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2NM MAKES A START—By Gerald Marcuse (See Page 205)

Popular Wireless

Every Thursday
PRICE
3d.

No. 278. Vol. XII.

INCORPORATING "WIRELESS"

October 1st, 1927.

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Contents

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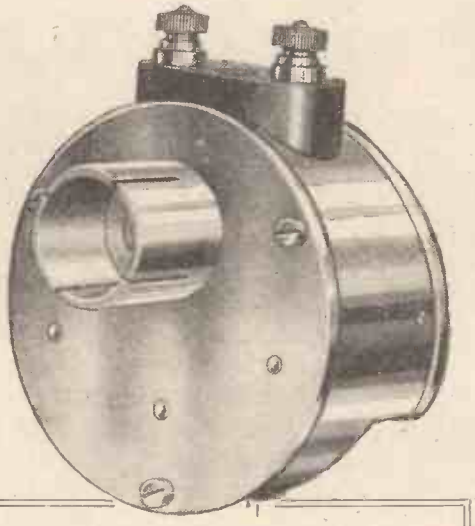

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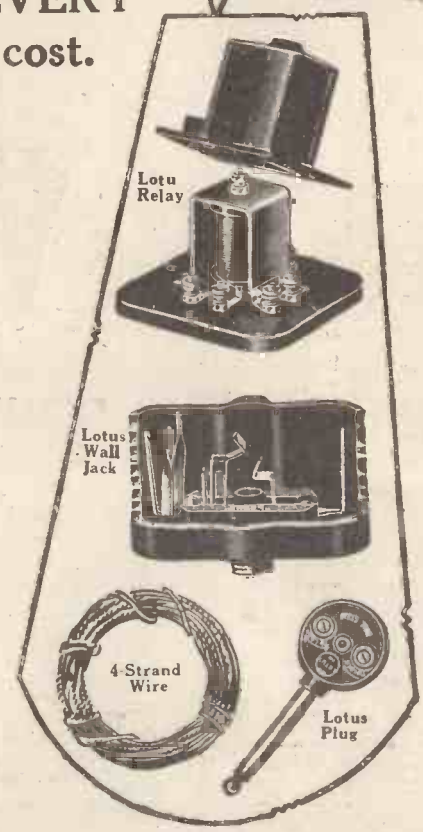

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Popular Wireless

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RADIO NOTES AND NEWS.

A Treat in Store—Justice For Birmingham—Try Our Wave-Trap—Indian Broadcasting—London and 5XX—A Television Society—A Word to the Wise.

A Treat in Store.

ABSOLUTELY not to be missed is Sir Oliver Lodge's new series of broadcast talks, "Pioneers in Astronomy," which began on September 29th. Sir Oliver is one of those geniuses who, like Tyndall, Huxley, Sylvanus Thompson, and Dr. J. A. Fleming, can clothe the dry bones of science with living flesh and make it glow with life. Added to this happy faculty he possesses the mysterious power of radiating his charming "personality."

Justice for Birmingham.

THE complaints from Birmingham (and district) listeners that they have been let down by the opening of 5 G B and the closing of their local station continue to be heard. Crystal users are the hardest hit, and, goodness knows, they cannot spare much aerial juice. I hope the B.B.C. will investigate this matter thoroughly, as the public does not want to enjoy 5 G B at the expense of a whole community.

Daventry Junior.

R. H. A. (Churwell, near Leeds), thinks I have unduly alarmed listeners by quoting Mr. P. W. Harris to the effect that 5 G B interferes with Langenberg. He gets Langenberg at full L.S. strength on a neutrodyne with no difficulty, and there is on his dial a silent band of 1½ divsions between it and 5 G B. On the other hand, he finds that 5 G B interferes badly with Aberdeen, and he loses Berlin altogether on 483 metres. As Mr. Harris is no raw beginner in manipulation, I can only suppose that direction and distance operate in favour of R. H. A.

Try Our Wave-Trap.

THIS is a convenient place in which to refer readers to Mr. Kendall's description of a wave-trap for use when receiving 5 G B, which is to be found in "P.W." for August 13th. A London reader (G. E. T.) writes of its virtues like a Poet Laureate. Living less than a mile from 2 L O, he gets 5 G B with a perfectly silent background. Of course he can! That is why we got Mr. Kendall to tell "P.W." ites all about it. We thank G. E. T. for reminding us of this.

New and Good Idea.

THE Munich Postal Administration now permits wireless dealers to instal radio sets in the houses of prospective customers for a week's trial, without insisting that the set be covered by a licence for that period. A commonsense rule, encouraging to trade, and one which might well be imitated here.

Mr. Marcuse.

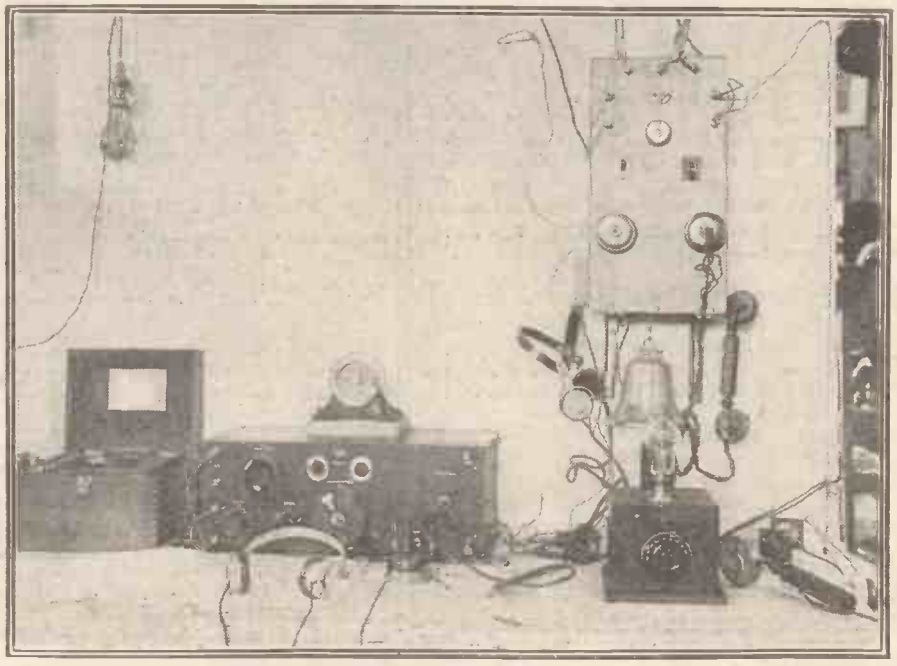
IN beginning his Empire broadcasting, Mr. Marcuse did not enjoy "beginner's luck." The breakdowns were the "deuce and all." But the subject of this note is experienced enough in radio to have acquired the professional radio engineer's philosophic mind. These things happen even to a Marconi. All electrical engineers subconsciously reserve a factor to account for the "Old Boy" which seems to inhabit their apparatus, and who, despite every precaution, bobs up when the show begins. In my opinion, Mr. Marcuse put up a fine performance—and I have studied all available overseas reports.

Accumulator Tests.

IF my grandma had known about that astounding young lady, Miss Violette Cordery, she would have been much more severe than she was about Aunt Sarah's swimming lessons. That particular flare-up seems to have occurred only a few years ago, and now here we have a "young girl" actually gallivanting round the world

(*Continued on next page.*)

BRITAIN'S AMATEUR BROADCASTER.



Some of the gear used by Mr. Marcuse in his experimental Empire broadcasts. From left to right can be seen the wave-meter, receiving set (with the microphone standing on it) and the control board and line output apparatus. An article by Mr. Marcuse appears in another page in this issue entitled "2 N M Makes a Start." (*Photo, "P.W." exclusive.*)

NOTES AND NEWS.

(*Continued from previous page.*)

in a "horseless carriage." She carried "Exide" accumulators which "never gave a second's trouble," says Miss Cordery. Hot or cold, rough or smooth, the cells did their job. And the Exide service all over the world was "charming." My own Exide stands the most cavalier treatment but is always "the little gentleman."

Indian Broadcasting.

NEWS in "The Times of India" shows that the Bombay station is heard satisfactorily, barring "atmospherics," from Simla to Colombo. The programmes show a brave attempt to serve English and Indian alike, as is only right. And I see that on August 1st, Colombo broadcast orchestral selections from *eight* Gilbert and Sullivan operas. Pity the B.B.C. can't do it!

Short-Wave Transmissions.

PCJJ will broadcast special transmissions on October 4th, 6th and 11th, at 17.20 G.M.T., and on October 13th at 0.3 G.M.T.

London and 5XX.

THE morning transmissions from these stations are as follows: Monday to Friday (inclusive), 2LO, 12 noon to 2 p.m.; 5XX, 11 a.m. to 2 p.m. Saturdays, both from 1 p.m. to 2 p.m.

Workshop Note.

W. V. T. (Kilkhampton) having seen in "P.W." how to make a keyhole saw from a hacksaw blade, has kindly sent us a fascinating little screwdriver made from a motor-cycle spoke. The business end is filed to shape and hardened, and for a handle the other end is bent over to form a loop, seized with wire, and soldered fast. I find that it will deal with screws in my set which hitherto only an eel could reach. This is a dodge well worth imitating.

Bolivia to Begin.

BOLIVIA is to have its first broadcasting station at La Paz, a five years' concession having been granted to a private contractor. Power, 1 kw.; minimum radius, 3,000 kms.! Sounds optimistic! Advertising matter is to be admitted for five minutes per hour, which is reasonable, as a station in Bolivia is not likely to be able to pay for even its rent unless it accepts ads.—cash with order. (*I believe yeh.*—ED.)

"Chang."

IN this film you meet—harmlessly—a number of the aristocrats of the jungle, besides monkeys, and at the Plaza (London) their authentic voices are caused to synchronise with the film at appropriate moments. This is done as a result of the co-operation of the Columbia Gramophone Co. and Graham Amplion Ltd., the first-named having made the records, which are reproduced by the Amplion Public Speech equipment. I am told that this arrangement adds vastly to the interest and thrills of the film.

Cores and Causes.

I READ in a weekly newspaper, "The H.T. battery is the very core of a set so far as absence from distortion is concerned," a sentence which is a perfect example of blither. But even if you are O.K. on H.T., you will find that there is always another core and *encore* a core. In fact, the set is all core—"so far as absence from distortion is concerned."

"Go Hon."

SIR RICHARD TERRY lecturing on music, is reported to have said that "the music which comes over the wireless is for the most part on the same intellectual level as the old 'penny dreadful'"! I bow before the intellect of Sir R. Terry and humbly inquire whether the compositions of Beethoven, Mozart, Handel, Brahms and Verdi are indeed as low as all that. Oh, Sir Richard! Let us drop this "superior" tone; the public is getting sick and tired of it. Besides, the public sees through it! Pose, my dear sir!

A New Terror.

AN assistant engineer-in-chief of the Post Office, so I hear, has stated that the P.O. is co-operating with the Marconi Company in automatically standardising the voice of the ordinary telephone subscriber in order to make it as perfect as possible for wireless telephony. Ye-es! but whose voice has been taken for the standard? That's what we want to know. Dame Clara Butt's, or Leslie Henson's, or Philip's (of Hyde Park Corner)? It matters!

Sublime to Mundane.

DID you ever? At the age of 40 the Rev. A. B. Grosvenor has relinquished his cure of souls for the cure of radio sets; he is now a "wireless doctor." But in case that profession should fail, he has another ready—that of conjuror and entertainer. Versatile sort of chap, I should say. I wonder whether he could shoe horses and calibrate thermometers in his spare time. An unique example of a parson who "knows the ropes" turning into a person who knows the wires.

SHORT WAVES.

The road repairing work in Piccadilly is to be broadcast. It is rather unnerving to think that the remarks of a workman struck on the thumb by the hammer of a careless comrade may be heard in a million happy homes.—"London Opinion."

* * *

The Radio Commission makes two stations share time on the air on the same wave. Stations not so particular about the programmes they give become mighty particular about the company they keep.—"Radio World."

* * *

A USELESS LOUD SPEAKER.

Mr. Newlyrich (proudly exhibiting latest purchase): "My dear, here's a little present for you—a French loud speaker; isn't it a beauty?"

Mrs. Newlyrich: "Whatever made you go and buy that thing, James, when you know I can't understand a word of French?"

* * *

Ad. inserted by wireless enthusiast in matrimonial column:

"Young man of good component parts wishes to meet refined loud speaker. She must be interested in the ohm. Only those of A class station in life need apply, and preference will be given to short-waves style of hairdress."

* * *

A seaside boarding-house advertises that every bed is equipped with wireless. A returned holiday-maker says that his bed was very wireless, judging by the lack of springs.—"London Opinion."

* * *

Miss B.: "On what grounds did she sue for divorce?"

Miss C.: "Cruelty; her husband compelled her to use a 1922 radio set."

* * *

"The wave-band is CROWED into 100 divisions on the ordinary receiver," we read in an American journal.

It is suggested that all roosters should be muzzled in future.

* * *

This week's Great Thought:

A valve in the country is worth two in the city.

A Television Society.

THE "Television Society of Great Britain" has been formed. It has forty-five members, all belonging to the British Association. I only hope something will come of it. My experience has been that the amateurs have been hard on the heels of the commercials, but that the commercials have generally done the heavy work. Thus I expect that the new society will always be one jump behind Mr. Baird. However, television needs encouragement, and I rejoice at the advent of the society for the improvement of "eagles' eyes."

A Reassuring Statement.

IN his book, "The Post Office," Sir Evelyn Murray, K.C.B., who is the Secretary of the Post Office, says: "Unless driven to intervention on major issues by Parliamentary action, the functions of the Postmaster-General will practically be limited to providing the Corporation with revenue and deciding upon any application for the licensing of new broadcasting stations which the Government may submit." That is quite in order. We should not expect the P.O. to be able to provide anything besides revenue—unless it were regulations.

A Word to the Wise.

OVER eighty pages of excellent matter for sixpence. That is the "Wireless Constructor," and this month's issue is better than ever. It is a special Exhibition Number, but includes "constructional" articles on five new sets. Capt. Round writes about the wonderful new shielded valve and the Editor introduces a specially selective two-valver. There is described also a novelty in the shape of a "knobless" three-valver. If you don't know what to do this winter, the "Wireless Constructor" will show you.

Brain-Storms at Birmingham.

I UNDERSTAND that during this month a meeting of Midland licensing authorities will be held at Birmingham to discuss the policy in regard to radio sets in public houses. Many applications to instal sets are refused. Surely, if anything could possibly relieve the dreariness of the average "pub," it ought to be encouraged. Are the authorities afraid of keeping people out, or keeping them in? And, if yellow-haired bar-queens with shrill voices and sparkling repartees are permitted, why not broadcasting?

Little Denmark.

THIS country has a population of only 3½ million people, but of these no less than 50,000 hold receiving licences, of which 35 per cent are for valve sets. Denmark boasts four broadcasting stations, Copenhagen (337 m.), Soroe (1154 m.), Odense (810 m.), and Ryvangen Radio (1,154 m.). Soroe is to be replaced by an 8 kw. station at Gisseloere (Zeeland), probably working on 337 metres.

ARIEL.

2 NM MAKES A START

by Gerald Marcuse

SINCE my last article appeared in POPULAR WIRELESS considerable developments have taken place in connection with my Empire broadcasting experiments. My first concert broadcast to the Empire was given at seven o'clock on the morning of September 11th in a studio kindly lent by the Columbia Gramophone Company. Six well-known Australian artistes were kind enough to offer me their services as a contribution towards the programme, and addresses were given by Sir Granville Ryrie, the High Commissioner for Australia, and Captain Ian Fraser, M.P.

Of course it never rains but it pours, and my first transmission seemed to annoy the Fates, for the generator broke down, which occasioned a delay of fifty minutes until a change over to the electric house mains was made. I found this alternative supply not so satisfactory as I had hoped, and, further, the delay made the time of the transmission much less favourable. Transmissions should have commenced sharp at 7 a.m. and finished at 8 a.m., but owing to the breakdown we did not get through the programmes until nine o'clock.

Gratifying Results.

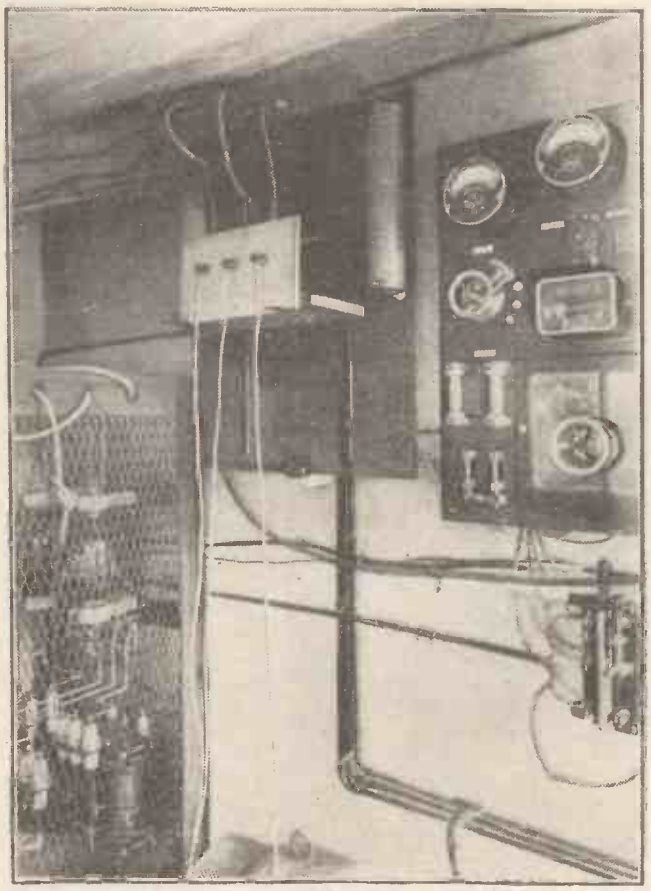
However, on the whole, I think results have been gratifying, for I have received a cable from Australia stating that the first part of the concert, in particular Captain Ian Fraser's speech, was received quite well. The transmission was on a wave-length of 32·5 metres, and a Post Office line acted as the connecting link between the London studio and Caterham.

It may interest the more technical of my readers if I describe the apparatus now being used at 2 N M. In all, thirty valves are used for practically each transmission from my experimental station. The transmitter is driven by a 130-metre crystal, followed up with two stages of doubling, which, in turn, drive the first magnifier, then a second, and finally the main magnifier, each amplifying stage being neutrodyned.

The whole of the drive is contained in a screened compartment. Ordinary choke-control modulating system is used, and the input from the line transformer is coupled straight to the filament and grid of the sub-control valve. A private line has been installed between the transmitter and the receiving station, about half a mile away, which is in charge of my assistant, Mr. Percy Valentine. In the control-room there are various microphone amplifiers, line amplifiers, and the modulation meter.

The aerial system used is one which has not been really developed yet to any great extent in this country, but it has caused us a considerable amount of interest and excitement. It is what is known as the Zeppelin type of aerial. It can either be operated at the full wave-length or at half-wave; and I should say it would be a very satisfactory aerial to use for anyone transmitting on 23 and 46 metres, as it can quite easily be changed from one to the other, using the same aerial with the same degree of efficiency.

The only trouble was that the feeders seemed to be very critical, and we found that by raising the aerial at the lead-in end and strengthening the feeders, the whole circuit had to be balanced up again to meet this change. But if one takes care over the measurements, so that the feeders do not resonate on the actual wave, or the harmonic of the main wave, there is no trouble in working the aerial, and it is quite easy to balance both feeders in order to get an equal feed in both.



The charging board and rectifiers installed in the power house at 2 N M. Note the H.T. leads (left) and the power-feed cables. (*Photo, "P.W." exclusive*).

From the results obtained up to the present, this aerial has proved on the whole most efficient. Considering the power I am using, reports have been really most gratifying. Needless to say, the chief point in my experiments is to determine the most suitable hours for transmission to the Colonies and other parts of the British Empire. Owing to the difference in time, this has caused me a good deal of worry, and my experiments are being carried out with a view to finding the audibility periods in various parts of the Empire.

Good Reports.

It is a curious fact, and one which I have noticed for the past few years whilst carrying out experiments with Australia and New Zealand, that these countries, having once chosen the right times, are the easiest with which to conduct radio-telephony tests, and in cases where efficient

(*Continued on next page.*)

2 NM MAKES A START

(*Continued from previous page.*)

receivers have been used at the other end I have had nothing but good reports.

I have had a good many requests lately to reduce my wave-length to the region of 28 metres, owing chiefly to interference on the 32-metre band; but I have also had some interesting reports to the effect that, although 32 metres is a good wave-length, 30 metres seems to be better for obviating night distortion and fading, and it will be interesting proof of the value of these experiments if this turns out to be correct.

Concerning the Programmes.

I am glad to say that the Postmaster-General has been kind enough to grant me the necessary permission to use a wave-length of 28 metres, and as soon as the new crystal for the transmitter is ground I hope to work on this wave-length.

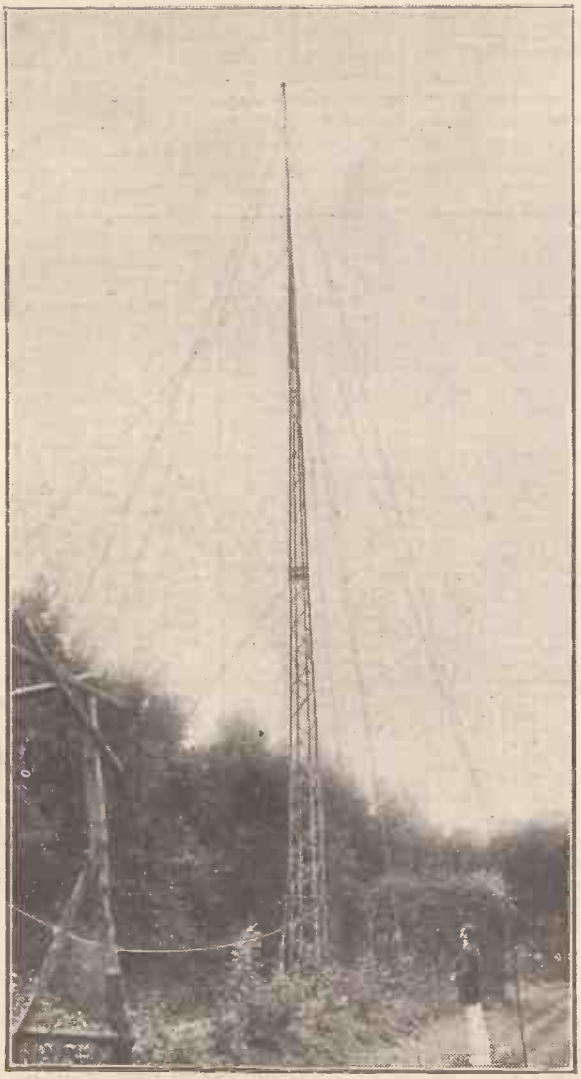
By the way, I am afraid I rather misled my readers in my last article about the arrangements being made to give published programmes of artistes who are being kind enough to help me. It turns out that my licence does not cover this, although I am hoping the Postmaster-General will eventually consent to a little more latitude in this matter. I make this statement because I have been inundated with offers from artistes who have been kind enough to show their keenness and patriotic feelings in offering their services free of charge in order to assist in entertaining enthusiasts in more distant parts of the Empire.

I feel I shall have better luck next time. Of course, one of the difficulties is that I cannot afford to duplicate and triplicate my transmitting apparatus, and that was the reason why fifty valuable minutes were lost when the breakdown occurred. However, I am hoping that, subject to the Postmaster-General's approval, I shall yet be able to complete the uncompleted portion of the programme at some early future date. Reports to hand indicate that the part of my programme picked up by Sydney and relayed by that station was also well heard in New Zealand. The actual cable I received from the Sydney station ran as follows:

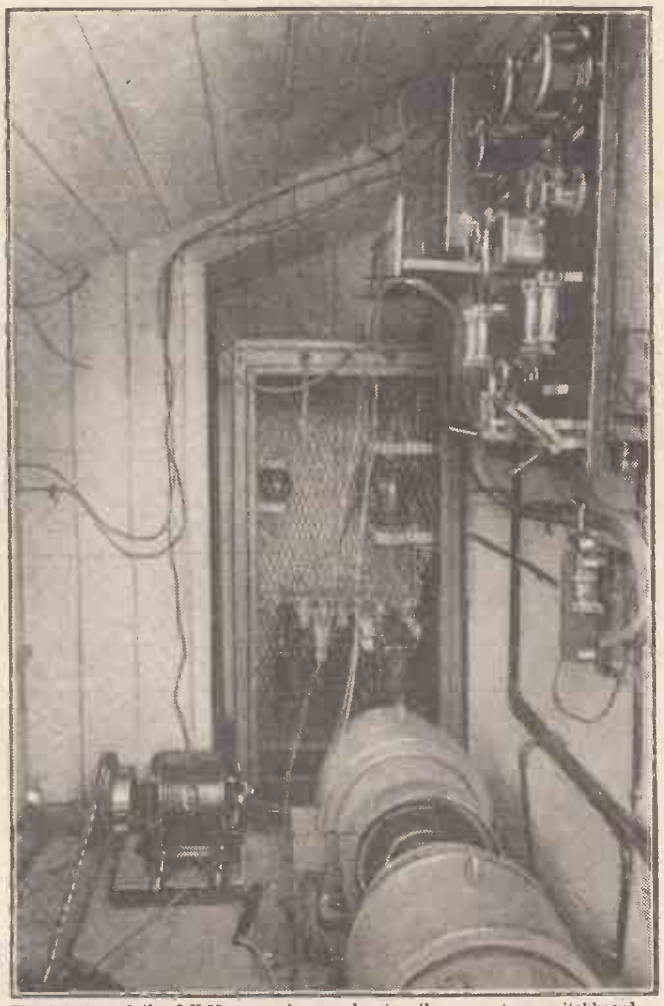
"2 F C rebroadcast until you disappeared. Fraser's speech good. Congratulate you. Deeply regret your difficulty completing programme."

Curiously enough, as my readers probably know, the day before the transmitter had been working O.K. for hours, and Australia had reported excellent reception, so that I really felt optimistic.

But of this I am certain: that my transmitter is capable of getting across despite the fact that I am using only one-fifth of the power of Daventry. This is proved by the fact that I have had a message from an amateur near Dunedin, New Zealand, reporting speech from 2 N M clear, and also Captain Fraser's speech.



Mr. Marcuse examines his aerial. This photograph gives some idea of the height of the mast, which is erected in the garden of the Caterham house. (*Photo, "P.W." exclusive.*)



The interior of the 2 N M power house, showing the generators, switchboard, and rectifying valves. These last can just be seen through their protective wire netting. (*Photo, "P.W." exclusive.*)

TRANSATLANTIC TEST TRANSMISSIONS

The Editor, POPULAR WIRELESS.

Dear Sir,—It may interest you, also many of your readers, to know that at 3 a.m. on a recent Monday morning the General Electric Co.'s short-wave station, working on 22 ·02 metres, announced that at midnight, New York time, they would carry out an experimental transmission, using 100 kilowatt.

These experiments are to be tried for a month apparently at the same time each evening (or morning).

Statement was made that it was the first time that such power has been attempted, and reports would be most useful for the engineers. Reports should cover the three points—modulation, strength, and reliability.

With such enormous power at the transmitting station I feel that there is every possibility of the station reaching out across the Herring Pond, and reports from this side would be more than useful to the organisers of the trial.

Unfortunately, they did not announce on what wave-length they were to broadcast, so on this point I cannot help. Most likely it will be on their standard wave—around 300 metres, I think.

Permission had been obtained from the Federal Commission to carry out the tests, and I pass on the information for the DX fiends, of whom we have a few on this side. Here is one more opportunity for them to help in the advancement of the radio science.

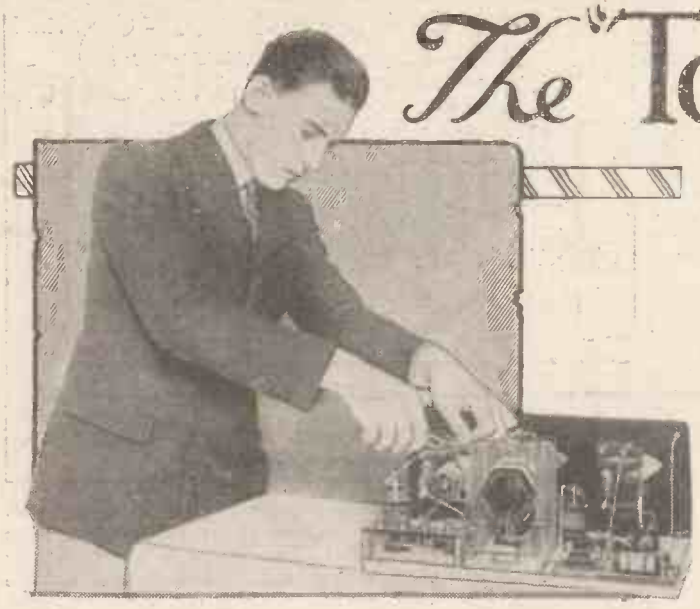
This may start the ball rolling in the respect of listeners, and perhaps you could get further information direct.

Best wishes to "P.W."

Yours truly,

Wood Green, N.22. G. E. BAKER.

The "Tourist" Two



A selective receiver capable of effective long distance reception. As in the case with all "P.W." sets it has been thoroughly tested by the "P.W." Research Department and passed as being really sound in all respects.

Designed and described by GEORGE T. KELSEY.
("P.W." Technical Department.)

NOW that the winter is approaching, or perhaps in view of the past season, it would be more appropriate to say the dark evenings, attention is being focused to a much larger extent upon sets capable of "reaching out" for distant stations. (However satisfied one may be with the programmes provided by the local station, there always is a special thrill experienced when listening to a "foreigner." Whether the language can be understood or not does not seem to enter into it.)

To be able to do this a receiver a little more sensitive, and (what is of greater importance) one that is more selective than the average "local" set is really necessary, and the two-valve set illustrated on this and following pages has been designed to enable the local station to be "closed down," and it is sufficiently sensitive to bring in quite a host of other stations.

It need not be emphasised that in the majority of receivers, the attainment of real selectivity is of necessity accompanied by a loss of signal strength. In the present receiver the balance between selectivity and signal strength is within limits variable, thus, by altering the tapping point on the H.F. transformer, it is possible to obtain the maximum signal strength from distant stations with just a sufficient degree of selectivity to eliminate the local.

As to results, a brief report is given at the end of this article, but in short the set is capable of "going the rounds" of a large number of British and foreign stations under average conditions. It should be pointed out that the set is not intended for loud-speaker work, but simply for the reception of distant stations on the telephones.

The receiver is really quite simple to operate, and although there are three tuning dials on the panel, the centre one of these is merely a reaction control, thus, strictly speaking, there are only "two knobs to turn" at once.

Since the set is a little different from the popular "H.F. and Det." arrangement, a few remarks about the circuit will not be amiss.

As those readers able to understand theoretical diagrams will have observed, the set consists of one neutralised H.F. valve followed by a grid-leak detector. Neutralisation is obtained by means of a centre-tapped grid coil, one end of which is connected through the neutralising condenser to the anode of V_1. The centre-tapping is taken through a resistance to the filament, and this particular method, which is, I believe, a patent of Standard Telephones and Cables, Ltd., is to obviate parasitic oscillations.

"Reinartz" Reaction.

The intervalve coupling, which, as has been stated, enables a variation of selectivity, is home assembled, and a screen is placed around it, not so much with the idea of eliminating "direct pick-up" as to prevent as far as possible inter-action between the H.F. coil and the other windings in the set.

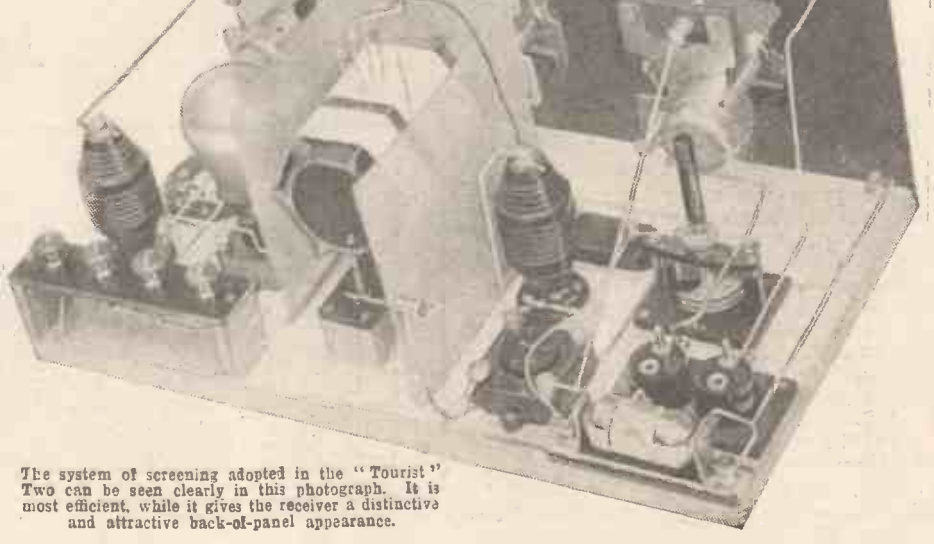
Reaction is obtained on the Reinartz principle, and, to my way of thinking, the use of reaction is necessary with a receiver

(Continued on next page.)

