REGISTERED AT THE G.P.O. AS A NEWSPAPER.

THE "REGIONAL" ONE-VALVER (See Page 153)

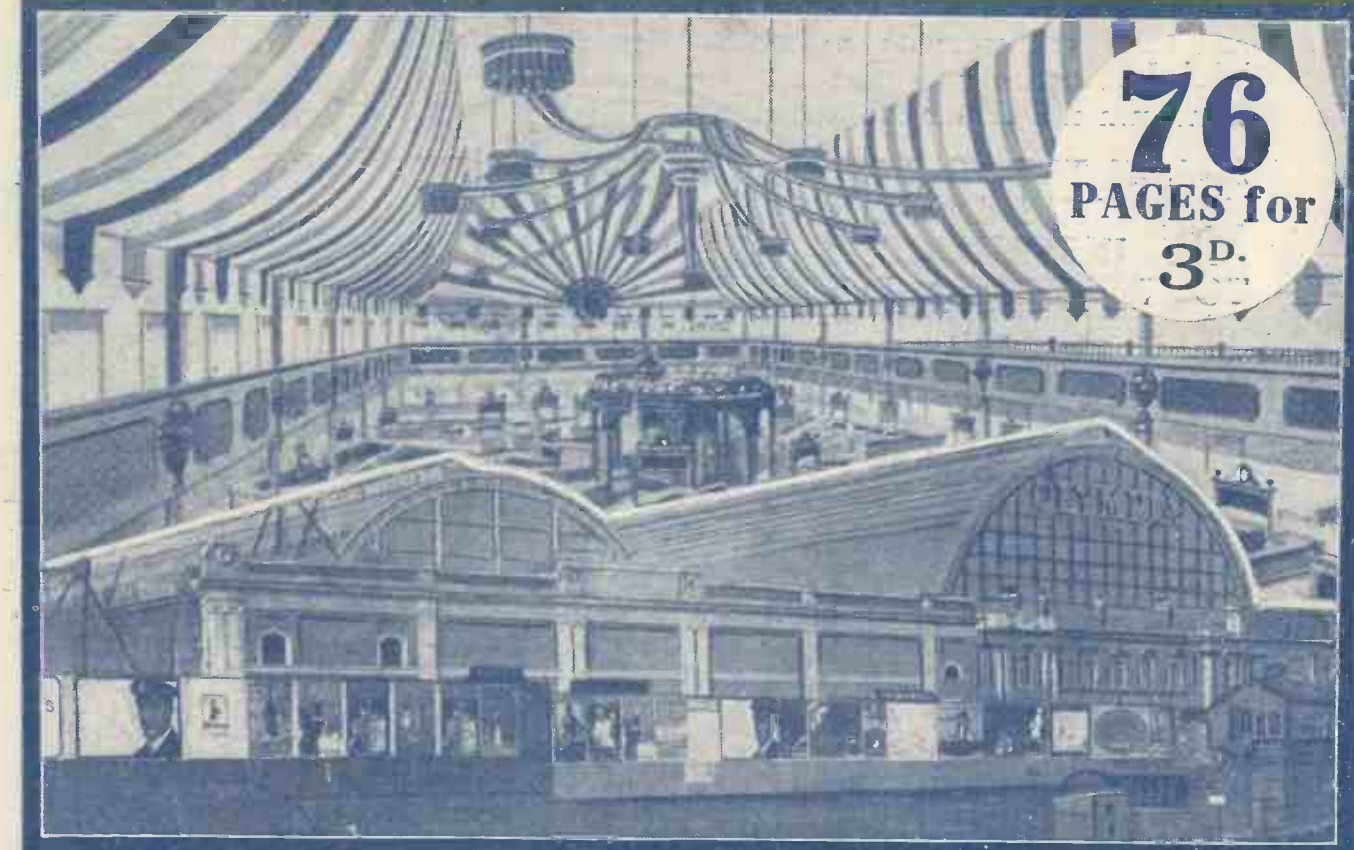
Popular Wireless

Every Thursday PRICE 3d.

No. 277. Vol. XII.

INCORPORATING "WIRELESS"

September 24th, 1927.



76 PAGES for 3D.

Special Exhibition Number

Special Features in this Issue

ROUND THE STANDS
A Chatty Review of the Outstanding Features of Interest at Olympia

OVERCOMING HUMMING—By W. James.

