

THE T. & R.

BULLETIN

THE INC.
RADIO SOCIETY
OF GT. BRITAIN

AND THE
BRITISH EMPIRE
RADIO UNION

Vol. 7 No. 10

APRIL, 1932 (Copyright)

Price 1/6

L.F. CHOKES

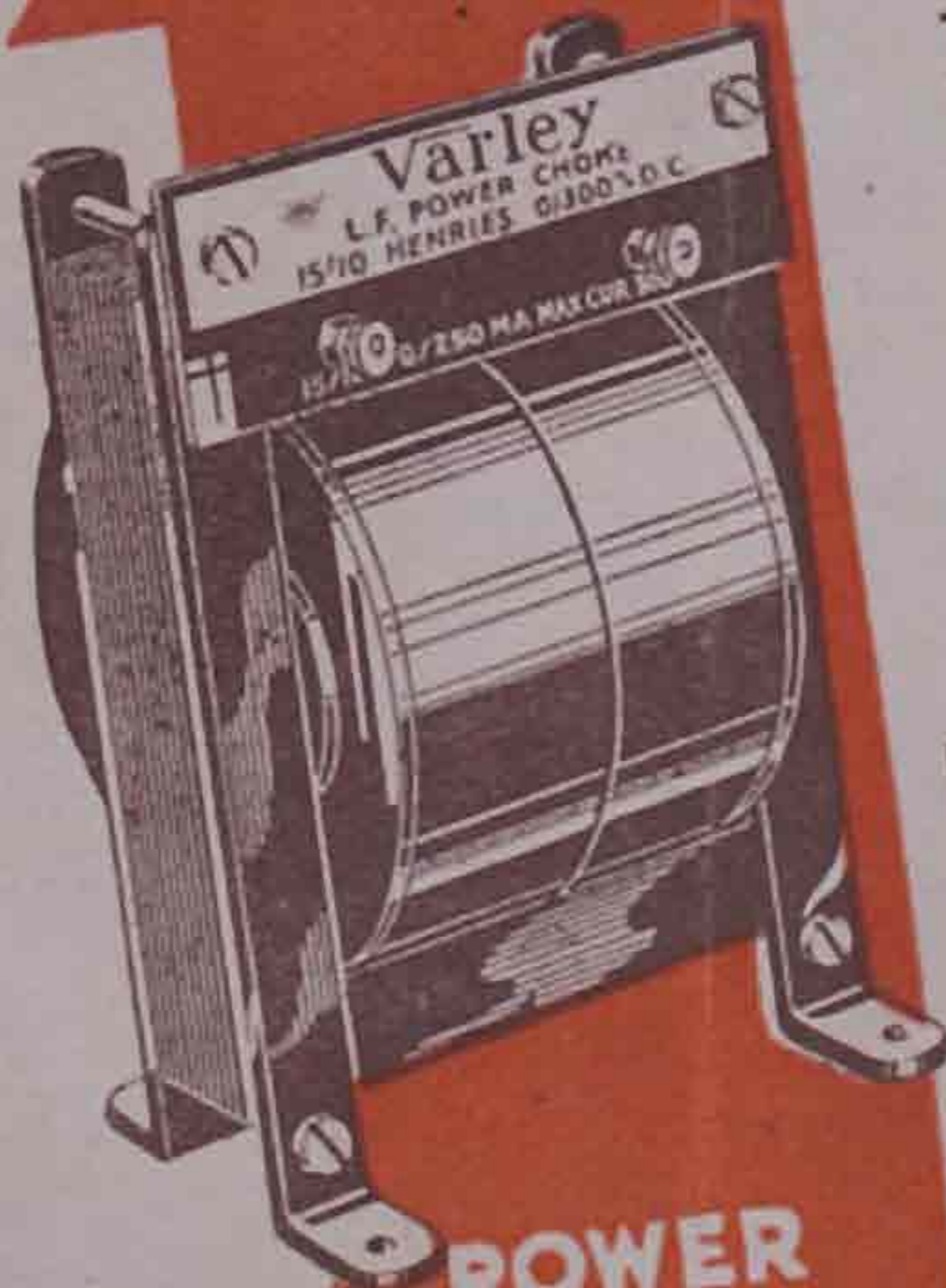
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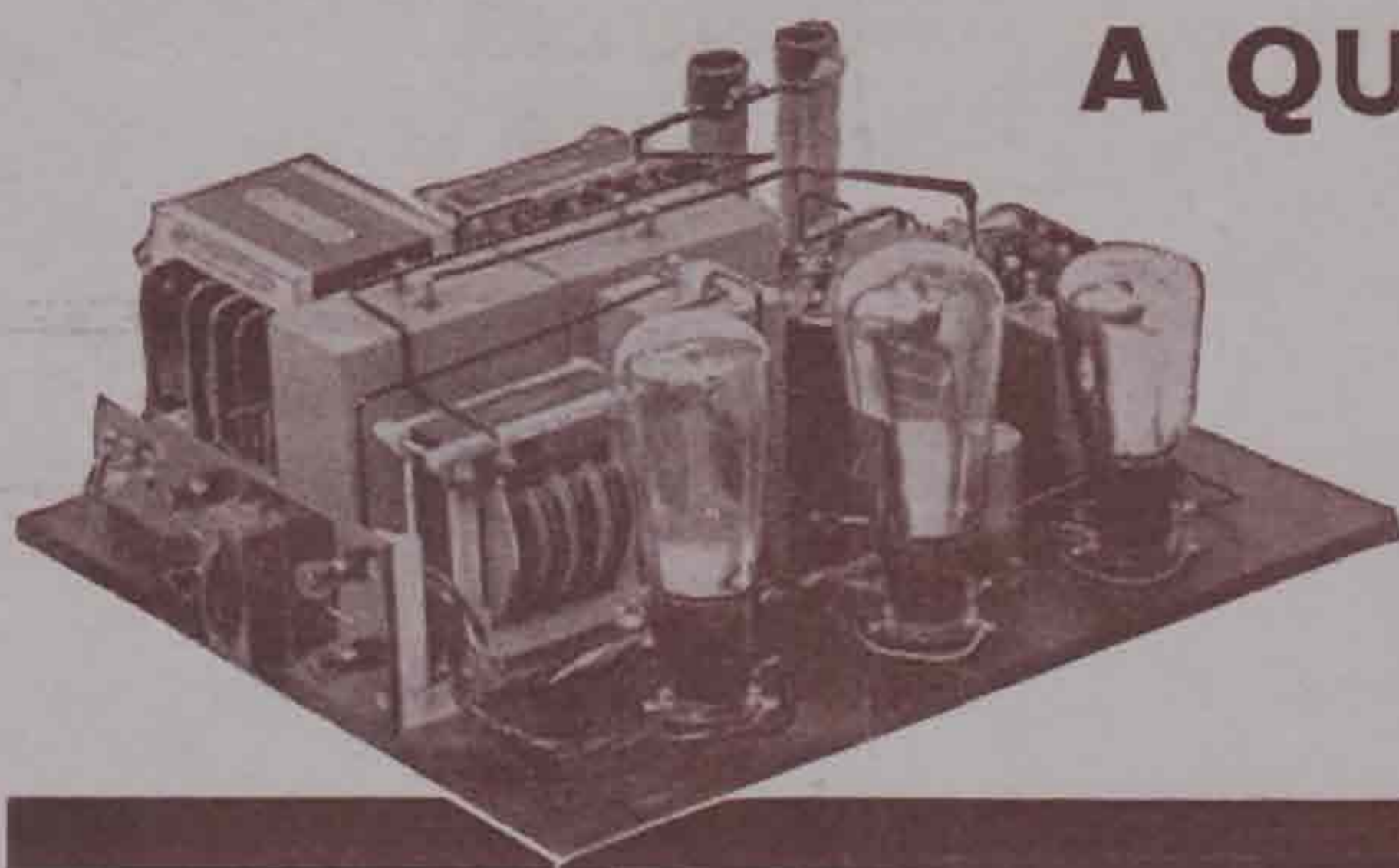
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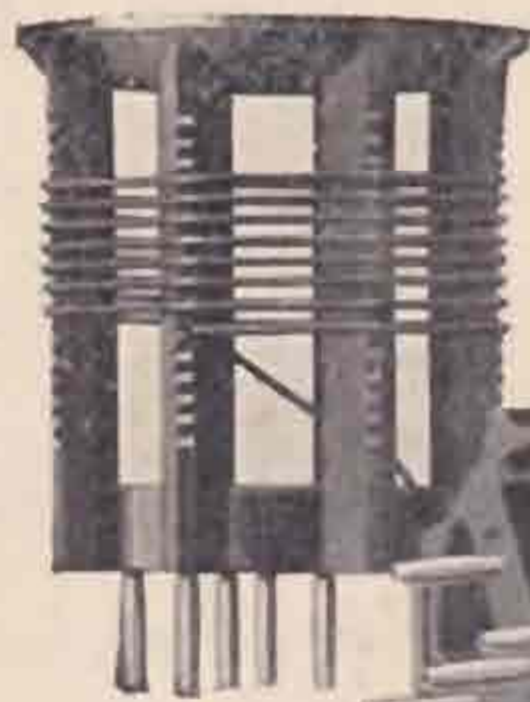
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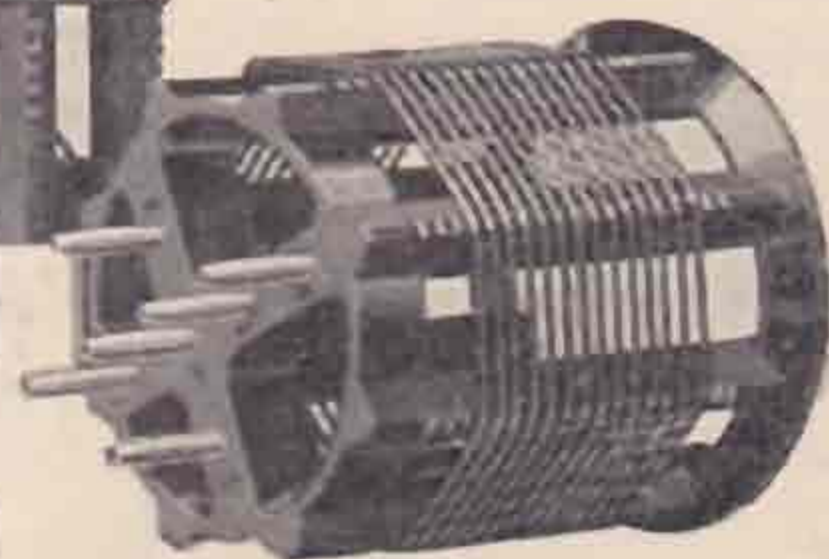
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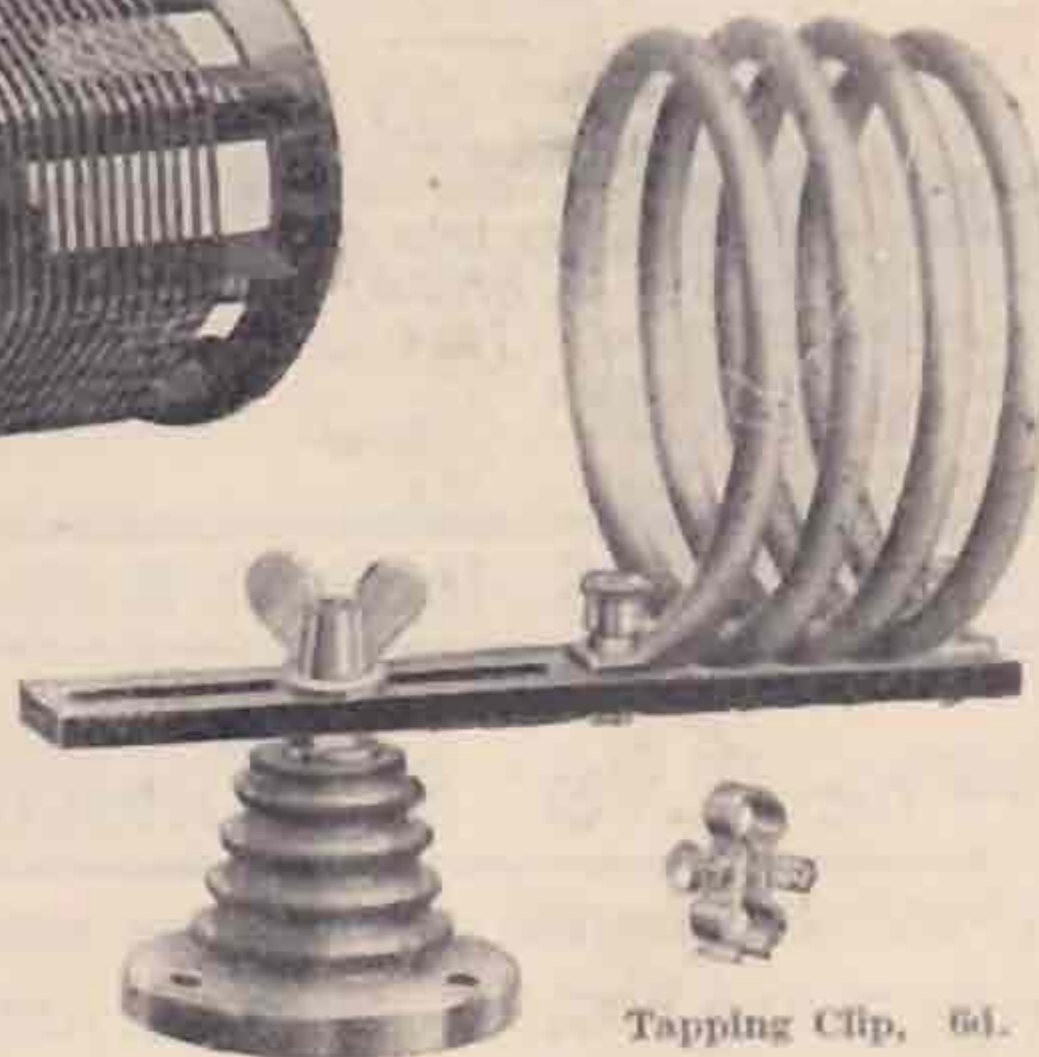
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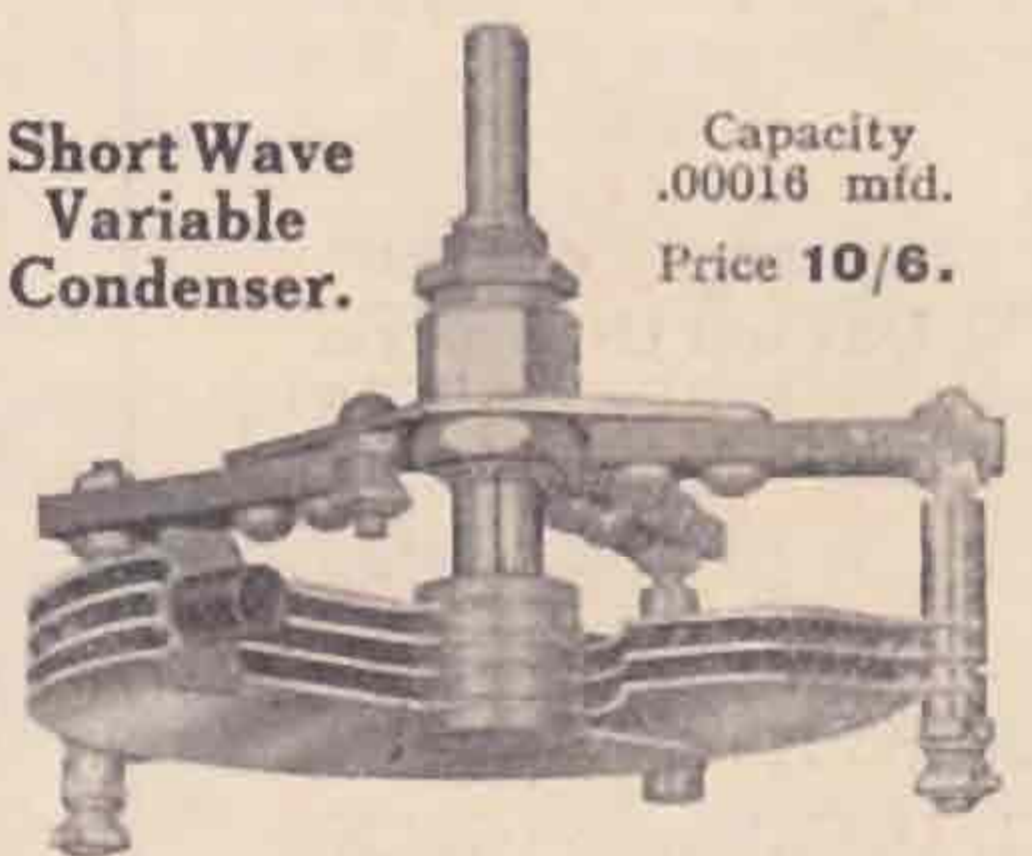


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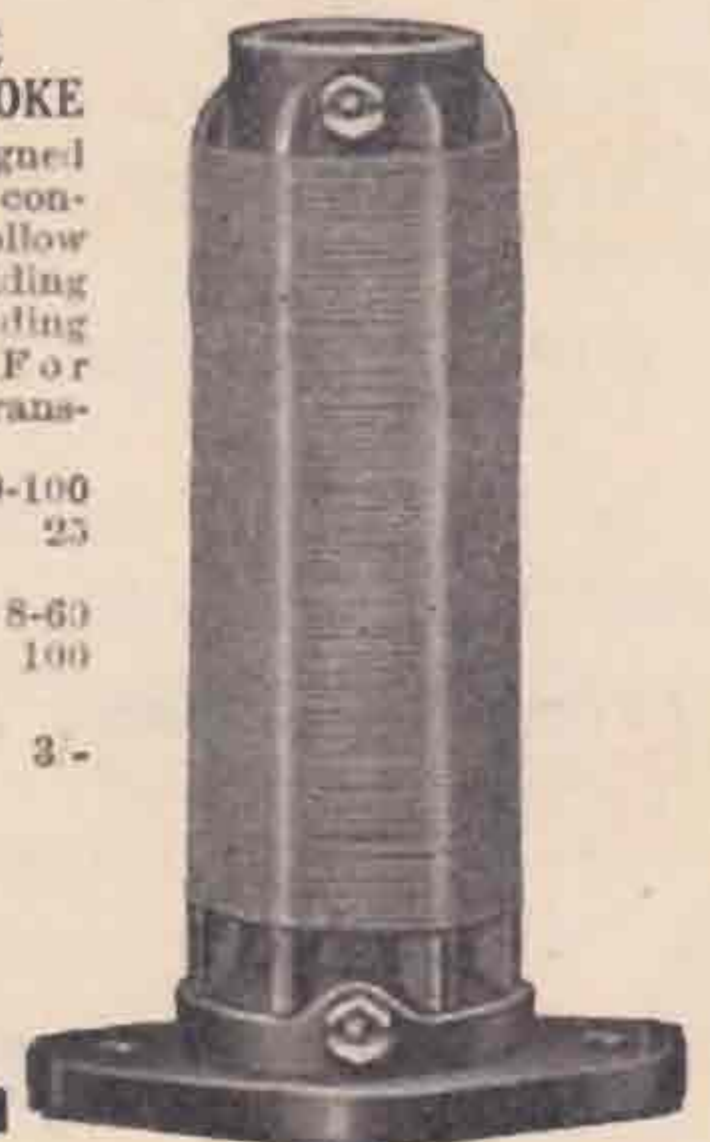


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President: H. BEVAN SWIFT (G2TI).

R.S.G.B. CALENDAR

April 22.—"The Manufacture and Use of Quartz Crystals," by E. A. Dedman (G2NH), of the Quartz Crystal Company, at the Institution of Electrical Engineers, at 6.15 p.m., tea at 5.30 p.m.

April 27.—London Districts Hamfest at Pinoli's, 17, Wardour Street, London, W.1. 6.30 p.m. for 7 p.m.; ham dress.

Details of forthcoming local Conventionettes will be found under the District Notes Section as they become due. The following have still to take place this year: May 1, Districts 5 and 10, at Bristol; May 15 (Whitsun), District 6, at Torquay; June 5, District 7; June 19, District 4, at Nottingham.

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The T. & R. Bulletin.

(Published on the 14th of the month.)

Hon. Editor: G. W. Thomas (G5YK).

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Bulletin

*The only Wireless Journal Published by Amateur Radio Experimenters
in Great Britain*

APRIL, 1932.

Vol. 7. No. 10.

QUALITY NOT QUANTITY—

“**C**ANDIDATES to be eligible for election as members must have attained the age of 21 years and must fulfil the following conditions:—
(a) Have been engaged in research or experimental work in the science of Radio Communication for at least two years.
(b) And satisfy the Council that they possess the necessary qualifications or training.”

The above paragraph is an extract taken from the Articles of Association and is the clause relating to the qualifications necessary for a person to become a Member of the Society.

During 1931 a grand total of 466 new members were elected to membership of the Society; of this total upwards of 250 were classed as B.R.S. members; in other words, they were persons who were not licensed to instal either radiating or non-radiating equipment.

All of these members had made a *bona-fide* application for membership which had been supported by a proposer and seconder, both of whom were members. Council, therefore, had little reason to challenge the authenticity of such applicants, although it must be admitted that in some cases doubts as to the technical ability of certain juniors arose.

The year 1932 started with a further flood of new members' applications—no less than 82 being submitted to the Council at the January meeting of that body. It is but natural that those responsible for furthering the interests of British Amateur Radio should view with pleasure this increase of interest, but at the same time the feeling exists in their minds, and we are sure in minds of many of our senior members, that this avalanche of new members is not wholly to our good *unless* the material is of a quality likely to withstand the critical scrutiny of the General Public, who are prone to judge the status of an organisation such as our own by the qualifications and personal bearing of one or two members of their acquaintance.

The R.S.G.B. is the senior Amateur Radio Organisation in the world and is the only one under Royal patronage. Its original members were drawn from the highest scientific ranks of the day and its list of Past Presidents compares favourably with the leading technical societies of the country. Surely, then, with such historic associations (and with such a wealth of pioneer effort to its credit, the members who form the Society to-day should guard jealously these traditions.

We do not expect or wish the proposer or the seconder of a new member's application to impose a third degree examination in order to test his credentials, but we do require a *bona-fide* assurance that the applicant has “been engaged in research or experimental work for two years.” We believe that in a burst of enthusiasm to increase the membership roll this essential requirement has in some cases been allowed to lapse. We base our assumption on two points: (1) The low degree of technical intelligence shown in certain correspondence to headquarters,

(Continued on page 344.)

FUNDAMENTAL CRYSTAL CONTROL FOR ULTRA HIGH FREQUENCIES.

By DR. HARALD STRAUBEL.

Published in the *Physikalische Zeitschrift*, December, 1931.

Tourmaline solves the problem of crystal control on the very high frequencies and this article should give something new for our 56-M.C. Groups to tackle. Dr. Curt Lamm obtained this article for us and we have also to thank Mr. Pilpel, G6PP, for the translation. In case Tourmaline is a mystery mineral to our members, Mr. Gay, G6NF, tell us, on another page, what it is and where it can be obtained.

THE method of fundamental crystal control which has been used to date presents difficulties on waves shorter than about 40 metres, because the thin quartz oscillators produce side tones on several neighbouring frequencies. This multiplicity of oscillations is noticeable even on longer waves but can be suppressed by cutting the quartz plate into a suitable shape.

Fig. 1 shows such a plate, the surface and sides of which are ground in such a manner that all oscillations starting at the centre will all be reflected there at the same time from the circumference of the crystal. The radius of the curves at the corners depends on the square root of the modulus of elasticity of quartz. If this plate is excited on its fundamental frequency, the whole plate oscillates in all directions. Lycopodium powder, uniformly distributed over the crystal plate, is therefore concentrated at the middle point, which is the nodal point of the whole disc.

For considerably shorter waves than 40 metres, this palliative can no longer be successfully employed. Crystal controlled short-wave transmitters nowadays do not often use this method but employ crystals with a fundamental wavelength of 100-200 metres with frequency multiplication. An installation of this sort becomes very cumbersome and complicated when used on ultra-short waves, because the harmonics are so weak that amplification must take place after each frequency doubling operation before further frequency doubling can be attained.*

If it were possible to construct fundamental oscillators for such short waves, the installation would be extraordinarily simplified.

For the abovementioned reasons, quartz is unsuitable for short-wave fundamental-control. As the result of research the author found that a Tourmaline crystal produces considerably more uniform oscillations than quartz, and it was noticed, even with a raw crystal which had only been cut perpendicular to the optical axis, that on exciting the longitudinal oscillations extraordinarily uniform transverse oscillations resulted (Fig. 2).

The piezzo-electric constant of Tourmaline is:—

$$5.7 \times 10^{-2} \frac{\text{electrostatic charge units}}{\text{kilogramme}}$$

i.e., about 10 per cent. less than quartz.

* It is not always necessary to employ amplification between successive frequency doubling stages as will be seen from crystal controlled transmitters that have been described in this Journal. [ED., T. & R. BULLETIN].

If in spite of the smaller constants and the irregular natural formation of this crystal particularly easy oscillations are noticeable, it is highly probable that this is due to the fact that there is considerably less tendency to side tone oscillation. Actually, in the natural crystal only a few symmetrical side tones could be detected, the frequencies of which were, however, far removed from the fundamental.

From these results it can be assumed that the oscillating properties even of such a thin crystal will remain constant, as they must do, if it is to

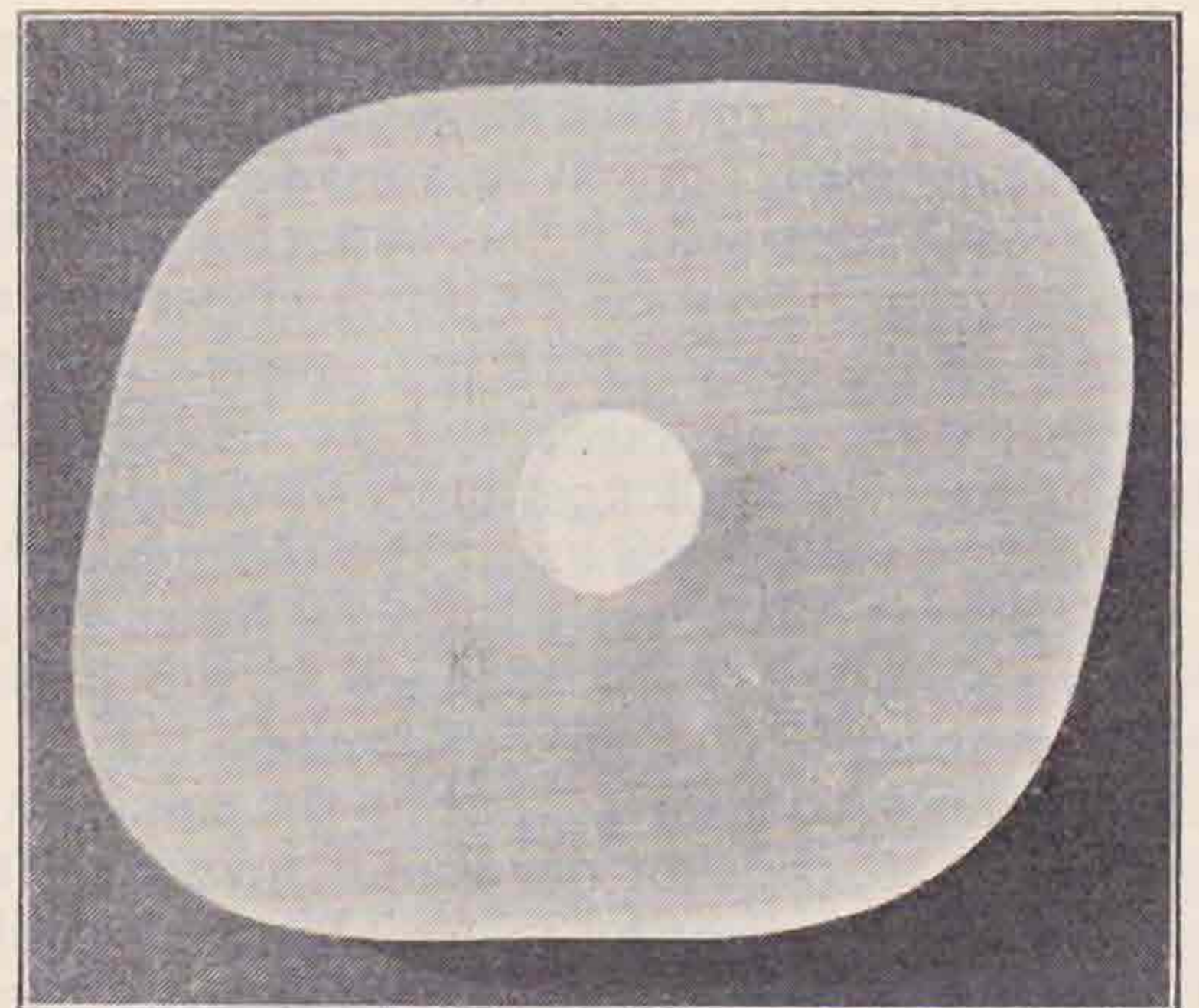


Fig. 1.

Quartz oscillator. All oscillations require the same time from middle point to the circumference.

be used for fundamental control of ultra-short-wave transmitters. A further advantage for the production of very high frequencies lies in the high speed of sound, necessitated by the very large elasticity modulus of 1.6×10^6 kg/cm² in the direction of Z (Fig. 5). Tourmaline therefore supplies a frequency 35 per cent. higher than quartz of the same thickness (1 mm. (or 0.0394 in.) = 80 metres wavelength).

A circuit for the production of oscillations is shown in Fig. 6, whilst Fig. 7 shows the actual

transmitter for use on 7 metres, employing 5 watts, from which will be noticed the simplicity of construction and absence of any type of screening.



Fig. 2.
Oscillations at the surface of raw Tourmaline. The optical axis is perpendicular to the plane of the picture.

For waves down to 2 metres ordinary detector or power valves were used, but for shorter waves a special short-wave valve was employed ("Valvo" S 0401). For longer waves, 5 metres upwards, a larger valve was found suitable (RS 241), which is similar to the English LS5 valve and the "Philips" TB 04/10. It was noticed that, as is usual with all self-excited transmitters, the higher the frequency the lower the efficiency until eventually oscillation ceased altogether (Fig. 9 shows the performance of an RE 134 valve). The reason for this is partly due to the large self-capacity of the crystal which, for a given valve capacity, upsets the phase of the reaction on short waves to such an extent that the crystal no longer oscillates. The crystal then works only as a short-circuit capacity, while the valve either oscillates unstabilised or ceases to oscillate altogether. This may be

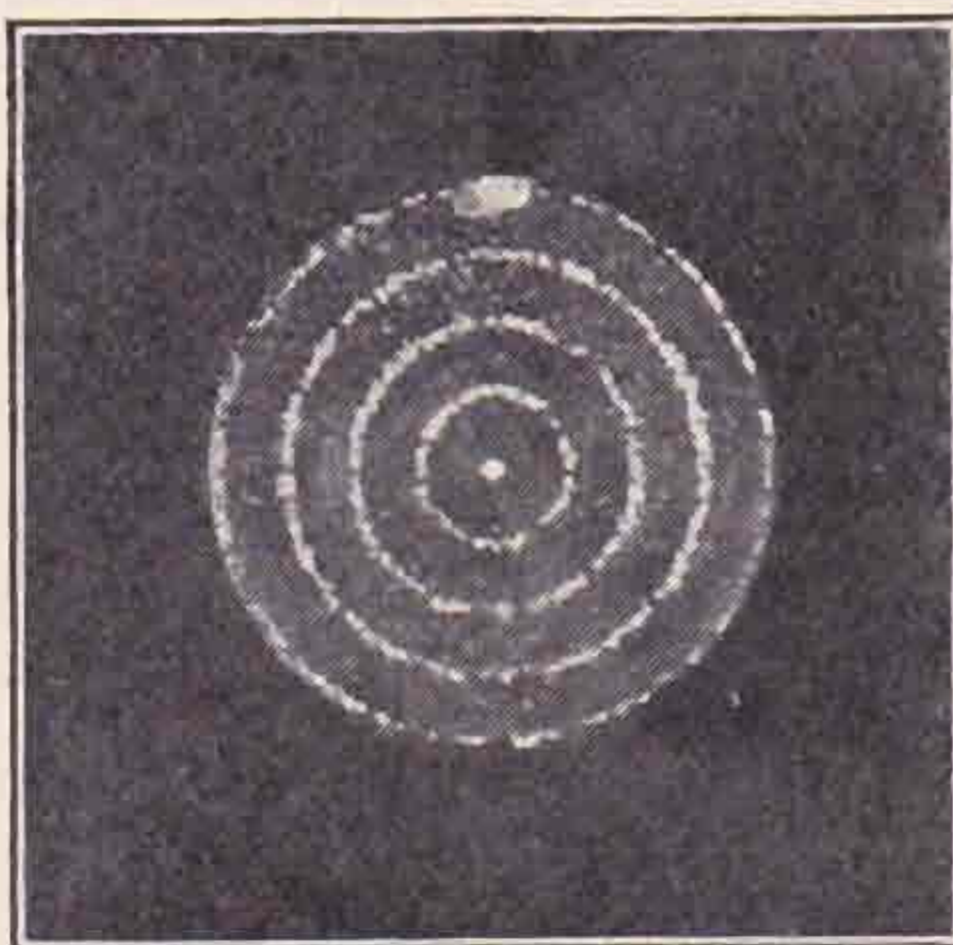


Fig. 3.
The same crystal and the same oscillation as in Fig. 2. The crystal has been ground circular.

avoided by reducing the capacity of the crystal, but this can only be done by decreasing its diameter. An increase in the diameter does not enable the crystal to stand a greater load on these ultra-short waves.

