Christmas Greetings

T. & R. Bulletin

THE JOURNAL OF

The Inc. Radio Society of Great Britain

AND THE

British Empire Radio Union

Vol. 6. No. 6. DECEMBER, 1930 (Copyright) Price 1/6

THE INCORPORATED

Radio Society of Great Britain

AND THE

British Empire Radio Union

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

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R.S.G.B. CALENDAR.

December 19.—At the Institution of Electrical Engineers, Savoy Place, W.C.2: Annual General Meeting, to be followed by a Lecture by Mr. W. D. Oliphant, of Burndept Wireless (1928), Ltd., on "The Theory, Design and Operation of Gramophone Pickups." Commence at 6.15 p.m. Tea at 5.30 p.m.

January 15.—Joint R.S.G.B. and Lensbury Radio Society Musical Evening and informal Dance at the Headquarters of the Lensbury Radio Society, 16, Finsbury Circus, E.C.2.

January 30.—At the Institution of Electrical Engineers, Savoy Place, W.C.2.: Presidential Address by Mr. H. Bevan Swift, A.M.I.E.E., subject, "An Historical Survey of Amateur Radio," with an exhibition of some early radio apparatus. Commence at 6.15 p.m. Tea at 5.30 p.m.

February 27.—At the Institution of Electrical Engineers, Savoy Place, W.C.2: Lecture and Demonstration by the Gramophone Co., Ltd., Hayes. Commence at 6.15 p.m. Tea at 5.30 p.m.

The following dates are also booked for meetings:—R.S.G.B., March 25 and April 29; jointly with the L.R.S., Feb. 13, March 13 and April 10.

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T&R

Bulletin

The only British Wireless Journal Published by Amateur Radio Experimenters

DECEMBER, 1930. Vol. 6. No. 6.

EDITORIAL.

Coming Tests.

A GLANCE through the pages of the BULLETIN will show that those responsible for organising tests have arranged a programme that far exceeds the ambitious arrangements brought to a successful close last season. To Contact Bureau we extend our thanks for the immense trouble taken by the Organiser to give world-wide popularity to the C.B. Tests, and we wish them unqualified success. The 28 M.C. tests are taking place in January; during February the 56 M.C. enthusiasts will be attempting to break all records; March has been reserved for 1.75 M.C. working and, judging by present results on that band, some new ideas of short wave working are going to be squashed and the old ideas will not seem so absurd as, perhaps, they do now. This series of tests deserves the support of all the membership and the more observers who can switch their attention from pure DX to a specific problem, the more assured of success the tests will be.

Our Publicity Section has been active and on another page will be seen details of the first British Empire Radio Week, which, as agreed at Convention, is to take place during the last week in February. It is hoped to make this an annual event and therefore criticism of the present arrangements will be welcomed before the second contest is held. May we be permitted to draw attention to the third paragraph in Mr. Watts' explanatory letter? Thank you.

Mr. Marcuse has promised to arrange another party on 3500 K.C., and we hope that considerably more interest will be evinced before the contest is due to start than was the case with his suggestions for a similar event in November. Although, at the time of writing, no details have been received, we hope they will be found in this issue.

With these preparations we do not think anyone will find his time unoccupied during the first three months of next year, and we hope that the contests will be supported with an enthusiasm that does justice to the organisers.

* * * * *

With the close of the year it is usual to review briefly the work of the past twelve months. We are purposely omitting this as, at the Annual General Meeting on December 19, Mr. Clarricoats, will tell you in his own words of the progress made during the past year.

We hope during 1931 to make even greater progress with the development of the British Empire Radio Union. We wish to see the name of the Society emblazoned on every QSL card; we wish to hear it shouted from the house-tops; we wish it to be a by-word wherever Amateur Radio exists—and we wish Amateur Radio to exist everywhere. With your support it can be done; and so we thank you wholeheartedly for your assistance in the past and wish everyone of our members a very Merry Christmas, with much Success in the New Year.

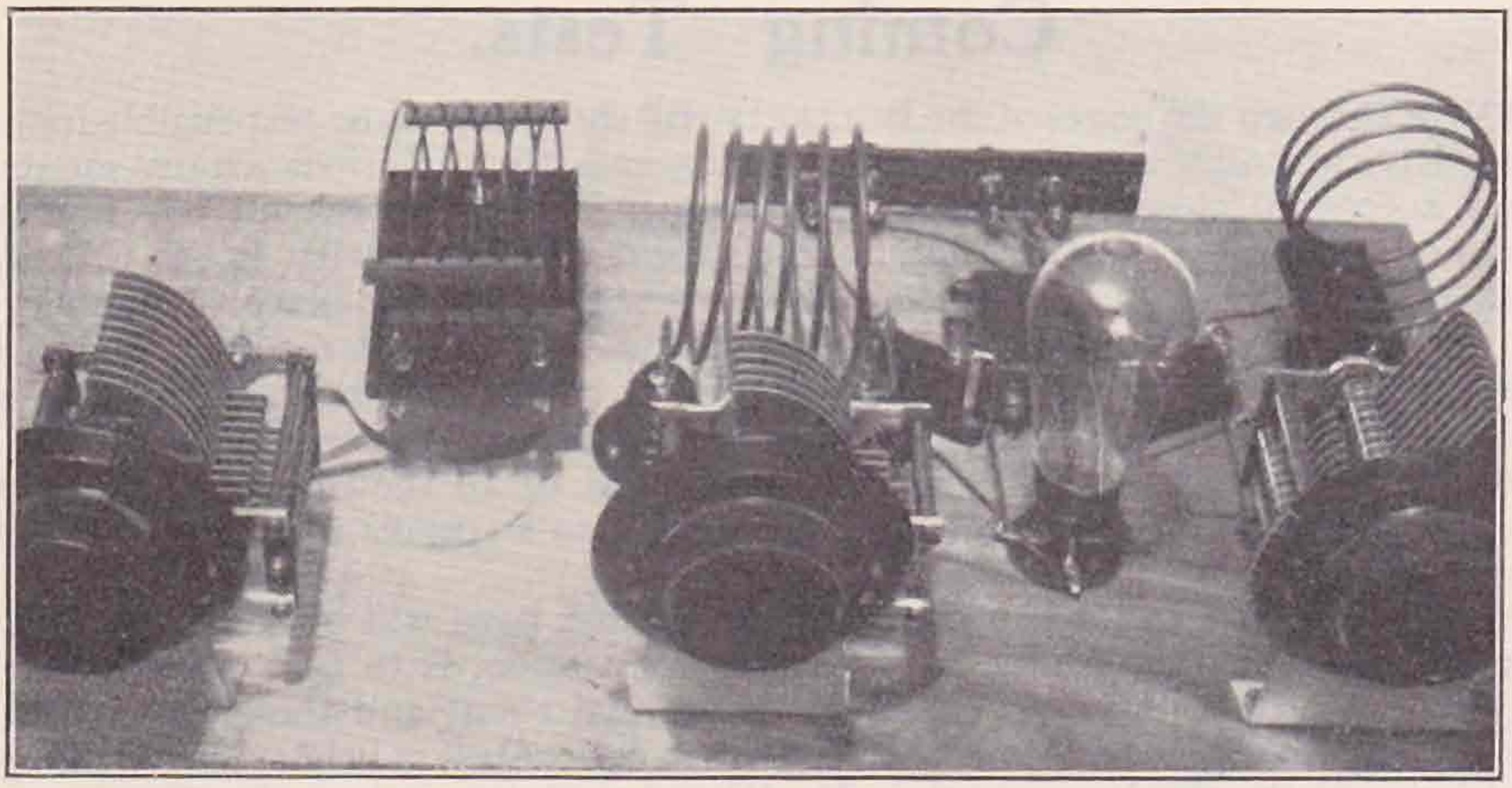
A Simple T.P.T.G. Transmitter.

IT is hoped that the following description of a simple transmitter for use on high frequencies, capable of handling low and medium power, will be of use to beginners in transmitting and assist them in designing their apparatus to give good results with a minimum of trouble.

The Tuned-Plate Grid circuit was chosen largely because of its general popularity as a single-valve transmitter. It is an excellent circuit to commence with and is reasonably efficient on all our bands, though for very high frequency work certain other circuits may be relied on to give better results. A glance at the circuit diagram will show two tuned circuits, apart from the aerial circuit, one of these being the tuned grid circuit and the other the tuned plate circuit. They are not inductively coupled and we rely on the capacity in the valve to provide sufficient coupling between the two circuits to maintain vigorous oscillation. Perhaps it is fortunate in this respect that a valve possesses an internal capacity of reasonable value for this purpose. Considerations of aerial coupling and keying will be dealt with later, but for the present it may be assumed that the key is "shorted." It will probably be realised that this circuit differs in no fundamental respect from an ordinary single-valve receiver, with the exception that the plate coil in a receiver is usually coupled and untuned to obtain oscillation, whereas here the reverse is the case. R_1 and C_3 may be regarded as the grid leak and condenser, respectively, though here their function is different from that in a receiver. The condenser C_3 acts as a by-pass condenser for H.F. currents which would otherwise be held up by the choking effect of the wire-wound resistances, R_1 and R_2. The condenser C_5 is also a by-pass condenser across the H.T. supply, and C_4 is connected across the filament of the valve. This has the effect of creating a very low resistance path for H.F. currents that find their way on to the filament and also tends to smooth out any ripple from the use of A.C. supply for heating the filament. Further, when keying a transmitter of this type, the filament may flicker, and C_4 will help to eliminate this. The high frequency portion of the circuit is all the apparatus shown above the centre line, and also the three condensers shown on the centre line and their connections. This apparatus must be wired up carefully, with short connecting wires and good joints everywhere. That is to say, the resistances R_1 and R_2, the key, the low tension and high tension leads are the only parts *out* of the H.F. circuit.

Choice of Apparatus.

We must next consider the choice of apparatus, and this is very much bound up in the power to be used. The set shown in the photograph is suitable



for low power and is seen with an *Osram* LS5 valve as a 10-watt oscillator, which was chosen as being one of the most suitable and reliable valves for this purpose. Where higher power is required, the first consideration would be the use of a larger valve of, say, the 50-watt dull emitter type, with changes in some of the other apparatus as outlined below.

The type of valve has already been mentioned, and this is fitted with a standard *Clix* valve holder; the latter may be mounted flush on the baseboard or, better, mounted up on insulated legs. The three tuning condensers are *Cyldon* transmitting condensers, their values being shown in the key below the circuit. These are mounted on mounting brackets, though, as no trouble was experienced from capacity effects when tuning, the extension spindles were not used. That would not, of course, have been expected from C_1 or C_2, as the frames of these are at "earth" potential (only from an H.F. point of view), though that is not the case with C_6.

and here an extension handle would be of value under certain circumstances. These condensers are quite safe with powers of 100 watts, so these will not need alteration if the set is used with higher power.

Condenser C_4 is a standard T.C.C., capacity 2 mfds., and, of course, has no high potential across it. C_3 and C_5 are mica condensers and must be chosen with care. Values of .005 to .01 mfd. are suitable, and whereas, for low power, C_3 may be a standard receiving condenser, C_5 should be one of stouter construction and may be chosen from T.C.C.'s list of low-power mica transmitting condensers. Type 1039, .005 or .012 mfds., should be suitable, or types 1040 where greater power is to be used.

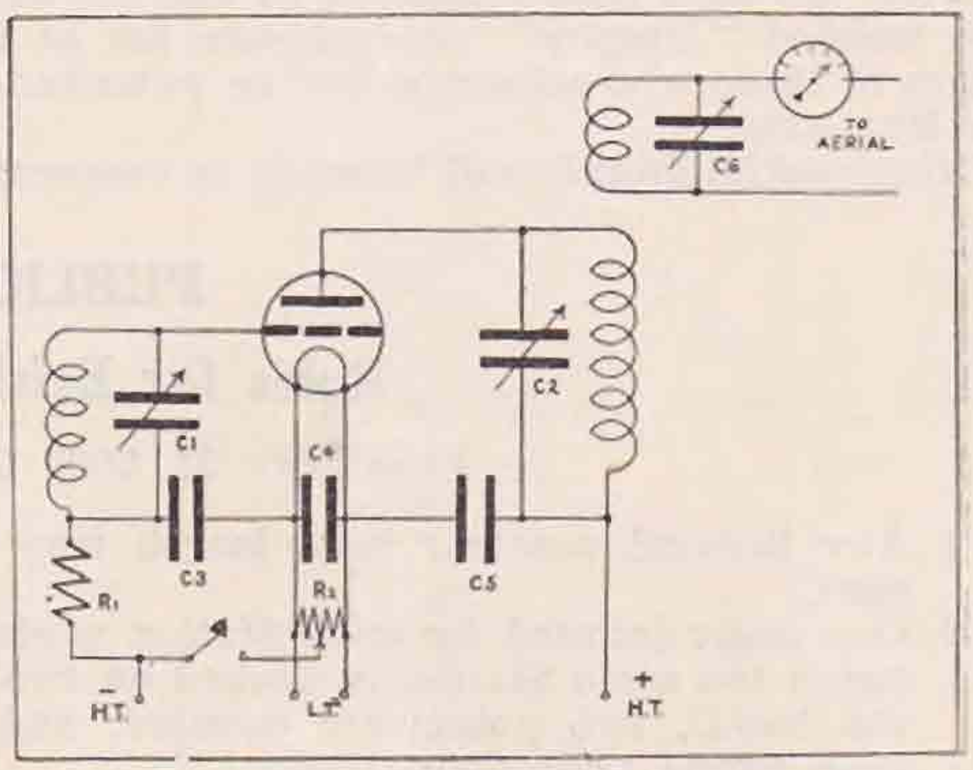
For a comparatively low or medium impedance transmitting valve, around 5,000 ohms, a 50,000 ohm grid leak will be suitable. A 10-watt set will only take a few milliamps grid current and a *Burne-Jones* Spaghetti resistance is used on the set in the photograph. A 50 to 100 watt set will probably take 12-19 milliamps and the grid leak would then need to be of stouter construction. Resistance R_2 is to obtain a centre tap of the filament supply. Even if a centre-tapped transformer is used it is just as well to employ an "artificial" centre tap on the set as a resistance can then be inserted in the L.T. lead next to the transformer if it should so be desired at any time. This centre-tapped resistance may be 50-100 ohms, and has only to pass a small current through it from the L.T. supply plus the H.T. current taken by the valve. The transmitter may be earthed, through a large-capacity condenser to prevent any fear of a "short" at either side of C_4.

Coils.

The coils shown in the photograph are those used on 20 metres with 10 watts. The centre one, plate, consists of six turns of $\frac{1}{8}$-in. (outside) copper tube, 3 ins. diameter, spaced two turns per inch. The coil coupled to it is the aerial coil, and consists of six turns, but the size varies so much with the aerial used that further details will not be given. The grid coil, on the side, consists of four turns, of the same tube, wound to a diameter of $2\frac{1}{2}$ ins. For 10 metres the plate coil may be three turns, $2\frac{1}{4}$ ins. diameter, and the grid coil two turns, 2 ins. diameter. Small coils wound with that material are self-supporting, though, if made similarly for the higher wave bands they will be found to be insufficiently rigid. Accordingly, for low power, the 40 and 80-metre coils are wound on ribbed or skeleton formers. Forty metres: Plate coil, 12 turns, 3 ins. diameter, spaced three per inch, No. 12 S.W.G. wire. Grid coil, nine turns, 3 ins. diameter, spaced four per inch. Eighty metres: Plate, 24 turns, $3\frac{1}{2}$ ins. diameter, spaced six per inch; grid coil, 15 turns, $3\frac{1}{2}$ ins. diameter, spaced six per inch (the latter are wound with 14 S.W.G.). Where high power is to be used, the coils should all be wound with 3-16 in. or $\frac{1}{4}$ in. copper tube. Wiring should be done with something consistent with the coils used—say, No. 10 or 12 gauge wire or copper strip. All coils shown are fitted with *Clix* valve pins, which fit into sockets. The sockets for the grid coil are mounted on a strip of ebonite, on ebonite pillars; on stand-off insulators for the plate coil; and on a piece of ebonite, shown in the photograph, for the aerial coil. This is allowed to swivel at one end so that the coupling may be varied, connections being taken to the aerial condenser by flexible copper tape connections.

Final Remarks.

It will be seen that keying is performed by breaking the connection between H.T.—and filament, the grid leak being permanently connected to H.T.—. Four *Clix* all-in terminals are mounted on a terminal strip at the back and are for L.T. (2), H.T.+ and H.T.—. The latter is connected to the grid leak only (on the set), and the key is then connected between H.T.— and filament centre tap on the power supply. These All-in terminals are a thoroughly insulated job, and when disconnected from each other there are no metal parts left exposed from which damage due to "shorts" may arise. A key thump filter may be fitted to reduce interference to local listeners: a



C_1	·0002 mfds.	C_4	2 mfds.
C_2	·0001 mfds.	C_5	·01 mfds.
C_3	·005 mfds.	C_6	·0002 mfds.

30 henry choke (or thereabouts) between the key and R_2 and a .01 mfds. condenser across the key points is effective.

No metres are shown in the photograph, though one aerial ammeter is shown in the diagram. The H.T. feed meter would, of course, go in the H.T. lead. The connections to the aerial may be taken direct from condenser C_6, via well-insulated terminals if desired.

It will have been observed that the grid-tuning condenser is larger than the plate-tuning condenser. This is so that a fairly high ratio of C/L may be used on the grid, which generally assists to keep the note pure and steady. As regards tuning, for the benefit of the beginner it may be said that when a set of this type is in resonance (i.e., when the grid and plate condensers are adjusted to give strongest oscillation) that the input is a minimum. When the aerial (a load) is coupled, and tuned, it absorbs power from the anode circuit, causing a rise in input. It is not within the scope of this article to deal fully with the fundamentals of tuning transmitters though it is hoped that the constructive details given will be of use to those new to the field of transmitting.

BRITISH EMPIRE RADIO WEEK.

To All Members in the British Isles.

I WISH to place before you the rules which have been approved for Empire Radio Week.

As will be seen it has been decided to offer a challenge trophy which will be competed for annually. The award will be presented to the member (R.S.G.B. or B.E.R.U.) who obtains the highest number of effective points as laid down in the rules.

In order to enhance the value of the trophy and to give proof in a practical manner to our fellow amateurs in the Dominions and Colonies of our keen interest in British Empire Amateur Radio, we have decided to invite every member of the Society resident in Great Britain to contribute the sum of *one shilling* (or more) towards its cost.

Your contribution should be forwarded to Headquarters not later than December 31 and the envelope marked "Trophy." A complete list of the names of those who subscribe will be published in the BULLETIN.

Other special awards will be made in connection with the week, details of which will appear shortly in the New Year.

I should like to emphasise that publicity is vitally necessary in order to make the project a success, therefore, please be sure to mention the idea to all your Colonial friends either over the air, or through correspondence.

All B.E.R.U. groups have been separately advised of our plans and we are confident that they will arrange for publicity where possible, but besides this we ourselves, should make a point of telling, the amateurs of the Empire our plans.

Adopt as your motto for 1931 "Make Empire Friendships." Wishing you all a successful year of work during 1931.

I remain, yours sincerely,

ARTHUR E. WATTS
(Vice President and Honorary Publicity Manager).

PUBLICITY SECTION.

Rules for British Empire Radio Week.

FEBRUARY 22, 0000 G.M.T. TO 28, 2400 G.M.T., 1931.

1. Any licensed amateur wave-length may be used.
2. One point counted for each Station worked, but if the same Station is worked on two of the bands, two points are counted, and if three bands, three points, etc.
3. To be valid, Stations worked must be in a different part of the Empire from where the Station competing is situated.

For this Competition the Empire is divided into the following Twelve Groups. :—

(1). British Isles.
(2) Canada, including Newfoundland and Nova Scotia.
(3) West Indies, including Bahamas, Bermuda, and British Guiana.
(4) South Africa, including N. & S. Rhodesia.
(5) Kenya, Uganda, and Tanganyika.
(6) Egypt and Sudan.
(7) Iraq.
(8) India, Burmah and Ceylon.
(9) Malaya.
(10) Hong Kong.
(11) New Zealand.
(12) Australia.

4. British Stations not actually situated in the British Empire may compete and will be considered as being in whichever of the Groups mentioned in Rule 3 they are nearest to.
5. The winner to be decided by the points mentioned in Rule 2.

   Everyone competing is required to send to the B.E.R.U. representative in ..... or to the Hon. Secretary, R.S.G.B., and B.E.R.U., 53, Victoria Street, London, S.W.1, a list of Stations worked, giving the date, time (G.M.T.) and Wave-band for each point claimed.

   All entries must reach your B.E.R.U. representative by March 15, or if sent direct by April 30, 1931, which is the final date for receipt of entries.
6. All members of B.E.R.U. are eligible to compete, and anyone not a member at the commencement of BRITISH EMPIRE RADIO WEEK, may compete, providing he sends his application for membership with his entry.
7. A maximum of 20 contacts on each wave-band will be allowed with stations in any one part of the Empire as defined in Rule 3.
8. It has been decided to offer a challenge trophy and other awards which will be provided by Great Britain.
9. The premier award will be known as the B.E.R.U. Challenge Trophy and will be competed for annually.
10. The Rules as decided, shall apply for the year 1931, but the B.E.R.U. Groups in the Colonies and Dominions will be asked to give their approval and make suggestions for the future.
11. It is suggested that the last week in February be fixed permanently as BRITISH EMPIRE RADIO WEEK.
12. There will be an award for Receiving Stations in accordance with the foregoing rules but with the following additions, the Station called as well as the Station calling must be stated for every point claimed. Only Receiving Stations will be eligible for this award.

