



T. & R. Bulletin

Incorporating

The Journal of the Inc. Radio Society of Great Britain

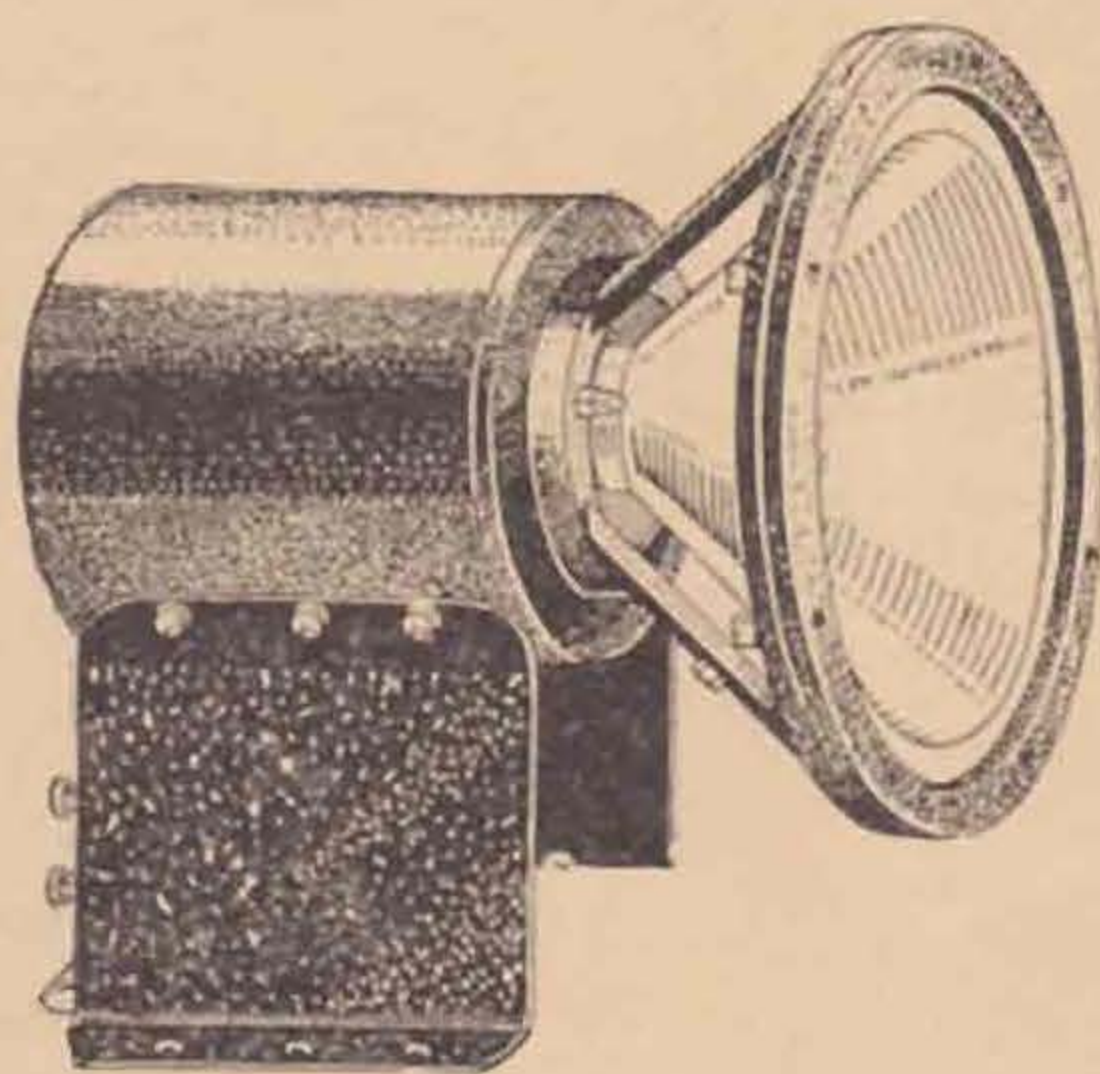
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Vol. 4. No. 2. August, 1928 (Copyright)

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"The Wireless World" says:

"We hope that other dry battery makers will follow Messrs. Ripaults' lead and come out into the open with details of the average life which may be expected from their cells."—See page 478, May 2nd issue.

FACTS AND FIGURES

The figures shown on the table below in respect of a "High-class Ordinary Battery" are, as a matter of fact, identical with those which recently appeared in a Trade Organ, and from the figures quoted it will be seen that

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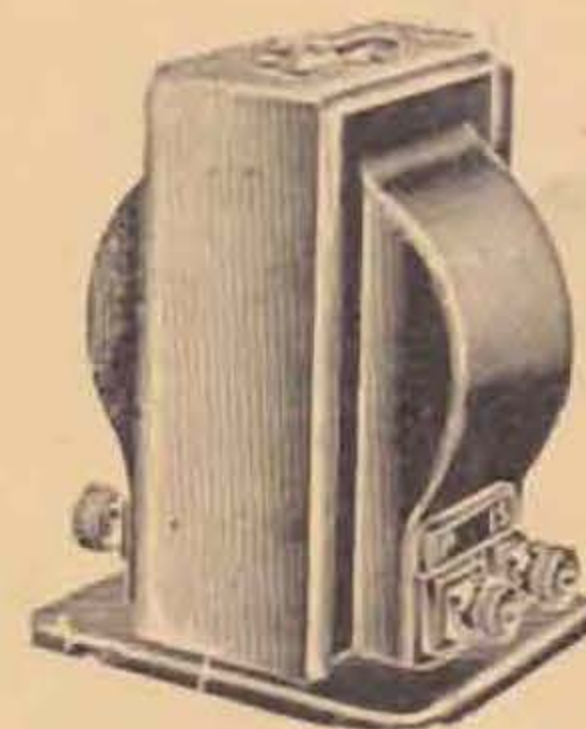
Better Radio

As specified for the R.S.G.B. All Screened Receiver

In the "Society Notes" of the June issue of this journal a protest was made against the quality of some of the components sold to the public. We agree. Satisfaction can only be guaranteed by purchasing components of reputable make.

It is sufficient indication of the quality and reliability of Igranitic components that these four should be Specified for the R.S.G.B. All-Screened Receiver.

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Igranitic L.F. Transformer, Type "G."

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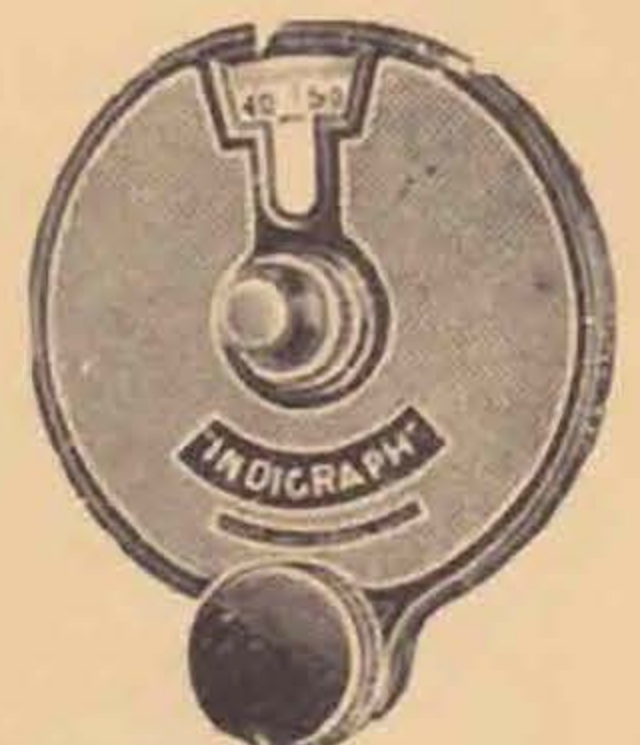
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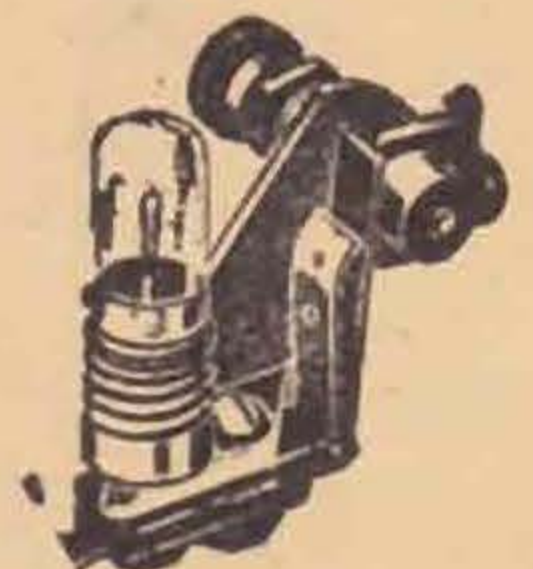
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Igranitic Dial Illuminator.

Illuminates the scale of the "Indigraph" Dial from the rear.

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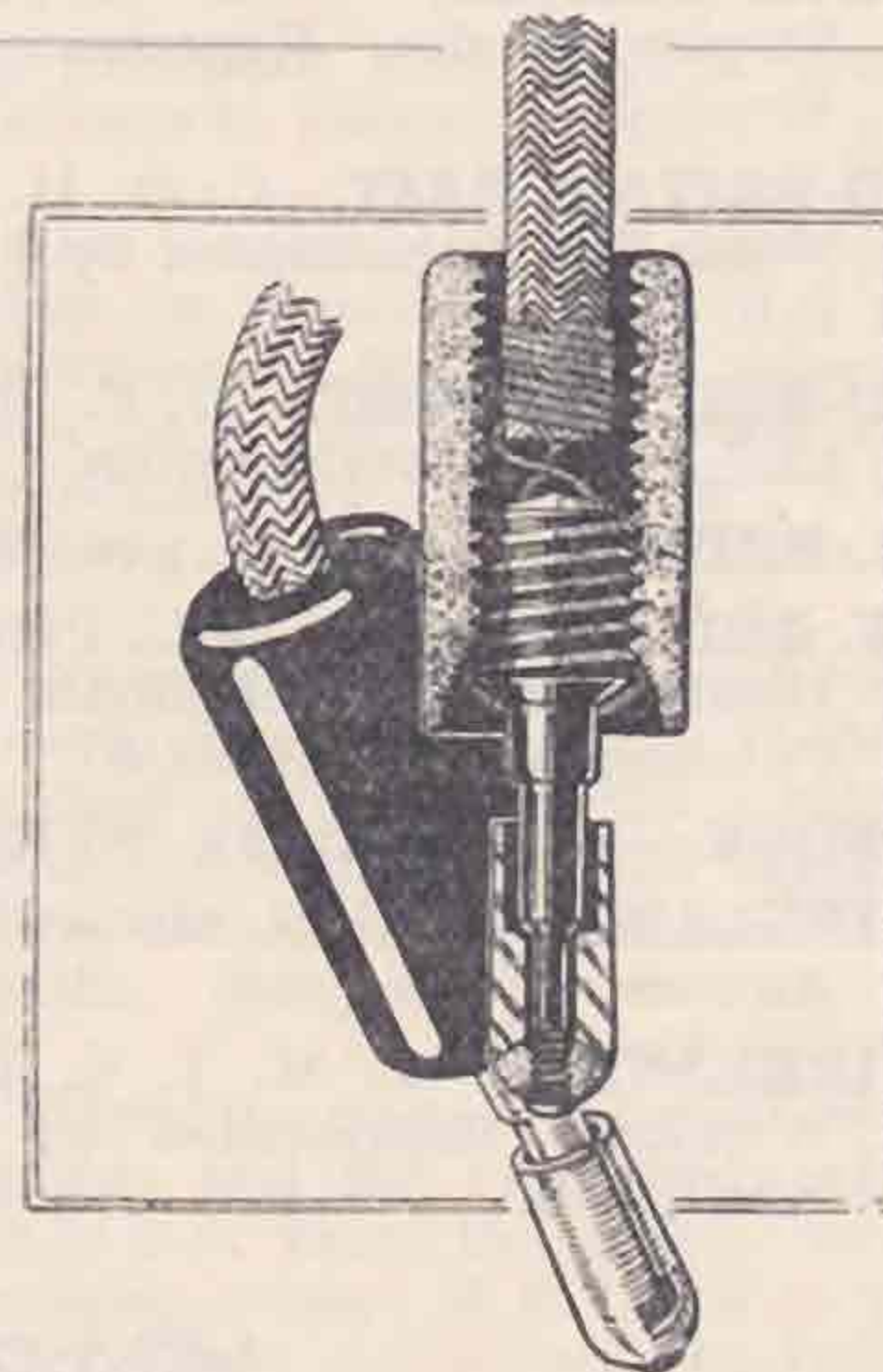


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T&R

BULLETIN.

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AUGUST, 1928.

Vol. 4. No 2.

SOCIETY NOTES

According to the letter which most transmitters will have received from the Post Office this week, it would appear that the new conditions are not going to be put into force until October 14, and, further, that existing transoceanic permits will continue to that date. This extension gives us more time to prepare for the new conditions and to consider all they mean. From letters we have received, it is evident that some members do not look favourably upon the new licences, while the majority consider that conditions will be much improved. Of course, we all deplore the narrowing of the bands, but then we must remember that the call upon the short-wave region is in very heavy demand and it is hard to find room for all. In this connection, it is the 10-metre band which will be one of the most interesting problems. It is largely up to radio amateurs to prove to the world that these excessive high frequencies can be used for practical purposes. Our American cousins have already done some valuable DX work with 10 metres, which tends to show that there are possibilities.

* * *

We were glad to meet such a number of American friends at the July London Area Hamfest. We hope they will carry back happy memories of the jolly evening spent together. We were specially pleased to meet the veteran radio worker, Dr. Everette, of California, and to hear something from him of the experimental work he has done. From accounts given, it seems that the conditions of radio work upon the Pacific Coast are anything but ideal. Bad QRM from powerful coast stations, coupled with adverse static conditions, appear to

be prevalent there, and it must require a lot of patience to tolerate them.

* * *

One curious incident occurred at the Hamfest when Dr. Everette met for the first time his fellow-countryman, Mr. P. G. Caldwell (NU6COG), who lives only thirty miles from him across the San Francisco bay. They came 6,000 miles and met together at a London Hamfest!

* * *

We were also extremely interested in the excellent speech given by Mr. F. S. Huddy (NU7SW), when he told us some of the conditions under which American hams get transmitting licences. We have often wondered how so many get licences in the States. Now we know!

* * *

When the so-called fusion between the T. & R. Section and the main body of the R.S.G.B. was made last year, the mystic letters T. & R. were dropped, except in the case of our magazine. The old T. & R. committee adopted the title of "The General Committee," and presumed that they could act under that section of our Articles of Association relating to that Committee. This has just been discussed at a special combined meeting of Council and Committee, when our President pointed out that such action was incorrect, and that the committee must continue to act under some other title until the Articles of Association could be amended to suit the case. It was then and there decided to revert to the old cognomen of T. & R. Committee for the time being, but acting under the rules of Constitution passed at the Convention last year,

It must be remembered that the "General Committee" referred to in the Articles of Association was founded when the Society had a large number of provincial societies affiliated to it. These societies were divided into groups and each elected its representative to serve upon the General Committee, together with a few members of Council and the officers. The meetings were held two or three times a year. Owing to the rapid demise of the affiliated societies, the General Committee was no longer necessary, and it was accordingly disbanded, but the rules governing its constitution are so framed that they could not very well be used for any other purpose than that for which they were intended.

* * *

We wish to tender our sincere thanks to those members who took heed to the opening paragraph of these notes last month and promptly bought their copies of the annual. There were quite a number who even sent apologies for their neglect. This was not asked for, and we only wanted you to share your part in the burden of the cost for us all. Others again took the opportunity to dictate a little fatherly advice upon us rubbing in facts which we know only too well. Neither did we ask for this, and we may as well assert here and now that it is merely waste of paper and ink writing in such strain. You have elected us to do the work for you and must consequently put up with our methods, however irregular they may appear to you. We would willingly change places with you if you so desire. Headquarters is open from 9 a.m. to 6 p.m., and there is home work every night up to 2 a.m.

* * *

With the holiday season in full swing, it is natural that the thoughts of most members are upon matters other than Radio. But the Committee find plenty to occupy themselves with in the coming Convention and Exhibition arrangements. We are sparing no pains to make this important feature a great success this year and we do hope it will be appreciated. The social side of the functions has been ably planned and should go with a swing. We do hope, however, that some of our requests will receive a little of your attention; particularly we refer to photographs of stations and gear for the Exhibition stand and offers from London members who can accommodate one or two of their provincial brethren during the Convention. We Londoners have been superbly looked after when we have gone into the provinces and we do want to show some of the same spirit in return.

* * *

Wanted: Some more articles for the BULLETIN. The holiday season has run us rather dry and we wanted to issue a special Convention Number for September. We must have some real good ham articles of general interest if we are to do it. Please send them along. If you don't, we shall write some articles ourselves on B.C.L. crystal sets and similar padding to fill up.

* * *

The past month has brought within our ken a number of our brother amateurs from overseas. We have given them a London welcome, and we thank them for giving us that opportunity, for it is only by such personal acquaintance are we able to appreciate fully the conditions which exist in their countries.

Ham spirit is indeed manifest in this country, and we hope that the impressions which our foreign and colonial friends gather from acquaintance with ourselves will do even more to foster and enrich that bond of comradeship which comes only through the medium of Amateur Radio.

A Simple Method of Transmitter Modulation.