The electrodes next presented certain difficulties. Silvering, such as used in thick oscillators, must be omitted, because this affects the fundamental frequency of the thin plate quite considerably, and a great load will cause peeling, the oscillator remaining, however, undamaged. Therefore silvering was dispensed with and instead perfectly level electrodes were used. Even slight unevenness of the elec-

trodes caused certain parts of the crystal to melt and become disintegrated. Splintering, such as occurs with quartz, was never experienced.

By using perfectly plain electrodes the load on the crystal could be considerably increased. Working temperatures of more than 100° Centigrade did not affect the operation in any way. Great overloading, using a crystal 8 mm. diameter and an RS 241 valve with 350 volts plate potential, once caused the edge of the crystal to crack without affecting the middle portion or causing the efficiency to decrease materially (Fig. 10).

When the crystal was in a horizontal position, no extra weight was placed upon the electrodes. An additional weight reduced the crystal's controlling properties, nevertheless it was possible, in the cases of crystals of larger diameter (12 mm.), to subject them to a pressure up to 500 gr/cm²

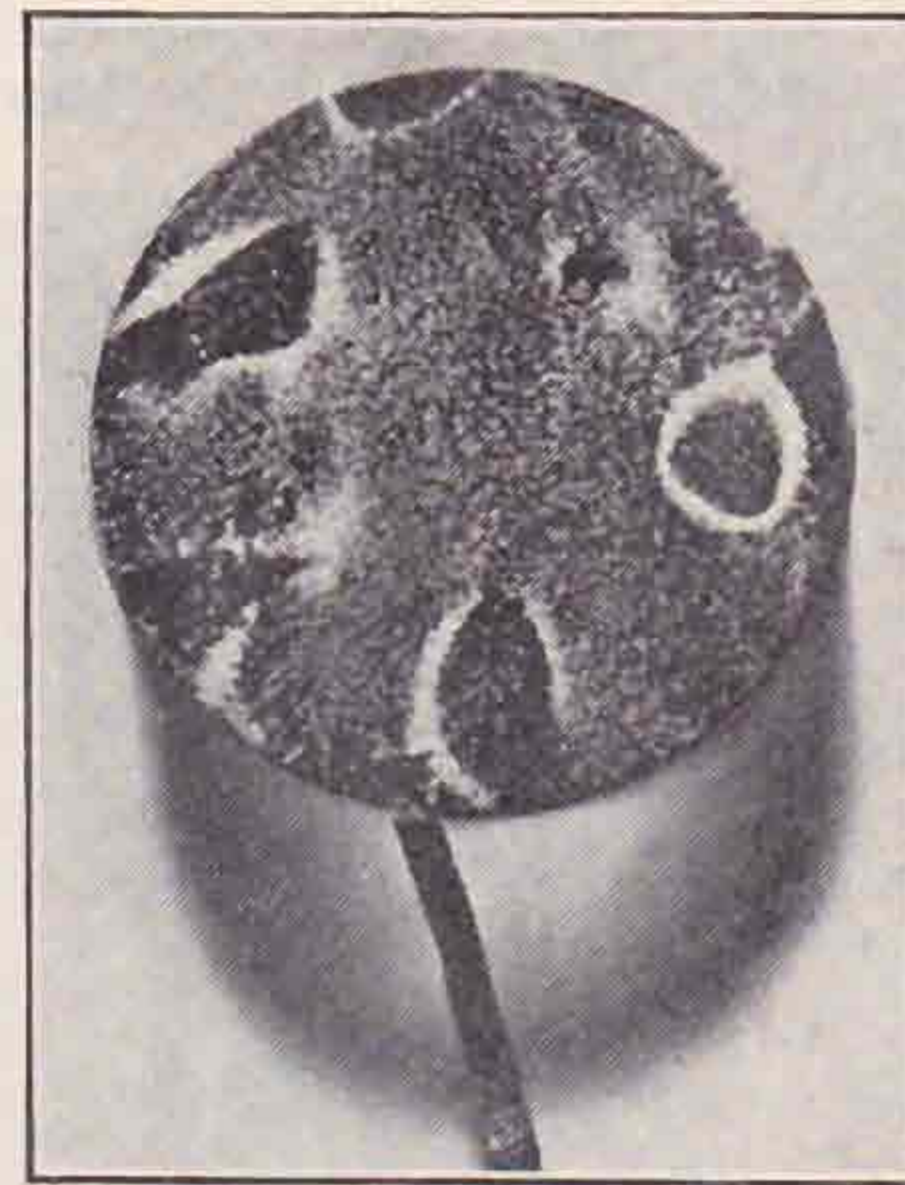


Fig. 4.
Oscillations at the surface of a disc-shaped quartz oscillator. Compare with Fig. 3.

before they stopped oscillating. In order to render them safe from shocks and vibrations, a light spring was always used to supply pressure.

With the transmitter depicted in Fig. 7 experiments were carried out to determine the actual amount of frequency stabilisation obtainable. The modulated transmissions were received on a simple

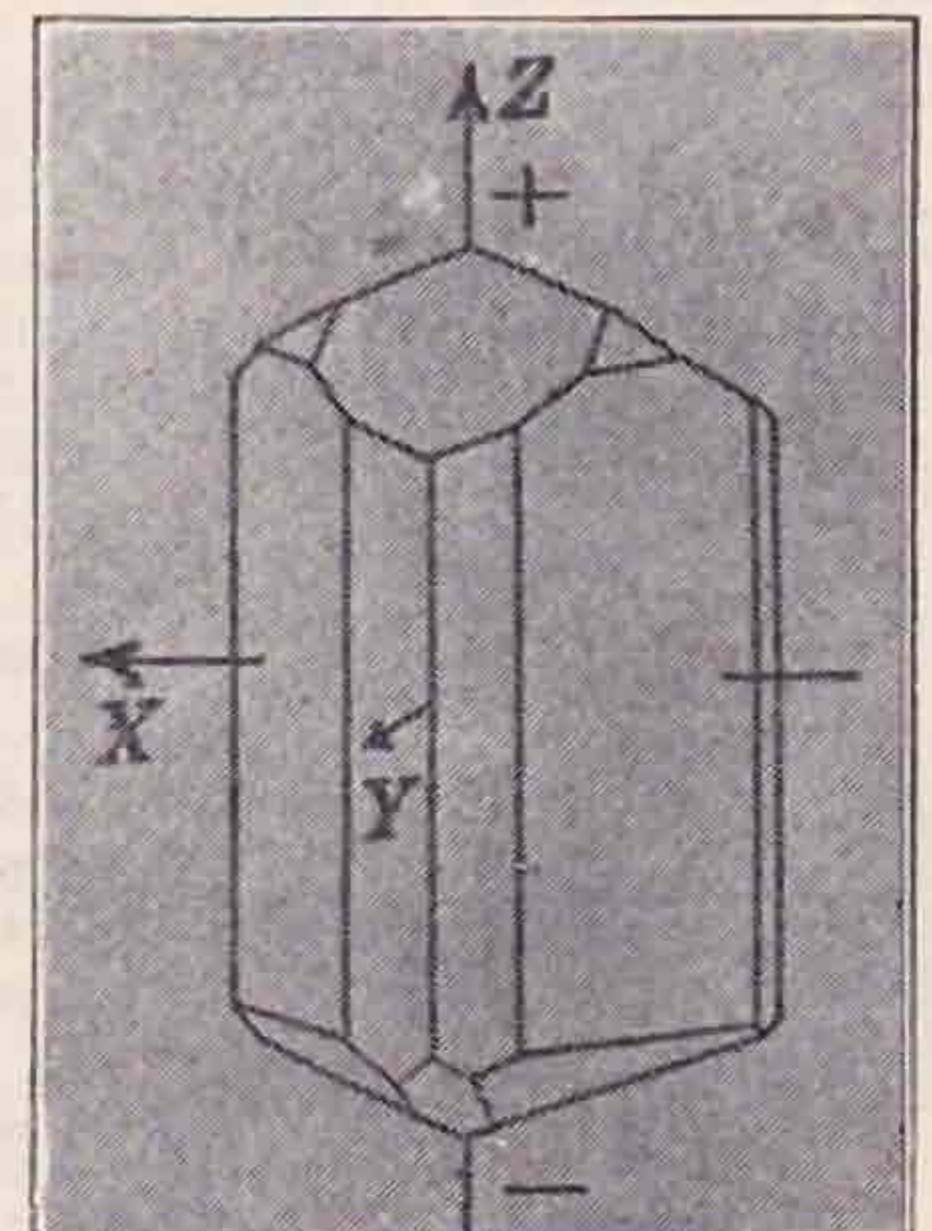


Fig. 5.
Tourmaline crystal. The optical and electrical axes have the same direction.

detector with regeneration over a distance of 1 km., although no aerials were used on either side. As far as the transmitter was concerned no hand-

capacity effects were noticed, but when the hand

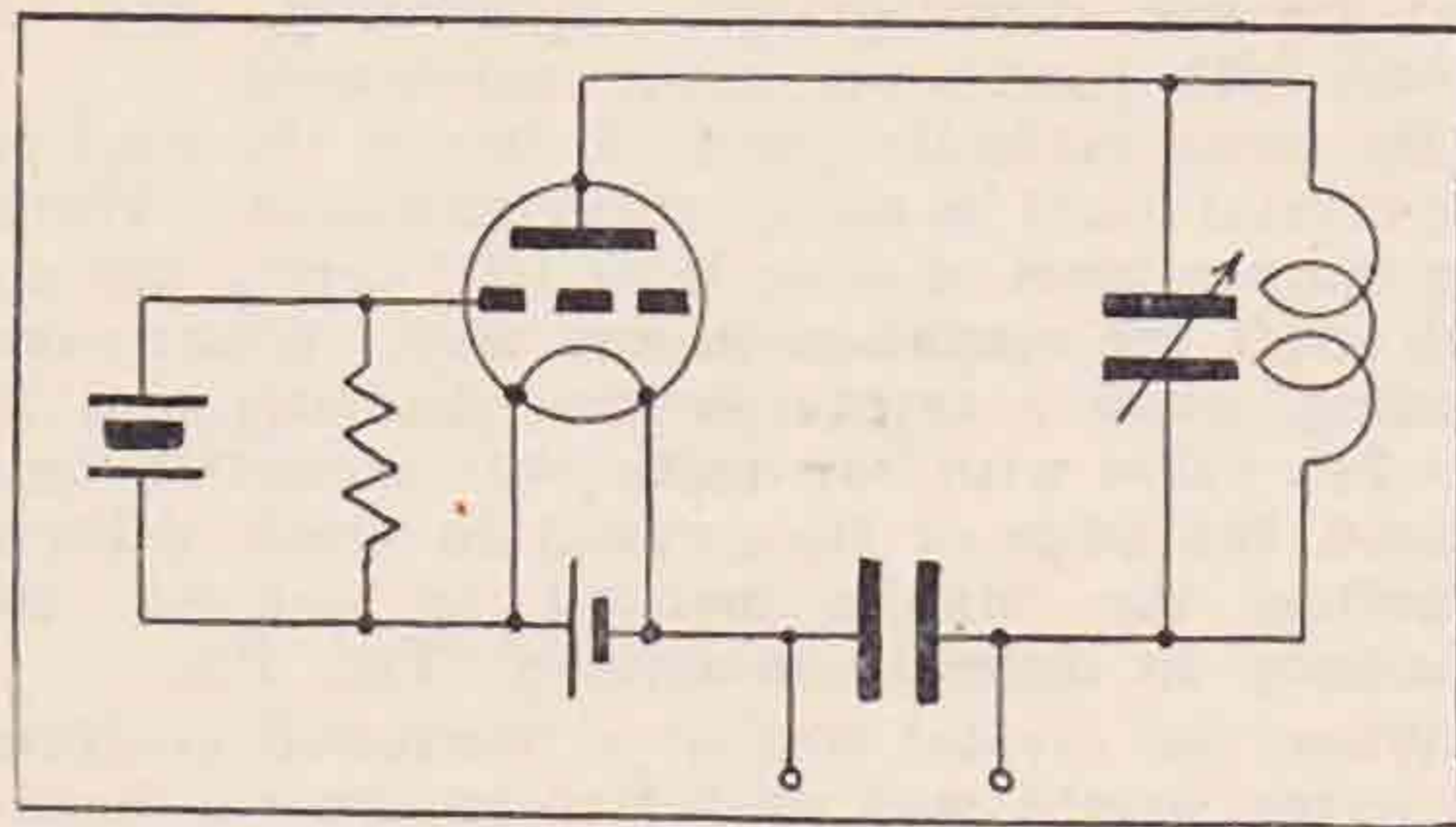


Fig. 6.
Oscillating Circuit.

was placed near the inductance, reception was louder owing to the body acting as a capacity-coupled aerial. Only when the coil was actually touched did oscillation cease, to recommence immediately on the same frequency when the hand was removed. This was particularly noticeable when the transmitter was keyed in the plate circuit. The heterodyne note as heard in an oscillating receiver was absolutely pure on a wavelength of 4 metres and showed no frequency change whatsoever, which was more satisfactory than could be obtained when using a 40-metre quartz crystal. The well-stabilised transmitted frequency could in every case be received on the detector with regeneration, without the need for the broad resonance curve of a super-regenerative receiver, which would have been necessary if there had been any change in frequency.

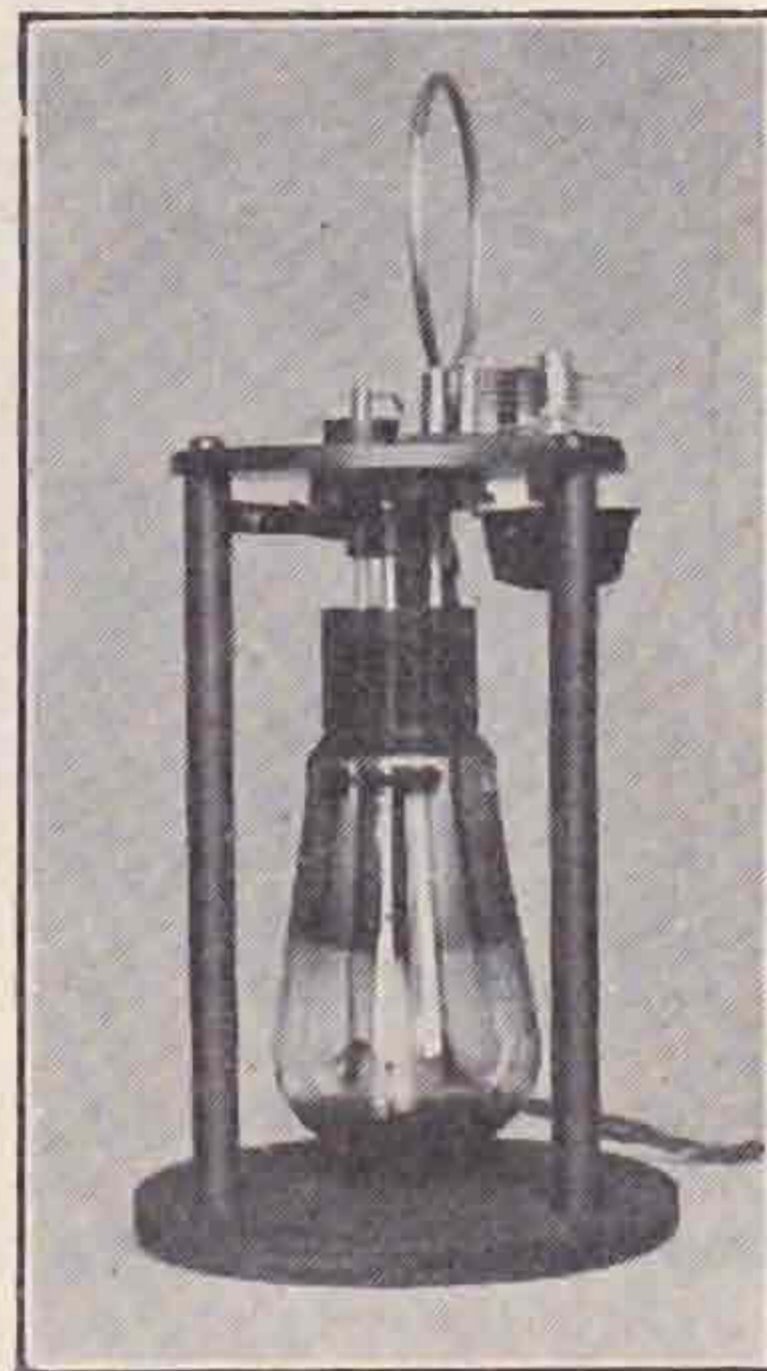


Fig. 7.
Transmitter with "Telefunken" type valve RS. 241.

By varying the condenser C (Fig. 6) no jumping in frequency could be noticed. Naturally, the frequency of the Tourmaline, just as that of quartz, was affected by varying the tuning of the plate circuit, but frequency jumping did not take place. To obtain this condition however, perfectly plain parallel crystal surfaces are essential.

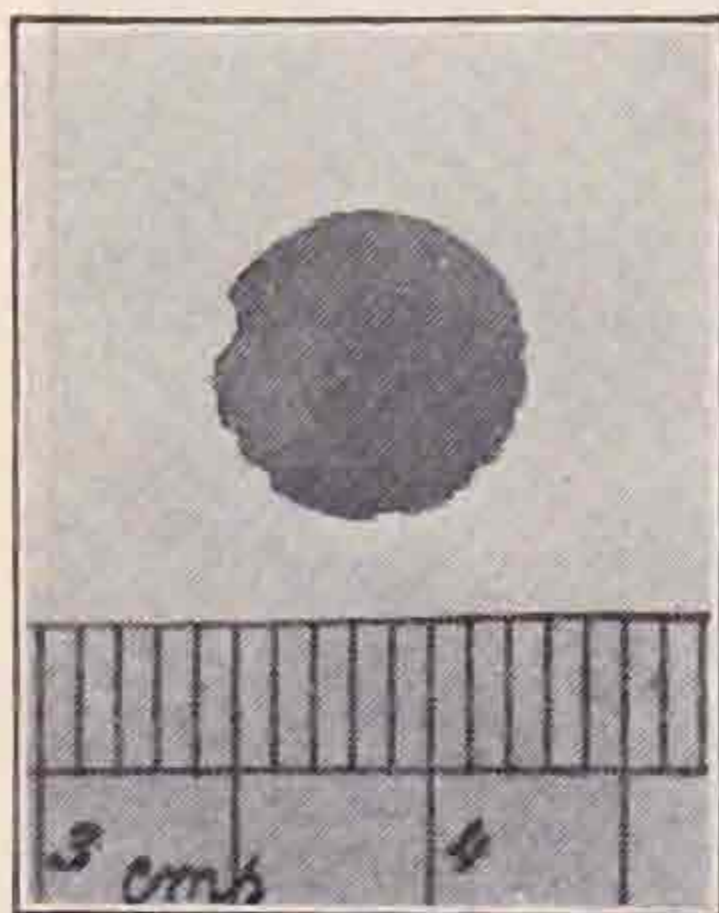


Fig. 10.
Crystal cracked by overloading.

Figs. 11a and 11b show the manner in which the crystal plate is cut from the actual crystal. The

position of the different axes is the same as in Fig. 5. The most suitable Tourmaline crystals are found in Brazil and South Africa.

The temperature co-efficient of Tourmaline oscillators is about 10 per cent. higher than the average for quartz. Repeated measurements in the region

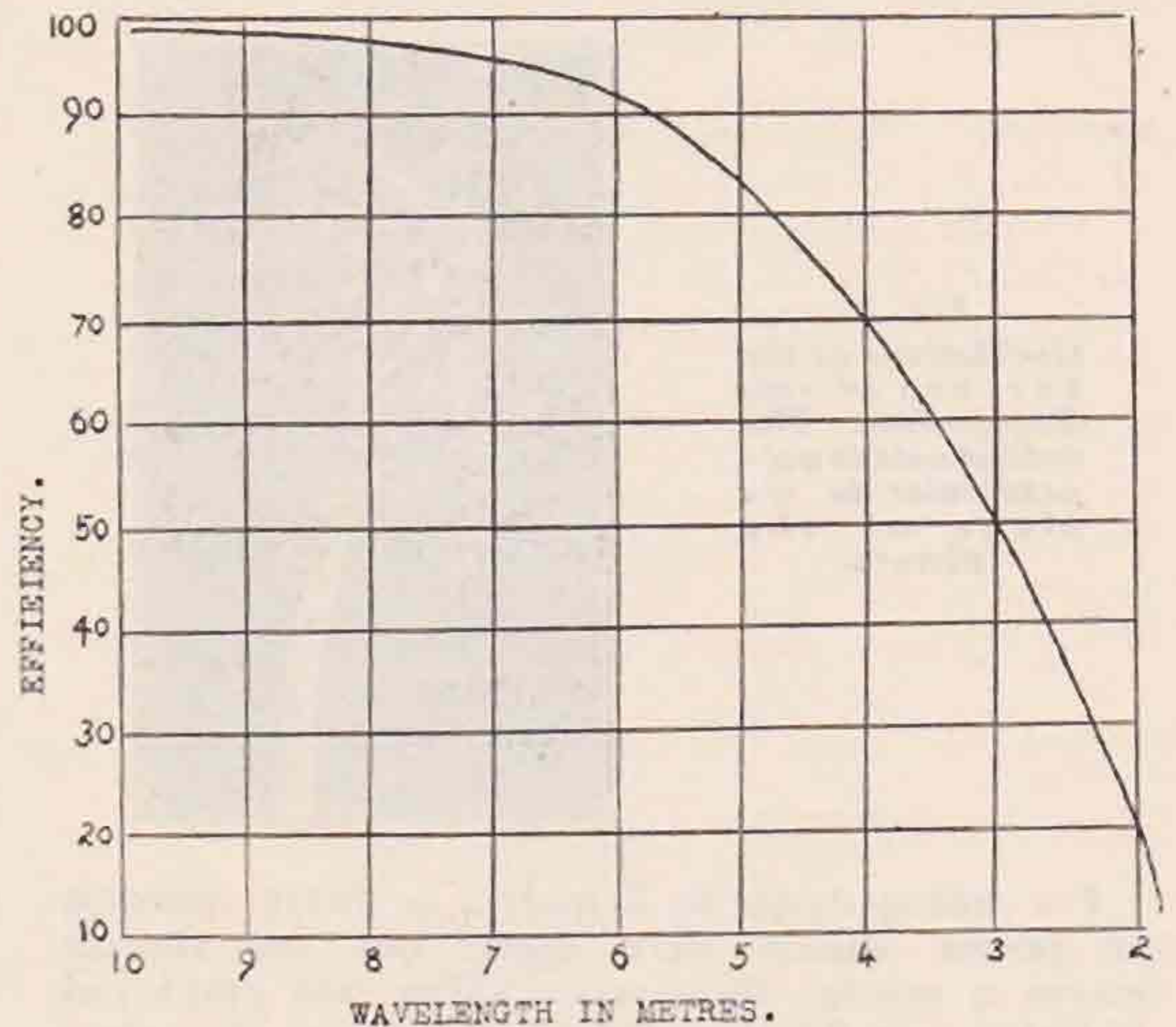
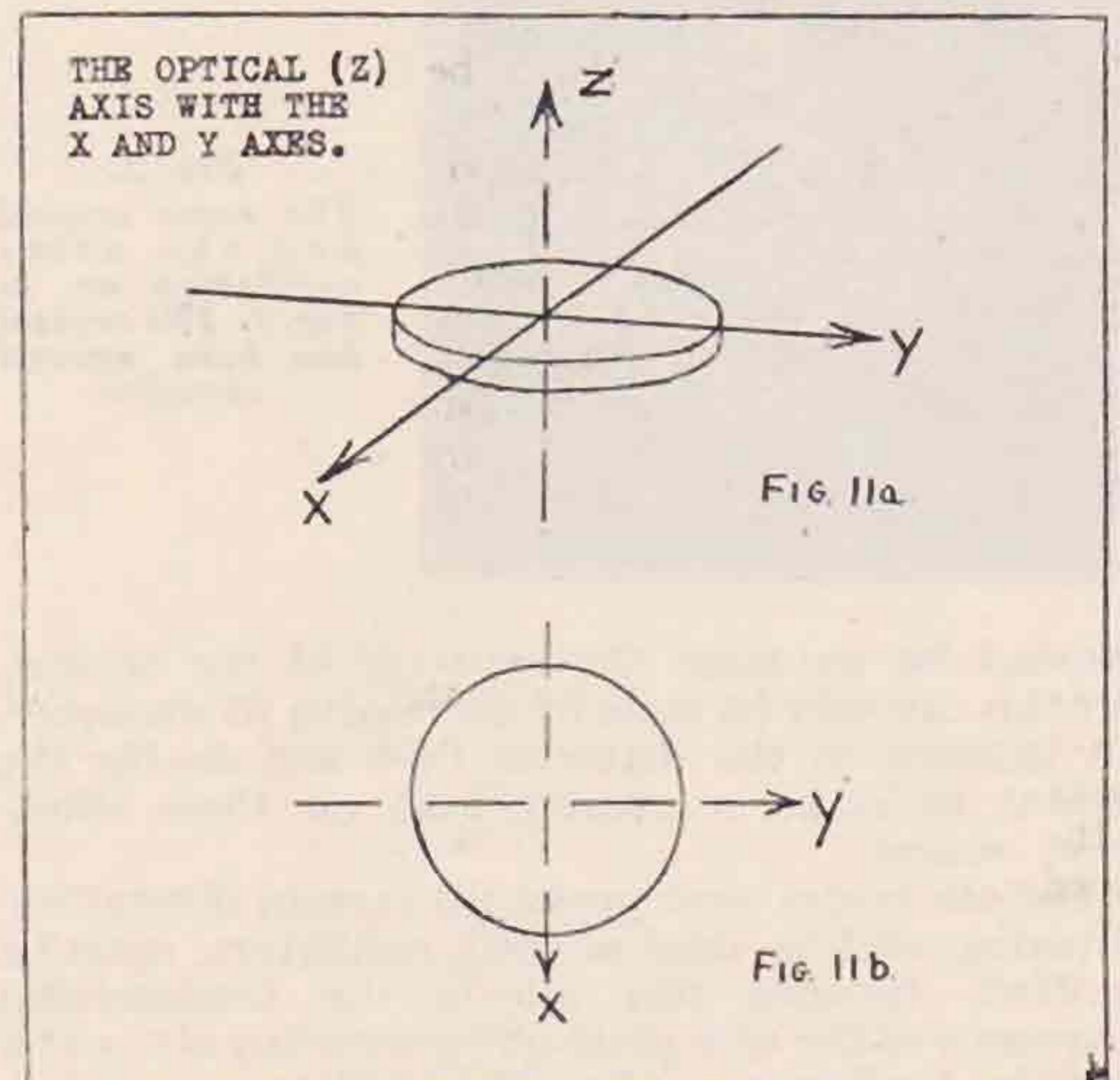


Fig. 9.
Performance of an RE 134 valve with Tourmaline oscillators of the same diameter, but for different wavelengths.

of 20° to 60° Centigrade showed this to be 46.6 parts per million per °C. For an accurately constant frequency one must use a thermostat, the cost of which is in no way comparable with the amount saved by the absence of frequency doubling and amplifying stages, and the simplicity of the installation.

For simple transmitters one can easily dispense with a thermostat because the frequency change of Tourmaline is always in proportion with the temperature.

The peculiarities of Tourmaline, described above, will doubtless be of interest to experimental and practical workers on the ultra-short waves.



In conclusion, I wish to offer my thanks to the firm of Carl Zeiss, of Jena, Germany, for their help in my experiments.

TOURMALINE.

By A. D. GAY (G6NF).

TOURMALINE differs considerably from quartz in its chemical composition. Quartz is pure crystalline silicon oxide (SiO_2), whereas tourmaline is a most complicated aluminium borosilicate containing variable amounts of ferrous oxide, magnesia and alkalis. Its formula is generally written as $(\text{H, Li, Na, K})_9 \text{Al}_3(\text{BOH})_2 \text{Si}_4\text{O}_{19}$ ($\text{Fe}_2\text{O}_3, \text{FeO}, \text{MgO}, \text{MnO}$). The specific gravity is between 2.94-3.24 and is therefore a little heavier than quartz. Its hardness is practically the same, lying between 7.0-7.5 (diamond 10.0).

Tourmaline crystals are rhombohedral-hemimorphic, the end-faces being differently developed, and upon this unsymmetrical formation depends its piezo-electric properties. The colour of the crystals is governed by the amounts of iron, etc., which enter into the composition, which is again dependent upon the source. For instance, green crystals are obtained from Brazil, grey-violet from Siberia, and yellow and brown crystals from Ceylon. The colour range extends from transparent white to jet black and may show great variation in colour in the same crystal.

Plates cut from the crystals are used in optical demonstrations of polarisation of light, and tourmaline tongs are well known for exhibiting this property.

Schorl, which is a variety of tourmaline, consists of aggregates of needle-like crystals and is therefore unsuitable for cutting into plates.

When a tourmaline crystal is slit parallel to the optic axis flaws are frequently found which have the same striated appearance of the crystal exterior. In cutting the crystals in the normal manner for piezo-electric purposes these flaws may not be apparent. It is generally accepted that flaws and occlusions in quartz crystals interfere with their ready response, but the writer has seen several instances where this has not mattered. Whether this applies to tourmaline also only experience can determine.

The crystals of tourmaline have a characteristic triangular shape with striated straight or curved surfaces. The coloured tourmalines are used by jewellers and are sometimes described as "Brazilian emerald," "Siberian ruby," etc.

Supplies of this mineral are obtainable through Messrs. Gregory & Bottley, Mineralogists, 30, Church Street, Chelsea, S.W.3.

The appearance of large crystals of tourmaline is generally jet black in colour, with a shiny surface on the principal faces. When plates have been cut from a crystal the transparency and natural colour is then exhibited. The price of suitable crystals is difficult to determine and depends upon the regularity and size. Small crystals of approximately 1-in. cross section are likely to cost considerably more than quartz.

Flash-Lamp Bulbs.

By G2WS.

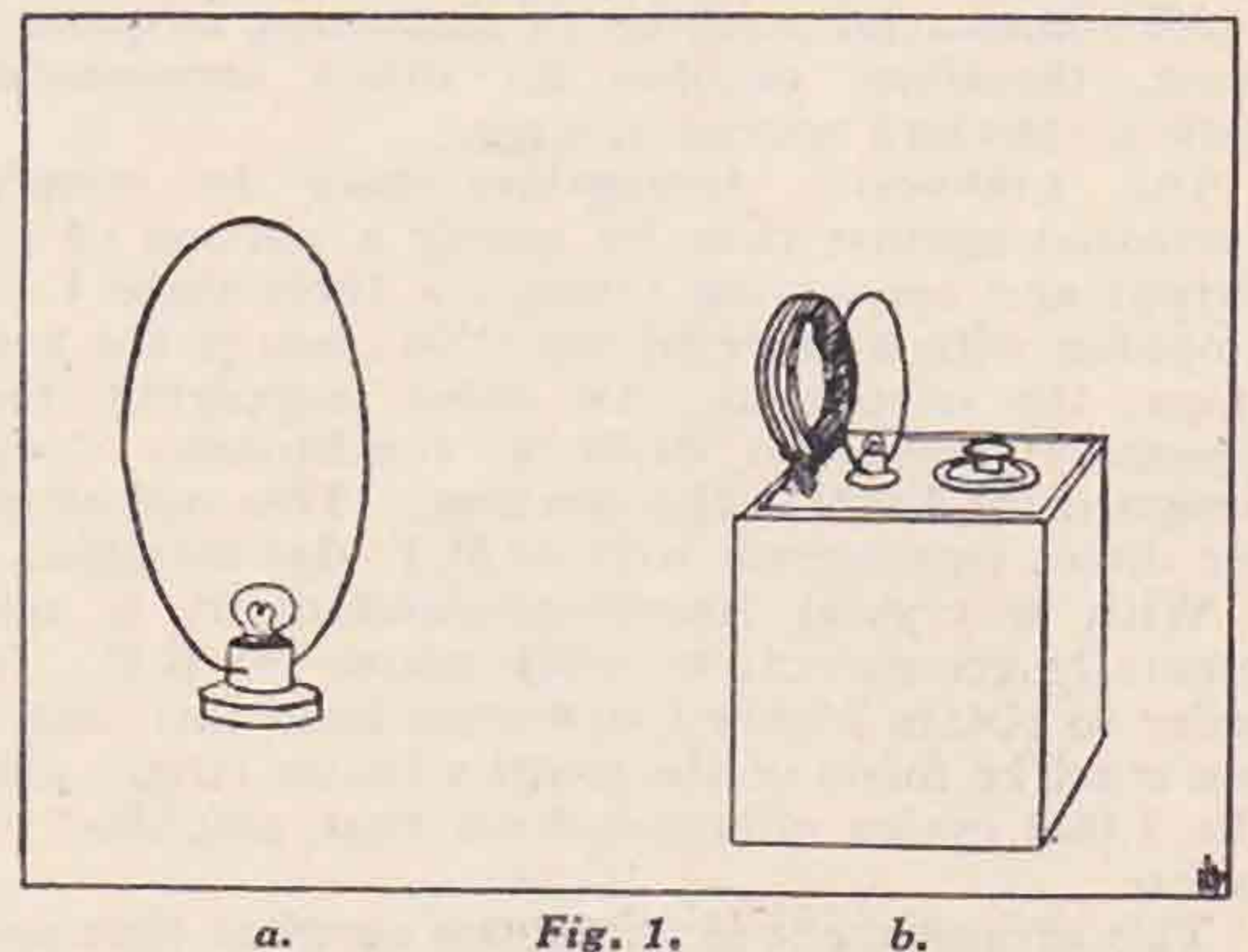
FLASH-LAMP bulbs and fuse bulbs are among the most useful little gadgets we have at our stations, and perhaps a word or two of advice about their use may be of value to the beginner.