WHAT YOU WILL NEED.

- 1 Panel, 16 in. × 7 in. × ¼ in. (Becol).
- 1 Cabinet and 9 in. baseboard (Artcraft).
- 2 Friction drive, square law variable condensers, ·0005 each, with dials (Ormond).
- 1 Ordinary square law variable condenser, ·0002 (Ormond).
- 2 Anti-microphonic valve holders (Benjamin).
- 2 Baseboard-mounting coil holders (McMichael).
- 1 Neutralising condenser (Peto-Scott).
- 1 Wire-wound anode resistance and base, 100,000 ohms (Varley).
- 2 H.F. chokes (McMichael).
- 1 30 ohm variable resistance, baseboard-mounting type (Lissen).
- 1 Fixed condenser, ·0003 (Dubilier).
- 1 Fixed grid condenser, ·0003, and leak, 3 meg., with special series clip (Dubilier)
- 2 Four-inch lengths of 3-in. diameter ribbed ebonite former (Becol).
- 1 Piece of ebonite, 5½ in. × 1¼ in., and 4 large "W.O." type terminals.
- 1 Piece of ebonite, 4¾ in. × 1¼ in., and 3 valve sockets.
- 4 Nickel type W.O. terminals.
- Sundry pieces of wood, screws, piece of perforated zinc, or preferably copper, Glazite for wiring, and a tapping clip.

Note: The above were components actually used. Other good makes can be employed instead if desired.



The system of screening adopted in the "Tourist" Two can be seen clearly in this photograph. It is most efficient, while it gives the receiver a distinctive and attractive back-of-panel appearance.

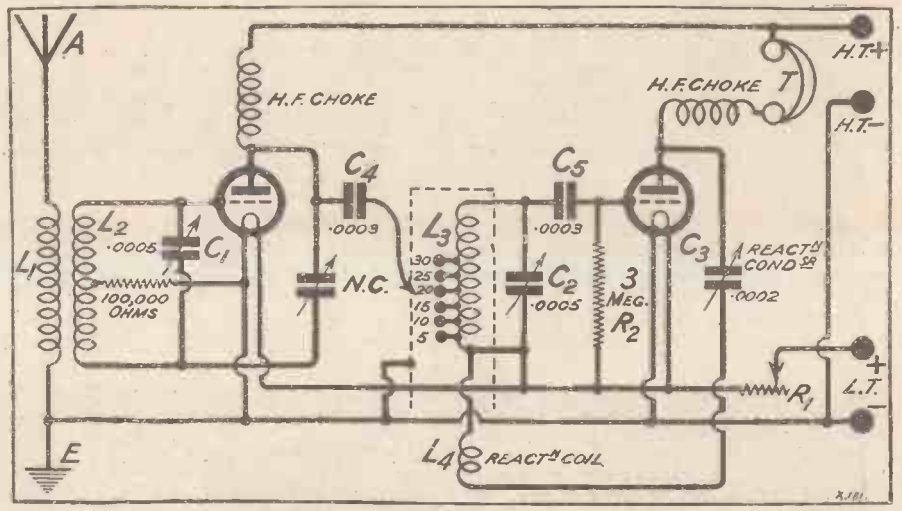
THE "TOURIST" TWO.

(Continued from previous page.)

of this nature if really satisfactory results are to be obtained.

Little more remains to be said about the circuit arrangement, and it is intended to devote the rest of the article to the construction and operation of the receiver.

It should be pointed out that, although the set is not perhaps quite so simple to construct as one in which ready-made coils are used throughout, yet for all that it is by no means difficult. For instance, the back-of-panel photographs show that the only novel component used is the screen. This is quite easily prepared at home from perforated zinc or preferably copper.



Drilling the Panel.

Having obtained all the components—a list is given elsewhere—take first of all the panel, and mark it out to conform with the diagram shown below.

It will be observed that no provision has been made in the drilling diagram for panel brackets. These can, of course, be used if desired; but in the original set a reasonably thick baseboard was used, and apart from the wood screws along the base of the panel, no additional support was found to be necessary.

The "Tourist" Two makes a very handsome cabinet assembly, as this photograph shows.

When drilling the panel, especially if it is of the polished variety, a sheet or two of soft paper should be placed between the ebonite and the drilling board to prevent the surface from becoming scratched. This may seem a somewhat obvious precaution to take, but is worth mentioning because neglect of it may spoil the set's appearance.

A Good Fit.

I have always found it best to secure the panel to the baseboard before mounting the components on it. By doing it this way a square fit is much more likely to result.

Incidentally, great care should be taken to see that the lower edge of the panel becomes absolutely flush with the bottom of the baseboard, otherwise it may be found that the finished job will not fit into the cabinet.

The stage has now been reached when the components can be screwed into position, and first of all the condensers on the panel should be secured.

Before such things as valve holders, H.F. chokes, etc., are finally fixed, it is advisable to make the two small platforms—one for terminals and the other to hold the H.F. coil. The sizes of these small panels are given in the list of components, and it only remains to say that the platform for the coil is mounted one inch off the baseboard, while the terminal strip to enable soldered connections to be made underneath it is one and a half inches high. Security is obtained by passing long thin wood screws from the underside of the baseboard into the wooden end pieces.

As to the placing of the valve legs into which the H.F coil is plugged, dimensions are given on the back-of-panel diagram. From this same diagram the exact layout of the components can also be obtained, and it is advisable to follow this as far as possible.

There is just one other point in the mounting of components which calls for elucidation. The two single-coil mounts should first be fixed to a strip of ebonite, as the final securing is then greatly simplified.

Securing the Screen.

The perforated zinc screen (or preferably copper if it can be obtained), can be cut to shape with a pair of scissors, but take warning and do not use the dress-making scissors, otherwise this part of the construction is liable to cause quite an amount of trouble! The screen is approximately 5½ in. x 14 in. and it should be bent to shape as shown in the wiring diagram.

The screen is held in position on the baseboard by means of a few small brass wood screws.

Wiring Up.

The next step in the construction, and, incidentally, the one at which quite a number of people fail, is the wiring of the receiver. This should be well spaced, particularly at the H.F. end of the set, and all leads should be kept reasonably short.

Here, again, it is recommended that the original be followed as far as is possible from the drawings and photographs.

To enable the set to be neutralised by the silent point method, a flexible lead terminating in a spade tag is used for connecting the filament of V_1 to L.T. negative. Although this method of neutralising is useful for roughly determining the setting of the neutralising condenser, the most reliable method is a little more complicated, and will be explained at a later stage.

Making the Coil.

For the construction of the special H.F. coil about ¼ pound of No. 24 D.C.C. wire, three valve pins, and one of the ribbed formers are required. Scribe a centre line on the former between any two adjacent ribs, and on this line mark the drilling centres for the three pins. The spacing of the pins should be exactly similar to

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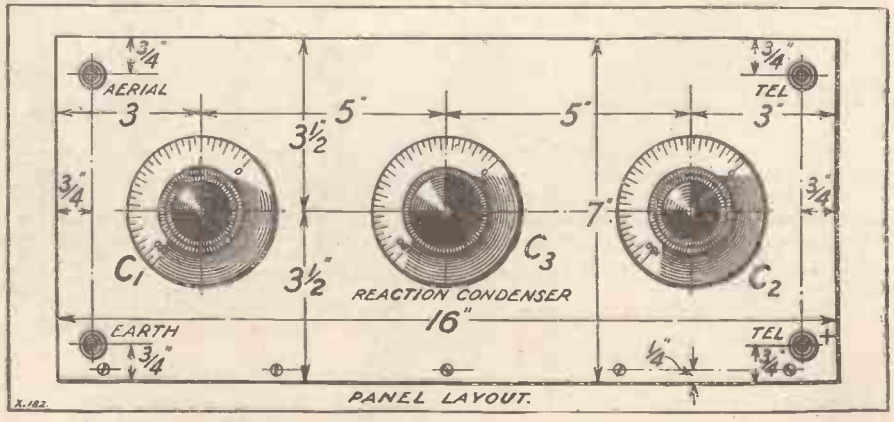


THE "TOURIST" TWO.

(Continued from previous page.)

that of the legs into which they have to be fitted.

Having determined the positions, proceed by drilling the holes, after which the pins can be fitted.

The grid winding (L_3) should be attempted first, and this consists of 55 turns of No. 24 D.C.C. tapped at 25, 30, 35, 40, 45, and 50 turns. Secure one end of the wire to the grid pin of L_3, and wind on 25 turns. This point reached, make a tapping and continue the winding, making a tapping at every five until 50 turns in all are on the former. Now wind on another five turns, and finish the winding off by securing it to the centre pin.

There are various ways in which the tappings can be made, and in the original it was found most convenient to make a loop by twisting the wire together at every tapping point.

For the reaction coil, secure one end of the wire to the centre pin, and, taking care to keep the winding in the same direction as the grid coil, place on the former 35 turns, at the end of which the wire should be secured to the remaining pin.

This latter winding must be started as close as possible to the centre pin, otherwise it will be found impossible to get 35 turns into the space.

Valves to Use.

With the set completed, the next item to receive consideration is with regard to the valves to use.

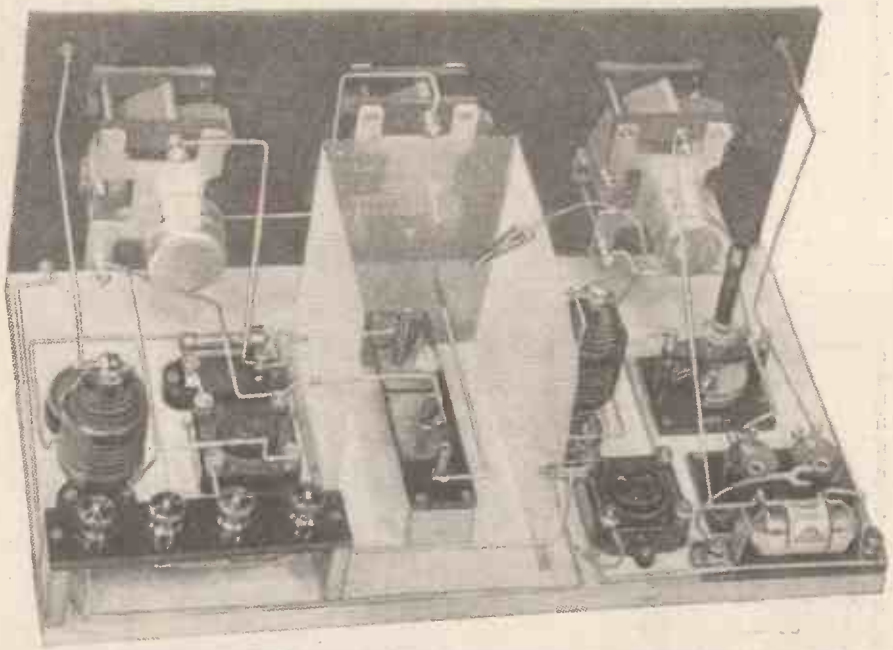
Since an H.F. choke is used in the anode circuit of the first valve, a high-impedance valve is to be recommended, and in the original tests an R.C. valve was found to give louder signals than one of the H.F. variety. Amongst those tried with good results may be mentioned the D.E. 5 B, P.M. 5 B, and Cossor 410 R.C.

To obtain smooth reaction control a valve of the H.F. type is to be preferred for detection, and the D.E. 8 H.F., P.M.3 H.F., and Cossor 410 and 610 H.F., all gave good results in this position.

Strength and Selectivity.

Having decided upon the valves, connect up the batteries (about 60 to 80 volts H.T. should be sufficient), and insert a No. 35 or 50 coil in the L_1 socket and a No. 60 or 75 centre-tapped coil in the remaining holder. The flexible lead from one side of the 100,000-ohms resistance should next be connected to the centre tapping on the grid coil.

For the first tests the clip should be attached to the 30-turn tapping on the H.F. coil. This will give the maximum signal strength but the minimum selectivity. Now, with the filament resistance nearly "all out" set C_1 and C_2 to minimum, and slightly readjust each until the two circuits are brought into tune. This condition will be found by a certain "liveliness" in the telephones. Keeping the two circuits in tune, slowly rotate the two condensers (C_1 and C_2) simultaneously until the local station is heard. Leaving the set tuned to this station, disconnect the flexible lead to one of the filament terminals on V_2, whereupon you will probably still be able to hear the local station, but this time very much weaker. To neutralise the set, rotate the neutralising condenser until a setting is found where the faint signals disappear or almost disappear.



It is well worth while carrying out the back-of-panel work neatly and exactly as described by the author, for, besides ensuring efficiency, the result will be a set the amateur will be proud to show his radio friends.

Testing for Oscillation.

This setting found, the flexible lead can once more be replaced, and the next thing is to make quite certain that the set will oscillate.

To do this, keep the two circuits in tune, but *not* on the setting of the local station, and increase the capacity of C_3 until a "rushing" sound is heard in the telephones.

The change to this condition should be very gradual, and if it goes into oscillation with an unpleasant "plop," then decrease the H.T. value until the change is quite smooth.

Now follows the most pleasant part of the testing—that of trying out the set's capabilities on stations other than the local. Should the local station be heard over a comparatively large part of the tuning dials, then alter the tapping on the H.F. coil step by step until the local is fairly sharply tuned.

To neutralise, set both the reaction and neutralising condensers at minimum (plates all out), and bring the two circuits into tune, whereupon it will probably be found that the receiver is oscillating. This being the case, slightly readjust the neutralising condenser until the set becomes stable.

The reaction condenser should next be rotated until the set once again commences to oscillate, and once more adjustment of

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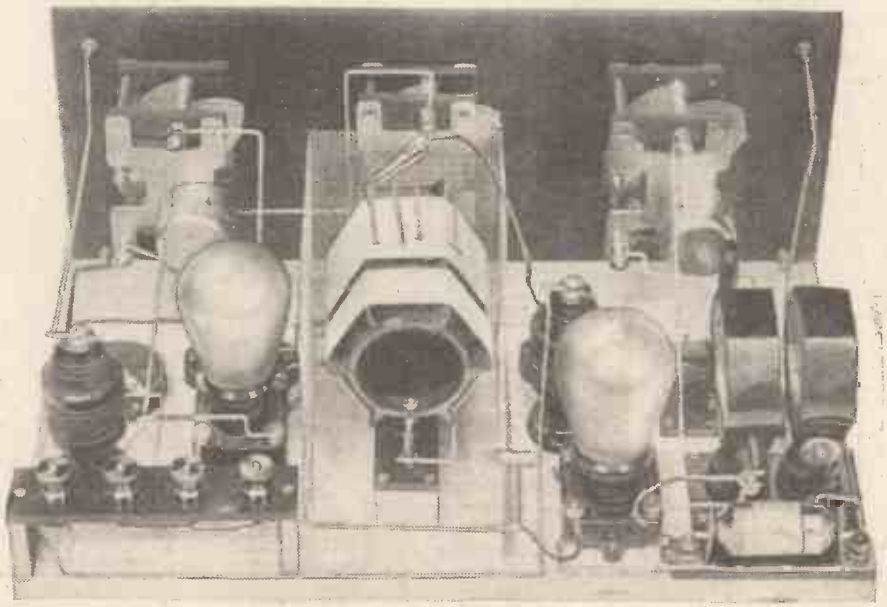


Here are shown the valves and coils in their respective positions. Note the tapping clip with which various degrees of selectivity can be obtained.

THE "TOURIST" TWO.

(Continued from previous page.)

the neutralising condenser should be made until stability is obtained.

After several adjustments similar to the above, a setting of the neutralising condenser will be found where slight readjustment of the neutralising condenser in either direction will make the set go into an oscillating condition, and it is at this setting that the receiver is correctly neutralised.

Using an average aerial at a distance of about ten miles from 2 L O it was possible during darkness to tune in quite a number of British and foreign stations.

Other than the local, 5 G B, Bournemouth, Manchester, and one or two other unidentified British stations were heard at quite reasonable strength.

From overseas, Langenberg, Hamburg, Toulouse, Frankfort, and a whole host of unidentified German relay and French stations were all received very distinctly

WIRING IN WORDS.

Aerial terminal to one side of L_1 coil socket.

Remaining side of L_1 coil socket to "Earth" terminal, one side of 100,000 ohms resistance, and also to one filament tag of V_1.

One side of L_2 to one side of neutralising condenser and also to moving vanes of C_1.

Other side of L_2 to grid terminal of V_1, and also to fixed plates of C_1.

Remaining filament tag on V_1 to one filament tag on V_2, and also to one side of variable resistance R_1.

Other side of variable resistance R_1 to L.T. +.

Anode terminal of V_1 to bottom contact of first H.F. choke, to one side of C_4 and also to remaining side of neutralising condenser.

Remaining contact on first H.F. choke to "H.T. +" terminal.

A flexible lead should be connected to the remaining side of C_4, the remote end of which is connected to a tapping clip.

Top socket on L_3 L_4 coil base to one side of grid condenser C_5, and thence to fixed plates on C_2.

Other side of C_5 (which is also connected to one side of grid leak R_2) to grid terminal of V_2.

Remaining end of grid leak R_2 to filament positive terminal on V_2.

This same terminal is also connected to centre socket on L_3, L_4 coil base, and to moving vanes of C_2.

Remaining socket (nearest back edge of baseboard) to moving vanes of reaction condenser C_3.

Anode terminal of V_2 to one side of second H.F. choke, and also to fixed plates of reaction condenser C_3.

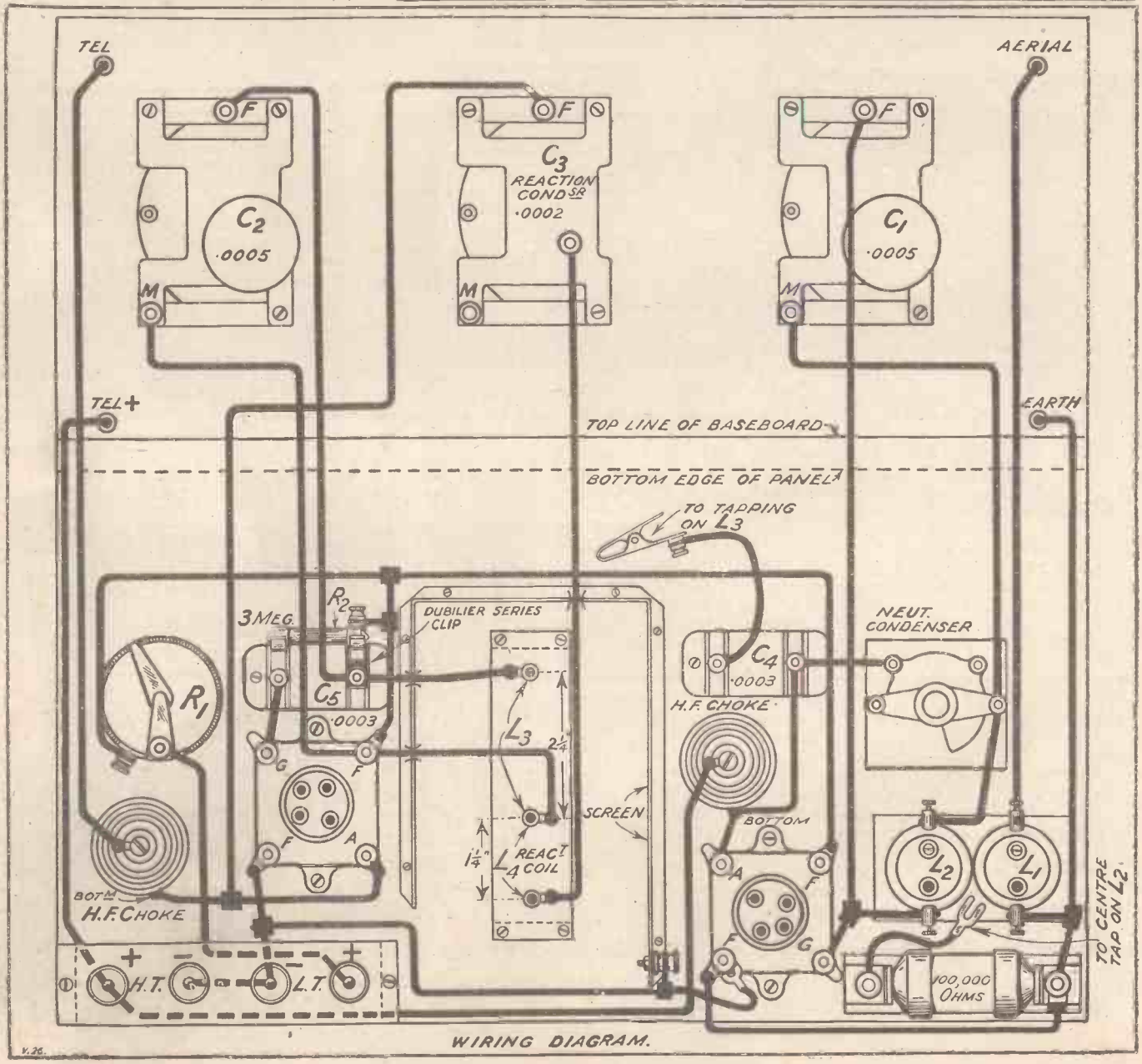
Other connection on second H.F. choke to one telephone terminal.

Remaining telephone terminal to "H.T. +" terminal.

Remaining filament terminal on V_2 to "L.T. −" terminal and also to terminal on screen and to H.T. neg.

A flexible lead is taken from terminal on screen to filament negative terminal on V_1.

Another flexible lead is connected to the remaining side of 100,000 ohms anode resistance. The remote end of the flex terminates in a spade tag.



WIRING DIAGRAM.

The "TELEVISOR"

An interesting interview with Mr. Baird, the television experimenter. By LESLIE W. A. BAILEY.

SOME years before the war the son of a Presbyterian Minister in Scotland came across "The Boy's Book of Sports and Pastimes." His imagination was fascinated by an article in the book on how to make your own telephone.

The instructions told you to buy a pill-box of a certain size at the nearest chemist's shop. John Baird, as the boy was called, went to the nearest chemist, in fact, he went to every likely shop in the district, but he failed to obtain a pill-box of the correct dimensions. Since then he has learned that no pill-box was ever manufactured in that size!

He succeeded in making his telephone, however, and in making it work.

"That was the beginning of my downfall," remarked Mr. Baird jocularly, when we had lunch together in Leeds during the meeting there recently of the British Association for the Advancement of Science. As the world knows, John L. Baird, the boy who searched his little world for a pill-box, is now one of the foremost television investigators.

Early Adventures.

Continuing his reminiscences, Mr. Baird remarked that he seemed to have been doomed to put his poor self against the great trusts and combines. (At present, by the way, he is having trouble with some of the very powerful and autocratic American electrical companies, whom he alleges to have poached on some of his patents.)

"My home telephone came to end," he said, "owing to a gale and a cabby. The gale caused my telephone wire, which stretched across the road, to slacken one night. The cabby drove into it. The wire took him under the chin and he was pitched off. Next day an official of the National Telephone Company, who then controlled the telephones, called at my home and said they could not allow this rivalry."

Such dry humour was not what one had expected of the television scientist, but he is actually a very human person, quiet and cultivated in conversation, a man who knows his subject thoroughly, and a scientist of imagination and initiative rather than a man of business. But he now has a company and capital behind him. Television is to be developed in this country on businesslike lines.

We discussed the important developments anticipated, but first let me add one or two further (hitherto unknown) incidents in what Baird calls his "downfall."

"Baird's Reaper and Binder."

After the telephone came the purchase of a motor-cycle for five pounds. This was known in the district as "Baird's Reaper and Binder."

"Baird's Folly" was a further landmark in his career, but this must have been something unusually fearsome, for I was unable to learn more than its name. Baird's activities have been—and are—so much in spheres beyond the comprehension of the man in the street, that he has acquired a reputation for wizardry. Had he lived 200 years ago he would certainly have been burnt.

During his early television experiments in London, there were many rumours in the offices below his rooms of the black magic that was going on above. One day, as Baird was using as a "sitter" for his televisor a ventriloquist's doll of fearful appearance, with goggly eyes and fuzzy hair, a typist came up from the office below to tell him that the rent man had called. Baird still held the doll in his hand when he opened the door. The first thing the girl saw was the grinning doll, and, of course, she thought that this was what the witchcraft had done to the erstwhile mild-looking Mr. Baird. So she went into hysterics.

Baird's public reputation as a magician has been widened by his activities in Leeds, which were one of the outstanding features of the British Association meeting. He demonstrated not only television but noctovision (the same as television, except that the sitter is in complete darkness), and his clever "stunt" of making a gramophone record of a person's face—in other words, of moulding a record by the electric current from the photo-electric cell of his televisor, instead of sending the current to the receiving apparatus for the image to be reproduced.

The Noctovisor.

After lunch, Mr. Baird gave me a special demonstration of his noctovisor, which was installed at the Leeds Education Offices. In television, of course, the "victim"

(Continued on next page.)

Mr. Baird arranging the "Noctovision" adaptor during his recent demonstration of Television at Leeds.

THE "TELEVISOR"

(Continued from previous page.)

sits in a bright light. In noctovision he sits in darkness, but infra-red light rays are projected upon him. These are invisible to the human eye, but affect the photo-electric cell in a manner similar to the effect of light upon the eye.

Seeing Through Fog.

For this demonstration the transmitter and receiver were quite close together, being in adjoining rooms and connected by a wire. Wireless would, of course, be equally practicable. The results were at times quite good, a recognisable image being obtained, but Mr. Baird has yet a long way to travel to perfection He has, however, achieved noctovision. The reproduced image was seen with its relief and movements at the receiving end through a large lens. It was a reddish colour with lines of light constantly crossing it, like a slowly reeled cinematograph film.

Baird sees commercial use for noctovision as a scientific novelty, as a means of seeing through darkness in war-time without being seen, and as a device for ships to see through fog.

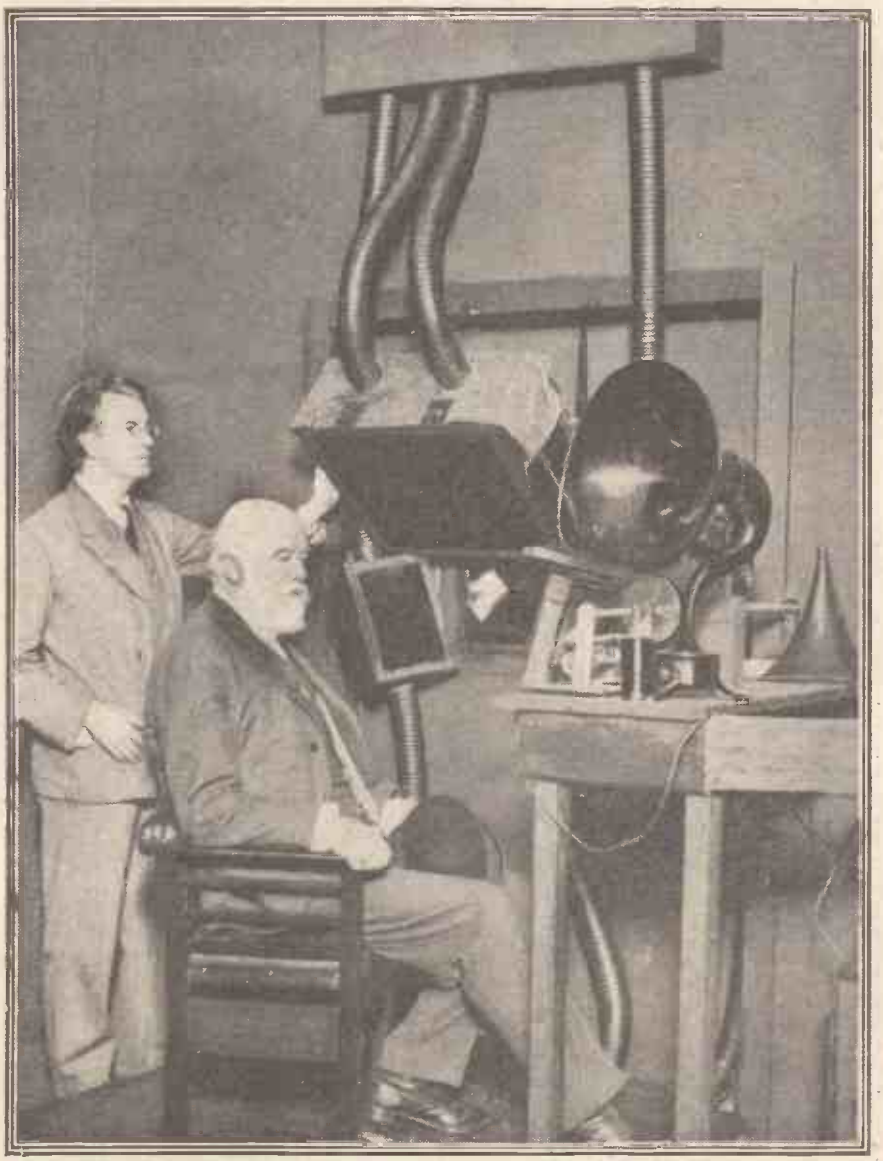
The Future Prospects.

Over our lunch I tackled him on the question of the commercial use of television, a matter on which I have had "ma doots." He had been telling me that at last the Post Office was moving, and they were expecting to be granted similar powers to those enjoyed by the B.B.C., when they would increase the power of their present transmitter in London, and open television broadcasting stations in other towns.

"But then," I asked, "what scope will there be for television? What will you be able to transmit that will interest the public? You speak of a future when we shall be able to sit at home and see, as well as hear, the Derby, a boxing match, or a theatre show. But will the organisers of these events allow them to be televised? The theatre manager, for instance, allows his musical comedy to be broadcast because people hear it, but are deprived of sight, and therefore want to go to see what they have missed. But you will let them see as well. Will they then have anything to go to the theatre for? Won't the theatres be empty, and the managers therefore opposed to television?"

"No," said Baird. In the first place, he stated, the televisor would be marketed as a novel scientific toy. Later, when the art developed and the novelty departed, would come the televising of theatre shows, and so on. And television, he asserted, would not hurt the box office.

"People go to the theatre to be in the crowd," he argued. "They will not be satisfied merely to see a horse race. They will still want to go there and be in the crowd."



Mr. Baird showing Sir Oliver Lodge how his Noctovision apparatus operates in conjunction with the Television system.

SOME READERS' RESULTS

The Two-Valve N. Circuit.—"30 to 3,000 metres."

The Editor, POPULAR WIRELESS.

Dear Sir,—No reports on the above have, the writer believes, appeared in your columns since immediately after the publication of the circuit in September last year. Perhaps the following results on an indoor aerial may interest users of this circuit.

Locality about 1 mile north of Croydon, 8½ south of 2 L O—electric trams and trains in the vicinity.

Aerial consists of a 6-wire (Electron) flat grid, fifteen feet long and about 24 feet above ground, *inside* the roof, and there are telephone wires running parallel about 15 feet away.

Regular daylight (and night, of course) loud-speaker stations all through the past year: Radio-Paris, Daventry, 2 L O, Hilversum, and now 5 G B. Koenigswusterhausen used to come in, but has been lost for some time, as a loud-speaker station.

Regular night-time loud-speaker stations: Stuttgart, Hamburg, Frankfurt, and Langenberg, also Toulouse and Rome lately.

On the 'phones other British and foreign stations up to a total, with the foregoing, of 30, have been received and identified, including Eiffel Tower, Moscow, Brunn, Breslau, Dublin, Glasgow, Plymouth, etc.

Stuttgart is usually received on the speaker at strength sufficient to drown the slight 2 L O background.

5 G B and Langenberg are received in the speaker without any interference by each other, 32 degrees on the condenser separating them, but, so far, 5 G B does not come in at anything like the strength of 5 X X.

On 2 L O the speaker can fill the house—generally it is preferred more quietly.

And lastly, the quality is unbeatable.

Yours faithfully,
H. H. G. D.

Thornton Heath.

The Editor, POPULAR WIRELESS.

Dear Sir,—Though I have scanned your columns from cover to cover, I have only seen one appreciation of L. H. Thomas' set "30 to 3,000 metres on a three-valve set."