BROADCASTING AND THE "PROMS"

MORE CAUSES OF DISTORTION—By Baynham Honri.

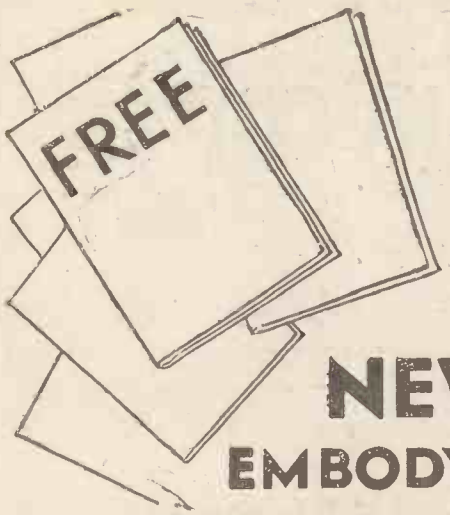
AERIAL EFFICIENCY

A STABILISING UNIT—By Percy W. Harris, M.I.R.E.

THAT MINIMUM GUARANTEE

2ZY—Describing Mr. Dowding's Visit to the Manchester Broadcasting Station

MORE ABOUT THE NEW UNIVERSAL CHARGER—By Dr. J. H. T. Roberts, F.Inst.P.



6

NEW CIRCUITS
EMBODYING THE NEWEST DEVELOPMENTS IN RADIO CONSTRUCTION

1

K.1 (for A.C. Mains). A three-valve broadcast receiver employing the famous K.L.1 valves.

2

K.2 (for A.C. Mains). Similar to the K.1 circuit, but this receiver incorporates one stage of high frequency.

3

D.P.1 (for D.C. Mains). A three-valve receiver. Easy to construct. Simple to operate. Life-like reproduction.

4

D.P.2 For greater range and selectivity than D.P.1 build this receiver. It incorporates a neutralised high frequency stage.

THE Marconiphone Research Department is in the nature of things, never at rest, leading in progress, evolving forever something new. In the new Marconiphone receivers are ultra-modern developments which nevertheless can be incorporated in home-built receivers.

SIX special circuits by the Marconiphone engineers are offered to the home constructor. Each one, designed for a particular purpose, incorporates the very latest developments in radio. Four circuits are for receivers to operate direct from the mains, whilst the remaining two show how to get the best possible results from the new Marconi S.625 valve.

MARCONIPHONE

FREE CONSTRUCTIONAL BOOKLET.

A free booklet, including blue print, and full constructional details, will be supplied for any one of these receivers. Booklets, including blue prints of the other five receivers, 6d. each. Send the coupon now. stating the circuit book you require.

THE MARCONIPHONE COMPANY, LIMITED
AND REDUCED
Head Office: 210-212 Tottenham Court Road, W.1.

DISTANCE—with the new Marconi S.625 Shielded Valves.

5

T.1 A 4-valve receiver, including 1 H.F. stage. Both sensitivity and purity of reproduction are excellent. Simple to construct, incorporating one S.625 Shielded valve.

6

T.2 A 5-valve receiver, incorporating two S.625 Shielded valves. Essentially a long-distance set. Stations hundreds of miles away can be tuned in with complete stability.

To the MARCONIPHONE CO., LTD. (AND REDUCED) 210-212 *Tottenham Court Road, London, W.1*

Please send me free constructional booklet, including blue-print for circuit.....

I am also enclosing.....for the following booklets.....

NAME..... *TOWN*.....

ADDRESS..... *COUNTY*.....

P.W.

M11368

What to see

No. 1—"Bijou" Crystal Receiver. A simple easily tuned set
Price 15s 0d

No. 2—Two Valve L. F. Receiver. This set can be operated by a dry battery or a 4-volt accumulator
Price ... £3 10s 0d

No. 3—R. K. Loud Speaker. The finest sound reproducing device yet designed.
Price ... £45 0s 0d

No. 4—C2 Loud Speaker. A full-sized, full-toned loud speaker.
Price ... £3 0s 0d

No. 5—Head Telephones. Light weight and extremely sensitive, these phones are eminently suitable for long range reception.
Price 15s 0d

No. 6—L. F. Transformer. A guaranteed instrument which gives a high, uniform amplification over the entire range of frequencies in speech or music.
Price 15s 0d

Nos. 7 & 8—B.T.H. Valves—2, 4 and 6 volt.