Some Difficulties of Short-Wave Reception at Sea

By One of Yourselves.

I CAN imagine you fellows, sitting back in your comfy shacks and dens and thinking of the posh Zepp and Levy antennæ fitted to our big passenger ships, saying, "Good Heavens, what's the man growling about. Got a jolly fine unscreened antenna and nothing to do in his spare time but listen on short waves." I may have had similar ideas at one period of my existence, but, after experiencing conditions in various types of cargo ships under conditions varying from the coast of Alaska in winter to the China and Java coasts in summer, although enthusiasm has increased, ideas have changed quite a bit.

Let's take the present voyage as an example of the snags which the sea-going ham comes up against. Twenty-four hours after returning from a coasting trip round the Continent I found myself leaving England again on a ten-months' voyage in a small cargo ship of 5,800 tons bound for Java and New York. In the rush of packing, time was found to ransack the junk drawer for the gear to make a short-wave receiver, the old one which did good work on the Pacific being left at home; but owing to shortage of time, I was unable to get the gear I really wanted, and it was only when off Holyhead that I began to remember the things I had forgotten—and the next radio store was in Batavia in six weeks' time. The object in view was a four-valve outfit of the "QST" 1929 variety, with the ham bands well spread over the dial, but with modifications to make it suitable for a continuous range from 30 M.C. to 3 M.C. for the reception of Press, time signals and other commercials in which I am interested. The same arrangement described by EI2B in a recent "Bull." is used, but Indigraph dials are used on both tuning condensers, the small "ham" condenser being kept at zero for ordinary work and the main tuning condenser dial is calibrated for the various stations and ham bands.

By the time Port Said was reached the receiver, complete with tube base coils, untuned H.F. and tuned L.F., was finished and used with a 40-foot vertical antenna coming down through a ventilator, but although it had any amount of kick behind it, it certainly was painful to listen to, all signals having a permanent wobble, so that even WIZ and Co. sounded T3, and unreadable generally, while continuous crackling noises were deafening, these being traced to sundry rubbing stays. The removal of the H.F. stage improved the signal to noise ratio and, after one PM12 had been seen to succumb to the effects of leaving the short-wave antenna connected to the set while pumping a kilowatt or so into the main antenna from the rockcrusher, the H.F. stage was permanently discarded.

Mechanical vibration was another cause of trouble. The shack is situated on the after end of the boat deck, right over the propeller shaft, and even when the ship is down to her marks, vibration is very marked, and the whole set is continually on the move. Fortunately, the valve holders were Sterling ones, which are mounted on Sorbo, and, after the original spiral connections had been replaced with very thin flex leads, proved to be a great help. The days crossing the Indian Ocean were spent in making all leads as firm and rigid as possible—and soldering by a big galley fire in the neighbourhood of Perim doesn't come under the heading of "my favourite indoor sports." Even the tuning condenser vanes, which are of the SLF variety and not normally very rigidly supported, have been fitted with strengthening ribs, as they were found to be vibrating. I never thought there was anything in those adverts. in "QST" for "Taper plate condensers" before, but out in Java these are out of the question, so that now the old SLF's, though not so good to look upon as of yore, are vibration proof.

Various methods of coupling the antenna were tried, and a swinging coupling coil was found to be the best, but owing to the absence of facilities for making a job which would only swing when required, the next best arrangement of tapping the antenna through a midget variable condenser to the plate end of the reaction coil is used, although as alternatives the antenna can be tapped on the grid through the condenser when, by increasing the capacity and increasing reaction to make up for the increased damping, reception of G5SW and Co., can be brought up to a maximum. Also, the aerial can be connected to a few turns wound round the socket holding the coil, but coupling is very weak and it is only used for 28 M.C. and when the antenna is swinging violently. My greatest trouble on the way out was that the receiver kept going in and out of oscillation several times a minute and this was traced to the jumper stay and maintopm'st stay touching as the ship rolled. The Chief Officer was approached and, although he did not see how two wires rubbing sixty feet from my antenna could do any harm, he sent a man aloft when we reached port and parcelled up one of the stays with canvas, and thus made decent reception possible at last. Later on at Sourabaya, I invested in half a dozen Sorbo sponges, and with the set chocked up on these I was able to hear my first ham signals from Europe since leaving home.

Having got rid of the major troubles, we come up against the smaller and equally annoying ones. Electric fans in bad condition are the worst of these, and they have been found to give out a mean signal up to about 250 feet, though generally screened by iron bulkheads. The next job was to find these, and by comparing the times of QRM with the habits of the people on board, the offenders have been tracked down and, by the expenditure of much tact, energy and glass paper, the air is now almost clear of "man-made static." In the worst cases, where the commutator was very bad or the fan very close to the shack, 2mf condensers purchased in Batavia proved a good investment.

The set is contained in a wooden cabinet which serves to keep all but the most adventurous of cockroaches out, but you can imagine my feelings

(*Continued on page* 159.)

A 28 MC Receiver for the Tests.*

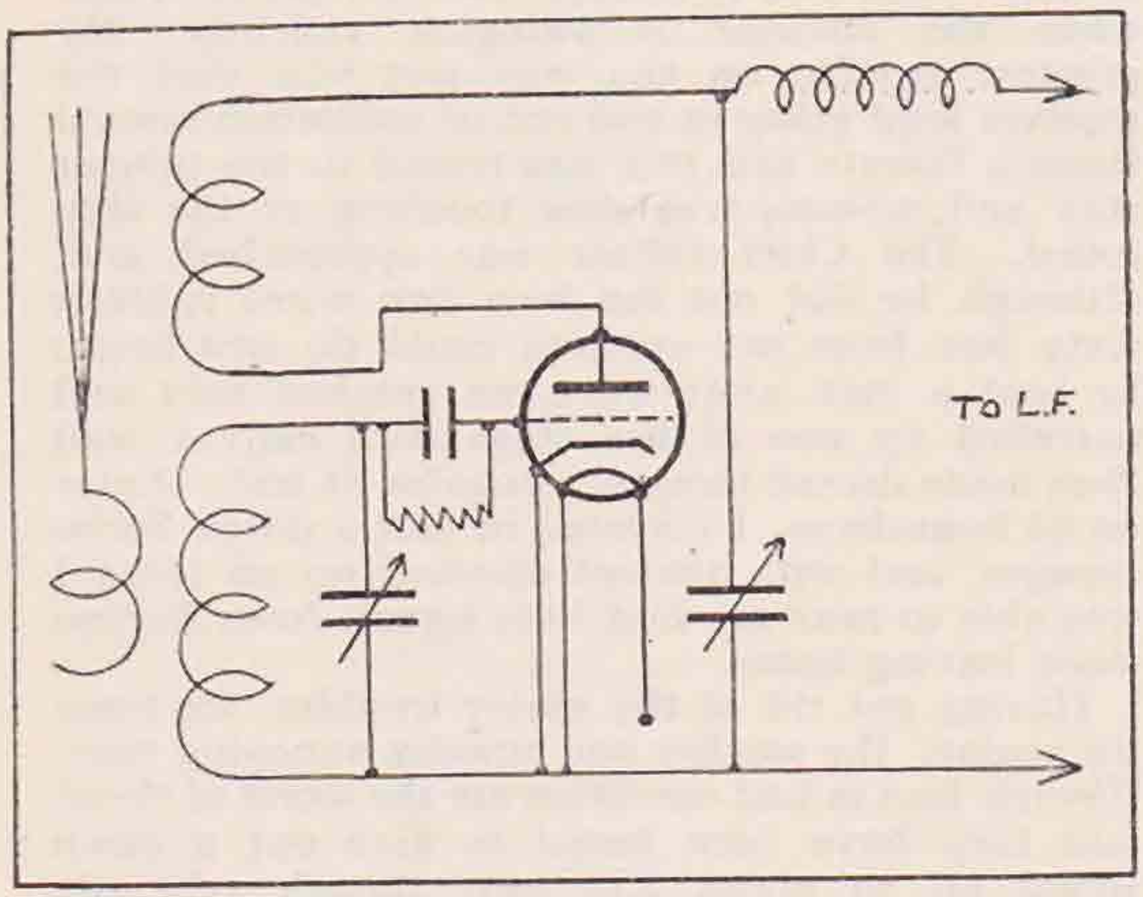
By J. W. Mathews (G6LL).

IN view of the January, 1931, 28 M.C. tests, a few words on the subject of receivers will possibly be of interest, especially to those making their *debut* on that band.

There is really no difficulty in making a receiver work on 28 M.C. : the only difficulty is to determine just when you are on 28 M.C. and not a few megacycles either side !

This should present little difficulty to those who already have a crystal-controlled transmitter working on 14 M.C., as it is a comparatively simple matter to pick out the 28 M.C. harmonic. The same, of course, applies to a 14 M.C. self-oscillator.

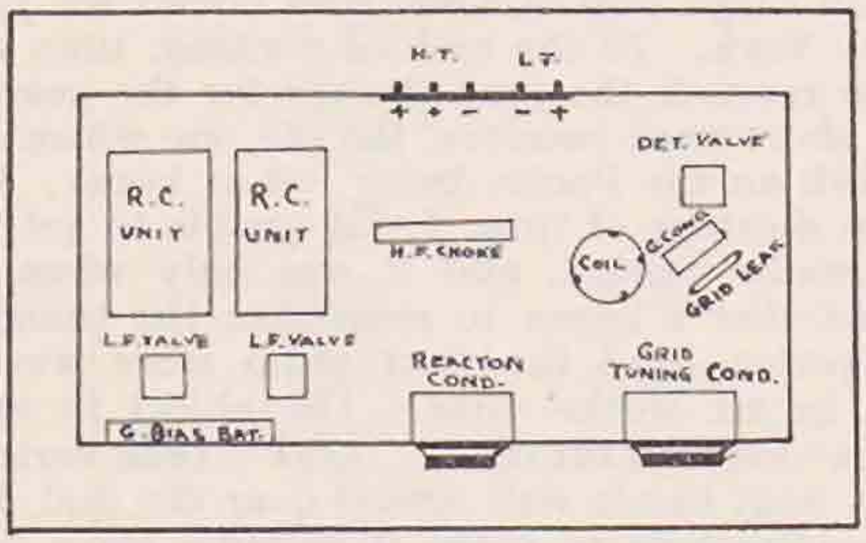
If, however, you don't possess a transmitter, the chances are you don't possess a heterodyne wavemeter, so some other system must be found to indicate the frequency at which the receiver is functioning. The best method is to make up a rough absorption wavemeter out of four turns of wire, 2 ins. diameter, and spaced about ½ in., which are self-supporting, put a flash-lamp in series with the coil and a variable condenser, say, .0002 mfd. This will be found to tune to 28 M.C., and most probably 14 M.C. as well. Take it round to the nearest transmitter you know and calibrate it roughly off his transmitter. The only other method is hit or miss. If you make your 28 M.C. coil about half the size of your 14 M.C. coil you won't be far out.



Now as to the receiver itself. For those commencing work on this band, H.F. amplification with a screen-grid valve is not to be recommended, as it requires quite a lot of " juggling about " to get it going properly. Then it is, of course, well worth while.

However, a straight circuit, as shown in the diagram, will be found to give excellent results if made up carefully.

It is very nice to see very short leads, but this usually means cramping the layout, which is a worse fault than excessive lengths of leads. Plenty of room should be allowed for the layout of the detector circuit, and the fields of the coils and condensers should be kept as far apart as possible. This does not mean, of course, that the leads may be of indefinite length, but that a compromise must be effected between short leads and well-spaced components. This is a very important point, and is usually the cause of failure of so many nice-looking receivers when called upon to function at this frequency. The accompanying diagram shows a suitable layout, more or less to scale.



A metal panel should be used, or else very long extension handles. The total screening of the receiver in a metal box may, or may not, be an advantage. It certainly keeps the dust out, and does not seem materially to affect the efficiency of the receiver.

The aerial may be coupled to the grid coil in several ways, but generally only a very loose coupling is necessary. A single turn wound near the grid coil is quite sufficient, and any method of tighter coupling does not seem to affect the signal strength at all.

In the case of the writer, the main tuning condenser is a G.E.C. cut down to one moving and two fixed plates, quadruple spaced. Any other *good* make will do, provided it is cut down in a similar way. A slow-motion device for tuning is, of course, a necessity. The reaction condenser is a .00025 G.E.C., and here again the same remarks apply. Slow motion is a distinct advantage, although not a necessity.

The grid condenser is an air-spaced .0001 mfd., and the grid leak, at the moment, .25 megohms. Various values up to 5 megohms may be used, depending on the detector valve.

The coils are mounted on a B. & J. four-pin base, and one is wound with 18-gauge wire, this being self-supporting. Four turns 1½ in. diameter, spaced ½in., are used for the grid coil. The reaction coil is wound with 22-gauge D.C.C., four turns of this being wound in a bunch. This is then self-supporting and can be soldered in position on the coil base. Coupling can be varied by merely

[* In response to requests for practical details for 28 M.C. work, the Editor has asked Mr. Mathews to write the accompanying article in the hope that it will guide the newcomer in the fields of 28 M.C. reception and thereby add to the number participating in the tests. Details of G6DH's 28 M.C. transmitter appeared in last month's issue and a simple T.P.T.G. transmitter for all waves appears in this issue.—Ed.]

bending the coil backwards and forwards, and will probably be found to be very loose. These coils may not be very strong, and are subject to vibration, but have been used with great success by the writer.

Now a word as to valves. This is a very important question, and should be given careful attention.

Most types and makes of valves have been tried as detector, but the first place must go to the Mazda AC/HL. This is an indirectly heated cathode valve, and is far and away a better detector than any directly heated filament valve. It is slightly better than two other well-known makes of I.D.H. valves.

The heater is run off a 4-volt accumulator, which is probably extravagant, but is certainly worth while, if A.C. is not available.

With this type of valve as detector, only about 40 volts H.T. are required and a .25 meghom grid leak.

With regard to the L.F. side, this may be either transformer or resistance coupled. In the case of the writer, R.C. coupling is used, as it gives, possibly, less background than transformer, and is more suitable to the type of valves employed.

The H.F. choke is an important point, and should be carefully made—8ft. 4in. of wire wound on a ½-in. paxolin tube will make a very efficient 28 M.C. choke, or alternatively it may be made to resonate on a definite wavelength, say, 12 metres.

That, in brief, is a simple 28 M.C. RX for beginners in work on this frequency.

As will be seen, every effort has been made to simplify the receiver, with the object of reducing all losses to a minimum, and it is thought that anyone building a receiver on these lines will not have much difficulty in making it function on 28 M.C., although whether they hear anything depends on prevailing conditions.

There are possibly several points in the foregoing remarks that may be criticised, and it is the wish of the writer that such criticisms be sent to the Editor for publication. (If there's room!—Ed.)

Memories.

By "Oletimer."

TO-DAY is the eleventh anniversary of my station. At 17.15, October 10, 1919, my first 7/22 phosphor-bronze aerial was connected to slider bar of my first A.T.I., and a few minutes later signals were received per a pair of Sullivan's W.D.B. 'phones, purchased for 3s. 9d. From whom these signals came I cannot say, because I did not understand Morse, nor can I tell you the wave-length, because I did not clearly understand what wave-lengths were in those days. But I do know that never since have I experienced quite the same thrill as I did on that autumn afternoon eleven years ago. The young "ham" of to-day may well ask what induced a person comparatively ignorant of the fundamental principles of electricity and wholly unfamiliar with the business of telegraphy to plunge into a specialised art. There are two answers, I think: (1) Imagination; (2) the desire to be different from everyone else. In those days wireless was considered something quite beyond the comprehension of a layman. It is a fact that in my case there were seemingly endless arguments before paternal permission could be obtained for the erection of an aerial. The grounds for objection were that the waves attracted to the house by the aerial might cause a fire! So that if you ran a wireless station you were a local wonder and a regular source of copy to the district press. And imagination gave no little incentive. To feel that certain sounds audible in your own home were being produced in far-off Cornwall, even in Paris or Nantes, or by some ship bound on a mysterious mission over the high seas, what allurement lay therein! It did not matter that the signals were unintelligible, they came through the void from afar—that was enough.

How did one break into the game in those days? Generally quite on one's own initiative. There were very few helping hands about. The germ was sown in my youthful breast when, as a schoolboy, the purpose of a local Army aerial was explained to me by my tutor. A little later I bought a cheap handbook on Wireless Telegraphy, published by Cassells. This book told you how to make a receiver and transmitter, and, in good faith, I proceeded to follow the directions given. The A.T.I., I remember, had 15 turns spaced ½ in. apart on a 2¼-in. cardboard tube. The natural wave-length would be somewhere about 35 metres I suppose, which, had I but known, was "the trumphet of a prophecy." From this book the magic words "silicon" and "carborundum" filtered into my vocabulary. Then I learned another lesson: you were not allowed to buy these minerals for wireless purposes unless you could produce a Post Office permit. If you had the permit the crystals were very difficult to get. I obtained my first carborundum crystal from a local ironmonger who had in his shop window a large block of the raw mineral displayed as an advertisement for knife-grinders. Will the good people at St. Martin-le-Grand forgive me when I confess that at that time I had no permit? But soon after I obeyed the law. Well I remember that first permit. There was a note on it to say that I must not use "thermionic valves" without special permission. As I did not know what these were I did not worry. With the crystal permit came a form which I was invited to fill up so that I might be given a transmitting permit. I told my father I should never want to transmit. Yes, it's all true.

The Cassell's receiver never worked, though much labour was put into it. About this time Mr. Bangay swam within my ken. Never can I repay the debt I owe to him, but let these words be a tribute. A few hours with his Elementary Principles and I wound an 8″ × 12″ cardboard tube full of 22s enamelled copper wire. I bought a Dennis multiple detector, a blocking condenser and the

(*Continued on page* 162.)

Station Description No. 11.

G2XV.

By G. A. Jeapes.

CHANGES in the QRA of this station have been many, but all have been in the vicinity of Cambridge, where the station is still situated at 2, Salisbury Villas, Station Road.

The " Radio Bug " caught the writer fairly early in the history of the game, and a receiver with inductances 2 feet long and crystal detectors adorned the bedroom table as far back as 1913.

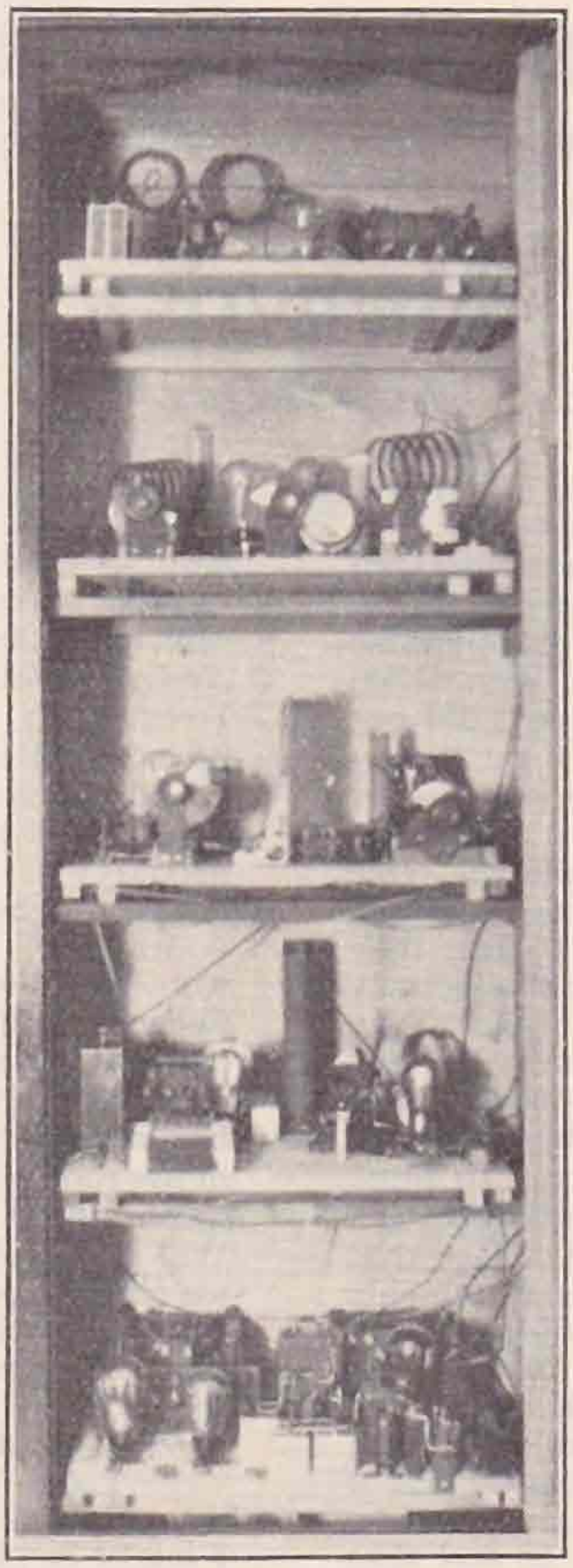
We have progress to thank for the fact that spark coils, and sensitive spots, of a very elusive character, on crystals, are now only humorous memories.

Passing through the various stages of evolution, we arrive at the present day to find things somewhat different.

G2XV is now out of the stage where one finds a bench and a few shelves, etc., littered with pieces of apparatus, connected up here and there with odd pieces of wire and the whole smothered with dust. After a number of years of this sort of experimenting, the writer became convinced that the game was taking up too much room, time, and money, so decided to hit a plan and stick to it.

One thing was definite—that the outfit was to be accommodated in the living room (no separate " radio room " now being available) ; this meant that the " bench and shelf " idea had to be scrapped for some neater idea so as to pass the criticism of the OW for tidiness ; it was to be compact, cheap to build, dustproof and, above all, as efficient as possible. (This is where the married, and " hard-up " readers become deeply interested) ! ! !