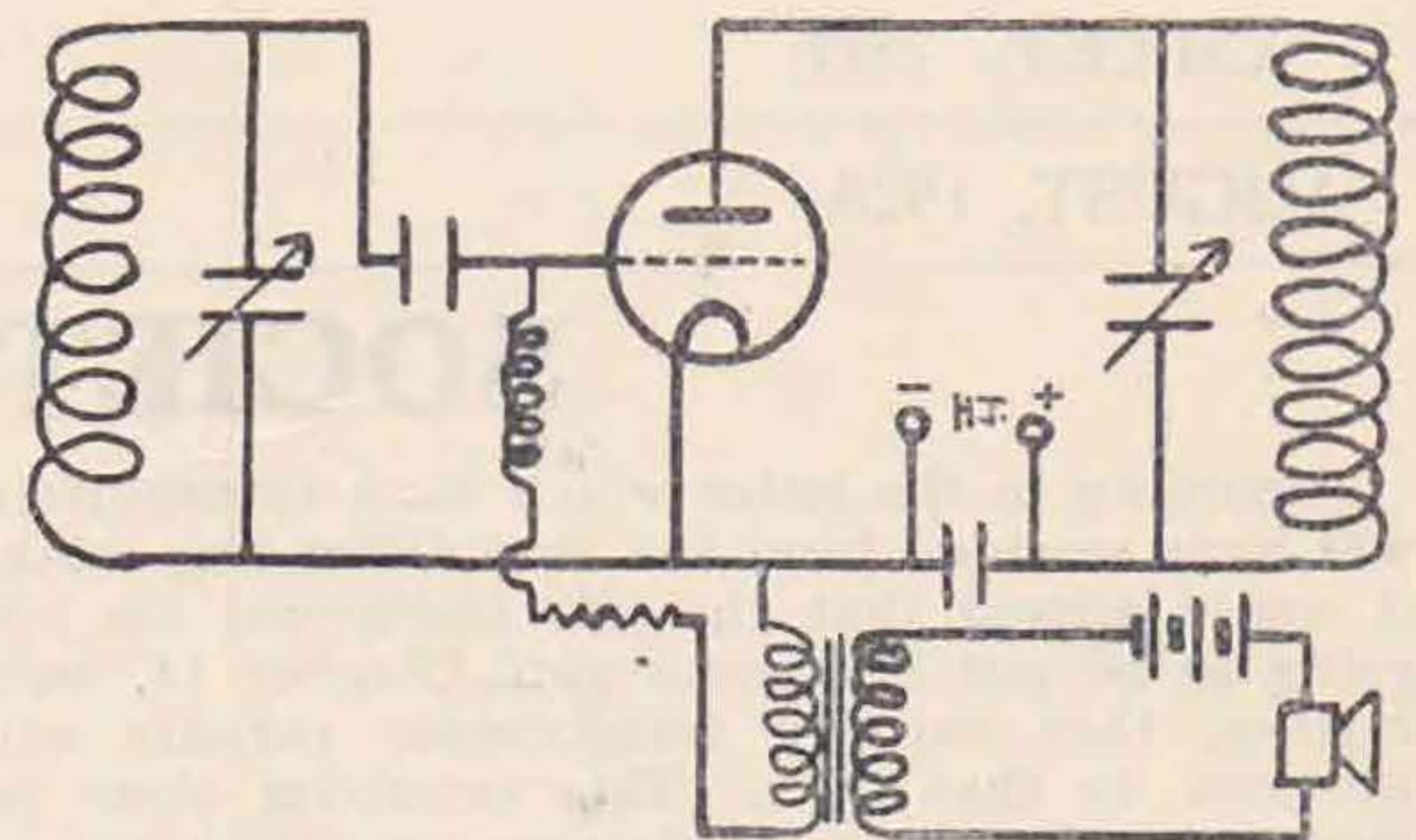
By H. C. PAGE (G6PA).

Perhaps the following little idea will be of interest, and possibly of some use to anyone who has a spare L.F. transformer in his "junk box."

I may as well say at the outset that the method to be described is for grid control modulation and therefore the disciples of choke control need not read any further.

Having carefully blown all the dirt off the transformer, connect the secondary in the grid return lead below the grid leak and the H.F. choke, if you use one. The following diagram will, I hope, make things quite clear.

The microphone battery may be about 12 to 16 volts of ordinary flash-lamp batteries connected in series. Owing to the high ohmic resistance of



the transformer primary the current taken from the batteries will be very small, perhaps as low as 15 milliamps. This, of course, depends on the make of transformer used. The one used here is a Formo 5.1 unshrouded. It has been in use for some time now and has proved very satisfactory.

Using this method of modulation, it is possible to get sufficient control for at least 8 watts. This could probably be increased by using a higher voltage battery. Then, however, the quality would no doubt drop owing to the overload on the transformer.

The above arrangement works equally well on all waves from 45 metres upwards. I have used it for local work on 23 metres. The quality was equally as good, but as the received signal could only have been due to ground wave, the results are not of much value. I know many people scoff at the idea of grid control, but at any rate it is better than that very crude arrangement known as absorption control which even now quite a few stations still use.

Anyway, if you have a spare transformer by you, it is worth a trial, and the results may surprise you. All G6PA's fone comes via just such an arrangement.

The R.S.G.B. "All Screened" Receiver.

By ETHERWORM.

(Continued from July edition.)

In our last issue we briefly described the parts used in building this receiver and also detailed many of the desirable features of the instrument. We have now to enter into certain details regarding the actual construction of the set, the arrangement and lay-out adopted and the circuit to be used.

Turning back to the previous issue, a list of the component parts will be found on page 4. This list was not quite complete as the sizes of Gambrell coils to be used for broadcast bands of wavelengths, etc., were not given, and we give an additional small list of other parts:—

- 3 Gambrell inductances, size "C."
- 1 Gambrell inductance, size "B."
- 3 Gambrell inductances, size "E."
- 1 Gambrell inductance, size "E1."
- 2 Mullard PM12 valves (2-volt screened grid valves).
- 1 PM6.
- 1 PM5X.
- 1 PM Power amplifier.
- The Ferranti.

MORE ABOUT CIRCUIT.

A circuit diagram of the receiver was given in Fig. 1 of our last issue. This diagram included the following units:—The wavetrap acceptor unit, top left-hand corner, the H.F. and L.F. amplifier (as shown in the photograph) and the output unit (for coupling the loud speaker or telephones to the amplifier). It should be understood that the wavetrap and output unit are exterior to the amplifier and consist of two separate units, the former preferably being in a copper cabinet. The circuit illustrated is quite suitable for use on moving coil type of loud speakers when quality reception of 5XX or the local station is desired, as tuning is not unduly sharp so as to cut off or eliminate the modulation side bands. This is largely due to the damping introduced into the last high frequency amplifying valve for reaction control when the screen X is removed. Very sharp tuning is available when reaction is not used and the screen X is in place, and the wavetrap is scarcely necessary unless the user happens to be in very close proximity to the unwanted local station (almost under the aerial). It is a matter for experiment, however, as to whether the user will prefer to use reaction for C.W. work and distant searching or whether the receiver will only be required for telephony, using a separate heterodyne for C.W. The latter arrangement, however, entails an additional critical control and so is not always to be desired, especially having regard to the fact that the straight H.F. amplifier without reaction is likely to be so sharp in tuning as to cause some difficulty in searching in conjunction with the separate heterodyne.

To summarise, the wavetrap is desirable when reaction is introduced (remove screen X and add the variable resistance across the tuned anode coil

preceding the anode bend detector) but is not essential when using the straight H.F. amplifier without the resistance but with the screen X. For best quality telephony it seems desirable to adopt the reaction arrangement as sufficient damping is thereby introduced into the circuit to give quality results and the telephony side bands are not cut off. This argument may appear contradictory, but the experimenter will be able to prove it to his own satisfaction after one or two experiments. The output unit is separate from the amplifier as the 10 mfd. condensers and Ferranti choke are a somewhat bulky combination, and also they may be taken from the circuit should it be desired to feed the steady D.C. anode current through the primary of an output transformer when low resistance loud speakers are used, and it is not necessary to isolate the anode current from the windings.

CABINET.

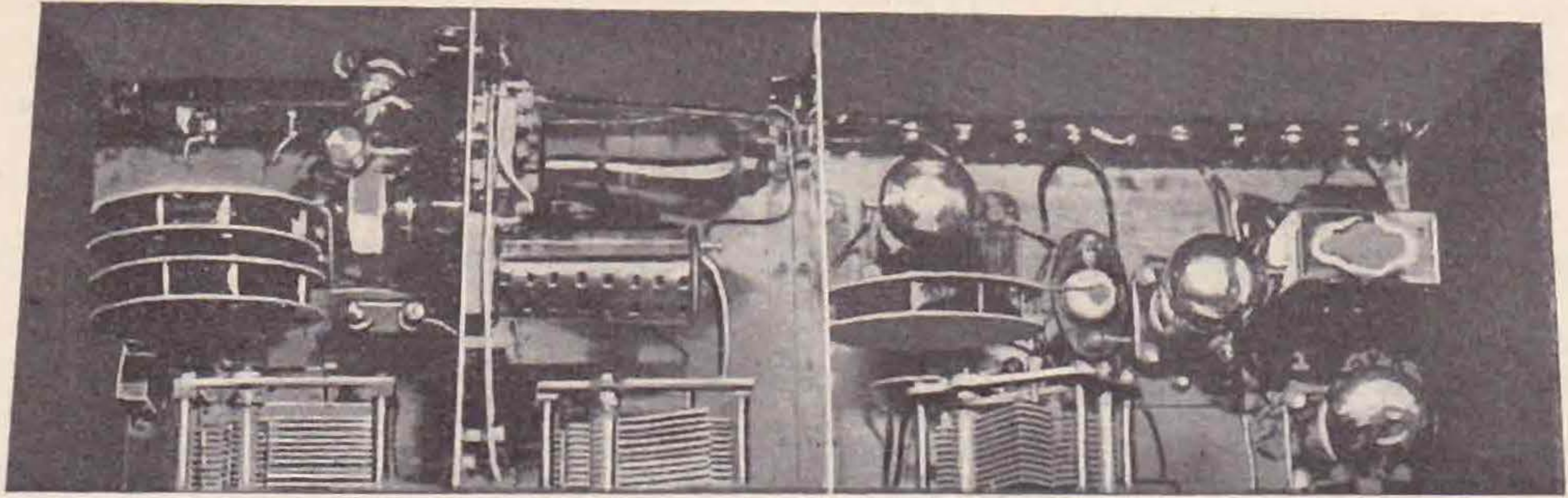
The size of the cabinet depends upon whether or not the screen X is used. If this screen is used the cabinet should be 28in. by 8in. by 8in. deep. Should X not be used a cabinet 24in. by 8in. by 8in. will be ample. The cabinet shown in the photograph is of copper and was made by Messrs. Parroussi to the dimensions given. A stiffening bracket and beading are used inside the cabinet, the beading being of wood (oak) and screwed on the top inside edge of the front panel, the size being $\frac{3}{4}$ in. by $\frac{3}{4}$ in. Two slots are cut in the rear of the cabinet, one for the aerial and earth terminals and the other for the battery terminals, the floor of the cabinet is copper foil which enables screws to be passed through to the wood baseboard for fixing purposes.

WAVETRAP UNIT.

This composes a cylindrical tapped inductance with a variable condenser, the maximum capacity being .0005 microfarads. If the wavetrap is used on longer wavelengths—as, for instance, 5XX—the variable condenser has a .0023 fixed condenser placed in parallel with it. The value of this capacity is critical, and only condensers with guaranteed tolerances should be used. The circuit diagram and data are given in Fig. 2.

LAY-OUT OF COMPONENTS.

The photographs give an idea of the lay-out of the component parts, when a cabinet 24in. by 8in. by 8in. is used. With the larger cabinet, the parts may be spread out with an advantage in "wiring-up" facilities. All wiring is on the de-coupled system, i.e., wires of opposite polarity are carried in pairs and bunched together, and as the cabinet itself is the common negative terminal, all wires are kept close to the floor or sides of the cabinet. Tuning condensers, etc., are wired on the same principle. Such an arrangement results in an absence of unwanted coupling in various parts of the circuit and enables a neat job to be carried out without a "spider web" of wiring. Readers are



referred to back numbers of "Wireless World" for articles on the theory of de-coupled wiring. All wiring which carries radio frequency current is run bare, but other wires are run in systoflex tubing bunched together and treated with amyl acetate, in which a small percentage of celluloid has been dissolved. The result is that the de-coupled wires are bunched and glued together. Points to observe in de-coupled wiring are that a separate pair of + and -ive leads are run to each circuit. Where the cabinet is one negative pole all wires except those carrying H.F. currents are run as close as possible to the sides. Negative tappings from the copper cabinet to terminals on component parts are kept very short and if possible run close to a wire of opposite polarity. For instance, L.T. + and -ive leads are run together, and also H.T. + and -ive.

Referring to the photograph on page 4, July BULLETIN, the arrangement of the component parts is clearly shown so far as the front of the panel is concerned. At the top of the panel we see three Igranic rheostats. In the centre are three Indigraph dials with the illuminator switches just above the dials. Between the second and third Indigraph dials is the Voluvernica reaction control knob, and to the right of the dials are two more Igranic rheostats, the Bulgin push-pull filament switch and jack and the Weston milliammeter which is in the plate circuit of the power valve. The components on the top of the cabinet are the wavetrap coil and Ripaults wavetrap condenser (.0005 mfd.), the Ferranti "B" choke and two Dubilier 8 mfd. loud speaker coupling condensers and Ripaults H.T. battery for screen potential and grid bias, together with Gambrell coils may also be seen. The base-board may be faintly seen beneath the copper cabinet.

The photograph on top of this page shows the interior arrangements of the set with both screens in position and no reaction control, a volume control being used on intervalve transformer. It will be noted that the second screened grid valve is located on the side of the first screen partition, no special precautions being taken to place the second screen around the valve screen. The set is free from reaction with such an arrangement, providing the first stage is adequately screened, but the valve screen potential is somewhat critical.

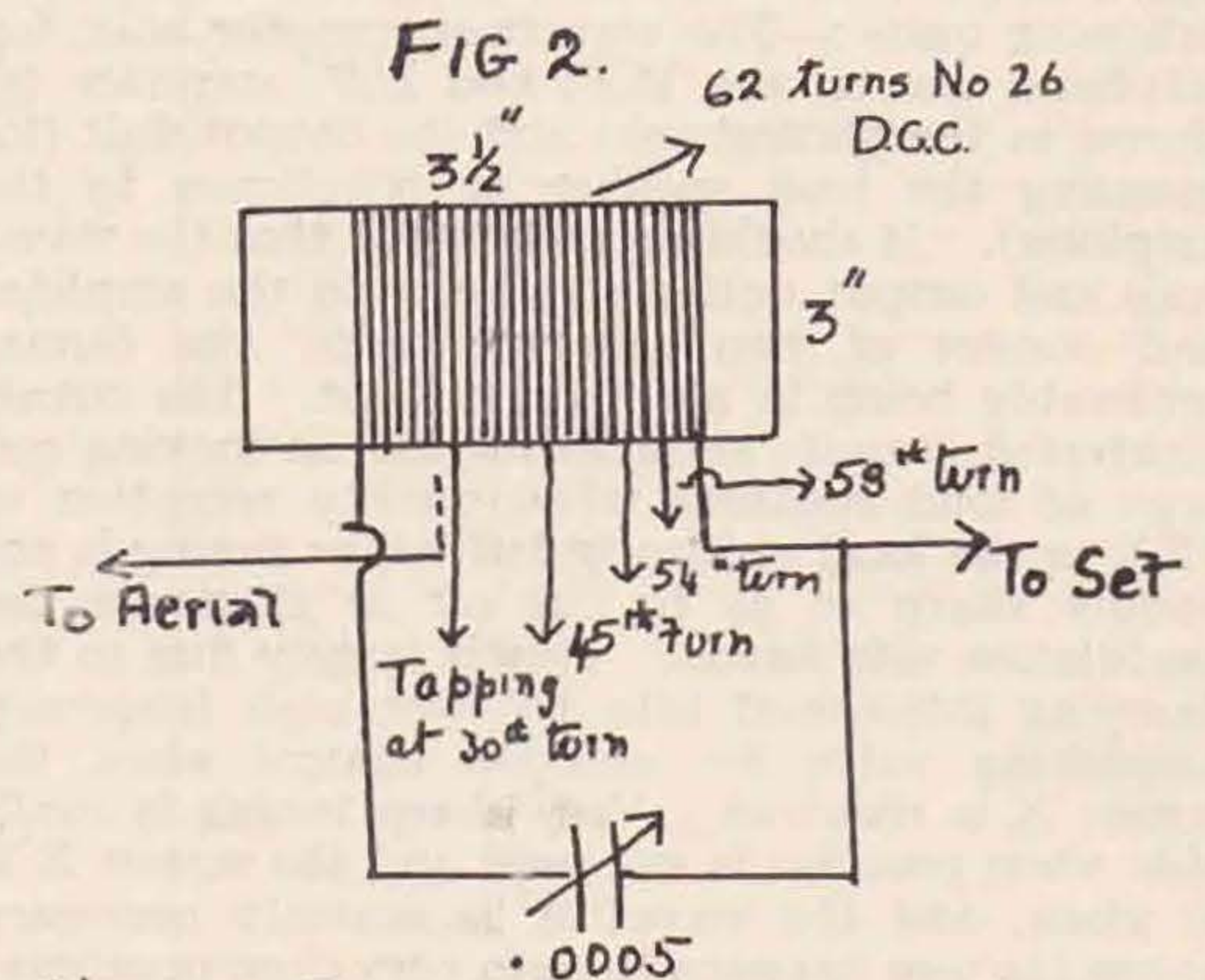
TREATMENT OF COMPONENTS.

An "all screened" set is not yet a common instrument, so that it is rarely that we find com-

ponent parts suitable for mounting on the set without treatment in the way of "bushing." In this case all the filament rheostats, the filament switch, jack, in fact everything except the "Voluvernica" variable resistance and variable condensers require bushes before they can be safely mounted. At first sight the Indigraph dial illuminators do not appear to require this treatment, but a careful examination will prove that it is required. All terminals are mounted on ebonite strips so that no bushes are required. There are two such strips at the rear of the cabinet, one carrying A and E terminals, and the other the remaining battery terminals.

THREE-WIRE SYSTEMS: A WARNING.

In certain cases, where the set is to be run from a mains unit in place of batteries the cabinet must not



NOTE:- The aerial is tapped to the 7th turn of wire giving best results and soldered.

be the common negative for the set as there is a grave risk of shocks should the cabinet be handled when the operator's body is likely to be earthed. In such circumstances the variable condensers are isolated from the cabinet by means of bushes and washers, and a number of 4 microfarad condensers connected between the common negative leads and the cabinet, one being at each corner of the cabinet (four in all). The cases should be earthed. These

condensers must be capable of handling the highest voltage used in any part of the set. In this case all component parts screwed to the metal cabinet must be adequately protected by ebonite bushes and washers. This warning should be observed very rigidly when using battery eliminators, otherwise a serious shock may be experienced by the operator or his friends. When the set is used in conjunction with a mains eliminator, the copper cabinet is earthed through a large capacity condenser, four microfarads being a suitable value. These remarks do not apply when a two-wire system is involved or where a rotary converter is used as a power unit, providing the converter is well insulated from earth.

