when the key opens, but is not quite as serious since the change is from full power to zero, whereas due to the rectifier regulation when the key is up the voltage will rise to approximately $\sqrt{2}$ its normal value; hence, when the key is pressed, $\sqrt{2}$ the normal voltage and consequently $\sqrt{2}$ the normal current, and therefore twice the normal power, are applied for a short interval. Keying in the grid circuit has the advantage that only small currents have to be interrupted, but owing to leakage across the key a squeal is very prone to occur when the key is up.

If keying is to be done after the rectifier, then the best method is to break both grid and plate circuits simultaneously by keying in the filament centre tap as shown in Fig. 1; this also shows the arrangement of a choke and condenser to make the rate of change of power with keying smaller. Assuming a maximum keying speed of 30 words per minute is to be used, then at this speed the duration of a dot will be 0.04 second. If 10 per cent. of this time is allowed for building up and the same interval allowed for decay, then readability will be unaffected, but clicks reduced to nearly nothing. Considering the break first—it is not difficult to remove all clicks by a condenser of between $\frac{1}{4}$ and $\frac{1}{2}$ mf. When the key opens, the condenser has to be charged up; this takes an appreciable time as it charges with the effective resistance of the valve in series (this usually being about 10,000 ohms as the valve takes, perhaps, 40 ma. at 400 volts), and if the condenser is too large then there will be a tail to the signal which may make it difficult to read. Elimination of the thump on make is a much more difficult feat; first, theoretically, a choke of 100 henries inductance at least is required in order to round off the curve; although in practice a 30-henry choke gives an appreciable reduction, it will not remove all traces. Also some means must be used to prevent the voltage rising, as not only does this rise make clicks worse, but is bad for filter condensers. It is often suggested that a "bleeder" resistance be connected across the H.T., but this is only a partial cure; the writer about nine months ago used an automatic back-loading scheme very successfully. This is shown in Fig. 2 and for the back load valve an AT40 was employed; this is a high impedence

valve similar to the LS5B, so that, with the key down and its grid connected to H.T. negative, it only takes a few milliamps. When the key is up, however, the grid of the AT40 is considerably positive with respect to H.T. negative, and by varying its filament voltage the total load taken from the rectifier can be maintained constant. This scheme gave good results, but is unsuitable for powers much above 10 watts, as the dissipation on the AT40 is the same as the input watts to the P.A. or Locked T.P.T.G.

PRIMARY KEYING.—In the opinion of all amateurs who have tried this method, it beats all others. To quote its advantages: the filter condensers charge and discharge relatively slowly and no clicks are radiated, the life of filter condensers is improved since they are only in about 50 per cent. of the time and the normal working voltage is never exceeded. As disadvantages, it is often said that the note is hard to read due to tail; the cause of this is too much capacity in the filter or the use of a high impedence valve. If reduction of the

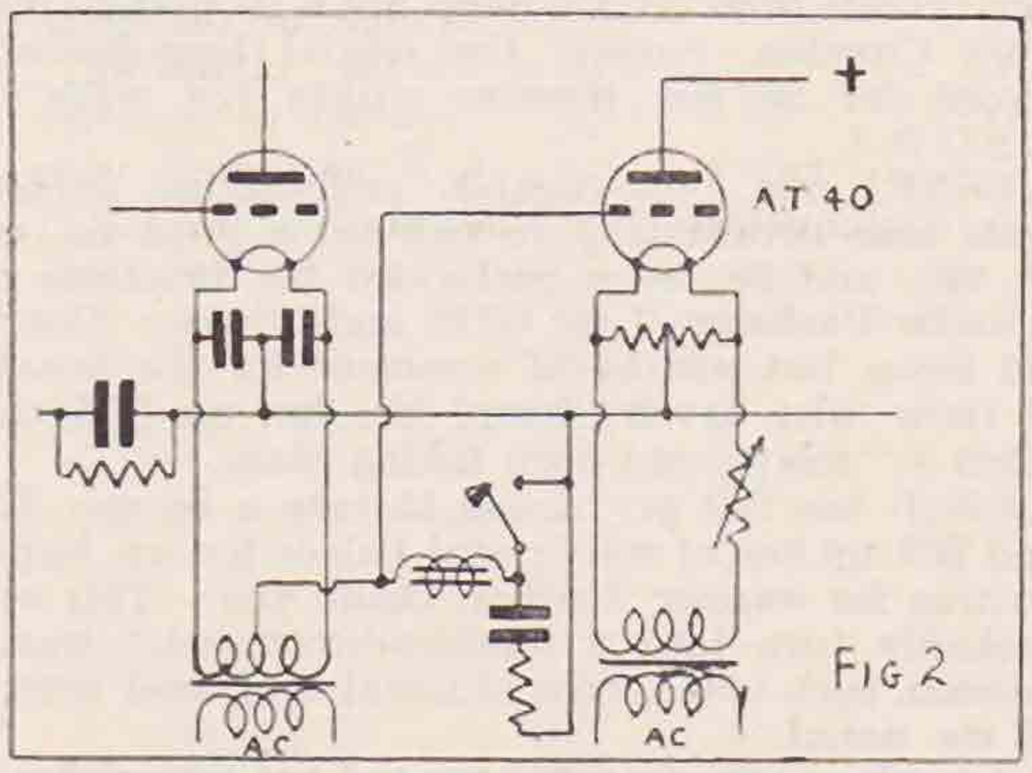


FIG 2

amount of smoothing introduces a ripple, then a better choke must be used: the writer has, with primary keying, used as much as 8 mf. without a bad tail. The other trouble that may be encountered is due to surges back along the mains, as it is quite normal for the switching on or off of an electric light to cause a click in a near-by broadcast set; unless, therefore, precautions are taken, interference may be caused; fortunately, it is not difficult to cure this.

A transformer may take a very large current for a few cycles if at the instant the key closes the mains voltage is passing through its zero value. This is because normally the magnetising current and the flux lag 90 degrees behind the voltage, so that the flux is a maximum when the voltage is zero. If both the voltage and flux start from zero, then to produce the back E.M.F. the flux will have to change from 0 to 20,000 lines/sq. cm. in the first half-cycle, instead of from +10,000 to —10,000; assuming that the design has been based on the usual figure of B=(maximum flux density of 10,000 lines/sq. cm.), then initially the magnetising current will be about 30 times its normal value, as 20,000 is a fair way upon the magnetisation curve and the iron is nearly saturated. If a transformer is about to be made and used with primary keying, then it is best to design with a maximum flux density of about 7,000 lines/sq. cm.

In spite of the surge, it is possible to prevent it from getting back into the mains, and the writer has been using the arrangement shown in Fig. 3 for some months and no thumps are audible on a receiver only designed for receiving the two London transmitters, and hence not using an H.F. stage. The condenser C_1 should not be larger than 0.05 mf. or a resonance may occur with the primary inductance. The lamp across the primary serves to prevent high voltages being developed should this occur, and it also reduces the spacing wave that would otherwise be introduced through C_1 to a negligible amount. (Amateurs using primary keying often find that they have to put a lamp across the key to reduce surges; the result of this is a strong spacing wave.)

The H.F. chokes are wound with No. 30 DSC or DCC wire on a 5-inch length of §-inch diameter dowel rod; it is perhaps not generally known that an efficient choke for any wavelength can be made by winding a length of wire equal to a quarter of the wavelength on a wooden dowel. The chokes used each contain 210 turns, *i.e.*, a length of 10 metres of wire; they will be effective for 7 mc., and as their resonance is about 11 mc., are also suitable for 14 mc. The resistance of each choke is 2.2 ohms, so that even with an input of 100 watts the volt drop will not exceed a total of 3 volts.

The condenser C_2 is only 0.001 mf., but the effectiveness of this filter is shown by the fact that no thumps are heard in the receiver when 50 watts are keyed in this manner, but if the key is put between points A and B on Fig. 3, then the thumps are extremely loud and make listening-in comfort impossible. As an additional precaution against H.F. getting back along the mains, the writer also

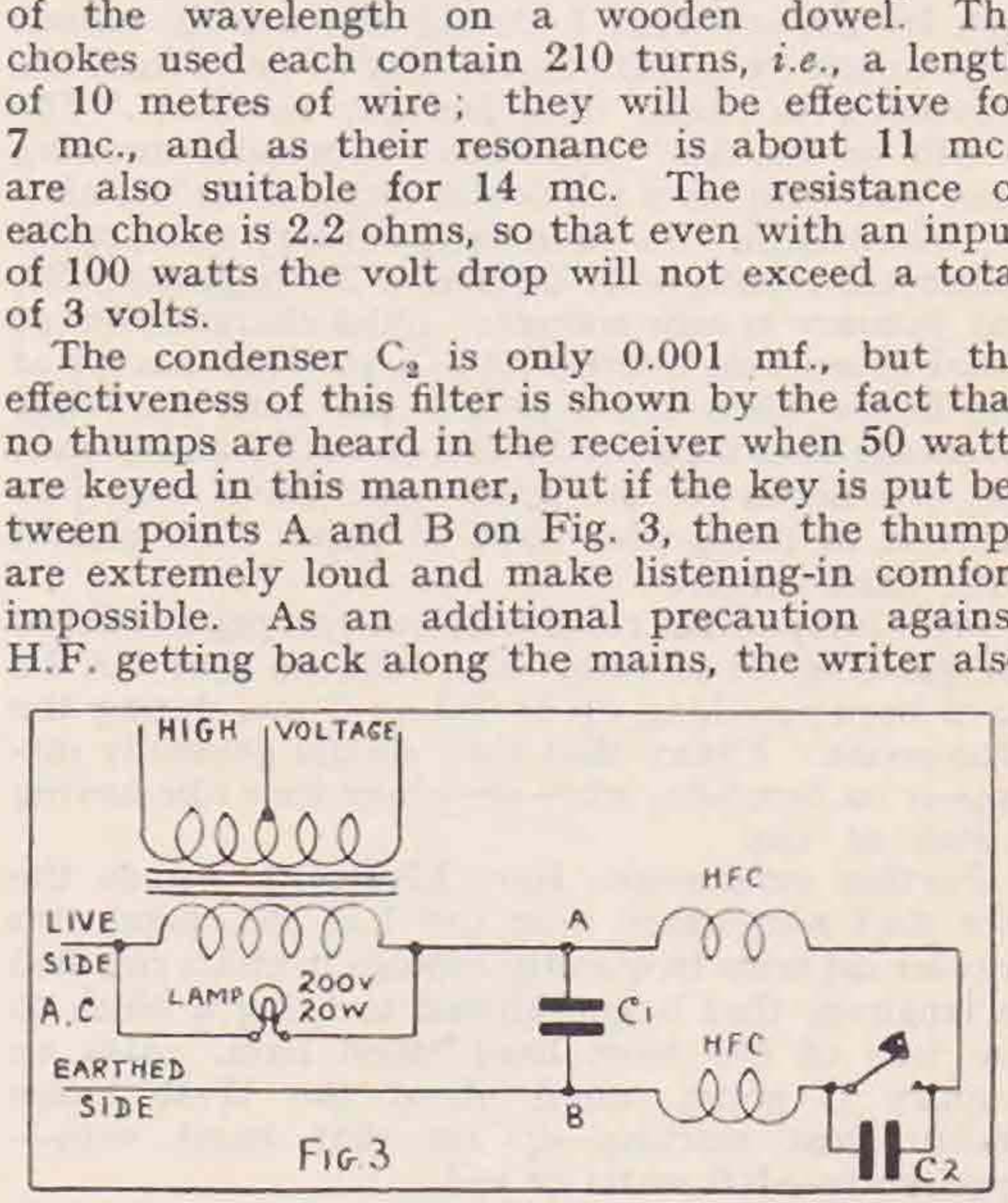


FIG 3

uses a choke in each main immediately after the switch which is used to make the whole of the room dead; these chokes are similar as regards number of turns, but are wound with S.W.G. 26 DSC or DCC wire on a 6½-inch length of §-inch as before; for an input of 50 watts to the last valve, the total current drawn from the mains will be 1.5 amps. approximately for a crystal-controlled transmitter. The chokes specified have a large surface area and will not become hot with this current; also, since their resistance is about one ohm each, the volt drop due to their use will be another 3 volts.

Finally with regard to wipe-out, it nearly always occurs with sets that have no H.F. stage, and the owners usually make the most noise in complaining, yet cause widespread interference themselves trying to get foreign stations. Even comparatively modern sets can suffer, however, and the writer

(*Continued on column* 1, *page* 257.)

THE MONTH ON THE AIR.

By Uncle Tom.

(A new feature in which our wandering boy-friend pours out his heart to the eagerly-waiting world.)

SOME time back it was suggested to your humble servant who hides his identity behind the *nom-de-plume* at the head of this page, that a monthly causerie of the not-too-serious variety would be a useful addition to the contents of the "Bull." It is not a nice thing to thwart the desires of an Editor (far less a secretary—some secretaries in particular), and this page is the awful result.

That's not the worst of it, though; there's going to be another like it next month, *and* the month after, and so on *ad nauseum*, until your Uncle gets chucked down the stairs on his neck.

Dropping the third person from now on (so as to give the printer a use for all those capital I's of his), let me say that I should like a little serious help month by month, in the way of news from the provinces, Scotland and Ireland, so that "The Month on the Air" shall have a broader meaning than just "my own particular location on the air."