An advertisement of one of the large London providers was spotted wherein large kitchen cupboards with shelves were offered for about 37s. 6d., and one of these was purchased, and the writer then commenced the process of cramming the whole outfit therein (except the receiver). The photo does not show much detail, but here goes :— Bottom shelf : one transformer providing H.T. 200v. for crystal oscillator, rectified through Osram U8, also winding providing 200v. grid bias rectified through Osram U5, and divided off through a potential divider to get various negative volts to following stages. On the same shelf is a further transformer giving 500v. H.T. rectified through another Osram U8 for H.T. to the F.D. stages. All the various smoothing arrangements for these circuits are on the same shelf. On next shelf above is a further transformer which provides 500v. rectified through another U8 ; this supply is for the power amplifier and modulator, whilst on the right of this power supply can be seen the crystal oscillator which uses an Osram DE5B ; the H.F. energy from this is fed up to the next shelf whereon is to be found the two frequency doubling stages ; a screen midway across the shelf will be seen which separates these two units, both of which utilise Osram LS5B valves with a switch provided to cut out one stage when working on 7 M.C. On the fourth shelf can be seen the power amplifier, which consists of two LS5B Osram valves in parallel and neutralised. It may be as well to mention here that each stage has its own separate wire-wound variable grid leak in addition to its own individual tapping on the grid bias potentiometer.



On the top shelf is to be found the speech amplifier (valve L610) and choke controlled modulator (LS5), together with microphone transformer, speech choke, volume controls, etc.

That completes the contents of the cabinet. This transmitter normally works at an approximate input of only 25 watts, although the station is licensed up to 100 ; keying is effected by breaking the negative grid bias feeds to both the last F.D. stage and the P.A.

The aerial in use at the present moment is a single wire fed Hertz and appears to give as good results as any antenna yet tried. It was found to be very critical on correct dimensions, and particularly the point of attachment of the feeder ; for dope on these aerials the writer cannot do better than refer readers to the article in " QST " of September, 1929, page 19.

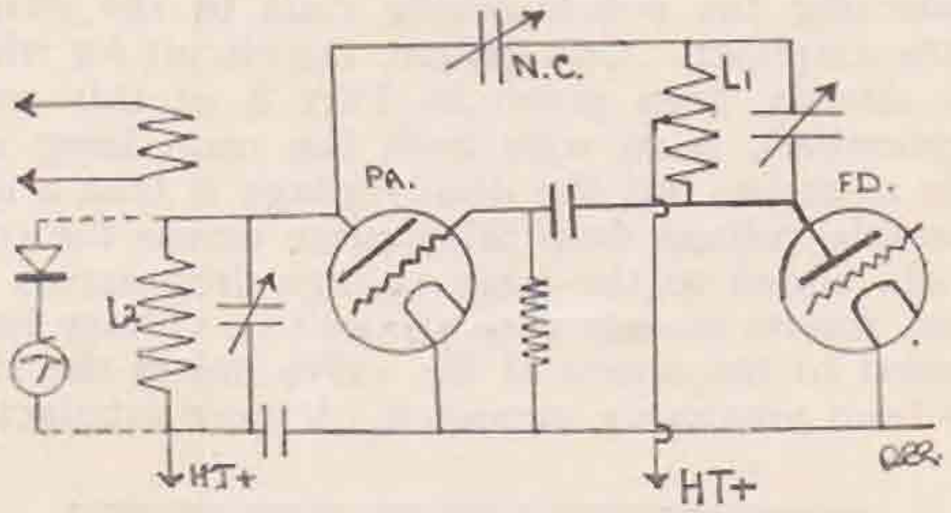
The receiver which the writer has settled upon, after much consideration and many tests, is an ordinary DET with two transformer L.F. stages. A number of attempts have been made to get S.G. valves to give good results, but the extra control was not considered worth while on 14 M.C., although

(*Continued on next page.*)

Transmitter Neutralisation.

By D. C. G. GATTIKER (G6DG).

During my recent stay in Germany I had the pleasure of making the acquaintance of several German hams. One thing of particular interest which was shown to me was a method of transmitter neutralisation which, to my knowledge, is but little, if at all, used in this country, and which was explained by Herr Klotz, operator of D4ABG. The method is applicable to almost any orthodox type of neutralisation, but let us consider the case of the popular CO.FD.PA type transmitter. In the diagram, for the sake of simplicity, only the PA stage is shown, NC being the neutralisation condenser. The only apparatus required is a crystal detector (conveniently of the semi-permanent type) and a sensitive moving coil galvanometer, which are connected in series. The neutralisation is carried out in the following manner. The crystal oscillator is tuned to the point of maximum excitation, and the FD is brought into step as shown by a kick of the milliameter in the plate circuit of the FD valve, in the usual manner. The PA stage is also brought into tune in the same manner. The aerial coupling should be fixed as it will be required after neutralisation. The filament current to the PA is now switched off and the crystal detector and galvanometer are connected across the plate inductance L2 as shown in the diagram by the dotted lines. The NC is now rotated, and it will be found that for a certain position of the condenser there will be a minimum reading on the galvanometer, i.e., if the condenser is rotated either way, the reading on the meter will be increased. In this position, then, there is a minimum transference of energy from the FD to the aerial circuit, and the transmitter is neutralised. On removing the crystal detector and galvanometer and switching on the current to the PA everything should function



correctly. The function of the crystal detector is, of course, to rectify the RF energy which is being transferred from the FD in order that it may be measured on the galvanometer. Whatever may be the theoretical objections to this method, in practice it is extremely satisfactory, and is probably one of the simplest, most straightforward, and accurate methods of neutralisation in use to-day.

Station Description No. 11.

(*Continued from previous page*).

there is undoubtedly a distinct help on 7 M.C. fone, but in view of the fact that most work is done on 14 M.C. the writer decided to forego the advantages on 7 M.C. Almost all countries in the world have been worked on C.W., and audible speech has been transmitted as far as U.S.A.

The usual frequency upon which speech is transmitted mostly is 7,200 K.C. (41.67 metres) and occasionally on 14,070 K.C. (21.32 metres), but the latter band is more usually used for C.W. working; speech, however, of 100 per cent. readability at strength R6 has been worked to Lisbon.

The microphone used is an ordinary Post Office type as used on the normal "land line" telephone, and the transformer into which it works consists of an old Sterling 1" spark coil (ex R.A.F.), with all condensers, etc., removed, and the primary rewound with two layers of 22 D.C.C. wound straight on to the core and pushed tightly home. The writer has yet to discover a better transformer for use with this type of microphone.

In conclusion, it may be mentioned that reports on the signals from this station are always welcomed and are always acknowledged.

Some Difficulties of Short Wave Transmission at Sea

—(*Continued from page* 155.)

one day when I found the H.F. portion swarming with ants, which had been attracted by the remains of a large beetle—the latter having apparently thought the space under the grid condenser (which is raised above the baseboard) a nice place to die in. I suppose this kind of thing is common to the tropics. The tropical atmosphere has a bad effect generally. H.F. chokes on various kinds of formers come adrift and L.F. transformers soon give up the ghost. PK3BQ tells me that the only ones they can get to stand up to it for any length of time are a certain very cheap British make, and I was surprised to see them in use in the speech amplifier of their short-wave broadcast outfit. Originally, I used air dielectric condensers in the H.F. side, but after the ebonite of the grid condenser had warped and given it a permanent short, I fitted Dubilier 610's, with no noticeable change in operation, even on 28 M.C. On this frequency the set handles quite nicely, although, up to the moment of writing, no hams have been heard, but harmonics of JFA, KBJ and radiation from speedboats in the harbour have been QSA. Another form of QRM, peculiar to the situation of the shack right abaft the engine-room skylight, is due to Chinese firemen letting the winds'l down with a run whenever a decent breeze comes along. This frequently subsides on the short-wave antenna, carrying it away. This happened five times in one week.

No, things aren't too good, as a rule, but these difficulties, though they may cause much cussin' and sleepless nights at the time, all help to make this ham game more fascinating. Add to this the joy of hearing signals from friends back home (many of whom I have met personally at Convention or Hamfest, and most of whom I know well by radio contact) out at sea, without a single ham to yarn with, and you'll probably realise why I said in the preamble of this lot that "enthusiasm has increased."

Television.

PART V (*Conclusion*).

By P. D. Waltdrs (BRS273).

FOR those who construct a "Televisor" from the kit of parts now on the market there are two alternative methods available for connecting the synchronising coils to the output of the amplifier. One system, the circuit for which has already been given in Part 3 of this series (September), is to wire both the neon lamp and coils in series, but the disadvantage is that a considerable voltage drop takes place across the coils, which, added to the large voltage drop across the neon, results in only a small positive voltage being applied to the anode of the valve unless the H.T. has been previously increased. A more satisfactory

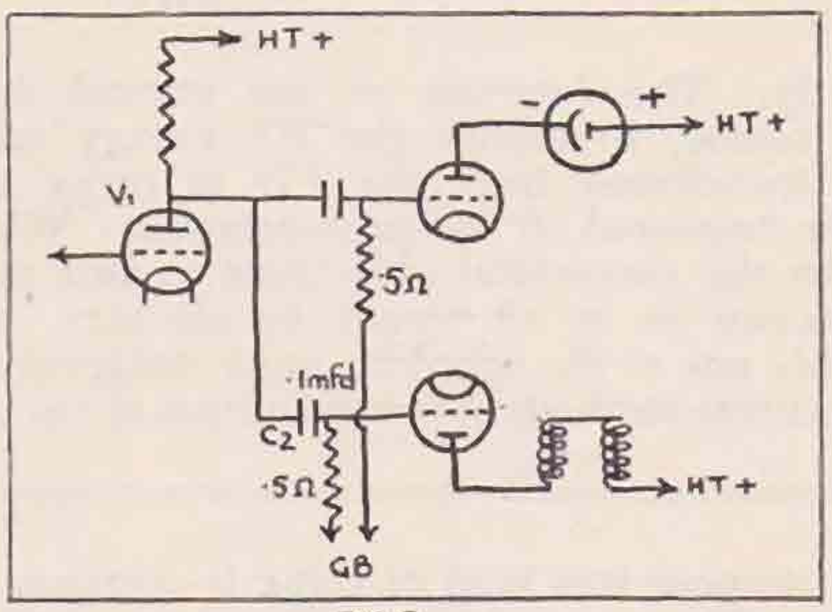


FIG.8.

method is to use a separate output valve for the coils (Fig. 8). Although the two valves V_2 and V_3 need not necessarily be of the same type, the two condensers C_1 and C_2 should be of the same capacity.

The simplest possible form of "Televisor" employs no automatic synchronising, but relies upon hand control, and can be easily constructed by the reader in a short time. The necessary components consist of an electric motor (mains or battery driven), a neon lamp and scanning disc. The disc is not easily made by the amateur unless he possesses special tools, but can be purchased complete with metal bush to fit the motor shaft. The motor, which may be of the "fan" variety, unless at a later date it is proposed to add synchronising gear which necessitates a more even running machine, must be capable of rotating the disc at a minimum speed of 800 r.p.m. The neon lamp, which may be of the flat plate television or commercial "beehive" type (G.E.C., Philips, etc.), fits into an ordinary B.C. batten holder mounted in line with the horizontal axis of the motor so that it illuminates in succession each of the thirty holes of the revolving disc (Figs. 9A and 9B).

This position of the neon lamp is in accordance with the vertical scanning used by the Baird transmissions, but for the German transmissions horizontal scanning is employed. The scanning disc is fixed to the motor spindle so that when rotated in an anti-clockwise direction (viewed from the side opposite to the neon) the outer hole moves upwards.

Having connected the neon lamp to the output of the amplifier by one of the methods already described, the television signals should be tuned in on the radio set. Adjustments must be made to the H.T. and G.B. of the output valve or valves in order that the neon lamp glows brightly whether it is modulated or not.

Assuming that the television signals are visibly modulating the neon, the motor is started up and allowed to gather speed slowly (by applying pressure with the finger on the spindle), otherwise the correct speed (about 750 r.p.m.) is easily missed. At first a series of oblique black lines are seen which tend to become horizontal, and as soon as this condition arrives further acceleration of the disc is stopped. Between these horizontal lines there should now appear the "image" being televised, and the operator should endeavour to "hold" the picture stationary by judiciously regulating the motor speed.

If the image, when synchronised, appears divided into two non-consecutive portions, the speed must be *slightly* altered to allow a few pictures to slip past until the whole of the image is clearly visible in one of them. Actually there are thirty pictures available, but only one of these is optically correct.

In the case of the commercial "Televisor," synchronisation is automatically maintained once the correct speed is found, and any slight vertical displacement of the image is remedied by rotating the coils around the toothed wheel for a short distance by means of a small control knob.

(*Continued at foot of page* 163).

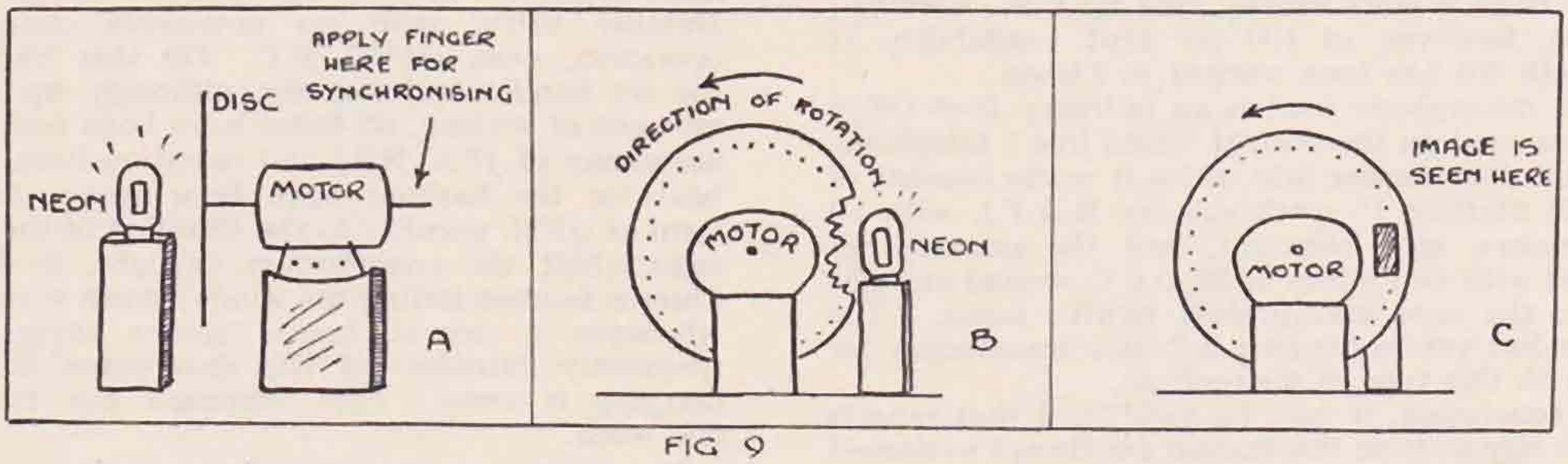


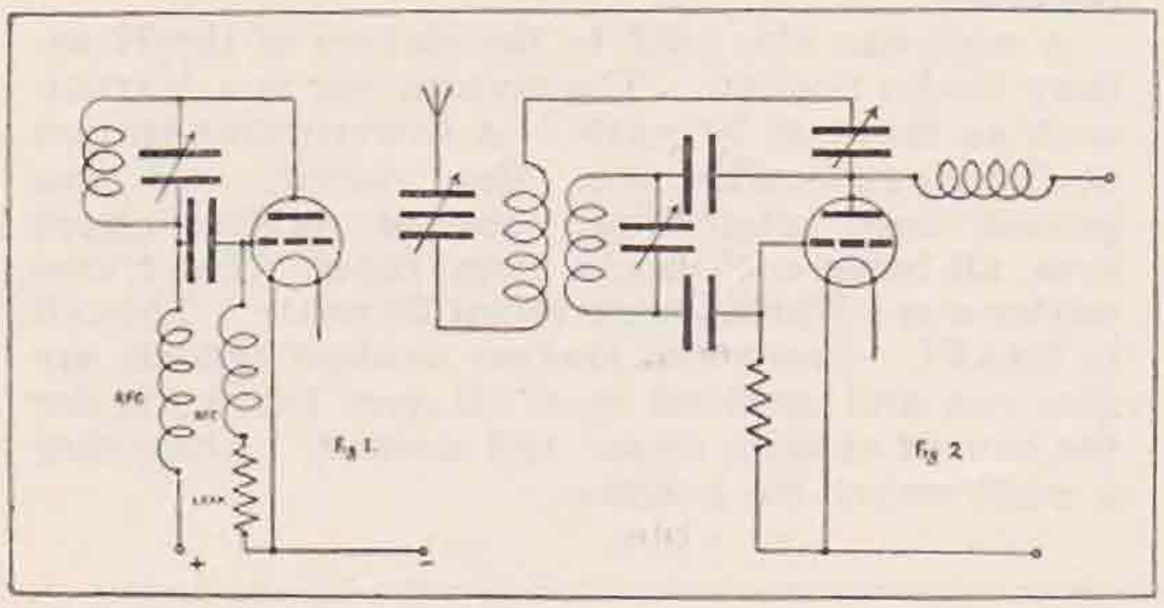
FIG 9

56 M.C. and The February Tests.

By G2OL.

IN the forthcoming tests in February it is desirable that large numbers of hams should co-operate, in order to find out as much as possible about the band and its DX properties, if any; and this short article is submitted in the hope that it will serve to stimulate some interest in the band. If it accomplishes this, the author will feel amply repaid.

There are, perhaps, some who will say, "Is it worth building special apparatus for a band which is little used, and where only local working is at present possible? Can't I leave it to the chaps already there, and carry on with my DX?" It is for these that this article is principally written.



As far as the present gear in use on the lower frequencies is concerned much can be done. A good 28 M.C. transmitter or receiver should easily be persuaded to function well on 56 M.C. without much, if any, alteration, but 14 M.C. apparatus presents rather a larger number of difficulties. A general clean up in the shape of cutting out a lot of unwanted stray capacities, cutting down condensers, and shortening all RF leads will do much to getting down. If possible, it would be as well to rebuild the transmitter, and the receiver, on 56 M.C. lines! It should then function perfectly on the lower frequencies. No special circuits are necessary, neither is there any need for special gear. Common sense coupled with a neat and clean layout will do all that is required. 56 M.C. is not a mysterious frequency, and there is nothing out of the ordinary.

Building a separate outfit for the frequency is not an expensive business, neither is it difficult. About the simplest and easiest circuit is the Ultraudion, and if constructed properly, will oscillate with almost any valve. Fig. 1 shows the circuit for the transmitter in use at this station. Any small tuning condenser, such as a reaction, or neutralising condenser will serve for the variable capacity, preferably double spaced. Inductance is of $\frac{1}{4}$ in. copper tubing, 2 ins. in diameter, and four turns, spaced half an inch. Valve holder is standard anti-cap pattern. Grid-leak 100,000 ohms, but depending on the valve used. Blocking condenser is of the mica variety, .001 uf.

In construction the coil is mounted directly on the condenser, and the condenser mounted on the valve holder, the whole assembled in such a way as to avoid eddy current losses as much as possible.

Existing aerial system can also be used with success, and it has been found that a large aerial gives a stronger ground wave.

Any standard method of feeding is satisfactory, and AOG aerials are ideal as they dispense with feeders, thereby eliminating feeder losses. Keying may be done as standard practice, but care should be taken not to key a heavy load, thereby eliminating chirp. A spacer is *desirable* as it assists the receiving station, making two signals to look for instead of one, and at the present stage of development will not be a nuisance!

On the receiving side again, almost any circuit will function. Two examples are given in the November BULLETIN by G6XN and G6CO. The receiver in use at this station is also quite simple, and akin to the transmitter in circuit and layout (Fig. 2). Here again it may be built in half an hour out of scrap material. Almost any 6-volt. power valve will oscillate, most 4-volt and some 2-volt. Shortpath valves are undoubtedly the best of all. The variable capacity should be smooth and silent, thick motor oil on the moving contacts ensuring this. A small double spaced reaction condenser with two fixed and one moving vane will do the job nicely. Inductance, about three turns of 2 ins. diameter No 12 bare copper. All fixed condensers are mica .0003 uf. The L.F. side is, of course, as standard. Care should be taken to ensure absolute rigidity in both transmitter and receiver.

The reaction control in the receiver shown is capacity coupling of the aerial, and does not shift the frequency much in use.

Two variable capacities are used, one being of small maximum capacity for ease of control, the other being to avoid "dead spots" and to cover a larger range, neither affecting the tuning to any large entent. A differential condenser is ideal for the smaller capacity. The aerial coil consists of two turns of bare copper, wound in the same direction as the tuning inductance.

Chokes may be made of No. 40 DCC, about 80 turns wound on a glass rod, or some such small diameter article.

As regards frequency measurement, the second harmonic of the 28 M.C. transmitter will do this excellently. Another method is that described by G6XN in the November BULLETIN. This method can be applied equally well to the receiver. Lecher wires, or absorption meter calibrated from a nearby 56 M.C. ham, likewise heterodyne, and crystal oscillators are all much the same.

A word as to results already obtained. BRS310, of Gloucester, has on several occasions heard harmonics of DX stations, notably those of EU5AM, FM8CR and EAR153, all heard round about 20.00 G.M.T. This should point to the possibility

(*Continued on page* 163.)

A Visit to Germany.