I hooked this circuit up on July 31st, and in the evening plugged in an old edgewise basket coil, and was surprised to find myself receiving amateurs on 45 metres. As all my previous attempts at short-wave reception had turned out to be utter failures, I would not even tamper with my hook-up. The climax came at 12.10 a.m. on August 5th, when, without any gearing on my condensers, I received 2 X A F on 32.77 metres. I held them for an hour and a half, when I retired for the night.

After that I rebuilt the set and have received 2 X A F five times, 2 X A D once, and K D K A twice.

I have altered the coils a little in that I have wound the broadcast coils on a Paxolin former, and mounted it upon an ebonite platform with two-valve sockets. This coil has brought in 29 British and foreign stations, while London was working, whilst below I append my short-wave telephony stations:

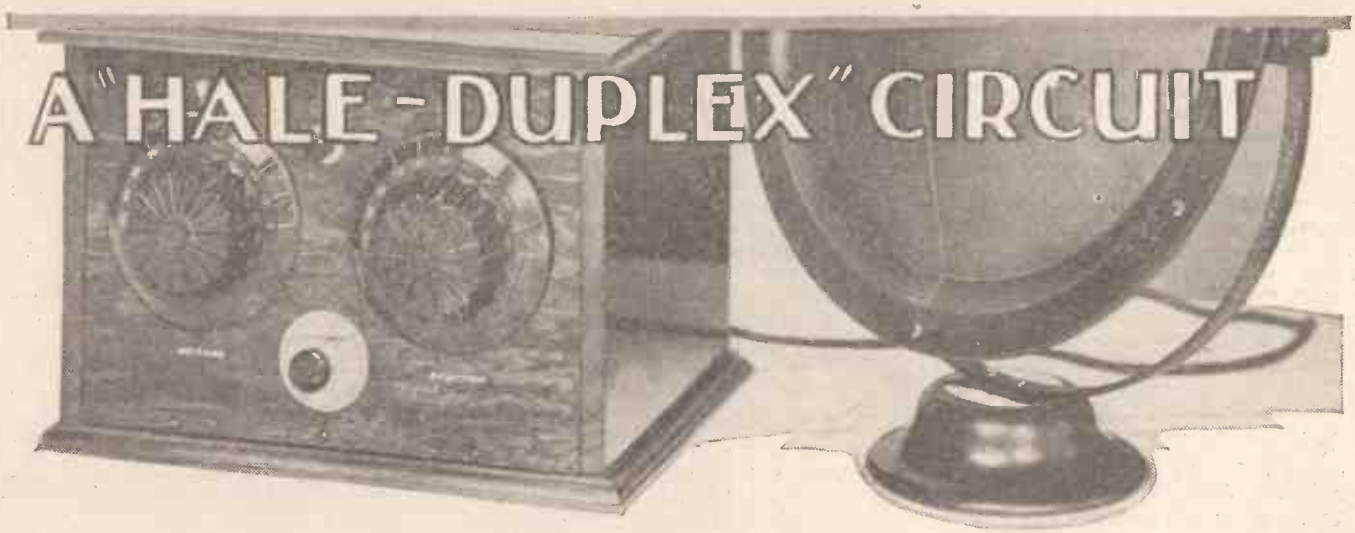
G 6 T S, G 2 A W X, G 5 O X, G 5 Y S, G 6 A S, G 2 G F, G 6 F N, G 2 L Z, G 6 N F, G 5 B C, G 2 B Z, G 2 K Z, G 6 A A, G 6 K J, G 2 R K, G 2 D I, G 6 Q B, (I believe this is Mr. Thomas), G 6 H M, G 2 N M (this is the Marconi experimental Empire broadcasting station on 32.5 metres), Spain E A R 35, E A R 7, Danish 7 A, Dutch North A X, Belgium 4 A I, also about six others unidentified.

I think Mr. Thomas deserves all the credit he gets for such an all-round set, with its ease of control and simplicity of construction. Again thanking him for the circuit and you for publishing it.

Yours truly,
F. C. SMITH.

Tooting, S.W. 17.

A "HALE-DUPLEX" CIRCUIT



Here is a "Hale" circuit incorporating an additional stage of "dual" amplification, which, in the opinion of Mr. Harris whose remarks are appended, is a combination of elements all of which have been found to work satisfactorily. The circuit should prove of keen interest to the experimenter.

By H. B. ALDRIDGE.

A PROMISE of further developments concerning the "Hale" circuit is sufficient to cause a flutter of pleasurable anticipation on the part of "P.W.'s" numerous readers. The accompanying theoretical circuit is a variation of the Hale circuit in which both valves act in a dual-capacity with remarkable efficiency without any of the usual "snags" in dual or "inverse-duplex" circuits.

Without doubt, no two-valve set has been designed which can give such pure and strong signals as the Hale circuit with a transformer-coupled note magnifier. The number of distant stations received on the 'phones with this combination has been a revelation to many readers. At the same time scores of us have wished we could have a super-aerial, or a stage of H.F. added to the circuit, to enable some of these distant stations to be brought in at L.S. strength. Here we meet with an old argument so often heard.

The average constructor finds that with two valves and a moderate H.T. voltage he can get quite good L.S. reproduction from the local station, and a few distant ones on the 'phones; why, he argues, should he go to the expense of a third valve and its upkeep just to obtain a few distant stations, if any, at moderate L.S. strength. He looks at his set, thinks hard, and comes to the conclusion that, if only that stage of L.F. amplification could be made to do a certain amount of H.F. amplification, he might get as much as if he added a stage of H.F. by means of another valve. These were the writer's thoughts, and I therefore hooked up several variations of the Hale two-valve circuit without any real benefit, until I evolved the accompanying circuit.

In this, the actual essential part of the circuit is transferred to the second stage, the first valve acting as H.F. amplifier, the second as the Hale, which amplifies at both frequencies and rectifies by means of the crystal combination and hands back the whole L.F. output to the first valve which now acts as L.F. amplifier and operates the L.S. which is in its plate circuit. A further advantage is that the reaction coil is not coupled to the aerial coil, but to the grid coil of V_2, thus minimising the possibility of "causing interference to one's neighbours." The various workings of the set proceed as follow :-

The H.F. impulses built up on the aerial-grid circuit of V_1 are amplified and passed via C_5 to the transformer and crystal in the grid circuit of V_2, where the redoubtable Hale circuit amplifies at both high and low frequencies, the reaction coil further boosting signals by being coupled to L_2, which is tuned by C_2. The amplified L.F. currents pass from the plate of V_2 to the primary winding of T_2, where they are again stepped up and passed by the secondary winding to the grid of V_1, which now acts as L.F. amplifier and passes them via the HFC_2 to the L.S.

Four "Valve Stages."

Thus we obtain the effect of two stages of H.F. amplification and two stages of L.F. The HFC_1 prevents any H.F. impulses from getting into the secondary windings of T_2 and setting up a cause of self-oscillation and buzzing, but allows the L.F. currents to pass to the grid from P_2 with ease. The HFC_2 prevents the same thing in the case of the L.S. winding. The fixed condenser C_3 allows unwanted H.F

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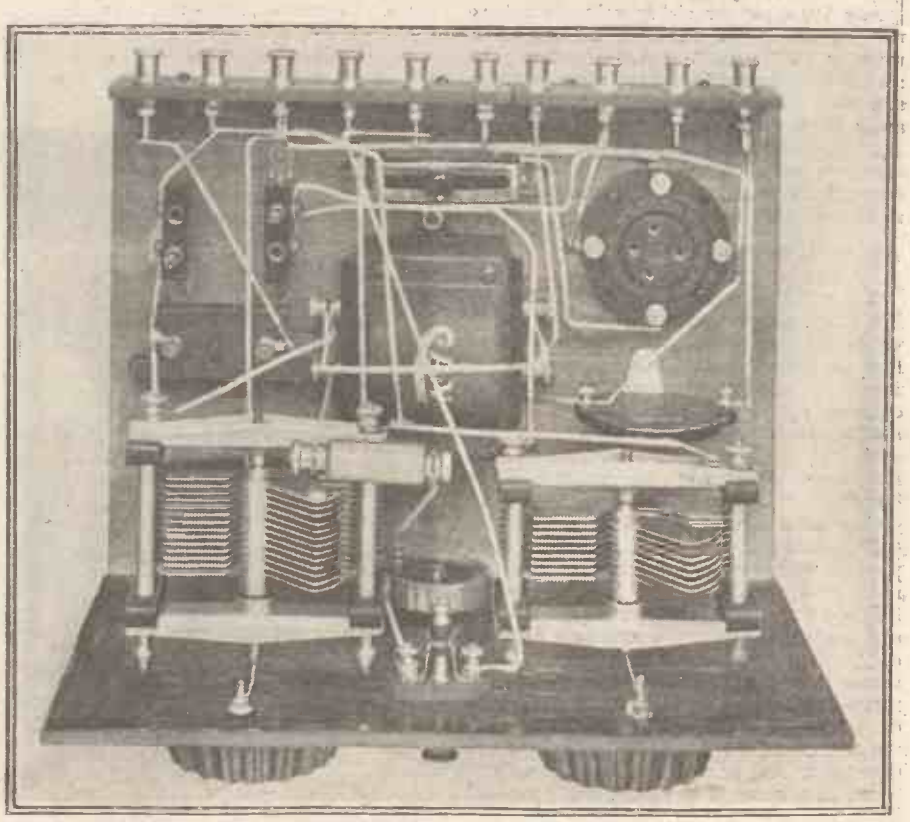


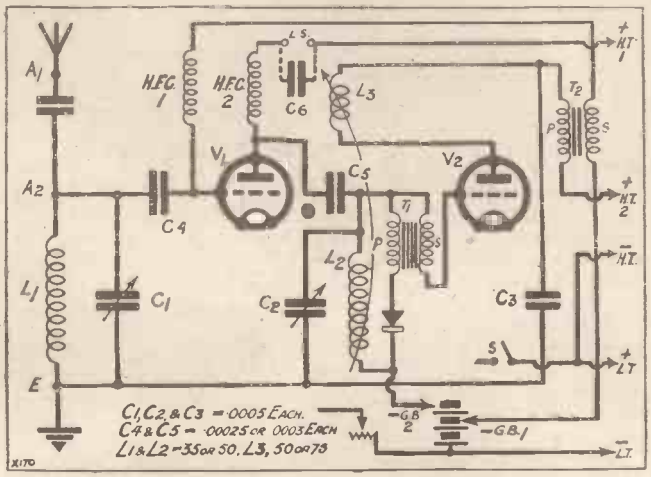
One of the original "Hale" one-valvers described by Mr. Harris, who has done a great deal of work on this efficient and popular form of reflexing.

A "HALE-DUPLEX" CIRCUIT.

(Continued from previous page.)

impulses to escape to earth before entering the primary of T_2.

A further refinement, strongly recommended, is to make the reaction control capacity coupled in the Reinartz manner, as in the "Samson Circuit" and Hale Reinartz, joining the reaction coil to the bottom of L_2. The fixed condenser C_4 prevents L.F. currents from running to earth via L_1. The most suitable valves are the L.F. type, if a power valve is used it should be on the first stage.



Any tendency for either valve to act as rectifier should be regarded as the valve working off the normal slope, and can be rectified by adjusting the plate voltage and grid bias. L_1 should be kept as far away from, or at right angles to, L_2 and L_3. The circuit is very stable, the usual changing over of reaction coil leads and transformer connections should also be tried for best results.

Analysis of the Circuit.

Mr. Percy W. Harris writes:—

"The Hale-Duplex circuit submitted by Mr. H. B. Aldridge is an interesting device which may be tried by readers who have had experience with the original arrangement. It consists of a normal H.F. stage coupled by the well-known parallel feed method to the normal Hale circuit, which is joined in the usual way. The radio-frequency output from the valve V_2 finds its way back through the condenser C_3 giving normal reaction effects between the coils L_3 and L_2. The audio-frequency component, however, passes through the primary of the transformer T_2, and the audio-frequency voltages set up across the secondary are applied between grid and filament of the first valve by the parallel feed method, which has been applied to numerous reflex circuits, and which, incidentally, was used in a very popular two-valve reflex set sold by the Marconi Company, and known as the V2 Receiver.

"The purpose of the H.F. choke marked HFC_1 is to prevent the radio-frequency currents in the circuit L_1—C_1 passing to earth through the self-capacity of the transformer.

"Certain precautions must be taken in using this circuit as the H.F. stage is not neutralised and in some cases uncontrollable oscillation may occur. In any case, I do not agree with Mr. Aldridge's statement that as the 'reaction coil is not coupled to the aerial coil, but to the grid coil of V_2, thus minimising the possibility of causing interference to one's neighbours.' If the Hale circuit is made to oscillate this oscillation will almost certainly be communicated to the aerial, causing interference.

"The general arrangement of this circuit, however, indicates that it should work very well when properly handled. It is a combination of elements, all of which have been proved to work satisfactorily, viz., the parallel feed H.F. stage and the parallel feed L.F. reflex with the well-known Hale circuit."

ED. NOTE:—Any reflex arrangement is liable to be a little critical. There are one or two points about the Hale circuit which should be borne in mind by those who wish to obtain maximum results. The reflex valve requires a high anode voltage and adequate grid bias, otherwise it will tend to rectify, with a consequent loss in efficiency. The Hale valve can be either a freely oscillating H.F. type, having a high mutual conductance, or a small power valve. In general, the 6-volt type of valve is to be preferred. A crystal detector of a good stable type is desirable, and an improvement sometimes results if the two leads to the crystal are reversed.

A LONG FIVE-VALVER.

A Turkish Reader's Experience.

The Editor, POPULAR WIRELESS.

Dear Sir,—I must really write and thank you for the valuable information contained in your valued paper, the POPULAR WIRELESS, which I take in regularly since my arrival at Constantinople.

As I always take great interest in reading readers' experiences with various circuits and sets described in "P.W." from time to time, I thought it might interest your readers to hear of the results obtained with the Neutrodyned set I have recently built from parts imported from England.

I am enclosing herewith a photograph of the set for the interest of your readers, to show them the unusual length for a five-valve set. It comprises 3 H.F., 1 Det., and 1 L.F. The H.F. transformers not being screened, I have arranged them twelve inches apart to avoid magnetic coupling between them. As a result of which I receive on the loud speaker "Radio Stamboul" (our local station) without aerial or earth.

As will be seen by this photograph, Mr. Behar's five-valve set really is a long one!

Although climatic conditions over here are very bad for wireless reception, I receive most of the Continental stations any night, and the Russian stations come in at tremendous strength on the loud speaker.

On one occasion, at about 1 a.m. (11 p.m. B.S.T.), working on the higher wave-lengths, I had a thrill when I heard part of the National Anthem, followed by the London announcer. I must have picked up Daventry unknowingly.

I should like to know if any of your readers ever pick up Radio Stamboul. Its wave-length being 1,180 metres and its power 6 kw. I understand it will shortly be increased to 12 kw.

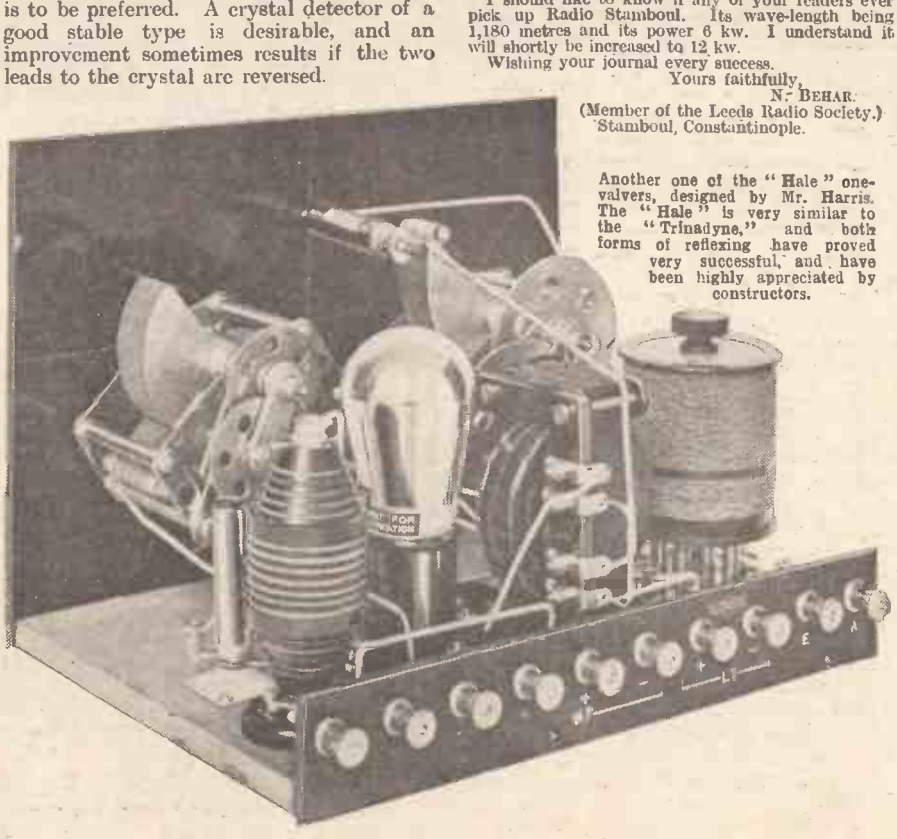
Wishing your journal every success.

Yours faithfully,

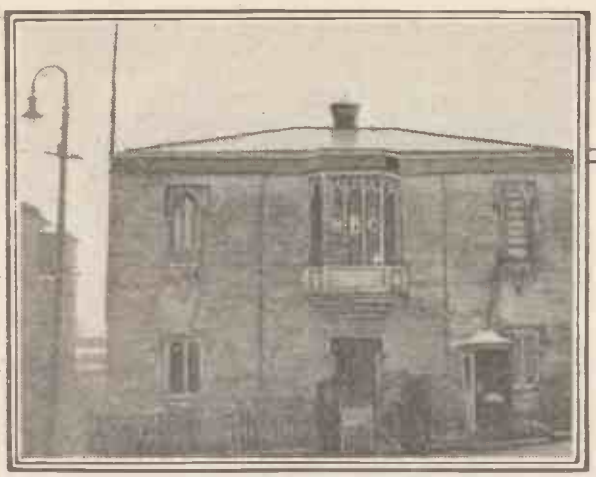
N. BEHAR.

(Member of the Leeds Radio Society.)

Stamboul, Constantinople.



Another one of the "Hale" one-valvers, designed by Mr. Harris. The "Hale" is very similar to the "Trinadyne," and both forms of reflexing have proved very successful, and have been highly appreciated by constructors.



5NO

All about the Newcastle Broadcasting Station.

By G. V. DOWDING, Grad. I.E.E.

(Technical Editor.)

IN one of the busiest thoroughfares in Newcastle-on-Tyne, standing all by itself on a sort of island site, is a neat little stone building. Although in appearance it resembles a chapel it is very plainly labelled, with large white letters, "B.B.C." A narrow strip of ground running round it is railed off and one approaches the doorway through a small iron and stone gateway. And as I walked in a chicken sedately walked out. Naturally, I expected to see one or two more inside, and perhaps a few pigs roaming round the main studio. But I was forgiven the sight of such broadcasting "bucolicism," and I am now quite certain that that fowl was merely another such investigator as myself.

I was rather impressed by the interior of the 5 N O building. It is by no means large, but the ceilings are high and the architecture is dignified if rather severe.

"This must be the only detached studio building erected specially for the B.B.C.," I said to Mr. G. L. Marshall, the Station Director, after we had exchanged compliments.

"My dear fellow," he replied pityingly, "this place was built two hundred years ago."

Historical Notes.

"Two hundred years ago!" I said with astonishment. "Then it must have been very nicely polished up during the last few years."

"It is in an excellent state of preservation," parried Mr. Marshall. "Originally it was a maternity hospital, and we were very fortunate in obtaining possession of it, for it is completely self-contained and has everything in the way of conveniences, such as kitchen, heating, and so on."

"The studios used to be in Eldon Square?" I queried.

"Yes," he replied. "We moved from there on December 23rd, 1925."

"Had you shifted a day earlier," I commented, studying my historical notes on 5 N O, "you would have celebrated your anniversary in so doing, for I see that your first transmission was on the 22nd of the same month two years earlier, and that yours was the first station specially assembled for broadcasting, the prior three, including 2 L O, being of a purely experimental nature."

I also had a note of the fact that in its early days no regular artistes were engaged at 5 N O, and that the programmes were mainly contributed to by the local Amateur Dramatic Society.

"Is your broadcasting of a straightforward nature, or do you have special dialect transmissions?" I asked Mr. Marshall.

"We occasionally have special Cumberland and special Tyneside programmes," he replied.

"Now," I went on, "I am going to ask you a question that I am asking, in one form or another, every station director that I manage to buttonhole. What is the percentage of your audition successes?"

"Well," Mr. Marshall replied, after a moment's reflection, "some 16 or 17 per cent are worth engaging for unimportant concerts, such as those given during the afternoons."

Studio Auditions.

"And as with most stations, more of the men are successful?" I pursued.

"Yes," he agreed. "And, by the way, at one recent audition we had three tenors."

"That surely must be a record," I commented, for tenors are comparatively rare. In answer to another of my queries, Mr. Marshall informed me that women displayed greater confidence at auditions, and are invariably present in greater numbers than men.

For some little while we discussed the subject of local talent and the development of young artistes in the technique of broadcasting, and then I mentioned that I had listened to the launching of the "Port Gisborne," together with shipyard effects which featured in a 5 N O programme some time ago. I also added that I found the broadcast fascinatingly interesting, and that it had "come over" almost perfectly. Mr. Marshall, I could see, was very pleased by these references to what was undoubtedly an "O.B." achievement.

An Interesting "O.B."

"We used seven microphones in that transmission," he commented. "And subsequently we had another broadcast of a very similar nature. This time it was the departure of a ship on a voyage. It was the Stella Polaris, and we had a microphone on the bridge to collect the sounds of the orders, signal telegraphs, and so on; another in the lounge to pick up the conversation of the passengers, and a third at the side of the ship to catch the farewells and cheering of the people on the quayside."

"Did it prove successful?" I asked.

"Very," he replied. "The whole thing was most realistic." And judging by the detailed description he proceeded to give me I should imagine that those listeners who were fortunate enough to hear the novel broadcast thoroughly enjoyed it.

Mr. Marshall then suggested that we should have a look round. As we were about to leave his office in order to do this, a tall standard lamp caught my eye. It had a large shade, and this appeared to be decorated in a rather futuristic manner. I

(Continued on next page.)

NOTE THESE DATES!

5 X X, 5 G B, 6 B M, 5 W A, 5 I T and 2 Z Y have been dealt with, and the remaining articles in the series will appear as under:

GLASGOW	.. ..	Oct. 8
ABERDEEN	.. ..	Oct. 15
BELFAST	.. ..	Oct. 22
LONDON (2 L O)	.. ..	Oct. 29

ORDER YOUR COPIES NOW!

The "Talks" studio at 5 N O. The tubular bells are used during "Children's Hour" broadcasts.

5 N O.

(*Continued from previous page.*)

stepped nearer to the article so that I could examine it more closely, and found that the shade was covered with signatures.

"Famous artistes?" I queried, as I tried to call to mind some of the names.

"Some of them are famous," Mr. Marshall smiled, "and some are not. For a time this lamp was in the studio, and some of the lesser lights managed to scrawl their names on it. I have removed it to my office in order to prevent this happening in future."

"That lamp will be very valuable later on," I declared as, twisting the shade round, name after name of world-wide fame came into view.

"Here are the signatures of Auntie Miriam and Uncle Ben," said the Station Director.

"Mister Tankerville?" I commenced then, before Mr. Marshall, who broadly smiled at this, could speak, enlightenment came to me. "The Earl and Lady Tankerville," I concluded.

Titled Broadcasters.

"Yes, they frequently contribute to the Children's Hour, and take a very keen interest in it," said Mr. Marshall. "And," he went on, "we are very fortunate in having a Lord Mayor who also is most interested in broadcasting, and is himself very musical."

"That must help you a great deal, having such a personal link with the local authorities."

"It does indeed," he replied enthusiastically. "Dr. Whittaker has been very good to us, and has collaborated with us in the preparation of many of our programmes.

By this time we were strolling around the ground floor of the building which is mainly devoted to the offices. We peeped into the general office where typists were busily engaged with the clerical routine work of the station.

"Do you have many letters from listeners?" I asked my companion.

"No," he replied, "not apart from applications for libretti and so on. During the last quarter, for instance, we have had less than a hundred directly concerning our programmes."

An "Applause Card" Scheme.

"Many criticisms?"

"A very small number indeed, and most of those were anonymous."

I also gathered, subsequent to tactful enquiries, that the B.B.C. "referendum," when it will be remembered that listeners were asked to send postcards giving their locations and types of sets used, was, comparatively speaking, a failure. As far as I can make out, but a bare 10 per cent troubled to do this. I have since wondered whether an "applause card" system would not be of value to the B.B.C. people, as at present they have no direct evidence as to the way in which their programmes are received. My idea, and I put it forward with all due modesty for it may have serious snags, is that the B.B.C. should issue free to every listener two or three postcards, and that the G.P.O. should allow these to pass through on an "O.H.M.S." basis. These postcards could be printed in a similar manner to the once very familiar "Field Card," with such statements as "I like your chamber concerts." "I do not like your chamber concerts. "I like your variety concerts." "I do not," etc., etc., with a small space for general remarks.

Such cards could be issued with licences, and the cost of the whole scheme might be kept well within a four-figure sum, including the clerical work involved in the work of analysis. One obvious snag is that only a small proportion of listeners might use their cards.

Having completed our tour of the ground floor, we proceeded upstairs to inspect the studios. The main studio at 5 N O is fairly large, but rather dark. There is a nice "talks" studio, and this is used for the Children's Hour as well as for radio lectures. It contains the usual table and table lamp, a gramophone, a set of tubular bells and, of course, a microphone.

The Engineer-in-Charge.

Downstairs again, I made the acquaintance of the Engineer-in-Charge, Mr. J. K. Nicholson, and settled myself down in one of the comfortable chairs in his office to have a chat with him about the actual radio side of 5 N O.

"You 'get away' very well from Newcastle," I commenced, after we had exchanged the usual amenities, not forgetting to tell each other it was raining!

"Yes, we have been heard in Cairo and several people in California listen regularly to our programmes," he said, and proceeded to show me letters which confirm these statements.

"By the way, I suppose some of the letters you receive are rather amusing," I suggested.

Mr. Nicholson laughed.

"Yes, very," he agreed. "We had a letter from a fellow in Sunderland some time ago telling us that we had broken down for a week—a week mind you!"

"That was useful information," I laughed.

"And——" commenced the engineer, but was interrupted by one of the assistants who burst into the room unceremoniously and, with a hurried apology for his intrusion, dramatically announced:

"Rain is coming through the studio ceiling."

The next few minutes were exciting. With a muttered exclamation Mr. Nicholson jumped up and disappeared through the doorway. People seemed to be dashing about all over the place, consternation and despair written upon their countenances. But in due course peace was restored, and Mr. Nicholson suggested that we should pay a visit to the transmitter.

This is situated on the premises of the Cooperative Wholesale Society in West Blandford Street. Threading our way through a yard littered with packing-cases, and dodging horses and carts, we arrived at a small stone building.

"This used to be a stable," explained Mr. Nicholson as he led the way through the door. "And," he continued, as we entered the transmitter-room, "in here we had to remove the partitions that formed the stalls before we could install our gear."

"My word," I exclaimed. "You people do manage to tuck yourselves away in queer places."

The shade of this standard lamp in the Director's office is signed by many of the famous artistes who have broadcast from the Newcastle station.

Uncomfortable Quarters.

It might have been my imagination, but I thought that I could detect a distinctly "horsy" odour about the room! Very little has been done to transform the interior and, were the transmitting gear cleared away, it would at once become a stable again in appearance if not in actuality. Most of the B.B.C. transmitting stations are bare, uncomfortable looking places, and I have frequently wondered why this should be the case. Surely the B.B.C. does not fear that listeners would begrudge the spending of a few pounds on making things a little more comfortable for the engineers. Their labours are just as taxing and onerous as those of studio staffs, although it cannot be said that the latter are, generally speaking, by any means luxuriously housed. However, I suppose most of the station buildings are still regarded as purely temporary, and that refinements will come lavishly enough with the security of permanence as in the manner of all national affairs! There are indications that Savoy Hill is setting the pace for this.

The transmitter at 5 N O is quite a standard sort of affair; when one has seen a dozen or so B.B.C. outfits, it is difficult to visualise any one of them.

As I stood by the loud speaker listening critically to the music issuing from it, Mr. Nicholson moved forward and deftly adjusted a rheostat controlling one of the modulator valves.

"Running rather hot; too much filament current," he explained briefly.

And, as we turned away to pass on to the accumulator room:

"You see it is quite cool now," he added with satisfaction.

(*Continued on page* 264.)

The "RADIO KING"

An interview with Will Oakland, who is stated to be America's most popular broadcaster.
By ARIEL.

DURING the course of my work for POPULAR WIRELESS I do not get the opportunity of chatting on broadcasting subjects with many crowned heads, but I dare swear that no journalist ever interviewed a more powerful and interesting personality than I did recently when I talked with Mr. Will Oakland, acknowledged by public acclamation to be America's Monarch of the Microphone.

"You must understand," said that magnetic personality known as Will Oakland, as I sat with him in the lounge of his hotel, "that I am not just an ordinary broadcasting artiste as your folks over here are. Though the people at home have been good enough to bestow on me the title of 'The Radio King of America,' I am, first and foremost, a business man. Just take a look at this."

He held out a picture postcard showing the dining-room of his café in New York. The design has more than a passing resemblance to that of the Café de Paris, in London. It has the same balcony, the same spacious dance floor with little tables all round the walls, and the same kind of stage for the artistes and orchestra.

Will Oakland's Château.

"And it's from that stage that nearly all my broadcasting takes place. In my little café I entertain my guests and thousands of listeners-in at the same time, and it is just from there I have earned for myself the title of which I am so proud.

"I don't believe in studio broadcasts because I, for one, have to have a real audience that I can *see*. I sing to my own patrons, who number about 450 on a good night, and my voice is relayed to W H N I (the station above the Marcus Low State Theatre) every Tuesday and Thursday night.

"I arrange all my own programmes, and before I start my real turn I describe the scene in Will Oakland's Château—that's the name of my little place—for the benefit of those who are spending an evening at home. Folks are good enough to tell me that I manage to get them feeling as if they are right there in the restaurant. How that's done I don't know. It just seems to happen."

Perhaps I ought to explain that although Mr. Oakland modestly referred to the Château as "his little place," it is really one of the smartest rendezvous in New York, and *the* restaurant for wedding receptions, banquets, and so on. There were seventy wedding dinners held there last June, and descriptions of those which fell on the right nights were broadcast.

A friend of mine, who went to hear Will Oakland in New York recently, told me that as soon as his turn comes on all the telephones in the place start ringing, and sometimes the line is completely blocked by those 'phoning through to get the Radio King to sing some of their favourite songs.

A recent portrait of Will Oakland.

"I think it's an awful shame to blame America for some of this musical tripe you get over here nowadays," he continued. "I have made my reputation entirely on higher class stuff like ballads, and I never have and never will chant about 'cuties,' and so on. They say sometimes that the better class songs are dead, but when I tell you that I have sung nothing else for the past three years you can judge for yourself how much truth there is in that statement.

Every Shop Has a Set.

"I think it would buck things up a bit over here if you could arrange to run a similar turn to mine, but I suppose your government would call it advertising, and that would put a lid on it. I don't want to criticise the state of your broadcasting, but I will say you've got a very long way to go yet. In the first place, it's almost as hard to get near a receiving set here as it is to lay your hand on a bottle of fizz in the middle of the Sahara.

"When I did a turn up at 2 L O the other day my wife wanted to hear me, but she couldn't get hold of a loud speaker or a pair of headphones anywhere. Why, even this big hotel doesn't seem to possess one. It isn't like that in the States.

"Over there you can find a receiving set in a few minutes wherever you happen to be. Every shop's got one, and there are three or four in most of the hotels. Perhaps the licence has something to do with it; but, after all, ten shillings a year isn't much.

A Friendly Criticism.

"In many ways I don't approve of government control of the radio. I think it is apt to hamper its growth and restrict variety, but in other ways there's a good deal to be said for it.

"What we want a whole lot on both sides of the Atlantic is some scheme so that everyone with a set can listen-in across the herring-pond whenever they feel inclined. The time when we can do this will surely come, and when it does we shall learn a lot from each other."

A TEMPORARY GRID LEAK MOUNT.