"The Month," for us in the February issue, really means the month from December 20 to January 20, but January is near enough. Chief characteristics: Total absence of interesting DX stations, except at the hours when most people are hard at work. Evenings have been pretty dull on both 7 and 14 mc., but afternoons on the latter band have been just Heaven to those who want to paper their shacks with Yank cards.

My Liverpudlian correspondent (no prizes offered for guessing his identity) also tells me that KA 1's have been anything up to R8 on 7 mc. during the afternoons. Funny that they should generally disappear on Sundays, when everyone feels like having a stab at 'em.

Further emanations from Liverpool include the fact that somewhere near the 1.75 mc. band two trawler captains frequently indulge in chats couched in language that is guaranteed to bring a blush to the face of the most hard-boiled ham. Also an enquiry is going round about the West Lancs station just starting up on that band with—apparently—100 watts or so!

London shows a fair amount of activity on 1.75 mc. Most of the Southern stations—who greatly outnumbered the Northerners a few years back—seem to have faded into oblivion, and 1.75 now appears to be the happy hunting ground of North and East London, and Essex.

Rumour has it that a very old stager in South London suddenly appeared with a carrier-wave like Brookman's Park and about 2 per cent. of modulation. When he puts a speech amplifier between his mike and his modulator the BCL's are in for a real treat.

My Scottish correspondent sends me some caustic comments from South Africa, where they have completely run out of their supply of patience concerning the long-range monoplane. A South African suggestion (?) for a modification of the "Q" code runs as follows:—QPY: Have you a plane? Yes, we have a plane. QYP: Does your plane fly? Yeah, our plane does fly. And, further, in response to an offered message regarding a flight:—QZZ: Will you kindly proceed across the Styx? Answer: After you.

Seriously, the South Africans are now regarding the flight as a bit of a farce. According to the daily papers, it is described there as the "Non-Stop, Non-Start Flight." But the R.A.F. have certainly had bad luck all along the line. Let's hope that when she does go off a ham will be found at the other end to take the dope.

28 mc. is apparently continuing to be an "all-Hungarian wave," just as 7 mc. a few years back was an "all-Russian wave" late at night. Does anyone ever hear anything but G's and HAF's on 28?

56 mc., on the other hand, is sacred to G's (as far as the said G's are concerned), and, in spite of dire threats from certain hams not a thousand miles from Croydon, Surrey, the official long-distance record for 56 mc. remains within the walls of R.S.G.B.!

G6NF, our indefatigable calibrations expert, finds time occasionally to put out a good sig. on 56 mc., and has even performed the functions of "Radio Exchange" for G5IS and others. This is old news, but worthy of comment for the benefit of those who haven't heard the fun on 1.75 mc. when a "relay" has been taking place.

G6QB has full permission to take a 56 mc. TX and RX up one of the Crystal Palace towers, but is waiting for warmer weather, thank you. This will probably turn into a "mono-directional" transmission, such is the mass of metal compared with a 56 mc. aerial.

Aeroplane experiments have not yet materialised, but I can see them coming along quite soon.

Looking back at these notes, I feel that they are rather scrappy this month, but that can be avoided if half a dozen really active hams will take it upon themselves to send in regular news of what is doing in their particular locations.

Thanks for your patience, gentlemen. "Here's to the next time."

Strays.

Mr. L. H. Vale, of 48, Albion Street, West Brunswick, N.10, Victoria, Australia, an Australian receiving station, would like to exchange letters and ideas with a B.R.S. member.

* * *

Mr. Canete, EAR3, draws our attention to the fact that his address is Jacometrezo 1 entlo, Madrid, and not Zaragosa, as published in a recent list of new members.

* * *

Mr. Forsyth, G6FO, advises us that during some local 28 mc. tests with Bristol, 15 air miles away, he was heard R4 QSA3 at Issoire, Puy de Dome, South of Paris. His input was 11 watts to a pair of P650 valves in push pull; the aerial being a 66 ft. Windom. This reception was logged at 1405 G.M.T. on December 18.

SOCIETY CONTESTS AND TESTS.

The 1933 3.5 M.C. Contest.

The Awards Committee recommended to Council, and the latter have approved, the following new rules for the 3.5 mc. Contest to be held on April 1 and 2 and April 8 and 9, 1933.

The general rules as set out on page 89 of the September, 1932, issue apply, with the following additions.

1. The British Isles, for the purpose of the contest, includes England, Scotland. Wales, Northern Ireland, the Irish Free State and the Channel Islands.

2. Scoring will be counted as follows :—

	Points.
Within the British Isles	1
British Isles and Europe	2
,, ,, and outside Europe	10

3. Points can only be claimed for one contact with a specific station during the contest.

4. Points can only be claimed for contacts with stations *over* 100 *miles distant* measured by Great Circle.

Logs will only be accepted when made out on one side of lined foolscap paper, set out and ruled as shown.

R.S.G.B 3.5 *mc. Contest, April,* 1933.

Call Sign..... Total Points Claimed .....

Name and Address.....

Apparatus used.....Power used.....

RULING FOR TRANSMITTER ENTRIES.

Date	Time	Station Worked	QRA	Report Rcd. QSA Tone R	Report Given QSA Tone R	Points Claimed

RULING FOR RECEPTION ENTRIES.

Date	Time	Stn. Hrd.	QRA Calling	QSA Tone R	Points Claimed

The 1933 3.5 M.C. Reception Contest.

The following are the revised rules for this contest, which cancel those printed on page 162 *of the November* 1932 *issue* :—

1. Entrants must be fully paid-up members of the Society and be resident within the British Isles.

2. The British Isles for the purposes of this contest includes England, Scotland, Wales, Northern Ireland, Irish Free State, Channel Isles, and the Isle of Man.

3. Contest will extend from 1200 G.M.T., Saturdays, to 2400 G.M.T., Sundays, on April 1, 2, 8 and 9, 1933.

4. Reception logs, for which points are claimed, must reach the Tests Manager, at 53, Victoria Street, S.W.1, within two weeks after the end of the contest.

5. Leading stations will be awarded Certificates of Merit, whilst trophies may be awarded at the discretion of Council.

6. A report of the received signal, QRK, QSA, and tone, must be recorded before points can be claimed, together with a description of the call, i.e., Test, CQ or station called.

7. Extra points cannot be claimed for logging a station more than once during the contest, and no points can be counted unless the station is over 100 miles distant.

8. Scoring will be counted as follows :—

	Points
British Isles	1
Europe	2
Outside Europe and under 5,000 miles	5
Rest of world	10

9. Council's decision will be final in all cases of dispute. They reserve the right to amend or alter the rules for this contest if deemed necessary.

The 1932 28 M.C. Contest.

Luck seems to be dead against any organisation who has the courage to sponsor 28 mc. Tests, for once again we must report that our 1932 Contest has proved a failure.

That keenness still exists amongst amateurs in every country is undisputed, but with such impossible conditions to contend with it is surprising that so many of them continue to devote their attention to a band which must surely be the " white elephant " of amateur radio.

The Awards Committee report that no contestant worked or heard any station outside the British Isles, and, therefore, from a contest point of view, it must be regarded as null and void.

Tribute must, however, be paid to G6WN, G2DQ, G6OY, G5FV, G5LQ, G2KB, G6LL, 2BHK, BRS565 and 918 for the excellence of their entries, which, although of a negative nature, emphasised the fact that interest is still awake.

The Committee regret that many stations who were in active operation during the contest failed to report.

Arrangements are being made to conduct a series of tests on this band during the summer, in the hope that conditions may have improved.

The dates fixed are May 22–26 from 18.00 G.M.T. to 24.00 G.M.T., and from 12.00 G.M.T. May 27 to 24.00 G.M.T. May 28.

Reception Tests

Arrangements for the next Reception Tests are given below, and for the benefit of new participants, logs as shown should be made out on quarto size paper. A separate sheet should be used for each period. Logs should be posted to T. A. St. Johnston, G6UT, 28, Douglas Road, Chingford, E.4, by March 27. All logs and letters are then circulated to each member contributing.

Member's Name and call sign or number.....

QRA .....

Wave Band..... M.C. Receiver..... Test Letter.....

Aerial details..... Direction.....

Date .....Period .....G.M.T. .....

Other information.....

Time G.M.T.	—Station— Calling	Called	QRK R	Tone T	QSA W	QSC R	Remarks

RECEPTION TESTS. SERIES 15.

Test Letter.	Date. 1933.	Period G.M.T.	Band mc.
A	Sun., Mar. 5	00.00–01.00	3.5
B	Sun., Mar. 5	09.00–10.00	1.7
C	Sun., Mar. 5	10.00–11.00	56
D	Sun., Mar. 5	11.00–12.00	7
E	Sun., Mar. 5	12.00–13.00	28
F	Sun., Mar. 5	18.00–19.00	14
G	Sat., Mar. 11	23.00–24.00	1.7
H	Sun., Mar. 12	07.30–08.30	14
I	Sun., Mar. 12	09.00–10.00	3.5
J	Sun., Mar. 12	11.00–12.00	56
K	Sun., Mar. 12	18.30–19.30	28
L	Sun., Mar. 12	22.30–23.30	7
M	Sun., Mar. 19	00.00–01.00	14
N	Sun., Mar. 19	09.30–10.30	7
O	Sun., Mar. 19	11.00–12.00	28
P	Sun., Mar. 19	14.00–15.00	56
Q	Sun., Mar. 19	18.30–19.30	3.5
R	Sun., Mar. 19	22.30–23.30	1.7

A Time Chart for the B.E.R.U. Tests.

Many RSGB members who are not continuously active, make a special point of being " on the air " during BERU month, and if they have not been transmitting during recent months, may be at a loss to know quite when and where to look for our overseas stations.

It was primarily with a view to obtaining some definite knowledge of conditions himself that the writer was led to make an investigation, but as the facts may be of use to other amateurs similarly situated, the table is printed below.

The table was obtained by a perusal of all the outgoing cards destined for BERU stations during two consecutive weeks in January. The times of all QSO's were noted and a rough estimate of the conditions at various times made. The times printed in heavier type indicate that the majority of QSO's were made in the band under which the hours in question are printed.

J. D. C.

Stations	7 mc. Band G.M.T.	14 mc. Band G.M.T.
SU	**2000—2200**	1200—1400
1 ...	nil	**1400—1800**
VE 2 ...	nil	**1100—1700**
3 ...	nil	**1800—1900**
4, 5, 6	nil	nil
VK	**1500—2000**	1145—1400
VO	nil	**1700—1830**
VS 1236 ...	nil	nil
VS7	**1530—1830**	nil
VU	**1600—1900**	nil
YI	**1700—2300**	1200—1600
ZL	**1500—1900**	0930—1200
ZS	**1700—2000**	1600—1730

Around Europe.

France.

From the R.E.F. we are reminded that their headquarters are now situated at 17 Rue Mayet, Paris 6. They also mentioned that M. Pierre Godfrin, F8BJ, who has been in charge of their Experimental Section for some time, has found it necessary, owing to other business, to hand over to M. Pierry Revirieux, F8OL. Details of the R.E.F. 28 mc. tests to be held during March and April will be found under Mr. Alan Smith's notes in the C.B. Section of this issue. We trust that British amateurs interested in this work will co-operate with the R.E.F.

We are also glad to note that an up-to-date list of French amateurs is now available, price 1 franc 50 cents.

A New National Spanish Society.

News of great interest reaches us from Spain. For the past two years amateur radio interest in that country have been somewhat disrupted owing to the operation of two separate societies—E.A.R. (the IARU National Society) and Red Espanola. It is therefore with much pleasure we learn of the fusion of these two societies under the name of Union de Radio-emisores Espanoles.

Mr. Uriarte, EAR12, who was secretary of R.E., has been elected president, whilst Mr. Bellon, EAR110, succeeds to the secretaryship. An old DX friend in Mr. Cordova, EAR96, becomes the Traffic manager and Mr. Canete the Honorary Treasurer. All of these gentlemen are members of the R.S.G.B.

We take this opportunity of heartily congratulating the officers upon their appointments, and offer our best wishes for the success of the new society.

Trade Notice.

Lectrolinx, Ltd., have now placed on the market terminal strips suitable for chassis mounting. Two strips are available, one with four sockets for loud-speaker and pick-up (suitably engraved) and the other with three sockets engraved A1, A2, and E. The sockets are mounted on paxolin strip, spaced ½ in. apart, with suitable fixing holes at the ends. The strips may, if desired, be adapted to baseboard mounting by the use of brackets.

The sockets are of the usual Clix resilient type, and fitted with screw terminals; they are suitable for use either with Clix solid or slotted pins.

The Elimination of Key Clicks.

(*Continued from page* 253).

at his old QRA had to cure what was then a de-luxe receiver ; the cause was in the method of controlling volume by means of the screen-grid voltage, thus making the valve insensitive and easily paralysed. Both wipe-out and clicks can be cured at the receiver by putting a wavetrap in the aerial lead. If transmission is done on the 7 and 14 mc. bands, mainly, then a trap tuned to 7 mc. will usually remove all trouble experienced on the 14 mc. band as well. This trap can consist of 8 turns of S.W.G. 24 DCC wire on a 2-inch diameter former and tuned by a 0.0001 pre-set condenser ; it can be tuned roughly to the 7 mc. transmitter and then, when placed in the aerial lead of the BCL receiver, readjusted till there is no interference when someone sends Vs on the transmitter. If the receiving aerial is close to the transmitting aerial, then this trap will absorb a certain amount of power. The average amateur will not like to see his watts going in this way, so before fitting the trap it is advisable to try a H.F. choke in the aerial, as this will sometimes be enough to cure the wipe-out : the chokes described in the thump filter are suitable, as their inductance is about 100 microhenries.