Everyone is familiar with the single loop and bulb device (Fig. 1a) for detecting H.F. oscillation in a coil. For low-power work a 60 m.a. fuse-bulb may be substituted for the ordinary flash-lamp bulb. In tuning a circuit for maximum current by this means, the loop should always be placed as far as possible from the coil (so that the bulb glows faintly), as otherwise the loop may affect the frequency of the circuit.

A loop indicator is a useful addition to an absorption wavemeter, and should be mounted *behind* the wavemeter coil so that it is only affected by currents flowing in that coil. A useful arrangement of the meter is shown in Fig. 1b. Although not so accurate as the heterodyne wavemeter, this instrument has the advantage that it will only respond to the fundamental frequency of the circuit which is being tested.

For determining the distribution of current along an aerial or feeder wire, a bulb may be attached to two short wires terminating in crocodile clips (Fig. 2). When this device is clipped on to the aerial near a current antinode, the bulb will light up.

Flash-lamp bulbs form cheap substitutes for hot-wire ammeters in current-fed aerial systems. It is recommended, however, that fuse bulbs with a stated rating (such as those made by Bulgin) be



used for this purpose as they can be more exactly matched than ordinary flash bulbs. For accurate tuning of Zeppelin feeders, the bulbs should be inserted close to and at equal distances from the ends of the aerial coil.

A word of warning is necessary here. If bulbs are inserted in an aerial connected to a self-excited transmitter, they will almost certainly produce a
(Continued at foot of column 2, page 340.)

FREQUENCY MEASUREMENT WITHIN AMATEUR MEANS AND BANDS.

By A. D. GAY (G6NF).

The accurate measurement of frequency is very well looked after by the National Physical Laboratory and other institutions, but the amateur can spend some very interesting hours on the subject as well. Mr. Gay, G6NF, recently delivered a lecture at a Society meeting on the above subject and told us just how to make and calibrate frequency meters. The calibration can be done with the aid of an old pebble lens, even uncalibrated, and the assistance of a few well-known commercial stations.

IN taking the above title for this lecture it was considered that only a short summary of methods in use at commercial stations need be described. First, because the methods are generally complicated; and second, very costly apparatus is usually employed. The complications are necessary however in order to obtain precision measurements. Precision measurements are determined within 1 cycle per second by heterodyne beat methods, and altogether different matter to making measurements within 0.1 per cent., which is all that the amateur requires. The principles and apparatus are of general interest, however, so that a brief description will be given.

Commercial Practice.

The measurement of frequency is bound up in the determination of rate of recurrence of certain vibrations during a definite time period. Time, therefore, or the rotation of the earth, is our fundamental basis of frequency. The rotation of the earth is conveniently divided up into various specific intervals, hours, minutes and seconds; the latter interval being the usual basis of comparison for measurement purposes, the change being expressed in frequency in cycles (or kilocycles=1,000 cycles) per second.

All commercial methods of measuring frequency must, therefore, provide for direct comparison with a standard source of time.

The 1,000-cycle tuning-fork may be simply compared against time by taking a portion of its output and amplifying through a three-stage L.F. amplifier with a valve of the PX4 class in the last stage, the output of this valve supplying the necessary power to drive a synchronous clock designed for 1,000 cycles working. This will allow for direct comparison with G.M.T. dot seconds.

With a crystal frequency-standard it is not generally economical to work above 50 K.C. In order to obtain higher frequencies from this source use must be made of the multi-vibrator circuit and the 1,000 cycles obtained from that amplified as before.

This arrangement is about the simplest that can be obtained for direct comparison with time. More elaborate systems are in use which depend upon recording impulses upon paper on a chronographic drum or upon a tape, the impulses being recorded side by side with time impulses.

Standards of Frequency.

Two standards of frequency are in common use at the present time—the tuning-fork and the piezo-electric oscillator.

The tuning-fork is now constructed of elinvar steel, developed by the late Dr. Dye, of the N.P.L. The temperature co-efficient of this steel is around 5 parts in 10⁶, and in order to make this variation negligible, the fork is maintained at an even temperature by means of thermostat control. The tuning-fork is generally adjusted to a frequency of 1000,000 cycles per second at 760 mm. pressure and a temperature of 30° or 50°. These constants are fixed according to the final location of the fork, as naturally a temperature of 30° C. would be unsuitable for a country whose peak temperature was above that temperature.

The valve maintaining the tuning-fork in oscillation is coupled to a low-frequency multi-vibrator

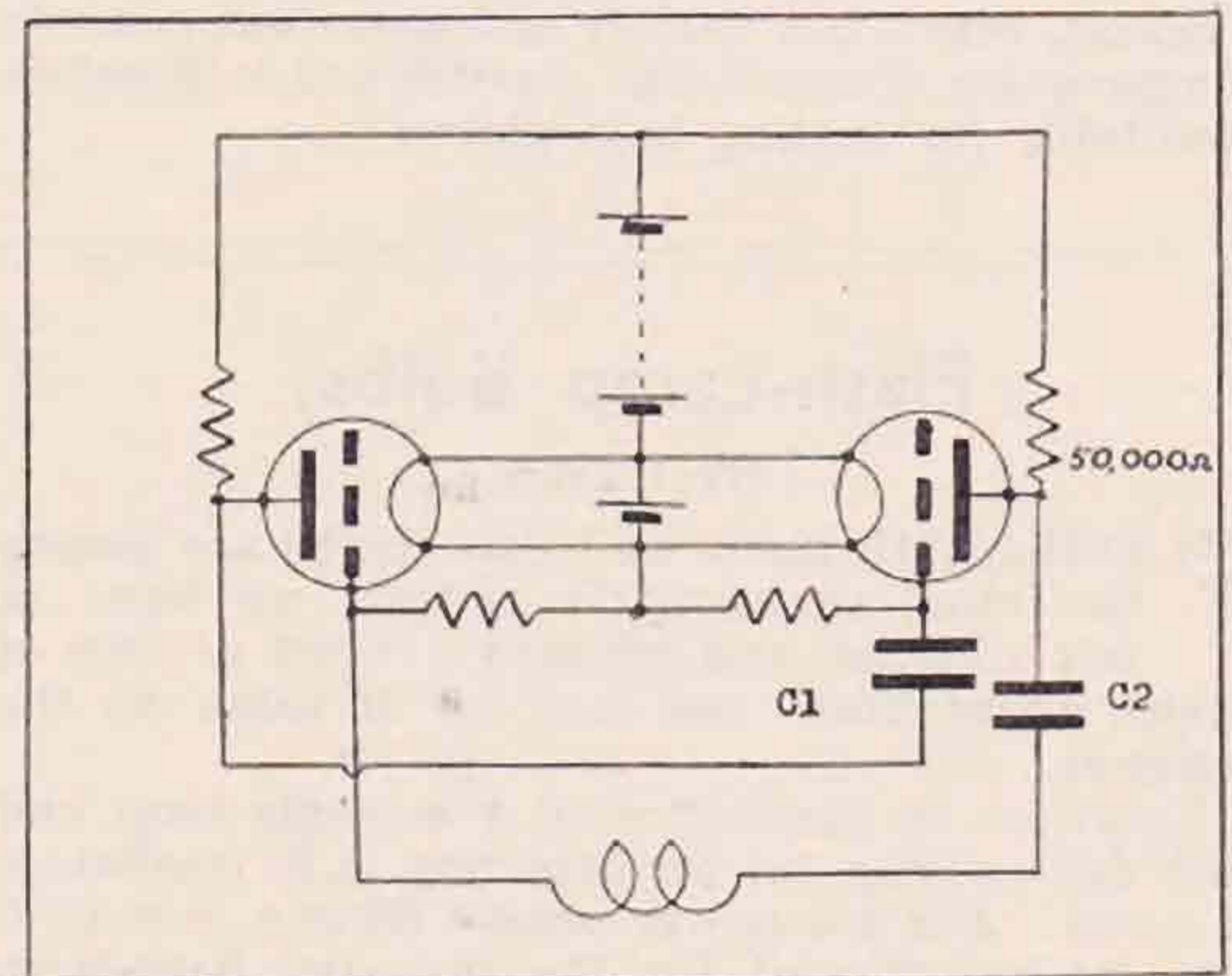


Fig. 1.
Abraham Bloch Multi-vibrator Circuit.

$$n \text{ (frequency)} = \left(\frac{1}{C_1 + C_2} \right) R$$

circuit, the output of which by means of a harmonic selector circuit is fed into another multi-vibrator circuit working on higher frequencies, the whole being carefully shielded.

Multi-Vibrator Circuit.

The multi-vibrator circuit developed by Abraham Bloch consists of a resistance-capacity coupled amplifier which has its output coupled back to the input by means of condensers, the result being that violent oscillation sets in which is determined by the values of R and C and, what is more important, by the influence of a small harmonic voltage in the anode circuit of the multi-vibrator. This small

voltage is able to hold the valve in oscillation within 4 per cent., providing the natural frequency of the system is near the input frequency. It would appear that this circuit was to be the forerunner of our present-day Goyder-lock system. Dr. Dye in *Phil. Trans. Roy. Socy.*, 1924, Vol. CCXXIV, p. 259, describes important work on this circuit.

It is impossible to give more than a brief description of this important circuit, and anyone desiring fuller information is referred to the original paper, *Annales de Phys.*, 1919, Vol. XII, p. 237.

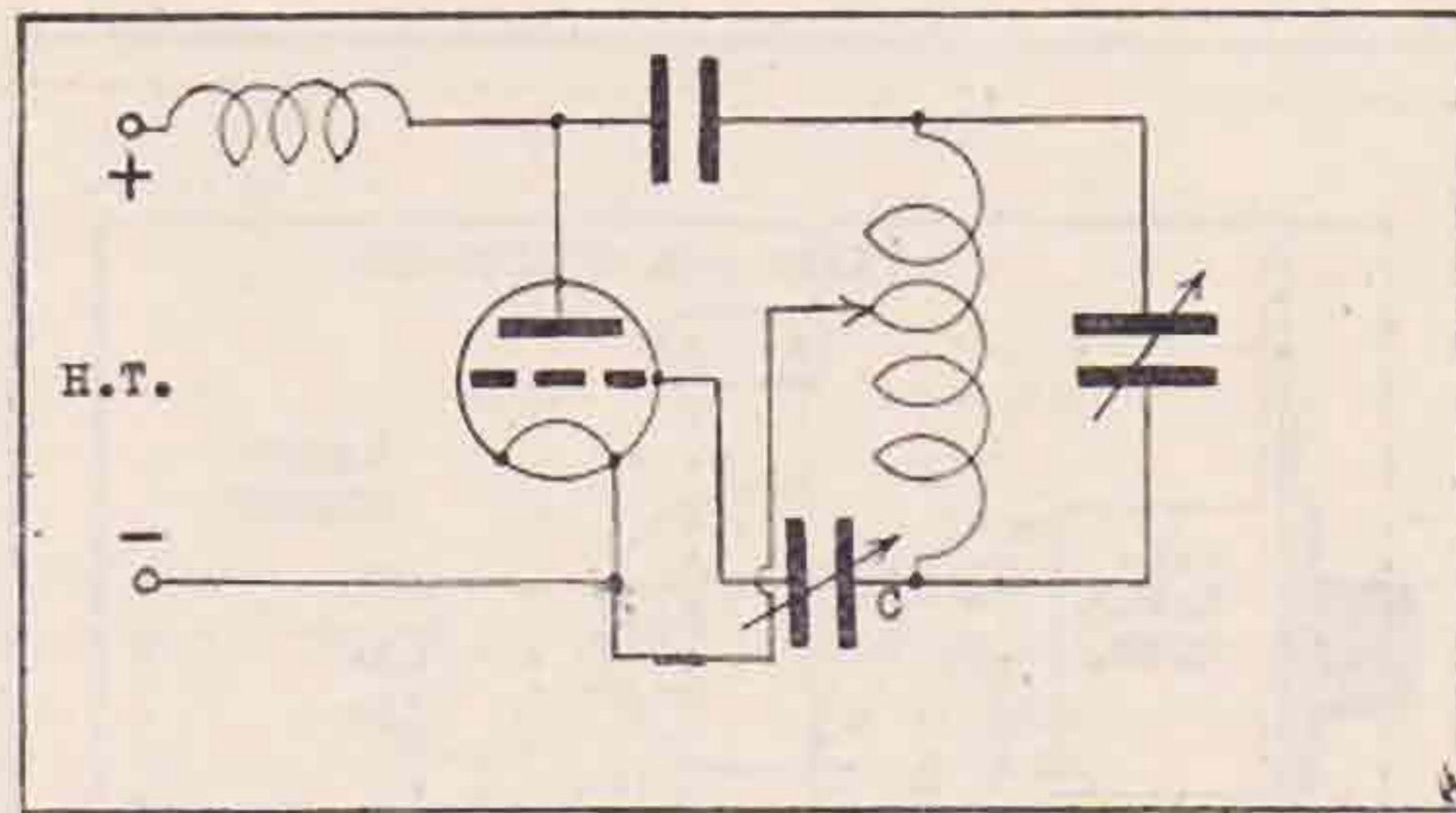


Fig. 2.
Balanced Hartley Circuit.

The Piezo-Electric Crystal Frequency Standard.

The properties of quartz crystals and their capability of maintaining oscillations in a valve circuit being so well known, only a description of the methods of ensuring stability is necessary. There are several factors influencing the stability of crystals. Temperature, humidity, applied voltage to valve oscillator and type of valve and circuit used are the most important.

The Lucas-Sullivan 50 K.C. frequency standard is one of the best-known frequency standards, consisting of a bar of quartz mounted between long electrodes with an appreciable air-gap. The electrode system is sealed in a glass tube and evacuated. The temperature co-efficient of this type of oscillator is within 5 parts per million, which is characteristic of all lengthwise oscillation quartz when cut correctly. In order to ensure temperature stability the same precautions as regards thermostat control can be taken. In the specification the crystal is connected between grid and filament of an LS5D valve, the output of this valve being passed on to the usual multi-vibrator circuit.

The crystal has certain advantages over the tuning-fork, inasmuch that its output is in the high-frequency range and needs little amplification. The tuning-fork is more rugged, of course, but the ultimate standard of frequency in this country will probably be a crystal cut from a ring with compensating temperature co-efficients. Dr. Dye was experimenting with such a system of 10 K.C. fundamental frequency last year.

Whatever system is used, it is obvious that the harmonics produced are all a definite frequency apart, and they may be secured either 10 K.C. or 1 K.C. apart according to the type of multi-vibrator in use. A calibrated condenser associated with an independent beat oscillator completes the

equipment for the measurement of frequency within 1 cycle per second.

Having briefly described how responsible frequency measurement is carried out, we are now in a position to contemplate how an amateur may set about constructing some reliable apparatus for himself.

Calibration Oscillator.

The first essential is a calibrated oscillator which may be a Dynatron frequency meter or a Triode frequency meter with a tuned grid and high C/L ratio plate coil, or even a Triode with a Hartley circuit. The latter circuit has disadvantages owing to hand capacity, although one advantage is that centre-tapped coils may be used. An interesting version of the Hartley circuit frequency meter is shown in Fig. 2. C consists of a semi-variable condenser which is adjusted for minimum grid current in circuit. When this adjustment has been made, variations in battery voltages of even 25 per cent. make no appreciable difference to the frequency of the circuit.

The Numans oscillator circuit described in *Experimental Wireless*, December, 1924, and using an ordinary 4-electrode valve, is another negative resistance device. It is used by G5IS in a frequency meter and appears quite constant (Fig. 3).

When an ordinary reversed feed-back Triode is used the grid and plate coils may be wound together in the same groove. This method of construction eliminates battery variation defects. A more satisfactory method is to wind the two coils solenoid fashion, spaced about 1 in. apart. This type of coil will give less variation with temperature changes.

The former for the coil should be of thick-walled Keramot, with bakelite end pieces carefully and

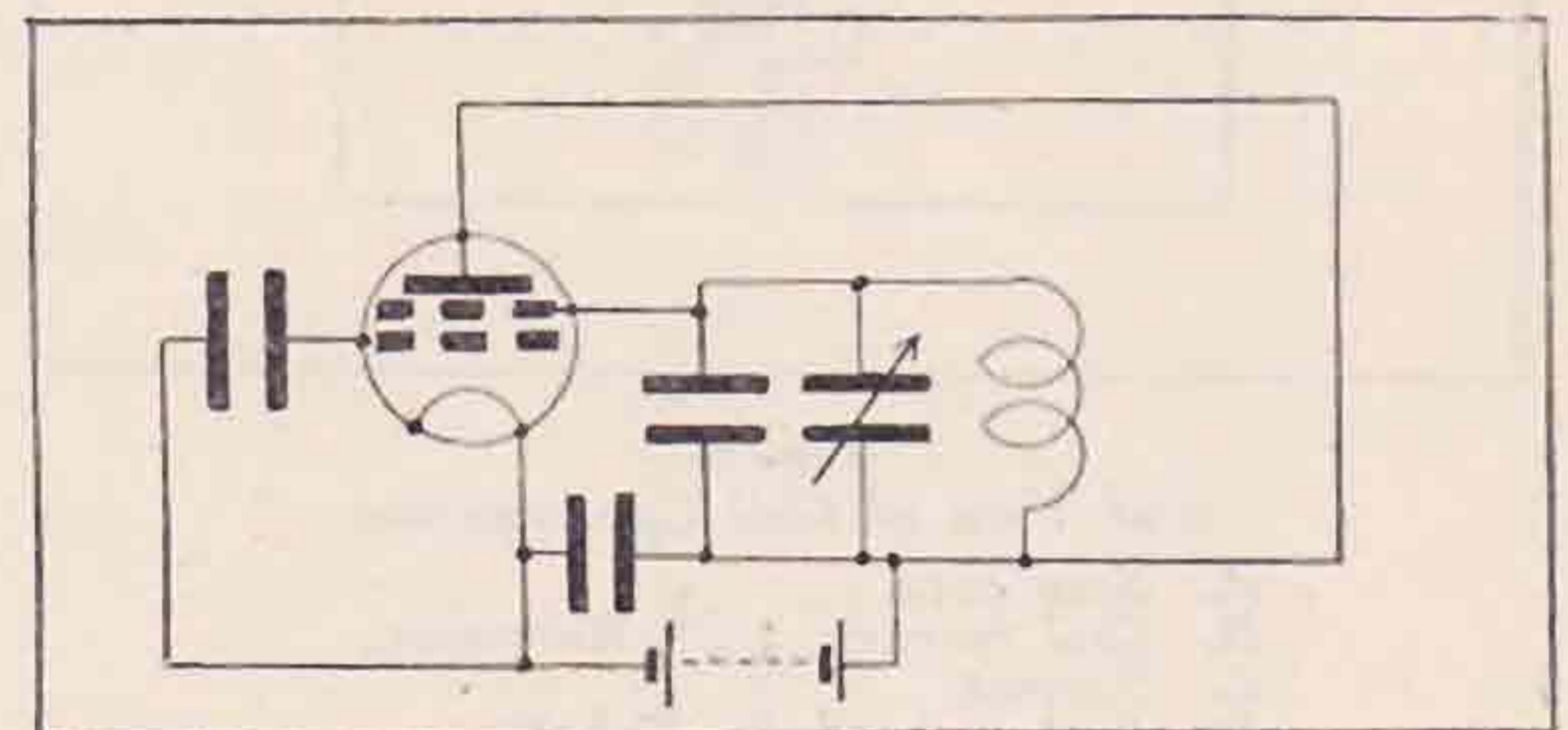


Fig. 3
Numans Oscillator.

solidly screwed together, as in Fig. 4. W. H. F. Griffiths has described in *Experimental Wireless*, October, 1929, the construction of coils of negligible temperature co-efficient, and it is in this article that it is pointed out that the use of other materials introduces serious temperature errors.

Having constructed a good coil for the frequency meter, a good variable condenser should be selected. One with substantial bearings should be chosen, and the Cylton receiving or transmitting or the Igranic transmitting condenser fulfil these requirements. A value of 300 mmfd. will be suitable with a lumped capacity of the same order and ample 3.5 M.C. band coverage attained.

Both the lumped capacity across the variable condenser and the plate coil should preferably be of air dielectric, although good mica dielectric

condensers, well clamped to prevent expansion changes, are almost as suitable.

With selected components the construction should be commenced with stout wiring of 16-18 S.W.G., the heavier the better, and due care is taken to have all wiring well spaced and as rigid as possible. A suitable arrangement is shown in Fig. 5.

The Dynatron frequency meter is well known, and several articles have been published in QST regarding its construction. It depends upon the negative resistance characteristics of the screened-grid valve, and its stability can be ensured by keeping the space current constant at some pre-determined value. Owing to the fact that only a single-layer coil is needed for this type of oscillator and other stability factors, it has much to commend it. In order to obtain strong oscillations the tuned circuit has to be of high impedance, therefore high C values are not permissible. Furthermore, valve life under Dynatron conditions is said to be short. The Dynatron frequency meter circuit is given in Fig. 6.

Whether a Triode or Dynatron frequency meter is constructed, care must be exercised in selection

switching on, whereas another make of valve of the same class which employs a different type of electrode construction took much longer and the degree of frequency drift was much greater. The S4V is a suitable type of valve for use in the Dynatron frequency meter, and there are probably many others which are equally suitable. These heavy filament current consumption valves take a considerable time to reach stability.

When the construction of a frequency meter is completed it should be adjusted to cover the 3.5 M.C. amateur band. This being done, and the valve

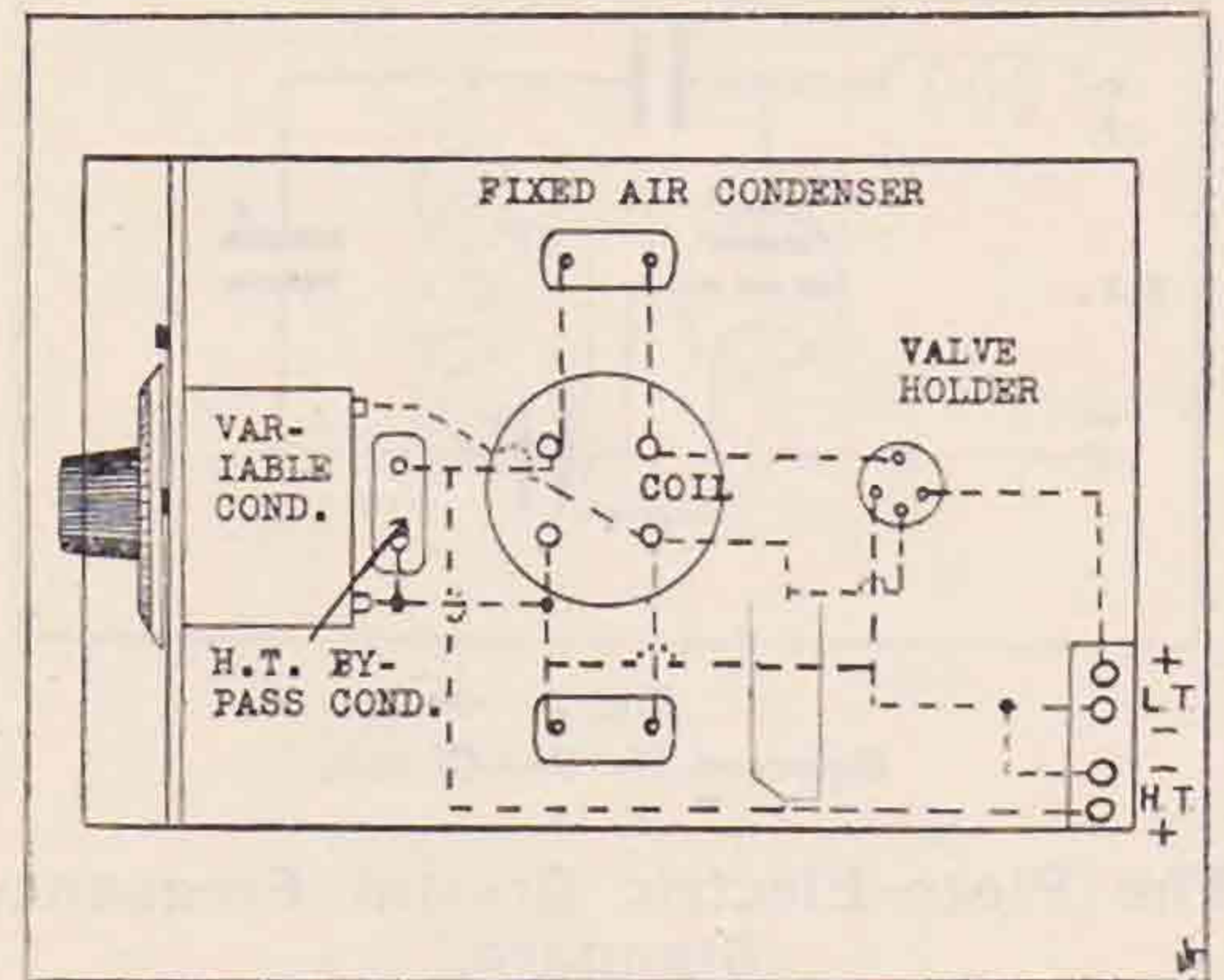


Fig. 5.
Frequency-meter Layout.

heated for a sufficient time to reach stability, a rough calibration curve should be plotted. The time required to reach stability may be estimated by beating against a crystal oscillator which is running under low-voltage excitation. The points for the initial calibration may be obtained by heterodyning the various commercial stations, which are known to keep within their allotted frequencies, and heard on 7 M.C., 10 M.C., and 14 M.C. G5YK and G2NM will supply further points within the amateur band.

Having obtained a number of reliable points, the next step is to draw a curve, and here great care must be exercised. Unless the adjacent points are correctly linked up serious inaccuracies will occur. A flexible curve will facilitate the completion of this somewhat difficult task.

An Amateur Frequency Standard.

The second essential is a frequency standard which may be either a calibrated or an uncalibrated 100 K.C. crystal. If calibrated, the frequency must be given within at least half the accuracy with which it is desirable to make measurements. That is, if it is required that measurements must be made within 0.1 per cent., the frequency of the crystal must be known within 0.05 per cent.

An accurately cut crystal will oscillate on frequencies governed by its three dimensions: length, breadth and thickness. If an oblong crystal is tried in an ordinary circuit, three frequencies may be obtained quite easily, and supposing the dimensions are 40 mm., 25 mm. and 1.5 mm., we may, by using suitable coils in the plate circuit, obtain frequencies of the order of

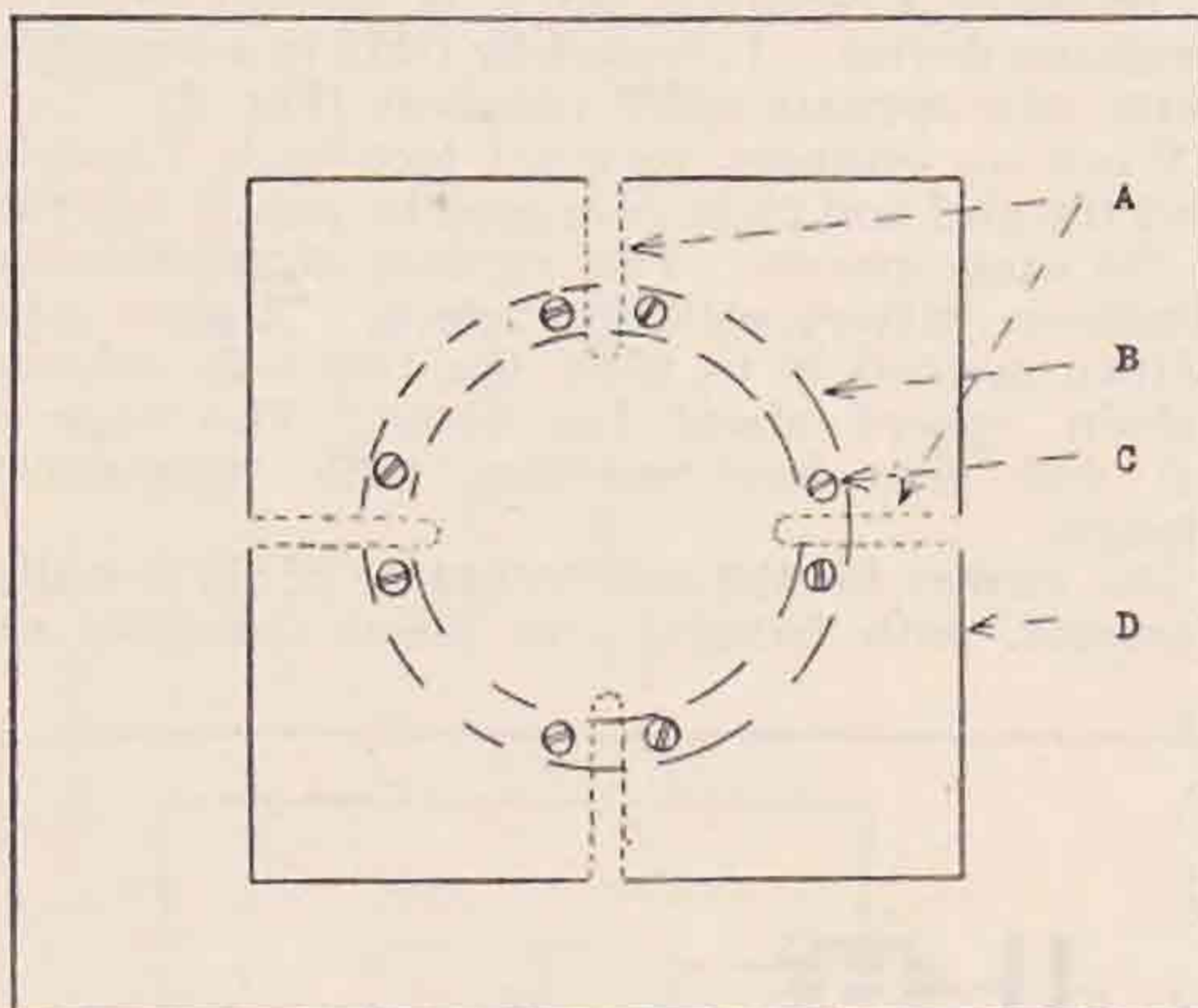


Fig. 4.
End View of Coil Construction.

- A. Saw cuts.
- B. Coil former, $\frac{1}{4}$ in. Keramot.
- C. Screws.
- D. End piece, $\frac{1}{4}$ in. Bakelite.

of a suitable valve. Any valve of the Mullard PM type will make a good Triode oscillator, although the LS5 thoriated tungsten type is more stable regarding emission. The latter types of valve, owing to the heat dissipation, will take longer to reach constancy, and a frequency drift of 1,000 cycles when starting up from cold is quite common. An LS5 will take from 8-10 minutes to reach a constant value. It is interesting to note, however, that these valves have quite a low inter-electrode capacity of constant value. When six different valves of this class were tried in the same circuit the frequency only varied by approximately 1,000 cycles. The PM type of valve has a much higher inter-electrode capacity. Only two valves of this class were tried and the frequency variation was of the same order as the LS5. The PM type of valve only takes a few minutes to reach stability with a drift of but a few hundred cycles after

80 K.C. (4,200 λ), 120 K.C. (2,625 λ), and 1,800 K.C. (157.5 λ), as the ratio of wavelength to size=105 metres per mm., with X-cut crystals.

A square or a circular crystal can only be made to oscillate on two frequencies. Almost any commercial square crystal will be found to oscillate on approximately 120 K.C., as well as its normal nominal frequency. Some circular plates will also be found to oscillate near this frequency, but not so readily as the square ones. Certain ordinary pebble spectacle lenses are also ready oscillators on 100 K.C. as their width is about the correct measurement for this frequency. Specimens have also been found which will oscillate at a frequency corresponding with their length.