General Purpose	
Bright Emitter	5s 0d
Dull Emitter	10s 6d
H.F. Amplification	10s 6d
Power Amplification	12s 6d

No. 9 — Anti-Microphonic Valve Holder. A holder to ensure complete absorption of vibrations.
Price 2s 6d

No. 10—Resistance Capacity Coupling Unit. A complete amplifying stage, less the valve.
Price 10s 6d

No. 11—3-valve Resistor Receiver. An extremely efficient receiver giving perfect loud speaker results.
Price ... £8 0s 0d
(exclusive of valves & batteries)
Royalties extra £1 17s 6d

The above prices are applicable in Great Britain and Northern Ireland only.

TIME is always short at exhibitions, so make at once for Stands 138 and 139 and see the most interesting things first. Whatever you may have to miss, do not fail to see the B.T.H. exhibits, and particularly the new apparatus illustrated and described on the opposite page.

B T-H

Popular Wireless

Scientific Adviser:
Sir OLIVER LODGE, F.R.S.
Editor:
NORMAN EDWARDS, M.Inst.R.E., M.R.S.L., F.R.G.S.
Technical Editor: G. V. DOWDING, Grad.I.E.E.
Assistant Technical Editors: K. D. ROGERS, P. R. BIRD.
G. P. KENDALL, B.Sc., A. JOHNSON RANDALL.

RADIO NOTES AND NEWS.

Radio Sets Are Safe—Best Wishes—Empire Broadcasting—Continental Relays—New Danish Station—Broadcasting In India—A Super S.B.—Amateur Tests—The "Hale" Again.

Radio Sets Are Safe.

IN spite of all that was said and printed about the first instance of a death being caused through electric shock whilst using a wireless receiver, the second instance, that of the Newport boy, has caused a lot of confused thinking. Once more, then, *the danger lay in fiddling with wires connected to the electricity mains.* Similar danger is run by doing the same whilst in the bath. *Don't do it!* The wireless set was only the unfortunate agent by means of which the deadly current was able to do its worst.

Best Wishes.

TO-DAY there opens the National Radio Exhibition. Good luck attend it!

May I put forward a plea, on behalf of public and exhibitors alike, that large numbers of the public will visit the show on days other than the first and last, on which days, as a rule, the place has been too crowded for normal movement.

Smother the Brutes.

WE are still well within the "atmospheric" season and it is, therefore, of interest to note the remarks of Dr. A. N. Goldsmith on the subject of how broadcasting authorities should protect the public against these pests. He says, "The only weapon against 'statie' (atmospherics) is brute force, or outdoing static with increased signal strength at the receiving end." He points out that in the U.S.A., 500 watts was formerly the standard for good broadcasting service, but now many leading stations use 5,000 watts, and some 45,000, 50,000, and even 56,000 watts.

Ker-ruel Criticism.

IN my time I have had my little jabs at the programmes, but I award the palm to a reader who, after reading my note about how since radio was installed in hospitals the average stay of the patients has been reduced by a week, sends me a card to say that it is "2 L O'S rotten programmes that drive the poor beggars out." Now, if *I* had said that——!

Empire Broadcasting.

AT the time of writing, several reports of the reception of Mr. Marcuse's broadcasting at the Antipodes have been received, and the B.B.C. is all agog and thinking furiously. Mr. H. A. Hankey, representing the Wireless Association of Great Britain, is shortly to visit the Dominions and Colonies in connection with Empire Broadcasting. The very man! He demonstrated for me some years ago at a most important lecture, and his coolness and resource, when five minutes before the appointed time the apparatus declined to function, won my admiration.

To Scrape or Not.

I MENTIONED here, a week or so back, that there is not so much importance to be attached to the scraping, cleaning and covering of the aerial as is pretended by many writers. The theory is, they assert, that because H.F. oscillating currents are largely confined to the "skin" of the wire the wire's surface must be as highly conductive as possible. Yes, but practice is quite another matter.