COMPONENTS AT EARTH POTENTIAL.

It will be realised that a little care must be exercised when mounting the components on the base of the instrument. For instance, all the valve holders should be examined and tested for possible shorts via the under part of the holders to the copper foil. The Igranic G type transformer is provided with an earthing tag for earthing the shroud, but this need not be used providing the enamel is scraped from the under part of the base. Care should also be taken that no soldering tags make contact when in close proximity to the copper. The H.F. chokes (R.I. Varley) are used in a parallel position and these are well insulated, but we might watch the soldering tags and see that these do not short to earth.

WIRING UP.

Having mounted up the Cyldon variable condensers, Igranic rheostats, Bulgin filament switch and jack, Weston milliammeter and Indigraph dial illuminators on the front panel, this is now screwed to a wooden baseboard of suitable size (Artcraft, of Croydon) through the copper foil. The front panel and one side are in one piece, whilst the back and the other side of the cabinet comprise the remainder of the cabinet. The intermediate screens, bracket and components are now screwed into position on the baseboard through the foil, and wiring completed, bringing all wires to rear of baseboard and leaving them long enough to reach the terminals. The terminal strips are screwed to the back of the cabinet, and it will be found an easy matter to screw these into position and solder up wires to the terminals.

OPERATION.

The operation of the set is fairly simple, and after the dials have been logged over with a wave-meter, any station may be heard quite readily. The set will tune down to very short wavelengths and amplify quite well on 20 metres. A slight complication may be noted when reaction is used as this may affect the + voltage to be used on the screen of the last H.F. valve. However a few simple experiments will soon determine the best valve, and for this reason a separate lead to this screen should be provided.

The set works equally well on a frame aerial, the only alteration necessary being to plug in the frame to the grid of the 1st H.F. valve in place of the tuning inductance.

It is thought that the foregoing remarks, in conjunction with the sketches, are sufficient to enable readers to proceed with the construction of this set without difficulty.

A VALVE TRANSMITTER FOR SHORT WAVES.

By F. E. KENNARD, B.Sc. Hons., London, M.I.E.E.

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The primary object of this article is to give a description of a low power short wave transmitter, but before dealing with actual apparatus, a few words on the simple theory of a valve generator will not be out of place.

A mechanical analogy of an unloaded valve transmitter (no aerial connection) is the mechanism of a watch. The first essential in a watch is the balance wheel and hair spring which together form the equivalent of a pendulum, and the periodic time of which determines the rates at which the hands move. The to-and-fro motion or periodic time depends on the equivalent weight of the wheel and the inverse of the stiffness of the spring, i.e., the heavier the wheel and the weaker the spring the longer the periodic time. The corresponding parts in our transmitter are the coil L^1 and the condenser C^1 (see Fig. 1) which form the closed circuit marked in heavy lines, the size of the coil corresponding to the weight of the balance wheel and the size of the condenser to the easiness with which the hair spring can be compressed.* If the escapement movement in a watch be removed and the balance wheel system be given a gentle touch, assuming the bearings are good (little friction), the balance wheel will swing to-and-fro for quite a long while. If now the escapement is inserted into the watch, energy is supplied from the main spring, and so the friction loss is made up, and the balance wheel continues to swing to-and-fro steadily through a certain angle.

Referring now to the coil and condenser, if this simple combination is given an electrical jolt, a to-and-fro current will circulate with a gradually decreasing value depending on the electrical resistance of the circuit, this resistance corresponding to the pivot friction of the balance wheel, and the value of the current to the angular velocity. The voltage across the condenser corresponds to the maximum angle of the swing of the balance of the wheel.

The coil and condenser form an electrical pendulum and the number of to-and-fro swings per second of the wheel correspond to the frequency. It should be remembered that the frequency divided into the velocity of light, i.e., 3×10^8 metres per second—will give the wave-length, viz., the higher the frequency the shorter the wave length.

A watch can be regulated in two ways by increasing or decreasing the equivalent weight of the balance wheel or altering the stiffness of the spring, and in a similar manner the frequency or wave length of our electrical pendulum can be varied by changing the coil or altering the size

H.T. Power Unit.

In the May issue of the BULLETIN we dealt with the push-pull system of amplification, and pointed out its special adaptability to moving coil loud-speakers. We have been pressed for more particulars regarding this feature, particularly for the H.T. unit for supplying the last stage of twin valves, and it is our purpose to do this now.

The supply of H.T. current for receivers by mains units has become quite a common feature, and they are quite essential where large amounts of power are required, as, for instance, for the moving coil speaker. In the trade it is usual to refer to this piece of apparatus as an "eliminator"; presumably because it eliminates the H.T. battery. This is not a happy designation, and has as much wisdom about it as calling a motor-car a horseless vehicle. There is, however, a vast difference between the small H.T. units sold for broadcast receiving sets and the power unit for a quality loud-speaker. The former, designed to give only some 120 volts, is generally compressed into a small case to conveniently adapt itself to be included within the cabinet of the set. The latter is more of an engineering job and nearly approaches the rectifier unit of the amateur transmitter.

The photograph shows the unit about to be described. It is all arranged upon a pine baseboard 26 ins. long by 8 ins. wide. The whole of the components used are of the commercial type and readily obtainable. The prices of the items have at present come so low that it is hardly worth while attempting to make them. Furthermore, it is only reasonable logic that a firm devoting itself to the manufacture of a certain class of apparatus will turn out a better and more efficient article than the amateur could ever produce in single items.

Beginning with the input end, a pair of terminals receive the current from the alternating current mains; in this instance 200 volts 50 cycles. The transformer, which was made by Messrs. Rich and Bundy, of Ponders End, is a particularly neat one, and is of the core type. In the one supplied to the writer the four clamping-up bolts were left long so that the transformer could be fixed either side up or bolted to an angle iron. The writer fixed his by boring holes through the wood base, recessed at the back and using nuts upon the bolts.

The transformer has an inner primary arranged for the supply voltage, as ordered. There are three separate secondary windings, each provided with a centre tap. No. 1 gives 400 volts or 200 volts upon each side of the centre. No. 2 gives 7 volts or $3\frac{1}{2}$ upon each side, while No. 3 gives 6 volts. A single-pole tumbler switch is used to control the primary input. The valves used are the B.T.H. well-known RH1 type. These valves appear to be extremely well designed for rectification work, and give very consistent results. They operate at a fairly high temperature, and easily carry all the current called for. They are mounted in Benjamin sockets screwed to the base.

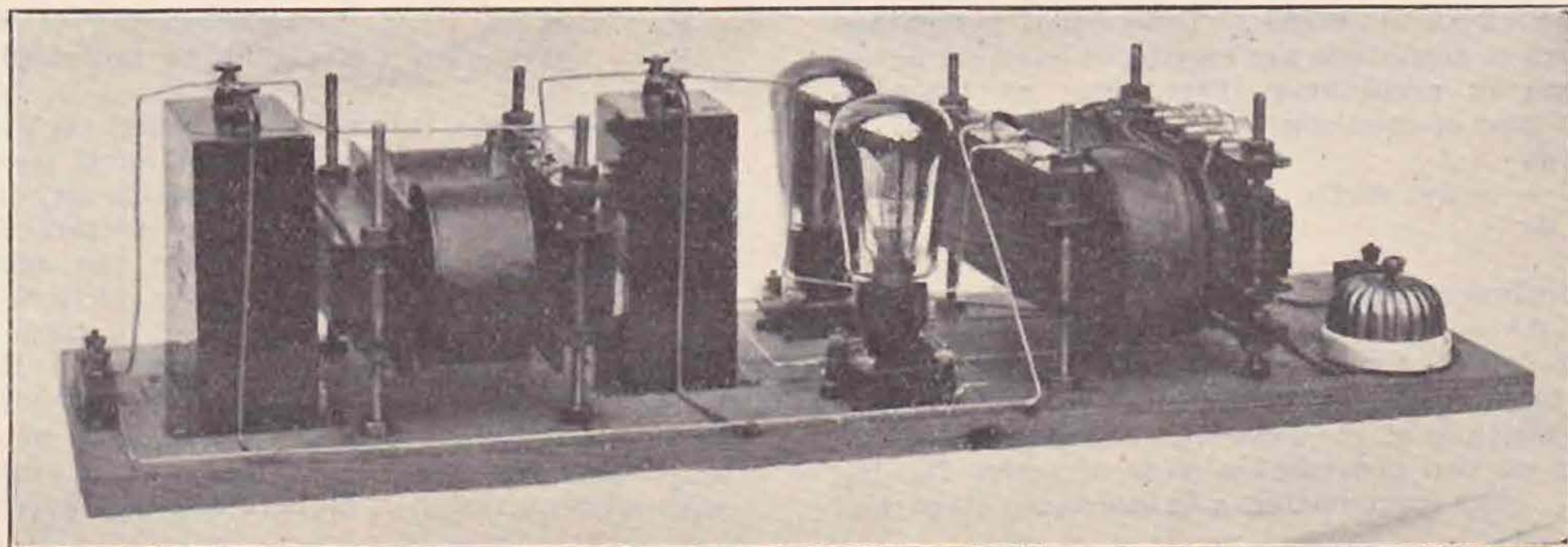
The choke is also by Messrs. Rich & Bundy, and is another sound piece of work. The iron core is very liberal, and some tests made by the writer showed that with the usual audio-frequency band fluctuations and a fairly high plate current, a very even curve and magnetic induction was obtainable.

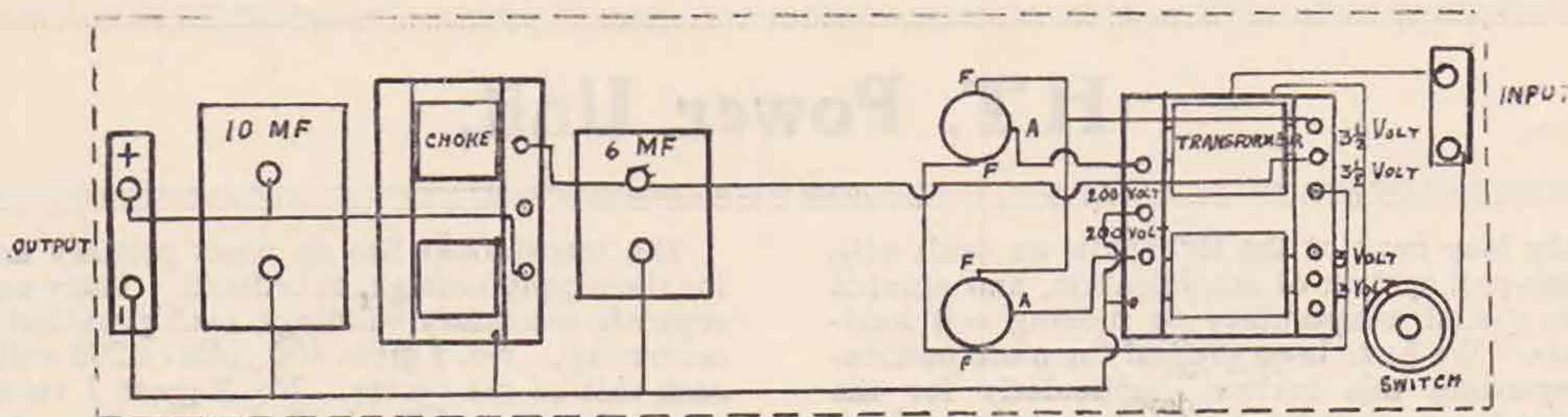
The smoothing condensers are the well-known TCC. The first is 6 microfarads and the second 10. It might be argued that the single choke would not provide sufficient smoothing, but this does not appear to be the case, there not being the slightest trace of hum in the loud-speaker. This is doubtless due to the efficient action of the choke, coupled with the two ample condensers.

The scheme of connections is shown in Fig. 2. This contains nothing novel, and is only given to complete the description. The whole of the connections are made with No. 16 tinned copper wire bare, with the exception of those leading in the primary supply to the transformer, which are 1/18th electric light wire.

It will be noticed that the negative lead runs the length of the baseboard and branches are taken from this to the condensers and centre tap of the main secondary output. The core and frames of both the transformer and choke are also connected to this, it being one of the conditions of the writer's supply that all such shall be earthed. It further conduces to steadiness of supply by providing a capacity to earth.

The choke is provided with a centre tap. The writer could not quite see the object of this, and upon consulting the makers, was informed that a





further condenser might be connected between this and negative. The writer has, however, not used this, as it appears to him that any A.C. component existing in the first coil of the choke would be reintroduced into the second coil, both being upon the same magnetic circuit. At all events the results without its use fully justify its neglect.

The 6-volt secondary winding upon the transformer is provided for those who wish to operate the filaments of the amplifier valves direct from the A.C. mains. The writer, however, has not yet made use of this.

No arrangements are included for voltage reduction to feed the detector and other H.F. and L.F. stages, as the writer prefers to feed these from another lower voltage unit. Of course, the usual potentiometer or resistance-reducing methods can

be used if desired.

The RH1 valve appears to be capable of handling a very large plate current, the writer carrying the output well over 100 milliamperes during his various tests. The normal output taken is about 35 milliamperes, the grid bias value for the PM256 valves being 46 volts. With this value the valves are working well in the centre of their curves, the normal grid swing voltage failing to carry them anywhere near the distortion portions.

Those unaccustomed to the RH1 valves should understand that these valves work almost bright with the nominal seven volts upon their filaments. Care should be taken to keep the plate current down as much as possible by careful adjustment of grid bias, as it is quite possible to heat up the anodes with prolonged high current.

"The R Code."

By 6CJ.

The human ear is a peculiar instrument with which to measure intensity of sound. Apart from the fact that its sensitivity varies with barometric pressure, and with the health of the individual, to which it is appended, it does not give a "straight line law." A doubling of sound intensity, or amplitude does not give the impression of doubled strength, but one of only slight increase. If the ear appreciates a doubling of amplitude as unit increase, then a further doubling, making the amplitude four times its original value is only registered as another unit increase in strength, or audibility.

Suppose, for example, to illustrate this more clearly, that we are listening to a morse signal of amplitude A , and that in some way or other the amplitude is increased by 150 per cent., say to $2.5A$. Suppose, also, that the ear registers the corresponding increase in audibility as making the signal sound twice as loud as A sounded. Then to make it sound three times as loud as A sounded, we must increase it another 150 per cent., making it now $2.5 \times 2.5A = 6.25A$. Thus equal percentage increases in amplitude are registered as equal linear increases in audibility. This gives us the well-known type of equation

$$\frac{dy}{dx}$$

$= ay$, where y is amplitude.

x is audibility.

a is a constant.

The solution of this is $ax + b = \log y$, or in another form $CA^x = y$, where A is a new constant, and $Cb (= \log C)$ another. Putting the audibility as equal to zero, we see that C is the amplitude of a signal which is at the lower limit of audibility.

Now we can construct a scale of terms R_0, R_1, R_2, R_3 , etc., representing x in increasing steps, and

the amplitude of signal represented will increase more and more rapidly as we progress through the series if we put $y = CA^x$, as above. Such a series of audibilities will be capable of embracing wide limits of signal amplitude. Thus an R_8 signal would be A^8 times greater in amplitude than a signal of amplitude C , whilst it would be only 8 units louder audibly.

In the writer's experience, a convenient value for A has been found to be 2.5 to 3, and a scale of signal strength built with such values would be as follows:—

CODE.	AUDIBILITY.	AMPLITUDE, IN UNITS OF C.
	$A = 2.5$	$A = 3$
R_0	0 units. 0 up to 1	0 to 1
R_1	1 " 2.5	3
R_2	2 " 6.3	9
R_3	3 " 16	27
R_4	4 " 39	81
R_5	5 " 98	240
R_6	5 " 240	730
R_7	7 " 610	2200
R_8	8 " 1500	6600
R_9	9 or more, units 3800 or more	20,000 or more.

It is, of course, convenient to round off the ends of the scale, as in the table. In aural reception, it is not possible to subdivide this scale any further, but if we are using measuring instruments for measuring field strength, then we can subdivide the R scale decimally, to as many decimal places as our instruments will allow, C can be the smallest measurable signal, and when we have finished measuring we can plot our answers in R codes, and so embrace signals of a ten-thousandth of a volt amplitude and signals of several volts amplitude without requiring half an acre of graph paper.

The best value of the leak R can only be found by trial, but frequently there is sufficient leakage in the transmitter to render an external leak unnecessary. The grid leak should also be adjusted for the best note. It will usually be found that this adjustment also gives good efficiency.

The three R.F. chokes shown in the diagram completely isolate the R.F. portion of the transmitter. This condition is particularly desirable if any rotating machinery is used in the H.T. supply, and the writer recommends it in any case. It should be noted that in both grid and plate circuits the chokes and stopping condensers are connected at the low potential side of the L.C. circuit. This should be done where possible in all transmitting circuits, as losses are bound to occur if the chokes are connected to the high potential side.

In conclusion, a few things may be mentioned which often spoil an otherwise good transmission.

Vibration of the R.F. parts of a transmitter can cause a lot of trouble, specially at very high frequencies, e.g., if the transmitter and the key are on the same bench and the construction of the transmitter is not sufficiently rigid. The cures for this are obvious.

Any sparking or arcing at the keying contacts should be avoided as it is likely to cause thumps and "tails." Care should be taken to ensure that the filament temperature does not change appreciably during keying, as this is bound to cause chirpy signals. This applies particularly to transmitters in which H.T. and L.T. are supplied from the same generator. In this case an accumulator should be floated across the L.T.

High Tension Supplies.

By J. G. WARD (5UA).

Awarded First Prize for this Subject in the recent Essay Competition.

The provision of a suitable supply of high tension current upon an economical basis is, no doubt, one of the most important difficulties with which the wireless amateur has to contend. With the use of electric mains, either D.C. or A.C., the problem is considerably simpler than when primary or secondary cells are the only source of supply. Dry cells can be used quite successfully for receivers, and even low power transmitters, when only a small current in milliamps is required, but for even low power work in transmission, the use of dry cells as anode supply entails tremendous expense.