STRAYS.

Mr. K. Rancombe, late YI6KR, advises us that he has now left Egypt for Palestine, where he hopes to operate under the call ZC6KR. His full address is W/T Section, No. 6 Squadron, Detached Flight, R.A.F., Ramlah, Palestine.

Mr. W. P. Jones (G2PA) has been appointed representative for Monmouthshire in succession to Mr. Gwillim (G6GW), who has resigned from that office.

The Medway Amateur Transmitting Society propose holding a special contest on March 12 next. The contest will be confined to members living in the Medway district. The winning station and the leading B.R.S. will receive silver trophies recently donated to the society. Full particulars can be obtained from Mr. Milne, G2MI, or Mr. Howell, G5FN.

Pirates Again !

Mr. T. Maguire (G5NY) reports that an unauthorised person is using his call. This station employs raw A.C. and anyone in a position to give information is requested to communicate with Headquarters.

* * *

G2CJ requests the gentleman who used his call sign last November to send him his name and QRA so that these may be communicated to the P.M.G. on the specified form in triplicate. The QSL card will be given to the defendant after the police court proceedings.

* * *

Mr. M. E. Tapson, G6IF, reports that his call is being misused by an unauthorised station. A similar complaint has been lodged by the Secretary of the City and Guilds Engineering Society regarding G5YC, the Society's call.

* * *

Mr. Williams (G5TW) and Mr. Caine (G5CN) both report that their calls have been " pirated." In all such cases we strongly urge members to advise the G.P.O. of these malpractices.

* * *

Mr. Stollery (G5QV) writes as follows :—

The pirate in the Ilford district who is so keen on using the call sign of G5QV in working other Continental pirates on 7 mc. (a band G5QV has not worked for five years), is bringing ignominy to those of his ilk, for one of them writes to me as follows :—" My xmtr is home build there I have no licence. On the 40m band it is safe for the radio police and without keyclicks. Pay not much attention on faults than my schooltime is far behind. I am 47 year."

Where's my truncheon ? Come to de lockup-hausen. Can anyone track this knave in East London ? I would go with pleasure a hundred miles in the train to stuff him with his QSL cards.

New Members.

HOME CORPORATES.

L. C. WILLCOX (G2FL), 21, George Street, Warminster, Wilts.
R. F. J. MAIDMENT (G5MM), Red House, Hoo, near Rochester, Kent.
J. H. CANT (G6FU), 7, Elthruda Road, Hither Green, S.E.13.
C. FENTON (G6JZ), 18, Hill Top Road, Kells, Whitehaven, Cumberland.
S. W. J. BUTTERS (G6UB), 84, Guy Road, Beddington, Croydon, Surrey.
F. E. WOODHOUSE (2AGV), 20, Hoodcote Gardens, N.21.
A. S. O. MILLARD (2AIZ), 1, Holmlands, Monkseaton, Northumberland.
F. J. WADMAN (2BWG), Widecombe, Dale Road, Walton-on-Thames, Surrey.
A. T. FLEMING (A.), c/o Wireless Dept., Patrick Thomson, Ltd., North Bridge, Edinburgh.
E. F. KERRIDGE (BRS1052), 444, Cranbrook Road, Ilford, Essex.
J. E. SQUIRE (BRS1053), " Winston," Alstone Avenue, Cheltenham, Glos.
D. J. ROBINSON (BRS1054), 30, Thirlmere Avenue, Stretford, Manchester.
C. R. SCOTT (BRS1055), Electric House, Pitlochry, Scotland.
A. H. BIRD (BRS1056), 9, Somerset Road, Ashford, Kent.
J. G. DAVISON (BRS1057), 49, Hyde Terrace, Gosforth, Newcastle-on-Tyne.
C. D. DIDCOTT (BRS1058), Addis Lane, Elmbridge, Droitwich, Worcs.
DR. E. J. H. ROTH (BRS1059), 40, Harley Street, W.1.
C. E. SPILLANE (BRS1060), Woodside, Meliden Road, Prestatyn, North Wales.
R. WILLIAMS (BRS1061), Lynchmere, South Road, Stourbridge, Worcs.
C. J. HARDING (BRS1062), 21, West View Road, Keynsham, Som.
J. PIGGOTT (BRS1063), 77, Jessica Road, S.W.18.
F. C. CROCKER (BRS1064), Deepside, Cross Deep, Twickenham, Middlesex.
J. V. BATTERSBY (BRS1065), 26, Eton Avenue, North Finchley, N.12.
C. A. BRADBURY (BRS1066), 23, Forest Road, Burton-on-Trent, Staffs.
P. J. WATSON-LIDDELL (BRS1067), 54, Victoria Street, Sheffield 3.
A. W. LISTER (BRS1068), The Church House, Bibury, Cirencester, Glos.
G. L. V. BUTLER (BRS1069), 995, London Road, Thornton Heath, Surrey.
D. B. PIPER (BRS1070), 65, Glendale Avenue, Edgware, Middlesex.
R. C. KIDD (BRS1071), c/o McGuire, 15, Tait's Lane, Dundee.
S. C. POWELL (BRS1072), " Iviedene," St. Luke's Road, Tunbridge Wells.

DOMINION AND FOREIGN.

G. A. POHL (DE0265), Hamburg 8, Gr. Reichenstr. 55 I., Germany.
H. JAGER (DE1174), Elisabethstr. 28, Frankfurt (Oder), Germany.
P. S. RAND (W1DBM), Box 151,, North Falmouth, Mass., U.S.A.
A. DAVIS (XU1U), Hong Lok Station, Canton, China.
J. MCCRUDDEN (ZS6G), Box 809, Johannesburg, South Africa.
DR. GEORGES DURANCEAU (FRS28), 9, Rue Saint Jean, Fontenay-le-Comte (Vendee), France.
H. H. PRINCE TEMENGGONG AHMAD (FRS29), State Commissioner of Muar, Johore, Malaya.

HIC ET UBIQUE.

Society Notices—QSL and QRA Sections—Calibration Section—Empire Calls Heard—Correspondence—Book Review.

R.N.W.A.R. NOTES.

CONSIDERABLE progress in connection with the Reserve has been made during the past two months. The principle of starting up one district (London) efficiently before proceeding into the provinces has been strictly adhered to with considerable success.

Seven London units are now in active operation, each in charge of a Unit Petty Officer owning an amateur transmitting station. These stations transmit procedure exercises weekly and use the common London District frequency of 3,740 kc. Several of the units are at full strength, whilst many new units are in the process of formation. Two provincial members have stations in operation, and are receiving procedure training over the air from London U.P.O.s

During January visits were made by members of the R.N.W.A.R. Committee to Bristol, Gloucester and Birmingham, where units were formed in each city.

A very keen unit is taking shape in Gloucester under Messrs. Hamilton and Rogers, whilst it is expected the command of the district will be given to our D.R., Captain G. C. Price (G2OP), whose experience as an ex-Army officer and an old-established amateur will do much to make the Western District one of the best in the country.

The response shown at the Birmingham meeting, which was held under the auspices of M.A.R.S., was highly gratifying. When it is remembered that the Midland members have little or no nautical traditions to urge them to join a Naval Reserve, it spoke well for their keenness when no less than 25 persons, most of them well-known members of R.S.G.B., signified their desire to enrol.

The Midland District is fortunate in having received an assurance that Dr. Marston (G2PD) will be willing to take an active part in its organisation.

Immediately instruction has been given to the unit stations in Bristol, Gloucester and Birmingham, steps will be taken to proceed with the formation of units in other parts of the country. As this calls for considerable advance preparation, the Admiralty propose drawing up an itinerary of places to be visited. D.R.s and C.R.s are therefore invited to advise Lieut.-Commander Mann, R.N. (at the Admiralty) if they wish a meeting to be held in their county or district during the next provincial tour to be conducted by the R.N.W.A.R. Committee members selected for this work.

R.N.W.A.R. Transmissions.

For the benefit of non-members of the Reserve we publish below the times and frequencies of the routine R.N.W.A.R. Transmissions.

GYB (CLEETHORPES), 90.2 Kc.

Mondays.—22.30 G.M.T.
Wednesdays.—22.30 G.M.T.
Fridays.—22.30 G.M.T.

MD9 (WHITEHALL), 3,740 Kc.

Sundays.—11.00-12.00 G.M.T.
Mondays.—21.45-22.30 G.M.T.
Tuesdays.—22.30-23.00 G.M.T.
Wednesdays.—21.45-23.00 G.M.T.
Fridays.—22.30-23.00 G.M.T.

The transmissions from MD9 and GYB on Monday, Wednesday and Friday evenings are in the nature of Morse Practices. Plain language, code, figures and accented letters at 20 w.p.m. are given first, followed by a Naval Procedure lesson at 12 w.p.m. The whole practice is then repeated at 12 w.p.m.

LONDON DISTRICT, 3,740 Kc.

Sundays.—11.00 to 12.00 G.M.T.
Tuesdays.—22.30 to 23.00 G.M.T.
Thursdays.—22.30 to 23.00 G.M.T.

The calls of these stations commence with the letter M, followed by another letter and the figure 2.

B.E.R.U. CONTEST.

25 WATT PERMITS.

It is interesting to record that over fifty members took advantage of the special G.P.O. concession to permit 10-watt British stations to use 25 watts during the contests.

It is hoped that every applicant for this concession will make a return, whether or not contacts have been effected.

Licence Facilities.

For the benefit of new members and those whose memories are short-lived, we again give information regarding the extra licence facilities which can be dealt with by the Society.

High-Power Permits.

Applicants for increased power must apply through their District Representative stating their reasons for requiring the increase, and giving an assurance that crystal control will be used for all high-power transmissions. It is the duty of D.R.'s to *comment* on all applications and to forward them to H.Q. not later than the *second Tuesday* in each month.

Applications are dealt with by Council at their meeting on the third Wednesday in each month, and members are advised immediately afterwards of Council's decision. The extended permit should reach the applicant not later than the first day of the following month. If this does not arrive, after notice has been received that the recommendation has been made, the member should advise H.Q. *promptly*.

3.5 *mc. Permits.*

Applications for the use of the 3.5 mc. band should be made direct to H.Q. with a copy to the D.R. These applications are dealt with monthly, and the extended permits are normally issued from the G.P.O. during the last week in each month.

Portable Station Licences.

These must be applied for direct to the G.P.O.

Note.

The Society cannot recommend members for new licences, neither can it recommend members for the use of amateur frequencies other than those already allotted them. *All such applications are personal to the individual and must be made direct to the G.P.O.*

Back Issues of the T. & R. Bulletin.

Headquarters have available certain back issues of the BULLETIN, which will be disposed of at the price of 4d. per copy. Early application is necessary :—

1926.—March (2), April (1), June (2), August (2), October (2).
1927.—March (1), April (2), May (1), October (1).
1928.—January (1), April (2), July (2), December (2).
1929.—April (59), June (5), July (1), August (4), September (1).
1930.—March (20), May (16), June (1), September (2), October (40), November (8), December (6).
1931.—January (27), February (1), April (54), May (37), June (16), July (30), August (14), October (24), November (9), December (21).
1932.—February (15), March (35), April (37), May (16), June (41), July (39), August (224), September (7), October (30), November (40).

The figures in brackets represent the number of copies available.

Changes of Address.

Many instances have occurred recently where members leave their registered address without advisi ng headquarters. This results in their copy of the T. & R. BULLETIN being returned to headquarters for which privilege the Society is *compelled to pay a Postage Due fee.*

Members are warned that the Society cannot in future forward back issues to members who leave their registered address without notifying headquarters.

Immediately a BULLETIN is returned the addressograph plate will be removed from our cabinet, and no further issues will be despatched until the member concerned gives notice of the change.

A.R.R.L. Subscriptions.

Arrangements have been made whereby Headquarters will accept members' A.R.R.L. subscriptions at a rate of 18s. per annum.

An improvement in the rate of exchange will be reflected in a reduction of this figure.

W.B.E. CERTIFICATES.

The following W.B.E. certificates have been awarded since the last list was published :—

VK2JZ, A. S. Mather ; SM6WL, H. Eliæson ; G2XH, A. S. Williamson ; OA4Z, Carlos Tudela ; G5AW, A. E. Wood ; G6PY, L. W. Parry ; G2KB, H. K. Bourne ; G6SC, S. H. Chapple ; G5NP, W. J. Crawley ; G2YU, M. H. Wilkinson.

The W.B.E. is awarded to members who have established two-way communication with a British Empire station in each of the five continents : Europe, Asia, Africa, America and Australasia. Claims, together with the necessary cards, should be sent to the Secretary.

The New Empire Broadcaster.

Mr. Noel Ashbridge, Chief Engineer of the B.B.C., in a letter to our Acting Vice-President, asks that the thanks of the B.B.C. be publicly accorded to those overseas members who so promptly forwarded, *via* the Home E.L.S. network, reports on the reception of the various zone transmissions.