For the purposes of frequency meter calibration a crystal of this low order of frequency is ideal. It will give harmonics at every 100 K.C. interval, and if the oscillator is coupled through a small capacity to the 14 M.C. receiver and the frequency meter made to beat against these high-frequency harmonics, we shall obtain calibration points at every 25 K.C. interval.

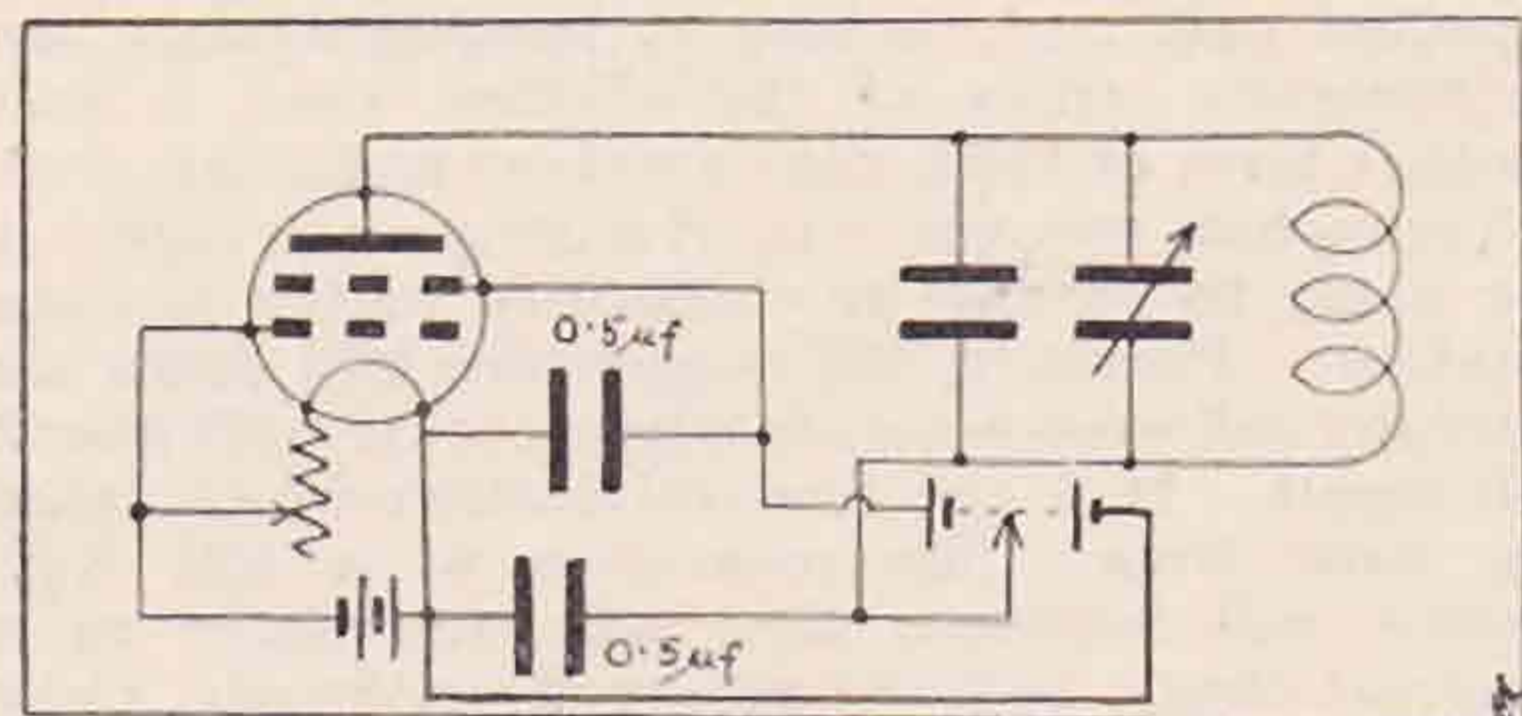


Fig. 6.
Dynatron Frequency-meter Circuit.

The use of several crystals (5) operating on their thickness vibration (900-700 K.C.) was at one time the standard method of checking the R.S.G.B. frequency meter, their harmonics giving points spread over the 3.5 M.C. band. This method was somewhat arduous, considering the frequency meter had to be checked each time it was used, and in order to obtain a good average figure several crystals had to be changed every time this was done. Furthermore, the temperature co-efficients of crystals vibrating on their thickness is sometimes of a high order. With accurately cut quartz the temperature co-efficient lies in the region of 20 parts in 10^6 per degree C. for thickness vibration, whereas quartz cut along the optic axis may have a temperature co-efficient of a much higher order: 80 parts per 10^6 has actually been recorded at the N.P.L.

With transverse oscillators (100 K.C. bars) the temperature co-efficient is usually of a much smaller order. With accurately cut quartz the figure rarely exceeds 5 parts in 10^6 , a figure which almost makes temperature control unnecessary. For amateur requirements the variation is absolutely negligible.

It will be seen, therefore, that a crystal properly mounted and vibrating along its length will provide a large number of harmonics of an exceedingly high accuracy, even with a room temperature variation of 10° C., and the production of such crystals is already in the hands of certain crystal-cutting firms who will no doubt supply them in

suitable holders and calibrated. The calibration of these crystals presents certain difficulties as they must be taken to an accuracy of at least 100 cycles to be within 0.1 per cent. The writer has had two measured with Sub-N.P.L. apparatus and found that the methods employed, although tedious, gave an accuracy within 20 cycles of their actual figures as determined by the standard multi-vibrator. I should here like to record my thanks to Mr. Lucas, A.M.I.E.E., for this assistance.

Calibration of Standard Crystal.

For the purposes of this experiment four pebble lenses, which gave good oscillations around 100 K.C., were selected with nicely separated fundamental frequencies. These were first obtained within 1 per cent. with the aid of an ex-Government heterodyne frequency meter (frequency range 80-200 K.C.).

In the case of an amateur who has only the roughly calibrated 3.5 M.C. frequency meter, the harmonics on the 3.5 M.C. band are each separately heterodyned and the mean of the separate frequency differences will represent the approximate frequency of the crystal.

Then, by listening to each of the reliable commercials, GBW, GBP, WNC, WQP, etc., etc., it is

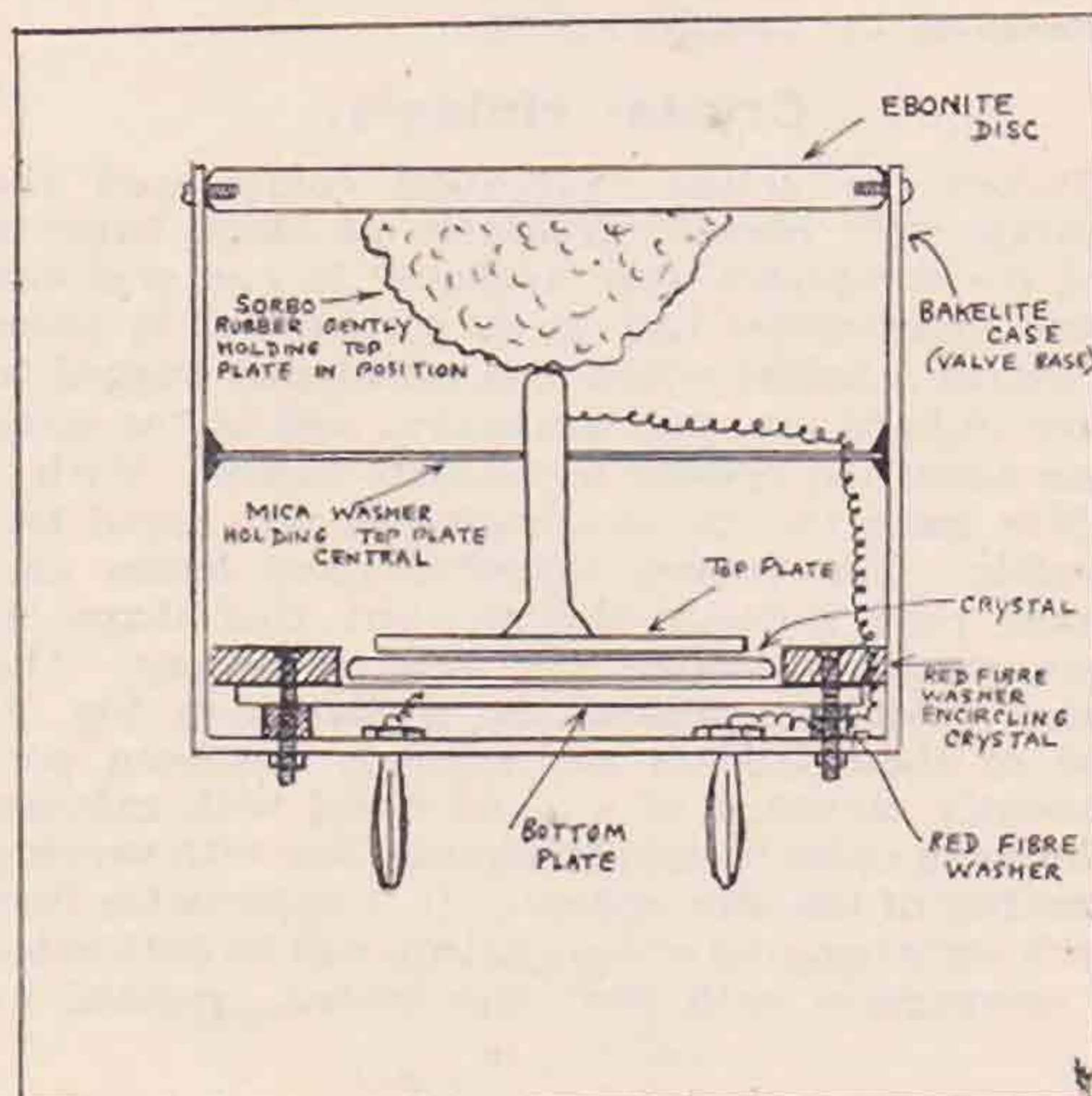


Fig. 7.
Crystal Holder.

probable that a harmonic will be found which is heterodyning one of these; the beat note if only estimated audibly, or by comparison with a piano, will give a check on the frequency of the crystal within 1 part in 10,000 or 0.01 per cent., which is ample for amateur purposes.

By calculation it will then be possible to reach an accurate determination of the fundamental frequency of the crystal.

It should here be mentioned that the type of valve used in the crystal oscillator should never be changed without recalibration. An instance of variation in this respect between a DE5 and an AC/HL made more than 1,000 cycles difference on the 3.5 M.C. band.

These selected crystals were then separately tested for their temperature co-efficients and all

found to be negligible (within 5 parts per million negative) over a range of 10-20° C. Four crystals were selected in order to have inter-crystal harmonic relationships to enable a check on the absolute constancy to be occasionally taken. With a large number of harmonics available the chances of having several which would beat against commercials of known accuracy was much greater. The value of this was afterwards borne out by experience. Harmonics were found which did actually beat against stations which were known to have a constancy of at least 5 parts in a million—GBP, GBM, GBW, etc. Furthermore, harmonics of each crystal were found which would beat against harmonics of each other crystal, thus when the fundamental of one crystal was known, the others could be directly calculated. This was ignored at first, and in order to give a double check and so as not to leave anything to chance, each fundamental frequency was determined separately. The resultant figures were most interesting and checked up quite accurately. As previously mentioned, two crystals calibrated by this system were subsequently calibrated by means of a Lucas-Sullivan multi-vibrator system of N.P.L. accuracy of a few parts in a million; in each case there were less than 20 cycles variation, which might easily have been occasioned by transportation.

Crystal Holders.

Before the actual calibration commenced the crystals were placed in holders of black bakelite and the top-plates were anchored in one position. Some experiments had to be carried out in order to evolve a holder which was sufficiently rugged to allow of hard use, transport, etc., and at the same time allow the crystal to oscillate easily. With a pebble lense the use of an air-gap was found impossible. The convex shape of these lenses also makes rigid holding difficult, but this shape to some extent mitigated the lack of air-gap. The sealed holder in present use is shown in Fig. 7. One of these holders and crystals has been permanently mounted in a glass vessel with calcium chloride in order to maintain constancy with varying humidity of the atmosphere. It is improbable that much variation of a serious nature will be noticeable in comparison with the unprotected crystals, at

least not within the accuracy of amateur measurements, but having a crystal mounted in this form gives an additional feeling of security.

Conclusion.

No mention has been made of the absorption type of frequency meter because this type of instrument is inadequate for accurate amateur frequency measurements for several reasons:—(1) Difficulty of accurate calibration; (2) importance of maintaining coupling constant; (3) unless used with an extremely sensitive indicating device only accurate at best within 0.25 per cent.

It is hoped that the foregoing descriptions will have sufficed to explain some of the necessary fundamentals for accurate working, at least within 0.05 per cent. accuracy. The possession of an instrument of this degree of accuracy is within the means of almost every amateur, and the use of such an instrument an additional delight to the well-operated station. To arrange a schedule on a frequency basis and tune the frequency meter to approximately that frequency and await the expected call, and to hear it beating against the instrument's carrier at the allotted time, is just another form of thrill that amateur radio can give.

The actual construction of a frequency meter is not likely to present any difficulty to the average amateur. Providing the suggestions laid down are carefully followed a constantly accurate instrument will result. It is the final calibration which takes the most time. The possession of a 100 K.C. crystal will facilitate this task and serve as a constant check, and as mentioned previously, these are available from various crystal-cutting firms at a reasonable price. G5YK is giving a calibration service on the first Sunday of each month. This consists of four points on the 3.5 M.C. band and should help amateurs considerably in getting their curves into shape.

In conclusion, it is desirable to explain that the work undertaken and outlined in this paper has taken practically the whole of my spare time during the last three months. It has been most engrossing and the time is not begrudged, as it has been the means of providing an amateur calibration service for the Society which should be as accurate as any in Europe.

R.S.G.B. AND N.P.L. CALIBRATION SERVICES.

R.S.G.B. Calibration Services take place from (1) G5YK (Cambridge) on the first Sunday in each month, commencing at 09.30 G.M.T. (or B.S.T. if in force) in the 3.500 K.C. band, and (2) from G2NM (Sonning-on-Thames) on each Sunday at 11.00 and 23.00 and Thursday at 23.00 G.M.T. (or B.S.T. if in force) in the 3.500 K.C. band.

The N.P.L. Service is given on the first Tuesday in March, June, September and December from G5HW at 21.00 G.M.T on 1,785 K.C.

Full details of all these Services were published on page 259 of the February issue.

"T. & R. Bulletin."

JAN.
1932

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STATION DESCRIPTION No. 24.

G2DZ

BY THE COUNTY REPRESENTATIVE.

G2DZ, owned and operated by Basil Hall, is situated at 25, Coombe Gardens, New Malden, Surrey, ten miles south-west of London.

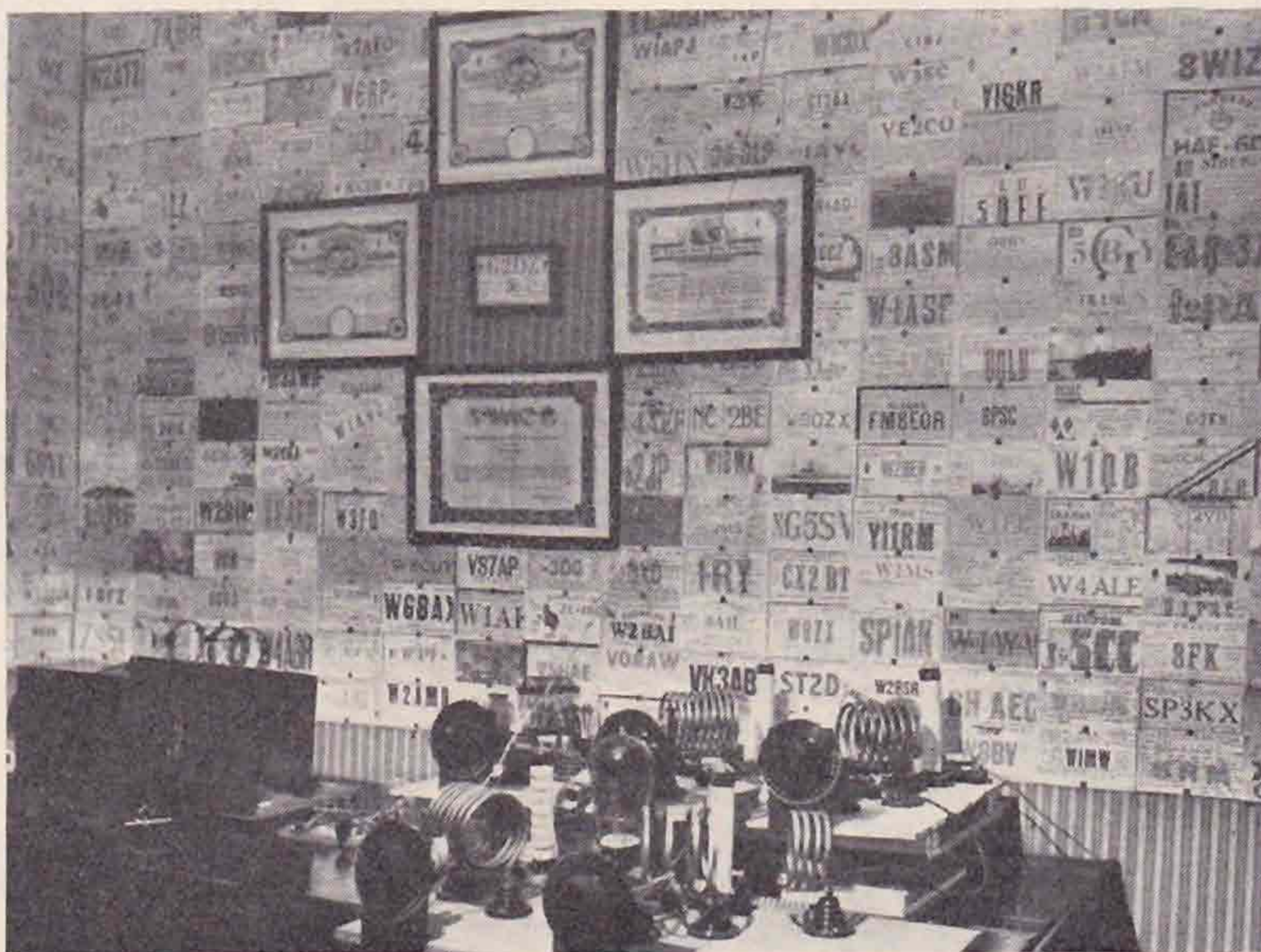
On entering the shack, one is at once struck with the neat, clean, and business-like lay-out of the station. This neatness does not interfere with quick adjustments, but rather helps, as owing to the entire absence of "haywire," everything is easily accessible.

The station was first on the air in July, 1929, when the operator was only 17 years of age, and during the first day had contacts on both 7 and 14 M.C. bands. The first transmitter consisted of an ultraudion circuit with tuned grid, using an LS5

local 28 M.C. QSO's were also had with the same aerial.

About this time it was found a rather expensive job working with batteries (most of which worked overtime), so a 600 v. 30 M.A. Marconi hand generator was obtained, but oh! what a rate that handle had to be turned. However, two dry batteries were put in series with the output and 400 v. 30 M.A. could be obtained by turning the handle quite slowly. February 9, 1930, was a red letter day, as by working OA4L W.A.C. was obtained.

Then came the summer, and it was found that summers and hand generators did not go well together, and that one felt anything but frisky after



valve supplied with 300 volts from dry batteries. The antenna was current-fed, having two flat tops of 16 ft. 6 in. with 33 feet feeders. During the first month of operation 23 countries and four continents were worked, including 1st, 3rd, and 8th W districts.

On January 19, 1930, VK and ZL were worked for the first time, getting R5 and R4 respectively. During the afternoon of this day the first 28 M.C. QSO was made, using an input of 3 watts, the low power being used, owing to the operator having grave fears for his one and only LS5.

Three days later (January 22), a voltage fed aerial 66 feet long was erected, and tapped straight on to the plate coil. With this aerial the first call on 14 M.C. produced a QSO with VE5AO at Cape Hope's Advance, Hudson Strait, while on 7 M.C. W's were worked, thus proving the efficiency of this aerial for both bands. At a later date numerous

about a couple of hours. As a result of this mains were laid on and during this time a 50-watt permit was obtained. A full wave rectifier was constructed giving 500 v. to the LS5 with A.C. on the filament. At this time the operator was at sea and only home four days every three weeks, so that very little time could be put in at the key and from November, 1930, till May, 1931, the station was closed down altogether, owing to a six months' world cruise.

On returning home in May, 1931, it was decided that the station should be crystal controlled, and a transmitter was constructed similar to that described in the March, 1931, "Bull" by G5YK, viz., C.O. 2 FD's and neutralised P.A. using a Mullard D.O. 40 in the P.A. stage. This change, of course, necessitated the use of a separate rectifier, so that the old one was used for supplying juice to the C.O. and FD's and a new one constructed to feed the PA.

A "Windom" aerial was now put up and found to be excellent on 14 M.C. but of little or no use of 7 M.C.

The output from the neutralised P.A. was thought to be unsatisfactory, as on doubling the plate voltage the increase in R.F. output was barely noticeable, while the DO/40 got very red in the face. As a result it was decided to give Goyder Lock a trial, so that a new transmitter was constructed which is still in use, and is the one shown in the photograph. At the back, from left to right, we have the C.O. 1st F.D. and 2nd F.D., while in front is the P.A. with a 4-turn coupling coil from the last F.D. This gave much more satisfactory results, as on 500 v. the output was far greater than the neutralised job, and on 1000 v. the output was more than doubled. Conditions were not good for D.X. but all continents were worked except South America, which was not even heard. As the Windom aerial was found almost useless on 7 M.C. it was necessary to go back to a 68 ft. AOG. With this aerial D.X. on 14 M.C. remained about the same, but work could now be done on 7 M.C., and this aerial is still in use.

Since transmitting began, the receiver circuit (O-V-1) has not been touched as previously over a year had been spent on receivers. This was prob-

ably as well as during the present dud conditions, had a new receiver been constructed it would most probably have been pulled to pieces again. The writer has often operated this station and can honestly say that it is one of the nicest receivers one could wish to handle, there being an entire absence of noise, one hears only signals, and an R1 signal can be read easily without strain. If no signals are to be heard then one can safely say that there are none to hear.

In the photo the receiver is on the left of the transmitter, while the monitor, which is used on all transmissions, is in the corner behind the receiver, the key and side swiper being on the bench between the transmitter and receiver.

The wallpaper to be seen speaks for the efficiency of the station and operator. Up to date 70 countries have been worked, and the operator has, of course, W.B.E. and W.A.C.

In conclusion the operator wishes me to say that he will be pleased to see any ham who may be in London. Arrangements can be made by letter or 'phone (Malden 1241). The writer can vouch for the welcome and has often been threatened with personal violence for leaving too EARLY!!!

APPARATUS WORTH BUYING.

Parmeko Amplifier.

Messrs. Partridge & Mee, Ltd., better known to our members as Parmeko, have recently marketed a 25-watt 2-stage amplifier in kit form for (less valves) £14 10s. This is an all-mains affair and from the specification we see that it contains a Mazda AC/HL valve, coupled by means of a Parmeko constant inductance primary transformer to a Mazda PP.5/400 valve. A .5 megohm volume control is fitted to the grid of the first valve and the amplifier may be used following the detector valve of a receiver or as a pure gram-amplifier. A choke filter is placed in the anode circuit of the last valve and speakers of various impedances may be used with suitable coupling units. The H.T. supply is obtained from a Mullard DW4 rectifier followed by a conventional smoothing arrangement. Only the very best of components is used throughout, and special precautions are taken to prevent any chance of parasitic oscillations. Very good volume is obtained and two M/C speakers may be worked at full volume in, say, dance halls or restaurants.

Parmeko's have, incidentally, now moved into their new modern factory, and they will be able to continue the steady progress made in the radio trade. All communications will find them at their new works, at Aylestone Park, Leicester.

* * *

The Clix "Master" Plug is made in two varieties, with long shank and with short shank. This new plug is built on the principle of their Vice-Grip plug, which was mentioned in these columns some time back. The wiring device is similar and is one that can be trusted to make a good contact. Its twin prongs constitute a strong spring and can be used with equal effectiveness in the 4 m.m. Continental sockets, so common in this country,

and even the smallest H.T. battery sockets. The entrant end is specially curved to facilitate insertion. Both models are supplied with red or black insulators with the full range of engravings; price 1½d. each.

(Continued from page 333.)

bad chirp in the note. Short-circuiting the bulb with a wire does not always cure this. The failure to realise this has led to the scrapping of many an

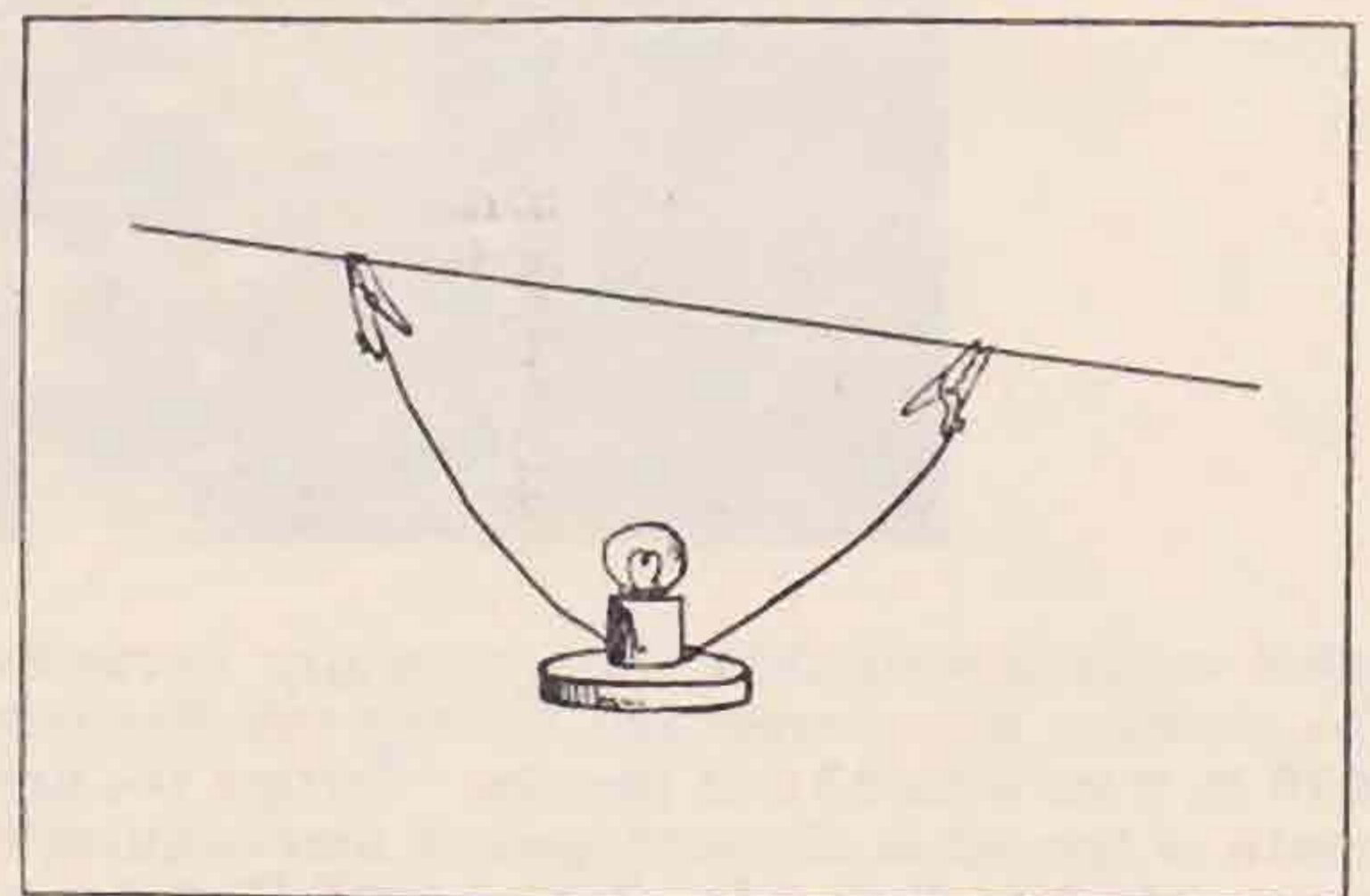


Fig. 2.

outfit. When the circuit has been tuned with the aid of the bulb, the bulb should be short-circuited by a short, stout wire and then removed from its holder.

STRAY.

W2CNL requests all stations hearing him on 7,000 K.C. to send a report by QSL card, which reports will all be acknowledged. He would also like to arrange skeds with G stations.

CALLS HEARD.

In response to many requests we have decided to revert to the old system of listing "Calls Heard," and in future we will publish lists of "Calls" from all parts of the world.

Richard Wright (2AWV), 42, Cedar Road, Aintree, Liverpool. February 14 to March 14, 1932.

1.7 M.C. : g2lz, g2oa, g5gy, g5rd, g5sz, g5xd, g6gl, g6gr, g6pa, g6zs.

3.5 M.C. : d4kda, d4vni, f8rj, f8np, g2cj, g2gb, g2nh, g2wp, g2ws, g2xs, g6bb, g6kp, g6li, g6om, g6rb, oz7a, pa0dc, pa0hr, pa0nc, pa0sr, pa0xx, pa0xy, sp3cd.

14 M.C. : pk4ja, py9am, velbv, velal, ve3wa, vk6gf, vs7ap, w7ai, w9alz, xl2al, yi2dc, zs6y, zu6w.

BRS669, 5, St. John's, Bedford Road, Kempston, Bedford.

7 M.C. : au7de, au7ka, cr6ak, cm2wd, cm2mm, ct2ab, ct2ae, ct2af, ct2ax, ct3ab, et8fa, fm8bik, fm8bt, fm8cr, fm8ev, fm8ih, fm8to, fm8wz, frear149, frear164, hh7c, k4ab, k4es, k5aa, st2d, sulch, sulec, ti3la, ti2fg, ts4sax, ullaw, vlyb, velbv, veldg, veldl, ve2aa, ve3ll, vk2bv, vk2oc, vk3ek, vk3ka, vk3lq, vk3wl, vk3zx, vk7ch, vp8jf (QRA ?), xf5a (QRA ?), xzn2a (QRA ?), yi2dc, yl2bk, ym4zaa, zalpz (QRA ?), zl2bs, zl2cc, zl4ao, zl4ap, zslz.

BRS579, Lansdowne House, Colwyn Bay, North Wales. January 21 to March 21, 1600 G.M.T. to 2400 G.M.T.

7 M.C. : au7cv, au7cz, au7de, cm2op, cm8yb, cr1ab (QRA ?), ct2an, ct2aw, ct3ab, frear149, k4aop, k4kc (QRA ?), k4rj, pk1sr, pk3bq, pylff, ru2a, sulch, sulec, su6bc, velbv, vk2ns, vk2oc, vk2pn, vk2pz, vk2zw, vk3bj, vk3bm, vk3bw, vk3dq, vk3go, vk3gz, vk3hl, vk3jf, vk3jw, vk3ka, vk3lm, vk3lq, vk3mr, vk3mx, vk3nm, vk3pr, vk3rh, vk3wl, vk3wx, vk3xi, vk3zb, vk3zn, vk3zx, vk4gk, vk5hg, vk5mb, vk5ml, vk5my, vk5wj, vk6gf, vk6wi, vk7ch, vk7pf, vs6ae, vs6ah, vu2fx, vu2kh, w6zzg, yi2dc, yi6wg, yi6kr, zl4ai, zs5u, zu5b, zu6w.

BRS497, 24, Woodside Park Road, London, N.12.

14 M.C. : aulde, ce7aa, cm2ra, k5aa, lu2ca, nylab (QRA ?), pylba, pylcr, pylff, py2aj, py2bn, py2bq, py3ad, py3aq, sulaa, tf3tp, velbr, veldl, veldm, veldr, veldw, ve2ap, ve2bb, ve2cd, ve2dm, ve3jm, ve3ll, ve3rf, ve3wa, ve3yo, ve4bq, ve4fx, ve4gu, vk2xu, vk4bb, vo8ae, vo8an, vo8lc, vo8mc, vo8wg, vu2bg, w7bd, w7hs, zc6jm, xl3aq, zl4ai, zu6w.

14 M.C. "Fone" : ve3ap? w1bmo, w2awc, w2bro, w2tp, w3ccf, w3qv.

7 M.C. : et8fa, ti3la, vk2ns, vk2oc, vk2oj, vk3bw, vk3fm, vk3hl, vk3lz, vk3wl, vk3xi, vk5hg, vp2pa, yi6wg, yn1nic, zllar, zl2ab, zl2ci, zl3ai, zl3aq, zl3aw, zl3az, zl3cf, zl4ao, zl4ap, zs6d.