The use of accumulators can next be considered, and there is now upon the market a large variety of suitable types from which to choose. Here, again, though an excellent supply can be provided up to any required voltage by using banks of large capacity accumulators, the initial cost is high, and facilities for recharging must be considered.

If the user can charge from his own mains supply, then this system will give a regular source of H.T., with nothing further than the attention which is necessary for accumulator welfare at very small cost.

A high voltage direct current can be economically generated by means of a T.V.T. unit or the buzzer-

transformer method, with a rectifying valve in the secondary circuit of the transformer, and a smoothing circuit in the output. When used for low power transmitters, this arrangement will give very useful results, though constant attention and adjustment are essential to give maximum results, and one of the chief disadvantages of this method is that a pure D.C. is not generated, and the note from a transmitter using this sound likes a mixture of C.W. and spark.

The Evershed Megger Generator is another machine which will give excellent service at a practically negligible running cost. This is a hand-driven generator giving 600-1,000 volts at approximately 30 milliamps, and constitutes probably one of the cheapest and most reliable forms of H.T., the only apparent disadvantage being the necessity for an assistant to provide the motive power. This difficulty, however, may be overcome by connecting the generator to an A.C. or D.C. motor, which is manufactured for the purpose.

The use of D.C. mains eliminates a great many difficulties, but has the disadvantage of only providing a fixed output according to the amount of the mains supply voltage when used direct. It is also necessary to introduce some form of filter, or smoothing circuit, to take out the ripple or "mains hum" associated with the majority of D.C. mains used for house lighting, from which most amateurs derive their initial power. A mechanical method of raising D.C. voltage can be used, whereby a number of large capacity condensers in series are charged at regular intervals from the mains, the required output being taken from the positive and negative terminals at the extremities of the series bank. For the amateur, however, who has the use of D.C. mains the accumulator system of charging from the mains previously mentioned would, no doubt, give greater efficiency and be more profitable. Under the heading of D.C. mains supply may be considered the various forms of motor generators, in which the motor is driven from the mains through a suitable control panel, and is coupled to a H.T. direct current generator rated to give the desired output. Another type well known to wireless amateurs is the ML Anode Converter, which incorporates an input regulator and a rotary transformer giving an output according to type used, and varying from 220 volts—1,000 volts D.C. The input varies from 6 volts to 12 volts.

The use of A.C. mains gives, undoubtedly, many advantages over most of the other systems on account of the numerous ways in which it can be used to give almost any rated direct current. Also from A.C. can be assembled the most economical arrangements for providing D.C. From the most generally used systems, such as chemical or electrolytic rectifiers, thermionic valve rectifiers, and mechanical methods of rectifying A.C., the electrolytic is probably the cheapest and one of the most satisfactory forms to use where economy is concerned. The amateur who requires not excessive voltages for transmission or power amplification, will find this type gives excellent service, provided the formation of the cells is carefully carried out with electrodes of large dimensions and pure materials used for the electrolyte. These rectifiers are constructed to give half-wave or full-wave rectification, according to the circuit used. The full



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wave type being preferable, as the resultant D.C. is simpler to smooth by means of a filter circuit.

For the user of high power transmitters, however, a valve rectifier is more suitable. Several forms of rectifier are available, using thermionic valves as the rectifying agent. These also can be constructed to give either half or full wave rectification, and are coupled to the mains by means of a step-up or step-down transformer, according to the H.T. required. By means of this form of rectification, practically any suitable voltage can be provided for either transmission or reception. The initial cost of material for the construction of the rectifier and its accompanying filter circuit is almost the only expense, as the amount of current used from the mains in this system by the average amateur is a very small quantity, and several hours working can be obtained for the cost of one unit. In using a valve rectifier, one of the chief points to bear in mind is the use of suitable chokes and condensers in the filter circuit in order to ensure as much freedom from ripple as possible.

The problem of choosing a system to suit requirements under local conditions is one with which many wireless enthusiasts have been confronted, and from the foregoing systems mentioned it is apparent that the simplest and most flexible is that which uses A.C. mains as its source of supply.

The Design of a Heterodyne Wavemeter.

By 6CJ.

A reliable heterodyne wavemeter is a useful piece of apparatus to have about the house, but to obtain reliability is a difficulty involving much consideration and careful design. The writer is proposing to describe a process of design which, if not entirely his own, is at least new, and certainly successful. Perhaps, before we launch the boat, it would be advisable to elaborate some of the requirements of such an instrument.

The first requirement is that the calibration of the meter shall stay put when H.T. and L.T. voltages vary within wide limits. One often sees a beautiful spit-and-polish machine which changes its frequency by two or three thousand cycle when the H.T. is reduced from 60 to 40 volts, or when the filament voltage is changed slightly. This is particularly the case on low frequencies. Even on the wavelength ranges round 400 metres such a change usually means about a degree on the dial, which is, of course, perfectly hopeless as far as calibration is concerned. Of course, one says, it can be set up with a voltmeter, but what horror! when such an evil can be avoided.

Secondly, it is useful to have an instrument which will give the same output at all points of one tuning range. Very frequently one finds a wavemeter which is almost squeaking at one end of its range, and yet hardly oscillates at the other end. The usual sort of process of wavemeter design seems to get enough reaction into the thing to make it oscillate all over the range, and to leave it at that!

Thirdly, it is usually desirable that the wave-

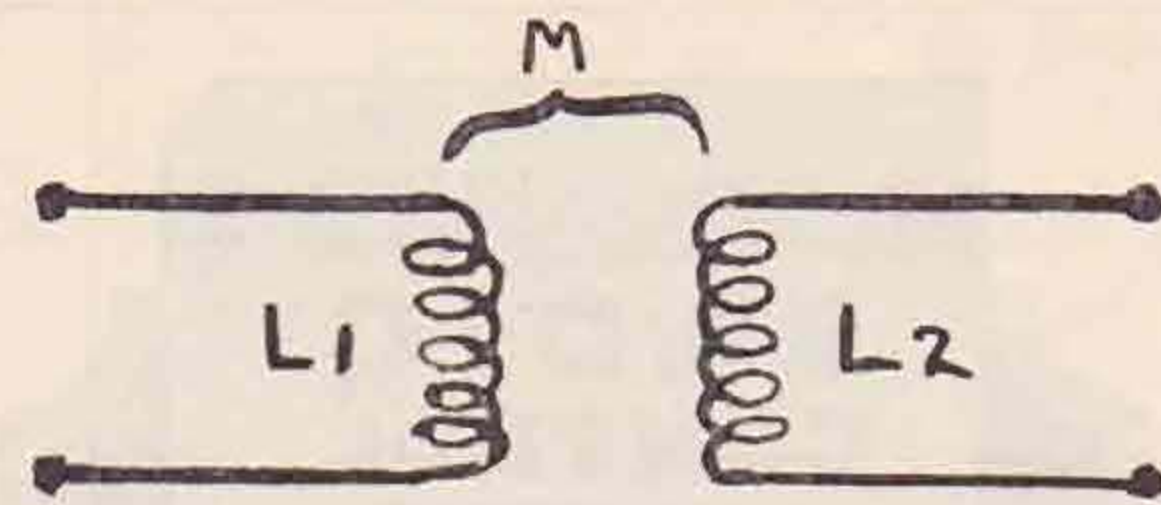


FIG 1

meter shall not ooze harmonics from every pore. It may be very nice to have a wavemeter which abounds in harmonics, but such a machine would suffer from the trouble of inconstancy with varying H.T. voltages, although constant output could be arranged, as will be seen. It is more advisable, however, to grow the harmonics externally from the oscillations generated by the wavemeter, and not straight from the cow.

The application of a simple principle, which is a bee in CJ's bonnet, will take us a long way towards elimination of the difficulties outlined. This is the well-known principle of "tight coupling" or "no leakage inductance." Let us think about such things for a moment.

Leakage inductance is a measure of lack of magnetic coupling in a transformer. Thus, in Fig. 1 we have two coils L_1 L_2 coupled together with a mutual inductance M . These coils behave as though the inductance M were common to the two coils (Fig. 2) and the remaining parts of the coils were not coupled. These remaining portions

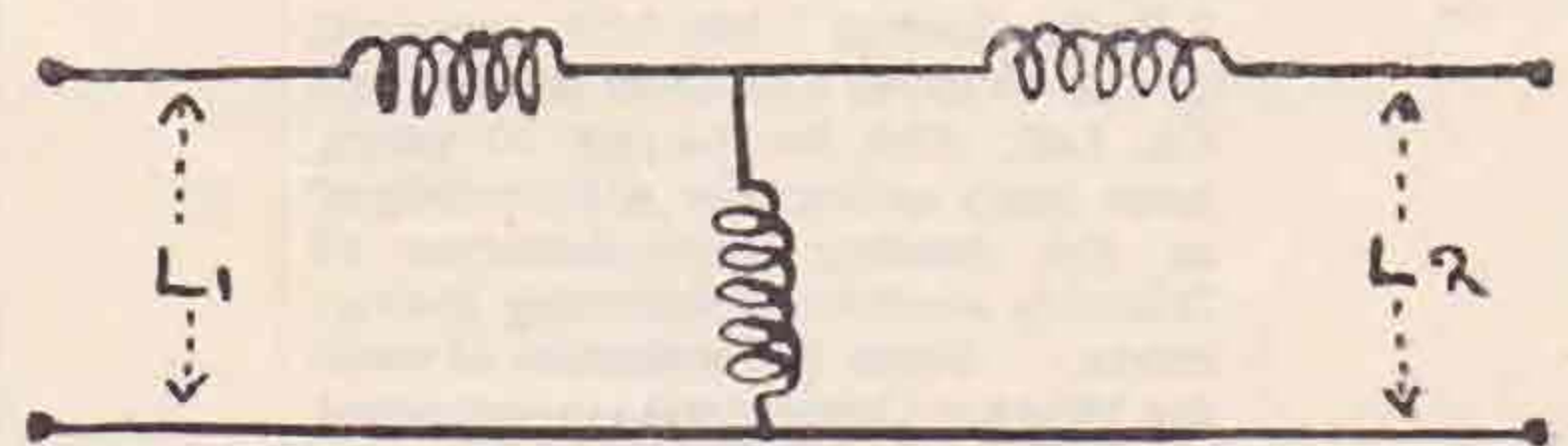


FIG 2.

represent leakage inductance; when the coupling is unity, *i.e.*, as tight as possible, there is no leakage inductance.

Now the main difference between a transformer having leakage inductance and one which has tight coupling is that in the former case things change as the frequency changes, whilst in the latter case, things which happen are independent of frequency. For example, suppose that we take a leaky transformer (Fig. 3) and plant some resistance across the secondary. We will, for convenience, transfer all the leakage to the secondary, a perfectly legal procedure. Now we will persuade a current to flow in the primary, under the influence of one fixed alternating volt across it. A current will flow in the secondary and through the resistance, and there will be a voltage drop and phase lag due to the leakage inductance l , of the secondary, which two will depend on the frequency. Consequently the voltage across the resistance will vary in magnitude and phase, as the frequency changes, and hence the load on the primary supply of one volt will change, decreasing more and more rapidly as the frequency rises. Now if we make the transformer so that there is no leakage l , there will be no drop in it, and the voltage across R will not depend on frequency,

the transformer will always have the same step up ratio and the same phase relationship between primary and secondary. The writer is not going to develop the mathematics of the subject here, as it would take up a lot of room and probably bore the readers, but it can be produced for anyone who is sufficiently interested. Let us return to wavemeters.

Suppose that we make a wavemeter in which the reaction coil is coupled tightly to the tuned circuit, as in Fig. 4. The plate-filament resistance of the

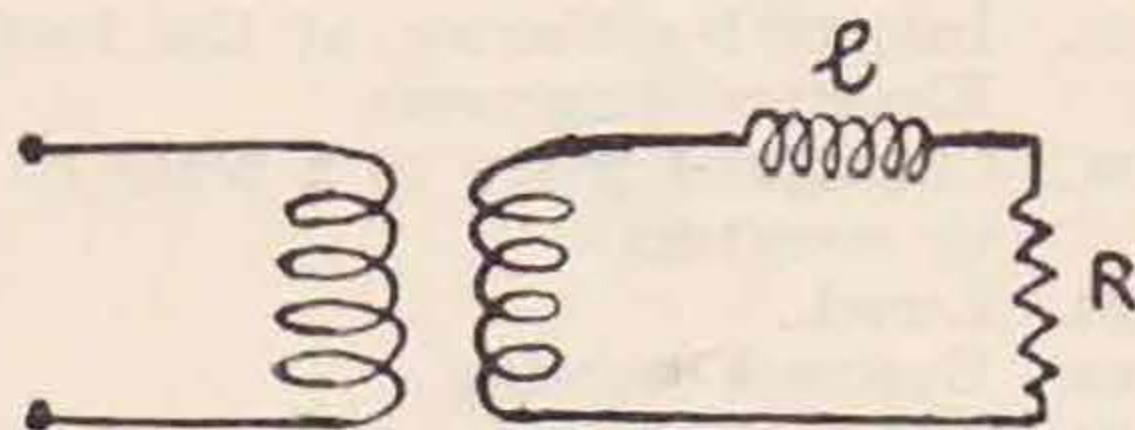


FIG 3.

valve, which is effectively in shunt with the anode coil, will add a load to the grid circuit, and since the coupling is tight, this loss will be independent of frequency. The other source of loss in the grid circuit, its resistance, can be made small in comparison with the loss due to the anode resistance of the valve, so that if this varies with change of frequency the total variation is small. We will ignore grid current losses, now, as they are dealt with in a later paragraph. Due to the tight coupling we have constant reaction over the whole of any tuning range, and therefore constant output over each range, which is item No. 2 on our list of requirements.

Having satisfied this requirement, it will be very easy to satisfy the others. The full expression for frequency of oscillation of a tuned circuit involves the losses in the circuit, and if these are sufficiently great, the circuit will not have a resonant frequency.

Now if we arrange for the valve to be just oscillating, then the anode current will oscillate up and down a small portion of the grid volts/plate current curve, and we can arrange for this to be on the straight portion of the curve. Altering the H.T. or L.T. voltage quite appreciably will not take us off the straight portion, hence the effective resistance of the valve will not alter, and consequently the frequency will be unaffected by such changes, since the changes in frequency are due to changes in the load or resistance of the tuned circuit.

The other source of loss in the grid circuit, that due to grid current, will be constant since we have already arranged for constant reaction and therefore constant grid voltage. Hence we can satisfy another of the requirements, and we can see how we have also already satisfied the third.

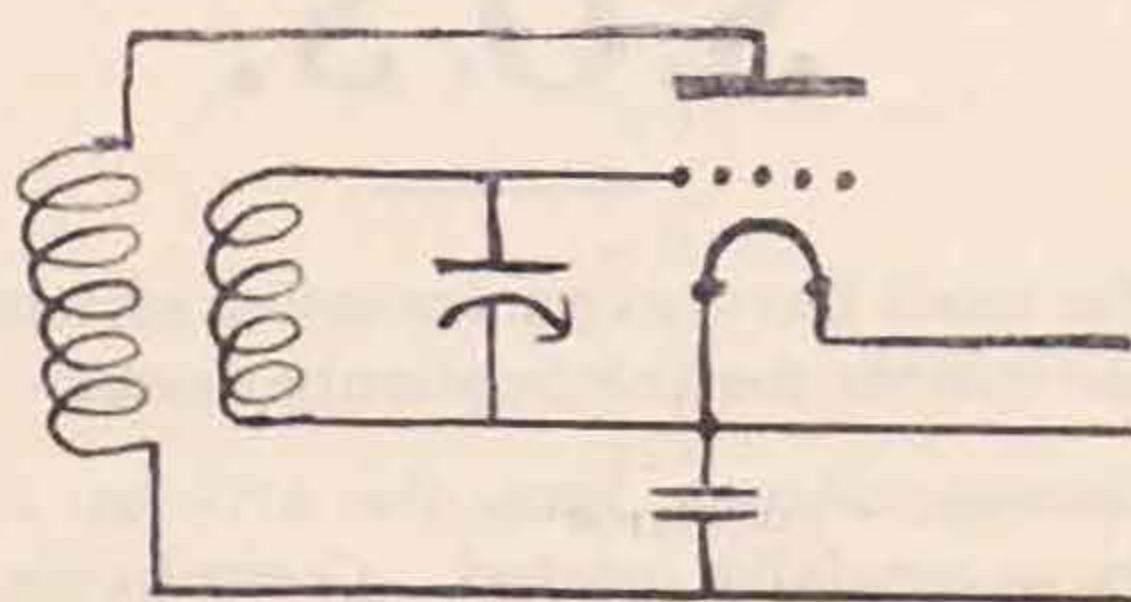


FIG 4.

Harmonics in a valve oscillator are due to two causes. Firstly we have those due to distortion of the wave form, involved by working over the curved parts of the characteristic curve, and secondly, the harmonics which added together form the grid-current. Since the valve is oscillating but feebly, it will be obvious that both effects are small. If it is desired to eliminate grid current, the valve may be biased, but this has been found unnecessary.

Thus we can overcome most of the difficulties which make the difference between a good wavemeter and a common or garden one, and now, after all this theory, perhaps a little practical information would be useful. NOTE.—Those who wish to skip theory start reading here.

The circuit of the writer's instrument is as shown in Fig. 5, and the valve is a PM6, which is a very nice valve for such a purpose. The coil ranges have been made to plug in, and here a word of warning—when one is using two or three turns for a tuned circuit, the inductance can be varied several per cent. by pushing the connecting pins half-in instead of right in!

The variable condenser is an Igranic Square Law, one of the heavy type, which has been found to be a very rigid instrument, not liable to change. The dial attached to the condenser has been specially treated to avoid slip, and is marked in 100 degrees, each of which is halved, and a close-fitting cursor with hair-line is used for reading. One can thus read the dial to 1/10th of a degree.