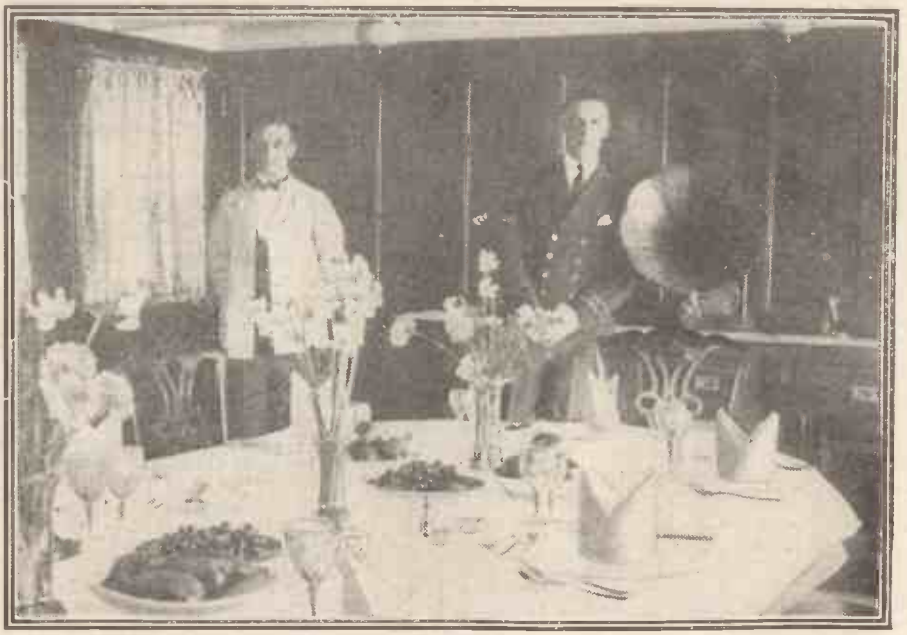
Contact's the Thing.

I HAVE still to be convinced that any difference would be noticed by the ear in the strength of the signals received on the average broadcast set, whether a dirty or clean aerial were used. The thing to take care of is *contact!* the juncture of the down-lead with the horizontal, and the connection with the leading-in insulator, are more prolific of troubles than corrosion or dirtiness of the unhidden part of the aerial wire. I thank A. C. L. D. for his letter about enamelled wire, which is of academic interest only.

Continental Relays.

WITH a view to future relays from the Continent, experiments on landlines are being made in order to determine the best route. So far, Ostend is top of the list and a repeater station has been set up there for amplifying the programmes before they cross the Channel on the new submarine telephone cable.

(Continued on next page.)



The dining-room aboard the "Conqueror," Mr. Selfridge's private yacht. It is very completely equipped with radio, and one of the many loud speakers installed can be seen in this photograph.

NOTES AND NEWS.

(*Continued from previous page.*)

New Danish Station.

A NEW broadcasting station has been opened near Kallundborg, in the north-west of Seeland, Denmark. Its power is 7 kilowatts and its wave-length 1153 metres. After it, you DX hounds!

Transmission to Schools.

SORRY to receive another elaborate booklet from the B.B.C. all about its plans for interrupting the education of our children with distracting talks during school hours. On October 14th the Plymouth kids are to stop arithmetic for a talk on "Blood," and a week later they are to be "educated" on "Marine Bristle-worms." No! I am unable to admire the Education Department of the B.B.C., and I see no good reason for its existence so far as elementary and secondary schools are concerned.

Two in the Net.

A WEEK or two ago I enquired whether any readers had succeeded in receiving 2 X A D direct when it broadcast the opening of the Peace Bridge at Niagara. M. B. (Southport) tells me he did, on a O-V-2 Reinartz made by himself, who is aged 15 years. He also got the Lindbergh reception from New York. We look to M. B. to tell us some more of his doings, because he shapes very well indeed. F. R. T. (Clapham) also got the Prince's speech, using Marconi R5 valves, as well as most of the other items of the opening. So you see what *can* be done.

Broadcasting in India.

THIS has now begun and I hope Indian readers will favour us with a few clear accounts of how the service "gets over," etc. I am specially interested to know what provision is made in the programmes for the Indian population. I was tickled to see in an Indian paper that "super*hot*erodyne" sets are popular—perhaps "Superchutneydynes" will follow in due course!

Wireless Patents.

IT is reported that in the past six years the wireless section of the U.S.A. Patent Office has doubled its size. About 125 applications for patents are now being made per month, as compared with about 60 per month in 1921. Verily, the field is wide but the workers many, so if you want to hit a winner it were well to begin work at once.

The Intruder.