3.5 M.C. : velax, velcy.

Frank A. Robb (2AXW), 3, Worcester Terrace, Chamberlain Street, Belfast, Northern Ireland. February, 1932.

7 M.C. : hh7c, k4rj, lu5ar, oa5p, pylff, sulch, sulfb, veldf, vk2xg, vk2oc, vk3xi, vk3zx, vk3jt, vk3wz, vk3wl, vk3jf, vk3lz, vk3bq, vk5vv, vk5aw, vq3msm, vu2fn, vu2fx, xzn2a, xxlyj (QRA ?), xfnhx (QRA ?), ym4zaa, zl2gq, zl3dn, zl4ai, zu5b, zu6w.

14 M.C. : k4rj, pk3bm, pylff, py2aj, sulaq, vlyb, velbv, veldl, velcv, veldw, velbt, veldr, ve2ca, ve2ap, ve2ch, vk2lz, vk2xu, vk4ab, vs7ap, vo8mc, vu2fx, w5boc, w6exg, w6bja, w9ef, w9adn, w9gv, xj2al (QRA ?), yi2dc, yi6wg, yi6kr.

G5WQ between Melbourne and Fremantle. January 23 to January 31.

14 M.C. : g2dz, g2oa, g5is, g5ni, g5vb, g6mn, g6xn, g6yl, st2d, vs7ap, xxlyj, xzn2a.

7 M.C. : g2cw, g2dz, g2qb, g2xa, g5gq, g6hp, g6jg, g6xb, g6xo, g6zr, vu2jp, xzn2a, zs2a.

G16YW, 62, Balmoral Avenue, Belfast.

k4aop, k5ab, vk2hm, vk2oc, vk3dy, vk3or, vk3jf, vk3zx, vk3zw, vo8mc, vu2fx, w4ft, w6dep, w6evl, w6zzw, zl3at.

BRS457, on 7 and 14 M.C., February 14 to March 13.

ailre (QRA ?), hh7c, hrr3qx (QRA ?), pj5xj (QRA ?), sf3bs (QRA ?), sulch, vk3vp, vk3wz, vk3zx, vk4ab, xf5a (QRA ?), zl3aq, zs6y, zu6w, yi6wg.

BRS536, G. Anderson, 24, Millway, Mill Hill, London, N.W.7. January to March.

January, 14 M.C. : xzn2a. 7 M.C. : cm8az, fmxxx, k4aop, pylff, ti2fg, vs7ai.

February, 14 M.C. : veldq. 7 M.C. : alaa (QRA ?), fm4ab, k5ab, nylab, ryla, sulch, velbv, vo8mc, x2ks, yi6wg.

March, 14 M.C. : au7kac, pk1ac, pylcm, st2d, veldq, xla2s, yi6wg. 7 M.C. : au7de, xoz2w, yi6wg, zl4ao, zl4ba.

G6BB, 31, Court Lane, Dulwich, London, S.E.21.

3.5 M.C. : vo8mc, wlazn, w1bgo, w1bu, w1bvp, w1mk, w1xu, w2cfv, w2cwk, w2dgu, w3ok, w3tr.

7 M.C. : cm2mm, cm2ww, cr1ab, k4rj, k4ry, k5ab, nylab, pylff, sulch, vu2bg, vu2fx, vk3cx, vk3es, vk3or, vk3lq, vk3wz, vk3xi, vk3zw, vk3zx, vk7ch, zl2ab, zl2aj, zl2bo, zl2je, zl3am, zl3aq, zl3aw, zl3az, zl3bq, zl4am, zl4ao, zl4ap, zl4ba, zl4by, zl4cm.

R. D. L. Dulton (BRS616), 13B, Lime Walk, Headington, Oxford. March 2 to March 22.

14 M.C. : aulde, celai, ce7aa, cm2vm, hi8x, k4rk, k5aa, lulca, lu2ca, lu4dq, lu8dj, nylab, pk1ac, pk1ba, pylcr, pylff, py2aj, py2ak, py2bk, py2bn, py3aj, rxlaa, st2d, velal, velcg, velck, velcw, veldl, veldm, veldw, ve2ch, ve3bk, ve3hy, vk2xg, vo8an, vo8aw, vo8lc, zs4m.

7 M.C. : aulde, au7di, au7th, au8cw, cm2gg, cm2op, cm2rz, cm2wd, cm8yb, ct2ae, ct2af, ct2an, ct2ax, ct3ad, frear149, hh7c, k4kc, lu2la, sulec, veldl, vk2je, vk2oc, vk3bj, vk3bq, vk3ek, vk3fm, vk3go, vk3ha, vk3lz, vk3ng, vk3nx, vk3pr, vk3ra, vk3wl, vk3zb, vk3zx, vk5hg, vk5my, vk7ch, vp2pa, xxlyj, zcls, zl4ao.

BRS250, 183, Ilderton Road, South Bermondsey, London, S.E.16. January 11 to February 19.

7 M.C. : ce3ag, cm2fn, cm2jm, cm2lc, cm2ww, cm8az, cn8mb, cr1ab, ct2an, fm8bip, fm8da, fm8eg,

fm8ih, fm8rdi, fq3rc, hh7c, hi8x, kalhr, k4aan, k4acf, k4aop, k4kc, k4ry, k5ab, k5ac, la2b, lu2ca, lu2la, lu5ar, pylff, py2bs, sulcb, sulch, ti2fg, ti3la, ve1bv, ve2ca, ve2cp, vk2hw, vk2hz, vk2je, vk2ns, vk2nr, vk3je, vk3lq, vk3rj, vk3zx, vk4oa, vp2pa, w5wf, w6zzg, w9crj, xzn2a, yi6wg, zllak, zl2aj, zl2ci, xl2du, zl2fa, zl2fi, xl2gj, zl2jx, zl3ab, zl3aq, zl3aw, zl3ax, zl3az, zl3cc, zl3cs, zl3ct, zl3cx, zl4ai, zl4ao, zl4bq, zp6ab, zslz, zs2a, ztlt, ztlz, zulb, zu6w.

* * *

By G2CX during BERU week-ends.

Sulch, sulec, vlyb, ve2ch, ve3va, ve5bc, ve4bq, vk2oc, vk2xu, vk3ki, vk3vp, vk3wl, vk3xi, vk3zx, vk5gr, vk7ch, vo8mc, vq3msn, vs3ac, vs7ap, vs7gt, vu2fx, yilrm, yi2dc, yi6kr, zl3ao, zl4ai, zl4am, zl4ap, zs5u, zs6d, zs6y, zu6w.

* * *

YI5TC, No. 1 Bungalow, "C" Squadron, I.A.D., R.A.F., Hinaidi, Iraq, during February, 1932.

7 M.C.: ar8mo, ce2bo, ctlab, ctlap, ctigu, ct2ao, cv5dg, cv5di, cv5mg, cv5vm, d4fye, d4uao, d4uni, ear19, ear28, ear91, ear94, ear123, ear185, ear224, ear227, ear232, eslet, f8an, f8bf, f8cg, f8ds, f8fw, f8gq, f8gs, f8jf, f8nc, f8sa, f8sd, f8sf, f8sk, f8sx, f8tx, f8ub, f8ud, f8un, f8uz, f8vj, f8vk, f8wd, f8wr, f8wu, f8za, fm4ab, fm8ay, fm8da, fm8fr, fm8is, fm8jg, fm8up, g2bp, g2cx, g2dz, g2di, g2ig, g2vy, g2xo, g2zq, g5bj, g5cs, g5cv, g5dj, g5dn, g5fj, g5ju, g5ml, g5ni, g5np, g5oc, g6bp, g6gv, g6ip, g6li, g6ll, g6nf, g6py, g6wt, g6xd, g6xn, g6xq, g6yk, haf2q, haf6g, haf8a, hb9y, ileo, ilim, jlct, lals, oa3xi (QRA?), oklan, okljs, oklks, oklpk, oklxd, ok2gf, ok2mj, ok2op, ok2rb, ok2uz, on4cr, on4fr, oz5a, oz7a, oz7k, oz9a, pa0fg, pa0jq, pa0oj, pa0qq, pa0rq, pk1co, pk4pb, sm8gf, splad, splbn, splbq, splbt, splon, splyl, sp3al, sp3kr, sp3lu, sp3mq, sp3nt, sp3sg, sulch, uo3ja, uo5jt, ve2ek, vk2ku, vk2ts, vk3dq, vk3xi, vk3zx, vk5db, vq3msn, vs7ac, vs7ag, vs7ap, vs7gt, vu2ac, vu2fc, vu2fx, vu2jp, vu2kh, vu2ks, w1xd, yi2dc, zl2fa, zs5b, zs6a, zs6d, ztld, zu5b, zu6w.

* * *

Heard by VS7GT, January-February, 1932.

14 M.C.: g2ig, g2bm, g2vq, g5bj, g5fv, g6hp, g6li, g6ll, g6mn, g6ot, g6qb, g6rg, g6xq, g6yl, gi5zy, vq3msn, vk2lz, vk2xu, vk3ln, vk4xn, vk5gr, vk6fo, vs3ac, vs6ae, vs6ag, vs6ah, vu2df, vu2fx, yi2dc, yi6kr, zslc, ztlz, zt5r, zs6y.

7 M.C.: d4rgu, et8fa, g2cx, g2ig, g2oq, g2vq, g5bj, g5fv, g5ml, g6hp, g6li, g6lk, g6ll, g6py, g6vp, g6wt, gi5zy, ilim, k6ar, vk2nq, vk2ns, vk2oc, vk2pz, vk3aj, vk3bw, vk3bz, vk3fm, vk3gj, vk3hl, vk3jf, vk3mr, vk3ok, vk3pr, vk3wx, vk3xi, vk3yo, vk3zh, vk4gk, vk5gr, vk5ml, vk5pk, vk5rn, vk5wr, vk6mn, vk6ra, vk6wi, vq3msn, vrlma, vs1ad, vs1fd, vs2af, vs3ac, vs6ad, vs6ae, vs6ag, vs6ah, vs6ao, vu2bg, vu2fs, vu2fx, vu2jb, vu2jp, vu2kh, vu2kt, yi2dc, yi6kr, zllar, zl2di, zl2jx, zl3az, zl4ai, zslc, zslz, zs2a, zs2f, zs2j, zs4u, zs5u, ztlq, ztlz, zt5q, zt5r, zt5v, zt5w, zt6x, zt6y, zu5b, zu5w, zu6w.

STRAY.

G2XT finds that porcelain ceiling roses make excellent economical stand-off insulators if usual fittings are removed and a terminal or plug socket fitted in hole in top to meet requirements.

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.

Shall We Abolish Morse?

To the Editor of T. & R. BULLETIN.

DEAR SIR,—Letters such as the one published in the last issue of the BULLETIN must only be prompted by the peculiar sounds which are sometimes heard, and miscalled telephony.

Why G2AI should choose to champion the key-thumpers when he never seems to be on the air on the higher frequencies, it is difficult to conceive, but the writer has certainly heard his 'phone and would imagine this to be the source of inspiration (?).

Before jumping into heroics and trying to lead a campaign against legitimate experimental work, the two following questions must be carefully studied:—

- (1) If the British amateur had telephony facilities removed by the G.P.O., would other nations follow suit?
- (2) What steps could be taken to place restrictions on the scores of unlicensed foreigners who seem to monopolise 7 M.C. with their telephony on Sundays?

Most of the interference is caused by frequency modulation as the majority of unlicensed stations are not crystal-controlled. Nearly all British stations are c.c. and they only operate on 'phone during a few hours of Sunday, leaving all the week-days for key-thumpers. It is obvious from these facts that the number of hours for which a raw A.C. CQ merchant can use QRM is 100 per cent., while the telephony man would only at the most utilise the non-broadcasting hours (very few these days) less than 10 per cent. of normal operating hours.

No G2AI, as one who reaps pleasure from both forms of operation, I say "live and let live," as a key-thumper I often suffer QRM from 'phone and vice versa.

Our licences are granted for experimental purposes. Why penalise the man who wishes to experiment with 'phone: he has just as much right to ask that, as a succession of dots and dashes is often unintelligible to him and that as it causes him QRM, Morse should be abolished. Which has the greatest experimental value?

Yours sincerely,

ALFRED D. GAY (G6NF).

STRAYS:

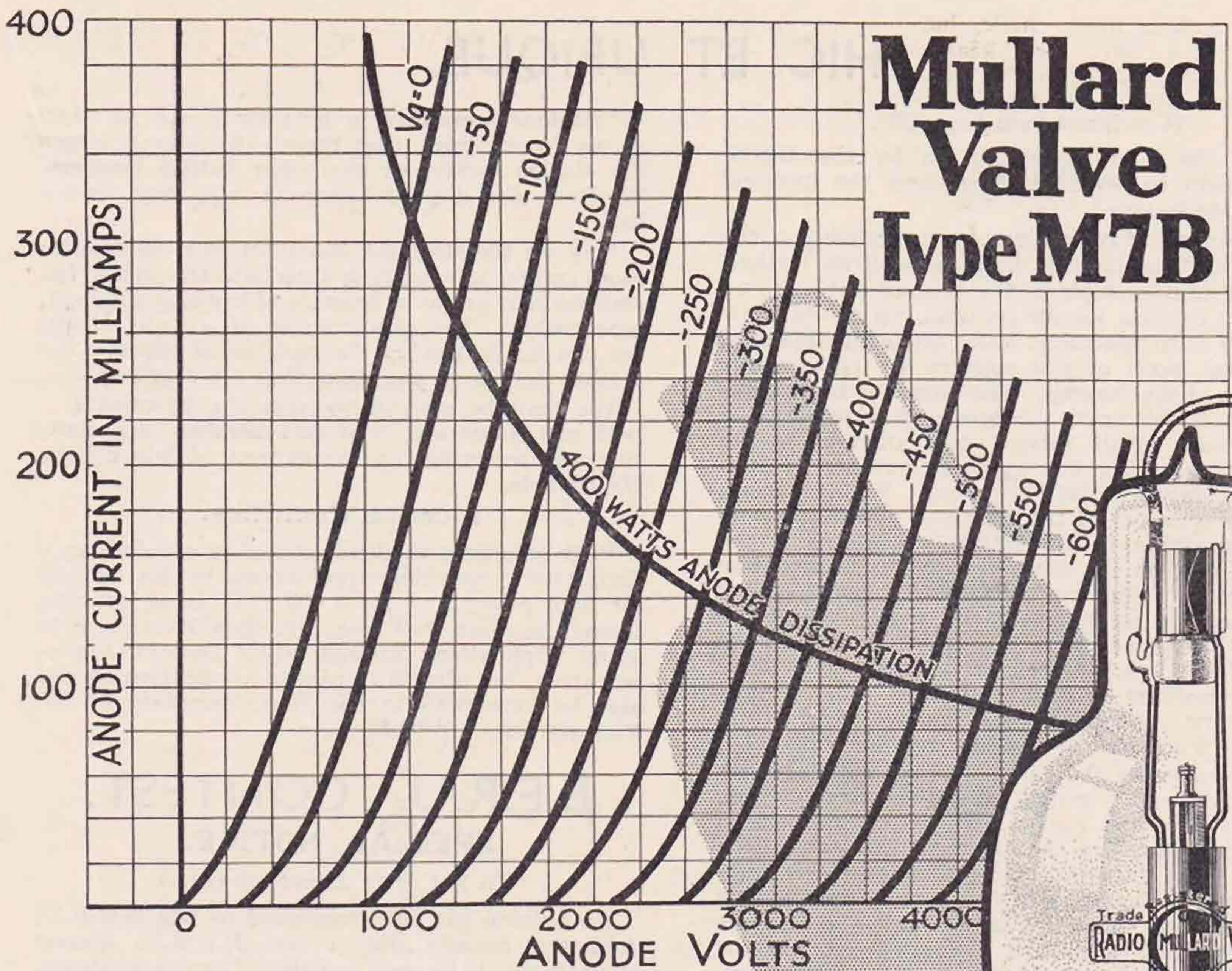
This issue contains but five articles (including a Station Description); if, for instance, the District Notes took up a more reasonable space of, say four pages, two short articles could have appeared that have had to be held over until next issue.

* * *

Div. 5, S.A.R.R.L., asks if the member who is sitting on the divisional wavemeter will notify the Hon. Sec. at once as the meter is urgently required.

* * *

Next issue contains a description of a Three Valve low power Crystal Control Set, made as much as possible from receiving components.



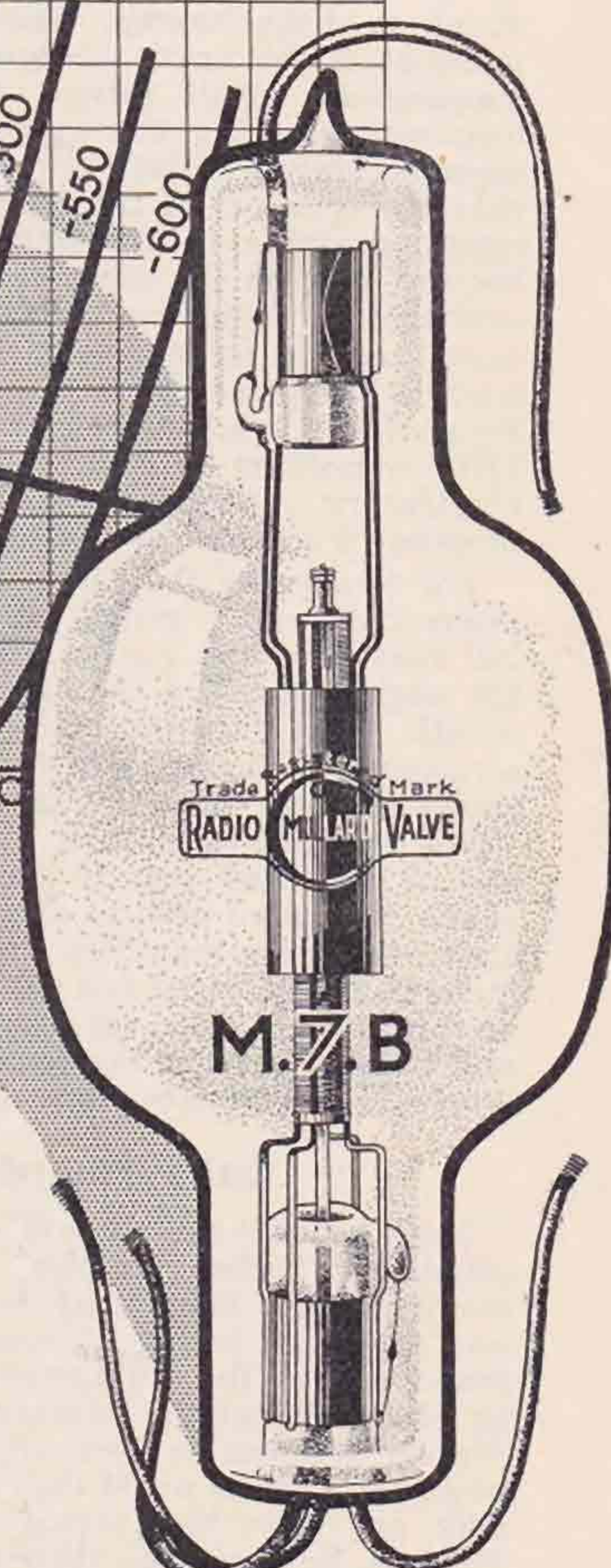
This valve is specially suited for use as an output valve in Public Address Amplifiers of the largest type such as are employed in the open air at football grounds, and for similar purposes where an undistorted output of about 100 watts is required. It is also suitable for use as a modulator in choke control telephony transmitters.

OPERATING DATA.

Filament Volts	- 16.5 volts.	Anode Impedance	3,100 ohms.
Filament Current	- 9.5 amps.	Amplification Factor	7.
Total Emission	- 0.55 amp.	Max. Continuous	
Max. Anode Volts	3,000 volts D.C.	Dissipation	400 watts.

The maximum output of about 100 watts is obtained with an anode voltage of approximately 2,800 volts, and an anode current of 140 milliamps, the load impedance being about 10,000 ohms.

The list price is £20 : 0 : 0 and a special insulated holder can be supplied for £3 : 10 : 0.



Mullard
THE MASTER VALVE
MADE IN ENGLAND

HIC ET UBIQUE.

(Continued from page 329).

and (2) the poor support given by the B.R.S. membership to organised tests and the national Morse code lessons.

The dangers of increasing our membership at the expense of Quality need be stressed little further, but as a final example of the type of publicity we fear may cause a loss of prestige, we would draw attention to competitions which are being organised in several parts of the country by enthusiastic members of the Society. The object of these competitions is the worth-while one of increasing the membership, small prizes being offered to the member proposing the greatest number of new members during a defined period. We are *certain* that the sponsors of these several efforts have no intention whatever of lowering the status of the Society, but, on the other hand, with an incentive available, is it not conceivable that some of our more junior members—who know nothing of the traditions upon which the present Society is founded—may introduce new members who have little or nothing to commend them other than a momentary interest in the hobby which their proposer is so anxious to share with his friends?

For two years the Council have watched with interest the rapid growth of the membership roll, but they have also viewed with some apprehension the slight "dip" in the graph which occurs each month when members fail to renew their subscription. An analysis of this loss in membership shows that the majority are new members of one year's standing who have "dropped out" at the end of their first year of association. This, then, is the danger we wish to avoid. We are confident that our senior members will welcome the views given in this editorial and will agree that it is better at this stage to voice these opinions, whilst there is still time to prevent the Society descending to the level of a second-rate radio club. J. C.

Calls Heard Lists.

Many months ago we said we would publish lists containing British Empire Calls only, the chief reason for this being that we felt too much space was taken up listing stations in countries where few copies of the BULLETIN were read. It must be admitted that the primary use of a Calls Heard Section is to enable transmitting stations to see in what parts of the world they are heard, where they may not have had actual contacts. Many BR Stations, however, use these lists to compare their logs with other listeners' logs, and as a result of requests to include all stations in future Calls Heard lists, we reverted to the original arrangement, and this has continued for some months.

Is this entirely satisfactory? We find much space being used in listing calls of stations who are always on the air. We know that ZS4M, ZL4AO and WICMX—to name but three—are received in this country every time they are on, assuming favourable conditions, and we venture to suggest that they know they are being heard in England and are not greatly interested to see themselves in Calls Heard. We have this month deleted "local"

W stations appearing in lists for 7 and 14 M.C. as we do not think that these calls interest either the station owners or our other British listeners. We have also deleted European calls from similar lists.

May we therefore ask contributors to be a little more careful in compiling their lists and not to list stations that are to be heard, and working England, repeatedly? The effectiveness of a Calls Heard list can be judged by the number of requests for further details of reception that are received.

We shall be pleased to have the comments both our Home and Dominion members (transmitting and receiving) on the subject of future Calls Heard lists.

Licence Facilities.

With reference to the Editorial in the February BULLETIN concerning applications to the Society for high power and for 3,500 K.C. band permits, Council request that members should continue to make applications through their District Representative, but that a duplicate application should also be forwarded to the Hon. Secretary at 53, Victoria Street, S.W.1.

B.E.R.U. CONTEST.

SPECIAL NOTICE.

TO B.E.R.U. MEMBERS ONLY.

An opinion has been expressed by one B.E.R.U. Affiliated Society that future B.E.R.U. annual contests should be open to British Empire amateurs, who are not necessarily individual members of B.E.R.U. Council, therefore, have decided to invite our present *overseas members* to record a vote in favour or against the proposal contained in the voting form below.

VOTING FORM.

I wish to record a vote

(1) in favour of (2) against

the opening up of our Annual B.E.R.U. Contest to British Empire amateurs who are not individual members of B.E.R.U., but are fully paid up members of an affiliated Society in the part of the Empire in which they reside.

Signed

Call Sign

Address.....

To the Hon. Secretary, Date.....

R.S.G.B. and B.E.R.U.,

53, Victoria Street,
London, S.W.1.

Note.—All votes must be returned to London before September 30, 1932.

GANGED

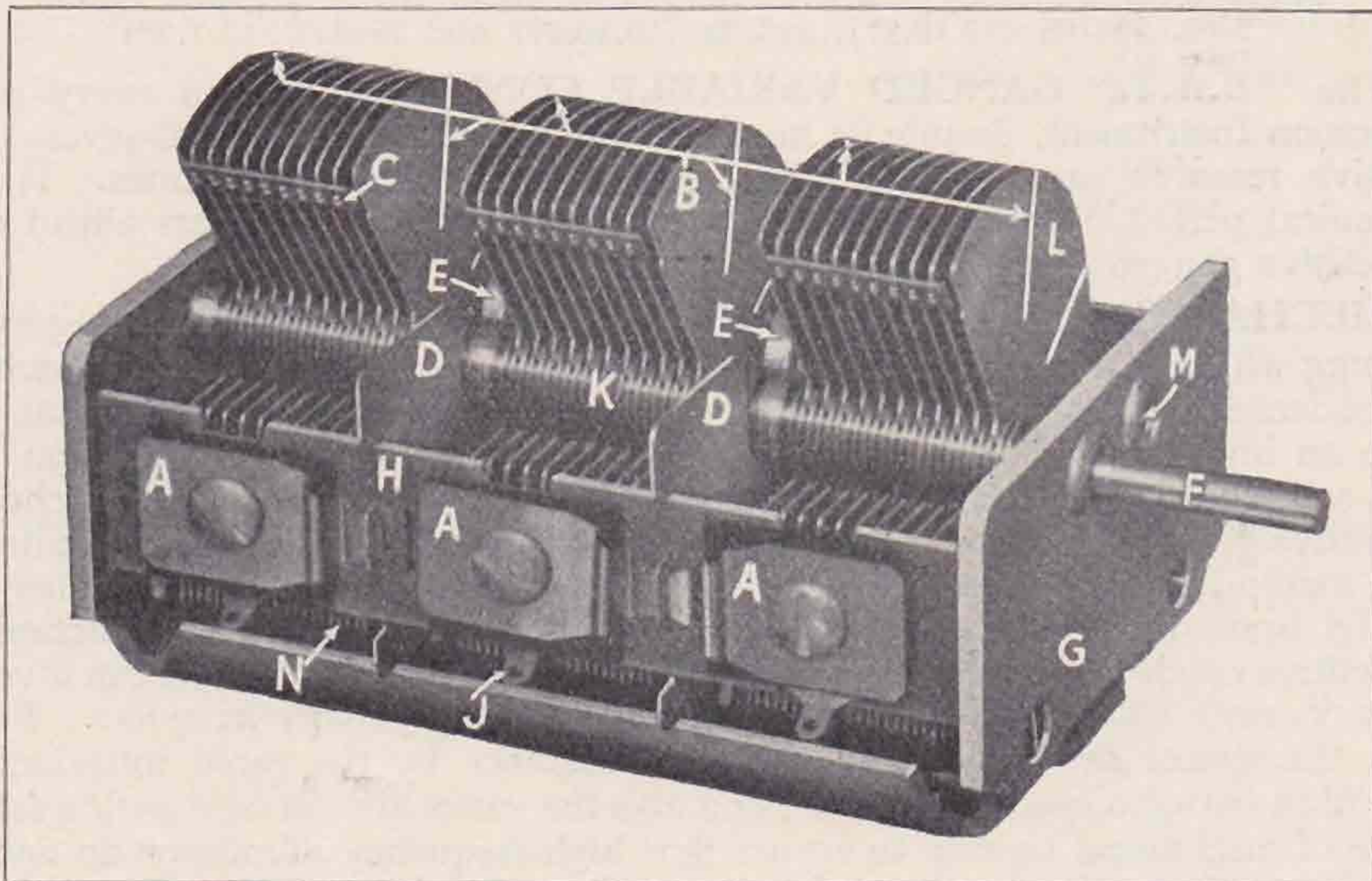
CONDENSERS



Precision Ganged Condensers

for the

DISCERNING AMATEUR



TYPE E3/23-500 : .0005 mF. PER SECTION.

These Precision Ganged Variable Condensers are the result of considerable laboratory experimentation over a long period of time. They are offered by us with the most complete confidence that they mark a decided step forward in the manufacture of such instruments.

The prices indicated on Page 4 are subject to the special discount of 20% to readers of the "Bull." We will also pay postal charges. Just send your remittance to our nearest depôt.

Kindly note that these Condensers are only obtainable direct from us, at Discount. If you order through the Trade, the full retail price will be charged. Every Condenser will be meticulously inspected before despatch and so packed as to ensure receipt O.K. Immediate delivery is guaranteed.

Our next announcement in this new series of Advertisements will appear in the June issue, and will be of unusual interest to all the fraternity.

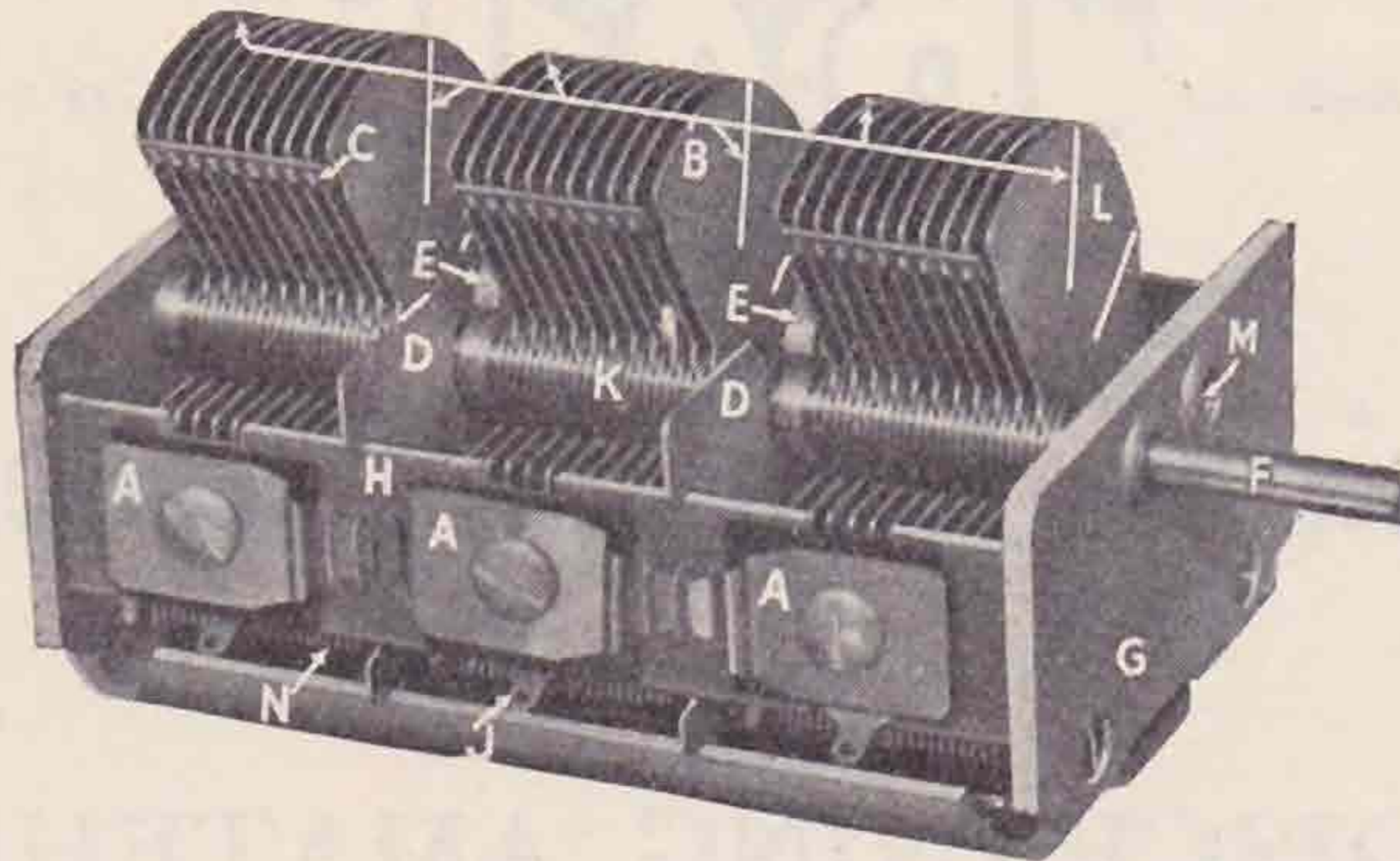
GANGED



CONDENSERS

(Registered

Trade Mark)



"B.A.T." GANGED CONDENSERS.

Manufactured strictly to I.R.E. Standards under British Letters Patent Nos. 280105 (10.10.27), 280045 (10.10.27) and 283391 (12.1.28).

The "B.A.T." GANGED VARIABLE CONDENSER is in every manner a Precision Instrument, despite its moderate price. It is the result of several years' intensive research, and is built along most distinct and novel lines. It has a mechanical perfection and general electrical specification some years ahead of any competitive ganged condenser.