Mr. Higson (G2RV) recently spent a very interesting fortnight's holiday in the State of Oldenburg, Germany. He found all the amateurs very hospitable and plenty of interest from the radio point of view. At Timmendorf there is a low-frequency amplifier which supplies the Bay of the Baltic Season with music from loud-speakers. There are three microphones, cubical in shape, roughly 5in. long, 4in. deep, and 2½in. wide of the magnetic field type, with a strip of silver foil in between the magnets. Two of these are in a café near the band, and the other is in a soundproof box in the control room. There are also two gramophone turntables, driven by electric motors, with two pick-ups. The microphones are led by transformers to a four-stage amplifier, and the pick-ups to the last three valves of this amplifier. The valves are of the receiving type ; then, following this, are two stages of apparently 15-watt valves, each feeding a stage of 75 watts. These in turn feed two 300-watt valves in parallel, making a total of 1,200 watts for the last stage. Following this are the transformers for the loud-speakers. These are built in with the loud-speakers and they deliver 3 volts at from 20 to 50 amps. The 300-watt valves are supplied with 1,500 volts from a motor generator, which also delivers the filament supply. The whole system is R.C. coupled and gives excellent results. There are eleven loud-speakers in all—four in Timmendorf, two in Haffkrug, three in Niendorf, and two in Scharbautz. The distance between the two extreme loud-speakers is 11 kilometres. The friend with whom G2RV was staying was a keen radio amateur, and on G2RV's suggestion a T.P.T.G. transmitter was rigged up with very good results. First QSO was with G5QF. Following this many G QSO's were accomplished. Most of the stations worked were due west of the transmitter—an interesting fact. Twelve countries in all were worked.

During a visit to Hamburg, G2RV met a radio amateur of many years' standing who has had considerable experience with quartz crystals, and here also he saw a 2.2-metre transmitter, also a 5-metre transmitter. This amateur is hampered by an official receiving station opposite. Apparently there are very few licensed stations in Germany.

A visit was also paid to the station of the Hamburg Radio Society. The transmitter is a Hartley with an input of 10 watts. A Government station at Landungsbrucke was also visited, and this proved very interesting ; several receivers were seen, all being enclosed in metal cases. The transmitter was a Hartley with about 20 watts. The call is D4AFI. From this station weather reports are sent out and received from all over the world for the benefit of ships at sea and aircraft. Altogether a most enjoyable holiday.

Memories—(*Continued from page* 157).

telephones from a Government surplus store, and I received signals.

Learning the code. Nobody to practice with, I hummed the letters to myself day and night until my parents thought they had begotten a veritable fool ! Soon I could read fifteens. Weather Reports, Time Signals, Press, TRs', MPD, POZ, UA, FL, GLD, what memories my masters ! I discovered the valve ; another permit and my first home-made single valve receiver, 300—30,000 metres with slab inductances. The valve was a French " R." I tried lighting the filament from a flash-lamp battery ! Later I was given an accumulator. The set howled beautifully, and I thought this howl was that mysterious thing called hetrodyne. Accidentally someone bumped the table one day and knocked the slab coils apart, thus I learned how to receive signals correctly with a valve set. Came my first variable condenser with this set, a Murdoch .001. Venerable relic, I have it yet.

The urge to transmit was born. I applied for a permit to use spark on 1,000 metres, and later 440. The permit was given and G—— was born. The range was about 30 miles, the hours of working (strictly to be observed) 2000-2100 and 1100-1200, and the five British stations I was permitted to work were . . . but they are forgotten now, *requiescat in pace*. I may say that only two of them were even probably in range. The nearest of them used to work a famous coast station from time to time. How I envied him and struggled to do likewise, and always failed. But at least I can boast that I am a " ham " who has called up a coast station with a fair chance of getting a reply.

Events moved with ever-increasing impetus. A voice was heard on 1,000 metres : from somewhere, I forget where, Melba sang. The Dutch Concerts, " Poste Militaire du Tour Eiffel," two emma toc, and Melba sang again. Then came my valve transmitter (T15) and the great climb down, 440, 200, 115, 95, 45, 23. You all know the rest as well as I do. But when I capture for a brief moment the emotions of those earlier days—when the honoured words and symbols—jigger, auto-jigger, A.T.I., A.T.C., " ORA," " R ", T.T., MPD, FF, OUI, PCGG, Townsend, Transatlantic Tests (not forgetting the Beveridge Antenna on the wild west coast of Scotland), and so many, many others, I feel I have experienced a pleasure new " hams " will never know, and which only the old gang will understand.

Erratum.

The Editor regrets two mistakes appeared in Part IV of Television on page 130 of the November issue. Referring to Fig. 6C, C_2 appears short-circuited : this should not be so, but the lower H.T. terminal (negative) should be taken to L.T. —. Further, in Fig. 7, the decoupling condenser in the anode circuit of the 2nd L.F. valve should have its low potential end connected direct to earth and *not* H.T. +.

The Relation between Power and Strength.

By A. B. Whatman (G6BW).

THERE has been some discussion recently about the relation between the power of a transmitter and the signal strength at the receiver. Several interesting theories have been advanced, but at the same time pertinent facts have been overlooked ; the object of this article is to draw attention to some of the chief points which must be taken into consideration when discussing the power/signal strength question.

The words " current " and " voltage " used below denote R.M.S. values.

Consider first the transmitter ; the useful power in radiation is I^2R, where I is the aerial current and R the radiation resistance. Hence in order to double the aerial current, the power used must be squared. Or if the power was doubled, the aerial current would be multiplied by $\sqrt{2}$.

Coming to the receiver ; the voltage on the grid of the detector varies directly as the aerial current in the transmitter, other things being kept constant. If the detector is working on anode bend without a heterodyne, the rectified current will vary as the square of the voltage impressed on the grid, but if with a heterodyne, it will vary directly as the voltage impressed on the grid. If grid-leak rectification is being used, the rectified current will vary directly as the impressed grid voltage, whether a heterodyne is in use or not. The statements made above depend on the assumption that an anode bend detector is worked on that portion of the characteristic curve which obeys a square law, and that a grid-leak detector is worked on that portion of the curve which is straight : this assumption, though not absolutely true, is sufficiently accurate to be justifiable.

We will assume that the phones are perfect and that the amplitude of the wave produced in the air varies directly with the amplitude of the rectified current. The energy of any form of wave-motion varies as the square of the amplitude of that wave-motion. Hence the work done on the human ear, and therefore presumably the loudness of the sound, *i.e.*, the signal strength, varies as the square of the rectified current.

[The author is not an ear-specialist, and it is possible that the loudness of a sound depends on the amplitude of the wave and not on the energy as stated above.]

It is seen, therefore, that owing to the ever-recurring presence of the square law, the signal strength at a receiver is by no means necessarily directly dependent on the power of the transmitter. In the case of an anode-bend detector without heterodyne, a doubling of transmitter power should produce four times original signal strength, or with heterodyne, or with leaky-grid rectification (with or without heterodyne) it should produce twice original signal strength. This is shown diagrammatically below. All units are arbitrary.

	Anode bend without heterodyne.	Anode bend with heterodyne ; or grid leak.
Transmitter input ...	2	2
Aerial current ...	$\sqrt{2}\times 1$	$\sqrt{2}\times 1$
Rectified current ...	$(\sqrt{2})^2$	$\sqrt{2}$
Air wave amplitude	2	$\sqrt{2}$
Loudness, or signal strength	$2^2 = 4$	$(\sqrt{2})^2 = 2$

(Where the transmitter input is taken as unity it is obvious that all the other figures in the above table will be unity.)

[This article is necessarily short and approximates considerably, but it may pave the way for further work. Two points of value that might be considered are (1) that an increase of intensity of from 10% to 30% (depending on frequency) is required to make an appreciable change of " loudness " to the ear ; and (2), that a 2,000 cycle note requires less energy to make it audible than any other frequency. Against this is the fact that the ordinary Bell type receiver usually has a natural resonance of about 1,000 cycles.—Ed.]

56 M.G. and the February Tests—(*Cont. from p.* 161).

of DX. Field days have been held in an around London, and QSO's are held regularly each week-end. It is an ideal wave for local work, and it is a real pleasure to work on the band, completely free as it is from all kinds of QRM. The frequency used by the London gang is 57 M.C., or about 5.28 metres.

In concluding these short and very rough notes, the writer hopes that they have at least interested a few hams in the higher frequency, and he appeals to all to have a cut at it in the coming tests. It is a great chance to find out something about the band, and this depends entirely on the efforts of us all. If nothing is heard, we shall at least know the worst, but hope is high, and " One never knows."

Television—(*Continued from page* 160).

A less tedious method of synchronising by hand is to control the motor speed by means of a variable resistance, and the writer can recommend the system illustrated in Part 4 of " The Science of Television " in the April issue of the " Bull." Many other systems will occur to the reader for effecting synchronisation, such as friction and magnetic braking, etc.

In conclusion, the writer would be pleased if all readers who are sufficiently interested in Television would communicate with him or G5VL, as a Television Group in C.B. has been suggested, and the number of probable supporters must first be ascertained.

" In the Course of Conversation."

By INCONNU.

Why do pick-up outputs not require rectification ?

Do Reinartz circuits give distortion of wave form ?

What is the best needle scratch filter ?

Does series or parallel aerial tuning give purest B.C. reception ?

Does grid-leak or anode bend rectification bring in weak DX the better, and which resolves more ?

What percentage change in wave-length is caused by wet or dry earth ?

Should frequency response of transmitters or receivers be limited to the musical spectrum ?

* * *

THE above questions were forwarded to me from a reader via the Editor, and I will do my best to answer them. At first sight the questions appear very simple, but when one realises the ambiguity of several, and the necessarily controversial nature of the answers to some, the job of supplying satisfactory answers is no easy one.

Let us take the Reinartz one for a start. This is only one way of obtaining reaction, and any form of reaction when pushed too far will sharpen the resonance curve of the input sufficiently to cut off the higher notes conveyed by the outer edges of the sidebands. That is, there will be distortion of the low-frequency envelope—not of the high-frequency waves themselves (or to be more correct the high-frequency response in the tuned circuit). Distortion of high-frequency impulses will not cause quality distortion if the amplitude variation is not distorted ; it may produce harmonic HF oscillations, but that has nothing to do with the quality. We are concerned with the variations of the amplitude, not with the wave form of the HF impulses.

In the Reinartz circuit we have a condenser connected, in effect, between the plate and the filament of the detector. If this condenser is not of a very small capacity there will be a high note loss due to its shunting effect across any transformer or other plate load. But this effect must be very small in the sizes of condensers now used for reaction purposes.

This cutting of sidebands again crops up in the question of series and parallel aerial tuning. Series tuning under ordinary conditions will give a sharper resonance curve and so will be more selective, but will therefore cut the sidebands to a greater extent. The losses may be sufficiently high to pass the major portion of the sidebands, but taking everything into consideration, it is more likely that series aerial tuning will cause sideband cutting than will parallel tuning, but naturally everything depends upon the particular case.

Grid-leak detection is much more efficient on weak DX signals than is anode bend. One can imagine how this is so, because rectification takes place " on the grid " and the audio-frequency variations are then amplified by the valve. Just what the questioner means by " which resolves more " is not quite clear, but the above applies to the valves in the non-oscillating condition as would be the case in the reception of telephony.

The percentage change in wave-length caused by wet to dry earth will depend upon the wetness or the dryness thereof, the circuit constants, and the type of circuit, so no answer is really possible to this question.

The question of frequency response and musical spectrum appears to be concerned with the reception of sidebands or the transmission of them.

There would appear to be trouble about the transmission of them as the carrier will be modulated by the low-frequency we superimpose, but why should we transmit frequencies we cannot hear ? How will they be useful except in television work ? As far as the receiver is concerned, the response should be a rectangular one whose width from the carrier should be that of the highest audible frequency. This rectangular resonance curve is not obtained in practice, but it can be approximated to in the band-pass filter where we can obtain a two-peak resonance curve by the use of two circuits tuned to slightly different frequencies.

I must confess that I know very little about scratch filters, but I have seen an ordinary good quality HF choke used with a certain amount of success in this job. A choke with an inductance of 100,000 mH would offer a reactance of approximately 3,142 apparent ohms to a frequency of 5,000 cycles per second—the average frequency of the surface noises of a record. If a filter is used which cuts off all frequencies above 5,000 it will not kill all scratch, but if the cut-off is lowered it will reduce the quality. There should be very little scratch with modern good quality records if the pick-up is adjusted for the position of minimum record wear, and further than that, it would appear that if we want good quality we must tolerate a little scratch. Perhaps some reader with more experience of the subject than has the writer will supply the information in these columns.

I feel sorry for the average little alternating current. As soon as it is seen someone says " we must rectify that." It must be a continual series of escapes if a jolly little wave is to be able to stick out its sinusoidal chest and exist at all.

Rectification is really only required when the job in hand is to obtain the low-frequency variations of the carrier wave. Once we have a low-frequency impulse we do not need to rectify any more. The voltage output from the secondary of an inter-valve transformer is alternating, so why should we not replace it by a pick-up which gives the same sort of output ? The valve will never know the difference.

Strays.

Will all intending participants in the 28 M.C. tests next month make immediate application to CB, if they have not already done so, in order to receive any special permits as to hours, etc., that may be issued for the tests.

* * * *

G2NU, Mr. A. J. Hall, states that he can supply Hams with small power transformers wound for standard voltage inputs. Three secondaries :— 250v.-0-250v., 4v.-0-4v. and 4v. Price 2)6 each, plus postage.

A Coil and Choke Winding Method.

H. J. Powditch (G5VL).

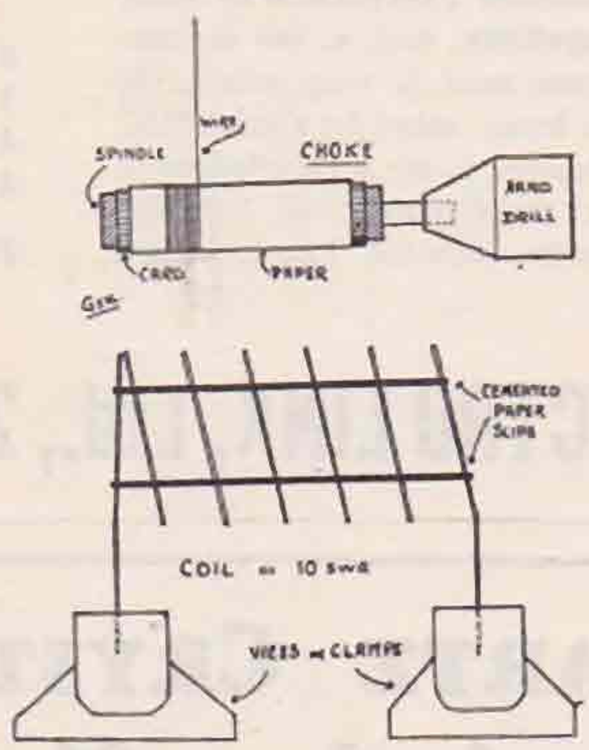
A METHOD of manufacturing coils and chokes for both receiver and transmitter to give mechanical strength without undue labour has been evolved by the writer for his own benefit and is passed on to anyone caring to try the method.

The requirements are: a tube of "Durofix" cement, marketed by the Rawlplug people, some fairly thin paper without a glazed surface, thin cardboard and the wire.

Taking H.F. chokes first. The usual diameters will be from ½ in. to 1 in. A spindle about 1/16th in. less diameter than choke is clipped into a hand drill in the usual way. Round the spindle is wrapped 1½ turns of thin cardboard (parts of an old valve carton will do), and over this 1½ turns of the thin paper. The stock reel of wire is arranged some 8 in. away on a vertical support so that the wire can be guided easily on to the paper-covered spindle. Now thoroughly damp the paper and wipe off all surplus moisture after the paper is damped through. Run lengthways along it 4 or 6 (depending on diameter of choke) lines of the cement from end to end. Not just smears but good thick lines. Over these wind the wire, smoothly and with each turn touching. Silk or cotton covered is best, and gauge should not be less than 36 S.W.G. The cement will appear through wire and after winding has been carried to length required, this should be rubbed over outer surface, a little extra being added to give just a very thin coating if required. Slip everything off spindle and with a pair of thin-nosed pliers, turn inwards the inside edge of cardboard, wrapping it round pliers until it comes easily out of paper. If the cement has not partially set, the whole thing can be slightly warmed first over a stove, but this must not be done too much as the paper must not be dried completely. After the card is removed, a similar method will remove the damp paper. If this has got too dry, some help from a penknife may be required. You will then have an air-cored choke, light enough to be suspended from any wiring and yet strong enough to throw across the room without damage. A touch of cement will strengthen the ends where the wires lead away from coil.

For receiving coils the winding is done on a card tube, previously cut lengthways from end to end. This is placed over a spindle and four strips of paper, slightly longer than windings, are stuck lightly at each end to tube. Winding, either close or spaced, is done over the paper and afterwards a thick layer of cement is run down each line of paper (without any damping) between the turns. The strips need be only 3/16 in. wide. Leave the coil on former for some hours until the cement is dry and then twist in the card as described above. Coils can be wound "by the foot" and cut to lengths later.

Transmitting coils are wound from 10 S.W.G. copper wire. These are first wound round a former some ½ in. less than diameter required. The wire is allowed then to spring off former and takes its larger diameter naturally. The ends are bent out at right angles to axis and clipped into the jaws of two small bench vices side by side, holding the turns spaced to distance wanted. If there is irregularity between turns, slips of wood or matchsticks will keep turns apart. Four slips of paper, 3/16 in. wide, and slightly over double the length of coil, are cut. One side is given as heavy a layer of cement as possible and one end is passed length-



ways through coil, brought round to outside and pressed on to wire facing inside strip. This is repeated with all four paper strips at equal distances round diameter. These coils must be left in vice over-night to dry thoroughly as there is considerable spring in the wire usually and this will concertina the paper if cement is not well hard. Cement should be added between the faces of paper slips if there appears to be any weak or uncemented spots before the coil is left to dry. The coils seem strong enough (I have just dropped an 18 turn, 3 in. diameter. some two feet to floor for trial), and are free from vibration. The cement has been used on anode coils carrying 150 watts at 2,000 volts without trouble.

The ordinary Morse recorder tape is just the thing for above and can be wound spirally for chokes, making removal easier. Ordinary celluloid cement (celluloid dissolved in amyl acetate) is similar in effect to the cement mentioned—but a trouble to make up.

STRAYS.

AC8JK, Shanghai, has a sked with his brother G5JK on 14 M.C. from 04.30 to 05.30 G.M.T. on the 1st and 15th of each month, commencing January 15. Reports from other G stations will be welcomed.

G6FO, of Newport, Mon., will call "Test DX" on 1854 K.C. at 23.00 G.M.T. each day for ten minutes. Any reports via R.S.G.B.

* * *

Reports are wanted by G6MN and G2HD on 1.75 M.C. phone.

Electro-Static Aerial Coupling.

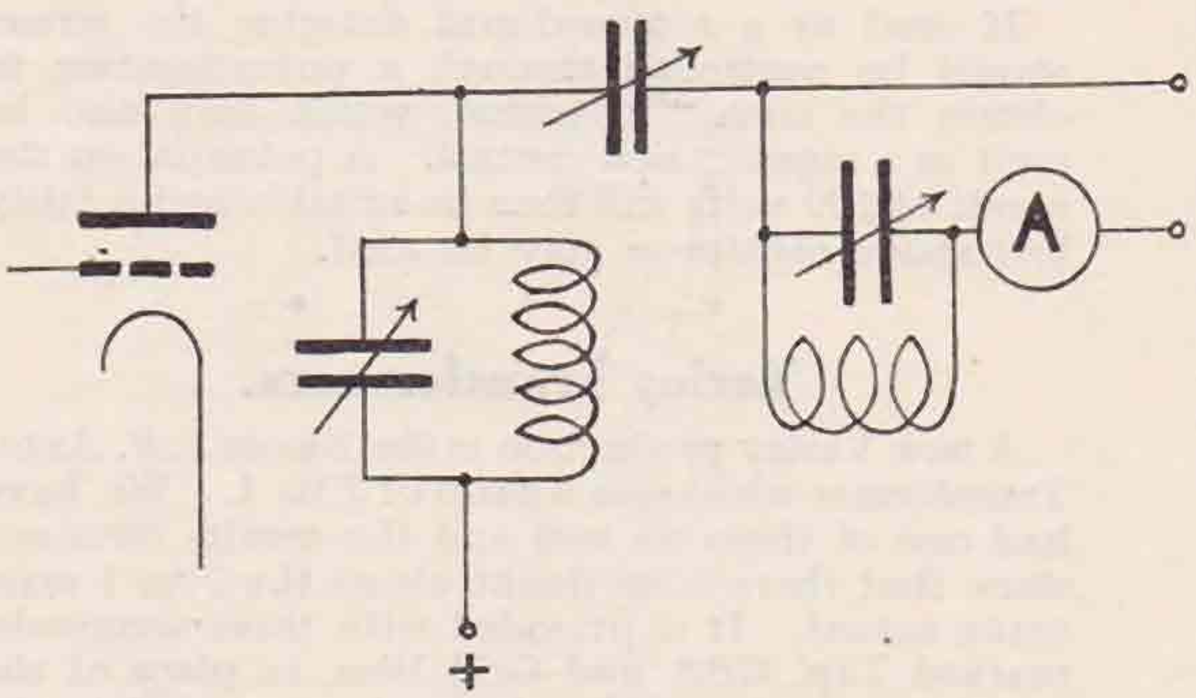
EVERY transmitting circuit which the writer can remember, makes use of inductive coupling to the aerial circuit.