AS a mount for grid leaks the following idea has been used by the writer quite frequently. Obtain two ordinary wire paper fasteners, and, with the aid of a pair of pliers, bend them at right angles half-way along their length. This will form two feet so that the fasteners can be fixed vertically to a strip of ebonite by screws. Their distance apart will depend on the size of the grid leak or tubular resistance which is used, but 1½ inches, or slightly more, is a fair average. Owing to their construction and the springy nature of these clips, the conical ends of the grid leak can now be held between the bent paper fasteners and a good contact is assured. A temporary mount of some character is always necessary when using cartridge grid leaks, as the soldering of wires to their metallic ends is bad practice since it causes damage to the leak—either a resistance alteration or a broken joint.

W. J. HENDERSON & CO., LTD.

Stand No. 254.

The principal items on view at this stall will be complete receivers. There are many types of self-contained and portable sets, and here also will be shown another receiver which is capable of operating direct from alternating current mains. Battery eliminators for taking H.T. current from the mains (D.C. & A.C.) will also be on view.

IGRANIC ELECTRIC CO., LTD.

Stands Nos. 148 & 149.

Quite a large proportion of the Igranic exhibit consists of the various new lines introduced by this famous firm for the 1927-28 season. Apart from these, however, there will be a full range of the Xlloss coils, the Igranic-Pacent components, "Honeycomb" inductance coils, etc., together with a

INCORPORATED RADIO SOCIETY OF GREAT BRITAIN.

Stand No. 226.

A very interesting show will be staged here, the society having arranged for the erection of a complete amateur radio transmitting and receiving station. In addition, there will be wireless apparatus of historical interest and literature relative to the various activities of the R.S.G.B.

HOARE AND JAGELS.

Stand No. 14.

The Rolls receivers, of which a complete range will be on view at this stand, have recently been fitted with new cases, of a type even more pleasing than their predecessors. In addition to an improvement in appearance, there is also an improvement in prices, these having recently been revised and reduced.

HOBDAY BROS., LTD.

Stands Nos. 19 & 20.

This well-known firm of wholesalers will be showing the popular lines of all the leading radio manufacturers. We understand that particular attention is being given to those exhibits which have only been introduced to the public at this exhibition, so that this stall will be a sample of "all the latest."

The products now being displayed at the National Radio Exhibition are reviewed in this—the concluding—article in a brief and impartial manner for the benefit of visitors and all readers.

The Exhibition is now being held at Olympia, London, and will close on October 1st. It affords the purchaser an incomparable opportunity of selection.

The Editor.

JACKSON BROS.

Stand No. 85.

People passing this stall will probably do so on a "slow-motion" basis, for there will be much to linger over. Although only condensers are shown, the variety will be quite bewildering; for the display will include standard air types with ebonite end-plates, square-law types (with and without verniers), low-lossers, low-loss twins, low-loss adjustable twins, and low-loss triple gangs! Also, of course, neutralising condensers, S.L.F.'s, both plain and slow-motion, not to mention "logarithmics" with pigtails and perhaps some late arrivals of which no notification has yet been made.

JEWEL PEN CO., LTD.

Stand No. 210.

Here will be found the Red Diamond components, including a new range of fixed resistances. Other components shown will include coil holders, plugs and sockets, valve holders, and the R.D.40 detector.

(Continued on page 223).

HOUGHTON BUTCHER (GT. BRITAIN), LTD.

Stand No. 61.

As this stall is chiefly a rendezvous for dealers and customers of the firm, its display will not be intended for the general public so much as for the trade. We understand that there will, however, be a limited display of items of outstanding interest.

Many portable sets are being shown this year, the one illustrated above being a McMichael Five-Valver.

selection of H.F. transformers, variometers, coil-holders, rheostats, resistors, and condensers.

The supply problem is met by auto-chargers, units, and a filament transformer for use with the new valves which work direct from A.C. mains. The seven-valve Neutrosonic receiver will also be displayed.

Amongst the new lines the various kits for home-constructors are of especial interest. These include a seven-valve super-heterodyne kit and one for a short-wave receiver that incorporates an H.F. amplifier.

In addition two types of L.F. transformers are making their appearance, these being known as the "F" and "G" types. The former, which is designed for first or second-stage amplification, has a ratio of 3½ to 1. The latter, being fitted with a very substantial iron core of generous proportions, has a high primary inductance. It is made in both the low- and the high-ratio styles, the figures being 3·6 to 1 and 7·2 to 1 respectively.

Another particularly interesting product of this firm is the new "Universal" high resistance. The name "Universal" will be appreciated when it is understood that the component in question is designed to fulfil the functions previously undertaken by the Igranic variable grid leak, high-resistance potentiometer and tone control.

Readers who have been in trouble with battery cords will pay particular attention to the six-way battery connector which is showing at this stand. By means of one plug and socket it simultaneously connects or disconnects all the batteries to or from the set. The Igranic-Pacent "Phonovox" and the new tapped triple Honeycomb coil also are sure to attract a good deal of interest.

ILIFFE AND SONS, LTD.

Stands Nos. 109 & 234.

In addition to wireless journals, a large number of text-books of various kinds will be shown at these stands.

The "Precision" Six-Pin H.F. Transformer (Collinson) is fitted with a detachable primary, so that a primary winding to suit the valve in use can easily be arranged for.

BE A RADIO MISER

THE IMPULSES your aerial receives from foreign stations are doubly precious because of their weakness. You must arrange your receiver so that none of the energy is lost. You must guard against leakage. You must be miserly in the way you save each minute portion. This means more than using good radio parts—it means using the one make of parts that have been conspicuously notable for their low loss qualities for many years—LISSEN.

ECONOMISES H.T.

By putting a Lissen 2· mfd. Mansbridge Condenser across your H.T. Battery (1 mfd. will do, but larger size is better) you will lengthen its life by 10 per cent.

LISSEN Mansbridge Condensers

2 mfd. 4/8 1 mfd. 3/10

Other capacities:

·01	2/4	·25	3/-
·05	2/4	·1	2/6
·025	2/4	·5	3/4

A specially moulded solid insulating case totally encloses each Lissen Mansbridge Condenser.

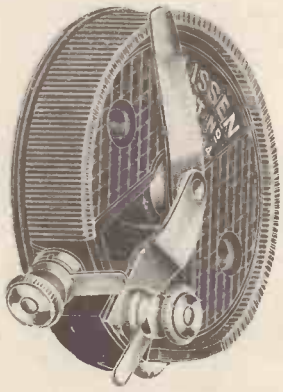
NEVER LEAK or VARY

Lissen fixed condensers are accurate to within 5 per cent. of their marked capacities. They never leak, they never vary. Less than a year ago they were being sold at twice the price—and since then they have been still further improved. You can't buy a finer condenser.

LISSEN Fixed Mica Condensers

·0001 to ·001, 1/- each (much reduced)
·002 to ·006, 1/6 „ „ „
A pair of clips is included free with every grid condenser.

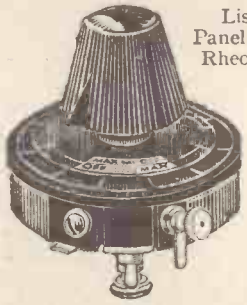
NOW COSTS 1/- LESS



The baseboard type of Lissen Resistor is now reduced from 2/6 to 1/6. This type has, of course, no knob, dial or pointer, but is provided with 2 holes for screwing to baseboard. 7 ohms Rheostats: 400 ohms Potentiometer, each 1/6
(Previously 2/6)

ALSO REDUCED

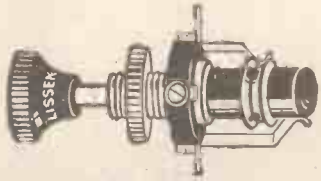
Lissen Panel Type Rheostats



The wires do not loosen, the arm keeps in perfect contact—nothing ever goes wrong.

Rheostats 7 and 35 ohms 2/6
(Previously 4/-)
Potentiometer 400 ohms 2/6
(Previously 4/6)
Dual Rheostat 35 ohms 4/6
(Previously 6/-)

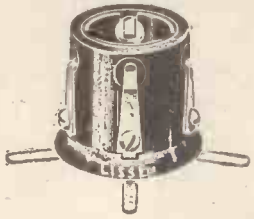
SAVE CURRENT



Energy is often lost at the switch points. These Lissen SWITCHES are designed to prevent energy leaking away while they do their work efficiently. There is one for every switching need—each one is very neat. Now

LISSEN TWO-WAY SWITCH 1/6
(Previously 2/9)
LISSEN KEY SWITCH 1/6
(Previously 2/6)
LISSEN REVERSING SWITCH 2/6
(Previously 4/-)
LISSEN SERIES PARALLEL SWITCH 2/6
(Previously 3/9)
LISSEN FIVE-POINT SWITCH 2/6
(Previously 4 -)
LISSEN D.P.D.T. SWITCH .. 2/6
(Previously 4/-)

STRONGER SIGNALS



There is not a square inch of superfluous ebonite in this Lissen Valve Holder. That means low capacity, and therefore stronger, clearer signals. Shown ready for baseboard mounting, but can also be used for panel mounting by bending springs straight. Patented. Previously 1/3. NOW 1/-.

ABSOLUTELY SILENT

Lissen Leaks are absolutely silent in use; their resistances never alter. This was proved some time ago by exposing them to the rain and sun on our factory roof.
All resistances. Previously 1/3. NOW 1/-.

Stand Nos. 158 & 160, National Radio Exhibition, Olympia, Sept. 24 to Oct. 1.

LISSEN LIMITED, 8-16, FRIARS LANE, RICHMOND, SURREY

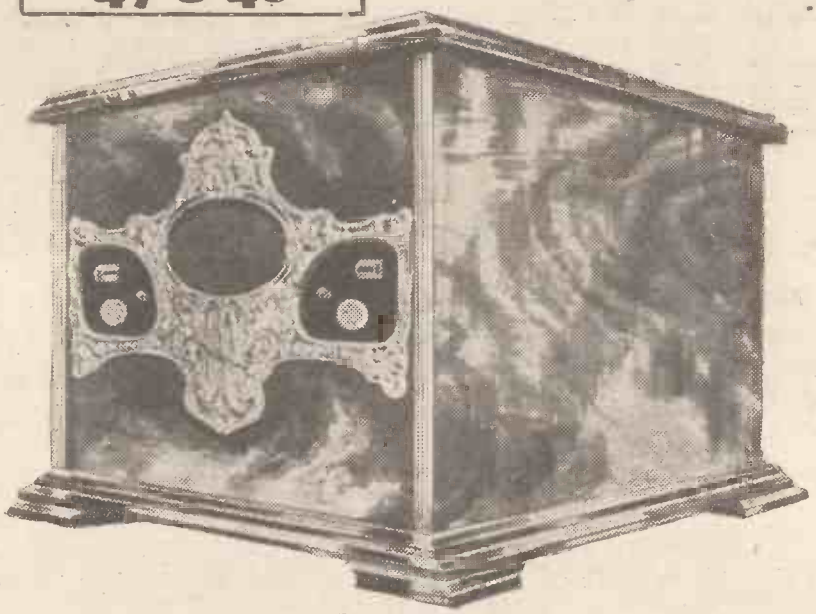
Managing Director: **THOMAS N. COLE.**

L.259a

The Sensation of the

The greatest

STANDS 45, 46 47 & 48



THE FILONATOR

is supplied with every General Radio Receiving Set. The Filonator can be *recharged instantly in your own home* simply by inserting refill tablets supplied. More economical, efficient, permanent and reliable than any accumulator. None of the usual inconveniences of accumulators—*No acids*, No fumes, simple and safe.

THE NEW VALVES

Standard equipment with the new General Radio Receiver. Operates at full efficiency on *only* 1.4 *volts*, with "power valve" results, and has a *double filament* designed to the specification of General Radio Research Engineers, by the famous Valve Manufacturers, Messrs. Mullard Radio Valve Company Limited. The Valve Holders are a patented Anti-vibration type and have the *lowest inter-electrode capacity* of any valve holder on the market.

THE TUNING UNIT

The Tuning Unit in the new General Radio Receiver is quite unique. The "Astatic Vario-Coupler" is tuned by a Die-cast S.L.F. Variable Condenser with constant vernier control. This is *the most sensitive and selective* Tuning Instrument in any Receiver.

The LOUD SPEAKER

The new patented "Magnetic-Cone" Loud Speaker is a revelation in perfect reproduction. Embodying entirely new features, it is *only six inches* in diameter and produces volume and tone superior to the large unsightly horn speakers. It is fixed inside the Cabinet.

THE AMPLIFIER

The Amplifier in the General Radio Receiver is an improvement of the well-known and widely-used General Radio Transformer-Coupled Audio Amplifier, and is responsible to a large extent for the amazing purity and volume of reproduction.

1928 MODEL GENERAL RADIO CABINET RECEIVERS are ENTIRELY SELF-CONTAINED and are transportable.

The Cabinet is made of first quality genuine hand-polished English Walnut.

NO INCREASE IN PRICES

2-Valve Set, absolutely complete and installed free. Cash price, £12.

Deferred payment terms of 20/- down and 12 monthly instalments of 20/- are still available.

UNIVERSAL H.F. CHOKE

The ideal H.F. Choke, its special sectional winding keeps distributed capacity at a minimum, but it will efficiently operate wave-lengths from the shortest to the longest.

List No. 288 .. 9/-

WHITELINE VALVE HOLDER

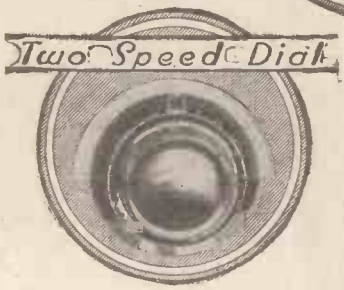
A great advance over all previous types of springy valve holder. Ideal for Super-Het. and short-wave sets. "Whiteline" for safety.

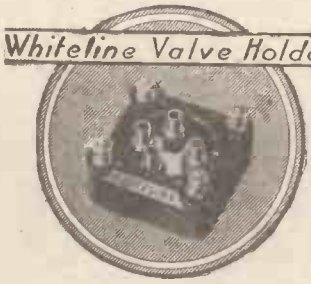
List No. 282.. 2/3

MARK II WAVEMETER

Covers all wave-lengths between 150/2000 metres. Fitted with a buzzer, self-contained battery, and a lamp to indicate resonance for transmitting and other uses where more convenient. Tuning is very sharp.

List No. 226—
In oak case £6 0 0
In walnut case 6 10 0





SETTING the STANDARD FOR 1928

TWO SPEED DIAL

Manufactured under Burndept Patent 243,218. This Dial is of polished Bakelite 3½" diam. concealing a double reduction friction epicyclic gear, giving a reduction of 18 to 1 or a direct drive.

Fits ⅛" or ¼" spindles.

List No. 253. Complete with Station recorder .. 9/-

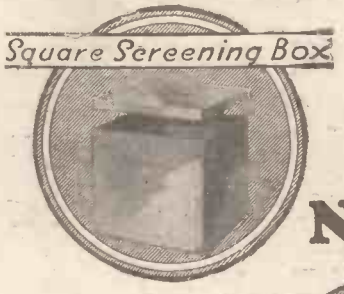
LOW FREQUENCY TRANSFORMERS AND CHOKE.

Owing to recent developments we can now supply these transformers at an economic price, and for those who want the best possible reproduction there is no other choice. Supplied in two ratios for first and second stage.

List No. 284. Ratio 3-1 .. .. .. 22/6
List No. 285. Ratio 6-1 .. .. .. 25/-

Also in Multi ratio giving 1.8, 3, 3.66, 4.5, and 6 to 1.
List No. 286 .. .. 27/6

Also Low Frequency Choke. List No. 287 20/-



TESTED RADIO
Bowyer-Lowe
APPARATUS

NEW COMPONENTS

SQUARE SCREENING BOX

Matt finished aluminium, supplied with baseboard and fixing screws. Packed flat and can be assembled in a few minutes.

List No. 283. .. 6/-

NATIONAL RADIO EXHIBITION OLYMPIA STAND NO 124

VARIABLE RESISTOR

Better than the panel rheostat and an advance on the fixed resistor, for use on baseboard. Wound under tension on a non-shrinking former and providing maximum aircooling.

List No. 289, 5 ohms 3/-
List No. 290 .30 ohms 3/-

SIX SOCKET BASE

Has sockets to the standard "Southern Cross" arrangement, and is for use in the Square Screening Box or when the six pin coils and transformers are to be used without a screen.

List No. 291 .. .. .. 3/6

SEND FOR THIS BOOK TO-DAY

THE BOWYER-LOWE STANDARD SEVEN AND EIGHT VALVE SUPER-HETERODYNE.—How to Build and Operate.

A fully illustrated description of this new Receiver which covers all wave-lengths from 35 to 2,000 metres. May be built as a 7-valver, and the 8th added when required without any re-arrangement of parts. Embodies the new valves. Full size blue prints included with the book.

JACK SWITCH

Fills the need for a simple and positive On and Off switch.

List No. 281 .. .. .. 3/-

THE BOWYER-LOWE Co., LTD., LETCHWORTH, HERTS.

Please send me a copy of "The Bowyer-Lowe Standard 7 & 8 Valve Super-Het," for which I enclose my remittance for 2/-

NAME .....

ADDRESS .....

509

MORE ABOUT THE EXHIBITION.

(*Continued from page 218.*)

BERNARD JONES PUBLICATIONS, LTD.

Stand No. 103.

In addition to wireless periodicals, a large number of handbooks will be displayed.

J. R. WIRELESS CO.

Stand No. 229.

The "Sovereign" products on show will include a new selective crystal set designed to cut out 2 L O and receive 5 G B within two miles of the London station. A gramophone pick-up and a Monotune wave-trap are other interesting exhibits, and there will also be a range of the firm's air-spaced coils, six-pin coils, and the H.F. choke.

JUNIT MANUFACTURING CO., LTD.

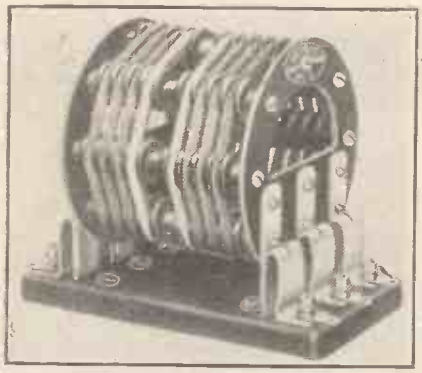
Stand No. 230.

Home-constructors will be specially attracted to this stand, where two lines which supply long-felt needs will be on view. Both of these are concerned with the simplification of set-construction, one being the "Junit" self-soldering wire and the other a soldering iron. Mention of this latter has already been made in the "Apparatus Tested" columns of this journal, and the simplicity of the mechanical movement necessary to operate the iron will be demonstrated convincingly.

S. A. LAMPLUGH, LTD.

Stand No. 117.

The whole range of this firm's sets and components will be showing, interesting items amongst the latter being the "Neutracon" and the Micro station-



One of the long-wave A.N.P. coils being shown at the Metro-Vick Stands.

selector. New arrivals include the "Quality" L.F. transformer and aerial reaction tuner.

Particularly interesting amongst the complete sets is the Long-Range Five-Valve Receiver designed by W. James, and recently described in detail in "Modern Wireless."

LANGHAM (DIAMOND-CLEAR) RADIO.

Stand No. 105.

A four-valve portable set will be on view here. It is a 30-guinea instrument, tuned by one dial, and employing two stages of H.F. amplification. The loud speaker is fitted in the lid, so that the set is completely self-contained.

LETRO LINX, LTD.

Stand No. 227.

Amongst the handy gadgets which will be displayed by this firm are "Clix" terminals, wander-plugs, multi-plugs, spade terminals, and pin-terminals. Although the bulk of the Clix specialities were exhibited at the National Radio Show at Olympia last year, a great deal of study has been given to the improvement in finish and perfection of design of all the various models.

A special feature of the stand will be the Clix Counter Showcase. This is intended to be exhibited eventually on the counters of all the reputable radio dealers in the country, and it should provide a great service to purchasers of this class of goods, as this case contains a comprehensive range of terminals calculated to satisfy the needs of even the most fastidious buyer.

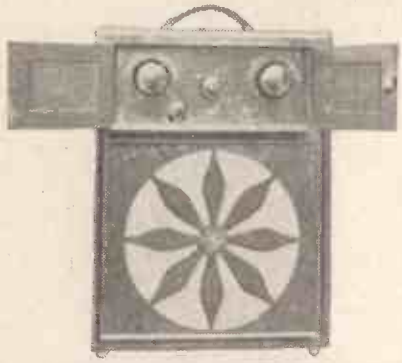
LISSEN, LTD.

Stands No. 158 & 160.

An excellent and easy method of making a loud speaker for one's self will be demonstrated here, and is sure to provoke tremendous interest, both amongst the old hands and those who are only now toying with the delights of loud-speaker reproduction.

Besides the how-to-make demonstrations there will be completely manufactured loud speakers of both horn and disc types on view, as well as a pair of extremely light headphones, only recently perfected.

Yet another novelty showing is an entirely new type of variable condenser. The latest additions to the low-priced Lissen range of H.T. batteries,



The "Nulli Secundus" Three (C. Creswick Atkinson).

and an electrical pick-up device for attaching to any gramophone, are other items which call for special mention in the very wide selection of components and accessories displayed on these attractive stands.

LITHANODE CO., LTD.

Stand No. 204.

A new unspillable L.T. accumulator will be showing here, of special interest to those requiring a portable battery. Another new Lithanode product is an H.T. accumulator of special design which is so safeguarded against self-discharge that it is claimed to be specially suitable for the man who leaves his batteries for months without re-charging.

W. & T. LOCK.

Stand No. 220.

A full range of cabinets is the feature of this exhibit. Various finishes, such as oak, mahogany, and lacquer, will be available, and, in addition to cabinets for sets, there will be a show of loud-speaker cabinets.

LONDON ELECTRIC STORES, LTD.

Stand No. 221.

All the L.E.S. products will be shown here, and in addition there will be other lines represented. Probably the centre of interest at this stall will be the radio control clock, which can be arranged to automatically bring the set into action at a predetermined time.

LONDON ELECTRIC WIRE CO. & SMITHS, LTD.

Stand No. 113.

All the Lewcos coils will be showing here, as well as "Glazite" wire and the various other specialities with which this firm is associated. In addition to the screened coils and bases, and the well-known Lewcos X coils, several new varieties will be displayed, the first being a type of binocular coil which is made to be interchangeable with the ordinary six-pin type. (These coils are supplied in ten types.) Another novelty is the Lewcos centre-tapped inductance coil, fitting into an ordinary plug-and-socket holder, and with a spring-contact plug for making the centre-tap connection.

Then there is the Lewcos dual-screened coil. This represents the latest development in screening, and comprises the standard short-wave coil of 250-550 metres and the long-wave coil of 1,000-2,000 metres incorporated as one unit. These dual coils may be supplied in single units, such as a Reinartz aerial

A neat "Mains" receiver displayed by Climax Radio Electric, Ltd.

coil, or in multi units containing one aerial coil and either one or two split primary H.F. transformers.

A novel feature is the single gang control, by means of which the change over from short wave to long wave may be effected by a single turn of the knob.

LONDON METAL WAREHOUSES, LTD.

Stand No. 13.

Wire of all kinds will be the feature of this stand, with particular reference to the various types of aerial wire that are now in demand for indoor and outdoor aerials.

L. McMICHAEL, LTD.

Stand No. 120.

Here will be shown a full range of the well-known "Dimic" and "M-H" brands, and as well as the old favourites there will be a large number of new lines. Components that will claim special attention are the H.F. chokes and L.F. chokes, and the recently introduced push-pull type of multiple switches with self-cleaning contacts.

Amongst the M-H range of complete receivers there will be several new arrivals showing, including a four-valve and a five-valve portable. Especially interesting are two sets for home assembly, one being a six-valve portable designed for short-wave reception and the other a three-valver called the "Dimic 3," about which a fully illustrated booklet can be obtained.

M.P.A. WIRELESS.

Stand No. 57.

Transportable receivers and cabinet sets that are completely self-contained are the attractions at this stand, as well as several new types of loud speaker. The Transportable Three has a switch for

An R.C. Coupler of distinctive design (R.I.-Varley).

long or short waves, and it is claimed that 5 X X can be received up to 500 miles.

An unusual feature of the M.P.A. loud speaker is that its diaphragm is mounted to a sounding-board by means of four sprung fingers.

MANUFACTURERS' ACCESSORIES CO., LTD.

Stand No. 219.

Practically all wireless sets, components, and accessories are handled by this organisation, as well as the associated tools and sundries.

MARCONIPHONE CO., LTD.

Stands Nos. 54, 128, 129, 130, 131, 132, 133, 134 & 135.

This tremendous block of stands—the largest taken by any exhibitor—is none too large to display all the Marconiphone Co.'s products. The valves would be an exhibition in themselves, including as they do the new Marconi shielded valve the already famous S.625. It is not too much to say that this valve, with its possibilities of enormous amplification and complete stability, opens up a new vista of long-distance listening. Extremely interesting, too, are the valves run direct from the A.C. mains with an indirectly heated cathode.

It is impossible to mention all the outstanding items of interest in such a large exhibit, so, beyond recording that the complete and comprehensive Marconiphone range is on show, mention can be made only of the interesting line of complete sets, including receivers in which all batteries are eliminated, the power being taken entirely from the mains.

Anticipating a heavy demand for the new shielded valve amongst home-constructors, the Marconiphone Co. have produced constructional models of several entirely new receivers. These include four-valve, five-valve, and six-valve models, incorporating the new four-electrode shielded or

(*Continued on next page*).

MORE ABOUT THE EXHIBITION.

(Continued from previous page.)

screened valve, (the S.625,) which is referred to above. Undoubtedly this valve and the sets in which it is utilised will provide one of the chief centres of interest in the whole Radio Exhibition, and nobody who is keenly interested in radio development can afford to miss this opportunity of learning as much as possible about this new Aladdin's lamp.

C. D. MELHUISH.

Stand No. 231.

Here will be exhibited a full range of the C.D.M. productions. They include a great many of the components which are required in any type of set, and in addition various refinements and gadgets. A wide variety of components will be on view, including H.F. chokes, variable condensers, combined grid leaks and condensers, fixed condensers, vernier-dials, and so forth.

An example of the Dubilier Mica Condensers.

The vernier dial is of a very unusual type, which provides two different ratios of movement, for that fine degree of tuning which is now becoming so essential. A feature of the construction is a fixed vernier cam, fitted with a set screw by means of which the different ratios can be obtained. (In effect this makes it possible to obtain three different speeds with the same dial.)

METRO-VICK SUPPLIES, LTD.

Stands Nos. 155 and 156.

Cosmos components, accessories and valves can always be sure of attracting attention, and in addition to all the well-known products of this firm that will be on view there will be shown a very large variety of new lines. Of special interest in the regular items that will be showing are the Cosmos Shortpath valves, the Cosmos Resistance-capacity coupling unit, and the range of receiving sets for which this firm is famous.

Newcomers to the Cosmos family include an interesting range of tuning coils. These coils are astatically wound, the object being to reduce the stray magnetic field to a minimum, and so save troubles due to accidental feed-back, and cross coupling of the various circuits. This line is styled the A.N.P. Tuning Coils, the initials standing for "astatic non-parasitic." When two or more of these coils are embodied in a set they should be mounted with their axes parallel.

Upon these coils there are centre-tapping and quarter-tapping points provided, the former being for use under normal reception conditions, with valves of high anode impedance. The quarter-tapping is for use in cases where the degree of selectivity required is so high that a very loose coupling is essential. The coils are made in four types, to cover the short, B.B.C., medium, and long wave-lengths.

For use with alternating-current lighting mains there are a number of new Cosmos products, including Shortpath valves with indirectly heated cathodes. These valves require no low-tension or high-tension batteries, the power to operate the set being derived entirely from the mains. An adaptor is provided so that the valves can easily be used in a set which is wired for the ordinary type of four-pin valves.

A five-valve receiver, designed to provide plenty of alternative programmes, is another attractive feature of the new exhibits at these stands. The circuit is arranged for two stages of H.F. amplification, detector, and two L.F. stages. The set is put up in cabinet form, in various styles, and employs the new A.N.P. coils mentioned above. Altogether the Cosmos exhibit is an outstanding one, and is sure to prove a big attraction in this part of the main hall.

One of the new units for taking H.T. current from the mains (E. K. Cole, Ltd.).

MULLARD RADIO VALVE CO., LTD.

Stands Nos. 40, 44, 164, 165 and 166.

Stand No. 40 has been taken by the Mullard Co. in connection with "Radio for the Million." This, it will be remembered, is the constructional booklet about the popular P.M. home-constructed receivers. A special double number has now been issued, and so great is the expected demand that Stand 40 is entirely given up to "Radio for the Million."

On the other stands occupied by this firm will be shown the whole range of the Mullard products. And it will be the sort of show that one cannot afford to miss! Valves, of course, will have pride of place. Every type of the 2-volt, 4-volt and 6-volt will be represented, in all varieties.

Another of the P.M. products that will attract a lot of attention is the Pure Music loud speaker, and yet another that will forcibly bid for favour is the P.M. resistance-capacity coupling unit. A particularly interesting feature of this unit is the H.F. stopper which is incorporated in it. The object, of course, is to prevent H.F. impulses finding their way into the L.F. side of the set, and those who have experienced the peculiarly distressing distortion that can arise from this source will welcome a unit that automatically prevents the trouble.

The new Marconi and Osram shielded-grid valve, the advent of which has created a furore.

In the new Mullard lines particular attention has been given to the supply problem, and an L.T. battery charger has been designed which automatically cuts itself out of action when the battery is fully charged. All you do is to put it on before going to bed, and let it work while you sleep. (By the way, "P.M." is a good and appropriate name for an all-night gadget of this kind, isn't it?)

The new Mullard grid leak will also be on view. It is obtainable in values ranging from ·1 to 5 megohms, and being of standard size is readily fitted into an existing set.

NEW LONDON ELECTRON WORKS, LTD.

Stand No. 70.

An earth-mat is one of the interesting features of this display. In addition there is the "Superial," boxed in 100-ft. lengths, and the "Simple-Strip." This latter enables sets to be wired up without solder, and is retailed in convenient boxes of 12-ft. lengths.

Recent introductions into the lines offered by this firm are the Electron loud speakers, of which there are both horn and cabinet types available.

OLDHAM AND SONS, LTD.

Stand No. 71.

People interested in all sorts of accumulators will accumulate round this stand, for here will be shown a full range of this famous firm's products. High-tension, low-tension, portable, and indeed any type or class of secondary battery for use with radio receivers will be on view, so that there should be no difficulty in making a selection even if your requirements are a little out of the ordinary run.

ORMOND ENGINEERING CO., LTD.

Stands Nos. 72 and 73.

Condensers, for which this firm is famous, will, of course, provide the main attraction at these stands, but in addition there are several new Ormond products which will make a bid for public favour. It is said that for the first time Ormonds will this year be displaying complete receiving sets, ranging from a two-valver up to a five-valve portable; but details of these have not reached us up to the time of writing.

A tapped wire-wound anode resistance (R.I.-Varley).

PELHAMS, LTD.

Stand No. 23.

What is an Axuel Automatic Programme Selector? The answer to this question is to be found upon this stand, where you will be introduced to a sort of clock which will switch your set on or off at any five minutes of the day or night—it's an "Axuel" fact!

Having settled upon the items you like in the programmes you can set the clock and forget it. And when you are ensconced in your chair for the last pipe of the day, and the announcer says "Good-night" so pleasantly, you can lean back undisturbed without the bother of getting up and switching off, for the Axuel will punctually perform its appointed task and see that your receiver is "put to bed."

A switch on the top of the time-piece is arranged so that the set can be switched on at any time without interference with the setting of the programme selector. The device is quite easy to instal, being merely connected in one of the leads from the low-tension battery to the set.

PETO SCOTT CO., LTD.

Stand No. 163.

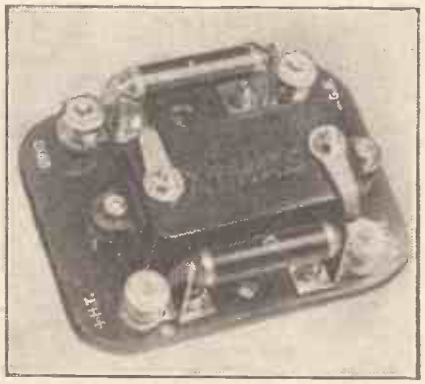
Besides a complete range of the components for which this firm is famous a very attractive display of complete receivers will be on show at this stand.

There is, for instance, the "Five-Fifty-One," which has nothing to do with nine minutes to six, as might be imagined, but indicates 5 valves, 50 stations, 1 dial. This £30-odd model (exclusive of valves, etc.), will "definitely tune in at least fifty stations at full loud-speaker strength, even in the hands of an absolute novice." There is only one tuning control, which is a slow-motion dial controlling a triple-gang condenser. No rheostats, no coil-changing, switch for local station, screened, and selective, it is made in either oak or mahogany.