MECHANICAL FEATURES.—The entire body ("G") is a single-piece die-stamping which is a veritable engineering triumph. During the process the base of the condenser is given a "girder construction," making "whip" or turning of the frame an impossibility. The entire Rotor-Shaft ("K"—"F") is precision turned from solid hard brass, and the specially shaped rotor plates are punched into alternative grooves. This results in producing rotor sections of extreme uniformity. This method is also immensely superior to threading rotor stampings on a screwed brass rod, separated by spacing washers, as is done on practically all competitive condensers. No condenser built up on the spacer method can give equal accuracy, since commercially produced spacers are always very irregular. Furthermore, the spacer method introduces high resistance by the rapid introduction of oxide films between spacer and vane, and also the vanes are not held with a sufficient degree of mechanical rigidity to ensure that high-frequency vibrations do not result during reception. As a 100% safeguard against this last-mentioned trouble, each rotor assembly is firmly clamped by a bonding-bar; this bonding-bar, however, **does not include the first and last plates of each section.** These first and last plates are **slotted in three places**, dividing the end plates into four sections, and the areas so divided follow a logarithmic law. The purpose of this slotting (which is essential) will be described below. This slotting is lettered "L" and the bonding "C" in our illustration. Finally **interstage shields** ("D") of sweatable metal are inserted between each rotor section. These serve a dual purpose: to provide additional bearings for the lengthy rotor (ensuring perfect alignment at all times) and to serve as braces for the rotor wiping-contact ("E"), one of which is placed at each shield. The shield also prevents interstage coupling. **The entire plate-shape is true "Log-Mid-Line."**

Dealing now with the stator assemblies, we will enumerate some special mechanical features. Each section is supported upon and insulated from a pair of

GANGED



CONDENSERS

(Registered

Trade Mark)

transverse rods. The sections have vanes punched into machined spacing assemblies, again using no washers as a spacer system. Stator connections are taken out at the true electrical centre of each separate assembly, and not at one of the ends, as in all competitive makes which have yet been brought to our notice. These central stator connections are brought out in extremely close proximity to the "high" side of the individual "Trimmer" Condenser, but actual connection is not completed, in case the constructor wishes to omit the compensators from one or more sections. These two soldering points are clearly shewn at "J." Finally the stator assemblies are cross-bonded at either side, ensuring extreme uniformity and, again, precluding absolutely any suspicion of H.F. chattering.

Mounting supports are provided on the base, tapped, and three wide-head fixing bolts are provided. The shaft is provided with ball and ball-bearing, and, even for the four-gang, turns with a delightful smoothness. Even with a plain dial there is no possibility of the "overhang" of the rotors causing rotational slip. It should be remembered that, instead of being "2-bearing" condensers (as in the case with other makes), the "B.A.T." 2-gang condenser is a 3-bearing model, and the 3-gang is a 4-bearing model, whilst the 4-gang has no less than 5 bearings. This is one of the primary reasons for the maintenance, for lengthy periods of time, of the electrical and mechanical stability of these unique condensers.

ELECTRICAL FEATURES.—Because of the unusual and unique method of jig-assembling and bonding the rotor and stator assemblies, and also due to the large number of bearings of these condensers, an extremely low-resistance assembly is provided at the same time as obtaining extreme mechanical stability. This gives an exceptionally high figure of electrical efficiency, their "figure of merit" being $R\omega C^2 = 0.075 \times 10^{-12}$. (R in ohms, C in farads, and $\omega = 2\pi f$ in radians per second). This is almost a "laboratory" precision. Furthermore, the method of assembly permits the accuracy of "matching" to be so high as to permit us to guarantee same to be in conformity with the specification laid down by the Standardisation Committee of the Institute of Radio Engineers, which lays down that for first-class ganged condensers:

"Rotor and Stator Sections shall be matched to an accuracy of one-half
"of one per cent., plus or minus one micromicrofarad (0.000001 mF) at
"any position of angular rotation of the shaft."

However, in order to compensate for any discrepancies in the matching of associated circuits, the usual "trimmers" or "compensating condensers" are provided for each section. These have a range of from approximately 1 mmF to 50 mmF (0.000001 mF to 0.00005 mF). These trimmers are employed to generally balance each circuit, and this balance is best performed round about 750 Kilocycles (400 Metres).

It is sometimes found that slight tuning "humps" or "depressions" are present in one of the high-frequency circuits. When this is so a general alignment by trimmer settings may not obviate the trouble. In such case the expert constructor may proceed to balance each circuit at four distinct points, by moving the divided rotor end-plates (referred to above), progressively, closer to or further away from the bonded rotor plate nearest to each movable one.

SPECIAL FEATURE.—The Shafts are Ball-bearing at each end.

GENERAL FEATURES.—The constructor's close attention is directed to the general features of "B.A.T." Precision Ganged-Condensers set forth overleaf.

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GANGED



CONDENSERS

(Registered

Trade Mark)

(A). **ROTATION OF SHAFT.**—The “Standard” or Normal direction of Rotation is “Clockwise” (as illustrated). When viewed from the shaft end, rotation in a clockwise (right-hand) direction **increases capacity**.

When “Counter-Clockwise” Rotation is required this must be distinctly stated on all orders sent to us, otherwise “Clockwise” will be supplied.

(B). **DIMENSIONS OF SHAFT.**—The normal diameter of the shaft is $\frac{1}{4}$ in. Shafts $\frac{3}{8}$ in. diameter will be supplied to special order, at no increase in price. The normal length of projection is $1\frac{1}{4}$ in., and, whilst **shorter** extension will be furnished, “No-Charge,” any additional length will be charged.

(C). **TYPES AVAILABLE.**—Nine distinct types are available, viz. condensers having sectional capacities of 400, 450 or 500 mmF (= .0004 mF, .00045 mF, and .0005 mF respectively), and built 2-gang, 3-gang or 4-gang. All nine patterns have identical **panel dimensions**, viz., $2\frac{1}{4}$ in. deep \times $3\frac{5}{8}$ in. breadth. The **length** of the condenser naturally varies with the number of sections, as follows:—

2-Gang, total length = $3\frac{3}{4}$ in. (Excluding Shaft).	}	i.e., Depth behind panel.
3-Gang, total length = $5\frac{1}{4}$ in. (Excluding Shaft).		
4-Gang, total length = $6\frac{3}{4}$ in. (Excluding Shaft).		

(D). **POSITION OF “TRIMMERS.”**—The trimming condensers are located at the **left-side** of the condenser (viewed from the shaft end) as illustrated, so that they form an accurate “stop” for the moving vanes at the minimum capacity position. On the opposite side of the condenser, in the same position as the trimmer-assembly, there is an electrostatic side-shield. If the position of the trimmers does not suit constructor’s assembly plans, the side-shield and trimmer assembly may be carefully withdrawn and their positions exchanged.

If condensers are **ordered** as “Compensators Reversed” we will arrange the reversal without charge, i.e., **place the Compensators on the right, for a “Clockwise” Condenser.** In such case, the side-shield acts as the “stop” at minimum capacitance. This will not cause noise since the rotor assembly and the condenser framework are always at the same potential.

PRICE-LIST.

Type.	Sections.	Plates per Section.	Max. Cap. Per Section.		List Price.
			mmF.	mF.	
E2/19-400	2	19	400	= .0004	13/-
E2/21-450	2	21	450	= .00045	14/-
E2/23-500	2	23	500	= .0005	15/-
E3/19-400	3	19	400	= .0004	17/6
E3/21-450	3	21	450	= .00045	18/6
E3/23-500	3	23	500	= .0005	19/6
E4/19-400	4	19	400	= .0004	25/6
E4/21-450	4	21	450	= .00045	27/-
E4/23-500	4	23	500	= .0005	28/6

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PULL OUT AND FILE THIS ADVT. WITH FURTHER ADS. OF THIS SERIES.

QRA Section.

Manager: M. W. PILPEL (G6PP).

NEW QRA's.

- G2KB.—H. K. BOURNE, 63, Shenstone Avenue, Hillmorton Paddock, Rugby.
 G2YI.—R. C. HORSNELL, "St. Neots," Wick Drive, Wickford, Essex.
 G5KU. R. POLLOCK, 14, Crown Terrace, Cricklewood Lane, London, N.W.2.
 G5LM.—D. C. STURDY, 91, Bolingbroke Grove, London, S.W.11.
 G5RT.—R. W. J. BREWER, 65, Russell Street, Reading, Berks.
 GI5RU.—R. BARR, jun., 4, Dunkeld Gardens, Old Park, Belfast.
 G5TL.—S. A. TAYLOR, 431, Cregoe Street, Birmingham.
 G5UH.—R. E. GRIFFIN, 7, Davis Buildings, West Street, Bedminster, Bristol.
 G6QC.—E. T. PETHERS, Gwynmur, Herbert Road, Rainham, Kent.
 2AVU.—J. HUNTER, 51, Camphill Avenue, Langside, Glasgow, S.I.
 2BFK.—C. W. THOMSON, 58, Kent Road, Mapperley, Nottingham.
 2BHT.—T. B. COCKING, 509, Finchley Road, London, N.W.3.
 2BHX.—R. E. KNIGHT, 37, Lonsdale Road, London, S.W.13.
 2BIW.—A. HINE, 15, Temple Gardens, Strood, Rochester, Kent.
 2BTP.—MAX B. BUCKWELL, "Wyncote," 114, Tankerville Drive, Leigh-on-Sea, Essex.
 2BXT.—T. H. BEAUMONT, Quebec Barracks, Bordon, Hants.

The following are cancelled:—G5YI, G6VO, 2AMC, 2BHK.

AN APOLOGY.

We wish to offer our sincere apologies to The Wireless Institute of Australia and to the Editor of the Television & Radio Review of Australia for the misleading statement made on page 309 of our last issue. The official journal of the W.I.A. is the T. & R. R., and not Radio Monthly, the subject of our review. We trust that no undue inconvenience has been caused by its publication, and take this opportunity of congratulating the Editorial staff of the T. & R. R. upon the excellence of the fare provided in the first two issues received in London since the "cut-over." We are glad to learn that Major Leo Fenaughty (late Editor and Founder of "QTC") is contributing to the official W.I.A. publication.

QSL Section.

There is little to add to the announcement in last month's notes concerning BRS and AA cards sent to W stations, except to say that at the present

moment negotiations are going on between the ARRL and RSGB without, I fear, much hope of success. In the meantime, and in future if the ban on BRS cards continues, there is only one course open to those who desire to send reporting cards to W stations, and that is to send QSLs direct by post to the station concerned. Copies of the Radio Amateurs' Call Book may be obtained at HQ, price 5s. 6d., although this fact is small comfort I fear!

After careful consideration the Council have decided that much as they would desire to do so, they cannot undertake to be responsible for posting these reporting cards separately to the American transmitters from HQ as the cost in postage and labour involved would be impossible to such a society as ours without the financial resources of ARRL.

J.D.C.

New Members.

HOME CORPORATES.

- F. W. DAVIES (G2FD), 13, Warbreck Road, Walton, Liverpool.
 D. P. JONES (G5SA), c/o Western Electric Co., Bush House, W.C.2.
 L. E. R. BOXWELL (G5UG), 115, Trowbridge Road, Bradford-on-Avon, Wilts.
 G. DREWRY (BRS804), Eccleston Nurseries, Prescott, Lancs.
 A. C. RIALI (BRSS05), Clonlost, Killiney, Co. Dublin.
 S. A. J. BARBER (BRS806), 9, Mottram Avenue, Chorlton-cum-Hardy, Manchester.
 M. G. L. BETTY (BRS807), The Rookery, Whitechurch, near Bristol.
 W. J. WICKS (BRS808), 44, Lime Road, Southville, Bristol.
 A. E. HERMAN (BRS809), 4, Hastings Road, Bedminster, Bristol.
 C. R. SOUTHAL (BRS810), 48, South Harry's Road, Birmingham, Warwick.
 E. JENKINS (BRS811), Lenton, Victoria Terrace, Aberystwyth, North Wales.
 C. E. DEAN (BRS812), Meadowlands Lodge, Mere, Cheshire.
 E. O. J. WOODWARD (BRS813), Amphill, Broadmead Road, Woodford Green, Essex.
 P. W. HEWITT (BRS814), Henley House, Rawdon, Leeds.
 W. B. STIRLING (BRS815), Mossgrove, Bridge of Allan, Stirlingshire.
 H. AMBLER (BRS816), 10, Coronation Grove, Harrogate, Yorks.
 C. A. PARRY (BRS817), 134, Goldsmith Row, Shoreditch, E.2.
 H. R. SCOBELL (BRS818), Sherborne, Bucknall's Drive, Watford Herts.
 S. K. FINCH (BRS819), Castle Hedingham, Essex.
 A. M. RUTHVEN (BRS820), Maitland Bank, Larkhall, Lanarkshire.
 G. E. SMITH (BRS821), 9, Mellor Road, Prenton, Birkenhead, Cheshire.
 W. H. J. ALEXANDER (BRS822), 63, Tennyson Road, Small Heath, Birmingham.
 H. R. NEECH (BRS823), 1, Barrie Terrace, Ardrossan, Ayrshire.
 R. G. FRIEND (BRS824), 23, Holmside Avenue, Gillingham, Kent.
 J. W. JEFFREY (BRS825), Stanley, Newmains, Wishaw, Scotland.
 W. L. B. PALMER (BRS826), Trentham, Wyck Road, Brentry, Bristol.
 R. V. ALLBRIGHT (BRS827), 2, Palmyra Place, Newport, Mon.
 F. C. BLAKE (BRS828), 6, Berkeley Road, Tunbridge Wells, Kent.
 A. E. STEELE (BRS829), 1, Franklin Avenue, Skegness, Lincs.
 B. LEWIS (BRS830), 106, Norlands Lane, Widnes, Lancs.
 G. S. PARDESI (BRS831), 28, Eardley Crescent, Earls Court, S.W.5.
 A. G. LAPWORTH (BRS832), 86, Muntz Street, Small Heath, Birmingham.
 W. H. CROWN (BRS833), 1, Thornton Road, Leytonstone, E.11.
 J. T. ROSS (BRS834), 20, Mains Drive, Dundee, Scotland.

DOMINION AND FOREIGN.

- ABILIO NUNES DOS SANTOS (CTIAA), Av. Anto Augusto d'Aguiar 144, Lisbon, Portugal.
 D. G. LINDSAY (VK2DY), Burgoyne Street, Gordon, N.S.W., Australia.
 C. L. ISAACS (VP2PA), Port Antonio, Jamaica, B.W.I.
 R. G. LAW (ZL2JH), Orlando Street, Stratford, New Zealand.
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 F. JESSEN (OZ2NF), Vesterskorrig 37, Vykobing Falster, Denmark.

CONTACT BUREAU NOTES.

By H. C. PAGE (G6PA).

THERE seems to be very little to say this month, as the results of the 28 M.C. and 3.5 M.C. Tests are not yet to hand. Next month I hope to let you have the full results. There is one thing, however, which is quite evident, and that is the disgusting lack of interest shown by our BRS and AA stations, especially in the 3.5 M.C. Tests. However, I shall have more to say about that next month, so the BRS men who did not take part had better look at these notes next month; they may find something of interest to themselves, but certainly not of praise.

G6MB has asked me to draw attention to the fact that his sked with Group 2A is NOT on Wednesday evenings, but on FRIDAY evenings. The sked on Sunday is correct.

Apart from the above there is little else of interest this month. G2DT has sent me some very interesting diagrams, and details of a super regenerative receiver for 56 M.C. work, but as I am not quite clear on some of the points he mentions I am going to ask him to elucidate fully before I publish the particulars.

I will conclude by hoping that all contestants in the 1.7 M.C. Tests have been having good luck, and will have still better luck for the rest of the month.

28 M.C. Work.

G6VP, Group Manager.

Very little work has been done as a whole this last month. It is only as expected. The B.E.R.U. Tests have taken up the time and interest of practically everyone.

As far as I can gather, none but local signals have been heard up till now, and three parts of the 28 M.C. Tests are over. Persistent negative results are leading many to the conclusion that 10 metres is not going to prove of any practical utility as a channel of long-distance communication and that contacts have been exceptions; in other words, that conditions were freakish when long-distance communications were established, and that normally only short distances can be covered with any degree of certainty. On the other hand, 28 M.C. conditions have always more or less coincided with those pertaining on 14 M.C., only "more so" if one can put it that way. And with the exception of one or two brilliant spells last month, we all know how poor conditions on all short waves have been recently.

To those who have associated barometric pressures with radiation, the last months must have furnished them with much useful data. It would appear that the pressures over the whole of the Northern hemisphere at least have been very different from what was normal in years gone by, and so perhaps the pessimists will eventually be proven in the wrong when we get normal "weather" conditions again.

It seems, however, certain that some new method of Group working will have to be arranged, and it is thought that perhaps the three groups now in semi-existence would merge into one, and with the sanction of the Contact Bureau Manager some such arrangement will no doubt be made.

Here follow the individual Group reports:—

Group 1B.—G5SY reports that there is absolutely nothing doing, and is considering the advisability of discontinuing regular work on this band. He, however, has a suggestion *re* formation of new collective group. G5MP has been trying out and further perfecting his SG—0—2 peaked stages. But beyond mechanical local noises, has heard nothing on it. He raises the old point of polarised radiators and wants information on the subject.

Group 1C.—G6VP has heard nothing but the usual local stations, most of these at far greater strength, though, than usual. G6WN have a similar report to G6VP's.

Group 1F.—BRS25 reports that very little listening has been possible, and that he heard nothing of interest. G2OA has been on 14 M.C.'s chiefly, and has nothing of interest to report. He has, however, added a pentode to his receiver, and finds it a great advantage. BRS615 listened for periods on eleven days, but only heard G harmonics. Is building a new receiver, which he hopes will function on 56 M.C.'s also. HAF8B informs him that his 28 M.C. signals have been heard in U.S.A. and South Africa, but he complains that no one seems to be working on that band.

Fading, Blanket, and Skip.

G2ZC, Group Manager.

I am glad to report this month the formation of Group 2C, and while it is yet a little early to publish the composition of this Group, I hope to do so next month. BRS500 has undertaken to act as G.C., and the numbers of applicants will be enough for a full group, though I shall be glad to have the names of any who would like to join one of our groups, for if we have not a vacancy in those already formed, I hope to form Group 2D before the winter starts.

Group 2A have started a "listening schedule" every Friday evening, from 18.30 to 19.30. All stations logged will be collected, and it is hoped to plot results on a chart. Any BRS or other station interested is invited to co-operate, and to report to the G.C. of 2A, G6MB.

Group 2A.—This group has returned to a discussion of the heaviside layer, and the discussion has been on "what form the layer (or layers) take?" and there appears to be a considerable difference of opinion on the subject, and the subject is to be gone further into.

BRS426 thinks it has a ripple surface due to the varying degree of bombardment by electrons from the sun; 2ATK considers that it may take on wave form at the fringes; while 2AWJ considers that it varies considerably, and takes on no regular form, and in this he is supported by G5NL. BRS519 and G6MB are definitely against any wave form theory, principally for negative reasons, that direct evidence is lacking, and phenomena associated with it may be explained without the necessity of it being in wave form.

It is generally agreed that the ionic density varies from time to time, and that this density increases from zero at the extremes of the layer, to a maximum at the centre.

Group 2B.—We again publish our list of earthquakes for the past month, and while there appears to be a divided opinion in the Group as to the effect that earthquakes really have on signals, at the same time evidence is coming in to show that either a quake has a decided effect on signals, or that it seems to coincide with conditions being as we have reported them to be. We had a letter of an experience that G6BU and G2PF had, when working a regular schedule, and while I cannot reproduce the graph of the type of fading that was sent, they each thought at the time that something unusual had happened, and an earthquake seemed to suggest itself to each of them, and so it actually turned out that an earthquake did take place at the time. 2ATK kindly sends in a report of his log compared to some of the times we gave, namely, on the quakes of December 14, 18, 19 and 26. On the two first days mentioned he reports 7 M.C. as being slightly below normal at 23.00 on 19th, while 3.5 was normal at 23.00, 7 M.C. had an unusually long skip at 16.00 and 23.00, and conditions were generally bad, while on 26th conditions were normal to good. Several members of 2A have compared logs, but they did not happen to be on watch at the times when the quakes were reported, but it shows that a little interest is being taken by those outside 2B.

case. (See 2B's theory as regards currents in unloaded cables, etc., in past BULLETINS.) From the evidence we have gathered, this scientist is rather inclined to think that earthquakes may have an effect on signals, so the subject becomes more absorbing, though it will take a long period of observation before we can say anything definite on the subject, hence our appeal for as many hams as possible to compare their logs with our list, and let us have reports.

3.5 M.C. Work.

Group 4A.—The 3.5 M.C. Tests and preparations for same have resulted in greatly increased activity on this band during the past month, but now that the reports are coming in, once again we seem to have been defeated by adverse conditions. Some excellent work has been done with stations on the Continent of Europe, but the only reports of contacts with stations on other continents come from G2QB and G6OM, who both managed to hook a W station. During the whole period of the Tests there appears to have only been one short period of DX, this occurring between the hours of 06.30 and 07.30 G.M.T. on the morning of Sunday, March 13.

G2QB, with an input of 125 watts, actively participated in the Tests, obtained numerous

Earthquake Report.

DATE 1932.	TIME, G.M.T.	SITUATION.	REMARKS.
Jan. 19	11.30 } 11.40 }	Two shocks felt at Horta, Fayal, Azores	Reported by CT2AN.
Feb. 3	{ 01.15 (G.M.T. ?) 02.40	A succession of severe shocks at Santiago and throughout E. Cuba	Recorded at Kew and Durham Observatories, and West Bromwich.
Feb. 5	About 05.00 (G.M.T. ?)	Slight shock felt in Gibraltar and district. Lasted 2 seconds	—
Feb. 6	?	Shock felt on coast of Madagascar	Reported by F8RJ.
Feb. 11	At night	Two shocks felt at Lima, Peru	—
Feb. 13	05.35	Sharp shock felt at Horta, Fayal, Azores	Reported by CT2AN.
Feb. 19, etc.	?	Shock felt at Almeria, Spain	—
		Volcano at Krakatoa, Dutch E. Indies, in violent eruption	—
Feb. 21	Evening	Slight shocks felt at places in Tuscany and other parts of N. Italy	—
Feb. 23	Recorded at 00.41	A "moderately violent shock," with epicentre about 7,800 miles away, probably in the Pacific, near the Caroline Islands	Recorded at Stonyhurst College Observatory.

The Group have been discussing some of the phenomena associated with our subjects, amongst which were "What Causes Blanket?" and it is thought that magnetic storms may have a lot to do with this, especially when the blanket is a local one. One member raised the point as to what causes hollowness of signals, and we should be glad to have a report from anyone explaining this. Another point raised was the effect of lightning striking the earth, as regards changing earth potentials. This question has been taken up by a well-known scientist, and it would appear that, while we have all thought of the earth being at zero potential, that this term is merely one of convenience, and that such may actually not be the

contacts with the Continent, and succeeded in hooking W2BYP, but reports conditions on the whole very poor. G6OM, employing an SW50 with 60-70 watts input, was also active during the Tests, and worked W2CSC, who reported his signal SQA2 R6. Says that the unfortunate part of this QSO was the fact that a W9 replied to his Test call in addition.

G6WY, with an input of 160 watts, was very disappointed with conditions during the Tests, and, apart from Continental contacts, was not able to do anything in the way of DX. R7-8 was obtained from UO, SM, etc. G6LI was unable to take part in the Tests owing to a crystal fracture at the last moment. Has not noticed any DX,

and is afraid that for this year the best season for DX on 3.5 M.C. has definitely passed. BRS408 sends in an excellent log for the period of the Tests, and appears to have heard everything possible on the band. (Another sleepless ham in the making.—G.C.) G2XT was only able to spend a very short time on the air during the Tests, and also found things very poor. G6RB found the Tests highly interesting, despite the absence of super DX. Regrets not being on the air during the good DX period owing to the alarm clock not being QSA enough. Atmospherics, coupled with a good deal of fading, have made even Continental QSO's very unsatisfactory during the past few weeks, and looking at conditions generally on the 3.5 M.C. band it would seem that most of us are again very much out of our reckoning with regard to good conditions following the 11-year cycle theory.

Suggestions for the next series of 3.5 M.C. Tests, which it is hoped will be held next season, would be welcomed.

Group 4B.—G2WP finds the "G6JV" aerial gives good results on this band. Quite good results were obtained in the 3.5 M.C. Tests, but mentions the scarcity of European stations working. G5NS has had good results over Europe, the best DX being Russia. Also notes scarcity of stations to work during the Tests. BRS552 finds QRN worse on 3.5 M.C. than in any other band. G2XS has been QRT owing to illness, but as he has now recovered he hopes to become very active once more. G2KB has been QRT for two weeks owing to illness also, and so has little to report. But a large amount of building has been done. The power supply is now using a mercury vapour rectifier. A choke control modulator and speech amplifier is now working, and the first tests on this were very satisfactory. Will be operating from new QRA by the time these notes are in print, and will welcome any reports on transmissions.

QRP Work.

G2VV, Group Manager.

Group 8B.—*Weather and Aerial Effects.*—G.C. G2VV has been completely QRT owing to business QRM. He is now in London, but hopes to be active every week-end. G5CM is now using remote control to his ultraudion, which is harmonic C.C. on 7,100 k.c. He sends diagram of his C.C. arrangement. The crystal is tapped across two turns of the coil, commencing from the grid end, and a resistance is shunted across the key in the usual way. He had also been working on 3.5 M.C. and has had some good reports. He says that on a very wet night with a S.W. wind DX is usually good on 7 and 3.5 M.C. G5OQ has decided that the 33-ft. Windom, whilst being good on 14 M.C., is no use for 7 M.C. work. Is spending a great deal of time on 1.75 M.C. Reports 14 M.C. decidedly improving. He finds that stormy weather means good DX, and notices the same as G.M. regarding moon effects. First quarter good conditions, but falling off as full moon approaches. G5RX is now in his new QRA, and is getting things fairly straight. Has been testing with 66 ft. 7 ins. tapped Windom and a Zepp. with 66-ft. top and feeders 40 ft. Is favouring the latter, and sends full details of results on each, and he gets .4 amps. in the aerial with the Zepp. He finds that a west wind brings in locals on 7 M.C. up to 300 miles, but with an east wind

DX up to 2,000 miles can be logged. He complains of consistent fading on 1.75 M.C. stations. ZD2A and G6SO do not report, but are active.

Group 8C.—*Lunar Effects.*—G.C. G5PH is still spending all his time on his new harmonic control CO-PA on 7 M.C. Excellent results are being obtained using a Zepp. 66 ft. 5 ins. long with 37-ft. feeders, and gets .4 in each feeder with 5 watts. Coil is very loosely coupled. He finds that a full moon means fine DX conditions, but quarter moon bad conditions. Exactly the opposite results as noticed by G5OQ and G2VV. G5LQ finds the same results as G5PH regarding the effects of the moon. Is spending a great deal of time on 14 M.C., but so far without much success. G5LC is now on phone with 3 to 5 watts to T.P.T.G., employing a P625A and a PX4. Method of modulation is grid, and results are very pleasing. Has worked G2WK with 10 volts H.T. at 1½ mills. to a P215. G6RS is a newcomer to the Group, and we all extend a hearty welcome to him. He is using a CO-PA with 5 watts to PA, and a 33-ft. aerial with 33-ft. counterpoise, and finds this difficult to tune. Hopes shortly to be on 1.75 M.C. BRS587 is now 2BUS. He is busy with a parallel-fed ultraudion, and promises data shortly.

Group 8D.—*28 M.C. Work.*—G.C. G5QU has reorganised the Group, as so many have recently dropped out. Also as 28 M.C. seems "dud," the Group are considering change of subject. The new members are G2JH, G5PX and BRS458. All will report next month.

Group 8E.—*Direct and Loose-Coupling Effects.*—G.C. G5JU reports G5DI and G5XM are no longer in this Group. Two new members are filling the vacancies, these being BRS689 and 2BSR. We welcome then to 8E. G5JU has found that loose-coupling on 3.5 M.C. improves reports from everywhere, but on 7 M.C. an adverse effect is noticed. His explanation for this is that best results are obtained on a certain position of the coupling coil, but at this point the impedance of the aerial must not equal the impedance of the tank circuit, as maximum voltage and current are induced in the aerial circuit. Increasing coupling may mean an increased input, but extra watts obtained seem to be lost. Highest mills. do not indicate maximum aerial efficiency. Using loose-coupling with a low input rather than tight coupling with a high input results are much better at his station on 14 M.C. G5QL is finding erratic results on loose-coupling tests, as his aerial tuning affects the tank circuit a great deal. He says his 66½-ft. aerial gives much better results on about 48 metres than it gives on 41 metres, and asks for explanation! (You have got your roof the wrong length, OM. See G6FO's articles in recent BULLETINS.—G.M.) QBRA is busy at the moment finding the best method of keying to suit his requirements.

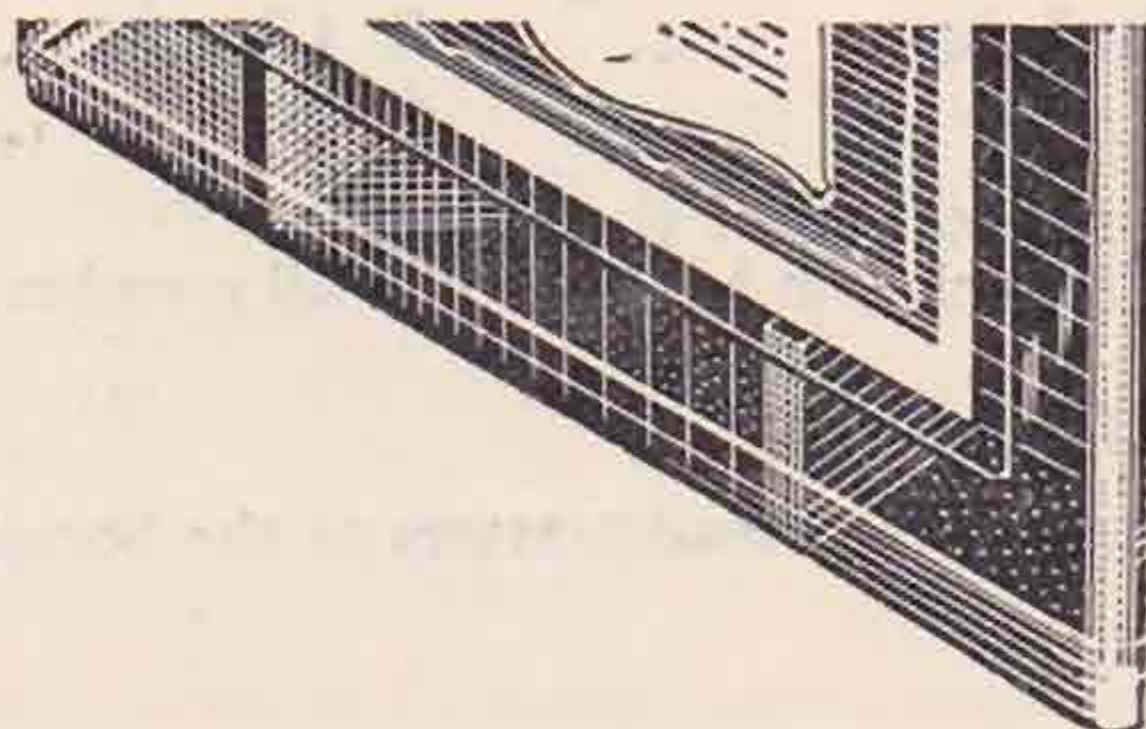
Group 8F.—*1.75 M.C. Work.*—G.C. G2TJ has spent most of his time this month preparing his new A.C. outfit and C.C.—F.D.—FD—PA. He will be pleased to receive any reports. Asks for better co-operation between 8F members. (Report to your G.C. each month, OM's.—G.M.) G5LW still carries on his amazing QRP DX, and has received a report from VK3AWA on his 2.5-watt 14 M.C. signals. He finds that at the time of his signals being heard in VK he was QSO W. Intends to go C.C. on all bands. Is active on 1.75 M.C. and

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Headquarters Society:—BRITISH EMPIRE RADIO UNION,
53, VICTORIA STREET, LONDON, S.W.1. ('Phone, Victoria 4412.)

APPLICATION FORM.

The Hon. Secretary,

Sir,—I beg to make application to be enrolled as a member, and shall be obliged if you will submit my name to your Council. I agree, if elected, to act and abide by the Rules of the Society as expressed in its Articles of Association and By-laws.

Signature.....

Name in full (please use Block Letters)

Address (to which all communications may be sent)

Nationality..... Age (if under 21).....

Call Sign.....

NOTE.—Members not having Call Signs are allotted B.R.S. (British Receiving Station) or B.E.R.S. (British Empire Receiving Station) Numbers, which are used for identification purposes only.

Proposed by..... Seconded by.....

NOTES.—Applicants who do not know any member may accompany their forms by references in writing by persons to whom they are known. Such persons should be householders, and should state profession and length of acquaintance with applicant.
The Council reserve the right to refuse any application without reason.

UNDERTAKING TO BE SIGNED BY APPLICANT.

I, the undersigned, agree that in the event of my election to membership of the INCORPORATED RADIO SOCIETY OF GREAT BRITAIN, I will abide by and observe the Rules, Regulations and Articles of Association of the Society, and that in the event of my resignation from the Society given under my hand in writing, I shall, after the payment of all arrears which may be due by me at that period, be free from this obligation. I further agree to observe strictly the terms of any licence issued to me by the responsible authorities to operate transmission or receiving apparatus.