DURING the final tests of the Indian Beam the signals from India weakened badly and the engineers had troubled times until they found a lizard in the apparatus. Old hands at the game are used to these intrusions of the animal and insect world and many is the scorpion and burnt bunch of dead moths I have had to poke out of my switchboards in one part or another of the tropics. But cockroaches are the worst anti-wireless cranks! They are "diehards"!

A Super S.B.

ON September 21st some 60 to 70 American stations were linked up for the world's (hitherto) greatest S.B., the broadcast being that of the proceedings of the Annual Radio Industries dinner at the Astor Hotel, New York. "Not a clink was heard, not a corkscrew note." It was poured silently from hip-flasks!

Amateur Tests.

RATHER late, but most welcome, is a letter from Mr. G. A. Jeapes, "Chandos," Great Shelford, Cambs (E G 2 X V), about the tests he is making till the end of this month on 32·5 metres and 22·75 metres and 8·5 watts power. During August he had two-way working with 28 American amateurs, the average strength report from the U.S.A. being R5-6. Half-wave rectified A.C. at 450 volts is fed to an Osram L.S.5 in a "tuned grid-tuned plate" circuit. The rectifiers are Osram U.3 valves.

Amateur Tests (continued).

MR. JEAPES uses a 66-feet semi-vertical aerial with an 18-feet horizontal counterpoise. He finds little to choose between the two wave-lengths, except that at this time of the year the shorter one "gets over" better about 8.30 p.m. (B.S.T.). After September the station will be at 117, Victoria Road, Cambridge, to which reports should then be sent. May we be permitted to hear from Cambridge again?

More About G 2 H.H.

REFERRING to my note on August 27th, Mr. H. Harding, Treve Radio Service, Libanus Road, Ebbw Vale, now states that for telephony he generally works on 363 metres and for C.W. Morse on 150 and 200 metres. He would appreciate more reports, please.

SHORT WAVES.

Mr. Soquachajavorski, the famous Austrian inventor, recently arrived in London. One can imagine the fervent prayers of the B.B.C. announcer that this would not be included in the News Bulletin.—"Kettering Leader."

* * *

In Bond.—None of us really know what radio enthusiasts we really are until our neighbours return all they have borrowed.

* * *

Harassed Amateur (after vainly trying to separate 2 L O and 5 G B): "I wonder if a wave trap would be any good?"

Helpful Friend: "What about a mouse trap?"—"News of the World."

* * *

A scientist is reported to have stated that sleep can be abolished. We knew that months ago; the new loud speaker next door has seen to that.

* * *

This Week's Book: "The Splendid Control," by A. Vernier Dial.

* * *

"When I am sitting in my room . . . I can hear the broadcast chime before the sound reaches me from the clock itself," writes a correspondent in the "Daily Chronicle."

That's nothing, we often hear sounds over the wireless that we never expect to hear anywhere else.

* * *

When Television Is Perfected.

"Lady Singleton is asking for you on the television, sir."

"Dear me, I shall have to call her back—I'm not dressed."—"New York Evening Post."

* * *

Customer: "You told me that set I bought would bring in the coast. I can't even get local stuff."

Salesman: "I'm sorry, sir, but we're hearing from all parts of the country through this set. In fact, you're one of those we're hearing from."

* * *

Wonders will never cease, they say,
And as to wireless wonders,
Why, wireless even joins to-day
Far lands that ocean sunders;
Nay, sense prophetic has it got
By which to-night we borrow
News from Australia of what
Has happened there to-morrow!
—"Daily News."

By the Way.

IT may still be possible to get a copy of this month's "Modern Wireless" if you hurry up. *Inter alia* it contains an article by Captain Round about 2-volt valves and one by P. W. Harris on "The Hale One-Valver." For people who cling to crystal sets there is a helpful description of the construction of a modern amplifier, and there are also full details of a five-valver.

The "Hale" Again.

THIS set continues to surprise "P.W." readers and others. Mr. R. Turnbull (Wood Green, N.) made it from one of our blue prints and so startled a policeman who was leading his traditionally unhappy life some 400 yards away that that said policeman approached and asked "How many valves?" On being told "Two" he indicated scepticism, and was promptly presented with the invaluable blue print. It is believed that the constable is now a happier and much wiser man. Mr. Turnbull continues to receive from places like Stuttgart and Rome with deafening success, cutting London out with ease, and is hoping to convert his friends to the "Hale." I have no doubt of his success.