These reports came to hand from South India, the Persian Gulf, New Zealand, Ceylon, South Africa, the Azores, Egypt, North India, Rhodesia and Canada.

In commenting upon this matter we wish to congratulate and thank the British stations who copied, under extreme difficulties in many cases, messages up to 300 words in length.

Radio with the Mount Everest Expedition.

During December we were asked to obtain information regarding short wave radio conditions in Northern India. Thanks to assistance from some fifteen of our most active B.E.R.U. members at present living in India, we were able to provide the Expedition authorities with valuable data, which we believe will prove of usefulness to those in charge of the Mount Everest Expedition radio equipment. At the time of going to press, we have received no definite information as to the class of equipment which will be used, but further details will be forwarded direct to India as received.

The Rilser-Larsen Antarctic Expedition.

We are advised by the N.R.R.L. that the transmitter in use with this expedition is now working on 30 metres, and listening on 20 metres. This cancels the previous information, in which it was stated that LMZ would use a wave of 21.4 metres.

The N.R.R.L. (Box 2253, Oslo, Norway) will be pleased to receive information from any amateur who has contacted this station.

Joint Committee of R.S.G.B. and Wireless League for the Registration of Dealers.

We are advised that Mr. W. R. Emery, 23, Broadway, St. Margarets-on-Thames, Middlesex, has been registered by the above Committee as an approved dealer.

BRS Numbers.

Due to a clerical error, the BRS numbers 1038 and 1039 allotted to Mr. Randall and Mr. Land were transposed in the January issue. Mr. Randall is BRS1038 and Mr. Land BRS1039.

Erratum.

The connection from the bottom end of Valve B illustrated in Fig. 1 of the article, " A 50-Kilocycle Frequency Standard," which appeared in our last issue, should have been shown joined to 120v + and not to 120v.—.

QSL Section.

The QSL Section has just received a periodic overhaul and a very sorry state of affairs has been revealed. We feel very disappointed that those who use the section do not take the trouble to do their share towards making it a success. During the past year the work of the section has increased to a very great extent, and it has been the aim of the section to improve its service continually. With both of these factors to contend with, it is, to say the least of it, very trying to find that fifty *per cent.* of the active transmitters have had cards lying in the files for at least six months, and have not bothered to collect them. Some have almost literally pounds of cards.

IMPORTANT.

It has been the practice in the past for the QSL Section to allow non-members of R.S.G.B. to keep envelopes at H.Q. for cards arriving at R.S.G.B. addressed to them. This was done, as it was then felt that it might be possible to induce prospective members to join, as a result of this concession, and also because the legal position of the Society concerning the cards was not certain. Both of these points have recently been reconsidered by the Council, and it was resolved that (a) *the first reason mentioned above had not proved of any use whatever to the Society in gaining members, and* (b) *that the Society has no legal obligation to forward a non-member's cards and needs only return them to the sender with an intimation that the Section is unable to deliver. This it is proposed to do forthwith.*

It cannot be a case of ignorance, as a man who is active for long periods must know that cards will collect. It cannot be that he does not want the cards; if so, surely he would have had the decency to have told the other ham not to QSL. The only and obvious reason is *pure slackness.* For goodness' sake pull your socks up some of you and try to do your part properly: you grumble enough when anything goes wrong at our end. There is going to be a grand bonfire at H.Q. on March 1, so if you want your cards, hurry up with those envelopes.

We have not much hope as to the result of this appeal, as our experience in the past shows that it is the conscientious ham, already having envelopes who usually sends up more envelopes, whilst the dyed-in-the-wool slacker probably never even reads these notes. However, if these burning words do happen to catch the eye of one of the latter gentlemen, we fervently hope that they will stir those sleeping consciences. So much for the scolding.

We have had a further communication from the A.R.R.L., in which it is stated that the new system of District QSL Bureaux in the U.S.A. is being experimented with, and that they hope before long to be able to accept listeners' cards once more. As soon as this is an accomplished fact, notification will immediately be given in these columns.

Will those members who change from BRS to AA calls or from AA to open aerial please make a point of informing the QSL Manager of the change? Otherwise it is possible that a file for the old and new calls will be running simultaneously, and the cards in the new one assumed to be unclaimed as the envelopes are marked with the old call.

J. D. C.

QRA Section.

NEW QRA's.

G2BJ—B. Jackson, Bryn Alan, Colwyn Bay, North Wales.
G2VH—L. A. Vaughan, 16, St. Alban's Road, Southsea, Hants.
G2XA—M. Griffin, 101, Crossways, Heston, Hounslow, Middlesex.
G5CL—M. Shaw, 19, Gillott Road, Birmingham.
G5OZ—E. Holt, "The Chalet," Gilbert Road, Hale, Cheshire.
G5RV—R. L. Varney, 19, Springfield Park Avenue, Chelmsford, Essex.
G5WG—W. E. Corbett, "Northwood," Alpas Road, Aigburth, Liverpool.
G6CM—J. McCammont, 23, Brandon Place, Bothwellhaugh, Lanarkshire.
G6NZ—L. E. Newnham, 145, Victoria Road North, Southsea, Hants.
G6PL—F. J. Popplewell, Hollin Bank, White Lee, Heckmondwike, Yorks.
G6QN—R. G. Baker, 1, Boundary Road, Colliers Wood, London, S.W.19.
G6VU—J. E. Sayers, Struan, Clarkston, Glasgow.
G6VV—J. A. McKinnon, "Colaba," Randall Road, Chatham, Kent.
2ABK—R. C. Mayman, 122, Victoria Avenue, Hull Yorks.

The following are cancelled: G2CB, G6DP, 2BIK, 2BUI.

Please send new QRA's, changes of address, etc., to G6PP, 7, Woodberry Down, London, N.4.

CALIBRATION SECTION.

Frequency Drift in Crystal Oscillators.

JUDGING by some of the letters we receive, it is very necessary to explain exactly how variations between calibration figures for crystal and actual working figures are produced. We were told the other day that so-and-so gave a much more accurate check on a certain crystal which had been sent to the NPL and that the R.S.G.B. check was 500 cycles, or 0.014 per cent. out. We would like to make it clear at the outset that no crystal will reproduce exactly the same frequency when used in a transmitting circuit as it gave under calibration conditions. The only way to guarantee that a crystal, which has been sent to the NPL for calibration shall reproduce the same frequency on the air is to use it under exactly the same conditions under which it was calibrated. This means that the valve, circuit constants, such as L/C ratio, resistance of coil, etc., applied voltages and temperature shall be the same.

Assuming that the crystal has been calibrated with a well-made holder and not simply wrapped up and sent all in a box, the variation to which that crystal is liable by means of circuit influences may amount to 0.004 per cent. If the holder is of the air-gap type, the amount of variation due to frictional loading is usually very small, but with contact electrodes it may amount to 0.03 per cent. in bad cases, particularly if the top-plate is not square with the crystal. This may be easily demonstrated by moving the top-plate of a crystal holder about while the crystal is oscillating and listening to the beat note in the receiver.

Temperature variation is influenced by the cut of the crystal. The "Y" cut has its contact surfaces parallel with the electric axes of the quartz, and has a temperature co-efficient of approximately plus 75 parts in a million per degree Centigrade. The "X" cut has its contact surfaces perpendicular to the electric axes and has a temperature co-efficient of approximately minus 25 parts in a million per degree Centigrade.

When a crystal is calibrated at the NPL, the temperature at which it was calibrated and circuit constants are given. It will be obvious, therefore, that, even if the same circuit constants are used, unless the temperature is the same, the frequency of the crystal will be affected either to the extent of 70-80 or 20-30 parts in a million for each degree Centigrade above or below this figure. The temperature at which the calibration is given may be 15° C. In the winter the wireless room may be less than 10° C., which means that either $5 \times 75 = 375$ parts in a million, or approximately 1 kc. on 3.5 mc. will have to be subtracted from the frequency of the "Y" cut crystal, and $5 \times 25 = 125$ parts in a million 0.0025 per cent. approximately of 400 cycles on 3.5 mc. added to the frequency of the best available type of crystal, *i.e.*, the "X" cut. In the summer, when room temperature may be 20° C. or 5 degrees above calibration temperature, the opposite correction is necessary, as these co-efficients are perfectly linear.

Another influence is due to use of high voltages causing the crystal to heat up during operation; for freedom from this defect an anode-voltage of 150 volts should never be exceeded.

With anode voltages of the order of 400-500 volts, we have observed frequency drifts of 0.3 per cent. on several occasions.

Frequencies measured between December 18, 1932, and January 15, 1933, inclusive:—

SU1EC		14,281	G5JM	...	7,057
G2DW	...	3,606.7	G5KA	...	7,248
G2GS	...	7,036	G5KH	...	3,546
G2MI	...	14,262	G5OJ	...	14,188
G2VZ	...	7,118	G5PL	...	7,150
G2YL	...	7,233	G5RX	...	3,561.8
G2ZC	...	3,643	G5YK	...	3,726
G2ZQ	...	7,113	G5YV	...	7,174
G5AC	...	3,528.7	G6HP	...	14,346
G5AR	...	3,643.2	G6QK	...	7,044
G5BJ	...	14,341	G6QW	...	7,093
G5CV	...	7,164	G6SR	...	7,059
G5HK	...	3,675.4	G6UF	...	3,537.5

A. D. G.

EMPIRE CALLS HEARD.

Miss B. Dunn, G6YL, Acton House, Felton, Northumberland, September-November, 1932:—

7 *mc.*: ve2ca, yi2ds, 6wg, su1ec, 6hl, zs2a, xx2ae.

14 *mc.*: su1cw, 1ec, 6hl, ve1ae, 1bv, 1dr, 1ea, 1ed, 2dz, 3bm, 3ll, 4bq, vk2xy, 3rj, yi2ds, 6ht, xyi6bz, zl2bh, zs2j.

7 *mc., December,* 1932: yi2ds, zl1cp, 2bw, 2fi, 2gn, 2je, 2kb, 3ax, 3dh, 3dn, 3fi, 3fs, 4ao, 4bp.

14 *mc.*: su1ec, 6hl, ve1bv, 1dr, 2bg, 2dm, 2ee, 3bg, 3wa, 3xc, vk2ba, 2hy, 2xu, 3bj, 3bw, 3fm, 3gq, 3wl, 3xv, 6mu, vu2lx, yi2ds, 6ht, zl2cw, 3ah, 3ai, 3aj, 3aq, 3cc, zs1.J.

* * *

J. F. Lategan, ZS4U, 39-C 1*st Avenue, Bloemfontein, October-December,* 1932:—

14 *mc.*: g2bm, 6gf, 2ak, 2fh, 2vl, 5ml, 5cv, 6vp, 5qc, 6vl, 5qb, 6xq, 2nh, 6bc, 6yc, 5yh, su1ec, 6hl, ve3wa, 3tm, 1bl, 2gh, 5eh, 3jm, 1bv, vk4gk, 5wr, 6sa, 6hf, 2hw, 2gw, 5hg, vq2bc, 2xd, 4crh, 4crl, 3msn, vr1ma (Mauritius), vs3ac, vu2jp, 2lx.

* * *

*T. F. Gleed, BRS*689, 32, *Brynland Avenue, Bishopston, Bristol, on* 7 *mc., November-December,* 1932:—

su6sw, ve1ax, 1dl, vk2cr, 2rr, 2wu, 3bw, 3cw, 3dt, 3hm, 3hq, 3je, 3kr, 3wl, 3zb, 5hg, 5pk, 6gf, 7ch, vp8jf, vs6ag, 6au, vu2ai, 2cs, 2kh, 2lz, xu1u (Hong Kong), yi2ds, 6bz, 6wg, zl1ar, 1gq, 2bw, 2bz, 2ci, 2fi, 2gu, 3au, 3aw, 2ax, 3bs, 3cc, 3cs, 3cx, 3dk, 3dx, 4ai, 4ao, 4ap, 4bp, 4xc, zs1z, 2a, 3f, 4m, zu6w.

14 *mc.*: su1aa, 1ec, 1cw, 6hl, ve1ae, 1bv, 2bb, 2ca, 2el, 3bm, 3he, 3jz, 3mo, 3wa, 4ft, 5cp, vk2lz, 2rl, 4gk, 4xn, 6mu, vp2mr, 2yb, vu2cs, zl2cp, 2cw, 2dn, 2lb, 3aj, 3aq, 3cs, 3dn, 3oq, zs4m.

* * *

*T. H. Beaumont, BERS*1, 1*st Battalion Beds. and Herts Regiment, Jhansi, U.K. India, December* 25, 1932:—

14 *mc.*: 2ak, 2bm 6gs.

7 *mc.*: 2nh, 2ya, 5by, 5hb, 5oj, 5pl, 5yg, 5yh, 5qx, 6cw, 6jx, 6wy.

December 27 *on* 7 *mc.*: 2bm, 2op, 5yn, 5la, 6cw, 6nf, 6rb, gi5qx, yi2ds, yi2fu, vu2jp, vu2jp, vu2lz, vs7gt, zt2c, zs6b, zs5a, zu6a.