Witness my hand this.....day of..... (signed).....

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Corporate Members resident outside British Isles ...	0 12 6 " "
Non-Corporate Members—Associates	0 10 0 " "

Associates are not eligible to vote or receive individual notices of the Society.
Certificates of Membership and copy of the Articles of Association are issued to all members upon election.

NO ENTRANCE FEE.

A copy of the Articles of Association may be inspected at the Headquarters of the Society, 53, Victoria Street, London, S.W.1, by applicants upon request.

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B.(E.)R.S. Number issued.....First Subscription Paid.....

other bands. G5OJ has built new power pack, and has also fixed up a 33-ft. Zepp. with 40-ft. feeders. Reports conditions too bad at the moment for fair tests. G5OU has nothing to report, as he is busy getting a TX ready for 1.75 M.C. work. G2QX is now using a push-pull T.P.T.G., and finds results much better than with old self-excited outfit. Hopes to be on 1.75 M.C. soon.

*Group 8G.—Weather Effects on 14 and 28 M.C.—*G.C. G2TK says that conditions do not only depend on prevailing weather, but also upon preceding weather. Notes reports from U.S.A. vary, whilst moon is constant, and is at loss to understand the effects at the moment. G5FV has been busy with B.E.R.U. Tests, but is taking notes on effects on 14 and 28 M.C. G6PS and G2TK are shortly starting on 56 M.C. G6PS has been busy plotting R strength graphs at sunrise and sunset, but results are not ready for publication yet. BRS575 still fails to receive G2TK at a $\frac{1}{4}$ mile distance on 28 M.C.! However, in spite of this G2TK works G2QO, who is $\frac{3}{4}$ mile away.

2 MC. Work.

G5UM, Group Manager.

Little improvement can be recorded on the 2M.C. band—up to the end of March, at any rate. Static seems to have diminished slightly, and signal strength to have improved; distant working, however, is still much more difficult than in the corresponding period of 1931. Opinions are conflicting as to the effect of weather on radio; one definite fact is that warm weather will always bring static, whatever the season.

*Group 10A.—*Further experiments by G5FP have resulted in the erection of a Hartley transmitter that gives T9 results on 7 M.C., and is expected to do so on 2 M.C. when necessary steps have been taken to prevent aerial swing. Commenting on the recent controversy in the Group on the merits of self-excited *versus* crystal-control, G5FP remarks: "I am convinced that, with a little trouble, self-excited can be made to give C.C. results, and there is the added interest and experience gained in attaining these results which the C.C. enthusiast misses altogether." He does not agree with G5UM's suggestion that 2 M.C. telephony should be abolished, and points out that "160" is essentially a 10-watt band, and the "boiling over" of badly modulated phone does not do much harm; that there is room for a few phones in what is a wide and not overcrowded band; that the subject technically is extremely interesting; and that a DX contact on telephony is a minor triumph. Both G5FP and G5UM admit the evil of gramophone grinding and of the considerable interference that can be caused by one high-power phone. G5UM thinks that amateurs whose telephony breaks up their carrier waves should be ostracised on account of the enormous local interference they cause; he wonders if it would be possible for phone and C.W. stations mutually to segregate themselves in different halves of the 2 M.C. band; and finally suggests a little economy in watts when conducting local contacts.

G5QY, who has recently joined the Group, also favours a self-excited transmitter. His Hartly circuit is coupled to the aerial system described in last month's BULLETIN. The two wires, 33 ft.

and 66 ft., are suspended at an angle to each other and from different poles. With the advent of A.C. mains, the full 10 watts power can be obtained. Although A.C. is used on the filament of the LS5—and with no centre-tap—all reports are T8 or T9; another point in favour of a well-designed self-excited set.

Definitely better results are obtained by G5RX from his new QRA. The aerial is now a 66-ft. Zepp. with 40-ft. feeders, the latter being shorted on 2 M.C. Some interesting tests have been carried out with G5UM on the subject of signal strength at dusk. During each of several QSO's over the 200 miles between the two stations, extremely good QRK was obtained during the period between sunset and complete darkness. No static or fading were apparent until dark, when they both increased rapidly.

Incidentally, both 'RX and 'UM are using a CO-locked-T.P.T.G. transmitter, and both report gratifying results. In fact, G5UM finds it unsurpassed for 2 M.C. when used with the limited mains supply of 240 volts D.C.

Group 10A were not a little intrigued to read in Q.S.T. that G2AY had worked WIAUY on 2 M.C., the latter using phone. Information from G2AY reveals that he has not worked on 160 metres since 1927, and is as much in the dark about the affair as are the group themselves.

Antenna Group.

G2OP, Group Manager.

Group Centres again report that stations do not send in monthly reports. This is a rule, and I have instructed G.C.'s to strike out the names of those who do not report regularly.

Regarding the aerial which I described last month, G5QY informs me that the results mentioned are for 14 M.C., and that he does not find the results so good on 7 M.C. He corrects me when I said that the system is little used. He has used nothing else for over twelve months. I meant, of course, that it is used but little by most of us.

G5OG has, unfortunately, had to resign from 12A, and his place is taken by G2WQ, from whom we hope to get some interesting notes. G2YX is finding his half-wave voltage-fed Hertz directional. G6GV is using 33-ft. feeders to a 66-ft. top on a new tx. Coupling is direct to the f.d. (he is not using a p.a.) by 12-turn coil. This gives .5 amps. reading when anode voltage is 480. Reports give R3 in VK, R8 in CV, and R7 in FM, but the scheme is not so good on 14 M.C.

I had hoped to receive reports of aeriels used during the B.E.R.U. Tests by many of the stations taking part, but so far none are to hand. Perhaps G5LN will send me a full description of the system which gave the excellent results recorded in the March BULLETIN C.B. notes.

STRAY.

G6PP complains that somebody is using his call, or rather modifying it to GI6PP, and that he receives many cards giving reports of T-5 on 7 and 14 M.C. The pirate occasionally uses the call G6PP and frequently gives the QRA as Manchester. Stations are requested to refrain from working any station signing "GI6PP."

Empire



News.

B.E.R.U. REPRESENTATIVES.

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

British West Indies, Bahamas, Bermuda, and British Guiana.—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. H. Jolliffe (VS7GJ), Frocester Estate, Govinna, Ceylon.

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

Egypt and Sudan.—H. Mohrstadt (SU1AQ), No. 1 Co. Egypt Signals, Polygon, Cairo.

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.

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

Irish Free State.—Col. M. J. C. Dennis (EI2B) Fortgranite, Baltinglass, Co. Wicklow.

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

Malaya.—G. W. Salt (VS2AF), Glenmarie Estate, Batu Tiga, Selangor, Malay States.

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.

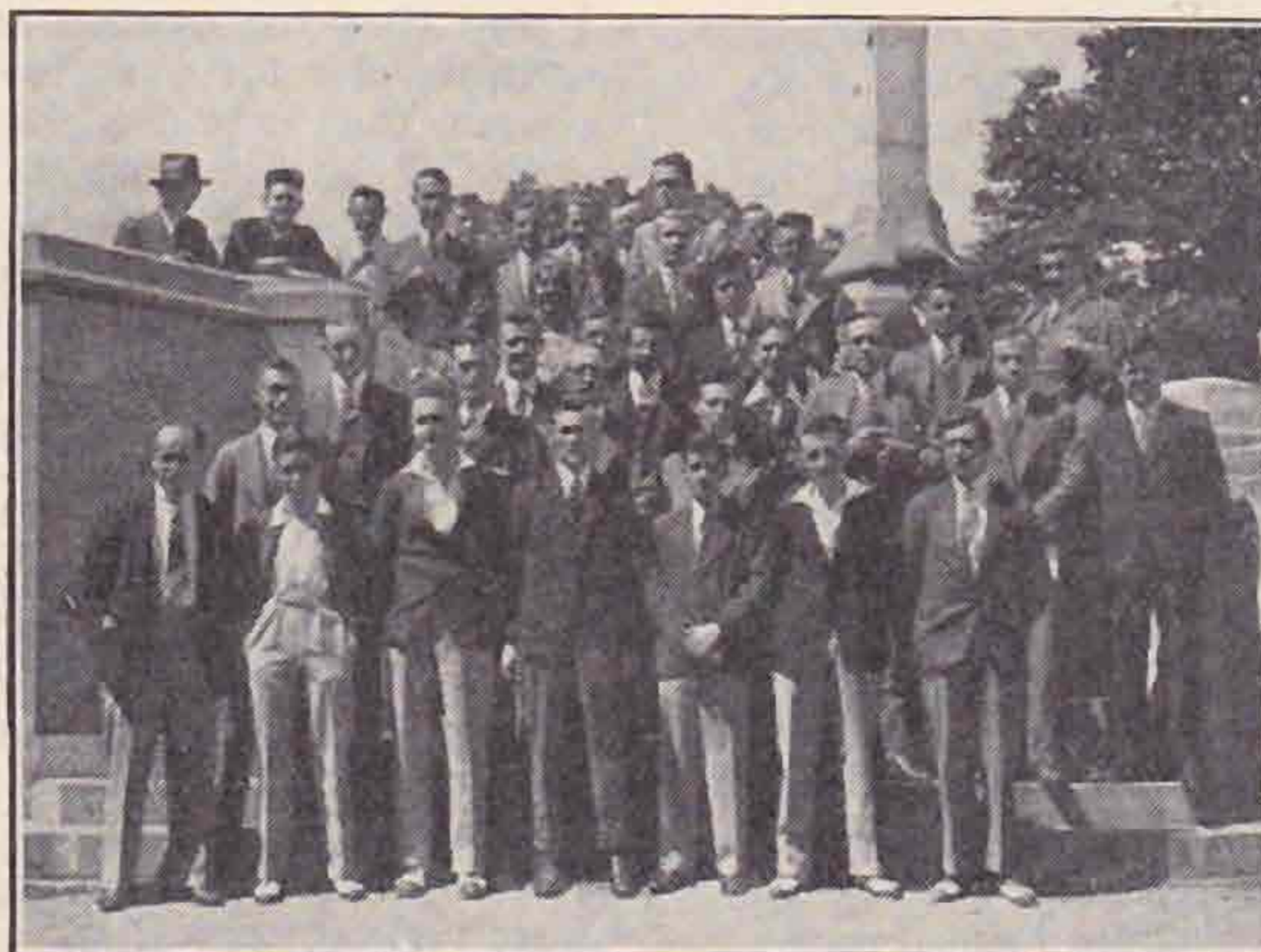
N.Z.A.R.T. Convention, Christmas, 1931.

A very successful Convention was held in Christchurch at Christmas, when all districts were represented. The morning and afternoon of the 26th were occupied by the business meeting, when matters dealing with the constitution and policy of the NZART were discussed, and a number of recommendations made to the incoming H.Q. executive. The Convention dinner was held that evening. Mr. E. J. Howard, M.P., who has done a great deal to better amateur conditions, was the guest of honour. We were entertained by songs by ZL3AG, pianoforte solos by Miss Nancy Kirby, a budding lady ham, and a very clever conjuring display by ZL3AS and ZL3CL.

On the 27th a picnic was held at Diamond

Harbour, on the opposite side of Lyttleton Harbour. The day was occupied by swimming, cricket, and sports, the prizes being radio gear donated by various hams. The Marks Cup, presented by ZL3DB as an annual challenge cup for the 220 yards Ham Championship, was won by ZL2BS.

On the 28th a 'bus tour of the suburbs of Christchurch was held, and visits to the local broadcast station, ZL3YA, the Wigram aerodrome, and various ham shacks took place. This Convention was unique in that four lady hams were present, ZL3AG, ZL3BT, ZL3DW and ZL4CL, whilst another of the lady visitors, Miss Kathleen Kirby, has since blossomed out as ZL4DT.



Some of the N. Zealand Amateurs at the Christmas Convention, Christchurch, 1931.

Australia.

By VK2HC.

January-February.—The contacts on 28 M.C. made during the last few months between interstate stations are still being maintained; VK's

have been heard in ZL, but there is no "real" DX to report. At the time of writing, two week-ends of the BERU contest have gone by, and DX conditions on 14 M.C. particularly are deplorable. ZL's can be worked from 0300-0700 G.M.T., VU

and VS between 1300 and 1500 G.M.T.; the best signals (R3) from G come in at the same time. Several contacts have been made with VU and VS on 7 M.C. at about 1400 G.M.T., while a little European DX is worked at 1900-2030 G.M.T.

The 3.5 M.C. band was well patronised between VK and ZL, despite severe QRN, and it did not take long to get 10 contacts.

Judging by the number of stations operating in the B.E.R.U. contest, we should have quite a large list of entries.

An interesting debate was held in South Australia recently. The motion "That the experimenter justifies his existence" was carried by the "hams" against extremely capable opponents.

British West Indies.

By VP4TA.

February.—There are no reports from the "gang," in spite of exhortations by letter, but it is hoped that in future we shall be able to collect a report of activities in the islands month by month.

Whilst on my way back from England I had the opportunity of calling in at Barbadoes and the pleasure of a visit to VIYB. He is very active on 14 M.C., but reports that G is only workable from 1100-1230 G.M.T., whilst W's are very prolific after 1900 G.M.T. VIYB has been helping a new station, VP2MO, to get on the air, and the latter hopes to join B.E.R.U. soon.

(Ed.—We were very pleased to welcome Dr. Cruikshank (VIBA) at a recent R.S.G.B. meeting, and hope that he will have a pleasant stay in England.)

Canada.

By VE2BB.

February.—I am glad to report a decided improvement in DX conditions on the 14 M.C. band, and a great number of foreign stations have been heard on this band as well as on 3.5 M.C.

On the 7 M.C. band only VK's and ZL's have been worked consistently.

Ceylon and South India.

By VS7GJ.

February.—As our hams are all busy trying to annex the B.E.R.U. Challenge Trophy, I am left to make this report single-handed.

Conditions this month on the 14 M.C. band are consistently poor, the few stations heard about 1200 G.M.T. are weak, and complete wipe-out renders this band useless after 1700 G.M.T.

The 7 M.C. band, especially over week-end, is so full of busy pot hunters that QRM is severe and several good QSOs are completely spoilt owing to this. QRN throughout the month has been extremely bad and general conditions very poor.

Channel Islands.

By G5OU.

Conditions on nearly all the amateur bands have shown a distinct improvement during the past month, 3.5 M.C. being quite lively at times after dark. QRM on 7 M.C. at week-ends has been so bad that many a good QSO has been spoilt. Although rather early in the year, may I take this opportunity to remind any hams visiting the island during the coming summer that they will be made most welcome. A P.C. with dates will be appreciated.

2BCS requires circuit of an A.C. Rex, either 1—V—1 or 0—V—2. Who can supply? (See September, 1930, BULL.—ED.) BRS657 is now 2BYO. And by the time these notes are in print we will have G2ZC back in the island. Those active BRS775, 2BYO, 2BCS, 2BDP, G5OU.

Iraq.

By YI6KR (via G5LA).

March.—YI6KR has left Mosul and will be away for some months. He will be travelling about in Kurdistan and, as he has a portable transmitter with him, he will be grateful if G and VK stations will look out for XYI6KR. QSL cards should be sent via R.S.G.B. only. He will be on the air from 14.00 to 18.00 G.M.T. on 14 M.C., and from 18.00 onwards on 7 M.C. He reports conditions slightly better, but not half so good as 1929, 1930 and 1931.

New Zealand.

By ZL3CP.

Owing to the large numbers of new hams the 3.5 M.C. band now sounds as crowded as the 7 M.C. band. W's may be heard on this band almost every evening, and a ZL-W 3.5 M.C. test is to be arranged.

On the 7 M.C. band DX has been good recently—Europeans and North Africans coming in well both morning and evening. EAR's are especially prominent in the mornings. Several hams have gained their W.A.C. by working FM, ST and SU recently.

The 14 M.C. band seems to vary in different parts of N.Z., some hams reporting good DX, while others report nothing doing at all.

The NZART H.Q. is now in Christchurch and the new officers are:—President, ZL2AB; general secretary, ZL3CK; assistant secretary, ZL3AZ; treasurer, ZL3AS; editors "Break-In," ZL3CG and ZL3AS; distribution manager, ZL3BZ; QSL Bureau, ZL3CD.

A recent alpine tragedy, in which two trampers lost their lives, has started a new movement in the NZART. The searchers for the lost trampers had a most difficult task and four Christchurch hams with two portable transmitters were about to leave for the scene of operations, to maintain contact between the search parties and the base, when the bodies were found. It is now proposed to form a Radio Emergency Corps, to be linked with automobile associations, ambulance associations, and other organisations, so that in the event of a similar tragedy, operators with portables may be rushed to the scene to provide communication between search parties and the base. With the R.E.C. and our now smoothly working NZART Guard Station chain, we hope to show the public that in any emergency we are "ready, aye ready."

Nigeria.

By ZD2A (via G5YK).

There has been nothing of interest to report lately as most members have been QRT owing to moves and duties. ZD2A goes to England next month (May) for five months so a new representative will be required.

(Continued on page 361).

NOTES and NEWS



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).

(Yorkshire, 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, Rutland, Lincoln.)
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), 95, Old Tiverton Road, Exeter,
Devon.

DISTRICT 7 (South-Eastern).

(Berkshire, Hampshire, Kent, Surrey, Sussex.)
MR. J. DRUDGE COATES (G2DC), "Burleigh," Farnborough
Park, Hants.

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.

SCOTLAND.

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

NORTHERN IRELAND.

MR. C. MORTON, (G15MO), 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 1 (North-Western).

AS I am at present situated in London for a stay I am unable to attend the monthly meetings and am therefore unable to give first-hand accounts of these events. The Manchester meetings seem to be going on quite satisfactorily from some members' point of view and are quite wrong from other points of view. All I can say is that if any of those who are regular attenders are too shy or afraid to get up on their feet at these meetings and speak their mind, then the meetings will not be run on the lines you want. Your station descriptions and debates are hard to better from an instructive viewpoint, but I should really like to see them conducted on more business lines as are the Liverpool meetings. I am told that 22 members turned up at the last one and that only three managed to send in a report. I make no comment, but will quote the C.R. for Lancs' pet theme song:—

"Now you jolly young sports,
Bung in those blessed reports,

If you can't use a pen,
Please try, try again,
Or the C.R.'s will d—— soon be *morts*."

I hear that 3.5 M.C. is getting quite good for DX, as one or two members have worked W, G6OM claiming the first contact this year in this district. The Liverpool meeting was well attended and about ten new faces were seen in the form of non-members who we hope to get signed up very soon. They came along at the invitation of G5WG who recently gave a lecture at Port Sunlight and managed to interest many of those present in the art of short waves. It is our intention to go ahead with this idea, and any member who can produce the place and the audience should communicate with his C.R., who will, in turn, communicate with me. The bad conditions still prevailing have apparently stopped the members in Cheshire reporting at all. Come on, chaps! Just read that piece of poetry(?) again!

Well, I seem to have taken up all my space for this month, so all the individuals mentioned in

the C.R.'s reports will have to be satisfied in the knowledge that I know that they are active and what they are doing and have done! I hope to be on the air from my London QRA by the time this is in print. Let's have more reports next month.

DISTRICT 2 (North-Eastern).

Report from G2TK that a new arrival in the Hull district, G2QO, is very welcome, and they set up the first 10-metre QSO in Hull—about 1 mile! G2TK also has had a QSO on 14 M.C. with K5AA. Is this first contact with K5 on 14 M.C.? QRA is Balboa, Canal Zone, outside RX territory. G5FV has done well in B.E.R.U. contest with a push-pull CC job. BRS771 has obtained AA permit, but at present the call-sign has not come through. He has got a transmitter going in a very satisfactory way on 1.7 M.C., after some aid from G2AW. 2ARN is now G5VO and he reports that conditions appear to be mending but not on real DX, only on medium DX. He has heard several W stations, a few VK and ZL stations on the 14 M.C. band. Much better results on 3.5 M.C. band now.

members and friends attended, and it is believed to have been the largest R.S.G.B. meeting ever held outside London. To our great joy hams turned up from London, Bristol, Nottingham, Birkenhead, Chester, Rugby, Wolverhampton, Cheltenham, Kenilworth and other places outside Birmingham, and it is hoped that our visitors enjoyed themselves as much as we enjoyed seeing them. The demonstration of sound reproduction by means of the five-channel split frequency amplifier at the works of Messrs. Wm. Bayliss and Sons, arranged by Mr. Gold during the afternoon, was greatly appreciated. During tea-time and at the excellent suggestion of our old friend "Clarry," and in order to introduce everyone to everyone else, the writer called out the name and call sign (if any) of each person present, who thereupon rose, smiled on us all cheerfully for a moment, and sat down. It was a great idea and one, we think, that should be followed at future conventionettes. A business meeting followed, from the results of which "Clarry" and G2VQ will be able to make certain representations to Council on points raised. The



District 3 (West Midlands) Conventionette (Birmingham, March 20).

Copies of this photograph may be obtained from Mr. Daniels, Webb's Radio Shop, 133, New Street, Birmingham, or from G2ZW, at 1s. 9d. each (whole plate size), or 1s. each (½-plate size).

LEEDS AREA.—The second meeting at G2WS was a great success, being attended by nine members altogether. G2WS reports that conditions on 14 M.C. are improving at night. CX, PY and W coming in well. QSO with XZN2A, a ship 900 miles west of Bombay. G5HB active on 1.7, 7 and 14 M.C. and wants co-operation with someone on 28 M.C. BRS739 is now 2BRJ and is very busy with transmitter.

SHEFFIELD AREA.—All this district is very active and the meetings are a great success. DX good at 07.00 G.M.T. on the 7 M.C. band noticed by G2XH, G6LF and G5HK—QRT for a while owing to new QRA. G2BH has buried a wire about 6 ins. deep, directly under the aerial and finds that results on 7 M.C. are very much better—this wire is used as an earth wire to the transmitter.

G6PY is still troubled with key-clicks and would appreciate any dope on same.

Don't forget the Conventionette at York, OM's. I am arranging for 25 to 30 to be present.

DISTRICT 3 (West Midlands).

The outstanding item of our activities during the last month was, of course, our Conventionette. This has been voted a great success. Over eighty

dinner was well attended and the toasts following that of the King, proposed by the Chairman (G5VM) were "Our Visitors," proposed by Dr. Marston (G2PD) and responded to by Mr. Auchterlonie (G6OM); "R.S.G.B.," proposed by Capt. Courtney Price (G2OP) and responded to by "Clarry" (G6CL); "B.E.R.U.," proposed by Mr. F. W. Miles (G5ML) and responded to by Mr. H. B. Old (G2VQ); "Our Growing Son—M.A.R.S.," was proposed by Mr. Curnow (G6CW) and replied to by its Hon. Secretary, Mr. S. C. Parish (G2ZW); "The West Midland (No. 3) District" was proposed by G6LL and responded to by Mr. V. M. Desmond (G5VM). To everyone of you who made this Conventionette the great success it was, the District Representative (*pro tem.*) offers his hearty thanks on behalf of District 3.

The C.R. for Warwickshire and Worcestershire (G5ML) reports that G2KB has just changed his QRA and will be getting going again soon, using mercury vapour rectifiers, and will be testing Heising modulation. G5SK—an old-timer—is about to start up again, this time using crystal control with a zepp. antenna. (All good wishes, O.M.!) G5ML had quite a busy time during B.E.R.M.

Conditions, he says, are still erratic on 7 and 14 M.C., but on the latter frequency a regular sked is run with ZS4M, who each night reports signals R8 to R9. A half-wave Zepp., pointed E.-W., is used for South Africa, but a "Windom" pointed N.-S. for QSO's elsewhere. W's 5, 6 and 7 and VE5 have been worked around 17.30 G.M.T. The transmitter is CC, 480 watts input, to two DET2's in push-pull as power amplifiers on 14 M.C. and one MT12 on 7 M.C. G2ZW is still rebuilding to A.C. mains and has been very busy with Conventionette matters, as also has G5VM. G5BJ, G6XQ, G6XJ, G5TL, G2MA and G5NI are all active, but have not sent in reports.

The C.R. for Staffordshire and Shropshire, G2NV, complains of lack of written reports, none being received from Shropshire, and he wonders whether anyone lives there! (I hope this will meet the eye of our Salopian friends and that they will let their C.R. hear of their radio activities, however humble.—D.R.) BRS457, of Burton-on-Trent, has been very active hearing a lot of DX, but he gave up the contest after the first week. BRS589 scored about 1,580 points and has heard, among others, ZL, VK, ZS, ZU, ZT, VIVE, SU, YI, VO8, etc. (F.B., OM.) BRS488 is still working hard in anticipation of getting his ticket and is co-operating with G6PC in tests from that station. G6WF has entered for the matrimonial stakes and is moving to a new QRA, where, as yet, there is no "juice." Congratulations and best wishes, OM, and may your keenness on quality be maintained. G2OQ and G5UW report that the new stabilising gear for regulating supply voltage is now installed and proves very satisfactory in use, many new contacts having been made. 2BUS, late BRS587, has now obtained his preliminary ticket and is building new apparatus for interesting work on the higher frequencies. G6PC has been heard putting out first-class signals on 'phone and CW. A little bird [Is she joining R.S.G.B.?—D.R.] has whispered that he has forsaken the shack for the house, which is warmer. G2NV is still very busy with new apparatus, and a variety of tests on aerial systems are being carried out; intensive listening and logging of stations for future use is being done.

DISTRICT 4 (East Midlands).

Leicestershire.—District 4 held their first meeting in Leicester on Saturday, March 12, at the Victoria Hotel, London Road. Quite a large gathering was present for tea, which started at 5.15. Twenty-eight members from Leicester, Nottingham, Newark Worksop and Rugby sitting down.

Mr. Old (G2VQ) opened with the chairman's remarks, and expressed his appreciation at the good gathering present. He suggested that District 4 meetings should be held every third time in Leicester.

Mr. Carpenter, from the Nottingham Post Office, then gave an address on "Radio in the Great War." Mr. Carpenter himself used to be an amateur transmitter, having to give up the hobby owing to pressure of business. Mr. Atkinson (G2CZ), one of the country's oldest amateurs—who started transmitting in 1912—summed up the two methods of frequency stabilisation, *i.e.*, COPA and Goyder Lock. After a very interesting address, the meeting was thrown open for a discussion on the subject. G6MN, G2XS, G2HD, G2IO and G2VQ

all contributed to a very interesting and instructive discussion, which went to show that COPA was, if anything, slightly better than Goyder Lock.

We now have three transmitters on the air in Leicester. G2CZ is putting out a T9 signal on 40 metres. He is using COPA to a half-wave Zepp. He has also built a push-pull T.P.T.G. for 56 MC., and would be interested to arrange a sked with anyone on this band. G6GF is active on 40 and 20 metres. Congratulations to G5VH—ex BRS601—on obtaining his full ticket; he is using COPA to a half-wave Zepp with 10 watts. BRS650 is now 2BVN, and is building COPA and TPTG for 40 metres. Congratulations, OM, and hope you won't be long before you apply for your full ticket. BRS559 is now awaiting his A.A. permit.

I am pleased to welcome again two new members this month, *i.e.*, Messrs. F. B. Tyler and W. G. Page.

Lincolnshire.—This month has produced a fine number of excellent reports. BRS474 is well on the way towards a full licence. BRS426 is code-improving. BRS103 is still at College in Durham. G6HK is back again on 1.75 M.C. A.C. supply is shortly expected. G5LQ is doing good 10-watt 7 M.C. work and sends a report for BERM giving much the same conditions as other area stations.

DISTRICT 2 CONVENTIONETTE

APRIL 16, 1932

The Black Swan Hotel, Coney Street,
YORK

Tea at 5.30 p.m., to be followed by
the meeting.

All details from the D.R. or C.R.'s.

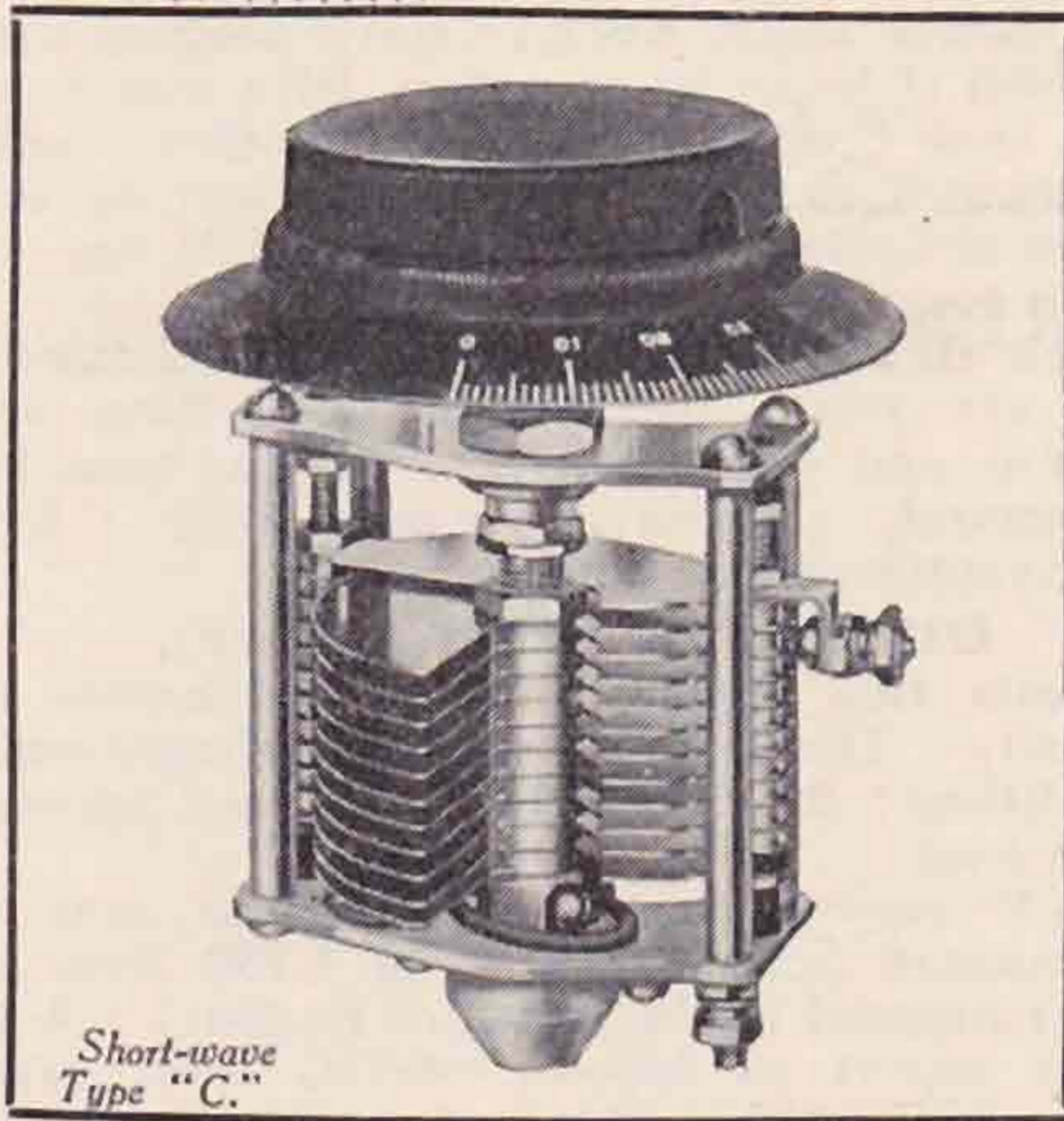
G5IX is raising new members. Active on 3.5 and 7 M.C. G2XG is momentarily inoperative. G2VH is working C.C. and worked Vladivostok with 9 watts recently. G2QH is testing speech amplification and desires fone contacts. G6LI is going onto fone again, it is hoped. No Lincolnshire stations other than G6LI scored points in BERM. The final score was 864 points and 6 zones. A special letter budget for BRS stations is in circulation. An effort is being made to organise local 80-metre contacts every first and third Sunday of the month between 11.00 and noon, G.M.T. Great improvement is noticed on 14 M.C. There is still total absence of Western DX on both 3.5 and 7 M.C.

Northants.—2ATV is busy changing to A.C.

Notts.—Congratulations to ex-BRS521, who is now G5VU. G2VQ is busy erecting a second station about three miles from his present QRA, the call being G2VR, and it will be about five weeks before fully equipped, but is using a QRP outfit in the meantime. The location of G2VR is well placed in the country and quite clear of QRM. All A.A. stations are very active. BRS fellows are, as usual, very alive.

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DISTRICT 5 (Western).

The annual Conventionette will be held at the Grand Hotel, Bristol, on Sunday, May 1, commencing at noon. I am hoping to see 100 present.

The membership of Gloucestershire is still increasing and is now 78, an increase of 50 in 20 weeks. Forty members attended the sixth monthly meeting at Bristol and the keenness for knowledge is shown by the amount of literature being bought. Sixty books from the library are in circulation and Morse classes are in full swing. The C.R. is at home every Tuesday and many attend these weekly meetings.