Recently a number of short-wave sets had to be built for use by military personnel unacquainted with frequencies above 500 Kc., and it was felt that the usual method of sliding coils about was unsatisfactory and that the set would be much easier to handle if a rotary knob adjustment could be provided in its place. Sliding coils are clumsy to adjust, while the ordinary type of " two-way " coil-holder, although giving a rotary movement, was out of the question as it would be unable to cope with the weight of the copper-tube coils used in " High-C " circuits.

Another objection to moving coils is that they require flexible leads, and flex has a much higher resistance than solid wire at the very high radio frequencies.

Furthermore, unless a clamping device of some sort is provided the coils fall out of position during transport.

E/S Aerial Coupling.



The result of these considerations was that capacity coupling was given a trial, the coupling being controlled entirely by turning the knob of a small variable condenser. This was found perfectly satisfactory and removes all the above-mentioned objections. The circuit used is shown in the figure.

The coupling condenser consists of a " midget " with all but two of the moving plates removed. The aerial and anode coils are mounted several inches apart (about 8 inches in this particular case) and fixed at right angles to each other in order to reduce inductive coupling to a minimum. There will still be some slight residual inductive coupling, however, and this should be arranged to be in the correct series to assist the capacity coupling. To simplify this, the use of a differential condenser is suggested as a method of making the capacitive coupling reversible (the stators being connected to opposite ends of the aerial coil). The writer has not actually tried this arrangement.

Owing to the fact that both sides of the coupling condenser are at high radio-frequency potential it is desirable to mount the condenser a few inches behind the panel with an extension handle to reduce hand-capacity effects to a minimum.

The size of condenser mentioned above was found

(*Continued at foot of next column.*)

to be entirely satisfactory over the whole range of frequencies from 5 to 18 Mc., using a T.P.T.G. circuit with a Philips valve type TB04/10, but a different value might possibly be required with a valve whose A.C. resistance differed widely from that of the TB04/10 (4,500 ohms).

Book Reviews.

" Testing Radio Sets." By J. H. Reyner. Published by Chapman & Hall, Ltd. 178 pages and 88 diagrams. Price 10s. 6d. net.

HERE is a sound book from the pen of a man who is well known to readers of wireless literature. Like any book written by a man of practical experience and expert knowledge of the subject, it is delightfully easy to read and of real usefulness to everyone who may be called upon to doctor a sick receiver—and that applies to most amateurs.

Mr. Reyner's book is a very attractive mixture of medical and C.I.D. methods applied to recalcitrant receivers. There is no class-room atmosphere about it, and no text-book laboriousness; the author evidently has enthusiasm and has the happy faculty of imparting it.

Trouble tracing in a receiver, of whatever type, is shown to be amenable to systematic method, inductive reasoning, and a logical elimination of healthy organs.

Section 1 deals with fault finding and opens with a concise explanation of the necessary instruments and what might be called the " preliminary attack " on the receiver. After having narrowed the trail a little by this, the low-frequency side is subjected to the " third degree." Then follow tests of the tuning and high-frequency circuits. Mains apparatus receives special treatment and many difficult faults may be easily diagnosed and suitable treatment prescribed. While discussing the treatment of mains hum (D.C.) the author makes a rather remarkable suggestion; he suggests that if one finds on test that there is only a few volts potential difference between the earth and the earthed pole " the effect may be tried of connecting the earthed main definitely to earth." This would be a contravention of the Regulations of The Electricity Commissioners for Securing the Safety of the Public (Clause 34, sub-clause A, " Connection of circuit with earth.") Should a fault occur on the three-wire distribution network while such a connection is present things are liable to prove exciting around that receiver.

Under " Special Tests " are the short-wave receiver and the superheterodyne. The treatment of short-wave sets, including reaction troubles, flat-spots, and threshold howl, is exceptionally good, and will be of assistance to amateurs in the design of efficient receivers. It is perhaps one of the most useful treatments of the S.W. receiver that has appeared.

A chapter is devoted to rare and curious faults, and Section 2 is concerned with Laboratory Tests, which are, naturally, a little more technical but of great interest.

One's first impression of the book is that it is priced rather highly, but after reading it there will be few people who will not consider it very good value indeed.

T. P. A.

Apparatus Worth Buying.

Cyldon Products.

"CYLDON" Transmitting Condensers need little introduction to R.S.G.B. members. The T.R.2, a model we have recently had the opportunity of examining, is a very rigidly-built instrument of ·0002 mfds. capacity. The plates are of heavy gauge aluminium, liberally spaced, and the insulation is provided by two pairs of ebonite strips at either end supporting the stators. The leakage path along these strips is made as long as possible. The bearings appear good and a small pigtail is provided. No spring washer is used but the front bearing is adjustable and the condenser is very smooth in action. The price is 16s. 6d. It is difficult to comment upon the qualities, from a practical point of view, of a variable transmitting condenser. The T.R. type condensers should be very satisfactory on powers up to 100 watts, as was found on actual test, and we have no hesitation in recommending them to any amateur in need of a good condenser at a resonable cost. The standard Cyldon mounting bracket and extension can be fitted if desired.

Another interesting condenser is the Series Gap in which two sets of stators take the place of the usual rotor and stator. The capacity is varied by two sets of rotors on one spindle meshing with the two sets of stators. This condenser should be very useful in split circuits as the rotors can be maintained practically at earth potential. There are, of course, no rubbing contacts to cause noises in receiver or possible losses in transmitters.

The maximum capacity of the model examined was 100 mmfds. The minimum 5 mmfds.

* * *

The Mullard S4VB.

This new Mullard indirectly heated screened-grid valve was released on December 1, and we have had the opportunity of conducting some rather hurried tests with the valve for the benefit of members. The valve was first tested in a standard short wave receiver (the R.S.G.B. 1931 S/W Three).

According to the maker's rating, the valve possesses the following characteristics :—Anode impedance, 257,000 ohms; amplification factor, 900; mutual conductance, 3.5 mA/v. (measured at anode volts 150, screen volts 75, grid volts .1). The heater takes 4 volts 1 amp., and the maximum anode and screen voltages are 200 and 100 respectively. It is suggested that the grid be biased to about 1.5 volts negative, or alternatively the grid may be left free by the insertion of a .001 mfd. fixed condenser in series with it.

The plate in this valve is of very small dimensions, appearing to be only about .5 cms. wide running down the whole length of the screen. This, of course, gave a low anode-screen capacity, thereby reacting favourably on the tuning of the detector grid circuit. Tests as an H.F. amplifier were conducted mainly as a comparison against the S.4VA, which latter valve was mentioned in some detail in the September issue. Although it is recommended that the S.4VB be used with tuned anode coupling in order to obtain the greatest amplification, other considerations, such as interlocking between the circuits, have to be taken into account, and in order to minimise this H.F. transformer coupling was used. At 150 volts to the anode, 75 to 100 volts was found to be a reasonable value for screen with grid bias 1 to 1.5 volts negative. This is against an optimum of 100 volts screen and .5 volts negative grid bias with the S.4VA. The current consumption was 4.75 m/as with S.4VB against 2 m/as S.4VA. The former valve gave slightly greater signal strength and the stability of the set remained excellent.

Used with an untuned grid circuit the S.4VB definitely fell short of the S.4VA in signal strength, and it is to be remarked that the latter appears to be the only S.G. valve that will work efficiently with an untuned input circuit. The system suggested of using a " free " grid with the S.4VB gave excellent results and is to be recommended, though it is unsuitable for use with the S.4VA.

If used as a screened-grid detector the screen should be controlled through a potentiometer to obtain the correct potential, which may also be used as a regeneration control. A potential on the anode of 100 volts will then be suitable and a fairly low anode resistance may be used.

* * *

Varley Transformers.

A new Varley production is the Nicore L.F. Auto-Transformer which has a ratio of 7 to 1. We have had one of these on test and the results obtained show that there is no doubt about the 7 to 1 ratio being actual. It is provided with three terminals, marked Tap, Grid, and Grid Bias, in place of the usual four, and, as the primary is connected to the secondary, no D.C. is permissible through it. The usual shunt feed method was employed in the test and the transformer is excellent for circuits such as that described by G6PA in the April BULLETIN. Details are as follow :—D.C. resistance Grid to G.B.—17,000 ohms, Tap to G.B.—3,000 ohms; Inductance Tap to G.B.—(equivalent of Primary), 120 heuries. The price is £1.

Another interesting Varley production is the Impedance Matching Output Transformer. By means of this transformer the impedance of the loud-speaker can be matched approximately to that of the output valve or valves to obtain maximum power output without distortion. A choice of six ratios is available from 8 to 1 to 25 to 1, and a chart is provided by which the choice of ratio for any valve and loud-speaker impedance can be made at a glance. The current-carrying capacity of the primary is 50 milliamps and the price is £1 2s. 6d.

* * *

The Tonax Cone Adaptor.

All of us who have used a cone speaker know what a tricky and awkward business it is to adjust the diaphragm and the leather surround to the correct tension and how one's fingers always seem several times too large when it comes to putting

28 Megacycle Test Conditions.

January 4, 11, 18, and 25.

The general lines and purposes of these annual tests has been set out fully in BULLETINS of February, 1929, and January, 1930. In the 1930 tests we endeavoured to get after dark communication—without success.

In 1931 we ask you to concentrate upon reflector systems, whether designed for directional work or not, and to compare your results so attained with previous results without the use of any reflecting system.

It will be noted that the tests run for 24 hours each day. Night working is possible, and it is hoped that it will be attempted.

In reporting, local G stations should *not* be given. G stations at a distance of over 100 miles should, however, be mentioned.

The two trophies, at present in the hands of G6LL and BRS310 will, it is gathered, take some shifting.

GENERAL REGULATIONS.

1. The tests will be run from 00.00 G.M.T. to 24.00 G.M.T. on the above four days.

2. Licence regulations must be strictly observed.

3. Stations taking part agree to supply any details asked for and also a description of their apparatus for publication if required.

4. Schedules may be arranged if the stations concerned limit their transmission to a mere exchange of technical reports. This is necessary to ensure that one British station will not occupy the attention of a distant station to the exclusion of others. Schedule working should be mentioned on report.

5. Stations should reduce power where possible and report effect.

6. The tests are open to all members of the R.S.G.B. in the British Isles. For the award of the trophy, a point will be allowed for each authenticated QSO with a station outside England, Scotland, Ireland and Channel Isles. For receiving stations, a point for each authenticated report of stations heard outside the same limits.

7. Contacts made with one station (or reports of one station) may only count twice in any one day if the two contacts are made on separate transmissions, separated by a time period of not less than four hours. Similar conditions will apply to reports by receiving stations.

8. Full logs of the tests from both receiving and transmitting stations must reach C.B. by January 31. Written confirmation from stations heard or worked must be supplied later if required. The final adjudication will be solely in the hands of C.B. and, in case of a tie, the general merit of the work will be taken into account.

Whether you think you are in the running or not, send in logs of the tests, as these constitute the most valuable part. A summary will be published. Use every effort to make the tests known to all foreign stations. We are doing this as well, but may miss some stations. Put a note on each card you send to foreign stations, giving the dates and times. Ask them to listen and report.

All reports to G5VL, Porth, St. Columb Minor, Cornwall. (Or for foreign stations, via R.S.G.B.)

Apparatus Worth Buying—(*Continued from page* 168).

them between the back of the cone and the unit in order to effect this adjustment. The Tonax Adaptor, which we have recently had the opportunity of testing, makes this unpleasant task quite unnecessary and allows the diaphragm to be adjusted for tension from the front of the speaker when it is finished and actually working—an undoubted advantage, as it is possible in these circumstances to obtain a rapid and continuous comparison of the effect of differences of tension in the diaphragm.

In principle the Adaptor is quite simple and consists of metal and felt washers sliding on a tapered chuck which can be made to grip the reed in any desired position. A lock-nut is provided so that the position may be fixed from the front of the cone or varied if this nut is loosened and pushed backwards or forwards a little. The tension of the diaphragm having the bearing that it does on the quality of reproduction is an important item to be considered in the design of a speaker, and the Tonax Adaptor at the modest price of 1s. provides an easy and direct method of ensuring that this factor is correct.

Stray.

ZL1FW asks G stations to look out for his sigs. on 14 M.C.

European Notes.

Activities in Norway recently have centred around the forthcoming Norwegian 1,750 K.C. Test Week. Some interesting reports are expected as this band seems to be increasing in popularity for European Contacts.

The Czecho-Slovakian amateurs very much regret that the above-mentioned frequency is, as yet, not open to them. Conditions generally in this country are improving and some good DX work has been done. Examinations for amateur licences are now held every fortnight in the G.P.O.

We hear from Sweden that the S.S.A. is now a member of the I.A.R.U. Many of the Swedish amateurs are assisting the U.R.S.I. in their wave propagation investigations undertaken in conjunction with the French Meteorological Institution. The fifth convention of the S.S.A. was held on September 27, and was a great success.

No licences have, as yet, been issued in Latvia and radio activity in this country is, therefore, somewhat hampered.

At the Sixth Latvian Radio Exhibition held recently the transmitter which is used on board one of the ice-breakers under call sign YLAV was exhibited.

There are no reports of anything heard on the 82 M.C. band in Europe this month.

Contact Bureau Notes.

By H. J. Powditch (G5VL).

IN last month's Bulletin there was a note regarding Council Elections. This prompts me to remind all who may read these notes that the job of C.B. Manager is not a life appointment and is due for reconsideration by the members of the Society this month. Further, new ideas and new methods from new managership are possible. The matter is in your hands. (No ; C.B. is in *your* hands, VL, and there it stays.—Ed.)

G6PP suggests having some ultra QRP tests next year. All the QRP Group Centres enthusiastically pledge themselves and their members to support these. The dates suggested are from April 11 to 18, and power 1 watt. Times will be during the evenings and nights only (to give all a fairer chance) and points will be allocated mainly on the basis of reliable communication, i.e., for every contact with one country over a fixed number an increased allowance will be made. The suggested rules are being polished up and will be printed in due course. Meantime, may we appeal to all QRO stations to leave the ether free for the QRP man on the above dates.

This " one watt week " is, I think, a novel experiment. The merits of QRP have been so often discussed that a week taken at random beforehand and dedicated to low power should go far to prove if communication can be relied upon under average conditions. We know from Group reports that the 5 watts used in the 1926 tests will, and did then, span the Atlantic, but 1 watt is another matter. As someone may express it : " Vun vot veek ? Vot ? Only vun vot ? "

Elsewhere are the amendations to the previous 28 M.C. test conditions. GI6YW has kindly consented to write up the results of these tests, and I am looking forward to the reappearance of his analytical articles based on both theory and practice.

A reminder, reprinted from last Bulletin :—

Will those Stations who propose taking part in the 28 M.C. tests on January 4, 11, 18 and 25, send in a note to this effect and enclose a stamped addressed envelope ? Unless this is done I cannot undertake to keep them advised of any late news, additional transmitting permits, etc., which may be available. QRA is : G5VL, Porth, St. Columb Minor, Cornwall.

If we are to ask for 24 hour working and the temporary suspension of limited periods, the names of those requiring these privileges must be sent in with the application.

I have a note from G2ZC in rather unparliamentary terms, accusing both the Hon. Editor and myself of " pinching " Group 2B's sunspot radio conditions theories without acknowledgment. Well, ZC, the acknowledgment is that only one of the 28 M.C. group reports this month and your and other pessimistic forecasts of a nearly total wipe out on the high frequencies seems to have proved itself. Bad enough ?

28 M.C. oddments. ZL2AC is on Sundays 08 to 11 G.M.T. with 350 watts on 10.5 metres (via G6RB). ZT6X every Sunday at 14 G.M.T. (via G6YL). FM8CR heard on November 2, G6LL, R4, OH2NY R5/1, G6DH/R6 (via G6DH). On October 19, OH2NM heard FM8CR, FM8BG FM8MST, CN8MOP and SU8RS working FM8IN. CH7ND heard FM8CR, FM8IH, and worked FM8BG. These were the first stations heard since March 23 last. Both of the OH stations are CC from 3.5 M.C. crystals. OH7ND is using new Philips TC.C4/10 valves and finds them good for the frequency. W9ASL and W9FVP will both be on the air this month.

28 M.C. Test News.—I think that every country has now had circulars regarding these tests. A supply of gummed labels giving dates has also gone to all G.C.'s for distribution. The idea is that these be stuck on any QSL cards going out to foreign hams likely to take part. I have a few over at the moment if anyone can use them. A note of thanks to our Scottish Hon. Manager who had additional slips printed and sent to all his area stations. Also, congratulations to some of the E.L.S. stations. One of these got a message to ZL and reply back in less than three hours from the time my message reached him, and also reached ZS and VO, beside further relays. May I repeat the request made earlier this year. Do all you can to keep our end up for these tests, both on transmitter and receiver. All the world knows of them ; every station who was heard last time, every ham paper of society and stations from VK to J have been advised that G's will be on. Please be on the air for January 4, 11, 18 and 25. Have you rigged that reflector yet ? Or are you only going along in the old way without trying any new ideas in 1931 ?

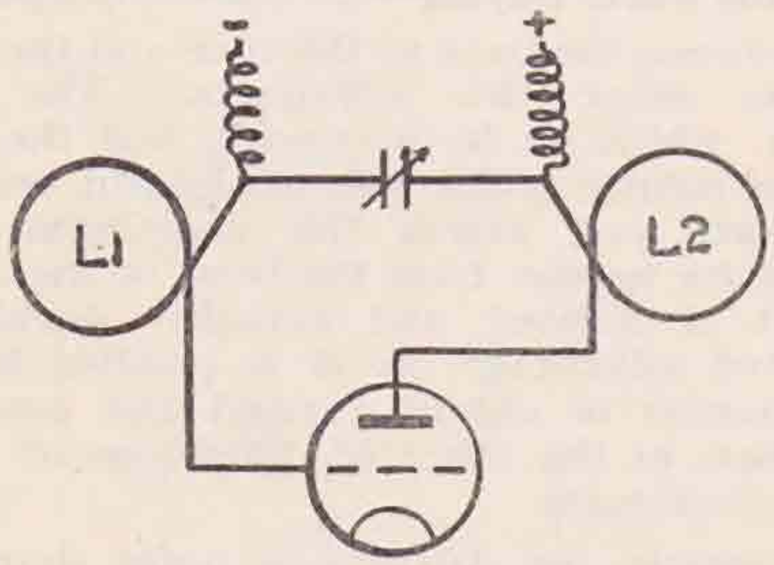


Fig. 1.
Approximate Constants.
L1 and L2 : Two turns 1½ ins. diameter, spaced 1 in. of 8 s.w.g. RFC's three small windings of 50, 90 and 40 turns on ¼-in. Pyrex rod of 26 d.w.s.

56 M.C. Tests.—February 1, 8, 15 and 22. I cannot do better than to refer you to the article by G6XN in the last Bulletin. Combined with this is a note from G2DT, printed below. The circuit he gives is rather interesting to compare with G6XN's, as showing two ways of getting to the same result, although obviously without the flexibility of G6XN's method. G6TW's directional aerial, shown later, is also well worth copying. In addition to the groups, G2VQ, ZS5X, W2AIU and others will be on the war path. W9AUH also

intends to join, and sends "Christmas Greetings to the 'Low Down Brigade' in England."

THE ULTRA SHORT WAVES.

(By G2DT).

THERE is very little doubt that during the next 25 years the ultra short waves are destined to overshadow anything that has yet been accomplished. It can, I think, be safely said that we have not yet scratched the surface of the possibilities of the ultra short waves, and very little practical results have as yet been accomplished, but it would appear that what has been accomplished places England in a leading position, and it is up to us to make her lead the world. Now, to do this means putting away QSO's on the other bands and some real research undertaken, especially in the Antenna field. It seems that our chain has two weak links, namely the receiver and the transmitting aerial. In this connection I may perhaps quote a sentence from

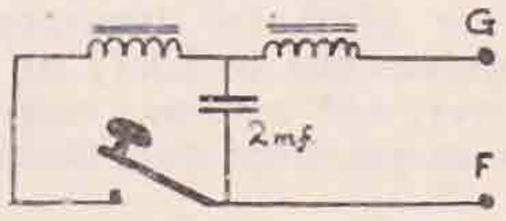


Fig. 2.
G5VL's filter for Grid Keying.

the pen of Mr. Gernsback, Editor of "Short Wave Craft": "Down at these extremely short wavelengths the difference of a few cycles may mean entirely different phenomena from those either above or below in the spectrum, and it will take many years of patient research to explore this ultra short wave spectrum. Entirely new instrumentalities for the transmission and reception of these waves will be evolved, and it seems certain that new class of instruments and apparatus will have to be invented before work with these waves becomes a routine matter." Well, this is where the R.S.G.B. should come in and, should success be the Society's reward through the efforts of its members, it may well mean the raising of the status of amateurs quite apart from the honour and glory. One has only to study some of the American and German Radio Journals to realise the terrific concentration of thought and experiment that is being put into waves of the order of 5 metres and downwards. Alas! This state of affairs is conspicuous by its absence in the British press, and I would like to make an appeal to all my fellow experimenters and B.R. stations to send along the results, negative or positive, of their experiments to the BULLETIN. May I also make an appeal for a few more souls to join in on the ultra short waves and not to be frightened off them? I append a simple and extremely good transmitter diagram for the newcomer to "5 metres" (Fig. 1). This circuit will operate with almost any valve. The RFC's are not very important, and the condenser can be variable or fixed. A small mica which will stand the plate voltage can be used, and its capacity can be of the order 100 to 150 mfds. In this case the frequency can be changed by sliding the fixed condenser along the turns and resoldering at the position corresponding to the desired value. The capacity is not critical as long as it is above a certain minimum. The condenser is in series with the valve capacity, so that its capacity has relatively little effect on the frequency. By shortening the leads to the value and using a small fixed condenser this circuit will oscillate as low as 1½ metres. By amplifying the second harmonic of a 1½-metre oscillator a MOPA set for experimental work in our next band (0.7 metre) will result. As regards a receiver, my own view is that it is necessary to build one specially for 5 metres. If it operates well on this wave, results will usually be found to be better on the higher waves as all unnecessary loading effects have been removed.