The selection of a size of variable condenser calls for some consideration. With a small condenser one has more degrees per metre on the scale, and hence it is possible to read to a smaller factor of a metre than when a larger condenser is used. The accuracy to which one can read the dial is one of the limits to which the instrument can be used, and consequently it is advisable to spread out the scale as much as possible by using a small condenser. On the other hand, however, one cannot have thousands of plug-in units to cover a few hundred

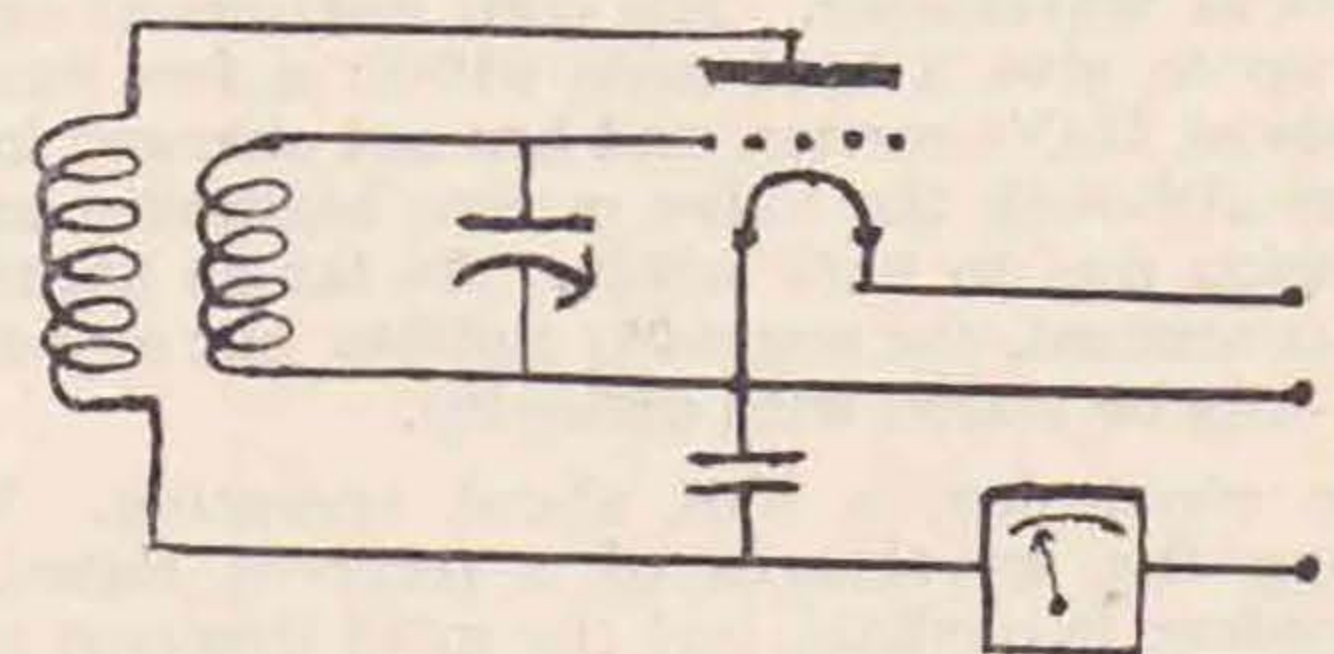


FIG 5.

meter wavelength range. The compromise arrived at by the writer is a .0003 M.F. variable condenser

Naturally, the smaller is this condenser, the more rigidly must the wavemeter be constructed, especially in connection with the coils and condenser; it is no good to have an instrument which can be read far more accurately than it will stay put, due to wobbly coils, loose bearings, etc.

Starting with the broadcast range 250-500 metres, the tuned circuit is about 50 turns of 9/38 Litz wire on a 3" tube. The reaction coil is supported on systoflex strips, laid axially along the coil, and stuck at each end with pitch or Mr. Chatterton, and is

arranged so that the valve is just oscillating, as indicated by a rise of not more than 10 per cent. on the feed meter. The reaction winding is to cover the same length of tube as the tuned circuit, and as only about three turns are required for this particular range, it is advisable, in order to get some sort of coupling, which may be called tight, to wind on three or four sections end to end to cover the tuned circuit, and to put these all in parallel. The feed should not alter appreciably when the condenser is turned over the whole tuning range.

For longer wavelength ranges, the same procedure is followed, the reaction turns being roughly in the proportion of 50 to 3 or 16 to 1 for each range, and the lower ranges are extended downwards till one requires only one reaction turn. Here several single turns may be paralleled, and for lower ranges, where less than one turn is required, it has been found more advisable to put on too much reaction and then to shunt it down to the required degree with resistance of a few thousand ohms. The resistance must be arranged to have little inductance, or it will be no shunt; it is best to double a length of wire on itself and twist it, bringing both ends out together.

On short waves, also, it is possible to improve the working of the instrument by removing capacity coupling between windings; this may be done by placing wires inside the systoflex spacers, which are brought out together at one end, and earthed. Also, on short waves, leakage inductance due to the wiring of the tuned and reaction circuits can be minimised by bringing out these two circuits to their respective points in two pairs of parallel close leads, and by using fat wire for wiring these circuits.

Such an instrument, if constructed with care, will be capable of a performance which is surprising for a home-made instrument. Also, the longer the wavelength, the more easy it is to make the instrument independent of battery variations, which is the reverse of the writer's experience of all other types of wavemeter. His own instrument can be set up to give a beat note within a few hundred cycles of 2LO's carrier, and has not changed in two years although the valve is now beginning to lose emission due to hard usage. As far as harmonics are concerned, the second is audible, but any others can only be traced with difficulty.

In conclusion, a hint about operating. When taking the wavelength of a received signal, the procedure is obvious, but the most frequent use to which the writer's instrument is subjected is for the measurement of tuned circuits. In such a case, the tuned circuit, whose resonant wavelength is required is coupled loosely to the wavemeter, and the feed will drop slightly when the two are in tune. Absorption wavemeters can also, in this way, be calibrated very accurately.

Forthcoming Events.

SEPT. 28-29. Annual Convention.

Programme of Annual Convention.

FRIDAY, SEPTEMBER 28:

- 5 p.m. Re-union and tea at the Institute of Electrical Engineers.
- 6.15 p.m. Presidential greetings.
- 6.30 p.m. Open Discussion. Subject: "Frequency Stabilisation." Opened by Messrs. Goyder and Simmonds.
- 8 p.m. Provincial members to be entertained by London members. Station visits.

SATURDAY, SEPTEMBER 29:

- 9.30 a.m. Informal gathering at the Institute of Electrical Engineers.
- 9.45 a.m. Charabanc party to a place of interest to members.
- 1 p.m. Lunch.
- 2 p.m. Business Meeting.
- 4 p.m. Tea.
- 6.30 p.m. Convention Dinner at Pinoli's Restaurant, 17, Wardour Street (price 5s.).

SUNDAY, SEPTEMBER 30:

Station visits arranged by London Area Managers.

Strays.

AC2AL is on the air from 6-8 p.m. every Saturday, and hopes to make some contacts after September when the WX conditions are better.

EG6L1 (A. E. Livesey) has received a report giving details of reception of his station at 20.30 G.M.T. on March 4, 1928, on 23 metres. As this report does not check up, he asks if anyone who was working at that time and whose call might, in bad QRM, have been mistaken for his, would communicate with him at 15 Rue d'Orleans, Pau, B.P., France.

S.O.S.

A double number next month.
TO BE OR NOT TO BE.
Depends on Contributions.
WHAT ABOUT IT?

Essay Competition.

We wish to thank the competitors who have sent in essays. The Council have agreed to allot as prizes two free subscriptions to the Society for one year. The first prize winning essay by J. G. Ward (5UA) appears in the present number.

S.O.S.

We must have more technical articles and other matter for the September issue.

Correspondence upon the articles in this issue is specially invited. Contributors like to hear your opinion about their efforts.

Strays.

We have to thank the B.B.C. for so frequently referring to the R.S.G.B. Log Book in "Answers to Correspondence," under the heading of "What Station Was That?" in *World Radio*.

We are pleased to note that Mr. Eric Megaw (6MU) has obtained his Degree of B.Sc. Congratulations, OM!

2AK is waiting for cards from 5RU, G6VP, EB4CO, EK4XR, ED7LK, EF8FBM and GW11Z.

5SK forwards a request from NU1AFF: "Please tell the gang that he is on ten metres every day."

It is interesting to note that Messrs. Burne-Jones & Co., Ltd., of Magnum House, 288, Borough High Street, London, S.E.1, were successful in receiving the order for 100 radio receiving sets for the Derbyshire Association for the Blind, for which tenders were invited some few months ago.

In view of the remarkable efficiency of Mullard P.M. valves, Messrs. Burne-Jones & Co. decided to incorporate Mullard P.M. valves throughout these receiving sets.

At the recent Exhibition at Bury St. Edmunds, a representative selection of Mullard products was exhibited on the stand of Ronald J. Bates, Esq. In addition, the Technical Department of the Mullard Wireless Service Co., Ltd., gave a demonstration of music provided by gramophone pick-up amplified by Mullard P.M. valves from records loaned by *The Gramophone* on an Edison Bell new portable type gramophone. Wireless reception was demonstrated by a portable wireless receiver manufactured by the Cooks Wireless Co., using Mullard P.M. valves.

Mr. M. S. Killen, hon. secretary of the Western Union Radio Club (c/o W.V. Cable Station, Horta, Fayal, Azores), whose station uses the call EP3MK, has written saying they find it very difficult to QSO British stations, though they have been reported R7 in London. Their QRH is 45 metres and power 80 watts R.A.C. He thanks G12IT for his very great assistance, and hopes other EG's will soon follow suit. Look out for him OB's and have a rag chew when you can.

KENYA CALLING!

The first broadcasting station in East Africa was opened recently, so we are told by the Commissioner of His Majesty's Eastern African Dependencies' Trade and Information Office.

This new station is situated in Kenya, a few miles out of Nairobi, the capital of the Colony. This

noteworthy enterprise was locally promoted and financed, Lord Delamere, the leading settler, being the chairman of the company, which is under the management of Commander L. Mansfield-Robertson, a well-known naval airman.

Kenya is, therefore, the first British Colony to possess a short-wave broadcasting station.

Our President, Captain Ian Fraser, sailed for South Africa on August 3, and will not be back again until November. He is anxious to get into touch with South African members during his stay there.

10-METRE TESTS.

Q.S.T. announce World-wide 10-metre tests for the following dates:—August 11 and 12, 18 and 19, 25 and 26. Just listen-in the new 10-metre band and log all you can. If you can transmit there, do so, and as much as possible. All reports to A.R.R.L. Headquarters, or to R.S.G.B. Headquarters for us to forward.

Social Notes.

Well done, London Area, you have indeed shown that we in the first city of Empire can give as good a welcome to our brothers overseas as our redoubtable friends in America.

That Hamfest on July 17 will long be remembered by the forty-two present. Among our guests were Dr. Wilmot Everette (NU6XAC) of California; Franklin Huddy (NU111), one of the best-known American hams; Jack Swanson (NU5PM), ex-route manager of Louisiana; Rodman (AI2KT), just back from India; C. H. Harris (NC4HM), who was told before he arrived in EG that the British amateur was rather cold and aloof, but who changed his mind before 1800 GMT on the above date, and W. H. Martin (GI5HV), from Belfast, who told us how much he appreciated the company of his brother amateurs, and promised to "whip up" his own Irish friends and get a special show of GI photographs for the Convention.

The great success of the evening was the talks by Huddy and Dr. Everette. The former in fifteen minutes did more to explain the amateur position in NU than most of us had learnt in our "ham lifetime."

Dr. Everette explained briefly the work which his research stations are doing, and left us gasping when he explained that some of his tests are conducted on aerials over 800 ft. long!—and we gasped even more when we heard of the coil which was hoisted skywards some 100 ft., for this coil contained over *three and a half miles* of 14 gauge wire!

The musical programme, under the care of Mr. Bradley (2AX) and Mr. Fuller, (6LB) kept the ball rolling, and a cheery five minutes' talk by our old friend, Bevan Swift, provided the swan song of a most enjoyable and never-to-be-forgotten Hamfest.

Again—well done, London!

And now for the serious work of the Convention. The full programme is now prepared and appears

SUBSCRIPTIONS.

Members are reminded that many subscriptions now fall due and that it would be a considerable help to our Office Staff if they would remit these as early as convenient to 53, Victoria Street.

Address all Cheques, Etc. to the Secretary—

RADIO SOCIETY OF GREAT BRITAIN,
53, VICTORIA STREET, S.W.1.

elsewhere. The business meeting will, we hope, be well attended, but the SHOW is to be the Convention Hamfest. Applications are coming in fast—Pinoli's can only take a few over the hundred, so please let me know, if you have not already done so, if you wish to come. There will be tickets available during September. The price is five shillings.

Mr. Bradley and Mr. Matthews can still find room on their programme for some items from provincial members—so if you can sing, play, dance, or jig, please QSR a message to 2AX or 6LL at once—and, as I said last month, the audience is not critical.

The R.S.G.B. stand at Olympia will be the rendezvous of all amateurs. As soon as you arrive, look us up and sign the visitors' book. The Social Committee will be represented every evening, and will be glad to make appointments to meet provincial amateurs.

Suggestions for improving the social events of the society will be very welcomed—we know improvements can be made, but seek your advice.

By the time this appears, my QRA will have changed to:

6, HARTLAND ROAD,
FRIERN BARNET ROAD,
LONDON, N.11.

J. CLARRICOATS,
Chairman, Social Committee.

Contact Bureau Notes.

By GI6YW.

As was to be expected, with the presence of summer, the work at C.B. has been lighter during the last month, but I am very glad to say that we have passed the 100 mark with our membership—we now number 103.

A point about this C.B. work has struck me recently, and that is that there are so few requests for assistance and so many offers of it. It would make one feel that we are either incapable or lazy of originating lines of experiment; that we are better "assistants" than "directors." It is extremely gratifying to have so many offers of co-operation, but I would make a strong plea for more requests for assistance with original work.

6FY suggests that group members indicate the subject of experiment during transmission. I think this would be a help to BRS men in knowing what type of report would be welcomed, and I suggest that group members use the following method, but in such a manner that it does not confuse the call-sign: The members of Group 1A should use the letter group X1A to denote an experimental group, and that they use it in the following manner: "Test X1A de G2NH," or "----- 73 CUL—HR X1A AR 6YW de 2NH," or "6YW gi g 2 NH—X1A AR K."

To inform listeners, I shall publish the letters of the groups as they are formed, and on hearing these transmitted a reference to C.B. Notes will give the subject of experiment. Groups with the letter 1 will be doing 8 and 10 metre work, and

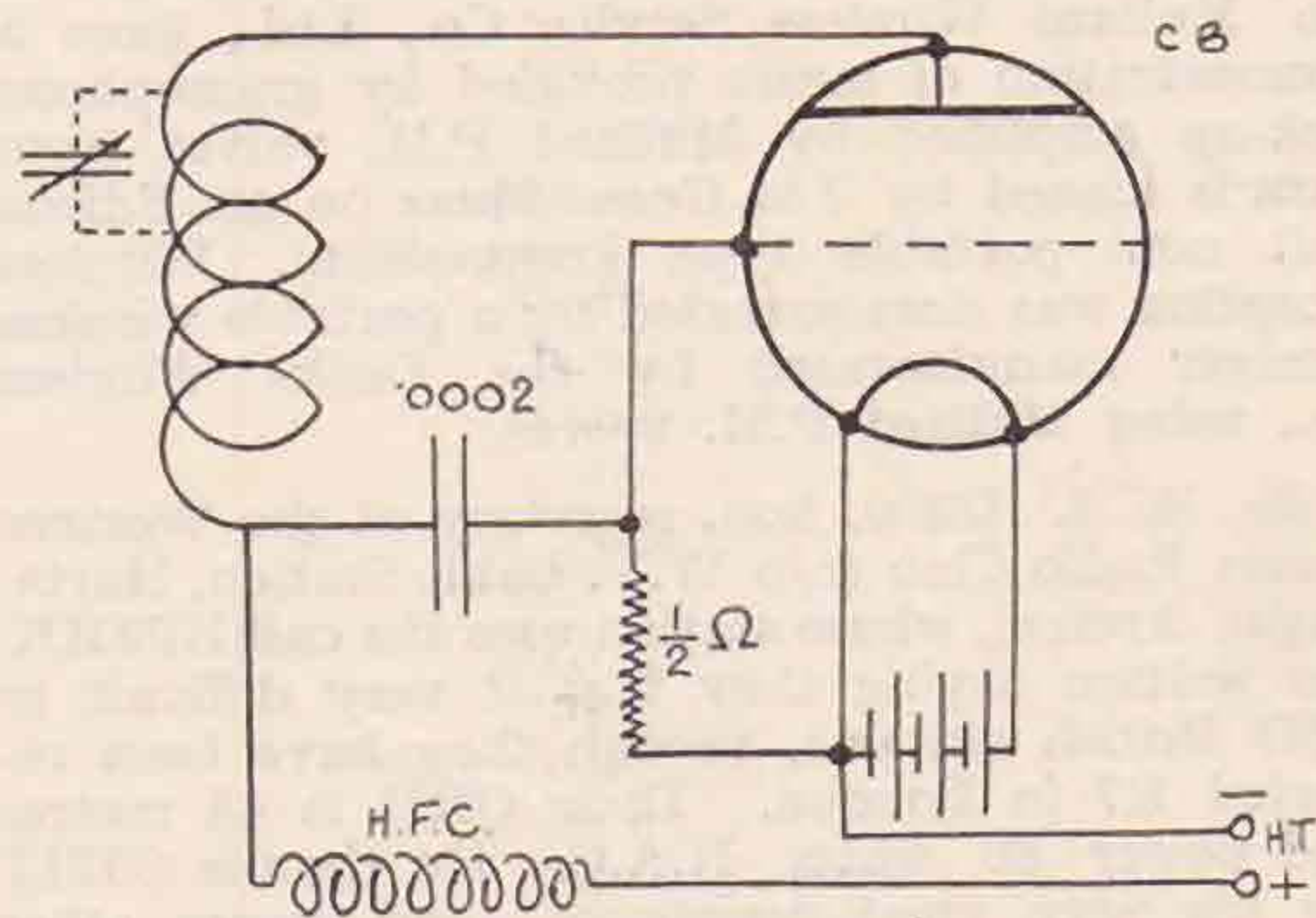
groups with the letter 2 are on "skip" and "fade-out" tests. The present groups are 1A (under 2NH) and 2A (under 6LN), while 1B and 1C are being formed at present.