The "Three-Thirty-One," three valves, thirty stations, one dial, the "Sociable Three," the "Solo-dial Two," the "Sociable Five Portable," and the "Sociable Four Portable," are other examples of complete Peto-Scott receivers on view, and in addition there is an attractive wave-meter range.

The Keystone and Copex components include a Universal "log" variable condenser, which has the advantage of being adaptable to different circuits, two or more of these condensers being easily gauged together by means of a small spanner in a very few minutes. The Keystone Multi-neut condenser was

(*Continued on page* 227.)



An "Atlas" Resistance-Capacity Coupling unit, with interchangeable resistances.

Brandes Variable Condenser
·0003 at 15/- ·0005 at 15/6

(Continued)

retaining the compactness so essential in an instrument at the back of the panel.

A positive movement for approximate setting is obtained by turning the 4-inch diameter dial, which is provided with finger grips for this purpose. The final critical setting is obtained by turning the 2½-inch knob which actuates the slow-motion mechanism, Low di-electric losses and the complete absence of backlash are ensured.

OTHER BRANDES PRODUCTS:

The Brandeset IIIa ..	6 : 15 : 0
The Ellipticon	4 : 15 : 0
The Brandola	2 : 17 : 6
The Table-Talker	1 : 10 : 0
The Table Cone	1 : 19 : 6
The Audio Transformers .	15/- & 15/6
The Matched Tone Headphones ..	13/6

Send coupon for full information.

Brandes

the name to know in radio.

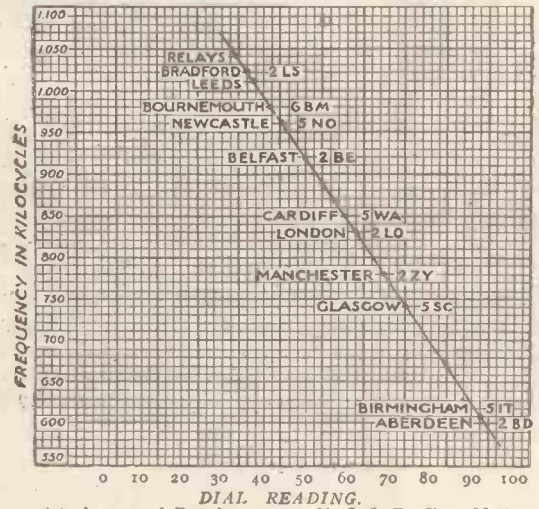
—fine critical setting & uniform separation

The Brandes Variable Condenser brings the most nerveless hand a faculty for expert delicacy over the sensitive spots.

It is sturdily built and gives clear-cut tuning and precise operation. It is obvious that a condenser in which the dial reading varies directly as the frequency will give a more uniform separation of stations than one in which the dial reading varies directly as the wave-length. This is particularly apparent in the Brandes Condenser, and is most pronounced in the lower wave-lengths.

This condenser has been specially designed to provide a straight-line frequency tuning characteristic and to bring in the B.B.C. Stations well spaced out over the major portion of the dial, at the same time

A typical tuning curve is shown below :—



Actual curve of Brandes ·0005 mfd. S. L. F. Slow Motion Condenser used with a loose-coupled circuit comprising No. 35 untuned aerial coil and No. 50 tuned secondary coil.

Brandes Ltd.,
2/3, Norfolk St., Strand, W.C.2
Please send me your free illustrated catalogue.

Name .....

Address .....

.....

P.W. 1

Brandes products are only obtainable where you see this sign.

MORE ABOUT THE EXHIBITION.

(Continued from page 224.)

designed to meet the need for a twin neutralising condenser, but it can also be used for balancing out stray capacities and as a "trimmer" between the different sections of a gang condenser.

PETTIGREW AND MERRIMAN (1925), LTD.

Stand No. 7.

A number of new lines will be on view, including H.T. Mains Battery Eliminators, and complete receivers that are driven from electric-light mains. There are three D.C. Eliminators and two for A.C., the former being called the "Junior," "Popular," and "Senior" models, respectively giving the following outputs 120 v./10 m.a., 120 v./20 m.a., and 150 v./50 m.a.

The two A.C. models have outputs corresponding with the "Popular" and "Senior" in the D.C. range, and are therefore called by the same names. In the "Seniors" the circuit employed enables the voltage to be practically constant, irrespective of the milliamperage drawn from the unit.

This resistance-holder can easily be mounted horizontally or vertically.

The mains-driven receivers are designed to entirely eliminate the use of the accumulator, high-tension battery, and grid-bias battery. It is claimed that by simply inserting an ordinary adaptor into a standard electric-light fitting, perfect reception is assured from local stations and Daventry.

Other interesting lines upon this stand are the Newey 4-point condensers for short-wave reception, the new "Phonos" cabinet loud speaker, and the five-valve "Phonos" portable receiver.

WATMEL WIRELESS, LTD.

Stand No. 1.

The Watmel wireless specialities on show include the variable grid leaks and anode resistances, for which this firm is famous, a compact little fixed condenser, and an L.F. auto-choke. The variable grid-leak is fitted with a special low-loss grid-condenser mounted at the end, the arrangement simplifying the wiring and enabling both components to occupy very little space inside the set, and to be mounted by a single one-hole fixing.

One of the new Lewcos Coils, with centre tapping.

Several new lines are being introduced by this firm, and for the first time will be on show, at stand No. 1 One interesting departure is a Watmel two-valve receiving set, and another new line is a fixed grid-condenser with clips to take any standard fixed grid-leak. This condenser is available in sizes up to '0005 mfd. and retails at 1s. 3d. Other attractive components recently added to the Watmel range are a fixed grid-leak and low-priced earthing clip.

PRINCES ELECTRICAL CLOCKS, LTD.

Stand No. 65.

On this stand will be shown a range of receivers, and also a compact little wave-trap known as the "Princeps."

The "Greater London" receiver incorporates the Prince-Percival circuit, and there is a three-valve portable set which has only recently been produced.

Amongst the new lines shown will be the "Princeps Concert" receiver, which can be furnished with its H.T. supply from either D.C. or A.C. mains, the "Trigger" circuit being incorporated. Another instrument known as the "Greater London de Luxe" employs no reaction, but has a tuned H.F. stage instead. It is a four-valve circuit, incorporating its own loud speaker.

W. G. PYE & CO.

Stand No. 136.

This well-known firm of precision instrument-makers are again this year showing a range of complete receivers of high quality. We understand that in addition there will be shown all the radio components which are manufactured as separate lines, including the series of chokes for all classes of low-frequency work.

A section of the display which is sure to arouse a good deal of interest is the space devoted to the Pye low-frequency transformers, for which this Cambridge firm is justly famed. Altogether, Stand No. 136 is not the kind of stand which the discriminating buyer who is out for high-quality goods can afford to miss.

R. I. & VARLEY, LTD.

Stands Nos. 5 & 143.

Many and interesting are the exhibits on these stands, as might have been expected when two such well-known firms as "R.I.'s" and "Varley's" have pooled their resources. As new valve developments are now in the air to an unprecedented degree, it is probable that more than anything else the R.I.-Varley contribution in this direction will be the centre of interest in the firm's display.

It takes the form of The "Interdyne" Receiver—the stability and selectivity of which is the result of the development of an entirely new valve by Dr. Robinson. In this valve there are two separate anodes, two grids joined together, and one filament, the latter being so disposed that it affects only one of the anodes.

The principle underlying the action is that any electrode capacities generated inside the valve are automatically cancelled, so that the maximum amplification can be obtained from the valve without instability, or the necessity for using external neutralising devices.

Two of these patent valves are fitted in the Interdyne, for providing amplification in the first two (H.F.) stages. Either four or five valves can be used, as required, a switch being provided, but the control is practically carried out by the single knob which operates the three condensers. There are two models of the Interdyne, that tuning from 250 to 550 metres costing £25, and the other which, in addition, covers 1,000 to 2,000 metres, costing £45. In the latter the change-over from short to long waves is made by three switches fitted inside the instrument.

Amongst this firm's components mention must be made of the R.C. coupler and the new H.F. choke. The former, with its Bi-duplex winding, is made in two varieties, type A being for use after valves with impedance of 15,000 to 40,000 ohms, and type B for use after valves of 30,000 to 100,000 ohms impedance.

The R.I.-Varley multi-cellular H.F. choke has an inductance of 60,000 microhenries, and is designed to choke efficiently over a range of from 30 to 4,000 metres.

In addition, the display includes a new general-purpose transformer with a ratio of four to one, a big range of resistances, and last, but not least, the new retro-active tuner; this compact component incorporates a .0003 mfd. tuning condenser and covers not only the shorter broadcasting wave-band, but right up to 3,000 metres.

ROOKE BROS., LTD.

Stand No. 215.

"Faradex" rheostats (both dual and baseboard types), and "Faradex" screened coils will be featured here, together with some new "Seaford" coils. These latter are of the six-pin type, wound on moulded formers.

REDFERN'S RUBBER WORKS, LTD.

Stand No. 84.

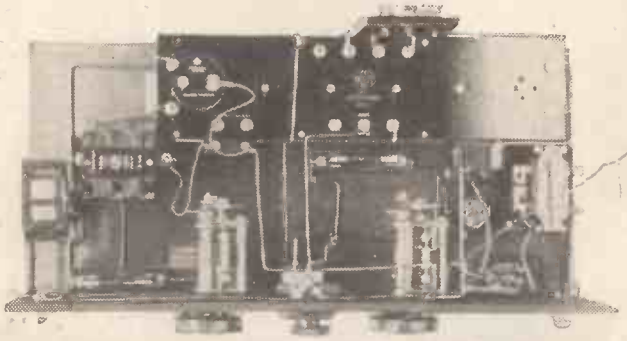
Ebonite and mouldings will form the staple attraction offered at this firm's stand. Redfern's Ebonart will be on view in panel form, in mahogany and black. It is noteworthy that the polished finish of the panels is non-metallic, and this season they are obtainable in nine new sizes.

For those who make their own coils there will be a selection of formers, including the Redfern Ebonite H.F. Choke former.

SIEMENS BROS. & CO., LTD.

Stand No. 150.

Radio batteries for H.T., L.T., and grid bias will be found in profusion upon this stand, the firm being well-known as specialists in batteries for over forty years. Many new items are being shown, including competitive type batteries, with small and large unit cells respectively. The former are for use with one, two or three general-purpose valves, whilst the latter (power type) are for multi-valve sets employing one or more power valves. These batteries are moderately priced to meet foreign competition.



A plan view of the McMichael six-valve Supersonic Unit.

There is also a line of rechargeable H.T. sac cells, with patent spring terminal, and of grid bias batteries with patent fixing flap. (This latter, by the way, was the invention of a well-known contributor to POPULAR WIRELESS.) Another very interesting feature of this firm's display is the radio testing voltmeter and combined volt and milliampere meter. These instruments are of the moving-coil type and are of extreme accuracy and robust construction.

A. J. STEVENS & CO., LTD.

Stands Nos. 27 and 159.

A complete range of the "Symphony" receivers will be one of the main features of this display, the models ranging from a two-valver (intended for the reproduction of the local and high-power stations on the loud speaker) to the Symphony Seven, which is a powerful super-heterodyne.

In addition, there will be shown the Symphony loud speakers, which include a Junior model and one of the cabinet type, as well as a new Symphony cone reproducer. The actuating movement of this latter instrument is unique in its magnetic system, being the result of over eighteen months' experiment and research.

A "Cosmos" Coil with many unusual features.

Another interesting newcomer on view will be the Symphony range portable receiver. This is a five-valver, with a range of 200 to 550 metres, and 1,000 to 2,000 metres. The circuit is 2 H.F., detector, and 2 L.F., the frame aerials, batteries and cone being included in the case.

This set is fitted with a single dial for control for tuning purposes, the other controls being one for volume, and a change-over switch so that the set can be used for long or short waves. This control also acts as a filament switch. The cone reproducer, which is incorporated, is fitted with the same

(Continued on next page.)

MORE ABOUT THE EXHIBITION.

(Continued from previous page.)

movement as the new Symphony reproducer, but it is slightly smaller. (Neither of these new cones have ever before been exhibited to the public.)

TRELLEBORG EBONITE WORKS, LTD.

Stand No. 91.

This is another ebonite display, and here that dark and useful commodity will be found rolled into rods, turned into tubes, and spread into sheets. Besides the Trelleborg ebonite itself there will be shown a number of wireless components and accessories made from it, so that anyone interested in the turned or moulded article will do well to pay this stand a visit.

TUNGSTONE ACCUMULATOR CO., LTD.

Stand No. 98.

This firm will be showing a very wide range of the De Luxe model Tungstone H.T. accumulators, from 12 volts to 96 volts, in steps of 12 volts. These accumulators have an actual capacity of three amperes, and they are fitted with a patent device for charging the batteries on an L.T. charging plant, at greatly-increased rates, which in the case of the 60-volter is two amps, instead of a quarter of an amp. It will be appreciated that this is an extremely great asset, and overcomes what has hitherto been considered as one of the really important drawbacks of H.T. accumulators.

One of the Gecophone Low-Frequency Transformers.

Another H.T. accumulator display will be of the well-known "Popular" models, in 30-volt and 60-volt units. The Tungstone Company will also be showing a complete range of L.T. batteries for wireless work. These accumulators have been specially designed for the slow-discharge work which is characteristic of radio L.T. supply, in capacities of 20, 40, 50, and 75 ampere-hours. They embody the revolutionary features of the Tungstone Car batteries, and are, in fact, interchangeable with these.

TURNER AND CO.

Stand No. 224.

The Tunewell and Tandco coils will be shown here, the former being of the enclosed type on low-loss formers. The Tandco coils also are encased in moulding, which, of course, adds materially to the mechanical strength and durability of the coils, as well as keeping them dust-proof and damp-proof.

A neutralising condenser for panel or baseboard mounting. (Bowyer-Lowe.)

UNIVERSAL BRACKET CO.

Stand No. 209.

Aerial fittings of all kinds are the speciality at this stand, and here will be found those gadgets for fixing aerials upon awkward roofs and chimneys which so often daunt the would-be aerial-erector. One corner-bracket that will be on view enables an aerial to be fitted to the highest point of the house, being fitted with an adjustable pulley which can be fixed at any angle required by the position and direction of the aerial wire.

C. A. VANDERVELL & CO., LTD.

Stands Nos. 157 and 212.

All the C. A. V. radio products will be showing, including this firm's popular line of loud speakers, and the complete receivers. Amongst the latter a Three-valve Baby Grand takes the eye as being an uncommonly handsome piece of work. Four- and five-valve models will also be displayed, the latter being equipped with a self-contained frame aerial.

"C.A.V.'s" are also putting on the market some new batteries for wireless work, and these will be showing at stands Nos. 157 and 212. They include a non-spillable 2-volt accumulator, in which a special jellied form of acid makes it possible to place the cell upon its side, or in fact upside-down, without any fear of acid being spilt.

With this C.A.V. battery, the electrolyte remains stationary whatever the cells position, so that it can be placed upside down or in any other unusual position without any danger of the electrolyte shifting and thus uncovering the plates and diminishing the active area.

Another new product is the 42-volt H.T. accumulator, specially designed to supply anode current to multi-valve sets. Tappings can be taken at any point and the battery is designed to be everlasting, as its vital parts can easily be removed.

WALKER BROS. (GUILDFORD), LTD.

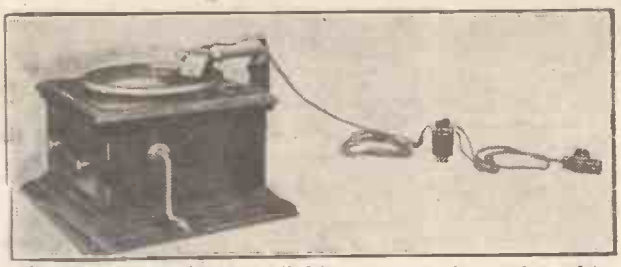
Stand No. 99.

All-wood loud speakers and horns are the attraction here, and in addition there are portable and self-contained cabinets of various types suitable for constructors. Wooden horns are available for practically all the different types of loud-speaker units.

WET H.T. BATTERY CO.

Stand No. 16.

Some very interesting features will be staged at this stand to demonstrate the efficiency of the wet type of H.T. battery. Arrangements have been made to show one battery giving off current of approximately 100 milliamperes during the whole run of the Exhibition, night and day, to demonstrate that the cells are quite capable of giving a comparatively large supply of continuous current over long periods without any falling-off of power.



The Igranic-Pacent "Phonovox" fitted on a gramophone and complete with plug for insertion in a receiving set.

Batteries at different voltages will be shown in sizes to suit from one-valve receivers to nine-valve super-heterodynes. An interesting display will be the demonstration of a seven-valve super-heterodyne supplied with anode current from a No. 3 size 91 cell wet H.T. battery.

Those contemplating the building up of their own batteries from wet cells will be interested in the new models showing, in which the necessity of soldering is completely done away with. This makes the job of assembling quite a simple one, somewhat after the style of a simple Meccano model.

This firm is also showing a wireless test meter, which reads voltages up to six and 120, with instructions for using as a milliammeter, reading from 1 to 35 milliamps. Large standard cells for supplying L.T. will also be on view, and sacs, zincs, jars, and electrolyte will be available for examination.

WEBB CONDENSER CO.

Stand No. 217.

This firm is showing a new type of wave-meter condenser, with aluminium end-plates. It is of low-loss design and logarithmic type, with a centre spindle run in ball-races.

WILLIAM WHITELEY, LTD.

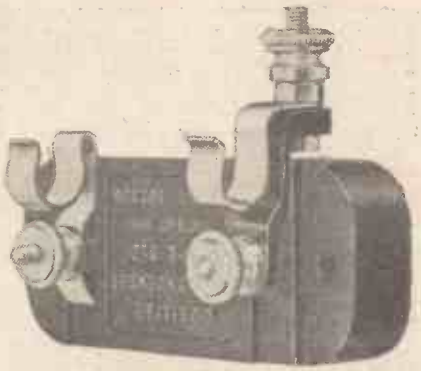
Stand No. 241.

The incursions into wireless of this famous firm of universal providers will be attractively displayed at Stand No. 241, and a very comprehensive range of all the lines dealt in will be sure to be worthy of the visitor's attention.

WHITELEY, BONEHAM & CO., LTD.

Stand No. 253.

The W.B. anti-phonic valve-holder (low-loss) and the cone cabinet loud speaker will be the leading features of this display. In addition to the regular line of cone cabinet loud speaker, which is made in Jacobean oak, there will be a new all-bakelite cone speaker on show. This is of bowl formation, standing upright upon neat feet, and fitted with an attractive open grill. The construction throughout is of bakelite.



The Dubilier insulating clip fixed in position on a grid condenser.

WILKINS & WRIGHT, LTD.

Stand No. 95.

The Utility Micro-dial has recently been redesigned by Messrs. Wilkins & Wright, Ltd., and the new model will be on show, together with several other interesting new lines. These include a neat on-off switch, and a logarithmic variable condenser.

In addition, there will be shown a complete range of the Utility components, including variable condensers of square-law S.L.F. types, neutrodynes, and "gangs." Jacks and plugs, and switches, including anti-capacity types, will also be in evidence here.

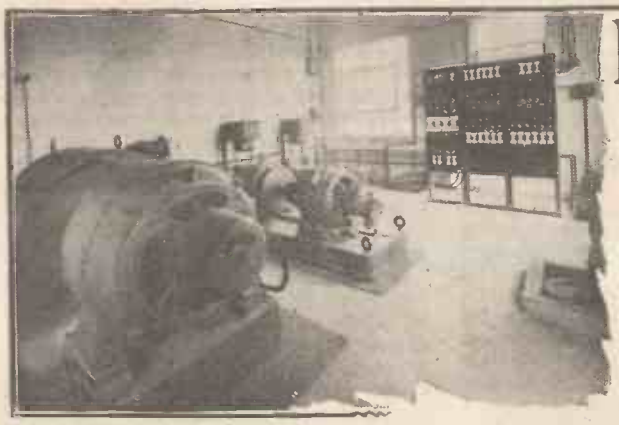
WRIGHT & WEAIRE, LTD.

Stand No. 253.

All the "Wearite" components will be here to tempt the constructor, and "all" includes change-over switches, multi-plug distributors, low-loss coil mounts and sockets, 2-way coil-holders, low-loss coil stand and coils, wire-wound anode resistances, plug switches, two-way geared coil-holder, anti-microphonic low-loss valve-socket, vario-coupled inductance and H.F. choke!

New lines of special interest include a neutralising condenser of very robust construction. It is controlled by a cam, and suitable for either baseboard or panel mounting. It is impossible for dust to get between the vanes or for these to touch and "short," and an extension handle can readily be fitted if required. Another very interesting new component is an automatic dual-coil holder, which not only controls the long or short range of wave-length as desired, but also switches the filament on and off. Thus the single control of the coil-holder controls the whole set.

One of the popular Oldham Low-tension Accumulators.



DAVENTRY JUNIOR IN THE NORTH

The author is a North countryman, but has, in the past, spent many years under the shadow of the aerial of the London broadcasting station. He is, therefore, well qualified to deal with the subject of reception in the northern provinces in an impartial manner, and his article should prove of assistance and interest to both listeners and the B.B.C.

By LAURENCE MANNING, A.M.I.R.E.

IN general, reception in the north is far better in every way than that in the south. By this we mean that, while aerials in the Metropolis, with only few exceptions, are screened by the proximity of London with its dense masses of metal buildings, aerials in the north, with smaller cities and towns, are not so badly screened. For this reason, it is found that, provided one lives outside 12 miles distance from a main, and more than 4 miles distance from a relay station, in order to obtain "selectivity" it is not invariably good practice to use stages of H.F. amplification, and often a comparatively "straight" detector followed by one transformer and one resistance-coupled valve, enables one to receive all that it is possible with the best receiver procurable, and, although possessing a super-heterodyne receiver, and several experimental 5-valve neutrodynes, the writer invariably, for general reception of even distant stations, used only three valves, in which no very particular provision is made for "selectivity."

"Screening" Effects.

The fact is, that the location of the receiving aerial is of great importance in wireless reception, while actual screening due to geographical formations is not to be ignored. It will be remembered, for instance, that the real reason for the erection of the first relay station (Sheffield) was that the 30-mile-distant Manchester station was quite inaudible in Yorkshire when a simple crystal circuit and average aerial was used, simply due to the screening of well-known hills between We use the word "screening" in a general kind of way to imply any kind of wave distortion or absorption which prevents reception when within reasonable range of a given station. As the fount of knowledge of the B.B.C., too, spends most of its time in the vicinity of Savoy Hill, it is perhaps not out of place for a North countryman, who has in the past spent many years under the shadow of 2 L O, and, incidentally, all his life in connection with wireless in some way or another, to write on the subject of reception in the north.

Before entering upon a discussion of the results obtained from 5 G B, it is as well to consider the reception obtainable with various types of receivers and aerials in Yorkshire, which we have found to be somewhat similar when observed in Lancashire at about 30 miles north of Manchester. Taking crystal sets (which appear to still be popular here) first, there is no doubt that many North countrymen obtain extraordinary reception results if they are blessed with "good" aerials.

This does not necessarily mean an aerial of gigantic height or exceptional length, but rather one ideally situated. In the country a few miles outside the town, we find it possible to receive main stations during the winter evenings, and nearby relay stations after 9 p.m. We find it possible, on occasion, to hear Langenberg and Berlin at pleasant strength, while other continental stations are possible on occasions, when they "kick the house down" when a loud-speaker set is used.

Popularity of Crystal Sets.

The majority of North country crystal-set enthusiasts are usually those who have had great success in distant reception, and many of them, mechanically inclined, as are all good North countrymen, utilise carborundum detectors with an applied voltage and potentiometer control. We have learned, too, the very great importance of a good earth, and it is not unusual to find a man who specialises on good crystal-set reception using three or more earth tubes, or a network of wires buried in his garden. Naturally, whatever type of receiver is used, this keen attention to matters like an efficient earth and the best possible aerial is bound to be all to the good, and incidentally assists in obtaining "selectivity without regrets," for the lower the resistance of any aerial system the better the ultimate selectivity.

Indoor Aerials.

At 100 miles distance from Daventry (5 X X) this station is received in the north by many crystal users. We have never dropped across a case, however, where crystal reception, which could actually be called real reception, is obtained with an indoor aerial, unless the location were extremely favourable, such as at the top of a high hill, or at a high portion of a town or city. It may be taken that, in order to receive 5 X X, therefore, listeners in the

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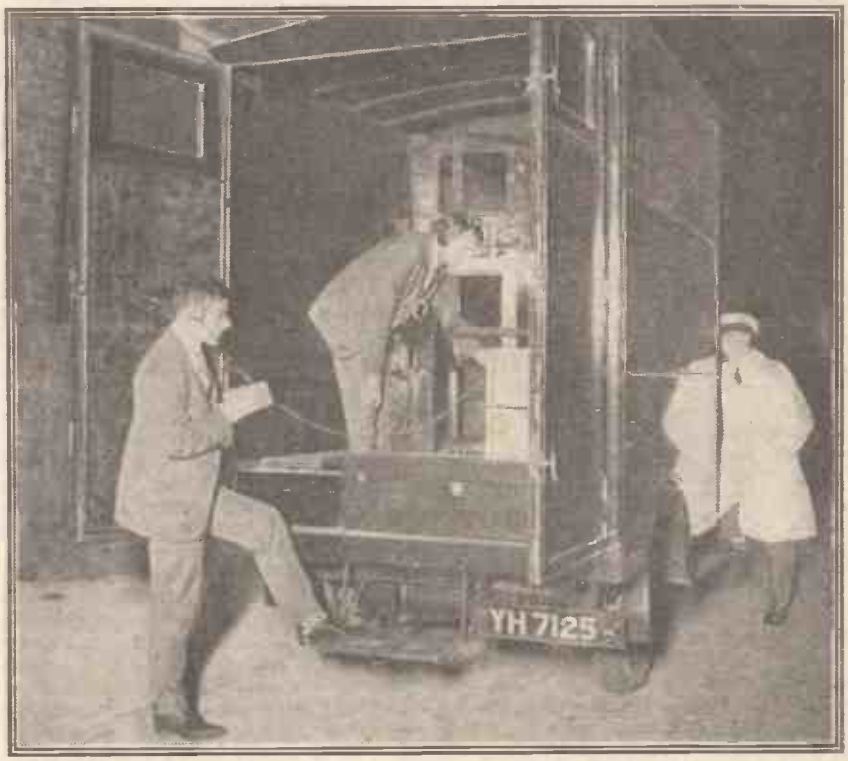


The B.B.C. van, which was recently touring Birmingham in order to discover how 5 G B is received in that area.

DAVENTRY JUNIOR IN THE NORTH.

(Continued from previous page.)

north with crystal sets either possess a good aerial location, or a high and directional aerial. In the heart of most Yorkshire towns, for instance, it is virtually impossible to receive Daventry with a crystal receiver, except in very special cases, while sometimes due to town interference from faulty tramway systems or adjacent electrical machinery, even with a valve receiver, reception of Daventry Senior is not always pleasant.

Use of Wave-Traps.

This, of course, does not appertain when reception just outside towns and cities is considered, and where no interference is felt. In passing, it may be of interest to southern readers to state that, generally speaking, one rarely experiences interference either from Daventry and the local station, or vice versa, no matter what type of set is used, unless one is very close to the local station and a wave-trap becomes necessary. It was when endeavouring to obtain distant reception for a friend living under the nose of a certain relay station that the writer designed the "Complete Eliminator" described in No. 193 of POPULAR WIRELESS, and again in No. 240, with an Editorial rider to the effect that it is "one of the most successful ever devised."

The most popular valve receiver in the north, and one which will give excellent results with both inferior and good aerials, is a straight three in which a detector is followed by two L.F. stages, coupled according to the constructor's ideas as to quality. There is a distinct leaning to reaction controlled in some way by a coil and condenser in series across plate and filament (Reinartz, Hartley, etc., etc.), which method, in proper hands, gives remarkably good reception, both from the selectivity and the "quality" standpoint; the latter is particularly pronounced if one of the two L.F. stages is R.C. coupled. In this connection, although we have inspected no end of receivers employing its principles, we have never been able to decide, other things being equal, which gives the best results, resistance before transformer, or vice versa.

5 G B—"Bitterly Disappointing."

Taken on the whole, the crystal reception obtained at 100 miles north of 5 G B has been bitterly disappointing. It is all very well for the B.B.C. to state that this and that should happen, adding a rider to the effect that most crystal users will have to erect enormous aerials (which they can neither afford nor accommodate) in order to hear 5 G B, but listeners, in the north at least, are just as conversant—probably more so, in many cases—as the B.B.C. experts, and really know what should happen from a 20 sic 30 kilowatt station transmitting on approximately 500 metres.

They have, for instance, had a great deal of experience from the powerful Langenberg, using a similar amount of power, but "made in Germany." It is no exaggeration to state, as far as actual results go, which are really all that matter, that the most simple of receivers, including crystal sets when used with a decent aerial, will receive Langenberg with a certain degree of success, marred occasionally by slight "fading," and if an aerial lies due east and west, or is in any way directional to Germany, results are frequently most pleasing. This notwithstanding Captain Eckersley's recent "Radio Times" dictum regarding "directional nonsense" in italics.

It has been a matter causing some considerable discussion among the listening fraternity in Lancashire and Yorkshire, that Langenberg modulation is perfect in every way, and what is more pleasing, with a permanent perfection. Here again the facts give the lie to the oft-repeated statement that our own stations are the best modulated in the world. At times, they may be; at others, the operator falls asleep.

Before leaving the matter of Langenberg we would state that in the North, towards the end of the programmes, this station improves with the advent of the well-known "night range" condition in an extraordinary manner, and is often much louder than a British main station 30 miles distant, and when at this strength rarely fades or boosts. At such times, the station is audible on a crystal receiver coupled to the worst possible type of indoor aerial.

The Preliminary Experiments.

Preliminary experiments before 5 G B actually happened, during the engineer tests which occurred when everybody should have been asleep, were promising. We cannot say if these engineers' tests were transmitted before the aerial alteration at 5 G B, but there is no doubt that signals were loud and clear on a crystal set at 100 miles distance, used with an outdoor aerial, and were audible enough to hear when the same set was used with an indoor aerial. After a few days, however, things began to be uninteresting from the crystal user's point of view, as day by day the strength became less.

We, in the North, of course, do not lose sight of the fact that thousands of aerials in the Birmingham district tuned to 5 G B will certainly cause some distortion and not a little absorption of the 5 G B emission, but, on the other hand, we still receive Langenberg at great strength when others receive Langenberg. It is conceded, too, that if the Daventry 5 G B aerial is made higher as is promised, an improvement may result, and crystal listeners here wish it would happen quickly. It is not thought, or even entertained, however, that this highering of the aerial will make an enormous amount of difference, and the opinion has been expressed in local papers that most listeners who cannot afford valve sets simply await the "Buxton Alternative"—for how long they will wait, nobody knows.

Where 5 G B Was "Woolly."

In the matter of valve reception, we have found that one pleasing point about 5 G B is that the station does not take up too many degrees of tuning condenser dial when a simple detector valve without H.F. stages or special provision for selectivity, is used. It will be clear then, that 5 G B does not interfere with Langenberg as a general rule, although in the short time the former has been working, we have observed that a few aerials which possess more length than height appear to require wave-traps or stages of H.F. in order completely to eliminate 5 G B when not required. But generally speaking, 5 G B may be tuned in and out within five or six degrees in a receiver possessing the benefits of properly controlled reaction.