I prefer the ultra-audion circuit, but the ordinary Reinartz-Grebe can be used with complete satisfaction. It is well to remember that if a change over from the latter to the former is contemplated that about twice the number of turns on the grid inductance will be required—surely an advertisement for the Ultra-Audion!

Future Tests.

February will witness concerted effort on the part of many "G" stations to open up the 5-metre band, and I am delighted to say that the following OM's will be joining the G's:—ZS5X, W2AIU-W2CSM and W9AUH-W9CHJ. Many more are desired. Please do your utmost to get going in time for these tests and note that the frequency will be 58,000 Kc P/Sec. Tnx vy.

* * *

BCL QRM.

Several suggestions have come in in reply to requests in C.B. Notes. First, G5UB uses the method published in QST some long time ago, by which one plate of an air-spaced condenser forming the link between CO and FD is brought opposite the other plate by a relay from key. He says that. although there is a small chirp now and then, this is preferable to QRT for BC. A BC receiver at 30 ft. from the transmitter finds no trace of 50 watts output. The sounder used as relay is sensitive up to about 25 w.p.m. G5FA suggests, for comparatively low power, a 5 hy. choke with .5 mf. condensers at each end in the feed (the usual filter circuit) which he found efficacious both as to "wipe-out" and clicks. He mentions the trouble of signal "tails" if inductance and/or capacity is too great. He filters out all interference to his own BC set. In passing, it should be remembered that a grid M/A will help a lot when dealing with grid keying, and I am showing (Fig. 2) a grid key filter, adapted from QST, which G5VL has used for years. In this, lag is secured by inductance in series, the capacity acts as usual, and is also discharged at a reasonable rate when key is used through half the inductance. All condensers used in such filters should be at least 500 volts test.

G5YK makes one of his only too infrequent contributions, and summarised the whole matter. His article says: The question of BCL interference and the cure can obviously be studied from two different points. (1) From the transmitter, and (2) from the receiver. They are largely linked up so we will consider the receiver first as being the simplest place at which to start.

Now there appear to be three distinct types of interference that affect the BC receiver: 1, key click; 2, wipe out; 3, hum.

Key click is caused by the power of the transmitter being switched on and off sharply, causing a sudden surge in the BC aerial and a series of objectionable clicks in the loud speaker. Wipe-out, as its name implies, is evidenced by the disappearance

of the programme, due, presumably, to the complete blocking of one of the grids in the BC receiver ; quietness reigns ! The third type, hum, is caused by the imperfectly filtered supply in use at transmitter ; it is said that this form of interference, i.e. hum, gets back along the A.C. mains from transmitter to receiver. It seems though that this should not be the case unless the transmitter is imperfectly grounded, thus leaving the power supply at a slight H.F. potential to earth.

The intereference to the neighbouring BC may consist of any or all of the forms mentioned. Obviously, battery DC supplies will be free from hum, although to others this may be a bad trouble.

It has been found that with a good filter in the power supply adequate emission on the rectifier valves and perfect CC a serious hum was radiated, although the signal was T9 in its best form ; still, the fact remains that a transmitter worked from A.C. mains cannot be as pure as a battery-operated set, and the slightest trace of ripple is sufficient to get out. It might be mentioned that the ripple was 160 cycles (90 mains with full wave rectification) and that BC sets are more responsive to this frequency than, say, 100 cycles. The first step is, therefore, to obtain as pure a note as possible. Little can be said about this except that overrunning or very tight coupling are not conducive to a perfect note.

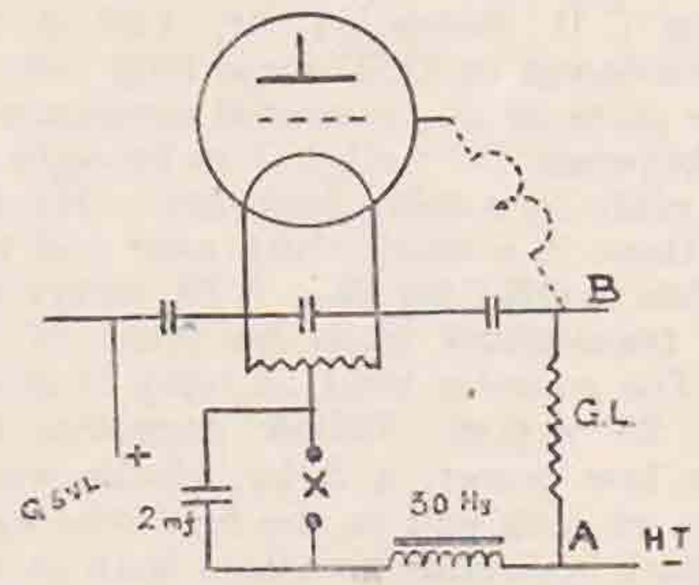


Fig. 3.
G5YK's Key Thump Filter.

Now the question of wipe-out is mainly with the receiver, unless it is possible to alter the strength of the immediate ground wave by aerial adjustments. Sharping tuning or the use of a smaller aerial on receiver is a sure whole or partial cure.

Key thump can be very bad or entirely absent, depending on the keying system used. Any sudden change in input to the transmitter will produce a thump, and any deliberate keying in a circuit carrying much power will provide bad thump. Sparking at key points does not necessarily mean thump. The habit of keying a spacing wave, now condemned, was at one time thought to be thumpless, but such has not been found to be the case. The question of key thump filters will be dealt with later, but ,having got down to brass tacks and made the transmitter as good as possible, we'll go to the BC receiver.

To cure slight interference to a BC set, all that is wanted is a short wave HF choke. One can be made with 150 turns of, say, 34 DWS wire on a ½-in. former ; ebonite rod will do. Put this choke in the BC aerial lead, and, if the leading is too much, put a small fixed ore preset condenser between the choke and the set. Keep the connections from the choke well spaced to either end, and don't allow too much capacity to earth at the aerial lead in ; that is, of course, on the aerial side of the choke. Such a system has been found to work wonders when the transmitter is on 7, 14 or 28 M.C. and the receiver band tuned to any BC station between 250 and 500 metres. The choke should be made as big as possible, depending upon the wave of BC station being received, but one much bigger than that mentioned will lead to a standard aerial rather too much for 250 metre reception. For, say, 500 metres, 200 turns on 1 in. diameter former would be right.

The choke in the aerial lead is most effective on interference from hum and wipe-out ; this is just as well, as key clicks can be more easily cured at transmitter. The choke is also quite effective against interference by speech modulation from the transmitter.

There are very many types of keying used, but one or two are ideal for incorporating thump filters. The system due to LA1J (in CB Notes for November) is very old and was originally used by W9EK. It is an excellent modification (especially

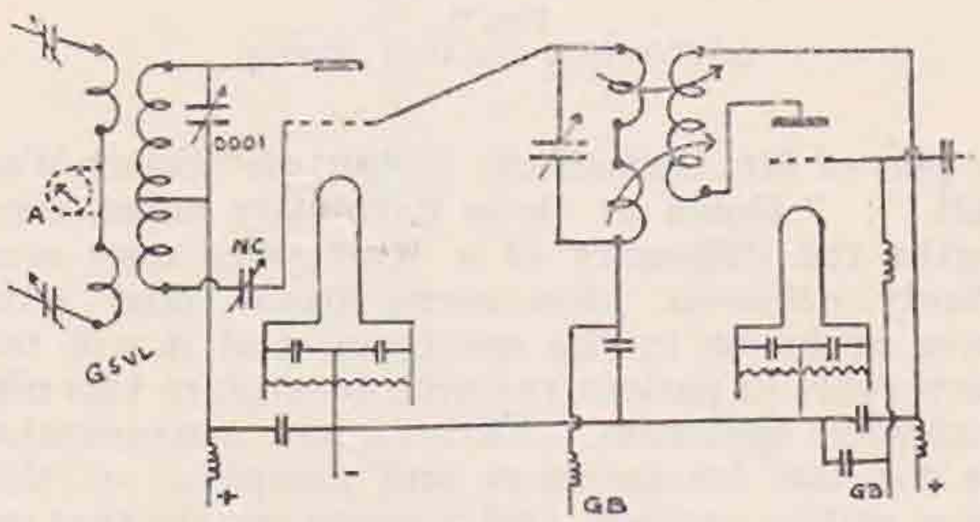


Fig. 4.
G6RG's FD/PA Coupling. P.A. Tank Coil is 6 turns, 2¾ ins. Three are tuned and three form neutralising coil (28 M.C. band).

for self oscillators) of the one shown herewith (Fig. 3) which is, incidentally, used by Marconi. It is as old as the hills. In the case of a CC set the grid-leak would be disconnected, B going to G.B. negative (through leak if required) and A to G.B. positive. The key is at X and choke about 30 hys. at zero milliamps. The condenser is about 2 mf. This is actually used in the last FD of a CC set, the valve being run off a separate filament winding so that only this valve should be keyed. No resistance has been found necessary to extinguish key thump, and a high resistance across key only tends to put out a spacing wave.

It was stated in QST some years back that a thump filter with a lag on make and break of 1/30 second was necessary in order to produce thumpless keying without introducing trouble in reading. It is not known what the lag in this circuit is, as it was found by experiment.

* * *

G6RG sends a coupling circuit for FD/PA (Fig. 4) which others may care to try out. He states : " The plate coil is fixed. The grid coils are mounted on GR insulators and are free to swing. It was found best to have the grid coil next to the low potential end of plate coil closely coupled, and the other at an angle of about 20 degrees—the best point is easily ascertained." The circuit is used by G6RG for 28 M.C. work.

Owing to an error by my typewriter or "Mr. Printer," 28 M.C. tests were announced for March in the last issue.

This is corrected in the printed circulars, and you will know that March is the month adopted by our 28 M.C. enthusiasts as all their own. The dates fixed are Sundays, March 8, 15, 22, 29. G5UM is, I believe, busily writing up hints on how to secure the 2 M.C. trophies. We are endeavouring to arrange such conditions as will simplify these tests while retaining the essential points aimed at—reliable and word perfect communication under varying weather conditions. Special attention will be given to foreign stations heard or worked.

* * *

SUNSPOTS.

G2ZN writes, regarding October conditions:—"Observations made during the last month tend to confirm theories, viz., that a prevalence of sun spots is definitely good for S.W. work, whilst the longer wave bands seem to suffer as a consequence. However, contradictory data will arise, and one finds oneself 'as you were.' Owing to bad weather and short daylight hours, only two observations were possible in October. October 11 calls for comment. (See Fig. 5.) A large number of spots mostly small, are visible; at no time during the past few months have so many been observed. And—it merits stress—that conditions on 7 M.C. for the following few days were vastly improved. On one night they were frankly phenomenal, W1, 2, 3, 8 and 9 being R6 to R9 on O.V.1. The next observation, a fortnight later, when the solar disc was practically free from spots, marked a period when conditions on 7 M.C. had returned to the bad state which I associate with such an observation."

* * *

FADING AND SIMILAR WORK.

G6NK has now the help of G6SV and 2AYK for a nucleus Group (2A). Volunteers to fill this group, please.

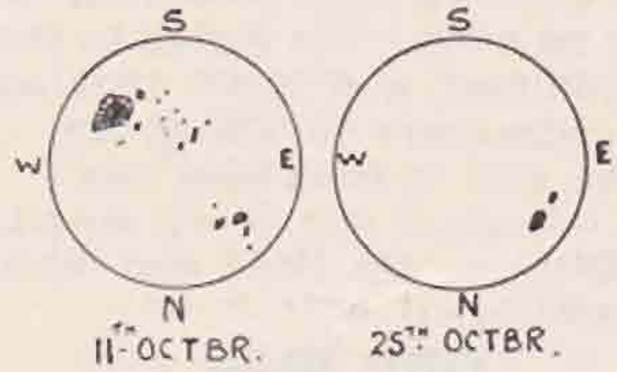


Fig. 5.
Sunspots (G2ZN).

Before passing to Group Reports let me wish all CB-ites, near and far, the very best of good wishes for Christmas and the New Year. My post last Christmas brought cards from Australia and California—amongst many others—and even if circumstances make it impossible sometimes to acknowledge every note, the appreciation is here though the day has only 24 hours.

Group Reports.

28 M.C. Work.

Only one Group has any report. C.C. BRS825 of Group 1F finds conditions not nearly so good as for the corresponding time last year. He has been keeping a good look out on the band from 10 to 19.30 G.M.T. On October 12 G6DH and SU8WY were heard (11.30 to 12). On November 2, between 14 and 19 G.M.T., harmonics of WEX (repeatedly), HJO, W1AE (R5) and other commercials were heard. On November 9, G6DH and ST6HL (? harmonic) at 13.14 G.M.T. BRS25 says that the harmonics heard on November 2 seem to point to this being a good day for trans-Atlantic work, and wonders if any genuine 28 M.C. stations were on the air in U.S.A. (I think the matter of harmonic/fundamental conditions as parallel is not yet proven, G5VL.) The reception of ST is the first, whether fundamental or harmonic, on the band, and as ST6HL has been trying 28 M.C. we shall hope that this is a first reception to BRS25's credit. G6HP reports that even commercials were inaudible on 14 M.C. on November 2, an interesting point to compare with the reception by BRS25 on their second harmonics. G6HP worked another station in SU8WY between 11.30 and 12 G.M.T. on October 12, getting R7. A sked with ZL1AN was arranged between 17 and 09 G.M.T., but the ZL sigs. were not heard. No news is to hand regarding G6HP's sigs in ZL. G6HP has just finished a new set, "built round a DET1.SW plus about 6 ins. of wire." Coils are mounted on condensers, and the usual coils did not take this set above 9 metres. He wants dope on aerial couplings, direct tap loads the set too much, and a coupling coil appears to lack efficiency. G2CX proposes copying G6HP's new transmitters.

Fading, Blanketing and Blindspotting.

Group 2B.—G.C. G2ZC has also received from G2ZN the note of sunspots on October 12 (mentioned earlier in these notes). He notes that, in accordance with the Group's views, the improvement expected on 7 M.C. did take place, and expects with the spots' disappearance, conditions will return to bad. The Group is said to be nearing its discussion on pressure systems; the H.L., however, is far from a finish, and points for its existence or non-existence are raised. The G.C. provisionally promises a sum up for next month.

3.5 M.C. Work.

G6RB is in trouble as several hoped for members of 4A have had to withdraw. Many stations are reported to be working on the band. How about joining G6RB?

56 M.C. Work.

Group 7A.—G.C. G2DT writes:—

G6LK has a "QST" Beam Antenna, and at present is finding difficulty in getting radiation on 58 M.C. He says, "To get the beam antenna clear of everything requires 2/4 wave feeders, and with these I am either on 56 M.C. to 59 M.C., and I am going to try phasing them as soon as possible." He reports hearing at 11.35 G.M.T. on October 26; T7RAC signals on approximately 57 M.C., but as they were QSA1, he is unable to give any further information. *Apropos,* ZS5X has a push-pull T.P.T.G. working in the band, and is carrying out

tests with SARS5AJ, and a flutter of excitement goes through the GC's mind at the thought that perhaps G5LK heard ZS5X. This ZS5X transmitter is reported thus: "Possesses no chokes, plate blocking condenser or by-pass ditto, and signals from it are as steady as a rock." FB, S.A.R.R.L. G2DT).

G6TW has not heard a sound except his grandfather clock which appears to perk magnificently on 5.1 metres. Hi. He has what seems to be a rather novel idea for a beam antenna, and a very rough sketch is shown in an endeavour to explain it.

G2DT has no news. He wishes to thank G6XN for past helpfulness, and hopes that success may attend his endeavours in Group 7B. Group 7A will always be glad to hear from him.

Group 7B.—In place of a Group report, an article by G. C. (G2OL) on the band and work generally is given separately.

QRP Work.

Generally speaking, thanks to lack of sun spots, excess of sun spots, or other evil happenings, there does not appear to be such a thing. G2VV of Group 8B, however, finds something to report. He says that G6SO has now a 3.5 M.C. ticket, and proposes to get away with 5 watts of CC there. G5CM has to use from 3 to 10 watts on three bands to get through. Europe is being worked consistently. G5JF has been on fone tests with Venice on 7 M.C. Other fone work with TS, EAR and F. W9 and W2 have been worked on 14 M.C. and OK, OH, FM and SU on 7 M.C. G2OA finds 2 M.C. OK, but other bands hopeless. He is now "General Organiser" unofficial, of the Liverpool gang. BRS309 sends in big collection of dope finding reception conditions very variable on all bands. He queries effects of sun and moon on high frequency work. Hopes to have a three letter call soon. G2VV has only limited time and reports QSO OZ on 14 M.C. 3 watt to a Cossor 2-volt valve reached OH at R4. On 7 M.C., with round 9 watts, his call reached ZL3AJ "who replied and then faded out!" So ended the first attempt at ZL. A 2 M.C. transmitter is slowly reaching completion. UD and HB have given R8 in daylight on 7 M.C. with 5 watts.

2 M.C. Work.

Group 10A.—G.C. G5UM reports:—

G5RX has now got going on 2 M.C., and his schedule with G6FO should be in full swing by the time these words are in print. He is using a T.P.T.G. transmitter with the crystal across the grid coil, and 6 watts input. He has converted to all-mains drive now, and the only battery in use is a small 2-volt accumulator. Discussing G5UM's opinion that North Wales was a good spot for DX, he says that various hams he knows have pointed out that they have found it not too good. He himself, however, has found no difficulty at all in raising stations there, though the intervening country is flat and not apt to cause screening as to the mountains in North Wales. G5RX is transmitting every Sunday evening from 18.00-19.00 G.M.T., and is particularly anxious to receive reports.

G6FO continues his six skeds. He has made further improvements to the transmitter, and is using A.C. valves heated off D.C. mains through lamp resistances; oscillator is an AC/P2 (now off the market) and the modulator an AC/R. Some excellent DX reports have been received lately, quite apart from the recent QSO with OK3SK. F8WHG, Savigny, Ardennes, has given R6, while a report has been received from Belgium. Perhaps the most remarkable was that of a station 25 miles away, who gave G6FO's C.W. as R4 when not using aerial or earth. Recently, many G's have been worked on 7 M.C. for the purpose of getting them to QRX on 2 M.C. for daylight C.W. tests. Separate transmitters are used, and G6FO can change from one band to working on another in 10 seconds. The result is that he is now working 2 M.C. DX in daylight, best QSO's being G2LZ and G6ZS, both on one Thursday afternoon. Taking it as granted that weather conditions do not affect DX in this country, as practically proved by the April 2 M.C. tests, he mentions a theory of G2PA that a patch of good or bad weather 500 miles away may alter conditions over, say, 200 miles in this country. Enthusiasm over 2 M.C. is very apparent in G6FO's district, some 20 stations using the band, at least five fone stations being in Newport itself! BRS164 reports conditions as not up to the standard of past months. He finds the best time of working

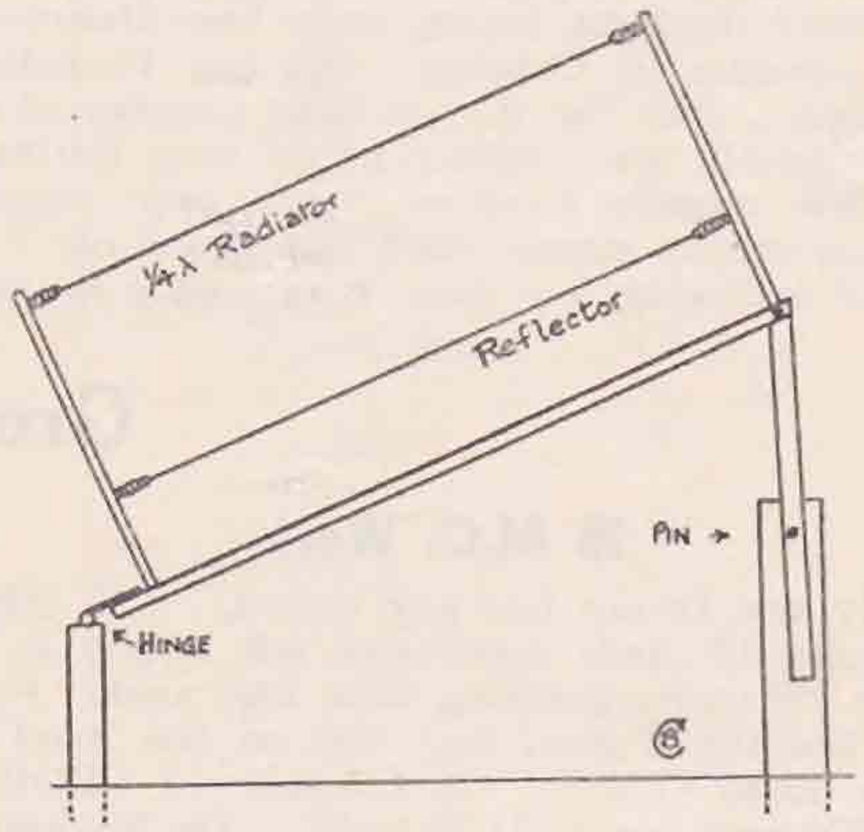


Fig. 6.
Five-metre Beam Antenna.

to be between 18.00 and 20.00 G.M.T., as general mush and static is noisier round about 23.00. A schedule is being kept with G6FO on Sunday evenings. The sked that had been kept with G5UM for over a year has, unfortunately had to be dropped, as G.C. finds his hours of working very erratic. G6ZH is keeping a schedule on Sunday mornings with G6FO, and it is expected that after a few more tests this will be run entirely on telephony. After a heavy thunderstorm in London on November 2, a QSO was made with G5UM, both stations being R6, QRB 70 miles. A sked was fixed for the evening, but contact could not be made. This points to the generally accepted theory that DX signals increase in QRK after electrical disturbances of the atmosphere, but on the other hand it might indicate a skip distance of 70 to 100 miles for 2 M.C., after dark at any rate. Q5UM finds little difficulty in working stations over this distance after dark. Apart from this interesting observation on his QSO with G6ZH, G.C. has found conditions extremely good for the first three Sundays in November. He is now a convert to the sunspot theory, following collaboration with G2ZN. No spots

indicate good DX on 2 M.C. and *vice versa*, but it is strange that on October 12, when G2ZN noticed several spots (indicating, presumably, a drop in the good conditions on 2 M.C.) G5UM found DX very good. He thinks that the spots seen were only transients, so to speak, and do not have any connection with the general sunspot cycles of 11 years. Such earthly phases as weather effects and so on, only influence local working, and introduce fading, static and so on. A push-pull transmitter is being built, following some helpful tips from G5VL, a straight crystal oscillator with two DE5B's putting the H.F. straight into the aerial, which is loose coupled.