6FY, who would like to get into touch with someone who is interested in a possible relation between the earth's magnetic field and QSS, sends me the diagram of a "super"-RX for 10 metres which appears in Mesny's "Les Ondes Electriques Courtes," but, as no values of components are given nor a method of controlling oscillation, I shall only refer interested transmitters to the book, which ought to be well worth getting. It is Vol. 12 of the collection "Conférences-Rapports de Documentation sur la Physique," and is published by Les Presses Universitaires de France, 49, Boulevard Saint-Michel, Paris Ve. In the same series is a good book on valves, "La Lampe à trois Electrodes," by Gutton.

GW11B does not quite agree with 2NH about the cures for threshold howl, and as no group is working on this problem, as yet, I shall tell you his story.

Receiver: straight O—V—1 (or 2)—capacity reaction and aerial coupling. L.F. couplings tried, (1) 2 Ferranti AF3, (2) Watmel choke and AF3, (3) same as 2 but wound, (4) R.C. in 1st stage, and AF3, (5) AF3 in 1st stage and R.C.

In all, threshold howl was bad, even when an old pattern transformer was substituted for the



good one. Varying G.L. and C, slightly altered pitch, but still there. The valves in use were PM5X, PM5A, and PM6. Howl was made worse by approaching 1st A.F. coupling with hand. Chokes and filters tried in umpteen positions, but no better. Resistances shunted across either or both primary and secondary of transformers gave no relief.

By neglecting L.F. stages and experimenting with various valves as detector, it was found that a Cossor 610 L.F. with 20 volts on plate for 45 metres, and 40 volts for 23 metres, gave complete relief on all waves.

Here is 11B's recipe: Aerial capacity coupled, detector Cossor 610 L.F., grid condenser 0.0001 with 5 megohms, first L.F. coupling Ferranti AF3 with 0.5 megohms across secondary, first L.F. valve PM5A with 100 volts H.T., second L.F. coupling Mullard R.C. unit, second L.F. valve PM6 with 100 volts H.T.

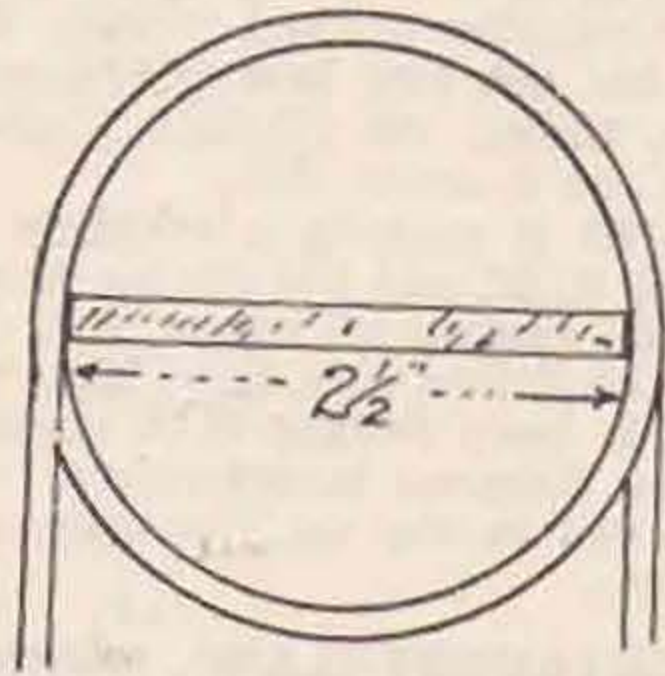
11B uses a common earth for B.C. set and S.W. set, but discovered that B.C. set must be connected

to E if hand capacity on S.W. set is to be absent! Jealousy, I expect!

With reference to the details published in these Notes about 6TW's aeriels, he writes to say that the whole feed system, if disconnected from the horizontal span and energised, will come into resonance at one-third the fundamental (45 m).

6PI sends information in reply to 6MU's query about coils, and says that in his outdoor shack the ebonite spacers on his coils got very green. He solved the difficulty by forcing 13 turns of No. 12 and $2\frac{1}{2}$ " diam. on to a glass bar as shown in sketch; this was found superior to the ebonite spacer method.

GLASS COIL SUPPORT.

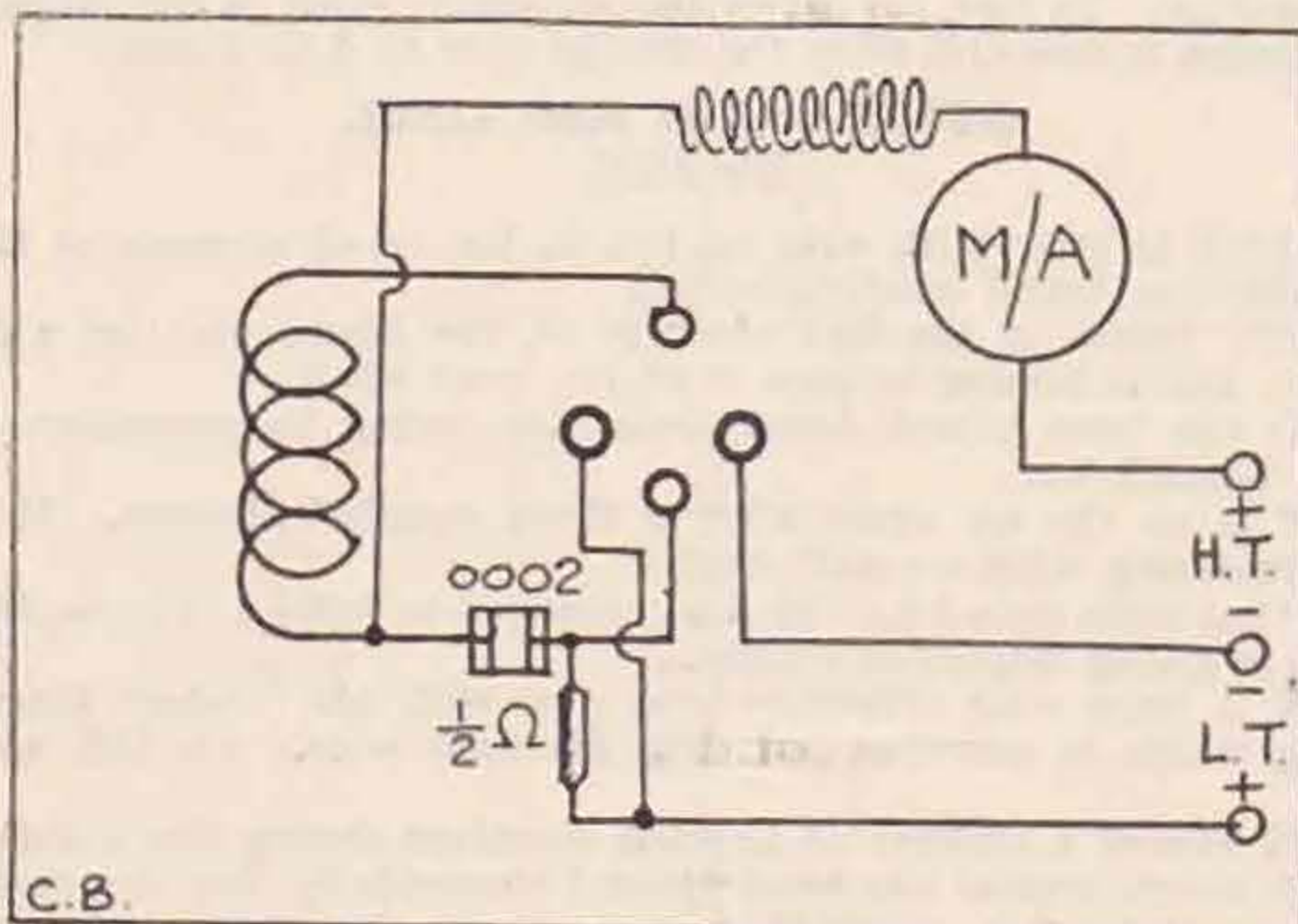


C.B.

6VL found that 30" of wire connecting the transmitter to the lead-in and having a H.W. ammeter in series showed a current of three-quarters of the normal amount when aerial is connected. He points out that the only safe way to judge how the aerial is fed is to have an indicator in the aerial itself, and thinks it possible that stations which cannot "get out" on 23 metres are not energising the aerial itself, and are misled by such an appearance of radiation as he obtained.

The second letter-budget of the 10 metre group (1A) shows that they are keeping up the good work. I have made some extracts from it, and will make them as short as possible. (Cheers from Editor.)

6LL received by 2NH at R8 at 23.00 with 10 miles DX and louder than any 20 m. station at same DX. EF8CT heard three times during May by NU9ANQ. Ultra-audion circuit best for 10 m. (2BRJ). Mesny easily first as 10 m. TX with tuned plate coil and slightly uncoupled grid (6QT). 6GC is receiving 6QT at three miles at R3 to R8 with 4 watts. The aerial is $\frac{1}{2}$ wave horizontal 3 ft. 6 in. high with houses and hill between. In sketch is shown a 10 m. oscillator recommended by 2NH; ultra-audion, 8 to 9 turns $2\frac{1}{2}$ " diam. No. 12 on Paxolin former or 9 turn commercial coil. GC



C.B.

not less than 0.0002 mfd (not critical), and a variable is useful for fine tuning. GL is metallised resistor any valve below 2 megohms. Choke about 30 turns on $\frac{1}{2}$ " test tube. If fil. leads are short, no choke is needed. All valves tried have worked perfectly, but one in use is a Cosmos SP18/R. The lay-out is also shown.

I hope to receive further items of interest from members for next month's Notes; please send them along to C.B.

New members this month: G5VL, G6HX, G6PA, G6LL, G5SY, G6CL, G2HH.

Membership.

NEW MEMBERS.

- T. W. READSHAW (6UU), 69, High Street, Bonny-rigg, Midlothian.
- H. TAYLOR (2KQ), Ormes Lane, Tettenhall Wood, Wolverhampton.
- LIEUT. J. M. D. WOOD (6SP), Totterdown House, Amesbury, Wilts.
- W. A. KEITH, 25, East Street, Horsham, Sussex.
- W. H. HEBDIGE (Associate), Beach Cottage, Botley Road, Botley.
- W. D. EGLINTON (Associate), 100, Lower Addiscombe Road, Croydon.
- R. D. BAUGHMAN (9BKK), 711, East 15th Street, Kansas City, U.S.A.
- P. BOESEN (ED7BK), "Bramhale," Simmersted, Denmark.
- V. M. DESMOND (5VM), 199, Russell Road, Moseley, Birmingham.
- DR. W. E. EVERETTE (6XAC and 6CWE), P.O. Box 188, San Rafael, California, U.S.A.
- C. H. HARRIS (NU4HM), 10,806, 125th Street, Edmonton, Alta, Canada.
- A. H. KNIGHT, 121, Holland Road, East Ham, E.6.
- A. C. BONVALOT, 2, Perceval Avenue, Belsize Park, N.W.3.
- T. TAYLOR (Chile 2BJ), Casilla, 868, Valparaiso, Chile.
- C. MACLURCAN (OA2CM), "Namanula," Agnes Street, Strathfield, New South Wales.
- E. G. AUTIE (2BJ), "A" Corps Signals, Karachi, India.
- V. SUIGUSAAR-ALEXANDROFF (ET3CK), Hobe 4, Pernau, Estonia.

RESIGNATIONS.

- A. J. CLEVERLY, 19, Broughton Road, Thornton Heath.
- H. R. MOORE (6LA), Moorlands, Bishops Stortford.
- F. APPLETON, "St. Muir," Leicester Road, New Barnet.

B.R.S. NUMBERS ISSUED.

- 174.—W. A. KEITH, 25, East Street, Horsham, Sussex.
- 175.—A. C. BONVALOT, 2, Perceval Avenue, Belsize Park, N.W.3.
- 176.—A. H. KNIGHT, 121, Holland Road, East Ham, E.6.

B.R.S. NUMBERS RELINQUISHED.

- 79 (now 2AJC).—D. J. BEATTIE, 374, Rossendale Road, Burnley.
- 92.—F. APPLETON, "St. Muir," Leicester Road, New Barnet.
- 62 (now 6QF).—A. M. ROBERTSON, 27, Ladysmith Road, Edinburgh.

Notes and News from the British Isles.

NOTICE TO AREA MANAGERS.

Area Managers may appoint an independent representative in the London Area to attend meetings of the Committee and to vote on their behalf. A letter appointing a member to the purpose mentioned shall be addressed to the Hon. Secretary informing him of the appointment.

Members appointed by Area Managers for this purpose shall not already be serving on the Committee as Representative Members.

London Area.

The Editor regrets that, with the exception of the Northern and Southern Division Notes, the London Area Notes had not been received at the time of going to press.

Northern Division.

By 6CL.

The past month seems to have been the worst in radio history! I have had only three reports sent in, but have, fortunately, met several of the fellows in the area and can thus supply the needful information to keep these area notes going.

5GU is continuing work with the Hampson System (how do you like the honour, Jerry Vick?) and reports that better results in daylight are obtained if the earth is removed—but for night work the earth is necessary!!

5HJ reports again after a long period of rest. He has done much useful fone work—one of his most interesting QSO being with a ship signing S.M.D., which, on enquiry, proved to be the M.-C. *Leonie*, cruising off the Somersetshire coast. At the key was BRS80—of Newport, Monmouth.

5QF has been experimenting with his aerial system and is trying to make his observations line up with those of the writer of an article in the July Q.S.T. entitled "Reducing the Cuss Quotient."

2AX has found Z3 very poor and reports only one QSO with NU on this wave.

6PP is very "bucked," his signals having been heard by OZ2GO. According to the July "BULL." as his power has never exceeded five watts, he is to be congratulated. He reports very poor conditions, but is QRW with QRA Section work. We congratulate him on the excellent supplemental list of QRA published last month.

6CL is changing QRA and is of necessity out of action. The new QRA is: 6, Hartland Road, Friern Barnet, London, N.11.

Southern Division.

By 6PG.

Reports are somewhat scarce this month, probably owing to the heat and holiday times.

5BQ has done little work (as far as radio is concerned), the only DX being SC3AC on 23 metres, using 10 watts from a hand generator. He has now worked 36 countries and four continents.

2AI has worked ES, ET and EX, and received a report from EURK30 giving R4 in daylight. He is testing TPTG with various aerial forms; usual hours: Monday to Saturday, 07.40-08.00 B.S.T.

2CX and 2WR are now spending a holiday in Jersey, taking a portable with them. DX generally has been poor, but SC has been coming in some nights quite well on 20 metres. SC has been worked again, and a number of reports received from OA. Rebuilding has begun and a crystal controlled MOPA for 45 and 23 metres will take the place of the old TPTG.

6HP reports that conditions have been very dud and the only DX has been with FEEGEZ, FK4MS (twice), SBIAH (R7), SBIAW (R6), SU2BT (R5), and a few local NU's and VE3CS, all on 23 metres. GLYK worked several times on 45. Two reports have been received from OA.

6PG is preparing to change his QRA, so will not be on the air again until this takes place. He is hoping to resume tests on underground aeriels.

Northern Area.

Manager: S. R. Wright (2DR).

YORKSHIRE.

By 2DR.

6BY has a TPTG working on 23 metres. SC., NU 1, 2, 4 and 8th districts have been connected with, while NC2 reports signals R6. Power not stated. 45 metres dud for distance work.

BRS107 is pleased with his new receiver, and is now a member of the Contact Bureau, 10-metre group under 2NH. Believes he received NUSALY on 10.5 metres, June 19, 1935 G.M.T., but QRM from car magnetos was bad at the time. Can anyone confirm?

6DR with crystal control on 45 metres is having good results, but has not yet succeeded in getting it going on 23 metres. QSO's NU4, SB3, FM1. He finds little doing on 23 metres except NU and SB.

6OO, using 8 watts on 23 metres, has been ploughing the ether well. Countries worked include NU, Poland, Austria, and Denmark, but the two best QSO's of the month were SC2AH (Valparaiso, Chile), and FEGEZ (Cairo). This is the second contact with SC on 8 watts, FB.

BRS162 is running a schedule with G6XH, and has received NU 1, 2, 3, SC and FM during June.

BRS26 sends a nil report, but is listening on 8-10 metres every day. Conditions here have been very bad of late.

5UB is busy testing H.F. chokes in his motor generator leads and also filament transformers. Good European work has been carried out in the early mornings, and FM has been worked on 23 metres.

NORTHUMBERLAND, DURHAM, CUMBERLAND AND WESTMORLAND.

By 2AIZ.

6QT finds conditions bad, but reports working NU2OX on 23 metres with 8 watts. Crystal control and a 10-metre transmitter are occupying a large part of the horizon here.

2AIZ says all the other stations must have closed down, for he gets no reports or replies from the majority. Surely there is more than one transmitter in the four counties!

LANGASHIRE.

By 5XY.

6UG has been closed down of late, and will not be working again until September. A tour of Northern Ireland is being made just now, and 2IT, 5ZY and 6WG have already been visited. More visits are to be made. A change of QRA with A.C. mains added is contemplated here.

5JW has also been closed down during the past month or two, but hopes to be working again shortly.

5WQ, smitten by my moving paragraph in last month's BULLETIN, sends a report of experiments on an aerial suitable for a small space, his large aerial having had to be removed. Any real experiments are always "worth shouting about," OM.

CHESHIRE.

By 6TW.

2SO has been on holiday, and thus has a nil report.

BRS152 is investigating the 8-valve super he has just completed, but is QRW with business.

BRS98 spends a good deal of time listening on 20 metres, where he finds plenty of NU's, but OA and OZ's are missing. (Are you on at the right time, OM?)

5BR uses 90 metres mostly, and would like reports of the 0700 B.S.T. Sunday transmissions, or to fix Schedules for the same time. Crystal control not working yet. Heard NKF calling WSBS on 12 metres R9-10.

6TW seems troubled over the affairs of the Cheshire sub-area, especially about the lack of enthusiasm about a Conventionette for Cheshire. In fact, his typewriter changed colour on the subject! His station is now OK after the change over to A.C. mains.