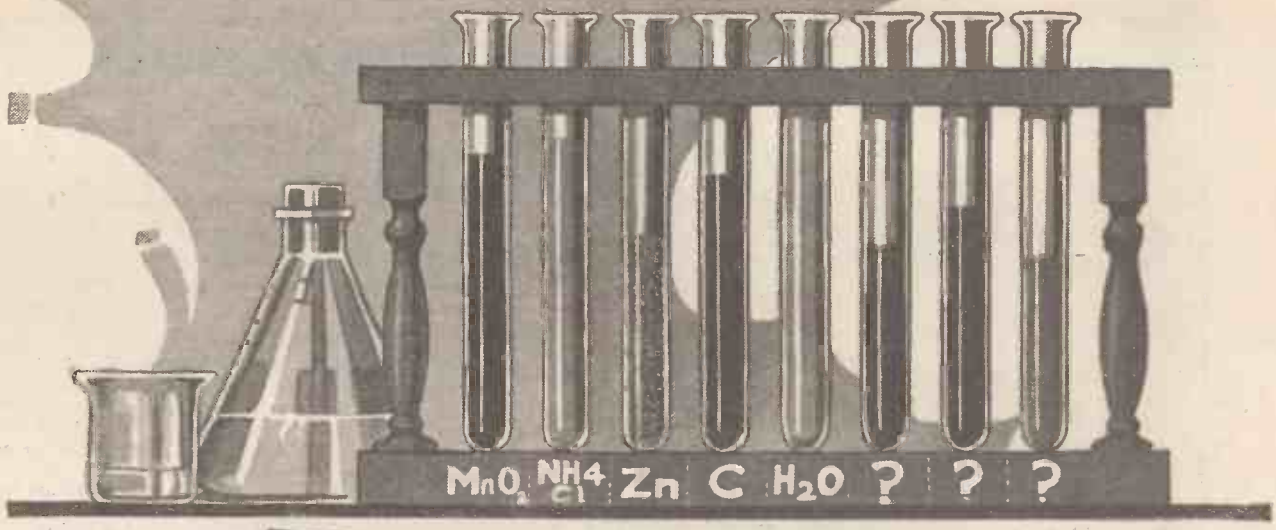
One cannot wind up an article in which 5 G B is discussed without mentioning that the modulation, which, by the way, is still being experimented with, is often extremely pleasing. Using a special R.C.-coupled amplifier following an anode bend detector, and adequate H.T., most excellent reproduction is obtained with a Kone speaker.

But not always; we were listening to 5 G B recently, occasionally slightly varying the tuning to receive Langenberg, and our suspicions were removed. Suspicions regarding the effective working of our receiver and amplifier, we mean; for Langenberg was perfect in every way, while 5 G B was decidedly woolly.

Previously, we would have stated that 5 G B was better than anything we have heard, but the distortion we often find on British stations, due, we are inclined to believe, to either indifferent landlines or careless control at Savoy Hill, was, that evening at least, permitted to affect 5 G B. Finally, may we say that for valve set users 5 G B is a good alternative programme in the North. For crystal-set users—a fiasco.

The Power House of the Klipheuvel Transmitting Beam Station, which is situated 30 miles N.E. of Cape Town.

THE SECRET IN THE TEST TUBES



Stand Nos. 158 and 160 National Radio Exhibition, Olympia, Sept. 24th—Oct. 1st.

What *are* the secret chemicals?

YOU KNOW THAT TEST TUBES and the minds of chemists have held secrets which have baffled discovery, but you may not know there have been none more sought after by battery makers than the one so jealously guarded inside each cell of the LISSEN New Process Battery, which makes each cell yield oxygen for your valves in a way *no other cell* does or has ever done before. Copious does not adequately describe this oxygen liberation of the LISSEN New Process Battery.

Since this new energy became available for valves tens of thousands of loud speakers all over the country are reproducing radio broadcast with a freshness of tone and a clear volume which is adding delight to radio. Whenever there is fine music to be heard by broadcast see that you have a LISSEN New Process Battery in your set and *hear your loud speaker voicing its appreciation.*

You pay shillings for this battery which many others would pay thousands of pounds for, yet 10,000 dealers are selling it at a price which has been made low to bring it within the reach of all.

The next time you want a good battery get a LISSEN New Process Battery. Take no other and you will be rewarded for your insistence by a new power smoothness and new tone clarity in your loud speaker.

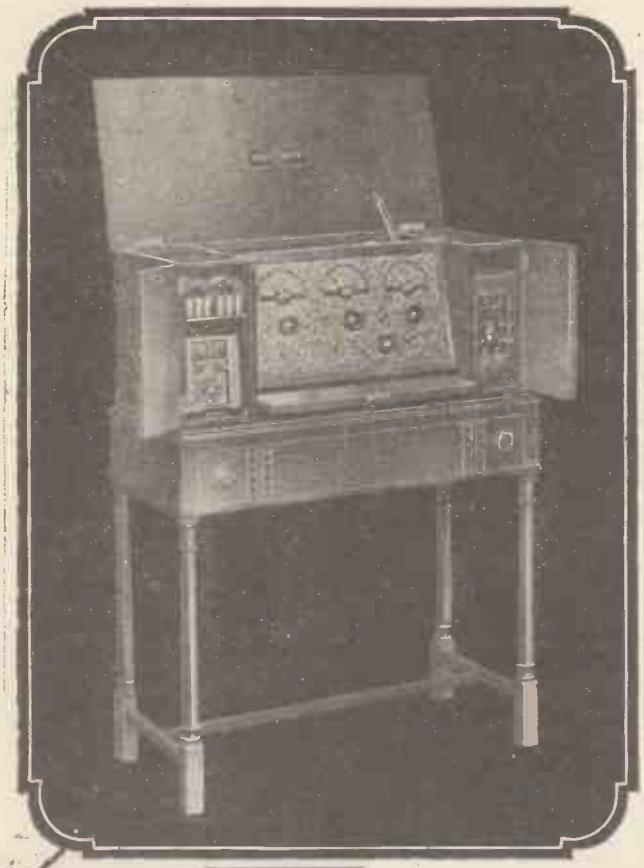
60 volts (reads 66) 7/11
100 volts (reads 108) - 12/11
9 volts (grid bias) - 1/6

LISSEN
SECRET PROCESS BATTERY

Now 10/6 7/11

LISSEN LIMITED, 8-16, FRIARS LANE, RICHMOND, SURREY.

L.412



MET-VICK
(COSMOS)
Wireless Sets and Components for the New Season

The illustration shows the new Met-Vick 5 with the eliminators contained in the side cupboards. It can be plugged into a lighting circuit just like any other Electric appliance. If used with H.T. and L.T. batteries these can be accommodated in the cupboards. The circuit employs two phase-balanced and stabilised H.F. stages before the detector, and two resistance-coupled L.F. stages.

Operation is extremely simple, the local station can be easily cut out and a wide range of alternative programmes obtained.

Special attention has been paid to running costs which are remarkably low.

The Met-Vick 5 is a really beautiful instrument and while a distinct advance on any 1926 model it still remains at a reasonable price. Obtain List 4117/9.

MET-VICK

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"Met-Vick" Battery Eliminators are supplied in two models. The H.T.-G.B. Model can be used on various supply voltages of 40-100 periods. Grid Bias tappings are provided at 5, 10, 15 and 20 volts. A high voltage (up to 250 volts) can be applied to the last valve. The L.T. Model gives an output of 5 amperes at 4 volts without hum.

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List 7117/8.

The various literature mentioned above gives full details and prices. Ask for your copies.

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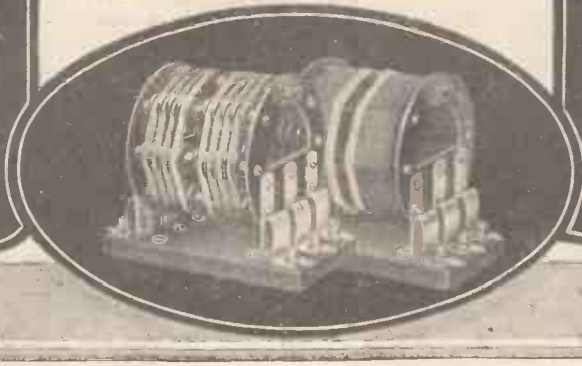
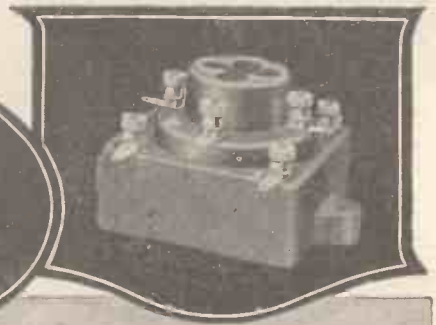




R
P 87

AMERICA CALLING

Some interesting notes on the present-day conditions of radio in the United States.

By LAWRENCE W. CORBETT.

(Our New York Correspondent.)

AS your correspondent writes, a fierce controversy rages in the British press. The discussion—and the ayes seem to outweigh the noes—relates to the advisability of the erection by the B.B.C. of a short-wave broadcasting station, to serve the dual purpose of catering to the experimentally inclined of the corporation's regular patrons and to attempt to make available the B.B.C.'s programmes in remote parts of the Empire.

An ornamental imitation "tilt-table" speaker made by the Crossley Radio Co. of America.

Since the efficacy of short waves has been so definitely established, it is with mingled feelings that the writer witnesses the backwardness of the B.B.C. in this matter. A recent mail brought the information that developments in the laboratory of Mr. Gerald Marcuse might influence a final decision by the broadcasting authorities. This might be taken as a very favourable outlook for we have much confidence in 2 N M, having heard his 'phone in New York on several occasions.

American Short-Wave Activities.

The surprising part of the whole matter to the reader is that the B.B.C. should still need to be convinced of the feasibility of short-wave communication by radio telephone. True, indeed, it is by no means perfected, but it assuredly has graduated from that embryonic state of mysticism in which it mouldered for so long before its exploitation by the amateur fraternity. Whether or not developments in the interim reduce to obsolescence those words by the time of their appearance in print, and despite the fact that they must appear out of place in a department purporting to disseminate wireless news of American origin, it is felt that their inclusion is justified by virtue of the fact that they probably express the general consensus of opinion of those American radio men who are watchful of developments in the British Isles.

And while the matter simmers in the B.B.C.'s teapot, activity marks the interest of the American broadcasters in the matter. In the United States there is the advantage that broadcasting stations are developed and controlled by private enterprise, and the official verbiage and red tape which accompanies every forward step of the British Corporation is there absent.

American initiative will provide at least six short-wave broadcasting stations for the delectation of the DX man this coming season (do we talk of seasons when considering short waves ?). It is probable, in fact, that they will all be on the air by the time this news appears in print, and others will be projected. In addition to "old-timers" 2 X A F (or 2 X A D) and K D K A's lusty little S.B. voice, W R N Y, W A B C, W H K, and W L W plan to S.B. all of their programmes on a short-wave channel.

New U.S. Wave-lengths.

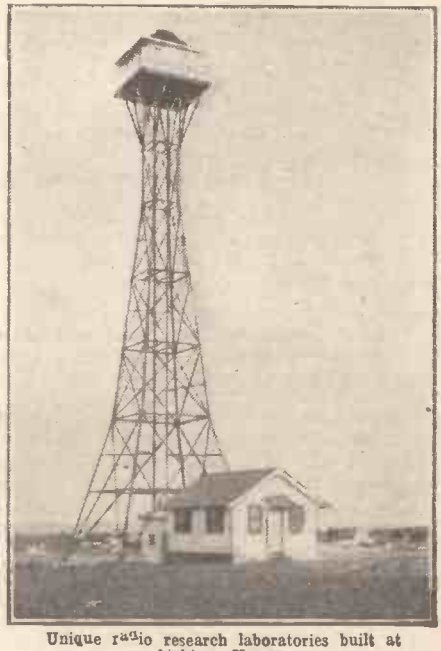
The Cincinnati station, W L W, has already been mentioned in these columns as broadcasting on the 50-metre band at the same time as its 420-odd metre wave. "Radio News" Magazine station, W R N Y, of New York, was delayed in getting its short-wave station on the air, but it is now licensed as a 500-watter operating on the tenth harmonic, 30·91 metres, of the parent station, whose regular wave-length is 309·1 metres. Cleveland's W H K will endeavour to annihilate distance on 66·04 metres simultaneously with its 263·3-metre wave. Station W A B C will be better remembered as the erstwhile W A H G, of Grebe, under new colours. The old W A H G was frequently heard in European and Australian countries. As pioneers in the development of short-wave equipment for amateur use, Grebe ought to be able to make a creditable job of sending out W A B C's programmes on a wave-length of probably between 50 and 60 metres. At the time of writing no definite information of this latter station is available, although it will probably be on the air by the time this article appears.

The Federal Radio Commission at Washington, only half satisfied with the broadcasting situation in the United States as it now stands, is looking for excuses to revoke the licences of perhaps two or three hundred broadcasting stations. The first stations to be hit in this move to weed out will be those which will not keep accurately to their assigned frequencies, and thereby heterodyne with other stations operating on adjoining frequencies.

Wide Wave-length Wanderings.

An order of the Radio Commission provides that a wandering of more than one-half kilocycle from the assigned frequencies by broadcasting stations will not be tolerated. Recent measurements made for the Radio Commission brought to light some wide discrepancies, one station in the New York area averaging a nightly deviation of over twenty kilocycles. As a matter of interest, the following official figures for some of the New York stations are given: W H N, approximately 6 kilocycles lower than the assigned channel of 760 kilocycles, an average of fifteen observations.

(Continued on next page.)



Unique radio research laboratories built at Atchison, Kansas.

AMERICA CALLING.

(Continued from previous page.)

W G L, 3·1 kilocycles from the assignment of 1,020 kilocyles in eighteen observations.

W R N Y, 2·4 kilocycles higher than its assignment of 970 kilocycles in ten measurements taken.

W M S G, 2·5 kilocycles deviation from its channel of 1,270 kilocycles in four readings.

W B N Y, deviation of 1·2 kilocycles in four observations.

Another form of American loud speaker.

W K B O, 6 kilocycles average deviation in thirteen observations.

W B B C, average deviation of 5·9 kilocycles in eight observations.

W S O M, 10·6 kilocycles deviation in ten observations.

W Q A O, average discrepancy of 3·1 kilocycles in two observations.

W O D A, 6·8 kilocycles average deviation in twelve measurements.

W N J, 4·6 kilocycles average deviation in fourteen observations.

W P A P, 3 kilocycles low.

W C G U, average deviation 5·2 kilocycles in nine observations.

W A R S, average discrepancy of 2·2 kilocycles in five readings.

W W R L, 1·7 kilocycles deviation in four readings.

W M B Q, 3·7 kilocycles deviation in four readings.

W C D A, average deviation of 21·7 kilocycles in three readings.

W L B X, deviation of 2·5 kilocycles in five readings.

W A A T, average deviation of 3·87 kilocycles in nine readings and found to be correct during four observations.

Why W C G U Wandered.

At the time of writing, no definite plan for elimination has been propounded. Many of the offending stations offered by way of excuse that they had ordered piezo-electric crystal equipment for maintaining their frequency at a constant level, but that it had not as yet been delivered by the manufacturer. True, indeed, the sudden demand upon the manufacturer for such equipment caused a temporary scarcity of crystal devices. One of the guilty broadcasters, W C G U, at Sea Gate, near New York, offered an interesting excuse for its deviation. The variations at this station, according to its chief engineer, are due to the rise and fall of the tide. The aerial of W C G U is only 75 feet from the sea, so an incoming tide tends to reduce its effective height from the ground (the surface of the waves in this case). Aerial capacity is thereby increased, with a consequent alteration of natural wave-length.

Interesting Legal Action.

Legal suit was recently instituted against W H N, New York City, by a firm of Broadway jewellers, and an effort will be made to collect $10,000 damages. According to the jewellers, a contract was made with W H N to broadcast the time hourly during the day for a year, mentioning the name of the jewellers at each announcement. The contract called for a price of $1,000 for this service, but the plaintiffs maintain that W H N, having signed the contract, failed to carry it through, afterwards deciding that $1,000 was inadequate remuneration for the service.

Cone Loud Speakers.

The cone loud speaker seems firmly established in the United States and it will not be long, the writer believes, before Europe too will generally adopt this form of loud speaker. According to a recent estimate, there are four million radio sets in the United States being used with cone loud speakers. As the total number of sets in use in America has been estimated as six and a half millions, it will be seen that the cone is favoured by a large majority.

A Record S.B.

Present indications show that there will be at least sixty American broadcasting stations tied together to simultaneously broadcast the proceedings and entertainment of the fourth annual radio industries banquet to be held on September 21st at the Hotel Astor, New York City. A conservative estimate puts the total number of broadcasters at over seventy, truly a stupendous tie-up—never before exceeded. The entertainment at the banquet will be even more extravagant than it was last year.

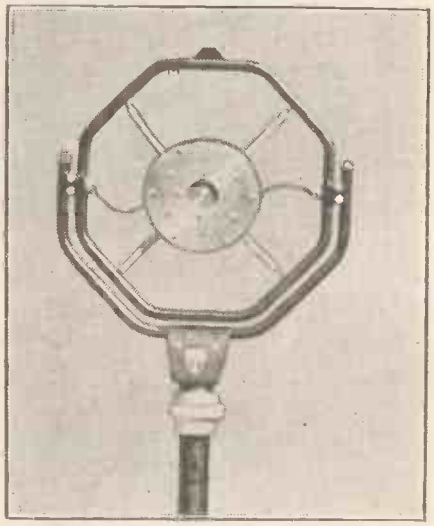
* * *

Station W H A M, Rochester, New York State, is going ahead with the construction of a new 5-kw. transmitter. This station should be a fair bet this winter for European DX enthusiasts.

An ornamental cone speaker that enjoys great popularity in the States.

Broadcast Finance !

How much does it cost to broadcast in America ? Figures recently made available now place the writer in a position to reply with accuracy. Suppose you wished to sponsor a one-hour programme over the "Red Network" of the National Broadcasting Company. The price would be $37,770.00. A pound sterling is worth about $4.85, so work it out for yourself. The "Red Network," incidentally, consists of a station in each of the following cities: New York, Boston, Hartford, Providence, Worcester, Portland (Maine), Philadelphia, Washington, Schenectady, Buffalo, Pittsburg, Cleveland, Detroit, Cincinnati, and Chicago. The "Blue Network," which includes stations in nine cities, sells its time for $2,800.00 per hour (about £580). The above rates are for periods between the hours of 7 p.m. and 11 p.m. Basic rates for other periods are one-half the above rates. A contract calling for a weekly one-hour broadcast is subject to a 15 per cent discount.



The microphone used for the transmission of meetings at the Victoria Hall, Geneva.

* * *

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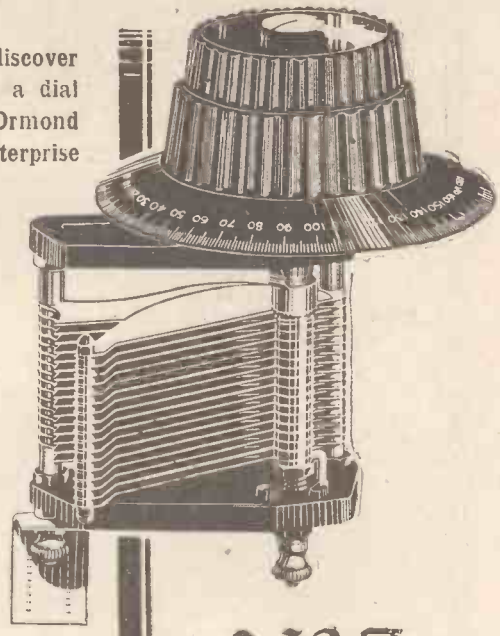

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Transformer Losses

An interesting article concerning one of the most vital of wireless components.
By J. F. CORRIGAN, M.Sc., A.I.C.

WHILST every wireless amateur is well familiar with the fact that there is no direct electrical connection between the primary and secondary windings of an L.F. transformer, yet there are some individuals who still harbour the mistaken notion that electric energy flows into and out of a transformer with as little loss as a current does when it flows through an ordinary coil of wire.

In a perfect transformer, this would be literally true, but with commercial instruments there is no gainsaying the fact that a loss of current does take place even in the most efficiently constructed transformer. Such a loss of energy is, of course, unavoidable, and in the best transformers it is kept down to an absolute minimum.

False Economy.

In the highest grades of L.F. transformers supplied for wireless purposes, the internal losses amount to about 3 per cent, but in transformers of inferior design and manufacture such losses may frequently mount up to the extent of 25 per cent. It will thus be evident that in most cases it is a very false economy to purchase inefficient transformers, for such instruments, in consequence of their excessive internal current losses, will inevitably prove unsatisfactory

After all, the L.F. transformer is one of the most vital components of any amplifying circuit, and if such an instrument is treated in a reasonable manner it will never deteriorate. Hence the use of the best possible transformer in a radio set is always a thoroughly good investment.

As we have seen, however, even in the highest grade L.F. transformer obtainable there is always some slight loss. It will thus be of interest to many readers if on this occasion we endeavour to obtain some idea of the causes which underlie these losses.

First of all then, let us go over very briefly the mode of working of an L.F. transformer. In an L.F. transformer we have two entirely separate windings which are well insulated from each other. A large number of turns of wire wound on a metal bobbin form the primary winding of the transformer.

On top of this winding is wrapped a few layers of insulating silk or other material, and over this is wound the secondary winding of the transformer which consists of a very large number of turns of fine wire. The bobbin containing the primary and secondary windings is then mounted on a metal frame or "core," after which the whole assembly is usually enclosed within a metal shroud, and mounted in a suitable and convenient manner.

Fig. 2.—A typical shrouded L.F. transformer.

Such, in outline, is the construction of a typical cheap L.F. transformer. Now, when a current is passed through the primary winding of the transformer it sets up a magnetic field in the immediate neighbourhood of the winding. This magnetic field consists of lines of magnetic force which radiate outwards from the primary winding. Consequently, they cut across the secondary winding which, as we have seen, is wound over the primary.

The Magnetic Field.

If the current in the primary winding is a steady one, the magnetic field created will also be a steady one, and it will have no effect on the secondary winding. If, however, the primary current is a fluctuating one, the intensity of the magnetic field will fluctuate in like manner. That is to say, it will expand and contract in sympathy with the fluctuations of the primary current.

The expanding and contracting magnetic field will then set up a fluctuating current in the secondary winding of the transformer, and the voltage of the secondary current thus created will depend, among other things, upon the number of turns of wire

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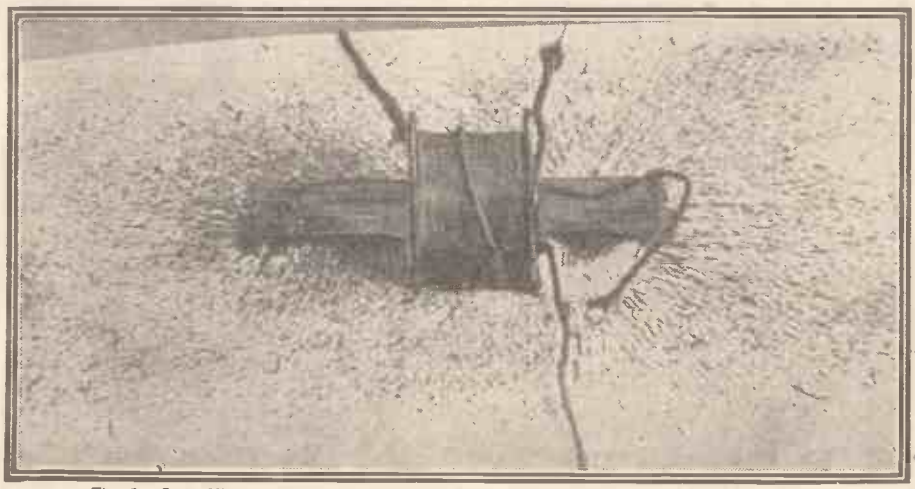


Fig. 1.—Iron filings give a good indication of the working principle of the L.F. transformer.

TRANSFORMER LOSSES.

(Continued from previous page.)

comprising the secondary winding. Hence, by varying the ratio of turns of wire in the primary winding to those in the secondary

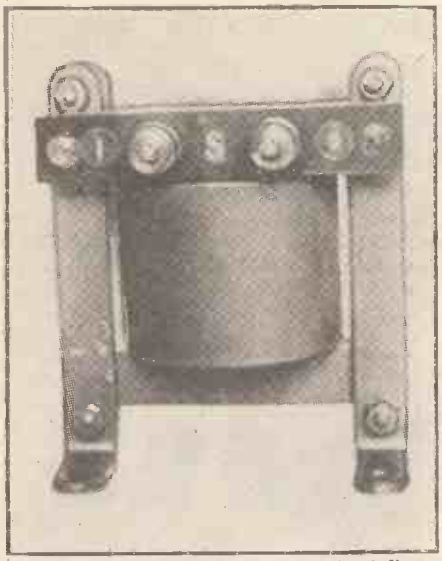


Fig. 3.—This transformer has no shroud, the windings being merely covered with cloth.

winding we can either increase or decrease the current voltage in the secondary winding.

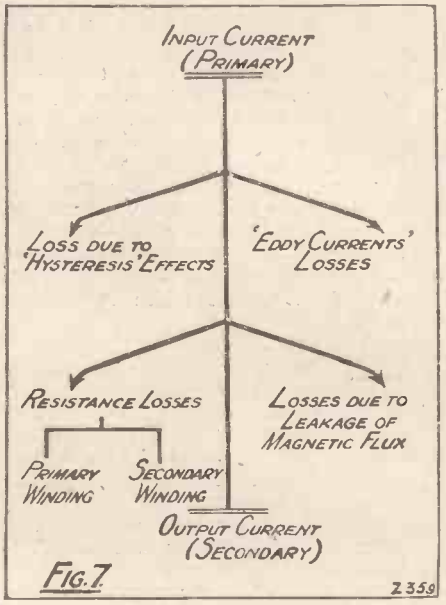
The "Step-up" Effect.

As we have seen, however, there is generally a larger number of turns of wire in the secondary winding of an L.F. transformer than there is in the primary, and therefore such transformers exert a "step-up" effect on the current. Thus the voltage delivered at the output terminals of the transformer is greater than the input voltage—the amperage of the current, however, being in like manner decreased.

In the photograph, Fig. 1, will be seen the lines of magnetic force which are created by a current flowing in the primary winding of the transformer. In the illustration we have a transformer bobbin containing the usual primary and secondary winding. In place of the usual transformer core, however, an ordinary straight core consisting of a bundle of iron wires has been supplied. The lines of magnetic force set up by the current flowing into the primary winding crowd into the core, from which they escape at the ends. By scattering iron filings over the card on which the coil and core are mounted, these lines of magnetic force are visibly displayed.

The Iron Core.

We may think of the current in the primary winding of a transformer being conveyed to the secondary winding by means of the lines of magnetic force which are set up around the former. Thus if, in a transformer, there is any leakage of magnetic force, some of the primary current will be lost. Here, therefore, comes the first source of transformer current loss. In order to minimise this loss of magnetic force, the cores of L.F. transformers are constructed in the form of a frame which completely surrounds both windings.



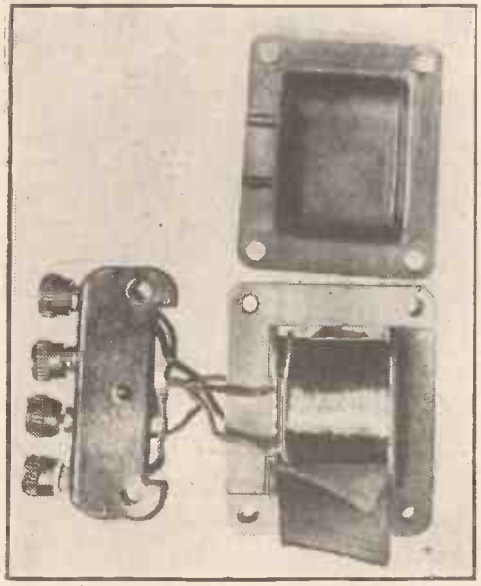


Fig. 4.—A shrouded transformer taken to pieces.

The lines of magnetic force therefore circulate around the core and are not readily dissipated into space. Also, in many cases, the transformer winding is shrouded with a metal covering, as in the photograph, Fig. 2. This construction tends to prevent the magnetic field from dissipating itself away from the windings. The metal shroud also, of course, has the effect of reducing any interference with the transformer from outside sources. In some cases, however, the transformer is not shrouded, an example of an unshrouded transformer being shown at Fig. 3.

Another set of losses which occur in transformers are those which are due to the resistance of the windings, both primary and secondary. The windings offer resistance to the current, and the current lost is dissipated in the form of heat. However, by having the wires as thick as possible, these resistance losses are, in good transformers, kept down to a minimum.

Two sets of losses which in a badly constructed transformer may rise to considerable amounts are those due to eddy currents and to hysteresis. Let us, therefore, consider these in some detail. Firstly, as regards eddy currents. When magnetic lines of force flow through the core of a transformer they cause wasteful currents to flow through the iron in a direction at right angles to the flow of magnetism.

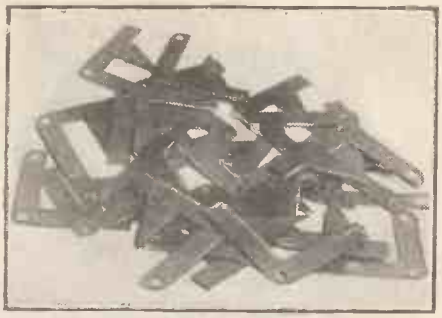


Fig. 6.—The pieces of stalloy forming the laminations.

If, therefore, the transformer core consisted of a solid mass of metal, the proportion of these eddy currents set up would be very considerable, and thus much energy would be lost. The cores of transformers, however, are made up of laminations, as shown in Fig. 5. The effect of having a laminated core is very greatly to reduce the proportion of eddy currents which are set up in the core.

Further, in transformers of the highest grade, these laminations are insulated from one another by the placing between them of some suitable medium, such as thin sheets of treated paper.

Explanation of "Hysteresis."

"Hysteresis" is a word which seems to frighten off many amateurs. Its meaning, however, is not difficult to understand. Reduced to its simplest terms, we can say that "hysteresis" denotes the molecular resistance of a metal to the flow of magnetism along it. We must remember in this connection that the magnetic force is constantly changing its direction of flow through the core of a transformer.

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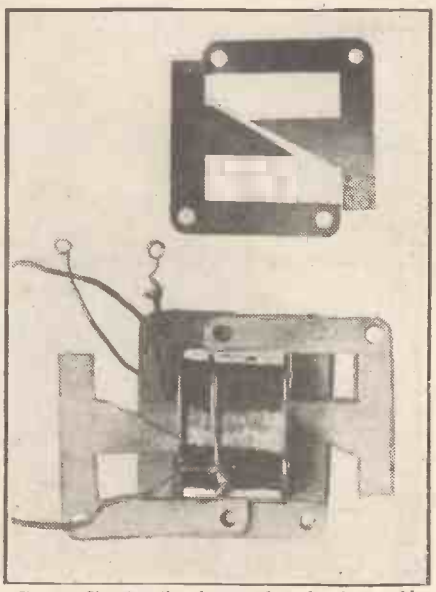


Fig. 5.—Showing the shape and mode of assembly of the laminated core

TECHNICAL NOTES — By Dr. J. H. T. ROBERTS, F.Inst.P.

THE TIME AMPLIFIER

CONE PATENTS—"DRY CRYSTALS," Etc.

SINCE the broadcasting of time-signals, anyone possessed of a wireless receiving set may now have Greenwich time in his home, and suggestions have been made for the design of special clocks which would either set themselves correct on the reception of the wireless time-signal, or would, in fact, be actuated by the signals.

The reception of exact Greenwich (or other standard) time is particularly important to watchmakers and clock manufacturers and repairers, and in view of this a well-known United States radio manufacturer has now placed on the market a small and compact instrument known as a "jeweller's time amplifier." This is particularly adapted for reception of the standard time signals transmitted daily by the Naval Observatory through the Arlington N A A station at Radio, Va. The instrument consists of a three-stage, long-wave amplifier and detector, completely encased in a drawn copper shield. The amplifier is carefully tuned at the factory to 112 kilocycles, or 2,677 metres—the wave-length on which N A A transmits the time-signals.

No Tuning.

To be put into operation the instrument requires four valves with the necessary batteries and aerial and earth. It is free of any tuning adjustments, and its operation is so simple that it is expected that it will appeal to the thousands of jewellers throughout the United States, who must have some standard time service for setting their clocks and watches.

Talking Shield.

Loud speakers have been produced in so many forms that it would seem to be a difficult matter to think of any new disguise. Incidentally, it is an open question as to whether there is any real point in disguising a loud speaker, and making it look like something which it is not.

However, the latest form of "artistic" loud speaker is a large shield about 18 in. high and 14 in. across, complete with swords and axes, of the 13th century type, the whole being adapted to be used as a wall decoration. The loud speaker itself, of course, is concealed behind this ornament in the usual way.

Cone Patents.

A patent action of considerable importance to the wireless industry has recently been decided on appeal in the United States Circuit Court at Philadelphia, the patent in question being that which was originally granted to Hopkins and now owned by the Lektophone Corporation, in respect of cone loud speakers.