Group 10A are hoping to run a co-operative schedule on December 8, in order to see if all stations could be linked up to receive and handle messages relating to the Group's activities. All open aerial members were hoping to QSO each other, and 2AZQ and BRS164 were to stand by and give reports later.

Group 10*B*.—G.C. G600 complains of 300 metre spark QRM, but notes a welcome decrease in QRN. G6UJ worked OK3SK several times and carried out tests with new mike. All the rest of the group have been worked, and G2BM (London) gave his fone as R6, F8. G6DR is rebuilding, but has worked all the group and OK3SK. G6PS remains QRP with 4 watts. G6MN fails to raise the G.C., but has worked the others in group. Uses 8 watts (R4 in Cornwall a few weeks ago, G5VL.) G6OO with 4 watts of CC on fone and CW gets all but G6MN—due to times. Look out for his sigs. after 22.30 and report, please.

Review of Foreign Magazines.

(Abstracted by G6FY).

In a long article in the September *Red Espanola*, Dr. J. Baltà Elias (EAR54) discusses "Some Anomalies of Meteorological Origin in the Propagation of Short Waves." The work of previous investigators is reviewed, numerous references being given, and considerable attention is paid to the work of the French "Office National Météorologique," with which the writer has collaborated.

The connection between fading and "scintillation" and the weather still remains obscure, but it appears that fading is more intense when the direction of propagation is parallel to isobars or isotherms, and more frequent when perpendicular. These effects are, however, local to the receiver, and seem to appear successively at different receiving stations, as though the phenomenon travels through space from west to east with a velocity of about 60 km. per hour. This happens to be also the average velocity of propagation of most meterological phenomena.

The explanation of "air bouché" or "dead nights" is more difficult, and has occupied much of the attention of EAR54. The results of a number of investigators agree in suggesting that the principal cause of these blank nights is the existence of a surface of discontinuity in the air between the receivers and transmitters concerned, the type of discontinuity referred to being that between a mass of cold dry air and one of warm humid air. This result is also suggested by researches on the dielectric constant of humid air, which indicate that large refractions would occur at the surface in question.

Although this effect seems to be well established, it can scarcely be expected to be the only cause of "air bouché."

Dr. Elias' paper should be of considerable value to certain C.B. groups.

Some experiences with the screen-grid detector are described in "CQ" by S. Kaplan, who finds that this is definitely superior to a triode, even if the latter is preceded by an H.F. stage, both as regards strength of signals and silence of background. Reaction control by a variable high resistance in the screen-grid lead is recommended. Valves of a number of manufacturers were tried, and were not equally successful, the most frequent cause of trouble being microphonic noise. The chief difficulties encountered were (1) hand capacity, removed by careful screening, (2) adjustment of anode and screening grid voltages, which proved very critical.

In a note on ultra-short wave condensers, Mr. L. Rhode points out that unless the distance between the plates is kept small the condenser will radiate an appreciable amount of energy and cause excessive damping of the circuit. Variable condensers of the type in which capacity is decreased by separating two plates are therefore open to objection for use on wavelengths of less than ten metres. If the distance between the plates (in cm.) is kept below the value $\sqrt{2} \times 10^{-5}$, λ^2 this loss will be negligible. This indicates 1.3 cm. as the maximum spacing for a condenser for use on three metres.

Chair Warmers Club

There is little to report this month, save that our first G member unfortunately has found that he has not the time to take on the work as British representative, so G2ZC has offered to carry on till someone else signifies his willingness to do so.

Will all British Chair Warmers therefore please note that on receipt of the C.W.C. magazine each month, will they please let that be a reminder to write up their monthly reports, and send them to G2ZC, by letter or postcard, who will forward them to the Hon. Secretary, say *one week* after the arrival of the magazine.—(G2ZC).

A Calibration Service on 3500 K.C.

Commencing January 1, 1931, Mr. Marcuse, G2NM, hopes to put out a calibration service on 3500 K.C. at 11.00 and 22.30 G.M.T., Sundays. The exact frequencies will be announced later, and, if permission can be obtained, the service will also take place in the middle of the week.

Strays.

2AMV, D. F. Waddington, 9, East Shrubbery, Redland, Bristol, will be pleased to stand by for 'phone tests by D stations on 1.7, 7 or 14 M.C. by arrangement.

* * *

LA2V requests reports from G stations on the transmissions on 3.5 M.C. band from Norwegian stations.

Empire B.E.R.U. News.

CANADA.

By V2BB, Ste. Anne de Bellevue P.Q.

DX is still elusive and not much has been done as regards Europe, although South America, ZL, VK, and others have come in consistently. VE2CA seems about the most successful DX fiend in this part of the country, but VE2AP and VE2BB report hearing G stations. The first named keeps listening skeds on 28 M.C. daily, at 12.30 G.M.T. and at 18.30 G.M.T., but only commercial harmonics have been heard; he would be glad of skeds with the G gang on that band. As conditions have been so poor, it is difficult to get dope on DX from the other parts of the country, but in the VE2 district the Aurora has played havoc with signals, and we shall be glad when conditions become normal again.

CEYLON AND SOUTH INDIA.

By VS7GJ, Frocester, Govinna, Ceylon (received by G2CX, via ST2C).

The more active transmitters have been moving from the 7 M.C. band to the 14 M.C. band. The former wave is suitable for local communications, but the latter, owing to skip, cannot be relied upon. In general, October has been a most unfavourable month for DX working. VS7AP reports that half of October conditions were fair, and that the best time for working on 14 M.C. is 15.30 G.M.T. After 16.30 G.M.T., G stations appear to have faded right out. VS7AL and VS7GJ are also active, but find conditions very patchy with pronounced fading. On the 28 M.C. band, nothing doing.

EGYPT.

By SU8RS, Egyptian Signals, Polygon, Cairo (received by G2CX).

November has been a month of little activity in Egypt because the hams are all waiting for the boat home to England and have had little time for radio. Service work has taken up most of the time, and when it has been possible to get a few moments at the key, there has usually been nothing doing. Conditions have been fair only, but a few VK and ZL stations were heard between 14.00 and 16.00 G.M.T. some days. SV1AA is temporarily off the air owing to H.T. difficulties, and SU8RS has been the only station working, and that on rare occasions only. 28 M.C. work in SU is also at a standstill owing to lack of time.

IRAQ.

By YI6HT, Squadron 84 (B), R.A.F., Shaibah, near Basrah.

Only YI6KR reports this month. He will be QRT for a short while, due to service QRM. Has found 7 M.C. good and has been working VK's and J's with ease. He reports that Slater (ex-2GQ and 6KR) has gone to VU (Kohat) and hopes to get on the air there. FB, OM. We welcome B.E.R.S. 12, of Baghdad, to the gang—perhaps he will stir up the dormant amateurs there. 28 M.C. has come to life in the south. YI6HT, having heard OH, FM, CN, VU, and HAF during the past few weeks, has formed the opinion that local cloud helps reception on this band. A sked is being kept with HAF8B on Sundays, but ND yet. YI6HT has also received a report of reception on his 28 M.C. signals in PA during last August; power in use at time was 5 to 6 watts, so he has high hopes for his A.O.G. and reflector with the QRO CC rig. It is hoped to start a letter budget next month, and also to restart the Sunday morning ragchews on 7 M.C. What about it, gang?

KENYA, UGANDA, AND TANGANYIKA.

By VQ4MSB, Radio Station, Mombasa.

So far as conditions are concerned the month of October did not come up to expectations and have been on the whole very poor. Activity in this division has not been great, although the divisional meetings held on 7 M.C., at 08.00 G.M.T., each Sunday morning have been well attended. The following stations have been on the air regularly during the month:—VQ3MSN, VQ3SKW, VQ3STM, VQ4CRE, VQ4CRF, VQ4KTA, VQ4-LMA, VQ4MSB, and VQ5NTA. VQ5NTA says that the little Mtoto boy who turns his hand generator for him is greatly amused to find out that the faster the generator is turned, the brighter becomes the light in the aerial. More power to his elbow!

MALAYA.

By G. W. Salt (VS2AF), Glenmarie Estate, Batu Tiga, F.M.S.

Conditions during August and September have been, on the whole, good on both 7 M.C. and 14 M.C. The nights of August 22-23 and September 2-3 were the two exceptions, practically no stations being heard here on either band. No 28 M.C. signals have yet been heard by VS2AF, though many hours have been spent listening. VS1AB, of Singapore, VS3AB, and VS3AC, in the Unfederated States, are all active, and VS2AF, hitherto the sole representative of the Federated States, has now been joined by a new station, VS2AT, who has just returned from leave and hopes to be working shortly. The Kuala Lumpur Amateur Radio Society (VS2AH) is at present broadcasting on 315 metres three nights a week, but hopes to be on about 49 metres shortly with about ¼-Kw. input.

NEWFOUNDLAND.

By VO8MC (received by G5ML).

Regarding the B.E.R.U. Empire Radio Week, all active stations have been informed, and reports are being received at the present moment. VO stations are preparing for a general broadcast on each Sunday at 2 p.m. local time on the 7 M.C. band. VO8Z is to visit VO8MC, and some important matters regarding B.E.R.U. will be discussed. VO8MC is on every Wednesday and

Saturday from 11 a.m. for traffic on 14 M.C. and another station to be appointed soon to assist.

NEW ZEALAND.

By C. W. PARTON (ZL3CP), 61, Hackthorne Road, Cashmere Hills, Christchurch (via ZL3AR and G2VQ).

After a period of very poor conditions, DX is looking up again, especially on 7 M.C. QSO's with Europe on this frequency are now common. 14 M.C. has also improved, though it is rather patchy still. An N.Z.A.R.T. Convention is being held in Wellington at Christmas and it is hoped to get a few more members for B.E.R.U. then. New hams are coming on the air very fast now, and it is noteworthy that several of the New Zealand light-house keepers are hams. Several of the Auckland and Christchurch hams have been operating sets in planes for the N.Z. Air Force. A scheme is afoot for using amateur stations as an army amateur network.

S. RHODESIA.

By VP9SR, "Salcombe," Plumtree.

DX on the 14 M.C. band can only be described as "patchy." This season is, so far, by no means as good as the last. At this station conditions were better during late August and September than they have been during this month (October) when, on some nights, not a single overseas station could be heard. Towards the end of the month a slight improvement was noticed, and some G's were worked. VE, VK, and ZL are conspicuous by their absence, while South Americans and W's (on 14 M.C. band) are few and far between. On 40-metre band, contacts with Union and the Northern Colonies are fairly good, but I have not heard of any long distances being covered on this band. VP3SRB has gone back to England, and he will be badly missed here, especially by the writer and VP6SR, who have benefited greatly by his friendly guidance. We all wish him the best of luck. The following stations have been active during the month :—VP2SRA, 3SR, 3SRB, 4SRA, 6SR, and 19SR.

SUDAN.

By ST6HL, R.A.F., Squadron 47 (B), Khartoum.

ST2A has now returned from England and is on the air again on 14 M.C., working from the Gordon College, Khartoum. ST2C is also active on 14 M.C. and has been handling some B.E.R.U. traffic. ST3WT is an aeroplane station working on 14 and 7 M.C. with ST6HL at Khartoum. The maximum range to date is 500 miles, when signals from the plane were received QSA5 (R8) on 14 M.C. Any reports would be very welcome.

SOUTH AFRICA.

By ZT6X.

DX conditions have considerably improved during the latter part of October, with the result that all continents (with the exception of VK and ZL) can now be worked easily on 14 M.C. QRN has once again put in an unwelcome appearance, and the rainy season, with its accompanying thunderstorms, has started. The proposal to hold an Empire Radio Week from February 22 to 28 is sure to meet with enthusiastic approval from S.A.R.R.L. and B.E.R.U. hams in South Africa. (NOTE.—The S.A.R.R.L. 3.5 M.C. competition was won by ZT6X, who is too modest to mention this fact himself in the notes. Congrats, OM !)

All VK hams send the grand old-time greetings to their friends and brothers (both in the "Old Country," sister Dominions, and other parts of the world), and wish them all a very Merry Christmas and Prosperous New Year.

NOTES & NEWS FROM THE BRITISH ISLES.

DISTRICT No. 1.

Representative : J. BROWNE (G2XB), Kenilworth, Beaufort Road, Ashton-under-Lyne.

CONDITIONS during the past month are reported as mainly variable. The 7 M.C. band shows little or no improvement. On this band, G2WP has worked Greece and wonders if this is a first contact G/SX on 7 M.C. Our 14 M.C. stations report conditions better, with a good spell November 11-14 which coincided with the cold weather spell. The 1·7 M.C. band is as busy as ever ; stations who don't use this band are missing some real QSO's. We seem to have only one station using the 3.5 M.C. band, which seems very good for G and local Europe. The higher frequencies still await exploration. The following stations have reported active :—G2OI, G2DH, G6RH, G5ZN, G2WP, BRS369 and 409.

DISTRICT No. 2.

Representative : T. WOODCOCK (G6OO), 8, George Street, Bridlington, Yorks.

This month has shown much interest on all the usual bands, with the exception of 28 M.C. Keen disappointment has been felt that the birthday party had to be cancelled owing to lack of support, but the district is determined to make up for it in the 28 M.C. tests. A Conventionette took place at Leeds on November 1, 22 being present. Mr. Old (G2VQ) represented the Council, and, at the request of the D.R., took the chair. A telegram was read from G6YL regretting her inability to attend and wishing the gathering every success.

AGENDA.

1. *Monthly Meetings.*—After much discussion it was decided to hold monthly meetings in each of the sub-areas. Details to be fixed by the sub-manager (see No. 6).

2. *Letter Budget.*—By a majority of 8 votes against 5 it was resolved that the district continue the Budget.

3. *QRM on Amateur Bands.*—G6SK proposed, and G6BX seconded, a proposition that complaint be made regarding the QRM caused by several commercial stations on the 7, 14, and 3.5 M.C. bands.

4. *1.75 M.C. and 3.5 M.C. Bands.*—It was decided that more use be given to these bands.

5. *28 M.C. Band.*—The D.R. asked for more support on this band. G5TQ complained that no dope was given in the BULLETIN regarding working on this frequency.

6. *Sub-Managers.*—As the district was very large it was decided to appoint several sub-managers

to look after their respective areas. The following are the results :—

Leeds District : G5TQ. Proposed by G6WD, seconded by G5CX.

Northumberland and Durham : G5QY. Proposed by G5CX, seconded by G5DD.

Sheffield : G6LF agreed to represent this area.

7. *Empire Link Stations.*—The chairman (G2VQ) gave details regarding the work done by the link stations on behalf of the B.E.R.U.

8. *QSL Section.*—That No. 2 District was satisfied with the QSL section was shown by all present. G5TQ proposed, and G6SK seconded, the motion.

9. *Smarter and Quicker Operation.*—It was agreed by all present that smarter and quicker operation be introduced in order to keep the standard high of the British amateur.

10. *Other Business.*—Proposed by G6LF, and seconded by G6WD, that messages of greeting be sent to G5WQ and G6UO/ZU1J.

DISTRICT No. 3.

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

Just one outstanding report, which comes from G2RV of Wallasey, to the effect that on October 24 and 26 he had a QSO with VK5HG, of Australia, on the 7 M.C. band. On both occasions it was about 21.00 G.M.T. He has every reason to believe it to be a *bona-fide* QSO and awaits card.

DISTRICT No. 4.

Representative : J. Lees (G2IO), 17, Trevose Gardens, Sherwood, Nottingham.

The usual monthly meeting was held in Nottingham on November 8, with the following members present :—G2HD, G2OC, G2VQ, G2XS, G2IO, G5DM, G5YI, G6MN, G6VB, BRS365, BRS366, and BRS402. After tea each member spoke for five minutes on progress made since the last meeting and was followed by a general discussion on aerial types and aerial couplings, with illustrations. The meeting wound up with a visit to G2HD.

DISTRICT No. 5.

Representative : F. W. Miles, " Rydal," Beechwood Avenue, Coventry.

The most important item of news for the month is that the first issue of the letter budget is now in circulation, thanks to the nine stations who contributed. Will other stations kindly help by sending their contributions to G5VM by the 15th of each month ?

DISTRICT No. 7.

Representative : H. C. Page (G6PA), Newgardens Farm, Teynham, Kent.

Conditions seem to have been very variable on the higher frequency bands during the last month. This has been especially noticeable on the 7 M.C. band. Perhaps the most consistent results have been on the 3.5 M.C. band. This band promises to become very useful to us, and it is a great pity that we can only use it at week-ends. The 1.7 M.C. band has improved considerably, the atmospherics and background noises being considerably less than they were a month ago. The " Budget " continues to find fresh contributors, and if everyone contributed regularly, we should have a fine show indeed. If any new members are interested in the " Budget " idea, and would like to join in with us, I shall be very glad to give them fuller particulars on receipt of a letter. This month we have three new contributors to the " Budget." There does not appear to have been any outstanding DX this month. The following stations have been active :—G2IG, G2RT, G2PF, G2SJ, G5MR, G6NU, G6NS, G5UY, G5AQ, G6PA, BRS309, BRS356, and BRS296.

No. 8 DISTRICT.

Representative : R. C. Neale (G6GZ), Farnborough Road, Farnborough, Hants.

Letter Budget No. 1 has now been through No. 8 District, so hope all have the idea of the scheme. Considering I notified over fifty, the response was very poor. It's up to you to write regularly, or the budget will soon die. Surely its not too much to ask—and I hate to go begging. Come along, you fellows—is the scheme going to sink or swim ? Will each man try and get at least one more man to write—we must increase—and leave the rest to your D.R. ? Tks !

I hope to commence a budget broadcast soon on either 1.7 M.C. or 3.5 M.C., which will be with a dual purpose, and handy for those looking for slow morse practice.

DISTRICT No. 9.

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

Now that the winter experimental season is here, I hope to get an increase in " Budget " letters for circulation. Will you please send me your reports on December work to reach me during the first few days of January, so that before the end of the first week I can start circulating them in " Budget " form? This procedure should be followed each month. I wish everybody a Happy Christmas and a Bright and Prosperous New Year with plenty of DX and good and useful work.

WILL ALL DISTRICT REPRESENTATIVES PLEASE READ THE HEADING TO THE NOTES IN LAST MONTH'S ISSUE ?

No. 10 DISTRICT.

Representative : S. J. Buckingham (G5QF), 19, Oakleigh Road, Whetstone, N.12.

On October 1, I sent out our first Letter Budget—on November 30 it had not come back ! This is not fair, and unless we can obtain better service the budget will be " washed out."

The following have been active : G6PP, G5UM, G6UN, G6OT, G6CL, G5SL and G5QF. Several of the above have been on 3.5 M.C. G6CL with EU and CV (using 5 watts and usual aerial) seems to have had best DX on this wave.

No. 12 DISTRICT.

Representative : T. A. St. Johnston (G6UT), 28, Douglas Road, Chingford, E.4. (Telephone : Silverthorn 1557.)

On the 1.7 M.C. band, G6FY, G6LB and G6TX have worked OK3SK and G2ZN has worked a French station at Nice. Members of this district have decided not to run a Budget as most of them actually meet each month at the regular district meetings. By the courtesy of G5AR the last meeting was held at his QRA, when a very interesting evening was spent. The next meeting is at

Chingford, on Tuesday, December 16. The 3.5 M.C. band is now being used by several members of this district.

DISTRICT No. 13.

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

The November meeting was better attended, and the next one will be held on Sunday, December 21, at the QRA of G6CO, 256, Ladbroke Grove, at 7 p.m. (ring bell). Eleven reports are to hand, and most stations report conditions improving. All bands from 1.7 to 56 M.C. are being used by members of the area. Outstanding achievements include the working of OK on 1.7 M.C. by G6XN and G2OL working his first VK and ZL, thus qualifying for W.A.C. and W.B.E. Again, don't forget those reports by the 20th.

DISTRICT No. 14.

Representative: H. HARDING (G2HH), Treve Cottage, Ebbw Vale.