The Wiltshire letter budget is still full of interest. As it is not practical to hold meetings in this county I hope to see 100 per cent. attendance at the Conventionette.

Oxfordshire has blossomed forth this month. We congratulate 2ALR on the new call sign of G5LO and offer him our best wishes and good DX. Three BRS members hope to get call signs during the next few weeks, and this county reports that it is in possession of No. 8 District D.R.'s raincoat, which he left behind at Convention!!!! We hope that Cambridge has now returned his hat, so that he should be able to attend next Convention fully

COME TO TORQUAY!**DISTRICT 6 CONVENTIONETTE****WHIT-SUNDAY, MAY 15**

Meet at G5SY, "Sherrington," CLEVELAND ROAD, at 3 p.m. Tea at 6 p.m.

Station Visits.

Dinner, 9 p.m., at St. James' Hotel, Victoria Parade.

Make a point of spending your Whitsun Holiday in the Sunny South.

clothed again! Will members please let their respective C.R.'s know if they are making use of the National Morse transmissions?

DISTRICT 6 (South-Western).

First of all don't forget the No. 6 District Conventionette which is to be held at Torquay on Whit-Sunday, May 15. It is hoped that a jolly good crowd will turn up, and the arrangements at the moment are for all those who are coming to meet at G5SY's house any time during the afternoon, having tea there, then on afterwards to a Hamfest at a local hotel. All those who are coming, please let me know, or else drop a line to G5SY. This district is very widely scattered, and it reflects great credit on those who have already promised to attend when it is considered the distance that they will have to come. **THIS IS THE FIRST CONVENTIONETTE FOR THIS DISTRICT, SO LETS MAKE A SHOW OF IT!**

G5SY has now completed his rebuild, and is using the 67 ft. Windom with good results. He has worked plenty of W's and VE's, and a fair number of ZL and VK's. He would like to know if any other G stations have consistently worked PY,

VK, LU and ZL stations in the early morning, between 0800 and 0915, in the winter months, G5SY finds that plenty of South American stations and W's from the Middle West come in at about 2300.

BRS 458 has been carrying out bench experiments with a 7 M.C. crystal, but whilst cleaning it, had the misfortune to drop it on the floor. He has now definitely proved that crystals do NOT bend. He says he intends to use a 3.5 M.C. crystal next time.

2AWJ seems to have done really well in the B.E.R.U. listening tests, and has got together quite a good list. Good luck to him.

G6WS, of Sidmouth, will be on the air again at the Easter vacation at his new QRA, and will be CC. G5QS still seems in the throes of designing his lay-out, which will be quite a posh affair when it is done. It has necessitated removing the whole of the gear from a shack in the garden, including the A.C. mains, and several unlooked-for snags were struck. G5WY is also now on CC. using the AOG aerial, but results at the moment are not too good. Never mind, 5WY! Keep pegging away. There will (I hope) be two more BRS men locally by the time this is in print, and another "local" now amongst us is G2XX, who has just started a business in Cullompton. Good luck, OM, and may we soon hear you on the air.

That's all for this month, OM's, but Cornwall—where are you? All dead? Let's have some reports in, and also the Plymouth gang must keep up to scratch. Anyway, once more, DON'T forget the Conventionette at Whitsun.

DISTRICT 7 (South-Eastern).

Reports this month from Hants, Surrey and Kent only. These show an all-round improvement in conditions: the 14 M.C. band is at last becoming a little lively.

G6WY reports that many stations note the extraordinary good reception of 1,750 Kcs. fone stations situated in the North of England. Active stations report as follows:—G2IG after experimenting with Push-pull, wonders if it is worth it. G5FN relates how the Navy builds 2 KW S/W transmitters and then fail to raise anything. 2BZW is going all out for his radiating permit. G5IB is testing crystals and G5IH is very bucked about the return of good conditions on the 7 M.C.'s band. G5OQ and G2JH are going strong with QRP and G5WB has rebuilt his RX. BRS505 and BRS681 both report a remarked change for the best in conditions. G6WY has put in a new power supply and was WAC within three days.

G6NK reports keen activity throughout Surrey. The monthly meeting was held on March 6 at G6GS and was attended by 19 hams. It was decided to hold a 5 metre Field Day on Sunday, May 8, and a number present promised to go right ahead with construction of apparatus for the event. Anyone interested in this coming event may obtain further particulars from the C.R. (G6NK). G2YD is to be congratulated on becoming WAC and we welcome G5LA back on the air again after his recent illness.

G6GZ is quite happy with the running of the combined Letter Budget, which now averages 15 letters each month. The new feature "Exchange and Mart" is proving very popular. One outstanding report this month comes from G5UY, who

claims a QSO with RV2A Persia, with 6 watts on 3.5 M.C. The following contributed to Letter Budget for March: G2GG, G2BI, G5NF, G50, BRS343, G5RS, G5UY, G5JZ, G2PF, G6NZ, G6BU, G6GZ, 2BCS, 2BDP. The leading article in the Budget was a description of a SG-O-Pen receiver by G6GZ.

G2AO, in a letter to the Editor, says his "Super DX Contact," mentioned in last month's notes, was effected using a 99 volt H.T. battery and a Peanut valve. He desires to thank G5KOD for his untiring help and advice, without which this achievement would not have been possible.

DISTRICT 8 (Eastern).

The D.R. has received a rather offensive letter from a member who omits to sign himself. Well, OM, I've a few words of advice for you. Never write anonymous letters. It's not done. If, however, you feel you must do it, take the trouble to use a typewriter. Your writing has not changed since you sent me that QSL nearly three years ago. Lastly, if you care to make your remarks through the correspondence column of this paper, I will reply through the same medium.

LONDON DISTRICTS HAMFEST

APRIL 27, 1932

Pinoli's, 17, Wardour Street, W.1

6.30 for 7 p.m.; 5/-; ham dress.

NORFOLK.—The county seems to be waking up. G5UF is trying a half-wave Zepp on 7 M.C. and finds it better than other types. We all extend sympathy to 2AAK in his sad loss. He was asked to join a syndicate to take tickets in the Irish "Sweep." He refused, but when the syndicate drew a horse he valiantly offered the loan of his RX so that they could follow the race. The horse took second place, and the party, in its excitement, kicked the RX to pieces. Only the grid-leak was unharmed—R.I.P. G2CJ now has his QRP 3.5 M.C. TX perking well and has worked most of the nearer European countries. G5LW has moved to this county. Delighted to have you, OM, and may your DX here compare favourably with that of Harrogate. BRS769 is a new and active member who hopes to have a full ticket soon.

SUFFOLK AND HUNTINGDON.—G6BT and G2RW hold the fort alone. Won't any of you others give them a hand?

CAMBRIDGE.—G6BS reports the usual activity but little of outstanding interest. G5YN has left the county, and we wish him the best of luck. While working on 1.7 M.C. the 3.5 M.C. harmonic of G5JO was R6 in Bristol though his fundamental was only R2.

DISTRICT 9 (Home Counties).

The following attended Districts 8 and 9 Easter Conventionette at Clacton:—*London District*: G2ZQ, G6LB. *Kent*: G6WY. *Kingston*: G2MR. *Herts* was represented by the C.R., G5FB, and *Essex* by G6QO, G6DH (both oprs.), G2AF, G2WG,

G5QV and BRS577. Headquarters Council was represented by G6CL, G2VQ, G5AR, G2CX, G6CW, and G6LL. No one was present from District 8. The above assembled punctually at the new Town Hall, and several matters of interest were discussed during the two hours session. All adjourned for tea at the new QRA of one of our oldest brass-founders, A. J. Dixon, late G6PD (Enfield). He put us on an excellent tea. The Relay Station was visited later, and next day 14 members visited the shore station working the Harwich group of lightships. This is situated at Walton-on-Naze. A very interesting hour of inspection was spent here, interspersed with QSOs with the Gunfleet Lighthouse and lightships in the group.

The DR for District 9 feels he has a legitimate grouse of the Mark VII magnitude. Of 18 present, seven came from Essex (five of these were local), one from Herts, and none from District 8. Reviewing the promises given the apathy is really appalling. Contrast this with G2VQ, who came by road from Nottingham, picked up G6CL at London, and journeyed down to Clacton, returning same route at the end of the day, and those who came from Surrey, Kent and Herts. Nevertheless, we enjoyed it immensely, but Essex and district might have made a better show if only backing their promises.

We are pleased to welcome a new station, G5VT, at Bishops Stortford. Congratulations to 2BQQ, of Westcliff, whose call is now G5VQ.

A new AA member, Mr. Max Buckwell, of Leigh-on-Sea, also visited Clacton, but was too late for Conventionette. We much regret G2HJ was unable to be with us, being still invalided, and trust he will soon be restored to normal health.

BRS669 and 490 also G5LY have reported, and the latter will be active again shortly.

DISTRICT 10 (South Wales and Monmouth.)

Bad conditions have been affecting work at all stations in the district, though there are a large number of members active.

G2PA and G5NS have been taking part in the 3.5 M.C. tests, and the latter has had some good European DX contacts with low power. G5LP, who is getting out exceptionally well on 7 M.C. with what should be a 14 M.C. half-wave Windom, who has had an abortive QSO with the States, using his 7 M.C. QRP C.O.P.A. outfit. G5KK, one of the new members in Newport, is putting out a very nice CC note on 7 M.C., also using a 40-metre crystal. 2BRF, of Penarth, is now only awaiting his two-letter call, and should be well away on 1.75 M.C. by the time this is in print. It is hoped that we shall be able to arrange a regular weekly four-cornered schedule on 1.75 M.C. shortly, with G6GW, G5FI, 2BRF and G6FO, telephony being used where possible. 2BPM, who ploughs a very lonely furrow up in Radnorshire, many miles from the nearest ham, is working up his Morse for a full ticket, and reports regularly on receiving conditions. The Cardiff BRS stations are active, but conditions on the higher frequencies are not giving them much to which to listen. G6FO continues to keep his schedules on 1.75, 3.5 and 7 M.C., but the G station concerned on 40 metres has not been workable for over two months. At present, the only Gs heard at anything like normal strength are those outside a radius of about 250-300 miles. There appears to be a permanent blanket over all signals within this

radius. It is hoped to have a new station in operation for the summer, working from a 25-cycle A.C. supply. This will be contemporaneous with G6FO, but there are doubts about the quality of the note!

An area meeting was held at the Cardiff Technical College on Thursday, March 3, when the proposed scheme for co-operation with the College Radio Society was unfolded to those present. We are indebted to the Principal of the College, and to Mr. Vernon, the physics master, for the facilities which they have placed at our disposal. There were present at this meeting:—G2PA, G5KK, G5NS, G5WH, G6FO, G6GW, 2BPI, 2BFR, BRS573, BRS659, BRS727, BRS766.

The Letter Budget has been a disappointment again this month, only four contributions being received. It has been held over to see if more will be forthcoming for April. I should be glad to hear from any member with whom I have not personally been in touch who would like to have information about the L.B.

No. 5 (WESTERN) DISTRICT CONVENTIONETTE.

Sunday, May 1, 1932

THE GRAND HOTEL
Broad Street
BRISTOL

ARRANGEMENTS:

- 12 noon. Assemble Grand Hotel.
- 1 p.m. Luncheon.
- 3 p.m. Meeting and General Rag-Chew.
- 4.30 p.m. Tea.
- 5 p.m. Station visits, etc.

Tickets are 5/- and members should notify their respective C.R.'s not later than April 22. We look forward to a large number from other Districts, and these should notify G2OP direct not later than April 23.

The following stations are known to be active:—G2PA, G5KK, G5LP, G5NS, G5TW, G6FO, G6GW, 2AIS, 2BPM, 2BRA, 2BRF, BRS245, BRS573, BRS659, BRS727, and BRS766.

We welcome as a new member Mr. Allbright, of Newport.

DISTRICT 12 (London North).

Activity in the district seems to be confined mostly to rebuilding TXs and one-valve RXs to overcome QRM from motors. BRS404 is waiting for his AA licence. BRS478 and 536 are still sending in very good DX reports. G5SG has rebuilt his TX again! G6CL has given up gas mains for A.C.

I am still in a difficulty for a QRA for meetings and hope that someone will oblige.

G5SL has been getting more members. Congratulations, OM. I think you must hold the record for this district.

DISTRICT 13 (London South).

The annual general meeting of the South London and District Radio Transmitting Society took place on March 3, when Mr. H. Bevan Swift gave a most interesting address on "Early Experiences in Amateur Transmission." Members of this area, both B.R.S. and transmitting, are welcomed as members. The subscription is fixed at 5s. per annum, in order to cover working expenses and hire of room at the Brotherhood Hall, West Norwood. Meetings at 8 p.m. every first Thursday in the month.

G2AI is as active as possible on 7 M.C., using a 33-ft. Windom. (How on earth does it work, OM.?) G5AW is now using primary keying, which has cured all clicks. He is moving nearer the DR in June. (The affection is appreciated, OM., but it's your funeral!) G6BB is also trying a new aerial, a $\frac{1}{2}$ -wave Zepp. G5PL is trying A.C. valves in RX. G5YH has gone to Italy for a rest cure.

DISTRICT 14 (London East)

At our last monthly meeting held at Chingford, members expressed their great regret at losing G2ZN as a member. Among those present at the meeting were G2QW and G2VV, and new members BRS752, 813 and Mr. Parry. Slow Morse tests are being maintained, and publicity has been given to this in a number of local newspapers. Week-ends April 9, 16 and 23 are being reserved for the District Field Days which are to be held at Rookwood Hall, Abbis Roothing, Essex. All members intending to take part should therefore keep in touch with District Representative for this information. G6FY has already completed the district transmitter, which will be used for future Field Days. Our next district meeting is being held at G6LL, 178, Evering Road, Clapton, E.5, on Tuesday evening, April 26.

DISTRICT 15 (London West and Middlesex).

The March meeting was fairly well attended, and the next is fixed for April 23 at G6WN at 7.30 p.m. On this occasion G2IY will be our host.

Four or five stations entered for the B.E.R.U. tests, and our congratulations should go to G6YK, who scored over 2,000 points.

Very few reports have come to hand this month, but the usual stations are active, as I have heard them.

Conditions still remain rather poor and DX seems to be lacking. Contacts are possible with all continents, but signals are weak.

May I remind the area of the "Hamfest," as it is my hope that you will all be there?

SCOTLAND.

As I write, conditions seem to have taken a turn for the better, and on 14 M.C. at least certain periods during the month have been phenomenal. We did badly in the B.E.R.U. contest, and in the main this may be put down to the poor conditions pertaining there. Our fellows in the South were much more fortunate, and were able to work comfortably stations we could not even hear. An outstanding performance, however, was put up by BRS417, of Glasgow, whose total of points closely approximated 3,000, and he certainly deserves all credit for his perseverance.

G6RG informs me that he has inadvertently purchased a crystal which doubles to the same frequency as that owned by G6RT. The fundamental frequency is 3,515, but as G6RG uses a

large air-gap which produces quite appreciable QSY, and G6RT uses none, no interference may be anticipated. I would, however, stress the necessity for examining these notes each month for the purpose of keeping your lists up to date, in order that there be no such clashes in future.

Another new crystal falls to be added, namely, that owned by G6KZ, of Leith, the fundamental frequency of which is 7,170.

I am glad to report that G6SR is once again in harness and rumour has it that he has just worked his first "W." G5XQ has not been so fortunate in the matter of his return to health, and I am informed is making slow progress.

I am sorry that I found it necessary to cancel the "A" District meeting due on March 30, but as I had occasion to leave Glasgow for several weeks at that time, I had no alternative. The next meeting will therefore be held on Wednesday, April 27.

I am pleased to welcome to the ranks of the transmitters in "D" District Mr. W. McKenzie, 183, Gt. Junction Street, Leith, who has been allocated the call G6KZ, and consequently relinquishes 2AUF. All success to you, OM.

In the February issue, the writer commented on the appointment of Mr. J. Kilgour vice Mr. John Batty to our G.P.O. inspectorate. Mr. Kilgour now informs me that his activities are to be directed elsewhere, and that his successor in the West of Scotland will be Mr. Brough. Mr. Brough has now taken over, and if they play the game, our members can expect a fair deal from him.

H.Q. have commented on the fact that members WILL send their entries for the various Society contests anywhere other than to the individual named as the correct recipient. Please give this your attention, as such procedure entails much needless re-direction of correspondence at H.Q. Recently one of our members took an entry by radio to H.Q., and the irony of the whole thing lay in the fact that the station which accepted the message for QSP was illicit and surreptitiously dropped the entry into H.Q. letter-box. Please, therefore, read carefully the instructions given in the BULLETIN and follow them.

G6IZ has again kindly offered a small prize for a Scottish contest during the summer months. The form this will take has not been decided, but the writer is consulting with Mr. Ingram on the matter, and will supply full details in due course.

NORTHERN IRELAND.

After a considerable lapse there is a certain amount of activity, by a few stations, to report this month. I have to welcome two new transmitters, viz., GI5QX and GI5SQ. GI5SQ has already worked most European countries and CT2AN on 7 M.C. Difficulties with the aerial system have limited the work done, but he hopes to improve matters soon.

GI6YW finds conditions very poor on 14 M.C., but on this wave and on 7 M.C. has been fairly active. He has noticed some DX coming through at midnight on 14 M.C., though he has been unable to contact as yet at this late hour.

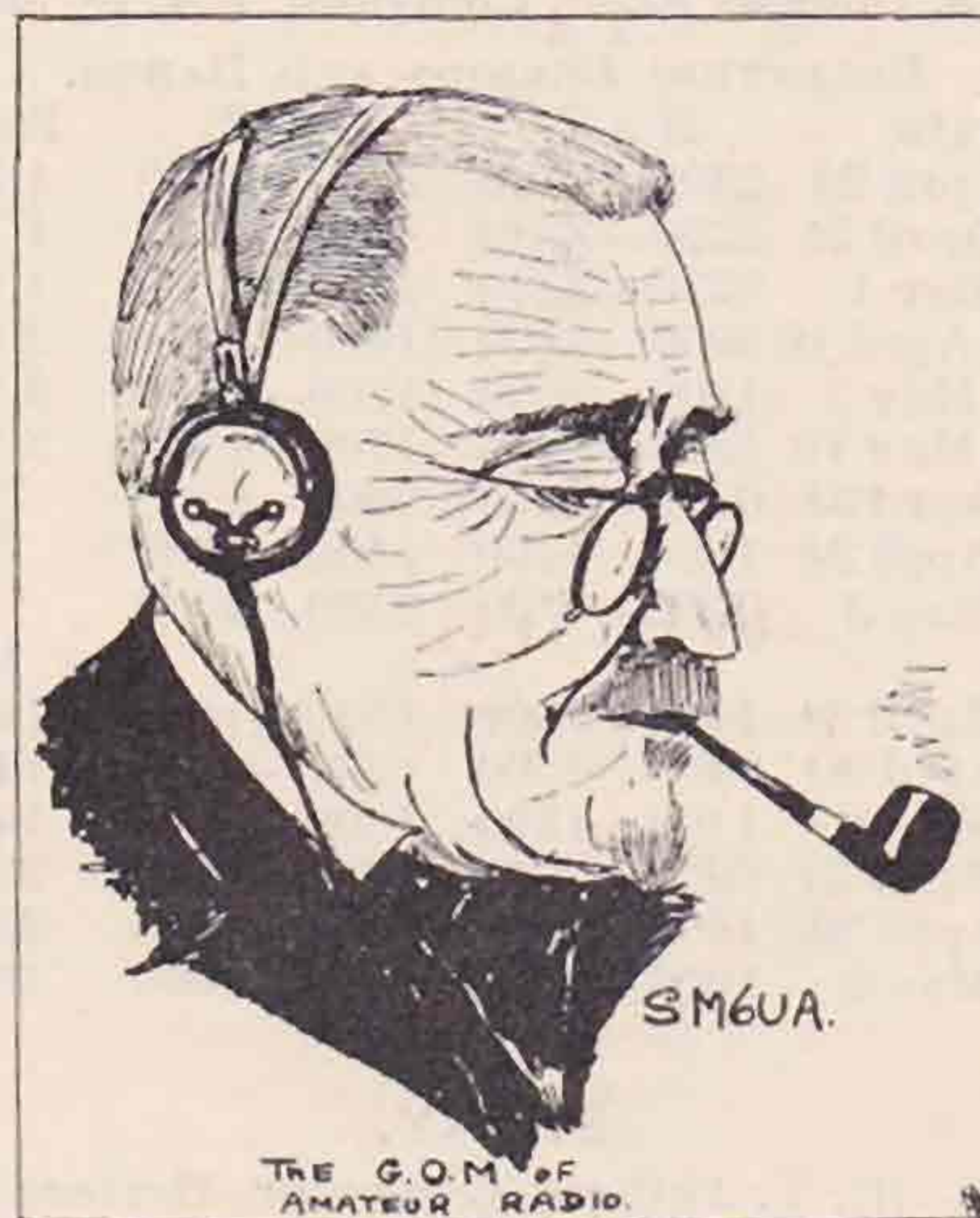
GI5MO has been active on 14 M.C. and has been in contact with several further European stations.

There are other active stations in the area, but they have omitted to send reports.

EUROPEAN NOTES.

We learn from Mr. Vydra (OK2AG) that he is leaving for the U.S.A. and will therefore relinquish his position as R.S.G.B. representative in Czechoslovakia. In thanking Mr. Vydra for his past help on our behalf, we must wish him every success in his new sphere of life.

Conditions in Czechoslovakia seem to be fast improving and plenty of DX has been done on the 7 and 14 M.C. bands. The 28 M.C. band still continues dead.



EMPIRE NEWS—(continued from page 353).

Northern India and Burma.

By VU2FX.

February.—No Northern Indian stations have reported this month, but VU2CS, VU2BG, VU2AY and VU2FS are known to be active.

The writer visited VU2CS a month ago and was very much impressed with the neat and efficient layout of the crystal-controlled phone transmitter. A push-pull C.O. feeds a pair of LS6B's in the power amplifier via a buffer amplifier consisting of a pair of ordinary receiving type screened-grid valves. Speech and music from VU2CS have been received at excellent strength at VU2FX.

It is understood that VU2CS now relays the programmes of VUC, Calcutta, on the 7 M.C. band.

VU2FX was active throughout the B.E.R.U. contest. He found conditions fair to good on 7 M.C., and poor on 14 M.C. The 3.5 M.C. band was also explored, but apart from a few unidentified phone carriers and GFM, no noteworthy signals were received. The latter station was R8-9, and it is thought that British amateur stations might have been worked on 3.5 M.C. if they had not been so busy on the higher frequencies. An unsuccessful attempt was made to work YI6KR on the 28 M.C. band.

Severe atmospheric interference marred reception on the 7 M.C. band during the last three test periods, between the hours of 1700 and 0300 Indian Standard Time.

Reception Tests.

The dates and periods for the next Tests are given below, and in order to prevent confusion, dates and periods are given both in B.S.T. and G.M.T. For further details please refer to December and January issues of the BULLETIN. The logs turned in by our Dutch friends proved most interesting, particularly those on the 1.7 M.C. band where they received a number of British stations. Logs are wanted from Scotland, Ireland and Wales, and the help from members in these regions will be appreciated. All logs should be sent to T. A. St. Johnston, 28, Douglas Road, Chingford, E.4, by May 12.

RECEPTION PERIODS AND BANDS.

Date.	B.S.T.	G.M.T.	Band.
Sat., April 23	2300—2400	2200—2300	1.7 M.C.
Sun., April 24	2230—2330	2130—2230	1.7 "
Sun., May 1	2230—2330	2130—2230	1.7 "
Tues., April 19	2000—2100	1900—2000	3.5 "
Tues., May 3	1900—2000	1800—1900	3.5 "
Tues., May 10	1800—1900	1700—1800	3.5 "
Sun., April 24	0700—0800	0600—0700	7 "
Sun., April 24	1600—1700	1500—1600	7 "
Sun., May 8	0000—0100	2300—2400	7 "
		(Sat. May 7)	
Sun., April 24	1400—1500	1300—1400	14 "
Sat., April 30	1400—1500	1300—1400	14 "
Sun., May 8	1100—1200	1000—1100	14 "
Sun., April 24	0900—1000	0800—0900	28 "
Sat., April 30	1500—1600	1400—1500	28 "
Sun., May 8	1000—1100	0900—1000	28 "

STRAY.

G6QC (E. T. Pethers, Gwynmur, Herbert Road, Rainham, Kent) requests reports on his 1.75 M.C. transmissions as he is collecting data on an unorthodox aerial system.

Notice to Contributors.

The Editor is pleased to have manuscripts submitted to him for publication, but would remind contributors that, owing to lack of space, a delay often elapses between the receipt of the MS. and the date of its appearance in these pages. All matter intended for publication should be written on one side of the paper only and preferably typewritten (double spaced). Diagrams should always be shown on separate sheets. Rough sketches can be re-drawn by our draughtsmen. Photographs, if any, should not be smaller than ¼-plate as otherwise the reproduction will be poor.

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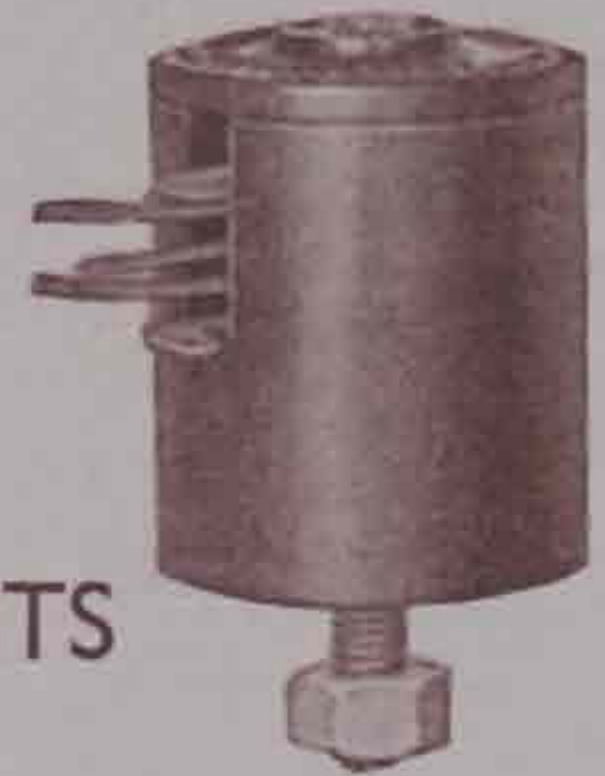
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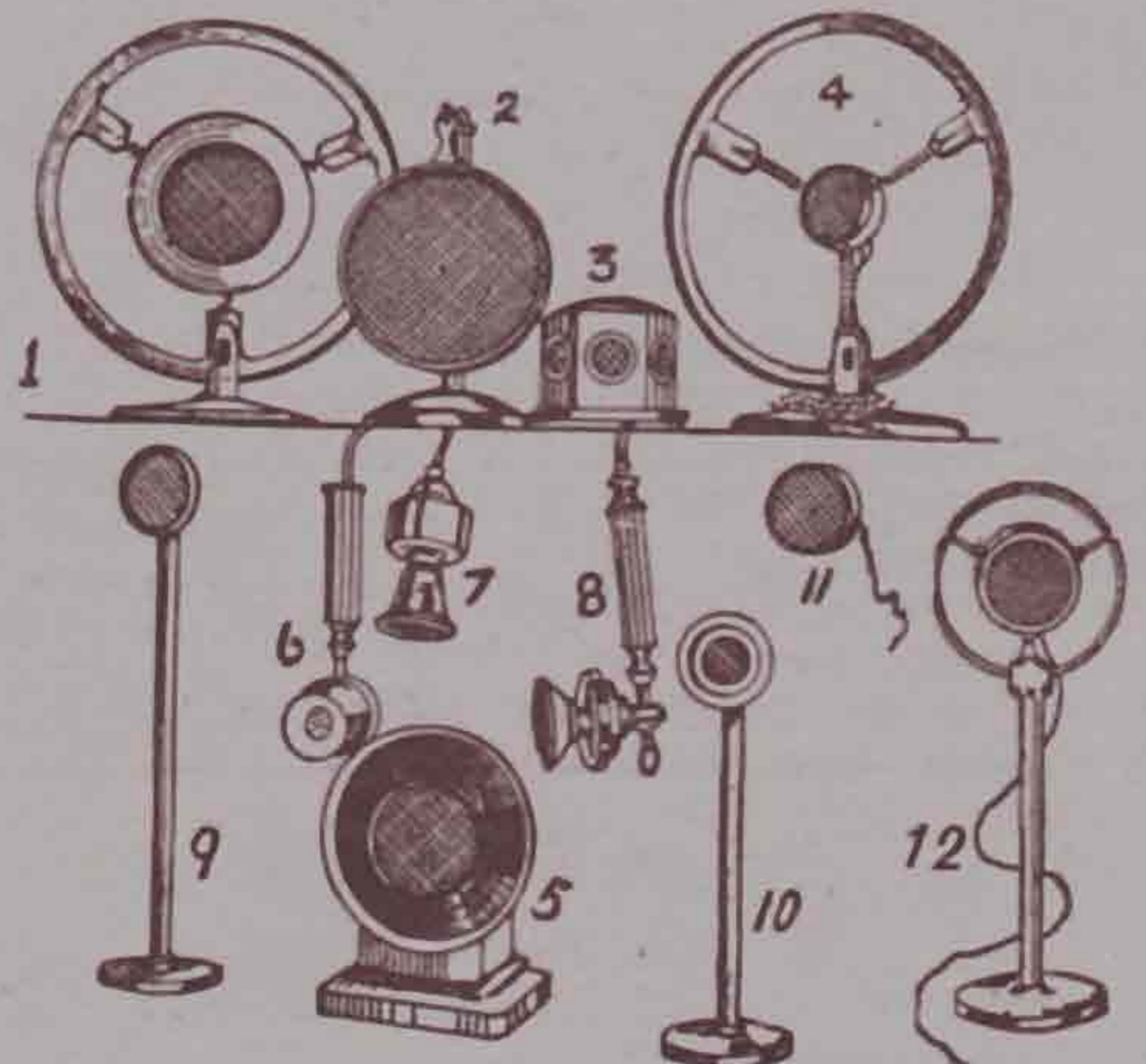
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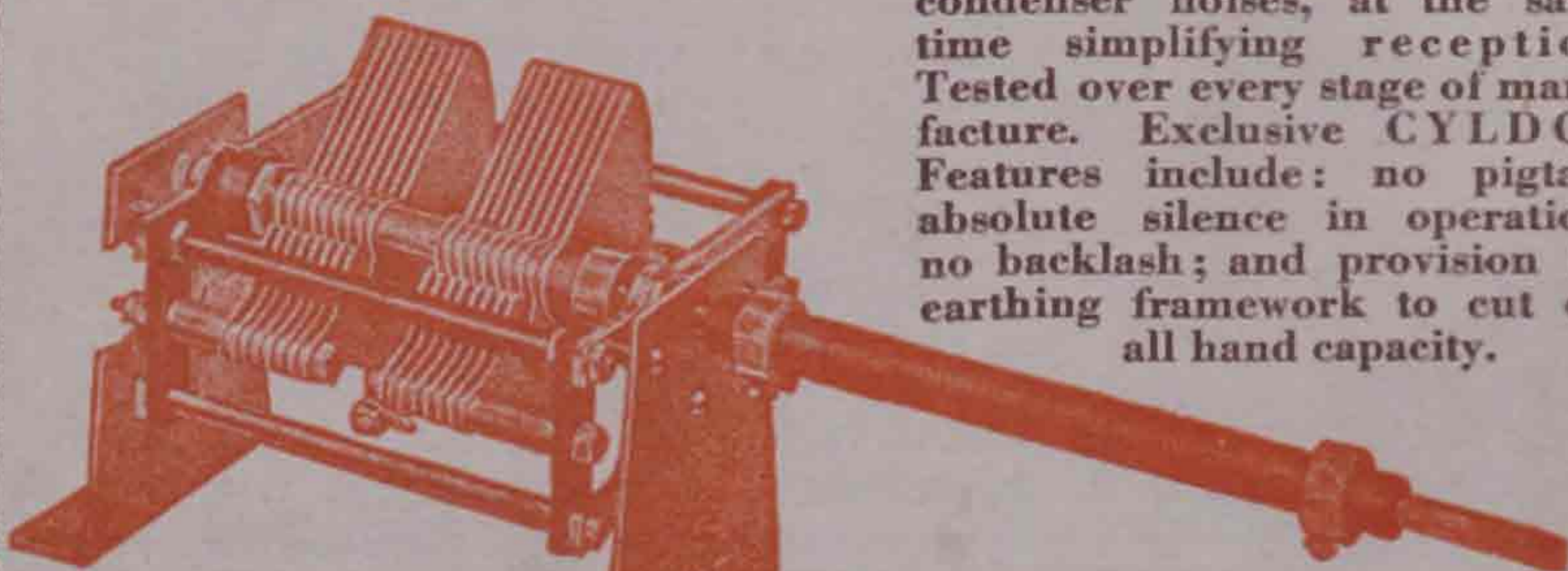
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