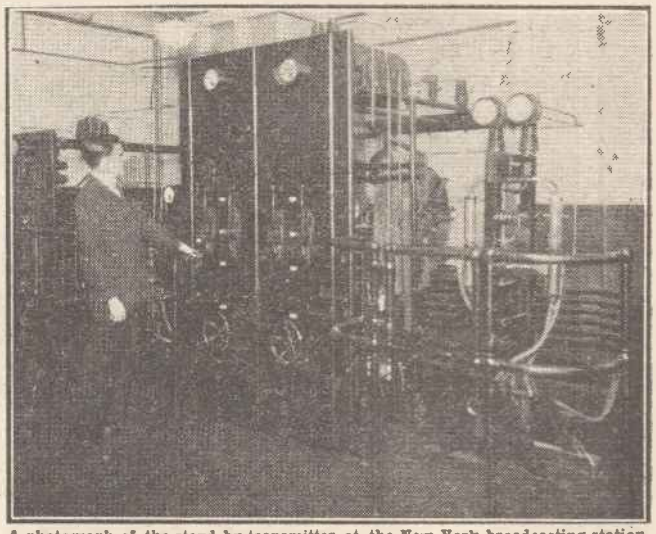
Recently this patent was declared invalid and, as some of the big corporations in America, including the R.C.A., had taken licences under the patent and had, in fact, already paid large sums by way of royalty, a very difficult situation arose. On appeal, however, the decision of the previous Court has been reversed and the Hopkins patent is declared valid.

"With protection assured to the manufacturers who are licensed under the Lektophone patents," said an official of the Lektophone Corporation, "these manufacturers can continue their work in developing cone type speakers to a higher degree of perfection even than at present, knowing that their improvements will be based on a patent that has been upheld."

This patent situation in the United States also affects the British industry, since certain British manufacturers hold licences under the patents in question.

"Dry Crystals."

The well-known United States journal, "Radio Broadcast," recently published a very interesting description of a so-called "dry crystal" rectifier, which has been satisfactorily used with a transformer for the purpose of low-rate battery charging. The writer has used crystal-type rectifiers for this purpose on many occasions, and has found that they can be quite successfully operated, but certain special arrangements have to be adopted in order to prevent the rectifiers from being burnt out.



A photograph of the stand-by transmitter at the New York broadcasting station, W G Y, showing the modulator and oscillator panels.

Battery Plates.

In the same article some interesting observations are given in connection with different types of battery plate. For instance, the solid plate such as is used in the "glass-box" type of cell is specially adapted for slow charge and slow discharge. This is principally owing to the fact that the lead peroxide in the interior of the positive plate is not so readily accessible, as in the case of a thin or laminated plate, and the same reason applies to the slow, normal rate of discharge. For use with a two- or three-valve set, cells of this type, however, may be very efficient and economical and they are, of course, particularly adapted for use with a trickle-charger.

On the other hand, where heavier currents are to be drawn from the battery, and where it is desired to charge the battery at a fast charging rate, it is preferable to use the multiple thin plate, or the laminated plate type. It is found that batteries which are adapted for fast charge and discharge are apt to suffer from plate disintegration if continually used at slow charge and discharge rates.

Neutralising Gravity.

Some very remarkable experiments upon quartz crystals are reported in the German radio journal, "Radio Umschau." It has been found by experiments in the Central Laboratory of the Nessartsaddin, Werke in Darredin, Poland, by Drs. Kowsky and Frost, that a piece of quartz placed between metal plates to which H.F. potentials are applied *loses weight*. The peculiar piezo-electric effect shown by quartz crystals (which was originally discovered by Monsieur Curie) is well-known, and it is probable that this effect recently discovered has some connection with the piezo-electric property.

When a quartz crystal was placed upon a balance (a pair of scales) and carefully balanced by means of weights in the other scale pan, it was found that on subjecting the quartz crystals to the influence of H.F. radiation the balance was upset, the scale pan containing the quartz crystal *rising*.

Increased Volume.

In another experiment, where considerable power was used, it was found that from a small crystal which originally measured about 5 × 2 × 1·5 millimetres, an opaque white body of about 10 centimetres cube resulted, or a total volume of about 8,000 times the original. The account of the experiment had perhaps better be quoted as follows:

"It was found that the specific gravity was reduced to a greater extent than the change in volume would have indicated, its weight having become practically negative. The energy employed in treating the crystal appears, however, as the counter effect of gravitation. It is the first time that experiments with gravitation at first hand have been possible, and it seems as if there were a method at last discovered to explain the inter-relations of gravity with electric and magnetic forces."

My readers may be a little sceptical as to the deductions made in the foregoing quotation, but there seems to be little doubt as to the authenticity of the account of the experiments themselves.

(*Continued on page* 263.)

BROADCAST NOTES.

FROM OUR BROADCASTING CORRESPONDENTS.

Musical Comedy Features—Lady Frances Balfour—In Memory of Jenny Lind—A Mezzo-Brow Revue at Belfast—"As Others See Us"—Community Singing—What About That Contrast?—Captain Eckersley in America.

Musical Comedy Features.

NEXT Wednesday (October 5th) 2 L O and 5 X X will give a complete broadcast version of Paul Rubens' play, "Miss Hook of Holland." This is given again because of its tremendous success on August Bank Holiday last. Huntley Wright, Dorothy Shale, and Dorothy Monkman are expected to take part. On Monday, October 10th, "The Lilac Domino" will be given from 2 L O and 5 X X, the leading part of André being played by Jamieson Dodds, who appeared in it when the play was first produced at the Empire in 1918.

Lady Frances Balfour.

Lady Frances Balfour will broadcast on Saturday, October 8th, from London, her subject being "The National Council of Women and Its Work." The B.B.C. appears to be inducing more and more of the titled aristocracy to grace the microphone with their active presence. It is understood that this acceptance in the best circles is due entirely to the activities of Miss Hilda Matheson, the new head of talks at Savoy Hill.

Miss Matheson's period as secretary to Viscountess Astor gave her a valuable connection in the "upper ten," which she took with her to the B.B.C. There is no doubt that listeners like a good sprinkling of titles in the programmes. If the B.B.C. were alive to the ease with which this feeling can be exploited, they would work a series of Lords and Ladies every season.

In Memory of Jenny Lind.

On Saturday, October 8th, Newcastle will give a special programme in memory of the great singer Jenny Lind. Although Jenny lived until 1887, she was an intimate friend of Mendelssohn, and was only twenty-three years older than Adelina Patti. During this special programme Evelyn Tierney, the coloratura soprano, will give a special selection of songs from the repertoire of the "Swedish Nightingale."

A Mezzo-Brow Revue at Belfast.

On Thursday, October 6th, at 7.45 p.m., Belfast will put on the air a mezzo-brow revue—representing a mid-way stage between the extremes of popular spectacular revue, and high-brow stuff, such as "Riverside Nights." There will be no jazz at all. The authors and composers are a formidable aggregation; sketches by Maurice Baring and L. du Garde Peach; lyrics by John Watt and Herbert Farjeon; and music by Claude de Ville, Harold Scott and Beverley Nichols (who is bursting into song lately). The artistes include Olive Grove, Phylis Scott, Harry Hopewell, Cyril Liddington, and Ivan Firth. This is a remarkable programme; but it is even more remarkable to note that the B.B.C. are not "S.B.-ing" it. Surely this is miles ahead of the ordinary run of stuff which will be on the air from the other stations?

"As Others See Us."

This is a stimulating title for a series of talks, and the names of those who will take part confirm expectations of satisfaction. Two distinguished Continental novelists, M. Andre Maurois, and Herr Lion Feuchtwanger have been booked. The latter is the author of "Jew Süss."

Community Singing.

The "Daily Express" and the B.B.C. are reviving their joint community singing sason with a special concert at the Queen's all on Saturday evening, October 8th. he broadcasting will be on a more generous cale than ever before; this time running the whole two hours from 8.30 to 10.30 p.m. It is understood that the sponsors of Community Singing have elaborated a much more ambitious programme for this year than they had last year.

The High Commissioner for Australia broadcasting his speech via 2 N M, Mr. Marcuse's amateur transmitting station. Mr. Marcuse contributes an article in this issue describing his first Empire broadcast.

What About That Contrast?

The first three weeks of 5 G B provided programmes excellently contrasted, and highly pleasing to most listeners concerned. Then there came a curious confusion and slump. Items were duplicated simultaneously; the same kinds of programme were put on both Daventry stations; something seemed to go wrong with the Savoy Hill organisation. This apparent collapse after such a brilliant opening may have serious consequences unless the Savoy Hill chiefs get on the job and restore the conditions of the first three weeks of alternative programmes from Daventry.

Captain Eckersley in America.

Captain Eckersley reaches the States early next week. Great plans have been made for his reception. As one American radio writer has pointed out, they propose to entertain the B.B.C. Chief Engineer so well that he will be heartily ashamed of the breaches of etiquette of which they accuse him after his last visit three years ago. Then a tremendous storm was caused by Captain Eckersley's attacks on American broadcasting after he returned to England. He says that all he did was to give a literal account of the conditions he discovered.

There are ways *and* ways of describing unpleasant conditions in other countries. Therefore, it is hoped this time that there may be no more "incidents" of the kind complained of three years ago. But Captain Eckersley is much more experienced in international matters now than he was then. For the Union Internationale de Radiophonie has come into existence in the interval, and Captain Eckersley has been the most prominent individual member.

One wonders what the versatile Chief Engineer will have to say when he gets before the "mike" in America. The Yankee radio fans like him when he is "playing the fool"; but he may be too cautious for this now. There are interesting rumours about Captain Eckersley's future. One of these is that he may stay in America; another is on his return, after a successful conference, he will go into manufacturing to produce on a large scale the ideal receivers which he has been writing about in a B.B.C. publication.

The latter is the more probable development, although he is certain to stay on at the B.B.C. until the Regional scheme is finished. This should net him a knighthood, after which the logical thing for him to do would be to make a fortune. His intimate friends say that he has given up hope of becoming head of the B.B.C., and is backing his brother "Roger" for the "succession" to Sir John Reith.

Another Triumph for LEWCOS!

THE LEWCOS DUAL-SCREENED COILS have been designed to facilitate the change from the 250-550 Broadcast Band to the longer waves used by Hilversum, Radio Paris, and Daventry. The change is effected by a switch incorporated in the coils and operated by a single panel control in the case of multi-coil sets and a lever in the case of the single Reinartz Aerial Coil.

The two and three gang sets are perfectly balanced before leaving the factory, and are suitable for use with the dual or triple gang condensers.

Ref. No. DRA/1	**Single Coil Units** Reinartz Aerial Coil - - - - -	Each £1 12 6
Ref. No. DSP/2	**Multi-Coil Units** The SP Aerial Coil and one split Primary HF Transformer with Reinartz Reaction - - - - - -	Per unit £3 7 6
Ref. No. DSP/3	One LP Aerial Coil and two split Primary HF Transformers, the last with Reinartz Reaction - - - -	Per unit £5 0 0

Note.—Multi-Coil Units are supplied complete with panel control as shown.

Obtainable through all wireless dealers. Full particulars from

The
LONDON ELECTRIC WIRE COMPANY & SMITH'S LTD.
Playhouse Yard, Golden Lane, London, E.C.1

No coil changing!

No removable screens!

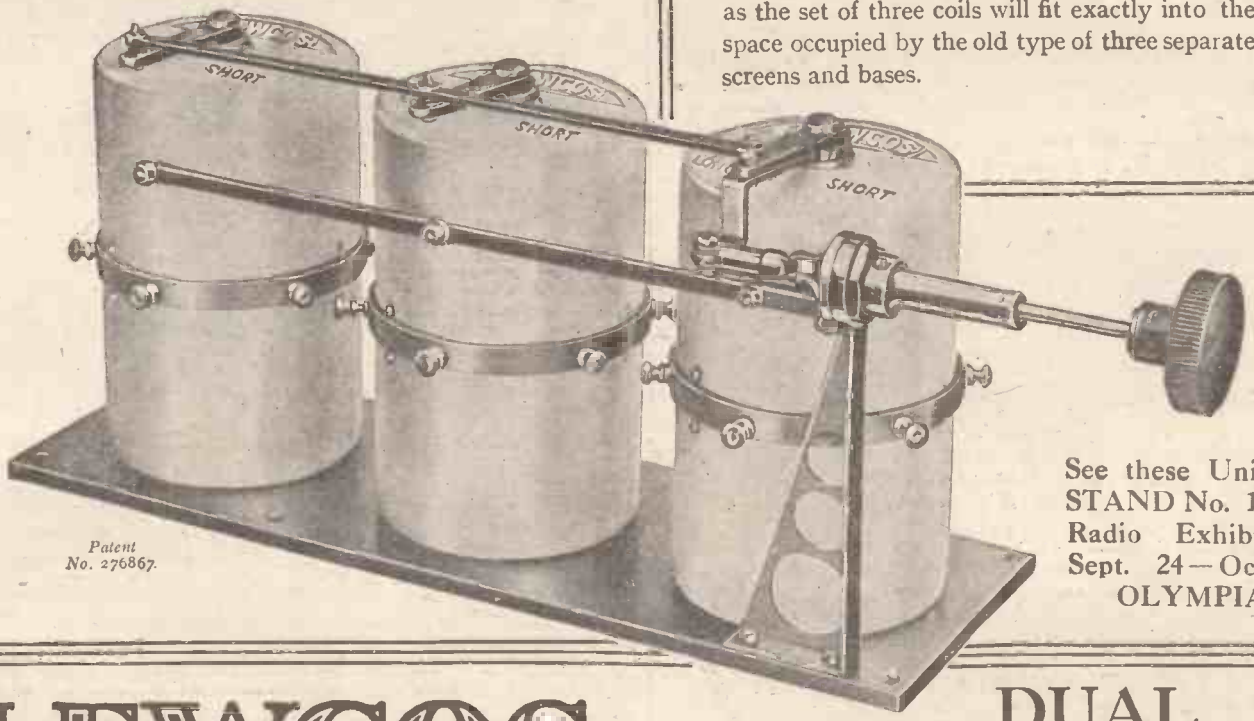
Perfectly balanced coils!

Panel Control
On multi-coil units!

Wavelength range
250/550 and 1,000/2,000 metres in one unit!

CONVERT YOUR EXISTING SOLODYNE

The set of coils DSP/3 is particularly suitable for the conversion of existing Solodyne Receivers as the set of three coils will fit exactly into the space occupied by the old type of three separate screens and bases.



Patent No. 276867.

See these Units at STAND No. 113, Radio Exhibition, Sept. 24—Oct. 1, OLYMPIA

LEWCOS
(Regd. Trade Mark)

DUAL SCREENED COILS

THE B.B.C.'s SHORT-WAVE EXPERIMENTS.

". . . the B.B.C. feels the time is close when the King may be invited to broadcast to the Empire.

By THE EDITOR.

WHETHER details of the B.B.C.'s short-wave experiments will have been further amplified by the time these words are read, remains to be seen. Anyway, at the time of writing the B.B.C. has changed its ground once more with regard to the Empire broadcasting controversy, and has announced a series of experiments due to begin in October.

Close observers of the B.B.C.'s policy are rather amused these days at the obvious way in which the B.B.C. has got itself entangled in its own short-wave contradictions.

When the successes of P C J J became generally public and questions were asked about the B.B.C.'s attitude, it was clear that Empire broadcasting had caught the B.B.C. napping.

A service was promised and then denied, excuses by the dozen were given, and finally (but rather late in the day) a definite statement of policy, which, in short, gave a series of reasons why the B.B.C. refused to be influenced by "unsound" proposals, "publicity stunts," etc.

Hard on the heels of this statement of policy came the B.B.C.'s announcement that, in its opinion, the time is close when it will be able to invite the King to address his 450 million subjects throughout the world by word of mouth, etc., and a promise of the October experiments above referred to, and a mysterious reference to a short-wave station being nearly finished and located near London—the site being kept a close secret..

The B.B.C. Wakes Up.

These latter announcements make interesting and welcome reading; but what is one to think of a policy which one day indicates that Empire broadcasting (from the B.B.C.'s point of view) is so uncertain that at least a year must elapse before the problem can be safely tackled in public, and then a change of front which indicates that the B.B.C. feels the time is close when the King may be invited to broadcast to the Empire?

One can only conclude that the B.B.C. was caught napping, and that P C J J and other short-wave stations had been more successful in development despite the B.B.C.'s claim to four years of intensive short-wave research work.

However, the main thing is that the B.B.C. is at last wide awake to the interest in and demand for a short-wave service, however experimental, and it is to be hoped that the B.B.C. will continue to experiment like P C J J, K D K A, etc., without sitting on the fence and waiting until technical progress has reached the fantastically high standards put forward by the B.B.C.

If we have to wait until those standards are achieved, we shall have to wait a very long time. As it is, Australia has got on with the job and has erected at Melbourne a 15 kw. short-wave station. Its transmissions cannot be guaranteed, nor can reception in this country; but it is a definite attempt towards the establishment of an Empire service, and a gesture which the B.B.C. should take advantage of without delay.

Whatever the result, there can be no doubt that the general opinion is against the policy of excuses hitherto made by the B.B.C. Perhaps the following criticism from the "Manchester Evening News" best sums up that opinion:

"I do not think anyone will find the statement made by the B.B.C. on Empire broadcasting very satisfactory. It is no argument to speak of it as 'being exploited as a publicity 'stunt.'

The P C J J Broadcasts.

"The demand for it has been, as a matter of fact, quite spontaneous, and comes from millions of users all over the Empire. What is the B.B.C. doing about it? It states that 'A carefully prearranged series of experiments has been in progress since 1923,' but it does not state what results these have produced. Incidentally, it is, I think, the first that has been heard of them.

"The general impression is that the B.B.C. has lagged behind in this matter, has allowed foreign and colonial enterprise to outdistance it, and was genuinely taken aback by the success of the Sydney relay last Sunday."

Readers will no doubt be keenly interested in the new series of P C J J broadcasts which begin late in September.

Past successes have encouraged the Phillips Lamp Co. to continue their experiments on a wave-length of 30·2 metres with a view to obtaining further data regarding the effect of light and also the effect of time on the transmissions.

Listeners are cordially invited to report on these transmissions and to give information concerning the skipping distance of these short-wave broadcasts.

The programme of transmission for the month, Sept. 13th—Oct. 13th is as follows:

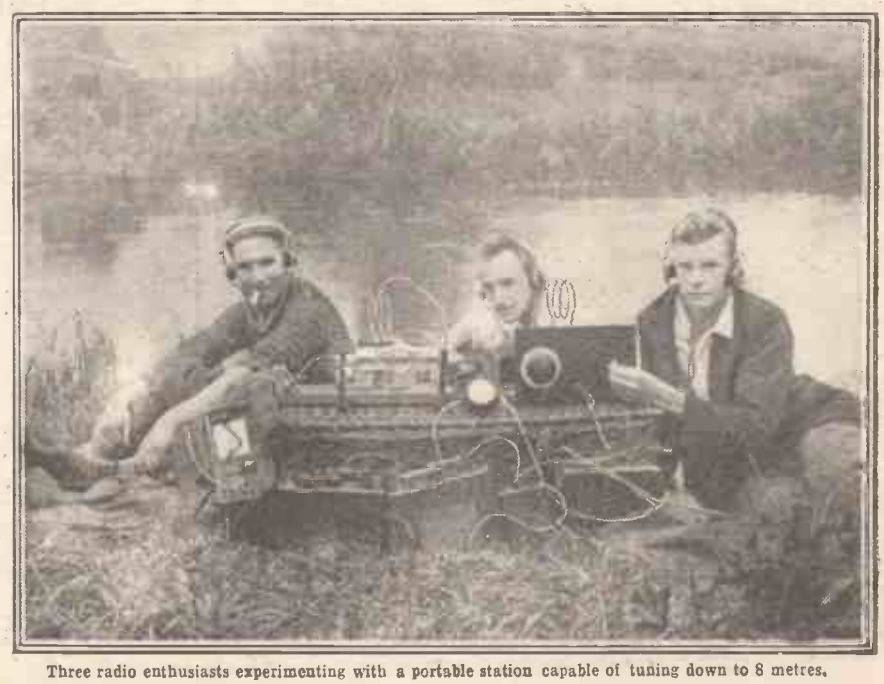
Tuesday, September 13th, 6 to 9 p.m.; Friday, September 16th, 2 to 3 a.m.; Tuesday, September 20th, 6 to 9 p.m.; Thursday, September 22nd, 6 to 9 p.m.; Tuesday, September 27th, 6 to 9 p.m.; Friday, September 30th, 3 to 4 a.m.; Tuesday, October 4th, 5 to 8 p.m.; Thursday, October 6th, 5 to 8 p.m.; Tuesday, October 11th, 5 to 8 p.m.; Thursday, October 13th, 12 midnight to 3 a.m. The times were British Summer Time until September 30th and Greenwich Mean Time after.

Obituary—Mr. Walter Fuller.

We regret to announce the sudden death of Mr. Walter Gladstone Fuller, editor of the "Radio Times" since January 1st, 1926.

Mr. Fuller was born in Dorset forty-six years ago. He studied medicine at Victoria University, Manchester, where he was actively engaged in the social life of the University, starting a university review and initiating the Inter-University Students' Congress Movement Later, he took up the profession of journalism, in which he has had a distinguished career. He was believed to have been the first to treat broadcast programmes as the subject of regular artistic criticism.

Early in 1925 he joined the staff of the British Broadcasting Company on the programme side. A year later he became editor of the "Radio Times," which, under his direction, became very successful. Mr. Fuller leaves a widow and two children, who are at present in the United States.



Three radio enthusiasts experimenting with a portable station capable of tuning down to 8 metres.

CONCERNING POWER VALVE RATINGS.

The Editor, POPULAR WIRELESS.

Dear Sir,—I note that Mr. W. K. Islip has replied to my letter on the subject of "Power Valve Ratings," printed in the Correspondence columns of the August 13th issue of your paper.

He states that I am confusing the A.C. resistance with the D.C. resistance of valves, and that the effect of having a 2,000-ohm D.C. resistance in the plate circuit of a super-power valve is not so great as would appear from my letter. In answer to this statement, I should like to discuss the subject a little more fully and explain to Mr. Islip that I am not guilty of such a mistake.

Your correspondent quite correctly points out that the potential drop across a 2,000-ohm loud speaker, included in the plate circuit of the valve to which he refers, is not very serious when 15 volts bias is applied to the grid, and that with the corresponding H.T. of 100 it is only a matter of 20 volts. When the grid of the valve is at this potential, the D.C. resistance of the anode circuit is certainly considerably greater than the impedance, the result being that the p.d. across the valve is also greater than it would be if the grid potential were zero with respect to filament. Mr. Islip, however, considers only the existing curve of his valve and apparently assumes that if we insert a 2,000-ohm resistance in the plate circuit and apply 100 volts H.T., the resulting curve will be that of the same valve taken alone with 80 volts. From the characteristic curve supplied with the valve it is quite easy to draw roughly the static curve obtained by inserting the 2,000-ohm resistance in series with the valve (the results may be checked by experiment with a milliammeter and variable grid-bias). The slopes of these two curves will be found to be quite different; the 100 volts with a resistance in series produces a curve which is much flatter than the 80-volt curve, but which cuts it at the point where grid potential is at 15 volts. The "anode current swing" is, consequently, much less in the case of the first curve than in the second, and the maximum anode swing obtainable is considerably less with an H.T. voltage of 100 and a 2,000-ohm loud speaker than with 80 volts applied direct to the valve. Therefore, Mr. Islip is not correct in assuming that the D.C. resistance of the valve should be considered only when the grid is biassed to its correct working potential.

When using the valve as an amplifier, the grid swing is limited by two things; the occurrence of a bend at the bottom of the curve, which would otherwise be approximately straight, and the flow of grid current caused by permitting the grid to become positive at any time with respect to the filament. Thus, if we are to avoid distortion, we must keep the grid-swing between these two limits. If the 100-volt curve with the 2,000 ohms, mentioned above, is compared with the curve obtained from 100 volts applied direct, it will be seen that they join together at the bottom bend of the latter. The respective anode swings are, therefore, settled by the point at which each curve cuts the ordinate where the grid potential is zero with respect to filament (this being the point at which grid current is about to flow). In other words, if we want to find the H.T. which, when used with a 2,000-ohm loud speaker in series, will allow the same maximum anode swing as 100 volts applied direct, we must first find the D.C. resistance of the valve when grid potential is zero, and then find what voltage will produce a p.d. of 100 volts across the valve. This D.C. resistance is given by the "lumped volt" curve of the valve—i.e. a curve of the plate current plotted against the plate voltage and, therefore, the slope of which gives the internal resistance of the valve at any particular voltage—grid potential being kept constant and, in this case, at zero. In the case of the D.E.5A., rated as having an impedance of 4,000 ohms, the "lumped volt" curve is straight over a considerable portion, giving a D.C. resistance of 4,000 ohms, approximately constant with an anode voltage of from 100 to well over 150, and therefore, instead of assuming the D.C. resistance of the valve to be 10,000 ohms, we must consider it as 4,000 ohms when the grid is at zero potential, which shows that we need an anode voltage of at least 150 volts instead of 100.

To make matters worse, the valve requires a larger grid swing and the amplification factor is consequently reduced to about two-thirds of its original value.

In conclusion, I might say that I agree entirely with Mr. Islip that a choke-condenser filter circuit is ultimately by far the best way out of the difficulty.

Yours faithfully,
F. H. E.

Wotton-under-Edge,
Glos.

CORRESPONDENCE.

CONCERNING POWER VALVE RATINGS

RECEIVING 5 G B—THE AUSTRALIAN BROADCAST, ETC.

Letters from readers discussing interesting and topical wireless events, or recording unusual experiences, are always welcomed; but it must be clearly understood that the publication of such does in no way indicate that we associate ourselves with the views expressed by our correspondents, and we cannot accept any responsibility for information given.—Editor.

RECEIVING 5 G B.

The Editor, POPULAR WIRELESS.

Dear Sir,—I noticed in a recent issue that Mr. P. W. Harris cannot receive Langenberg without a trace of 5 G B. May I express my views on this?

I can receive 5 G B or Langenberg independently, without any trace of interference of any form. I can also receive several British and Continental stations without interference from London. I think this is a very good performance for a small roughly hooked-up set, and not due to the operator's skill (if any). I am just fortunate. The set used is a single-valve Reinartz made from "P.W." The coil is 80 turns 24 D.C.C. wire on 3 in. former, tapped at 40 and then every five. I trust this will be of interest to readers.

Thank you most sincerely for the circuit published, which is the best I have used.

Yours faithfully,
"ONE-VALVER."

Maida Vale, W.9.

The Editor, POPULAR WIRELESS.

Dear Sir,—Re comment "Good-bye Langenberg," I beg to differ with "Ariel" and P. W. Harris. One of my panels in use, the Simmonds 10-metre panel, with an amplifier wired in—and disconnected at will—and the wave-trap given in "P.W." by G. P. Kendall, August 13th, constructed and placed in series with aerial, makes the separation of stations 2 L O, 5 G B and Langenberg a perfectly simple matter. The tuning condenser in trap does the trick perfectly. Zither and guitar music comes through from Langenberg with no trace of the other two stations, working the loud speaker with fine volume. I have dispensed with the arrangement of coils given in the original circuit, and use a three-coil holder and plug-in coils even down to the 32·77-metre reception from 2 X A F. Coils used for the three stations: 50, 75, 100 Igranic.

(*Continued on page* 248.)

CORRESPONDENCE.

(Continued from page 246.)

Choke coil (basket) wound accordingly. I thought you might like to know of this success with "P.W." circuits. You supplied me with circuit for the amplifier a few weeks back.

Yours faithfully,
C. M.

(Member Radio Association and Wireless League).
N.12.

THE AUSTRALIAN BROADCAST.

The Editor, POPULAR WIRELESS.

Dear Sir,—Re the recent Australian Broadcast, I note that the Daily Press reports show that reception was not made in Britain until after 6 p.m., and then only by a very few amateurs.

It would be interesting to know who among the "short-wave" twiddlers was the first to receive:

1. 3 L O's carrier wave?
2. Readable speech or identified music?

Also it would be of interest to me to know to what extent a certain Morse station interfered with reception in other parts of the country.

Follows extracts from my log:

15.02 G.M.T.—Faint carrier amid X's, about 32 metres.

16.20.—Carrier improved in strength.

16.22.—Few words male voice (unreadable).

16.27.—Carrier and unreadable speech much stronger.

16.31 to 16.32.—Dialogue in nasal voices, only odd words readable.

16.37.—First loud speech. "Oh lord! Aren't you—well!"

16.38.—First readable announcement, "3 L O Melbourne calling."

16.39.—Words "New York" repeated.

16.40.—"3 L O Melbourne calling—of Melbourne University," poetry reading in which the words "I loved her" seemed very often used.

16.43.—Two dance pieces, the second announced as "Perhaps You'll Think of Me?"

16.52.—Morse station blotted out until they closed down, except that odd items could be heard behind the Morse barrage.

Receiver, O-v-2 modified Schnell, Det. D.E.6, 22 volts, L.F. transformer, P.M.1 and P.M.2 120 volts (headphones only used).

Yours faithfully,
E. C. BANNISTER.

P.S.—The two dance pieces were very good R.6-7, rapid fading but very good quality indeed, X's rather bad all of the time, weather dull and heavy rain at 16.35. Outdoor aerial used and buried earth.

PEACE BRIDGE OPENING CEREMONY.

The Editor, POPULAR WIRELESS.

Dear Sir,—Your request for reports duly noted. My experience of this reception was at 8 p.m. B.S.T., the carrier of 2 X A F was very weak, but by 8.30 signals began to come in. A description of the bridge was given and followed by band music, which came in strong at times. Fading was very troublesome and nothing could be followed clearly for any length of time. About 9.50 the National Anthem was played and an announcement about His Royal Highness; more speech followed, but was not readable. At 10.9½ the announcer at the studio gave the exact E.S.T. and announced the finish of the broadcast, after which the station closed down.

PHILLIPS' SHORT-WAVE STATION.

It may be of interest that on the occasion of the Queen's Birthday Anniversary this station relayed from the Royal Palace in Amsterdam some very beautiful chimes. These were picked up at 7.15 p.m. and were at full loud-speaker strength. There was a very slight sway of the carrier, but not sufficient to cause fading. This relay was continued until 7.45 p.m., after which gramophone records followed until station closed down at 8.10.

AUSTRALIAN SHORT-WAVE STATION 2 M E.

Whilst listening for the short-wave Melbourne broadcast, this station was picked up and is believed to have relayed a programme from Sydney broadcasting station 2 F C, as the "Farmer Broadcasting Co." was heard. Several items of music were logged and at 7.55 B.S.T. the station announced it was 4.55 a.m. At 8 p.m. chimes were heard and a clock which struck 5. At 8.10 p.m. the announcer wished listeners "good-morning" and closed down. As Australian time is nine hours ahead of B.S.T., the above times appear to be correct. This reception was made during the evening of the 3rd inst.

On the 4th inst., after listening to the B.B.C. relay of this station, I again reverted to the direct method and found the station at better strength than the previous evening. Reception was continued until 7.40 when bad atmospherics spoilt reception.

As regards strength on the 3rd inst., this was weak on the 'phones, but quite clear. Considerable fading occurred throughout. On the 4th inst., signals were good strength on 'phones, but fading; while not so bad as the previous night, it was still troublesome. I failed to make contact with either Sydney or Melbourne on their later broadcasts, but I notice that the B.B.C. also fared the same.

I consider this reception to be far superior to U.S. because it must have been daylight over a considerable distance. Strange enough, U.S. short-wave has been very weak of late, and it seems strange that Australia should have been received when the "nearer" stations were off-colour. I am sending to 2 M E to notify them of my reception.

For your information the receiver used was a three-valve V 2 and has a Simmonds' Detector circuit followed by 2 L.F. transformer-coupled amplifiers. I use a coil in the place of a choke and a Cleartron G.P. valve, which I find very satisfactory down to 22 metres. My L.F. valves are P.M. 3 and 4.

What will be the new title for this reception?

I am, Sir, Yours faithfully,
EDWARD TARPLEA
Gloucester. ("P.W." Valve Baronet).

A NOVEL AERIAL.

The Editor, POPULAR WIRELESS.

Dear Sir,—I was interested to read in POPULAR WIRELESS, No. 270, of Mr. Hulbert's good results with a wire mattress aerial, as I have used one for three years for the local station, when my other indoor aerial has been engaged in receiving the Daventry programme.

It is on the second floor of a four-storey house, surrounded by very many aerials. The earth is "via gase-pipe."

I obtained the following results last Sunday night, using an old-fashioned four-valver (1—v—2) with no coupled coils;

Daventry, with three valves, was good on 'phones.

Langenberg, Hamburg, and other big German stations were fair 'phone strength with three valves, but *very* good with four.

These results are not quite so good as those obtained with my other indoor aerial—a length of insulated cable slung zigzag across the ceiling above the bedstead. I notice that your correspondent has a long vertical lead to the floor below. My set is only a yard from the wire mattress. Many of my friends are using this form of aerial, and I have found that in a few cases the iron bedstead frame was insulated from the mattress by its enamel coat. There was much improvement after a wire connection had been made between these parts. An easy way to experiment with mattresses is to solder a length of flex to a large bulldog letter-clip and clasp the mesh with this.

Yours truly,
London, W.2. E. SARJANT.