The November meeting of the M.T.S. was held on November 20, at Abertillery, and eleven attended. It was decided to send the letter "Budget" to all members this month, but afterwards only to those who contributed, it being thought that new members would like to see how it was run to gain confidence and overcome a little shyness in putting their thoughts and results into writing. A letter was read by G2HH from G6CL wishing the M.T.S. success, and asked all to bring the R.S.G.B. to the front in anything concerning radio. A suggestion put forward by G2HH for a relay in the area was adopted, and it is to be worked as follows:—The Chairman (G6FO) originates a message to the M.T.S. members and sends it to one of the other members. This member relays it to another, adding to it that the message was received by him from G6FO at a certain time and date, and what wave, and whether CW or fone. In order that AA and BRS men can join it, it was made permissible to use landline better and verbal exchange. The message is finally to be returned to G6FO with its record of travel appended. BRS239 (G. R. S. Farnie) gave a short paper to open a discussion on short wave reception. He gave details of his SG-V-1 and his aerial outfit, and described the results. A little while ago, BRS239 decided to listen on 2 M.C. He received all the M.T.S. stations, but very weak, until he reported to G6FO of a sudden rise in strength which proved that 239 was listening on 3.5 M.C.! We welcomed a new member in Mr. V. Bartlett. We have three new calls this month—BRS237 is now 2ACB, BRS239 is now 2AHK, and BRS359, G6GW. G6FO, G2BG, and G2HH have been active.

WALES.

Representative: B. F. PHILLIPS (G5PH), 21, Byng Street, Landore, Swansea.

Will all hams in Wales let the D.R. have their opinion of a circulating budget, to be called the "Snowball," because it will get bigger as it rolls on. How many are interested? G2AV, 2BMP, and G5PH have been active this month.

SCOTLAND.

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

The period ending November 24 appears to be something of a milestone in Scottish radio affairs. It marks the first period since the birth of the Scottish organisation in which not a single report has been received from the various districts. Perhaps, however, the district officers and members generally have gained the impression that owing to the change in character of the BULLETIN notes and the elimination of the personal element, that it is no longer necessary to report. This may be quite in order where some of the compact English districts are concerned, that is their own particular "pigeon," but if a country like Scotland, the members in which are scattered over a wide area, adopts this comfortable easy-going attitude towards its radio affairs, then the lot of whoever happens to be in charge of the organisation is going to be very far from pleasant, if not absolutely impossible. In your own interests, is it wise? It will certainly mean less work for the hon. manager, but I am not aware that he has ever complained of the amount of work on your behalf in which he has functioned. Candidly, OMs, from the Society point of view, I view the present attitude with something of alarm, as I have been engaged in this work for a number of years now, and experience has proved beyond a doubt that isolation from one's fellows in radio matters in a very short while spells death to amateur radio. It is not necessarily the isolation of distance to which I refer—which is perhaps not quite so serious, although bad enough—but the lackadaisical isolation of stations separated by, possibly, only a few miles. For example, A. and B., being a few miles apart, are both interested in amateur radio, and frequently communicate and inter-experiment. B. gets a lazy fit, and can't be bothered getting in touch with A. He will do it to-morrow, or perhaps later. A. immediately senses B.'s failing interest, and as B. was undoubtedly one of A.'s interests in radio, the "maggot is in the wood," and unfortunately this state of "laissez faire" does progress—backwards. Some of you may think I have a "bee in my bonnet" in this connection. Possibly I have, but my views are the result of 5½ years' experience of radio work, and represent my considered opinion on the subject. Of course there is no gainsaying the fact that the poor conditions pertaining have militated against DX working, but after all, the G.P.O. does not grant a licence for the purpose of enabling a man to do DX, and there are other and just as interesting sides to radio, which many of us are inclined to forget. So far as I can tell, all may be deep in experimental work, indeed it must be so, as the only Scottish stations which appear to be active on the air at the moment may be counted on the fingers of one hand. That, then, is my plaint. Outside of my immediate locality, I do not know what is being done, and I cannot be expected to know if you will not tell me via your district officers. Thanks to the consideration of the Council and the interest and assistance of our hon. secretary, Scotland has just achieved national status in the Society's affairs, and is no longer a district designated by a number and sharing joint representation with the other districts. We represent ourselves in council, and it is up to the Scottish members to justify their emancipation by showing an awakened and lively interest in the affairs of the Society, of which each member is a unit. Thus endeth the first chapter!!!! Conditions generally have not been too good, but a date which, from the DX

(*Continued on page* 184.)

HELP US TO KEEP IT.

Correspondence.

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

The Solar Cycle and Short Waves.

To the Editor of T. & R. BULLETIN.

SIR,—I noted with interest your Editorial in the last issue.

It is pleasing to Group 2B to notice that the solar cycle is being taken as being the cause of the present conditions on short waves, as we issued this, as a theory, many months ago, and in fact we forecast the beginning of these conditions as long ago as the autumn of 1929.

As a group, we are not quite settled whether it is the solar effect on the Heaviside layer, or the solar effect without the Heaviside layer existing at all, but these points will be issued later, as a group report on the subject.

Whether or not, two points are, however, to be noted.

First, that 2B forecast just such conditions as are prevailing at the moment, and also some of us forecast that we shall not return to 1927-29 conditions till about 1938, and such being so, the low frequencies are possibly of more value than the high ones during the next few years from an amateur point of view; and also we may expect odd periods, approaching normal, just as in the old days we got freak days, or weeks. One of our members lately issued a statement on the fact that sunspots being visible, we should expect better conditions, and we all know that for the past few weeks conditions have been almost normal.

Secondly, it is gratifying to note that what was laughed at when we first issued our forecast is now, seemingly, being taken as a matter of actual fact by serious-minded experimenters.

The behaviour of signals under solar influence cannot be summed up in a few words or in a short time, especially as in Group 2B there are several channels of thought being investigated, but if we do arrive at anything worth publishing, we shall be glad to let you have the facts for publication.

Yours faithfully,
A. M. H. FERGUS (G2ZC),
G.C. Group 2B.

A Question for Malay.

To the Editor of T. & R. BULLETIN.

DEAR SIR,—While the article and curves on "The Zepp-fed Hertz Radiator" in the current issue of the BULLETIN are very interesting, I should like to ask VS2AF if he has taken into account the difference in the height above ground which takes place with his aerial each time he alters the angle.

Thus, when he was using the horizontal aerial the total height was only fifteen feet above ground, whereas as the aerial approaches the vertical the effective height must be in the neighbourhood of eighty feet.

Now according to experiments conducted at Round Hill (Mass.), the height of a Hertz aerial must be at least half a wave-length above earth for maximum efficiency, so it would be useful to know the curve for a horizontal aerial at the same height as that of the 32 degree one shown in curve "B," taken under similar conditions.

Yours faithfully,
C. R. PILL (G5CX).

An Appreciation.

To the Editor of T. & R. BULLETIN.

DEAR OM,—At the close of the year there must be very many others like myself who think that a few words of thanks and praise are due to you. OM, and to the contributors and compilers for the magnificent stage of technique to which the finest of radio journals has been brought. It really is no mean achievement, and is, I feel sure, in large measure responsible for the rapid increase in membership of the Society. "O Floreat æturnum."

73, E. T. SOMERSET (G2DT).

CALLS HEARD.

By XG5SV, H.M.S. "Queen Elizabeth," c/o G.P.O., London. At Corfu, October 20-29.—ct1aa, cn8mop, d4abr, d4mfm, d4nuz, f8eo, f8ex, f8kwt, fm8eor, fm8ih, g2ax, g2by, g2ma, g5ml, g5pj, g5qy, g6tx, g6wt, on4fq, on4jj, ozli, pa0xd, pa0xps, pk4aj, st6hl, su8rs.

* * *

By G6RH, 5, Mostyn Avenue, Allerton, Liverpool.—14 M.C.: ct1aa, fm8cr, fm8ih, fm8lc, k4alk, st6hl, ve1am, ve2be, ev8aw, vk5ar, w1ae, w1aml, w1amq, w1aqd, w1au, w1axc, w1azd, w1aze, w1bmm, w1bwa, w1bxc, w1caa, w1cdx, w1cpb, w1fh, w1wv, w1zo, w2aif, w2arb, w2ary, w2bia, w2buy, w2bvd, w2cjx, w2qf, w3ajd, w3bph, w3gs, w8adm, w8avd, w8bbl, w8ben, w8bfo, w8bud, w8cjf, w8fz, w9lf, zl3ar. 7 M.C.: fm8bg, fm8cfr, fm8cr, fm8ih, st6hl, ve2bd, w1cpf, w1kc, w1lz, w1wz, w1zj, w2aja, w2aof, w3agf, w3sz, w4ft, w8baz, x3m, xx3bmd, zl2gq, zl3aj.

* * *

By ST6HL, at Khartoum, October 13-31.—On 14 M.C.: cm2ss, ct1aa, d4wao, d4wer, ei2b, ei2d, ei8b, ear39, f8cs, f8eo, f8ex, f8gb, f8gdb, f8gf, f8kwt, f8luf, f8pz, f8rex, f8ru, f8sh, f8whg, f8wrk, f8wrg, fm8cr, fm8eor, g2lz, g2nm, g2od, g2sw, g2vq, g5ml, g5pj, g5qa, xg5ud(?), g6dh, g6nf, g6rb, g6rm, g6ta, g6tx, g6ut, g6vp, g6wl, g6wt, g6xn, haf1c, haf8c, oh2nm, oh2og, oh3np, ok2op, on4au, on4fp, on4jc, on4jj, on4or, pa0qf, pa0qp, pa0xf, pk1cx, pk4aj, st2a, st2c, st3wt, su1aa, su8rs, vp9sr, vq2ba, vq2ty, vq3msn, vq4cre, vq4crf, vq4msb, vs3ab, vs7ap, w1aax, w1wv, w1zo, w2avw, w2ckr, w2cps, w2el, w2jn, w2zg, w3baq, w3dc, w4ft, w8cpc, w8dld, zs1b, zs1c, zs2c, zs4m, zs5w, zt1h, zt1t, zt5r, zt6j. 7 M.C.: au7kah, ap7ax, d4abg, eu2hs, f8by, f8ja, f8pr, g5bz, g6ta, i1hv, on4gn, oz7t, sp3ar, sp3bo, st3wt, yi2fy, yi6kr, w4akh, w4ft, w5zk, zc1s. On Nile River Steamer, "Victoria," Dongola to Merowe, October 1-8.—14 M.C.: d4aaz, d4wao, ei8b, f8bbd, f8cs, f8eo, f8fem, f8kt, f8cgb, f8pz, f8taj, f8whg, fm8eor, fm8smu, g2cj, g2gm, g2lz, g5qv, g6dp, g6hp, g6nf, g6up, g6ut, ka1cm, oh3na,

ok2kt, on4bz, on4fa, on4fp, on4fw, pa0ku, pa0xf, pa0zf, pk4ao, st2c, su8rs, su8wt, vp9sr, vq4msb, vs7ap, zs4m, zt1t, zt2b. 7 M.C.: ap7ax, au7kah, d4adb, eu6ac, eu9ac, f8ej, f8gq, f8kwt, f8prx, f8whg, g2by, g5by, g5pj, on4oj, on4or, pa0fp, su6sw, w4ft, w5acy.

* * *

By VO8MC on the 7 and 14 M.C. bands during October (via G5ML) :—g2ay, 2by, 2dh, 2dy, 2ma, 2nh, 2nm, 2nz, 2vq, 5bd, 5bj, 5ml, 5qy, 6dh, 6gs, 6hp, 6mz, 6nf, 6qb, 6wl, 6wn, 6wt, 6wy.

* * *

By VS7AL on the 14 M.C. band during October :—g2cx, 2vq, 6dh, 6vp, f8pz, 8wh, hc2jm, ok2si, pa0qe, pk4aj, vs3ab, vu2ah, vu2jb, vu5yo, zs2n, zs6y.

* * *

By VP9SR on the 14 M.C. band (September and October) :—g2cj, 2cx, 2gm, 2kl, 2nx, 2vq, 5ml, 5qv, 5yk, 6dr, 6gc, 6hp, 6nf, 6qb, 6vp, 6wn, 6wy, 6xg, 6xq, gi5nj, ei7c.

With two exceptions all were excellent signals, mostly T9. (No prize is offered for the detection of the offenders as it is felt that the South London gang would have an unfair advantage !—Ed.)

QRA Section.

New QRA's.

G2HZ.—N. I. Bower, Court End, Adderbury, near Banbury.
G2QG.—Ebbw Vale and District Radio Society. (Op. H. J. Gwillim, "The Mount," West Hill, Tredegar, Mon.).
G2QI.—D. Briggs, 24, Gaer Park Crescent, Newport, Mon.
G2QT.—Lieut. F. S. Benney, Wykham Hall, Lee-on-Solent.
G2RU.—H. C. Hall, 351, Eccleshall Road, Sheffield.
G2TK.—J. H. Wetherill, 30, Sculcoates Lane, Hull.
G2UB.—A. Boffey, Newtown, Westbury, Wilts.
G2US.—C. C. Mortimer, "The Grosvenor," Thornton Road, Thornton Heath, Surrey.
G2VZ.—H. W. Daly, 73, Castleton Road, Goodmayes, Essex.
G2WA.—F. W. J. Pigott, 180, Franciscan Road, London, S.E.17.
G2XY.—H. T. Littlewood, 82, Stainburn Crescent, Chapel Allerton, Leeds.
G5AW.—A. E. Wood, 102, Gracefield Gardens, London, S.W.16.
G5JK.—L. R. Harper, "Seafield House," Aberdeen.
G6BS.—B. M. Scudamore, 39, Owlstone Road, Newnham, Cambridge.
G6BU.—G. E. Bull, 64, Arthur Street, Ryde, Isle of Wight.
G6GW.—H. J. Gwillim, "The Mount," West Hill, Tredegar, Mon.
G6IS.—H. Higson, 99, Ashton Terrace, Stopes Brow, Lower Darwen, Blackburn.
2AAY.—J. R. Baker, 133, Trafalgar Street, Gillingham, Kent.
2ACG.—J. Oxley, 282, Easter Road, Leith.
2AJY.—H. C. Thornton, 181, Woodside, Todmorden Road, Burnley.
2AMV.—D. F. Waddington, 9, East Shrubbery, Redland, Bristol.
2AON.—J. G. Openshaw, The Square, Haslingden, Rossendale, Lancs.
G5RV.—R. L. Varney, 27, The Avenue, Sunbury-on-Thames, Middlesex (Station). Also 44, Marconi Road, Chelmsford, Essex.
G6IY.—A. Pacy, 36, Severley Road, Sarnehurst, Kent.

The following are cancelled :—G2ZV, 2AJT, 2AXN, 2BQF. M.W.P.

QSL Section.

It is fitting that at the end of another year we should look round and thank those people who have helped to give us the service that we expect from the QSL service. In the first place, our best thanks are due to Miss Gadsden, of the H.Q. staff, who works so hard and uncomplainingly at a job which is at the best of times dull and uninteresting. Miss Gadsden, as you know, looks after the "home" side of the section and sends out all the cards to British stations, in addition to her general secretarial work in the office, so you see that her job is not exactly a sinecure. BRS300 and G6QB also deserve thanks for many weary hours given to the section.

There have been quite a number of cases recently where sealed envelopes have been sent to the section for distribution abroad, and it seems that it would not be out of place to remind members that, owing to Post Office regulations governing the rate under which the cards are sent out, no sealed enclosures are allowed, and in consequence we have had to break open all envelopes arriving here for forwarding.

Another point that needs emphasis is that the section cannot entertain requests for cards to be forwarded at regular intervals instead of the present arrangement under which cards are sent out in batches as they arrive. The reason for this is that, in order to work efficiently, the section must have, and stick to, definite rules, and if exceptions are to be made for people who want special treatment, it means that a great amount of time is going to be wasted each day. We are naturally sorry that we cannot do everything to please everybody, but this is obviously impossible.

J. D. C.

NEW MEMBERS.

A. Powys-Lybbe, R. Signals Mess, Catterick Camp, Yorks.
James Blake (G5BC), 94, White Hart Lane, Barnes, S.W.13.
A. H. Garrett, Billocks, Green Street, Enfield Highway, Mddx.
E. F. D. Webb (BRS418), The Droveway House, Haywards Heath, Sussex.
W. J. T. Boyd (BRS419), 14, Warriston Crescent, Edinburgh.
J. A. R. Smith (BRS420), 46, Fountain Hall Road, Aberdeen.
G. H. Grossin (F8WHG), Savigny, Ardennes, France.
J. W. Ralph (BRS421), 1, Herschell Street, Anfield, Liverpool.
S. N. S. Mee (BRS422), Corner Cottage, Lutterworth Road, Leicester.
C. W. V. Oxley (BRS423), Mapplewells Inn, Sutton-in-Ashfield, Notts.
R. H. Dunn (BRS424), 47, Lowlands Road, Harrow, Middlesex.
J. C. Stannow (OZ7Y), Rungsted, Denmark.
P. L. Harbour (VS7AK), c/o Walker, Sons & Co., Ltd., Colombo, Ceylon.
S. Cook (BRS432), 2, Queen's Avenue, Snodland, Kent.
A. E. Berlyn (ST2A), Sudan Club, Khartoum, Sudan.

F. Pitkin (VS7FP), 4, Bawa Place, Cotta Road, Borella, Ceylon.
G. A. Martin (BRS431), 43, Tothill Street, Ebbw Vale, Mon.
G. F. Bloomfield (BRS430), 27, Belmont Avenue, Tottenham, N.17.
T. C. Jones (BRS429), 8, Wyndham Street, Barry, Glam.
C. Blackburn (BRS428), 40, George Street, Cleckheaton, Yorks.
D. A. G. Edwards (BRS427), 19, Gravelly Hill N., Erdington, Birmingham.
S. G. Gow (BERS13), No. 2 Cav. Bdr. Signal Troop, Sialkot, Punjab, India.
R. H. Nisbet, 27, Neeld Crescent, Hendon, N.W.4.
Wm. Backhouse, Waziristan District Signals, Wana, India.
S. H. J. Garne (BERS22), Wigton, Rozelle, Ceylon.
E. Gola (W1LK), 16, Becket Street, Dorchester, Mass, U.S.A.
W. E. Scott (BERS21), "Hoscottay," Somwarpet, N. Coorg, S. India.
H. Jakeman (ZL1CA), Progress Buildings, Huntley, Waikato, N.Z.
R. Keir (ZS6Y), Largo Colliery, Welgedacht, Transvaal.
A. F. N. Blackburne (2AJB), 11, Sea Road, Bexhill-on-Sea, Sussex.
E. A. Bramwell (BERS20), Rasagalla, Balangoda, Ceylon.
R. J. R. Mackenzie-Grieve (BERS19), c/o Assam Co., Ltd., Nazira, P.O., Assam.
W. G. Manson (VQ3MSN), "Ubiri Estate," P.O., Lushoto, Tanganyika.
J. F. Stanley (2BAJ), The Frith, Aldington, Mersham, Kent.
Rev. Br. W. P. Stoyles (VO8MC), Mt. Cashel School of Industry, St. John's, Newfoundland.
S. E. Ridgewell, 6, Ewelme Road, Honor Oak Road, Forest Hill, S.E.23.
S. G. Peeling, Druggist Arms Hotel, Bampton, Devon.
Miss E. M. Letemplier, Goblin Corner, Ruan Minor, Cornwall.
A. H. George, 41, West Church Street, Buckie, Banff.
S. G. King (BRS425), (ex-BERS5), 1, St. Germain's Cottages, Crofton Park, S.E.4.
F. E. Grainger (BRS426), Eagle Lane, Thorpe-on-the-Hill, Lincoln.
F. J. E. Dowsett (BRS433), 22, Willowbridge Road, Canonbury, N.1.
W. H. Hannaford, 85, Denzil Road, Willesden, N.W.10.
S. Riesen, (G5SR), 192B, Fulham Palace Road, Hammersmith, W.6.
W. E. Camp (BRS435), 3, Mansfield Place, Hampstead, N.W.3.
F. N. Hitchcock (BRS436), 98, Highfields, Dursley, Glos.
F. M. Caine (BRS437), 75, Warren Drive, Wallasey, Ches.
I. F. Meiklejohn (G5MI), Royal Signals Mess, Aldershot.
W. F. Moore (BRS438), 17, Lawn Road, Uxbridge, Middlesex.
W. A. Clark (2BXZ), 89, Laburnum Avenue, Garden Village, Hull, Yorks.
L. C. Lewis, 29, Kersley Road, Stoke Newington, N.16.
A. P. MacGrory (2BZH), 58, Kirk Street, Campbeltown, Scotland.
S. G. Turner (BRS439), 18, Valley Road, Shortlands, Kent.
R. J. W. Harvey (BRS440), Glinshisk, Deerpark Road, Cliftonville, Belfast.
A. E. Mitchell (BRS442), Northbrook Farm, Goring-by-Sea, Sussex.
H. P. Guerrier (BRS441), "Little Oaks," Christchurch Avenue, Finchley, N.12.

Scotland—(*Continued from page* 179.)

point of view, must be regarded as "super" was Saturday, November 22. At one time or another during the twenty-four hours covered by that date, stations in every part of the world were coming in at excellent strength. An outstanding instance on the 14 M.C. band was the wonderful strength of W6BAX who, during the afternoon, was seldom under R5. Canadian 4th District stations, which we seldom hear, were coming in in considerable numbers. Once again, this period of good conditions coincided with a rapid descent of the barograph to an exceptionally low point, and began to fall off immediately the "rise" commenced. Mr. Rowden (2ABL) has had a full licence issued by the G.P.O. and awaits his call. G2QO is temporarily out of action as he is at sea for a short time. I understand G2MG, our first Scottish amateur station, has got started up again, and I wish him luck. Once more there has been a gratifying influx of new members, and I sincerely hope it may continue. G6RG has been quite easily our most active station this month. He has qualified for his W.B.E. certificate; and it will be only a matter of days before the W.A.C. award is also due him.

Notice to Contributors.

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

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