NOTTS, DERBY AND LINGS.

By 6MN.

BRS103 is busy with exams., but in the small amount of time available has found conditions bad.

2BOW failed on his first attempt at the Morse test for a full licence, but is hoping to pass it at the next effort.

5BD has been closed down since May owing to generator and aerial breakdown.

5QT is on the air again after a three months' absence. He is experimenting with crystal control.

5SP has little time for radio, but managed to build a new receiver, which is giving improved results.

6LN is busy with schedules and also with his Contact Bureau group, which is carrying out skip distance tests. No DX work done.

6MN visited a number of London members during the holidays. A 45.5 metre crystal has been ground successfully, but the results are not yet regular or satisfactory.

Mid-Britain (East).

Manager: H. J. B. HAMPSON (6JV).

Members of this area are asked to excuse the brevity of this month's notes for two reasons. Firstly, the writer is in holiday mood and attempting to carry out his duties upon a particularly beautiful day in the land of Erin, and secondly, the only sub-area reports to hand are those of the ever-punctual manager of the Cambridge division. Other reports are very possibly following me round, and will not arrive until too late for publication this month.

Cambridgeshire.

By 2XV.

Reports this month seem almost as rare as 23-metre DX sigs. in first week of July.

BRS161 has rebuilt his receiver and got it to oscillate nicely on 10 metres, but has heard nil. He will stand by for sigs. on any wave to order.

6CR is building a real "hush hush" C.C. transmitter, and it is rumoured that the OW's meat safe has been robbed of the perforated zinc for screening coils with; usual NU stns are still being worked on 23.

5JO has built a portable "trans-ceiver," and has had good results with telephony tests on 45 metres.

2XV has been dividing his time between 23 metres' work and conventionette arrangements. Usual NU stations, also Australia and Brazilians, have been worked with about 80 watts input to a 40-watt valve on 23, and a choke controlled QRP 45-metre telephony outfit has now been completed. Reports on any telephony heard from this station are welcome.

5YX, 5YK, 2DB, 2HK have all failed to report, although it is believed that some work is being done.

Norfolk.

By 2BWB.

I must accept responsibility for the fact that the Norfolk report is not yet to hand, due possibly to the fact that 2BWB may not be certain of my present QRA.

There may, however, be another cause, for I regret to say that the last time I saw 2BWB he had just kept a schedule with the surgeon in a nursing home. I am sure that all of us wish him a speedy recovery and return to full health—and Radio. May I drop the hint that perhaps he would appreciate a line from any members who would like to cheer his convalescence?

6JV has been making hay while the sun has been shining, and among other expeditions has spent a wonderful week-end at Whitehead, Belfast, chez GI5NJ. Another "schedule in the flesh" has been kept in Dublin with GWIIB, and the suitcase has just been packed with a view to visiting "Fortgranite," Baltinglass, forthwith, and unless these notes are concluded the writer hereof will be late for this sked!

Mid-Britain (West).

Manager: D. P. BAKER (20Q).

One of the most interesting things I have seen this month is the new portable transmitting and receiving set which 5UW has made ready for his trip on the Norfolk Broads, and I am sure he will have great things to report when he returns.

I am also pleased to note that a few fresh people are reporting via 6 C.C. This is very good, and I am looking forward to this county doing very well in the near future.

Staffordshire.

Reports to 5UW.

Considering that this county has over 30 fully-licensed stations, and quite a considerable number of members, it seems curious that only two solitary reports have been received from the county, and one verbally at that. The glorious weather and summer vacations no doubt are the cause, but as these are a passing phase, perhaps next month will prove more successful. As soon as you receive your BULLETIN, OM's, drop 5UW a card and let him know what you are and have been doing. Also let us make up a fine party to visit London for the Convention on September 28. How say, OM's?

5UW has been building GX5UW in preparation for the portable tests on the "Broads," and the RXTX is working fine. Has had only one DX QSO this month, and that with SAENS. Has temporarily QSY'd to 45 metres after a long absence, and finds operating on that band very different to what it was a year ago. Enough said.

6UZ received a visit from 5UW, and together they put up a Levy for 23 metres. Lack of time, however, deprives 6UZ from doing much work on radio or DX.

6SO has the honour of being the only station to consistently send in reports, and as such we will have to make him the star station. Has been testing out various methods of modulation, and finds that he prefers grid control for QRP work. Is now very busy fixing up rectifiers for A.C., and hopes to be on the air with it before next report.

Notice for Members of the Wolverhampton and District Radio Transmitters' Society.

Owing to QRM from fine weather, business and holidays, meetings of the Society and QRW have been suspended until the autumn session commences at the end of September.

Warwickshire.

Reports to 6CC.

2AK is working 45m. most evenings, 2.5 to 4 watts. Also 200m. phone on Sundays. Has so far only worked Europe, but hopes to raise NU on 23m. soon.

2TN has now started CC, and is drawing 50 watts from rotary convertor, rectifying and smoothing to 2,000 volts D.C. "CC is a lot of trouble to get going, but is worth it."

2ZW.—In spite of the aerial coming down to P.O. lines, this station has worked all Europe, greatest distance being EU60RO 1,070 miles. This station is changing to 45m. Reports will be welcome.

5SK reports getting married (best wishes OM). Has worked NU 50 times on 10 watts. Has received NU1AFF on 14m.—R9.

6CC has been to see BIH, so no work done here.

6CI is testing with semi-vertical aerial. QSO with FK2MS Mombasa. WAC certificate has arrived (congrats OM).

2BNB.—Experiments are being carried out with CC, using air-gap. Circuit found best is tuned plate; free grid QRH 180m., power 2 watts.

BRS29 is getting down on his receiver; 14.33m. was reached early this month.

Southern Area

Manager: L. MEYER (2LZ).

Firstly, I must tell you that I sent last month's notes up and am in no way to blame for their non-appearance.

However, perhaps as they were not very lengthy, OM Editor will add them to these, as these are also scanty.

6FT reports 20 metres poor, also DX on 45 the same. Had a visit on July 1 from 2MI; 6QO, 6WI and 5QV should have turned up, but failed, for reasons not yet known. Hi! Also 6AH (Leiston, Suffolk) paid him a visit. (How about a report OM.—2ABK.)

2HJ has been active only in BCL work, although a feeble attempt was made to get on the air once.

2MI is jogging along on 45 and 180 metres.

6VV and 6MO, both of Chatham, are going strong on 180 metres.

2QN has been on 150 band again, after nearly two years' silence.

2MJ is going strong at his new QRA on 45 metres, also on 180.

2AHV is a new Margate ham and will soon be joining up.

2LZ has been busy again on 23 and 32 metres, and his log pages begin to look as they did in olden days.

2AFG, of Dover, is keeping weekly sked with 6XN, and also has made a S/W H.F. unit, but says he gets no amplification.

5QK (operated by 2ABK) has been busy on 172 metres, best QSO being 5BQ, Dulwich. Preparing for a field day on July 22.

2BUW reports having regular schedules with several telephony stations. He is the only amateur in the Farnham area, and is anxious to help anyone with reports on any wave. (SA OM send your report in future to 2LZ, South Eastern Area. He may be glad of your help in collecting reports from Surrey stations.—6CL.)

Southern Area Notes from last month omitted in error.

Notes are very few again this month, but the weather has been very nice, and I myself have done only "open-air" work.

6WI reports QSO with OA four times, average QRK R4-6. Has forsaken the 150-200 band and is all out on 23 metres.

5XW is not dead according to 6WI, but seems to have lost all interest in radio.

2HJ has been QRT, he wants DX reports from all gang for QST notes.

5QV is busy in 23 metres and reports QRM (mag). Any British stations hearing NC 4th sigs. please notify him of time, etc.

BRS114 is now 2AGC, busy on TPTG transmitter and a more accurate wavemeter.

6NZ has had 80 QSO's on 45 on 10 watts, using half-wave aerial. Finds electrolytic rectifiers FB and will soon be on 23 metres.

5UY has had two QSO's on 23 with 6 watts with hand generator. Has dropped 90-metre band for the time being.

BRS91 has received FLU R9 and has only just switched off. How many valves, O.M.?—2ABK.

2LZ has not done much radio lately on Sundays and 2ABK has been revelling in the clear air caused thereby. (2LZ is just over 100 yards away.)

2ABK has been busy with 5QK and a field day was held on June 17, and two stations were in operation on 'fone on 150-200 metres, and excellent loud-speaker QSO's were established about 10 miles.

South-Western Area.

Manager: G. COURTENAY PRICE (2OP).

Reports, as one may expect, are few and far between, and, after all, who wants to sit in a hot radio den these glorious summer days. I don't blame you a bit OM's.

6JK only 10 QSO's during month, and will be away until the middle of September. Is going for a two months' DX trip in the air. Has given up mains and gone back to generator. Best QSO FM and ES.

6ZR.—Very little doing. Receiving experiments on 8/10 metres. Now on 90m, and looking for skeds week nights.

2OP can be heard almost any morning between 6 and 8 B.S.T. doing comparative tests.

2ACG in the depths of an Igranic S.W. receiver, and says it is very F.B. Hopes to get full licence at early date.

2BUW.—Your Area is S. East Britain, and your report has been forwarded to 2LZ, who collects for that district.

Scottish Area.

Manager: J. WYLIE (5YG).

June has produced nothing of note, and a marked deterioration in the quality of the reports received. This, of course, is to be expected at this time of year, when the long summer evenings are not conducive to intensive radio work. The holiday season has also begun to make itself felt, and I expect will continue to make a desert of my report sheet until October.

No. 1 District.

By 2WL.

2FV.—QRW. Conducting exams.

2MA.—A new Glasgow station which started up in June. A little was done with crystal control, but without much success. The problem of H.T. supply is with this station, and will have to be faced in the autumn. The station is now QRT till end of August owing to holidays.

2WL.—Collaborating with 5YG in crystal control experiments.

5XQ.—QRT till September.

5YG.—A certain amount of work with quartz crystals was done in the early part of June, but the station closed down on June 20 and will not resume again till early in October, when it is hoped to make a start with a new transmitter using crystal control on 21 and 42 metres.

6NX continues to peg away, and reports numerous QSO's with Chile.

6WL has been carrying out indoor aerial tests on 23 metres, and has also done some QRP work on C.F. Hertz aeriels, with an input of 6 watts. He has worked NU, SB and AI with this input on 23 metres. The transmitter is TPTG.

No. 2 District.

By 6IZ.

2BQK has returned to Aberdeen again, and has lodged his application for a radiating permit, but so far has heard nothing.

6IZ has experienced quite a lot of difficulty in getting started up at his new QRA. A start has been made with the 23-metre set, but the 45-metre gear is not yet complete. A method of quick QSY from the one wave to the other is being devised in order that transmissions on the two waves from the same aerial system may be compared at various times of the day and night.

6VO has got a start made again, but has had to QRT owing to holidays.

No. 3 District.

By 6KO.

6KO has been QRW business and had little time for radio in June. His best DX for the month consisted of QSO's with Egypt and U.S.A.

No. 4 District.

By 5JB.

5JB has been transmitting at odd times during the month, but has succeeded in working many stations with a 3-watt input. Has been experimenting with high V/C and vice versa ratios to oscillator, and finds former best in his case.

6UU has long been up "in the cold" on 150 metres, has now applied for use of the higher frequencies, and awaits the P.M.G.'s permission. When on 158 metres some reports on his telephony have been received from the Continent, giving R6 when his input was only 5 watts.

BRS62 passed his G.P.O. morse test, and now awaits his call-sign. Carried out some QSS observations on PCJJ.

Northern Ireland.

Manager: ERIC MEGAW (GI6MU).

There has been little activity on the air among the GI's during the past month. Quite a number of usually active stations are closed down for holidays and the poor conditions and increasing atmospheric have made operating less attractive than usual.

I should like again to remind any amateurs who are thinking of visiting Belfast for the motor race on August 18 that a special meeting of the R.T.U. (NI) is being held on the previous evening (August 17) and that they should communicate with 6TB or myself.

2WK has been doing some phone work with a Magnavox L.S. as microphone, followed by two stages of A.F. With 2 watts input from accumulators some encouraging reports have been received from between 5 and 500 miles. The generator is still used for more work.

2CN is camping at Carnalea (Co. Down); he has a portable set with about 2 watts input and is getting good results. He returns to Bangor at the end of August and would be very glad to have reports on his QRP signals before that date.

5HN has put up a new aerial, 45 ft.—30 ft. high, "6YW" type. Signals are reported much stronger, but still don't seem to get very far.

6HI has been grinding quartz, evidently without much success, but has not been very active otherwise.

Notes and News from British Dominions.

Irish Free State.

Manager: COL. DENNIS (GW11B).

We have had some real summer weather lately which probably accounts for the paucity of subject-matter in the reports received, in the collection of which 17C has very kindly assisted. Conditions are pretty generally reported poor, especially during the last half of the month.

14B has done little beyond working G and local stations on 'phone, using grid modulation.

15C has been testing aerial systems and reports Zeppelin "NG except for local DX!!"

16C has been touring Europe with his 3-4 watt perker on 45 m., using a half-wave C.F. Hertz. He has had good reports of 'phone, choke control, from G stations using the same input. He contemplates being on CC in the near future.

17C, on 45 m., has had a very satisfactory 'phone QSO with EK4AU and has worked many European stations as well as the Norwegian ship AWL with 3 watts input, also several G's on 'phone late at night. On 23 m., with 9 watts input, he has worked FK4MS, FK2MS, SB1AW, and NU1CME.

18C reports conditions bad. Owing to the proximity of 16C these two stations have to work on alternate weeks.

13D on 45 m. has worked ET and ED on CW, and on 'phone EK4CB as well as several G's and local stations with about 5 watts input.

11B has nothing to report beyond the usual European work. He has been experimenting with modifications to his aerial system, without, however, any very definite results. He is looking forward to a visit from 6VJ in the very near future. This will be the first visit to his station by a G and will doubtless be productive of good results to him (11B not 6JV).

Notes and News from Europe.

Germany.

DEAR O.M.,—We take the liberty hereby to inform you that, according to decisions taken at our annual meeting in Dresden, the foreign interests of the German amateurs will, in future, be taken over by OM Reiffen (EK4KU) and OM Vantler (EK4AN), as OM Lamm, due to protracted absence from Germany, has had to retire from the staff of the D.A.S.D.

We hope you will show the same confidence in the gentlemen mentioned as you have shown to us in the past.

Further, will you kindly send all correspondence for the German amateurs to OM Reiffen or OM Vantler at the D.F.T.V. as per above address.

Vy 73 and DX.

(Signed) REIFFEN.
VANTLER.

Holland.

(Prepared by ENOCX.)

It is with great regret that I have to announce that this is the last time that these notes are written by a pirate, and I thank all readers of these few lines heartily for their interest in this little space in the "BULL." nursed by me during one year and a half. The matter is this: The reporting of Dutch news will be officially undertaken by the Manager of the Sales Department and Foreign Press Agency of the N.V.I.R. (Dutch Section I.A.R.V.). Activities, especially on 30 metres, were very good indeed. Remarkable astonishing contacts were made by ENOWIM and ENOBU. Both worked Chile, using inputs of 6 watts. The rest of the 40-metres gang, due to QRN, give their tubes a rest during the summer days. Only skeds are regularly worked. And now, good-bye to all! ENOCX will now only be heard on the air and no longer in these splendid columns. Cheerio and good luck, and that the "BULL." may go stronger and still grow bigger and bigger is our wish!

Calls Heard,

By EP2AA.

EG—2bi, 2kd, 2mf, 2un, 5by, 5ad, 5gq, 5iv, 5jo, 5jh, 5lw, 5pl, 5pm, 5qf, 5td, 5uf, 5up, 5wk, 5wq, 5yl, 6cl, 6co, 6dr, 6jy, 6pa, 6pf, 6pp, 6rb, 6rc, 6vj, 6wy, 6rm.

GI—6wg, 5ot, 5hv.

GW—11b, 14c.

On 23 metre band by OA5HG, Mr. H. M. COOPER, 51, Hastings Street, Glenelg, South Australia.—EG—6ut, 5hs, 2nh, 5yk, 6rw, 5vl, 6wi, 5ad, 6rb, 6ci, 6qb, 5qv, 5ma, 5br, 5ml, 5mq, 6hp, 2od. EF—8ct, 8orm, 8dmf, 8grg, 8hip, 8fd. EI—1dy. EGI—2it. EK—4dba. EB—4rs.

Correspondence.

To the Editor of T. & R. BULLETIN.

FIRST QSO CANADIAN 5TH DISTRICT ON 20 MTS.

May I, through the medium of your columns, bring to the notice of other transmitters that I have worked the above, the stations being NC5CP and 5AW. The latter being on April 8, 1928, who informed me that this was the first two-way communication with England.—Yours faithfully,

F. W. MILES (EG5ML).

To the Editor of T. & R. BULLETIN.

DEAR SIR,—I enclose an extract from a letter received from a Mr. C. Cater, c/o Chili Exploration Co., Chuquicamata, Chili, South America. As the wireless section of the Institution are unable to take any action in the matter, it has been suggested that some of the members of your Society may be interested.

I have told Mr. Cater that I should refer the suggestion to you.

Yours faithfully,

P. F. ROWELL,

Secretary, Institution of Electrical Engineers.

"During my spare time I have erected here with a friend of mine, a Mr. Burr, Superintendent of Power, a wireless receiving and transmitting set, with which we have had conversations with U.S.A., France, South Africa, China and Australia. So far our messages have been received in various parts of England, but on our part have received none from England, although several people have tried to get us.

"If the wireless section of the Institute are willing I would suggest that we try to hold a two-way conversation on any date that is suitable, if they would kindly inform me what time (English or American) and wave-length they propose using.

"Perhaps you could kindly bring the matter up and let me know as soon as possible."

To the Editor of T. & R. BULLETIN.

DEAR SIR,—I have just received a card from the Spanish amateur EAR104, who asks me to spread the news that he is very anxious to QSO English transmitters. If anybody wishes to arrange a schedule with him, will they, please, drop him a card beforehand. He tells me he is working phone most nights at 21-00 G.M.T. His QRH is 40.2 metres and his QRA:—R. Elizalde, — Valencia 302, Barcelona, Spain.—Yours faithfully,

K. H. RANDALL (BRS116).

To the Editor of T. & R. BULLETIN.