Apparatus Tested

Traders and manufacturers are invited to submit wireless sets and components to the "P.W." Technical Department for test. All tests are carried out with strict impartiality in the "P.W." test-room, under the supervision of the Technical Editor, and the general reader is asked to note that this weekly article is also intended to provide a reliable and unbiassed guide as to what to buy and what to avoid.—EDITOR.

IMPERIAL TUNER.

THE Wireless Apparatus & B.C. Co. recently sent us one of their "Imperial" tuners. This is a very neat little device for single-hole panel mounting which embodies a tuning coil and a reaction control. It has seven terminals, and these include two reaction connections. Others of these terminals have to be taken to a shorting switch, which thus can control the wave-length band covered by the tuner. The component is very well made and is robust. The reaction control is smooth. On test we found that the tuner adequately covered the ranges claimed, namely, 200-600 metres, and 1,000-2,000 metres, and operated quite satisfactorily. At the price of 12s. 6d. it appears to be an attractive proposition.

From the same source we also received an "Imperial" Resistance-Capacity unit. This is a very small article. At first sight it looks like nothing more than a two-inch circle of ¼-in. ebonite with four terminals mounted on it. One gains the impression that it is an inefficient assembly of squashed paper condenser and "cotton thread" resistances. But upon dissection quite a good mica condenser is revealed, and the resistances on test easily stood up to high voltages. But they are of high value, and we should prefer not to use more than one of these units in a receiver.

However, at 4s. it represents pretty good value for money, although on account of its small size it does not look it!

THE "PYE" VALVE HOLDER.

We recently received a Pye valve holder, and it is, of course, a product of that Cambridge firm of the same name which is so justly famous for its L.F. transformers and chokes. It is a nice little holder of the "anti-pong" type for baseboard mounting, and although it is small, it is quite efficient. The metal sockets are sunk into the ebonite holder so that shorts between these cannot occur if one attempts to put a valve in the wrong way round. There is a continuous metallic contact between each of the four sockets and their respective soldering tags which project from the base of the holder, and there does not seem to be the slightest possibility of anything coming loose.

"EKCO" ADAPTOR UNIT.

E. K. Cole, Ltd., of London Road, Leigh-on-Sea, recently sent us one of their "Ekco" M.I. Adaptor Units. This is a device for plugging into an ordinary electric-light socket connected to D.C. mains, and from that source deriving the necessary H.T. current for running a one, two, or even three-valve set.

The unit is not very large—it is only about the size of an electric-light bulb, in fact. On

(*Continued on page 252.*)

This new condenser attachment, produced by Messrs. Dubilier for their grid condensers, enables the grid-leak to be connected in series when required.

APPARATUS TESTED.

(*Continued from page 250*)

the one end is the bayonet-type plug, and from the other end runs the flexible lead. This latter consists of three wires each given a distinctive colour. One is for connecting to the earth terminal of the set in place of the usual lead, and the others are for the plus and minus H.T. terminals of the set.

The unit provides a voltage of about half of that of the mains themselves. Naturally it cannot be used with a powerful set employing power valves, for it will only give up to about 10 milliamps of current on 250-volt mains. On 150-volt mains it only gives 6½. However, a two-valver using ordinary Det. and L.F. valves generally takes about 5 milliamps, although if a small power valve be used 7 is by no means an outside figure. By the way, readers should always ascertain the anode current consumption of their sets before purchasing a mains unit, and see that they obtain an instrument which will give them a margin in this respect at the particular voltage on which the unit is to be operated. Anode current is really more important than voltage—the one should be incidental to the other, but this is not always the case. The resistance of the unit and the resistance of the valves with which it is to be used and the mains voltage must all be taken into consideration.

However, the "Ekco" M.I. Adaptor Unit only costs 17s. 6d., and even bearing in mind the above current limitations, it is very excellent value for money. It is quite adequate for a simple one- or two-valver, and despite its lightness, contains a choke large enough to eliminate practically all "hum." It is a most convenient little unit, and many amateurs should find it well worth a trial.

LARGE CAPACITY "WET" H.T. BATTERY.

The Leclanché type of battery is a very attractive form of H.T. supply, although in the past many of the smaller types have been found to be rather more trouble in maintenance than they are worth. However, as in all other things, there has been progress, and there are "wet" H.T. batteries available which are really practical propositions. Such a one is the No. 3 of the range marketed by the Wet H.T. Battery Co. The No. 3 cell is of a sensible size and is a proposition that will appeal to owners of four and even five-valve sets. It is capable of delivering up to 30 milliamps, and is large enough to make everything accessible and eliminate those fiddling little scraping and other tasks necessary with the very small cells of the same type. Each cell is provided with a detachable terminal, and provision for tapping each zinc with a wander plug is made.

We were sent a battery comprising 36 of these large sac-Leclanché cells, and it has given quite satisfactory service. We have had it on discharge at well over 20 milli-amps for very long periods, and it keeps at a constant voltage and is quite silent in operation.

As previously indicated, it is an easy-to-get-at battery, and as the carbons are fitted with screw terminals any individual sac or zinc element can very easily be removed. The sacs, by the way, are each approximately three inches long and one inch in diameter. The depth of the jar exceeds four inches and this article is well waxed on its upper surfaces.

A TELEGRAPHIC ADDRESS.

Sydney S. Bird & Sons, makers of the well-known "Cyldon" variable condensers, inform us that their new telegraphic address is "Capacity Enfield."

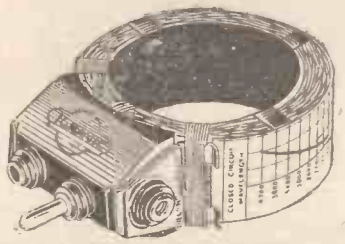
This Celestion loud speaker costs £25, and is almost as large as a cabinet type of receiving set of average size. The special cone type of diaphragm measures nearly two feet in diameter.

Igranic " Xllos " (Extra Low Loss) Coils.

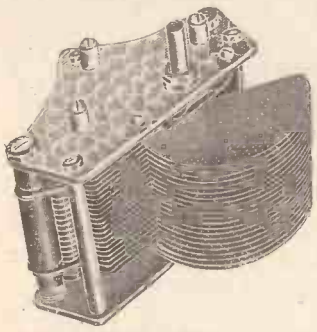
Igranic Fixed Condenser.

Igranic-Pacent Jackswitch.

Igranic-Pacent Porcelain Rheostat.



Igranic Triple Honeycomb Coil.



Igranic Low Loss Square Law Variable Condenser.

To build the best sets

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are essential

You'll get perfect team-work in your set if you specify Igranic. Each component gives of the best—helps to obtain the best from the other components in the circuit, and the result is perfect team-work, without which even good constructional work is useless.

Here are interesting details of some of the illustrated components:—

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The choice of experts. A component of instrument precision.

Prices. ·00015 mfd. **12/-** ·0003 mfd. **14/6**
·0005 mfd. **17/6** ·001 mfd. **22/6**

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Its unique construction ensures that it is a *fixed* condenser in the truest sense of the word.

Prices.
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·003 mfd. and ·005 mfd. **1/6** each
·006 mfd. **2/-** each
·01 mfd. **2/6** each

Igranic-Pacent Jacks & Plugs.

A comprehensive range of well-designed, strongly-made devices too numerous to detail here. Prices moderate. The free booklet will tell you all about them.

Igranic-Pacent Porcelain Rheostat.

A really cheap *and* efficient valve control. Made with 2, 6, 10, 20, 30 or 50 ohms resistance. Price **2/6**. Also made in Bakelite at **4/-**.

Write for Publication R.61, which illustrates and describes the entire range.

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RADIOTORIAL

All Editorial Communications to be addressed to The Editor, POPULAR WIRELESS, The Fleetway House, Farringdon Street, London, E.C.4.

The Editor will be pleased to consider articles and photographs dealing with all subjects appertaining to wireless work. The Editor cannot accept responsibility for manuscripts and photos. Every care will be taken to return MSS. not accepted for publication. A stamped and addressed envelope must be sent with every article. All enquiries concerning advertising rates, etc., to be addressed to the Sole Agents, Messrs. John H. Lile, Ltd., 4, Ludgate Circus, London, E.C.4.

The constructional articles which appear from time to time in this journal are the outcome of research and experimental work, carried out with a view to improving the technique of wireless receivers. As much of the information given in the columns of this paper concerns the most recent developments in the Radio world, some of the arrangements and specialities described may be the subject of Letters Patent, and the amateur and the trader would be well advised to obtain permission of the patentees to use the patents before doing so.

Questions and Answers

TAPPED CRYSTAL FOR REFLEX CIRCUIT.

D. N. (Cupar Angus).—"After a good deal of experimenting, I have been amazed to find how great is the increase in strength which can be obtained with a crystal set, when the crystal lead is tapped into the aerial coil, instead of being blindly connected to one end of it. What I want to know is, would there be a similar increase in results if the crystal in question were employed in a one-valve reflex set, instead of a pure-and-simple crystal receiver? I am making up a set of this kind, using an H.F. transformer (made of basket coils), for the lower wave-lengths only, and although room is a bit scarce in the cabinet, I could leave room for a crystal tapping if this is likely to be an improvement over the old method of reflexing."

There is generally a decided advantage in tapping a crystal connection, and although this may not be quite so great in a reflex circuit as in a straight crystal receiver, there is a possibility that the effect will be just as marked in the latter case as in the former. We should certainly allow for a tapping when making the set.

L.F. TRANSFORMER AS CHOKE FOR FILTER CIRCUIT.

S. M. H. (Bradford, Yorks).—"Putting in a big 25s. L.F. transformer instead of the older type worked wonders in clearing up reception, and in improving volume. But being of an economical turn of mind, I should like to use up the old L.F. transformer, as it appears to be in good condition. Can I put it across the L.S. terminals, and use it as an L.F. choke with its primary and secondary in series, to form the choke for an L.F. filter circuit?"

Probably it would work all right in this position, as far as getting-signals through it goes, but we are rather afraid that you would be spoiling the ship for a ha'porth of tar. As it has already proved unsatisfactory in front of the last valve, the transformer will hardly be of adequate size to do justice to the total output from the whole set, and a larger choke would no doubt give superior results. But you could try it as suggested, and if it is found that there is no noticeable loss in reproduction you will have the satisfaction of knowing it is safeguarding your loud speaker.

(*Continued on page* 256.)

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 254.)

WHAT IS TUNING?

S. E. (Falmouth).—"What is meant by saying one aerial is 'in tune' with another aerial? Why is it necessary to be in tune?"

"In tune" in the wireless sense, means very much the same as "in tune" in the musical sense.

If you hang up an aerial and "earth" one end of it, wireless signals from innumerable stations flow along the wire. But many of these currents are extremely minute ones, and would not work any kind of electrical apparatus. Suppose, however, that one station is transmitting fairly near to your aerial; then an appreciable H.F. current effect is obtained and the nearer the station the greater the effect, generally speaking.

You can assist these particular wireless currents to flow in your aerial by "tuning" it, so that from an electrical point of view *it becomes a replica of the transmitting aerial.* When this is done the currents flow backwards and forwards in it, keeping in step exactly, with the currents in the transmitting aerial. If your aerial were not tuned, its maximum response would be only to currents of its own natural frequency (for every aerial has a natural wavelength of its own, at which it will tend to work.)

Where this wave-length tendency is different from the wave-length being received, there is an out-of-step loss, due to the two different tendencies. But where the receiving aerial is "tuned" to correspond with the transmitting aerial, there is a maximum response in the receiving aerial, maximum current flows in it, and consequently loudest signals are obtained from the "in tune" position.

GOOD FIVE-VALVE SET FOR ALL-ROUND RESULTS.

S. M. Y. (Banbury, Oxon).—"Can you tell me where I can get how-to-make details of a good five-valve set? I want to be able to receive foreign as well as British stations upon the loud speaker, and as I want faultless tone quality, I should prefer to use an anode-bend detector, as recommended by Captain Eckersley. For the sake of purity, too, I should prefer all the amplification to be of the resistance-capacity coupling type, but if one transformer or choke is necessary or advisable, this would suit me, provided resistance-capacity was used in the other stages.

"I should prefer the set to be of the enclosed type with baseboard, and *not* to include any of the new shielded grid valves, as I have found one neutralised stage of the older type of valve perfectly satisfactory, and I have valves of this type on hand."

We think you would find the circuit given upon "P.W." Blueprint No. 28 just the thing for your purpose. It has an H.F. split-primary neutralised valve, followed by an anode bend detector, and three res.-cap. L.F. valves, the last being provided with choke filtered output and volume control. Screened coils are employed, and reaction is applied to the grid circuit of the detector valve by the well-known and efficient "Reinartz" method (condenser controlled). The cost of the blue-print is sixpence, and postage, and it is obtainable from the "P.W." Technical Queries Department.

HUM WITH H.T. ELIMINATOR.

B. N. B. (Chadwell Heath, Essex).—"My next-door neighbour always worked his set off the electric-light mains, and when he went away I suddenly decided to buy his eliminator instrument from him, as he found he could not use it in the new district he was going to. I did not trouble to connect it up straight away, but let my own H.T. battery run down first, so I have had it standing in a cupboard for two or three months. Last night I tried to get it going, but I found it gave out a loud hum. This I cannot understand, as my set is practically the same as his was (he made them both), and, of course, I expected clear reception like my neighbour always had.

"As I do not understand much about these things, I have only tried to connect it up once, as per the enclosed sketch What can I do to get it clear?"

Probably you had the unit connected up the wrong way round. Most D.C. eliminators of this type have an unequal distribution of smoothing chokes, and sometimes all the smoothing is done on one of the mains, the other having no chokes in series with it at all. In these cases, if a hum is experienced upon connecting up, it is a good plan to try turning the whole unit round electrically. All you have to do is to switch off the light at the main, and then turn the adaptor in the lamp-socket half-way round to send the current through the eliminator in the reverse direction. The polarity of the eliminator's positive and negative plugs will have to be reversed to correspond, and you will probably find that the hum has disappeared.

EXPERIMENTS WITH SELENIUM.

A. G. K. (Sudbury, Suffolk).—"If selenium is not a very expensive crystal to buy, I should like to try out some experiments with it. Can you tell me how much it costs?"

Selenium is not at all expensive, the usual price being a couple of shillings or so per ounce.

SERIES-PARALLEL AERIAL CONNECTIONS.

R. P. D. W. (Brierley Hill, Worcs).—"My youngster has bought a one-valve set from another boy, and he gets both British and foreign stations on it night after night. The only thing that he can't make out is the fact that there are three terminals instead of two for aerial and earth. One is marked 'E,' and above it is one marked 'S,' above that being another marked 'P.' He has got the earth on 'E,' the aerial on 'S,' and nothing at all on 'P,' so what that is for we don't know. His friend told him it was a 'P.W.' blueprint set, so will you explain what the 'P' and 'S' mean?

"The set is really excellent as it is, so it doesn't matter if we can't use 'P' at all."

The terminals marked "P" and "S" are both aerial terminals, the "S" being Aerial (Series), and the "P" being Aerial (Parallel).

Briefly, the advantage of having two terminals instead of one is that with a given aerial coil the

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RADIOTORIAL QUESTIONS AND ANSWERS

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set will tune over more wave-lengths when two terminals are provided.

You do not say what coils you are using, but doubtless you will have noticed that when the condenser is nearly "all out," you are picking up the shorter wave-length stations, and when the condenser is nearly "all in" you are receiving stations of higher wave-lengths.

As you might naturally expect, if you could put still more condenser "in," you would receive still more stations whose wave-lengths are at present too high for the set to tune in.

The advantage of the parallel terminal is that you *can* receive on these still higher wave-lengths, even when using the same coil and same tuning condenser. To change over to the parallel position in order to get these higher wave-lengths, all you have to do is to take the aerial lead off the "S" terminal, and put it on the "P" terminal, at the same time joining a short piece of bare wire from the now vacant "S" terminal to the "E" terminal. (The earth wire still remains connected to "E.")

Having done the change-over (it takes but a moment when you are accustomed to it), you will find that the wave-lengths over which the set will receive are raised, and you will probably start tuning in stations which could not be heard formerly.

You will find that generally speaking the parallel position is better for all the high wave-length stations such as Daventry 5 X X (for which a 200-turn aerial coil will be required), so we should certainly use the "P" terminal as well as the "S" terminal.

THE TECHNICAL QUERY DEPARTMENT

Is Your Set "Going Good"?

Perhaps some mysterious noise has appeared and is spoiling your radio reception?—Or one of the batteries seems to run down much faster than formerly?—Or you want a Blue Print?

Whatever your radio problem may be, remember that the Technical Query Department is thoroughly equipped to assist our readers, and offers an *unrivalled* service.

Full details, including a revised scale of charges, can be obtained direct from the Technical Query Dept., "Popular Wireless," Fleetway House, Farringdon Street, London, E.C.4.

A postcard will do: On receipt of this an Application Form will be sent to you, free and post free, immediately. This application will place you under no obligation whatever, but having the form you will know exactly what information we require to have before us in order to solve your problems.

NEW VALVE FOR OLD SET.

R. T. (Poole).—"I am using one of the old-fashioned anode circuits (un-neutralised), and as my old valve has gone west, I shall have to buy another. What kind shall I get for this class of set?"

We should use one of the modern class of H.F. valves, i.e., one having an amplification factor of from 15 to 35, and an impedance between 15,000 and 70,000.

"WEAK AND WONKY" RECEPTION.

C. D. G. (King's Langley, Herts).—"Reception has always been good ever since the set was installed two and a half years ago, except during this last few weeks. More or less suddenly it has grown worse and worse, until now it is weak and "wonky" altogether. A friend suggested it might be the valves, and, sure enough, when his own valves were put in the set went well. (That was a fortnight ago, before it was as bad as it is now, though.)

(Continued on page 260.)

CALLERS' COLUMN

AERIALS.—100 ft. 7/22 Hard drawn, 1/11. Extra heavy, 2/2. Phosphor 49 strands, 1/6. Electron stocked. Special INDOOR Aerials, phosphor, with ebonite separators and rubber rings (12 ft. x 8 strands), total 100 ft. 4/6. O.V., 2/6. Rubber Lead-in, highest quality, 10 yds. 1/-; 10 yds. 1/3; 10 yds. 1/6. Extra heavy, 2d. and 3d. yd. R. & B. Twin Flex (best), 6 yds. 10d.; 12 yds. 1/6; 36 yds. 4/-. Ins. Hooks, 2 for 1½d. Egg Insulators, 2 for 1½d. Ins. Staples, 4 a 1d. Earth Tubes, Copper, extra value, 2/3. Climax, 5/- (also at 2/6). **EASY FIX AERIALS**, with 2 insulators and lead-in, 1/3. **EBONITE GRADE A.** Stock sizes, 6 x 6 and 7 x 5, 1/3; 6 x 6, 1/6; 9 x 6, 1/9; 10 x 6, 2/9; 12 x 6, 2/9; 12 x 8, 3/6; 12 x 9, 4/-; 14 x 7, 4/6. ALSO CUT TO SIZE while you wait at ½d. per sq. inch 3/16th, and ¾d. sq. inch for ¼ in. Special cheap panels for Crystal Sets. **TERMINALS.** Nickel W.O. Pillar, 'Phone, 1/- doz. (3 for 4d. with N. and W.); Brass do., 10d. doz. (1d. each with N. and W.); all high quality. Valve-Pins, with nuts, 2 a 1d. Ormond Screws, 6 or 4 B.A., 6d. dozen with nuts; washers 12 a 1d. Red and Black Spades, screw at side, 3½d. pr. Plug and Socket, Red or Black, 3½d. Wander Plugs, Red or Black, 3½d. pr. (Large, good). 'Phone Connectors, 1d. Flush panel sockets and nuts, 4 for 4d., 10d. dozen. Brass Spade Tags 6 a 1d. Nickel Solder Tags, 4 a 1d. 2 and 4 B.A. Rod, 3d. foot. Nickel Valve Legs and Nuts, 1d.; 8d. dozen. Stop Pins, 2 a 1d. **H.T. BATTERIES.** Highest quality only at lowest prices. Adico (Trade test award best given) 60-v., 6/11; 100-v., 12/11. Theria, 60-v., 5/11; 100-v., 10/11 (with extra Grid Bias). Everready, 66-v., 9/6; 108-v., 15/6. Others from 5/-. 1·5 L.T. Hellesen's, 2/6; Adico, 1/8; B.T.H., 2/-; Flag, 2/-; British, 1/6. **FLASH LAMP.** 4·5 Adico, 4½d., 4/3 doz. British, 6d., 3 for 1/3. **SOLDER**, with resin, 2d. foot. 1/16 sq. Bus Bar, 2 ft. 1d. Tinned copper, 16 and 18 gauge, round, 9d. per ½-lb. D.C.C. ½-lb. 20 gauge, 8d.; 22 gauge, 9d.; 24 gauge, 10d.; 26 gauge, 11d.; 28 gauge, 1/-; 30 gauge, 1/2. **MANSBRIDGE CONDENSERS.** "Hydra" 1 mfd., 2/6; 2 mfd., 3/6; 0·1, 1/9; ·25 and ·5, 2/3. **SWITCHES** on Porcelain, D.P.D.T., 1/3; S.P.D.T., 8½d. and 10½d. Sound quality. Panel switches, with Ebonite handle, worth double. S.P.D.T., 1/-; D.P.D.T., 1/6. Insulating Tape, 4½d. Copper-foil, 4d. foot (6 in. wide). Grid Bias Clips, 6d. Panel Brackets, 9½d., 1/- pr. Shorting Plug, 3d. **PERMANENT DETECTORS.** Red Diamond (a topper), 2/-. Lion Micro (latest, cannot be equalled), 2/6. Brownie, 3/-. Enclosed Kay Ray, 1/-, 1/3. Service Micrometer, with crystal, 2/9, 4/6. **CRYSTALS.** Superzite, 1/6; Shaw's sealed genuine Hertzite, 8d., 1/-; Wyray, 1/6. **HEADPHONE CORDS.** Good, 1/-, 1/3, 1/6. L.S. Cords, 1/6, 1/9. 4-way H.F. and L.T. Leads, 1/9, 2/-. Lewcos stocked. **COIL PLUGS.** Ebonite on Base, 6½d., 7½d. Lotus, 8d. Burne-Jones, 1/9. Low Loss, 8½d. Panel, 6½d. Various stocked. **GEARED COIL STANDS.** 2-way, 2/3, 2/6, 2/11 up. 3-way, grand value, 5/11. Back of panel from 2/11. All ebonite.

RADIOTORIAL QUESTIONS AND ANSWERS

(*Continued from page 258.*)

But I do not see how it can be the fault of the valves, as these are all three burning as bright as ever, in spite of their long service. Had I better get new ones?"

The fact that the valves are still "burning bright" is no indication that they are in good condition. Although each filament is still intact, and therefore glowing, one of them (or more) may have "lost its emission," in which case it is useless for reception. We should get the valves tested (failing anyone else, the makers will probably do this for you), as if the plate current at normal filament and anode voltages has fallen off the valve needs replacing.

REPAIRING AN ACCUMULATOR.

D.M. (Bermondsey).—"Is it possible to put a new terminal into an accumulator? The old one has broken off owing to being very badly sulphated and neglected, but the plates seem quite O.K. I have a large new terminal that will do well enough for the job, but I can't get the old brass out of the lead lug. How can it be removed?"

The brass can be drilled out if you go about it in the right way. First it should be filed quite flat, and then centre punched neatly with a sharp punch. Drill it carefully with a very small drill (not more than $\frac{1}{4}$th), and then use larger and larger drills until the brass is completely removed.

Do not attempt soldering or sweating the new terminal if the accumulator has a celluloid case, as the risk of fire is great, and this is a job for an expert.

THE "SPAN-SPACE" FOUR.

C. A. (Bournville).—"Having heard a 'Span-space' receiver working (it was built from the particulars given in 'Wireless Constructor'), I should like to make a similar set, but with an additional valve. Is there a "P.W." blue print of such a set?"

No blue print is issued, but the full constructional details of such a set were given in "P.W." No. 260, May 28th issue.

FAULTY CONDENSER CONTACT.

G. L. L. (Brooklands, Surrey).—"I couldn't make out why reception kept coming and going until I found out that the spring contact between the condenser terminal and the spindle carrying the moving vanes was faulty. Can this be remedied?"

If you are handy enough with tools it is easy to make a good contact by using a "pigtail" instead of a spring. You will need to insert a terminal into the end-piece of the condenser, say $\frac{1}{4}$ in. away from the spindle. To it solder one end of a 3-in. long strip of copper foil about one-eighth of an inch in width. The end of this foil has to be wound round and round the spindle several times, and then neatly soldered to it. The spring will then coil and uncoil as the plates are rotated; but if no "stop" is at present arranged for this must be fitted, to stop the spring being strained. When this has been done the adjustment of the condenser from maximum to minimum and vice-versa will simply coil or uncoil the spring a little, but there will be a positive soldered contact at both ends of the spring in all positions.

SCREENS ALTER TUNING.

D. J. L. (Petersham).—"I have been using one of the standard split-primary coils in my home-made set, and as screening has proved unnecessary and takes up too much room on the baseboard I am using the coil in an ordinary base, but without the surrounding metal screen.

"Using the tuning condenser specified, I find that the wave-band covered by the coil and condenser is about fifty metres higher than it should be, and I presume this can be counteracted by taking off some of the turns. How many turns less will be required?"

For the ordinary band of wave-lengths it is usual to provide about ninety turns upon the secondary winding of such a coil, and the effect of the screen surrounding it is to give an inductance value to the coil of the equivalent of about *seventy* turns of unscreened wire upon the same size of former, etc. In order, therefore, to cover the same wave-band with the unscreened, as with the screened coil it will be necessary to remove approximately twenty turns of the secondary winding.

TRANSFORMER LOSSES.

(*Continued from page* 238.)

Now, when the magnetic flow changes its direction in the core, a sort of magnetic friction or inertia is set up, and a dissipation of energy is the result. In other words, the magnetic current in the iron core tends to lag, and it is in consequence of this lagging tendency that the term "hysteresis" has been coined from the Greek word *hysteros*, meaning "later."

Only 3 per cent Loss.

Losses due to magnetic friction within the transformer core are, in good transformers, minimised so far as possible by using cores made from special irons, notably stalloy, which possess a high permeability and a low reluctance to magnetism, which means to say, that such iron cores allow the magnetic force to flow freely through them.

Apart from current losses due to faulty construction of a transformer, such as inefficient connections and so forth, the losses which are set up in all transformers, good or bad, are summarised in the table shown at Fig. 7. As we have seen, these losses are all unavoidable to a certain extent. But they can be, and *are* reduced to an absolute minimum in any good transformer, so much so that only about three per cent of the input current to the transformer is absorbed in those directions.

Summing up, therefore, the efficiency of a transformer is established by the ratio between the useful energy delivered at the secondary terminals of the transformer to energy supplied at the primary terminals. Generally speaking, transformers which are so constructed as to have ample proportions are more efficient than transformers which are diminutive in construction.

The Transformer to Trust.

For a transformer which has massive or, at any rate, ample proportions has nearly always good strong windings of as low resistance as possible, and its core will also be built on lines which will reduce the eddy current and hysteresis losses to a minimum. Such transformers, as a general rule, are the ones to be the most trusted, although, of course, there exist much smaller transformers which for their own special work are productive of good results.

In the above columns we have not considered the various factors in transformer design which may lead to or eliminate distortion. That subject is a specialised one in itself, and therefore it cannot be dealt with here. Excessive current loss in transformers leads, of course, to distortion; but, on the other hand, distortion can arise through other causes.

Current loss in transformers leads to weakened signals, faulty amplification, and other effects for which very frequently the transformer itself remains totally unsuspected. However, in any transformer of reputable make, such losses are reduced, as we have seen, to the very lowest minimum, and the purpose of this article has been to show for interest's sake just how such small losses are created in transformers of even the highest reputation.

TECHNICAL NOTES.

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Metal Crystal.

Probably everyone has, at some time or other, seen large single crystals of well-known crystalline substances such as alum or sugar, but it is not commonly known that metals will take on a crystalline formation under appropriate circumstances and that by special precautions single crystals of metal may be produced of quite large size, sometimes more than an inch in length.

In some interesting experiments recently conducted upon the making of single metal crystals, iron is melted in a crucible and is kept a few degrees above the melting point by means of electric heating coils. By a suitable mechanism a piece of wire is dipped into the molten metal and slowly withdrawn at the rate of 10 millimetres (about 0·4 inch) per minute. A thick rod of the metal is drawn up, and this solidifies, forming a single crystal. In this way single metal crystals from 1 to 2 feet long and about $\frac{1}{8}$ inch in diameter have been produced. This scheme has been evolved by a well-known German physicist, Czochralski.

I think I mentioned in these Notes some time ago that single metal crystals have very special electrical properties, their electrical conductivity, for example, being quite different from that of the metal in the ordinary state, in which it consists of a vast aggregation of tiny crystals all jumbled up together.

Sound Waves.

In a recent gunnery test, carried out by the British Air Ministry, some of the vagaries of sound waves were investigated by an observer at Birmingham who was able, by special apparatus, to receive the sound waves from Shoeburyness, where the gun was located.

Probably many readers of these Notes heard the broadcast, from Daventry, of the times at which the gun was discharged and, no doubt, many made observations on the reception of the sound.

Some important observations were made (as a result of these experiments) upon the variation in transmission due to wind pressure.

Silver Soldering.

I suppose the majority of experimenters are quite *au fait* with ordinary soft soldering, as this enters so largely into wireless experimental work. But in special cases it is desirable to employ hard soldering, or silver soldering, as it is sometimes called, more particularly where the joint requires to be specially strong, or where it has to withstand a temperature which would melt ordinary soft solder.

Silver soldering is quite simple, much simpler than is commonly supposed. The surfaces to be soldered should be thoroughly cleaned by filing, sandpapering, or otherwise. The flux to be used is ordinary borax and the solder is pure silver, or so-called silver solder, which can be obtained from any working jeweller. The borax should be mixed with a small quantity of water so as to make a fairly stiff paste. The parts to be joined together should be liberally treated with borax paste and then a blowpipe or other suitable torch (which does not

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deposit carbon) should be applied, care being taken to prevent the borax from spitting and jumping off the part. Presently the borax will puff up, and when the parts to be joined are at about cherry red heat, the silver solder should be applied to the joint. It is not a bad plan to snip off two or three very small bits from the solder and place them in position before commencing the heating. After a little practice it will be found quite easy to make the solder "run." After the job has cooled somewhat, water may be applied in order to remove the hard "scale" which will have formed.

Silver soldering, of course, is hardly possible where the parts to be joined are in a confined space, or where there is anything inflammable in the immediate vicinity.

Transmission Without Aerials.

What is believed to be the longest two-way communication without transmitting aerials was accomplished between the Naval Research Laboratory, N K F, in Washington, D.C. and the Naval Research Station 4 X E, Florida, on 13,940 kilocycles. The two stations started communication using transmitting aerials, but after communication was established the transmitting aerials were disconnected and the transmission was effected only from the coils. So far as is known, this is the first two-way communication carried on over a distance of approximately 900 miles without transmitting aerials.

5 NO.

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The accumulators employed are, of course, fairly large. Those at 5 N O have been in use for five years, and the acid in them has never once been changed. There is a fair amount of sediment in them, but the plates seem to be in excellent condition.

"Good for another five years," stated one of the engineers, and that is also my own impression. I expect this will make some of my readers with experience of the short life of the average small cell somewhat envious, but it should be remembered that such accumulators are not of the robust construction of those used in power work and, moreover, seldom receive the same expert care and regular charging.

Outside again in the rain I hurriedly examined—from the ground!—the aerial which is suspended from the inevitable chimneys, took one or two hasty photographs, and said good-bye to 5 N O and such of its staff who were on hand.

The Newcastle station has left me with no outstanding impression, and probably the only two things concerning it which will remain for any length of time in my memory are that its studio building was once a maternity hospital and that its transmitter is housed in a stable. And I have a vague fear that when they hear of the latter, inveterate 5 N O programme grumblers will exclaim with cruel satisfaction:

"And we are not surprised!"

Printed and published every Thursday by the Proprietors, The Amalgamated Press, Ltd., The Fleetway House, Farringdon Street, London, E.C.4. Advertisement Offices: Messrs. J. H. Lile, Ltd., 4, Ludgate Circus, London, E.C.4. Registered as a newspaper and for transmission by Canadian Magazine Post. Subscription rates: Inland, 7/4 per annum, 3/8 for six months. Abroad, 10/6 per annum, 5/9 for six months. Sole agents for South Africa: Central News Agency, Ltd. Sole agents for Australia and New Zealand: Messrs. Gordon & Gotch, Ltd.; and for Canada: The Imperial News Co. (Canada), Ltd. Saturday, October 1st, 1927.
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