* * *

*BERS*74 (*Quetta, India*) *during December*:—

14 mc.: g2ak, g2dz, g2ii, g2nh, g5qa, g6sr, su1ec, vu2lv vk: 2ba, 2nr, 2xu, 3bj, 3cw, 3gj, 3kx, 3od, 3zl, 3zy, yi6ht, zl1es, zt5v.

7 mc.: g5pl, ve2ec, zt5v.

* * *

*BERS*79 (*Quetta, India*) *during December*:—

7 mc.: yi2fu.

14 mc.: g5sg, g5pt, vk2xg, vk6hf, yi6ht, zl2ac.

* * *

VU2AH (*Sind, India*) *during December*:—

7 mc.: su1ec. vk: 2zh, 2rw, 3xf, 3lr, 3al, 5pk. vu: 2lj, 2lz, 2lx, 2lv, 2lt, 2cs, 2jp. vs6ag, vs6ad, vs7gt, yi2fu, yi2ds, yi6bz, xu1u.

14 mc.: g2oa, g5bj, 5by, su1ec, su6hl, su6kr, su1aa. vk: 2xu, 2ba, 2xy, 2jt, 2lx, 3dt, 3br, 3fm, 3kx. vk: 3dy, 3bj, 3jj, 3zl, 3mr, 4gk, 4kl, 4bb, 5ja, 5gr. vs7gt, vu2lt, xzn2b, yi2ds, yi2fu, yi6ht, zl1ca, zl3cc, zl4ck, zl2ha.

Correspondence.

The Editor does not hold himself responsible for opinions expressed by correspondents. All correspondence must be accompanied by the writer's name and address, though not necessarily for publication.

Why not an International Field Day?

To the Editor, T. & R. Bulletin.

Dear Sir,—I have noted with interest, the innovation of a National Field Day, to be held on June 10 and 11, 1933, by your society. Now, in conjunction with this thought, I am wondering if there would be any possibility of staging an International Field Day.

The ARRL, I am sure, will co-operate most fully, and I shall be more than pleased to aid in advertising the matter in this territory. There are hundreds of amateur operators here with portable calls that are ready for use at a moment's notice. An International Field Day could be held with the idea of not only testing portable equipment actually in the field, but also portable equipment on high frequencies. High mountain locations and excellent country reception form an ideal condition for the tests, and if a definite date could be arranged, with proper publicity work, I believe we can stage a very successful and enjoyable affair. Even if DX records cannot be shattered, we shall have the satisfaction of knowing that we had tried our best!

J. P. Gruble (W7RT).
Section Communications Mgr., Wash., ARRL.

[Editorial Note.—In connection with Mr. Gruble's letter, we trust that his suggestion will be followed up by amateur organisations in all countries. Invitations to take part in this event, which is fixed for June 10 and 11, will be sent to all European and B.E.R.U. Affiliated Societies. Most British Districts are planning to put four separate stations (for work on 1.7, 3.5, 7 and 14 mc.) on the air during the event.]

Are You a Flat-Earthist?

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

Dear Mr. Editor, G6LI, and Others,—As the R.S.G.B. has long been noted as a society of scientific precision, I was amazed to note the inaccurate formula which was put forward for the determination of Great Circle distance. I have practically checked the result—all but a negligible factor of $\sqrt[2]{(\cos a + \cos \frac{a-b}{2} + \sin b)}$—and have come to the conclusion that the result give is for a SPHERE. Now apart from the possibility of offending members who belong to the sect of "Flat-earthists" (you have never heard of them? Their title is explanatory, and their argument convincing—"you can see that it is"); apart from this, I repeat, has it been overlooked that the earth is an oblate spheroid?—if any members wish this explained more precisely, squashed at both ends. There is no need to explain *why* it has this shape—one theory is that, on account of the heat near the equator, less brass is pounded than in cooler regions, the consequence being obvious. (If you are still doubtful as to the shape, try watching a football match—in some cases a ball of the same shape is used, only more so.) It now remains for G6LI to apply the necessary simple mathematical corrections in view of the foregoing; if he is still applying them by the time the B.E.R.U. contest is over perhaps a few suggestions for other methods of determining distances might be opportune.

(1) The signals from the distant station travel to you at 186,000 miles per second, so you have only to find how long they take coming to you and you have the result. This is so simple that I need not explain it further.

(2) Take your list of distant localities to S-L-I-G'S Information Bureau—they will be *delighted* to work out the distances for you.

(3) Pretend that you have failed to comply with the regulations of the contest and submit your log with no points claimed—the kind-hearted secretary will be pleased to calculate your score (I may say that I tried this method myself with success).

May I conclude with an economy tip picked up from G * * *? You may benefit both the G.P.O. and yourself by the simple expedient of issuing a fone appeal for QSL's and ask for enclosure of postage stamps for reply—of course, the next step is obvious, do not QSL. With the large BRS membership this will be found very profitable—stamps which have thoughtlessly been affixed to envelopes may be easily steamed off.

Yours very sincerely,
BRS10[10].

Unlicensed Stations Using EI Calls.

To the Editor of T. & R. Bulletin.

Dear Sir,—A large number of unlicensed stations appear to be using EI call signs, and amongst others are the following: EI2R, EI1S, EI1T, EI1W, EI2X, EI3X.

In the interest of clean, honest amateur radio, all stations are requested to refuse to work with any of the above stations or with any stations using EI calls not included in the following limits, which include all the licensed EI stations, viz.: EI2B to 9B, EI2C to 9C, EI2D to 9D, EI2F and EI3F.—

It is, of course, not certain that all the above stations are situated in I.F.S., as, on a previous occasion, stations not in the Free State have been found to be using EI call signs for purposes of camouflage.

Yours faithfully,
M. J. C. Dennis,
Col. (EI2B).

An R.S.G.B. Translation Bureau.

To the Editor of T. & R. Bulletin.

Dear Sir,—I shall be glad if you will give publicity to the suggestion contained herein.

Many members receive at times letters from other amateurs written in foreign languages, which give endless translation troubles to the recipient. Knowledge of such languages as Czech, Spanish and Portuguese is not widely known in English-speaking countries, but I imagine there are isolated members who would be willing to translate, providing the Society agreed to sponsor the small amount of work which would be entailed.

I suggest, therefore, that members who can translate *any* foreign language be invited to send

their names to Headquarters, so that an R.S.G.B. Translation Bureau may be formed.—Yours truly,

L. Hill (BRS685).

[Editorial Note.—We shall be pleased to prepare a list of members who are willing to translate foreign languages, and publish details in a later issue.]

A New Code.

To the Editor of T. & R. Bulletin.

Dear Sir,—May I express my agreement with Mr. Scarr's suggestion of using the "C" and "P" codes to report conditions and modulation? I should like to point out, however, that while R1, T1, W1, and P1 are given to represent the worst report, and R9, T9, W5, and P9 the best, Mr. Scarr has designated the worst conditions C4 and the best C1. I think confusion would be avoided if the C code were reversed in order to make it correspond with the others. The code would then be as follows:—

C1.—Both local and DX signals weak or absent.
C2.—Good local signals; little or no DX.
C3.—DX signals good without interference from locals.
C4.—DX and local signals both coming through well.

I hope that these two new codes will be universally adopted.

Yours faithfully,

C. S. Pollard (2BWF).

BOOK REVIEW.

Short-Wave Wireless Communication. By A. W. Ladner, A.M.Inst.C.E., and C. R. Stoner, B.Sc. (Eng.), A.M.I.E.E. 348 pages and 201 illustrations. (Published by Chapman & Hall, Ltd., London. Price, 15s. net.)

The authors of this volume set themselves a very stiff task: they have attempted to cater for the scientific amateur as well as for engineers who have a knowledge of long-wave technique, and they have attempted to present a "self-contained" treatise which deals with the principles common to both long and short waves in so far as their exposition assists the main theme. In their aims they have succeeded extremely well, and the amateur will find that this volume makes available an easily-read outline of the technique of short waves, and one which leans more towards practice than theory. The treatment is non-mathematical, which is a virtue to some and a vice to others, but in view of the purpose of the book the authors have explained the principles very lucidly without recourse to mathematics, and in this connection they deserve a special commendation for their treatment of feeders.

After a short introduction, a brief history of short waves is given. It is pleasant to find that the amateur transmitter is given much credit and praise for his early work, because in the past it has not been unknown for professional radio men to belittle or ignore the amateur's part in short-wave development. A printer's error in this chapter attributes the Hamilton-Rice contact to 2MN, instead of 2NM, but the call-sign is correctly given elsewhere in the same chapter. The only other error noticed was on page 113, first line, where an ω has been omitted from the numerator of the expression.

Chapter 3 consists of "Notes on Electro-magnetic Waves." One section of this chapter might be expanded a little with advantage. In dealing with the fields very close to an aerial, the authors consider three fields to be present, viz., the "electrostatic field," the "ordinary magnetic field, usually termed the 'induction' field," and the electric and magnetic components of the radiation field. The reader is warned that the term "static field," frequently used for the first-mentioned, is misleading; but is "electrostatic" not just as misleading? Why not simply "electric field"? The latter expression is used elsewhere in the book, but in connection with the radiation field. The description of the "induction field" as being magnetic is, in the reviewer's opinion, a misleading one. The induction field of an aerial has electric and magnetic components in time and space quadrature, whereas the radiation field components are in time phase, but space quadrature.

The chapter on propagation of short waves will be of great interest to all amateur transmitters, and at the end of this chapter a description is given of the Eckersley and Tremellen charts.

Chapter 5 treats the modulation of high-frequency waves and the question of side bands, and the explanation of the difficulties of obtaining suppressed carrier working really deserves a special word of praise. The illustrations are invaluable and were obtained by the use of a mechanical synthesis machine developed by one of the authors.

Succeeding chapters deal in a comprehensive way with Push-Pull, Self-Oscillators, Driven Circuits and Constant Frequency Oscillators.

Chapter 10 deals with modulation circuits and compares at some length the comparative merits of high and low power modulation.

The treatment of feeders in Chapter 11 is a very sound piece of work, and this chapter deserves the special attention of amateur transmitters.

Aerials and aerial arrays for beam work are fully described and explained, and the illustrations in this chapter also are commendable.

Problems of Reception and Simple Receivers, Commercial Receivers, and Commercial Transmitters and Circuits are dealt with in Chapters 14, 15 and 16.

The last chapter is concerned with Ultra Short Waves, and contains a description of the various methods in use for generation; circuits, directive systems, propagation, and the transmission of circularly polarised waves all receive generous treatment, but it is, perhaps, not unreasonable to feel that the authors have hardly given the magnetron justice in dismissing it with a brief paragraph, and it is quite probable that amateurs interested in 5-metre work will be very much interested in this valve in the near future.

The book concludes with four appendices, the fourth being a useful table of the inter-electrode capacities of certain valves, including such well-known types as HL610, LS5, and S610.

The reviewer has no hesitation in recommending amateurs to find a place for this volume on their shelves; it certainly fills a gap in the literature of short waves, and is written in such a way that any amateur of average technical knowledge could follow every word with interest and advantage.

T. P. A.

CONTACT BUREAU NOTES.

By H. C. Page (G6PA).

THERE seems to be very little to comment on this month. Probably this is due to the fact that Christmas is only just past, and most stations have hardly recovered from the effects!

I would like to draw special attention to the suggestion put forward by G6XN, in his 56 mc. Notes. I refer to the suggested 56 mc. network. This appears to me to be a very fine idea, and I should very much like to hear from members interested in the proposal.

As announced last month, G6OM has taken over the 3.5 mc. groups, and is now busy re-organising them. He would be very pleased to hear from anyone interested in 3.5 mc. work. His address is: The Gables, Well Lane, Gayton, Heswall, Cheshire.

No news from abroad has reached me this month so far.

28 M.C. Group.

G6VP, Manager.

As was to be expected, very little work has been done during the past month, and reports are few.

International tests on the 28 mc. band, organised by the R.E.F., will take place during the months of March and April, 1933, from 13.00 G.M.T., Saturdays to 24.00 G.M.T. Sundays.

It seems pretty useless to discuss the possibilites or probabilities in view of the behaviour of the band during the last year, but it seems nevertheless to be worth while keeping these dates open and doing our utmost to acquire as much knowledge from this organized effort as possible.

Group 1B.—G5SY reports that both himself and members of his group are chiefly occupied in station modifications, and that no active work has been done, G6RP, of Tiverton, joins the group, and as his QRA is some 20 miles from G5QA and G5QA about 20 miles from G5SY, they hope to carry out some interesting ground wave tests. G2FN is at Plymouth, 30 miles the other side, and listening frequently, but hears commercial harmonics only.

Group 1C.—G6VP has done no active work on 28 mc. at all during the last month, although the 28 coils have been in the Rx. at odd moments. No other member reports.

Group 1F.—BRS25 has been listening without results and only one member of his group reports. 2BHK has been listening and his patience rewarded by ane bright spot on December 18, when he heard harmonics of D4UAO at 11.25 G.M.T., F8WK at 12.37, and 12.46, and FYQ. The only G. fundamental he has heard being G5VB. He is still interested in the fading of local stations, and is working at a theory to account for this.

Fading, Blindspotting and Skip Group.

G6MB, Manager.

In this, my first report as Group Manager, I want to express my regret that it should have become necessary for anyone to have taken over the office from my very able predecessor. Groups may come and Groups may go, but I think it could only have been the greatest wish of all that the Group Manager (G2ZC) should have gone on for ever. However, under medical advice he has been compelled to resign, and with feelings of diffidence, I consented to become his successor.