DEAR SIR,—G5VP (Epsom) has not been working since end of April owing to QRA Jugoslavia. When negotiations are completed with the authorities and QRM static not too bad, will endeavour to QSO home stations. CJ stations are difficult to locate as they are mostly unofficial.

Yours faithfully,

G. F. KITCHEN (5VP).

To the Editor of T. & R. BULLETIN.

DEAR SIR,—Having passed the necessary Morse test at the Post Office, I have been granted the open ariel. My call signal, 2BAJ, is now cancelled; the new one is 5VN. I shall be working shortly between the band of 150 to 200 metres CW and telephony. Would be glad to get in touch with any other member interested on the said wave-band, preferably in the northern area. Trusting you will help through the BULLETIN,

Yours truly,

S. ENTWISLE (5VN).

To the Editor of T. & R. BULLETIN.

DEAR SIR,—If you have space in the "BULL.," I should be obliged if you would publish the following:—

"FOA9A reports E sigs. on 45 metres QSA lately. EE and EP R7-R8. FOA9A works on 35.75 metres daily from 17.30-21.00 G.M.T., and is QRV for E stations replying on 32 to 45 metres."

Yours truly,

B. DUNN (G6YL).

To the Editor of T. & R. BULLETIN.

DEAR EDITOR,—I note in this month's BULLETIN an article by 6YW on double modulation. I comment on this because I erred the same way myself once, only no one found me out, apparently! The point lies in the last sentence on page 10: ". . . we have a carrier . . . with a steady supersonic frequency of modulation, which is varying in amplitude." A little thought, or a sketch, will show that this just as much modulates the original carrier, i.e., the L.F. envelope of the I.F. is still an envelope to the R.F. Thus, the I.F. does no good, in fact harm, for if we work out all the side bands, we find that we actually transmit on umpteen different waves at once. There are, of course, the two side bands from the I.F., on the R.F., but there are already two on each of these from the L.F. What the actual useful component is, if any, is not easy to find out. This idea was originally published in Q.S.T. some years ago, and, although I cannot find a reference at the moment, I am almost sure they put in a note saying that the idea was fallacious, about a year or two later.

Yours faithfully,

F. LIVINGSTON HOGG

(EG2SH, EG5VG, NI2SH).

P.S.—How does 2DR measure fading "orally"!

To the Editor of T. & R. BULLETIN.

DEAR SIR,—I wish to advise all members that I have removed to 6, Hartland Road, Friern Barnet Road, N.11.

My new QRA is within five minutes of 107, Friern Barnet Road, the old home and "birthplace" of G6CL.

Visitors always welcome.

73's,

J. CLARRICOATS (G6CL),

Chairman, Social Committee, and

North London Area Manager.

To the Editor of T. & R. BULLETIN.

SIR,—With reference to your article in the current number of the "BULL.," entitled "Double Modulation," I think it behoves me to let you know that I have been working on this identical idea for a number of years, on and off, and recently filed an application and provisional specification for patent. Also it was to undertake certain tests with this system that I recently asked you to kindly supply me with the QRA of a transmitting amateur to co-operate with me.

If, and when, I obtain Letters Patent for the invention, I have no intention of making any charge for licences to amateurs constructing their own transmitters and receivers, so that any amateur who wishes to construct and use apparatus using this system need not be deterred.

I would like to add to Mr. Allen's article one or two interesting (I hope) items. By superimposing two or more of the supersonic or lower frequencies, and then causing these to modulate the carrier wave, it is possible to transmit several trains of signals from the one transmitter simultaneously. The carrier wave may also have a signal train (fone or Morse) modulating it, without any interference from the other signal trains. Lastly, but by no means least, for DX, and working in the tropics, this system reduces all types of interference to a negligible quantity.

Thanking you for your assistance in the past,

I beg to remain,

Yours sincerely,

R. S. SPREADBURY.

To the Editor of T. & R. BULLETIN.

DEAR SIR,—I have just received a letter from the Consul-General of Mexico stating that a new S.W. station has just been opened in Mexico. Particulars:—

Call: XC51.

QRH: 44 metres.

Power: Exact power not yet settled.

Type of transmission: Articles dealing with the history and culture of Mexico, in English and Spanish.

Times of transmission: 9 p.m. Mexican time (same as U.S.A. Central time, which is seven hours earlier than G.M.T.). That is 4 a.m. in this country.

Reports are wanted and can be sent to: The Consul-General of Mexico, Bush House, Aldwych, W.C.2.

I expect you probably know all the above, but in case you do not, I trust that you will bring it to the notice of all T. & R. members.

Yours faithfully,

JAMES N. ROE (Op. 2BUW).

To the Editor of T. & R. BULLETIN.

DEAR O.M.,—I wish to draw your attention to the fact that the "NC" prefix has now been altered by the Canadian Government to "VE," also that "VE" stations are watching for "EG's" as follows: 80 metres, 02.00-05.00 G.M.T.; 52 metres, 01.00-08.00 G.M.T.; 20 metres, 05.00-09.00 G.M.T. Please insert this in the "BULL."

Tnx vy, OM!

73's,

CLAUDE W. COOMBER (EGBR515).

QRA Section.

Look here, fellows, just a little heart to heart talk. When I took on the job of managing this section a month or two ago, I was full of enthusiasm, and thought to myself: "Well, I'm going to do my utmost to make a success of it, and I know the chaps are very enthusiastic and they'll do their best to help me." After a few weeks had passed and things had had time to settle down, I noticed that there was something wrong. Apart from my sub-committee, I was ploughing a lone furrow, for the outside help I was getting was very scanty. Most of you, instead of writing to me and offering your suggestions as to how the QRA Section should be run, apparently just sat tight and took it for granted that whatever I did would have to do, and if you didn't like it, oh well, it's too much trouble to write, and besides, the letter would land in the W.P.B. anyway! Of course, as I did not get any letters of criticism, I was under the impression that you were all satisfied with my way of running things, and I was getting quite a swelled head about it. Then, with one crash, all my castle fell in ruins. A member of the QRA sub-committee went to a certain part of the country for a holiday and naturally looked up as many hams as possible. He found, much to his consternation and disappointment, that almost without exception they considered that the QRA Section was being run just about as rottenly as it possibly could be! But did they write and tell me so? Not they; but they preferred to call me names under their breath and nurse their grievances in silence. NOW THIS WON'T DO!!! I have got my own ideas as to how this section should be run, but they count for nothing compared with the wishes of the majority. It is always the majority that counts; but the majority in this case seems to be entirely indifferent. What's the matter with you all? For goodness sake wake up. Let me know what you want and I'll do my very best to see that you get it. Surely you must know what you do want, so drop me a line and let me know what it is. Don't think that because I don't reply to all your letters that I take no notice of them. I always give letters my utmost attention, but as my postage bill is heavy as it is, I find it out of the question to answer every letter individually. Now get down to it and write to me whenever there is anything you don't like, and don't be afraid to give your opinion, good, bad or indifferent. I always welcome your suggestions with open arms, no matter how unimportant they may seem on the surface they are of the utmost importance to me. Now, just a word to those few faithful ones who have not considered it too much bother to write. Thank you, old chaps, your letters and lists of QRA's have been most helpful, and don't forget to write again whenever you have something to say. In other words, vy mni tnx es hpe cuagn sn.

Norfolk.

6JV is suffering from holiday QRM in Erin, where he is enjoying "chin-skeds" with the gang over there. Has managed to squeeze in a QSO with 6YL and has been heard in OZ. (Congrats., OM!)

5UF reports conditions bad on 45 metres during the day, but has managed to keep skeds with 6YL and 5WQ. He dropped to 23 metres for a few days, but found conditions "dud." Has also been experimenting with capacity coupling on his receiver, which he finds an improvement.

2AAK also finds reception conditions bad and so has little to say.

2BWB is at present QRT in a nursing home, so has only been able to browse peacefully among an enormous pile of radio literature thoughtfully provided by 6JV. He wonders whether the design of 6YL's QSL cards has anything to do with all these QSO's, and thinks he will send in a report himself when his ears are strong enough to bear phones again! He hopes by the time these notes are printed to be able to report on 5-10 metre transmissions, if required.

2AAS, 2BLA and 6ZJ have not reported this month.

WANTED.—A thousand or so members to advertise their surplus gear for sale in these columns.

EXCHANGE & MART.

Rates ½d. per word, minimum charge 1s. 6d.

"ALWAYS" RESISTANCES.

PATENTS obtained, Trade Marks and Designs registered, British and Foreign.—GEE AND CO., Patent and Trade Mark Agents (H. T. P. GEE, Member R.S.G.B., A.M.I.R.E.), 51-52, Chancery Lane, London, W.C.2. Telephone: Holborn 1525.

TRANSMITTERS please note.—We are making a Rectifying Valve to cost you 15s. Specifications: Fil. volts 5½, plate volts 1,000 with an output of 50 m.a. Guaranteed.—Send for price lists of new valves and repairs to NORTH LONDON VALVE Co., LTD., 22½, Cazenove Road, Stoke Newington, N.16.

EG-6LI SELLING UP.—Sterling Audivox Speaker, Amplion Junior de Luxe (former just overhauled by Marconi; Western Electric Output Transformer, heavy duty; 4 Western Electric super heavy LF Chokes; Sterling Phones 2,000 ohms.; 3 .001 and 2 .00025 ex-WD Variable Condensers; Marconi Ideal, 2.7-1, unused, bought March, 1928; Dubilier RC Unit, few weeks old, unused; Set of Metro-Vick Fieldless ANP Coils, range 200-2,000 metres, perfect, six weeks old, with bases; DET1 s/w. Double-ended Transmitting Valve, still unpacked in original box, cost £7 5s.; Quartz Crystal, specially ground by Hinderlich & Co., fundamental 45.7 metres, unused, perfect, guaranteed to oscillate without bias. Offers of any kind considered; must sell quick and cheap. Write for full reasons, and particulars and list of other parts for sale.—STOURTON HALL, Horncastle, Lincs.

VARIABLE FIXED STOPPING CONDENSERS (.0015, .002, .003, v. .005 Mfd) tested to 5,000 volts; limited number only; 2s. 6d. each, postage 4d.—GI-6JA, 60, Clifton Road, Bangor, Co. Down, Ulster.

FOR SALE.—Set Aero Short-Wave Coils, 13-250 metres, with holder, 30s. Weston 0-5 Milliammeter, mounted portable base, 23s. Sterling Lab. Type .0005 Variable Condenser, 10s. Western Electric Microphone, P.O. pattern, 15s.—6BR, Overdale, Ilkley.

QUARTZ LENSES for C.C. experiments wanted.—Write, stating price, etc., to 7BB, Box 183, Aalborg, Denmark.

ORMOND FOUR-GANG VARIABLE CONDENSER, .0005 mfd., square law, ebonite dial; absolutely unused; bought for a multi-valve set which was not constructed. Price 32s. 6d.—FRANK ADCOCK, 46, Kingston Road, Teddington, Middlesex.

TRANSMITTER has surplus gear for sale, cheap, including Generators, Valves and other Components. Exchanges considered.—28, North Drive, Norbreck, Blackpool.

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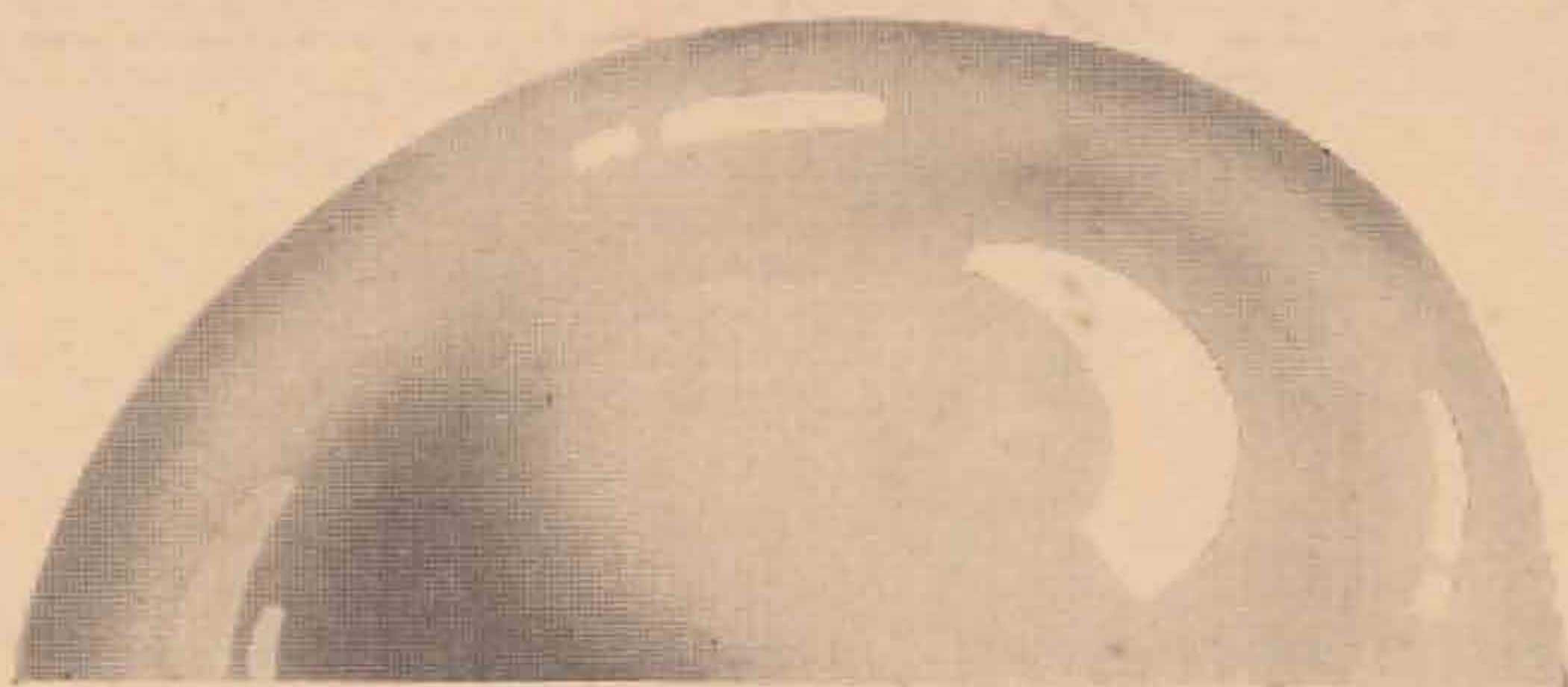
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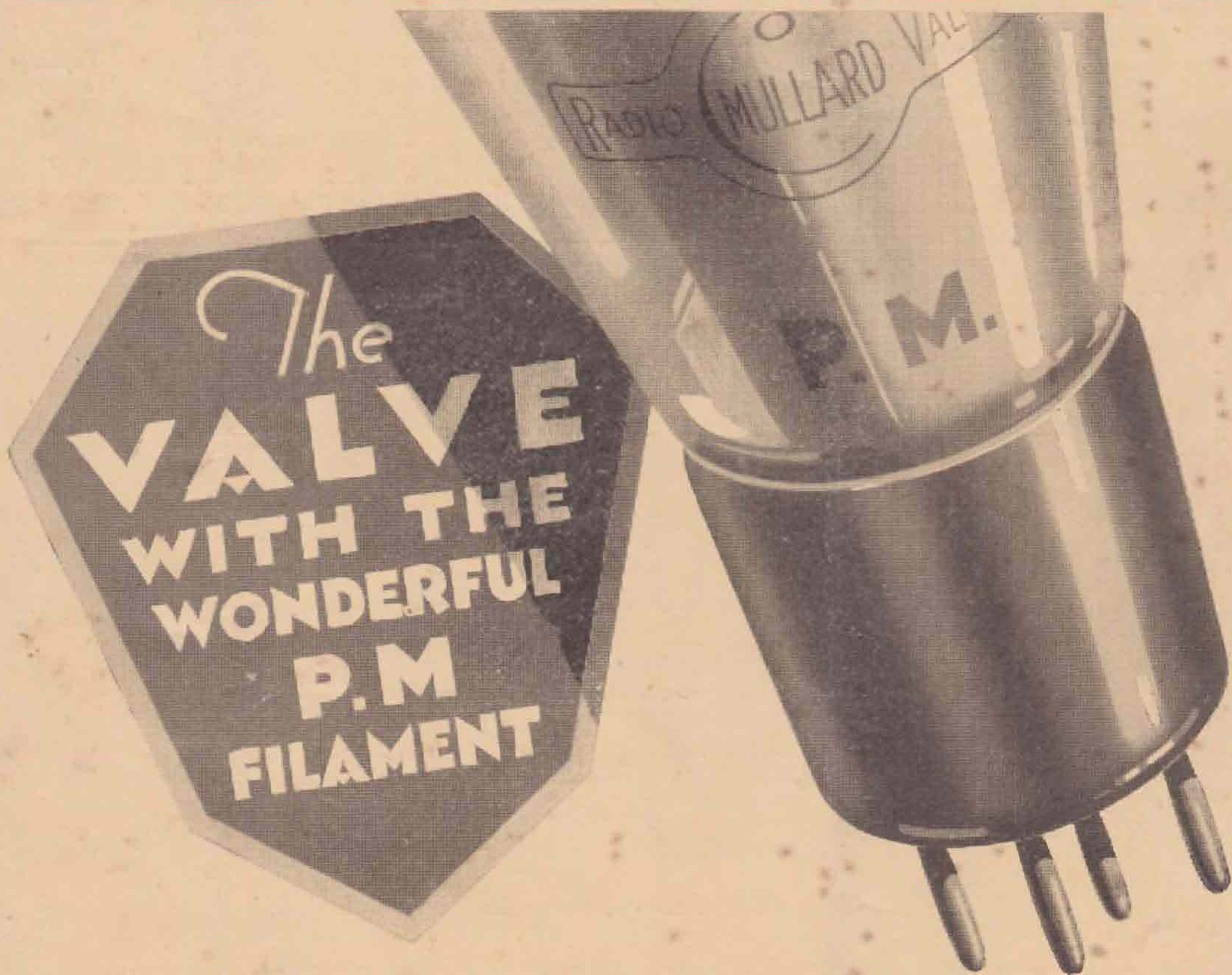
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