There is very little for comment this month. The following changes in Group personal have taken place:—

Group 2A.—G2HJ, of Amersham, Bucks, takes the place of BRS519, who has resigned for examination reasons.

Group 2B.—The unfortunate collapse of this Group after so many years run, makes it necessary to reconstitute it entirely, and this is being done.

Group 2C.—One vacancy has appeared in this Group, and the G.C. is taking the necessary steps to fill it. G.C. has sent me a summary of the year's working, and it is hoped that it will be possible to publish this at an early date.

Group 2D.—One change of call-sign is reported, the G.C. having obtained a radiating licence becomes G6WM in place of 2AVR.

Theory Group.

BRS 865, Manager.

Group 3A.—The response to my request for members in the November Bulletin has been good and 3A now has the surprising total of eleven members! This state of affairs is to be altered almost immediately and Group 3B will be formed, probably with G6ND as G.C. This will leave us one member short, and a further application will be appreciated. The members of the Group are: G6ND, G2KB, BRS803, G6OT, G6FJ, BRS497, YI1RM, G5UT, G6VU, and BRS981.

The original scheme of work is to be adhered to, but practical work will probably be introduced in the near future. Many ideas have been submitted, so that the Group should not have trouble in finding outlets for its activity. A budget, though not very voluminous, has been started, and it is hoped, in the near future, to make it one of the chief features of the Group's work.

In conclusion—one more member, please!

Ultra High Frequency Group.

G6XN, Manager.

A scheme has been put forward this month for a national 56 mc. network. The idea originates from G2KB, who suggests a maximum of 20 miles between stations participating. There seems no reason why such an arrangement should not be practicable, and it would greatly add to the interest of 56 mc. work. It is proposed to make a start in the Midlands. Will any stations interested please communicate with G2KB or myself?

G2IG and G6XO send a very interesting account of work done with their "pocket" duplex 5-metre gear. The transmitter is a push-pull tuned-plate fixed-grid arrangement. A single turn 9 inch diameter plate coil serves as aerial. Modulation is by grid control via secondary of microphone transformer. Valves are PM252 or PM202.

The receiver is a series-tuned Ultra-audion, with one L.F. and Heising quench—three valves in all, viz., PM1HL, PM1LF, PM2A. The aerial is a copper sheet, 4 ins. by 8 ins., or a brass rod, 18 ins. long. The total weight of the complete gear whilst operating in a mobile condition is only 17 lbs. !

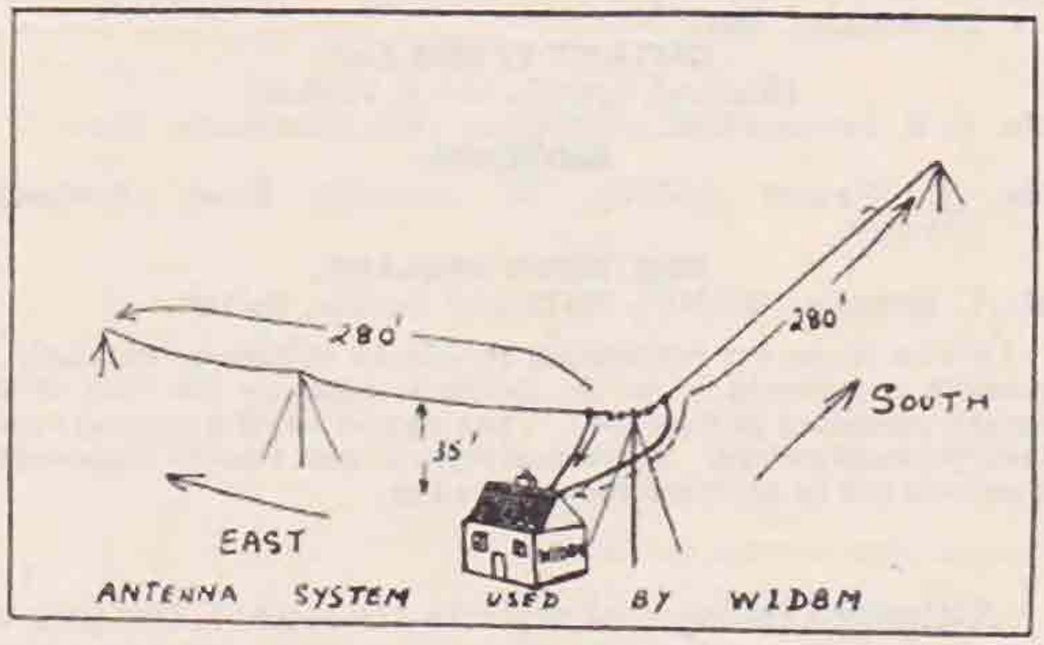
An amazing amount of work has been done with it on propagation phenomena in town and country, and field strength contours have proved very fascinating. One important point noted was that metal objects not only act as screens, but alter the direction of the field in their neighbourhood.

G2KB is rebuilding, and continuing his experiments with aerials. He is also experimenting with D.E.V. and D.E.Q. valves as electron oscillators.

2 M.C. Group.

G5UM, Manager.

Group 10A has, at last, received confirmation from the three U.S. amateurs who were heard on 2 mc. in December (as reported in the last issue of The Bulletin). W1DBM, admirably situated on Cape Cod, and heard by all Group 10A members, was using 200 watts input throughout the December tests, while W1AGA, New Bedford, Mass., and W8CPE, Western Pennsylvania, who were heard by G5UM, had 65 and 180 watts input respectively.



Especial interest attaches to details of the antenna system used by W1DBM. As will be be seen from our sketch, it consists of two lengths of wire, each 280 ft. long and running at right angles. Commenting on this, G6FO says : "The disposition of W1DBM's aerial interests me, as it is what I should call a perfect arrangement for working on any band, altering wire lengths accordingly. A full wave aerial in one piece is of little use in an open situation, owing to the shadowing effect of the two half-waves ; but split it, and put the two halves at right angles, and you get what amounts to omni-directional radiation at maximum efficiency."

It will be recalled from last month's report that members expressed surprise that fading was practically absent on W1DBM. The use of this long right-angled antenna no doubt contributed towards eliminating fading at the source, so to speak, as the stratosphere waves would probably be radiated at different angles from such a system. Each of the two 280-ft. wires was connected to one end of a push-pull coupling coil.

A very similar aerial layout was described by G5QY in The T. & R. Bulletin some considerable time ago, and is being used by several British amateurs with excellent results. As far as can be ascertained, however, no one has tested such an exceptional length of aerial as 280 ft.

Further proof of the steadily improving conditions on the lower frequency bands is forthcoming from the fact that New World stations are being readily received on the broadcast band. G2DW, of St. Albans, informs the G.C. that he has heard several South American broadcast stations lately, and that he heard W1MK on 1750 kc. some months ago. Further, it was rather a coincidence that G6LI should have been making a special test to receive U.S. broadcasters at just that period in December when Group 10A made *their* 2 mc. effort. The fact that both tests were successful, points to a general trend towards increased lower frequency DX.

Review of Foreign Magazines.

The majority of National papers received recently announce national tests, mainly relay competitions devised as a test of operating skill. As most of these tests will be completed by the time these notes appear, there would be no point in giving details, but it is gratifying to be able to record that QTC announces a series of tests organised by the SSA for Swedish hams, in which points can be scored by operation in any band, the use of the 1.7 mc. band being encouraged by allowing double points for scores resulting from work in that band. *Ragchewing* also gives details of tests intended to encourage interest in the 1.7 mc. band ; *OZ* appeals to Danish receiving amateurs to pay more attention to the band, and *Old Man* continues to advocate the use of the band by Swiss hams. There seems to be, therefore, good reason to expect an increasing activity on the low frequencies.

Developments at the other end of the spectrum may be foreshadowed by a description in *Hochfrequenztechnik* of a high frequency amplifier for use at frequencies of the order 50 mc. Designed by M. v. Ardenne, this consists of two valves with choke-coupling unit, assembled in one envelope. An amplification of one-hundred times has been obtained by the use of two such multiple valves in cascade operating on 7 metres.

It is interesting to learn from *Radio REF* that the Moroccan section of the REF, in conjunction with local radio clubs, has succeeded in arranging a regular broadcast of morse practices from the Radio-Maroc broadcasting station. Transmissions take place each Monday, Wednesday, and Friday from 1915 to 1930 G.M.T.

Strays.

Mr. P. L. Cooper, 158, Hutt Road, Petone, Wellington, New Zealand, will be pleased to report on the signals of any Empire or foreign amateur.

* * *

We are advised that W7BMA, 1387 Irving Avenue, Astoria, Oregon, would appreciate reports. He has recently been heard for the first time in North Wales.

NOTES and NEWS from the BRITISH ISLES

DISTRICT REPRESENTATIVES.

DISTRICT 1 (North-Western).
(Cumberland, Westmorland, Cheshire, Lancashire.)
MR. S. HIGSON (G2RV), "Hebblecroft," Egremont Promenade, Wallasey, Cheshire.

DISTRICT 2 (North-Eastern).
West Riding, Durham, Northumberland).
MR. L. W. PARRY (G6PY), 13, Huddersfield Road, Barnsley, Yorks.

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

DISTRICT 4 (East Midlands).
(Derby, Leicester, Northants, Notts.)
MR. H. B. OLD (G2VQ), 3, St. Jude's Avenue, Mapperley, Nottingham.

DISTRICT 5 (Western).
(Hereford, Oxford, Wiltshire, Gloucester.)
CAPT. G. C. PRICE (G2OP), 2, St. Anne's Villas, Hewlett Road, Cheltenham, Glos.

DISTRICT 6 (South-Western).
(Cornwall, Devon, Dorset, Somerset.)
MR. H. A. BARTLETT (G5QA), "Donbar," Birchy Barton Road, Exeter, Devon.

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

DISTRICT 8 (Eastern).
(Cambridge, Huntingdon, Norfolk, Suffolk.)
MR. S. TOWNSEND (G2CJ), 115, Earlham Road, Norwich.

DISTRICT 9 (Home Counties).
(Bedfordshire, Hertfordshire, Essex, Buckinghamshire.
MR. F. L. STOLLERY (G5QV), "Kingsmead," Lancaster Gardens East, Clacton-on-Sea, Essex.

DISTRICT 10 (South Wales and Monmouth).
(Monmouth, Glamorgan, Breconshire, Carmarthen, Cardigan, Pembroke.)
MR. A. J. E. FORSYTH (G6FO), "St. Aubyns," Gold Tops, Newport Mon.

DISTRICT 11 (North Wales).
(Anglesey, Carnarvon, Denbighshire, Flintshire, Merioneth, Montgomery, Radnorshire.)
[To be appointed.]

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

DISTRICT 13 (London South).
MR. A. D. GAY (G6NF), 49, Thornlaw Road, West Norwood, S.E.27.

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

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

DISTRICT 16 (South-Eastern).
(Kent and Sussex).
MR. H. A. M. WHYTE (G6WY), Killiney, Worsley Bridge Road, Beckenham, Kent.

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

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

NORTHERN IRELAND.
Mr. C. MORTON, (GI5MO), 27, Bristol Avenue, Belfast.

District Notes for publication should be written as concisely as possible and should be in the Editor's hands by the 25th of the month preceding publication. They should be of a general rather than personal nature. Individual reports from County Representatives will not be accepted for publication.

DISTRICT NOTES.

District and County Representatives throughout the Country complain that very little attention is paid to their request for information. In order to make these notes of value it is essential that members should send items of interest to their C.R. not later than the 22nd of each month.

DISTRICT 1 (North-Western).

ON March 1, Mr. Lockton, A.M.I.E.E., Technical Lecturer for "Exide," will give a lantern lecture on the manufacture of accumulators, etc., at the monthly meeting to be held on that date. The C.R. for Lancashire has asked me to make special mention of this, so that as many members as possible will book the date well in advance, in order that a record crowd can be present. I might also mention that it is not limited to those in the Manchester area.

Although individual reports are scarce, the following stations report active :—G6GV, 2DH, 2WP, 6JN, 6AX, 2WQ, 2OI, 5CT, 6ZS, 5WR, 2BRG, BRS767, BRS602.

In the Cheshire and Liverpool area many stations have gone on to 1.7 mc. with good results for local work. G5KL has managed to get two "SW50's" to work in push-pull, and finds it very satisfactory. Besides the above the following are active, not because they report, but because they are heard! G5GY, 6CX, 6TT.

The members in Liverpool and District have recently organised themselves into a society, under the name of "The Merseyside Amateur Transmitters' Society." It is hoped by this means to enrol many new members to R.S.G.B., since we are looking round for a suitable place to make our H.Q., and we shall have something definite to offer those who are interested. It is very much a "baby" at the moment, but we have already twenty members who have definitely promised to join, and by the time this appears in print we hope to have a definite programme worked out. The Secretary is G2OA, with G5CN as assistant, from whom details may be obtained.

DISTRICT 2 (North-Eastern).

Practically no individual station reports are to hand, although the district generally is very active. Arrangements have been made for a meeting of Leeds and Sheffield members to be held at The Angel Hotel, Sheffield, at 3.30 p.m., on Saturday, March 4, 1933.

Several stations put up good scores in the QRP Contest, and many more will, it is hoped, enter the B.E.R.U. Contest.

The D.R. and Mr. Riddiough have both visited headquarters recently, and spent several interesting hours discussing District matters. Attention has been drawn to the continuation of " piracy " in the District, and steps are to be taken to clear the air of these bad sportsmen who in general are using other members' call signs. Stations G2WS, 5CX and 6BX are setting up D.F. apparatus in an organised attempt to rid the District of these nuisances.

A most interesting visit was made to Mr. Riddiough's new station, G5SZ, recently.

The following reported themselves as being active : G6WJ, G6KU, G5SZ, G2AW and G5TQ.

DISTRICT 8 CONVENTIONETTE.

CAMBRIDGE *MARCH 5th*

Full Programme of the day will be found in District 8 notes. Will all attending kindly notify the G2CJ or G6BS.

The second monthly meeting of the North-Eastern Amateur Transmitters' Society, held under the auspices of the Northumberland C.R., was held on January 8 when 14 members attended ; at the third meeting held on January 29 over 20 were present, including Miss Dunn, G6YL and XOH5HB. The subjects discussed ranged from the simplest receiver design to the latest circuit for 56 mc. transmitting.

Interested amateurs are cordially invited to attend meetings of the N.E.A.T.S. The Secretary, who is also C.R., is Mr. Hornsby (G5QY), 7, Lansdowne Terrace, Newcastle-on-Tyne 3. Morse instruction is being given to non-transmitting members whilst beginners' lectures are being delivered by G6AY and 6BC.

The following Tyneside and District members are active : 1.7 mc., G5QY and G6YL ; 3.5 mc., G2XT, G5QY and 6YL ; 7 mc., G2CO, 2XT, 2TJ, 5LH, 5QY and 6HV, and 6YL ; 14 mc., G5LH, 5QY, 6BC, 6HV and 6YL ; 28 mc., G5QY and 6BC ; 56 mc., G2TJ, 5DI and 5QY.

DISTRICT 3 (West Midlands).

Eighty-five members attended the last meeting of M.A.R.S. on the occasion of the visit of Mr. J. Clarricoats (G6CL) and Commander Saunders, R.N., to outline the objects of the R.N.W.A.R. A very interesting discussion took place, and many members handed in their names for enrolment. (Very many thanks for your support, OM's.)

Please note our Annual Conventionette will be held on Sunday, March 19, at the Hope and Anchor Hotel, Edmund Street, Birmingham. We assemble at 12.15 p.m. ; luncheon at 1 p.m. ; business meeting at 2.30 p.m. ; tea, 4.30 p.m., to be followed by station visits and discussion. These arrangements are subject to alteration, as a visit of interest may be arranged.

BRS 693 is troubled with hum on his receiver when using mains H.T., and would appreciate assistance. G6ML has had some good contacts on low power. There are no other direct reports.

DISTRICT 4 (East-Midlands).

Note.—We regret that no report is forthcoming from the D.R. of this District. The following has been received from Mr. Storer, the Leicester C.R.

Members are turning their attention to 56 mc. again, and several stations will be active on this band at an early date. Tests are being arranged with G2KB of Rugby, when we hope to work duplex fone.

The following stations report active : G5VH, 6GF, 6WU, 6JQ, BRS683, 866, 2BHA, BRS884, and BRS1028.

DISTRICT 5 (Western).

The annual dinner of Gloucester County was held at Morrison's Restaurant, Bristol, on January 21, when the D.R. was entertained as the gues- of the evening. He was presented with two photot graphs of groups taking part in field days, which were so very successful and popular during last summer. There were thirty present, and the occasion was used to inaugurate the R.N.W.A.R. in the West. We were privileged in having with us Commander Saunders, from the Admiralty, as well as Mr. Clarricoats. Speeches were made by these two, and also by the D.R. and C.R., and a most enjoyable evening was spent. One unit of the Reserve has been started in Bristol, and on the following Monday, Commander Saunders and Mr. Clarricoats visited Gloucester, where another unit was raised, and another thoroughly enjoyable evening spent.

Wiltshire membership is unfortunately too widely scattered to hold these " rag chews" but the letter budget continues to be a great success, and the C.R. is to be congratulated on the high standard which is maintained, and the co-operation obtained by the members.

Oxfordshire, too, is making good progress, and there is now another call on the air. There is a sign of conditions becoming better on the higher frequencies as I write, and by the time you get these notes I hope that all of you are taking part in the B.E.R.U. tests. If you have not yet begun, do so at once. I should like to see every member of this District send up his log, no matter how humble his effort may be, as these tests are *the* tests of the year, and I consider it a duty to take part in them. Don't let your District down—on the contrary, let us show the others we are alive—remember our motto : " The West is the best."

DISTRICT 6 (South-Western).

As far as can be ascertainced from the letter budget (which gets better and better as the months pass), all stations in this District are very active.

We welcome back an old member in G5YR, of Tiverton, who is on the air on 7 mc., and doing well with some really high-class 'phone. G5WY, of Exeter, is a strong opponent of the Heaviside layer theory, and some good arguments and theories are being put forward. (Mr. Hamilton (2ASX) of Gloucester, would like to hear from you in this connection.—Ed,) G5VL supplies in the budget full details and circuit of his short-wave super-het, which looks very good. Would any other District like to exchange budgets with No. 6 ?

The following stations are active in this District: G5SY, 5VL, 2ZP, 2FN, 5WY, 5QS, 5QA, 5YR, 5YB, 6RP, 6WT, BRS836, BRS958. Ten-metre work is being kept going by 5SY, 2FN, 6RP and 5QA, who are listening regularly, but hearing very little. BRS958 is now at Exeter College, Oxford, and would like to get in touch with members in that locality. (Try G5OG.)

The No. 6 District Conventionette will be held on Whit Sunday, June 4, at Exeter. Please note the date, and come along for the meeting and hamfest.

DISTRICT 7 (Southern).

The January meeting was held on New Year's Day, at G2DC, and was a great success.

Our star station this month appears to be G2YL, who, although a recent recruit to our ranks, has only to work W for W.A.C. I understand that she was successful in working VK during the first week in January. It is with much regret that we hear of the illness of G2BM, and trust that he will soon be restored to normal health.

Regarding radio activity, 7 mc. has been the most popular band of the month, and good conditions have been experienced. The 14 mc. band has been patchy, but at times VK's and ZL's have been worked from 10.00 to 12.00 G.M.T. All stations are now preparing for the B.E.R.U. tests, and given good conditions we hope for some excellent results.

G6NZ is busy erecting his gear at his new home, and we have a new member in the area, G6XM, at Aldershot, who is to work exclusively on 56 mc. for the present.

The next monthly meeting will be held on March 5, at G6GS, Bermuda Cottage, Warren Road, Guildford, 14.30 G.M.T. sharp.

The following stations report active through the C.R.'S: G2NH, 2DZ, 2DC, 2YD, 2MR, 2YL, 5MA, 5RS, 5LC, 5CM, 5JZ, 6GS, 6NA, 6PK, 6NK, 6GZ, 6NZ, 2PF, 2GG.

News has just come to hand that G2YD has left for an unknown destination as a commercial op. Good luck, O.M., and let us hear from you occasionally.

DISTRICT 8 (Eastern).

Our Conventionette takes place at Cambridge, on March 5, and it is hoped that all members in this District will make an effort to attend. It need hardly be mentioned that members from other Districts are welcome. After careful consideration, it has been decided to make this a one-day affair, but if you can manage to reach Cambridge on the Saturday afternoon, so much the better.

The assembly will meet at the Guildhall, Cambridge, at 10 a.m., whence the party will split up and go on tours of interest as scheduled below. Please send a post card before 25th of this month to either G2CJ or G6BS if you intend to be present, and *say which tour you would like to go on.* Arrangements can then be made in advance. The inclusive cost of lunch and tea will be 4s. 6d. per person.

Programme.

10 a.m. Meet outside the Guildhall, Cambridge.

10.30. Tours of interest (one to be booked by each person).

(*a*) Visit to the Pye Radio Works under the direction of G5JO and members of G5PI.

(*b*) Visit to the Cambridge University Engineering Labs. with Cathode Ray oscillograph demonstration by BRS930 and members of G6UW.

(*c*) Station visits.

(*d*) A walk round the Cambridge Colleges.

12.30. Gather at the Lion Hotel, Cambridge, for lunch.

2 p.m. The D.R. (Mr. C. J. Townsend, G2CJ) will open the Conventionette, followed by reports from the various C.R.'s, after which Mr. J. Clarricoats (G6CL), Secretary of the Society, will address the meeting.

4 p.m. Tea.

5 p.m. Paper by Mr. Brittain of the Pye Radio Company's Research Staff on "Quiescent Push Pull."

6 p.m. General discussion.

8 p.m. Finis.

This District is growing! We now have a member in Huntingdonshire; while Cambridge boasts several additions to its ranks. G6BT is suffering from shock. He has received a report from one of his members!

DISTRICT 9 (Home Counties).

Activity prevails as usual in Essex. The following are active: G2AF, 2LZ, 2WG, 6KV, 5VS, 5FB, G6OA and G6WI. Fone from G2LZ on 7 mc. has been received by VK3KR, QSA4, R4, and confirmed. He also has been working duplex fone with G2DQ on 28 and 1.7 mc. G5VS mentions that Mr. Miller (VS6AJ), who was with us last Convention, is now back in Hong Kong.

DISTRICT 10 (South Wales and Monmouth.

The centre of activity in this District appears to have moved to Swansea, and in view of the importance of getting an effective liason with the membership in that locality, R. W. Hall (BRS907), "Newholme," Llwyn Mawr, Sketty, Swansea, has been appointed sub-area representative to act under G5WU, the C.R. for Glamorgan.

BRS907 is also the Hon. Secretary of the Swansea Short-Wave Club, and the work of both he and 2AWN in this connection deserves the highest commendation and support. It is also hoped to get the Club affiliated to the R.S.G.B., while by the time this appears, a meeting will have been attended officially by the C.R. and D.R.

The new C.R. for Monmouthshire has now been appointed in the person of W. P. Jones (G2PA), 24, Maesglas Road, Newport, and all members in the county should in future refer to him and report regularly by the 15th of the month.

2BRA, of Newport, has now completed the formalities, and at the time of writing is awaiting his two-letter call. His very neat station is equipped for both CW and 'phone on 1.7, 7 and 14 mc.; while both G5WU and G5FI have resumed operations after being laid up for some weeks. Work on 1.7 mc. has increased in consequence.

A local meeting was held at G6FO, on Friday, January 13, at which G2PA, 2BRA and BRS907 were present, as it was found impossible to arrange a regular meeting in Cardiff.

A number of contributions having been received at intervals during the last three months, the Letter Budget will be put in circulation again at the beginning of February, and your D.R. hopes, probably without justification, that members will now contribute more regularly. Please do, because it helps the new man more than you know.

Three members of the District, G2PA, G5WU and BRS727 figure in the results of the recent 1.7 mc. tests, the latter earning special commendation for his RX log. In connection with 1.7 mc's working, the results obtained by Group 10a in a test with the States early in December, and which are described in the January BULLETIN, should stimulate interest in the DX possibilities of 1.7 mc. in a District where such a large amount of work is carried out on that band.

DISTRICT 12 (London North).

The January meeting took place at G5MG (Mr. Bloomfield), when congratulations were accorded to both him and Mr. Baveystock (G6YS) upon obtaining full licences. Mr. Radford (G2IM) gave an interesting chat on the subject of "Trying," whilst some outspoken remarks regarding North London "pirates" were made by Mr. Clarricoats. Mr. Vickery (G5VY) offered to provide accommodation for National Field Day enthusiasts, and arrangements were made to hold a meeting to discuss details at a later date.

Both Mr. Vickery and Mr. Bloomfield are carrying out tests on 56 mc. and request co-operation from others interested in this frequency. Mr. Bloomfield's 56 mc. transmitter was on view at the meeting.

The February meeting is fixed for the 25th, at G5UM, 17, Eastwood Road, Muswell Hill, N.10.

The Letter Budget continues to grow, but acting on recommendations from interested members, it has been decided to revert back to the "one budget for all" idea. As there are now nearly 30 contributors, it will be impossible to use extracts for the District Notes; therefore, members who have items of general interest should advise the D.R. prior to the 25th of each month.

And now for the B.E.R.U. Trophy—Senior and Junior, and, with a little luck, the 3.5 mc. and the N.F.D. awards!!! Any challengers?

DISTRICT 13 (London South).

The writing of District reports is now being shared by G2ZQ, G5AW and G6NF. Last month's report was written by G5AW, and it is G2ZQ's turn next month. At the time of writing we are preparing for the annual dinner of the S.L. & D.R.T.S., which is to be held at the Half-Moon Hotel, Herne Hill. Twenty-five members have intimated that they will be coming, and we are to be honoured by the presence of the President of the R.S.G.B., Mr. H. Bevan-Swift (G2TI).

DISTRICT 14 (London, East).

Our last meeting was held at G5AR, South Woodford, when the members attending admired the new transmitter, which is certainly representative of "1933." The next meeting will be held on Tuesday, February 28, at G6UT, 28, Douglas Road, Chingford, E.4, at 7.30 p.m. The next District field day has been tentatively fixed for March 18 and 19. Further particulars will be available at the next meeting, and will also be published in the March issue of THE BULLETIN.

DISTRICT 15 (London West and Middlesex).

Despite the cold, a total fifteen members rallied to the area meeting. It was very pleasing indeed to see four new members present, and I hope they will continue to come along to these meetings and to support the letter budget.

The February meeting will be held at G6CJ, The Cottage, Park Way, Long Lane, Hillingdon, on Wednesday, the 22nd, at 7.30 p.m. Take either Metropolitan Railway to Hillingdon or tram to Long Lane, on the Uxbridge Road.

Only two contributions for the budget have come to hand from G5PQ and BRS642. Why?

The report from BRS642 contains some of the finest dope from a BRS that I have seen for a long time. He has heard W6DJC of Santa Paula, on phone, on the 3.5 mc. band. He has also heard W1, 2, 3 and 4 on this same band between 0700 and 0800 G.M.T. This is certainly something to congratulate him on.

While conditions on both 7 and 14 mc. have not been too good, we at G6WN have found it possible to make contact with most DX heard. Incidentally, we are now WAC on both these bands.

In his report, G5PQ regrets being unable to attend meeting on account of 'flu, but has worked ZU1C and CR6AD on the 7 mc. band.

Arrangements are already in hand for the National Field Day and, judging by the interest shown, should prove a great success.

DISTRICT 16 (South-Eastern).

Mr. Sands (G5JZ) recently wrote to 18 members in Sussex to see if the county was "alive," and received 6 replies and reports, which is rather a poor return. I hope some of the other Sussex members will do their best to report to him in February, and let him know what they are doing. Apart from anything else, it is rather poor courtesy not to reply to someone when he writes to you.

G2RM is working on 56 mc. G2AO is very active and has worked two-way phone to VK and G5JZ has picked up his television transmissions, and had a television QSO with him. This is believed to be the first television QSO between two amateurs. G2PF, 2BKR, BRS899, and G5CM are active; the latter wishes someone to co-operate with him on 56 mc. near his QRA, Billinghurst.

G2IG and G2WY are entering for B.E.R.U. tests. Activity in Kent seems to have dropped off; drop a card to G2IG and let him know what you are doing.

SCOTLAND.

February finds me offering an apology for being somewhat out of touch, but owing to pressure of

(*Continued on foot of column* 2, *page* 271.)

Empire B.E.R.U. News.

B.E.R.U. REPRESENTATIVES.

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

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

Canada.—C. J. Dawes (VE2BB), Main Street, St. Anne de Bellevue, Quebec.

Ceylon and South India.—G. Todd (VS7GT), District Engineers Bungalow, Nuwara Eliya, Ceylon.

Channel Islands.—H. J. Ahier (G5OU), Lansdowne House, 45a, Colomberie, St. Helier, Jersey, C.I.

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

Hong Kong.—P. J. O'Brien (VS6AE), 12, Kent Road, Kowloon Tong, Hong Kong.

Iraq.—H. W. Hamblin (YI6HT), Wireless Section, R.A.F., Shaibah, Basra, Iraq.

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

Jamaica, British Honduras, Turks Island and Cayman Island.—C. M. Lyons, (VP2MK), 68½, King Street, Kingston, Jamaica, B.W.I.

Kenya, Uganda and Tanganyika.—H. W. Cox (VQ4CRF), Box 572, Nairobi, Kenya.

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

Newfoundland.—Rev. W. P. Stoyles (VO8MC), Mount Cashel Home, St. John's East.

New Zealand.—D. W. Buchanan (ZL3AR), 74, Willis Street, Ashburton; and C. W. Parton (ZL3CP), 69, Hackthorne Road, Cashmere Hills, Christchurch.

Nigeria.—Capt. G. C. Wilmot (ZD2A), 1st Battalion Nigeria Regt., Kaduna, Nigeria.

N. India and Burma.—R. N. Fox (VU2DR), C/o VU2FX, Sgt. C. D. Connerton, Aircraft Park, Lahore Cantonments, Punjab, India.

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

South Rhodesia.—S. Emptage (ZE1JG), Salcombe, Plumtree, Southern Rhodesia.

Australia.

By VK2HC.

NOVEMBER-DECEMBER.—Considerable success has been obtained on 28 mc. recently, and many Interstate contacts have been effected. VK4XN appears to have had the greatest number of QSO's. On 14 mc. conditions have been good between 12.00 and 15.00 G.M.T., whilst the usual DX on 7 mc. has been heard from 08.00 G.M.T. onwards, and between 19.00 and 21.00 G.M.T. Local conditions have also been good, the 3.5 band is more or less deserted, but the "old-timers" are still hanging on, despite heavy QRN. Permits have been granted to several stations desiring to work on 1.2 mc., outside B.C. hours. Stations 3OR, 3KR, 3CD, 3KI and 2AK have done excellent work recently in connection with the R.A.A.F. Wireless Reserve at Deniliquin.

Congratulations are due to Mrs. Hutchings and family, for they now possess three calls, VK3HM, 3HL and 3HQ, Miss Margery Hutchings having just passed her tests, comes on the air as 3HQ, whilst Mrs. Hutchings and Mr. Alan Hutchings continue to raise DX as 3HM and 3HL, respectively. All are members of B.E.R.U. A proud family record to be sure.

We are anticipating a large entry in the 1933 B.E.R.U. Contest.

Egypt.

By SU1EC.

December and January.—Conditions, though varying slightly day by day, remain unchanged throughout December and January. On 14 mc. good Eastern DX came in well between 12.00 G.M.T. and 15.00 G.M.T., and again on 7 mc. from 15.00 G.M.T. to 21.00 G.M.T.

Western DX has been poor, and no W stations have been heard on 14 mc. for six weeks, though they came in at fair strength on 7 mc. between 02.00 G.M.T. to 05.00 G.M.T.

SU6HL has been active and had good results on fone, an R6 report from VK making him W.A.C. on fone. (Congrats.—ED.)

SU1AA has been fairly active and is now preparing for the expedition as described in the article which follows this report.

SU1EC is experimenting with fone on 20 metres and has had a QSA5 report from G using grid modulation of the P.A. Finds now that the G2BI aerial, being tried out for the second time, gives superior results to the 60 or 130 ft. Zepp Hertz, and having cut the feeder length to exact resonance on 7 mc., is now efficient on both 7 and 14 mc.

* * *

An Army experimental convoy of W.D. vehicles is leaving Cairo about March 1, travelling south to Kenya and Uganda, and return.

The purpose of the expedition is to test various types of motor vehicles over divers conditions of going.

In all probability SU1AA and set will accompany the convoy for keeping communication with Cairo throughout the trip.

His own set is to be used and is at present undergoing severe mechanical strength tests to ascertain the likelihood of breakdown.

The set, both transmitter and receiver, is housed in a strong box and will be mounted, well sprung, inside a 30 cwt. lorry.

Power will be supplied by a 120 watt rotary transformer, run from 12 volt 120 A.H. accumulators, these latter being kept up by a portable 2¼ h.p. Douglas charging engine.

Date of starting, times of working, frequencies and call signs will be published as soon as available. This should be an excellent opportunity for B.R.S. members, as the set will be on the air frequently.

A further expedition has left and is at present situated out in the Western desert. SU6HL has left with this trip, and his station is being operated by a friend during his absence, and keeping in touch with him by fone and C.W. The call sign is GEZHW on 6,666 kc.'s.

Nigeria.

By ZD2A (via G2IG).

Conditions have recently been bad on 14 mc., and QRN level so high that only loud signals are workable. ZD2A has started activities again after accumulator charging difficulties. He is now using an input of 35 watts on the 7 mc. band. The B.B.C. transmissions from GSC are well received.

North India and Burma.

By VU2AH.

The Empire broadcasting tests have attracted a lot of attention in India, and are perhaps responsible for the short time that many members have spent on the air this month. The tests in general have been well received in India, especially those on 31 metres.

The 14 mc. band brightened up considerably during December, while 7 mc. quietened except for commercials. From Burma comes the rumour that the far-famed R.A.C. KA stations are changing over to D.C.! We find it hard to believe, but we hope for the best.

Canterbury Branch (3rd District), N.Z.A.R.T. Conventionette.

The organisation of the Indian Emergency Chain is rapidly nearing completion, and we are hoping to see the Chain do some useful work in assisting the 1933 Mount Everest Expedition.

The idea of the Chain was put forward by VU2CS and VU2FX as the only method of arousing the interest of VU members. So far it seems to have justified their arguments, for VU appears to be awake at last! Poor conditions and the distances between stations seem to have induced many a VU amateur to lay aside his TX, but quite a few have lately been hoisted from their hiding places. The half-dozen or so regular transmitters are now mostly C.C.—no doubt they would all be but for the depression!

South Africa.

By ZT6X (*via* ZU6W and G5ML).

December-January.—South African amateurs have received intimation that in future the regulations governing the issuance of their licences will be rigidly enforced. R.A.C. will be conspicuous by its absence, as will gramophone broadcasting.

DX on 14 and 7 mcs. has improved to the satisfaction of those who have intimated their intention of participating in the B.E.R.U. tests in February.

Southern Iraq.

By YI2DS.

Conditions on 7 mc. showed much improvement during the first half of January, and VKs have been heard late in the evening. The 14 mc. band has been quiet except for a few OH and occasional G stations. Tests on 3.5 mc. were made from 23.00 G.M.T. on January 14 from YI2DS, but no contacts established. Reports will be welcomed from stations working on this frequency at week-ends.

Notes and News—(*Continued from page* 269.)

business, I have not had so much time for radio as normally.

At the beginning of the year, "A" District elected Mr. J. P. Stove (G5ZX) as District Officer to succeed G5XQ, and he took over as from January 1. His address is 35, Melville Street, Pollokshields, Glasgow.

There will be three new calls in the district ere this reaches print—G6VU and those of 2AVU and 2BTT, who have passed their morse tests. G6VU is the call of Mr. Jas. Sayers, recently domiciled in Manchester but now at home at "Struan," Clarkston, Glasgow. We are very pleased to have Mr. Sayers back amongst us, but deplore the circumstances which made his return imperative. Mr. Sayers' father died suddenly on Christmas Day, and I am sure that he has our united sympathy.

Once again at least one of our members has put up a very fine show in a Society contest. I refer to G5ZX who, in the course of the QRP contest, accumulated approximately 250 points. Very fine work indeed. At the moment I have no word of any further participants from Scotland, so far as this contest is concerned.

"B" District continues to distinguish itself by its aloofness, and I am in complete ignorance as to what eventuates in these parts. This attitude may be very exclusive and all that sort of thing, my friends, but it is emphatically not in your best interests nor those of the Society.

"C" District once again comes away with a very excellent report. The district held its annual general meeting on January 18, and at this meeting, Mr. J. Hamilton (2BLJ) was asked to carry on as District Officer for 1933. Mr. Hamilton agreed, and district correspondence should therefore be addressed to him at 10, Airlie Terrace, Dundee. Arrangements for the District Field Day were further discussed, and as they may be of service to other districts, no apology is made for giving them in detail. A base station will be erected at Amulree, in Perthshire, and will radiate signals every half-hour on 3.5 mc. In the forenoon various mobile transmitters and receivers will converge on the base station from all over the district, and maintain

contact where possible. Arrangements have also been made to have complete 56 mc. outfits at the base station for use with duplex telephony during the afternoon. The base station will be in the capable hands of G5NW. More details anon.

"D" District also reports considerable activity and continues to hold its regular meetings. G6FN has received his first VK report relative to 14 mc., and is hoping for an early contact. G6RG has branched out in a new direction. With the consent of his local authorities he is purveying broadcast on the "central heating system." That is, he is purveying for his clients from a common receiving source at a fixed charge. He has already a large number of subscribers, and we wish him every success in his new venture.

Lastly, will those who intend to take part in the 3.5 mc. contest please let me have their names at least 14 days before the contest?

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Rates 1d. per word, minimum 1/6. First line in capitals if desired. 2d. per word where all capitals are required. Minimum 3/-.

A. MATHISEN, B.Sc. (Elect.Eng.). Specialist: Patents for Television, Radio Engineering Inventions.—First Avenue House, High Holborn, London, W.C.1.

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FOR SALE.—Carter's Crystal Oscillator, R9 condition.—Gi6NY, Daisy Hill, Newry.

TANTALUM AND LIONIUM.—Make your own Battery Chargers for alternating current. Simple, reliable. Lionium Rectifying Electrodes, 2-4 amps., 10s., 5-10 amps., 15s. Also Transformers, Blue Prints, 1s. each, and complete Chargers.—Blackwell's Metallurgical Works Ld., Liverpool.

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30-WATT 20,000-OHM ZENITH RESISTANCES, 5/- each. "Autoplex" Bug Keys, 25/-, postage 1/-. Seven days' approval. .0002 and .0003 G.E.C. Slow-motion Condensers, brand new, 6/6.—G2MA Marshall, 41, Kelvinside Gardens, Glasgow.

5NI's MONTHLY SELECTION OF "SNIPS," whether for "ham" gear or B.C.L. requirements. Get our quotation first.—Below.

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P.S.—OVERFLOW MEETINGS held in the Café below!!!—Radio Mart, 19, John Bright Street, Birmingham.

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