A Deaf "Listener."

HARD on the heels of the story of the dumb man who broadcasts vocal items comes a report from New York that Mr. F. J. Shaunessy, who is deaf and dumb, listens to broadcast through his fingers. He has invented an addition to his cone parchment loud speaker which enables him to "listen" by feeling the vibrations. It is stated that he can distinguish talk from music, and even one instrument from another. There seems to be hope, therefore, that television will be enjoyed by the blind and that Scotsmen will one day be able to understand a "turn" by Sir H. Lauder.

That Reminds Me.

THERE is a whisper from Scotland that real working crystals can be found on the shores of the west coast and at Strontian, Tyndrum, Rothesay, and elsewhere. Severe and widespread excavations are now taking place. (I am expected to make remarks like that!)

Let's Try Again.

EARLIER in the year the B.B.C. broadcast Mr. Honegger's "King David," a performance rendered with musical instruments used as mere noise machines. Of course, you and I were greatly puzzled and had a singing in the ears for the next few days. The newspaper reviews were polite about the row because Mr. H. is a foreigner, though here and there a critic exploded in ecstasy. The B.B.C. now has the hardihood to offer the thing again, and it is to be broadcast on November 2nd. Well, if I can't get a game of bridge, or if the pup is asleep, I shall try it again out of sheer daredevilry.

ARIEL.

BROADCASTING AND THE "PROMS"

In a special interview with "Ariel," the famous British musician Sir Henry Wood explains why he has now definitely ranged himself amongst the champions of Radio. Sir Henry also makes a stern indictment of those musical snobs who whine about "canned" music and the "mechanisation of art."

WHEN we talk about a great *artiste* in the real sense of the word, we are sometimes rather apt to overlook the fact that he may also be a great *man*. Sir Henry J. Wood, probably the most famous of British conductors, undoubtedly has all the merits of a great artiste combined with the strength of character and forceful personality of a great man. He is one of those who is bound to make his presence felt, no matter into what department of life he may enter.

And that is why all wireless enthusiasts and music lovers have equal cause for congratulation and delight in the knowledge that Sir Henry is now determined to sponsor the cause of broadcasting just as keenly as he has upheld the best traditions of music for so many years.

Musical Snobs.

"I am entirely convinced," Sir Henry said to me when I spoke with him at the Queen's Hall, recently, "that the future of good music in this country is very largely linked up with the future progress of broadcasting. I say 'convinced' because I claim that this has already in great measure been proved.

"The broadcasts of the Promenade Concerts from the Queen's Hall were sneered at by a great many musical snobs, and they even went as far as to describe it as 'canned' music and 'mechanised art.' To say such a thing is to talk sheer, absolute, undiluted bosh. But such people aren't really worth troubling about. Judging by the hundreds of letters I have received from all over Great Britain and the Continent, there has been a far greater public demand for really good music since the B.B.C. came into being than there ever was before.

"While, of course, the beauty of a composition and its rendering are bound to lose a little of their perfection when transmitted through microphone and loud speaker, broadcast music is a most excellent substitute for those who are not able to be actually present in the hall where the concert is taking place.

Removing a Reproach.

"Besides, it would be quite impossible to find a hall large enough to accommodate the huge audiences before which wireless has made it possible for we artistes to 'appear.' Even were such a building procurable, tens of thousands seated at its far end would be entirely out of adequate hearing range!

"And think what it means, not only to people in this country, but to those in Germany, Austria, Holland and other European countries. How else could these gain such a vivid conception of what a really good British concert is like?

"Think what that is going to do for the future of music here! Why, even the applause which they hear breaking out at the end of every item is raising the prestige of British music in the eyes of the foreigner, and helping him to realise—perhaps for the first time—how untrue of us is that old reproach about Britons being unmusical.

"Far from lowering the standard of musical taste, the radio has effected just the reverse, for never before has there been such a demand for first-class compositions, excellently rendered. The average nightly attendance at this season's Promenade Concerts was far greater than usual, and it was undoubtedly the influence of broadcasting that brought the newcomers in.

Sir Henry J. Wood.

"While broadcasting is stimulating the demand for good music, there is no doubt that it will also improve the quality of performance beyond measure. Because artistes know that the slightest fault in quality or harmony is magnified by the microphone, they will strive unceasingly towards the most perfect technique and finish. More rehearsals and more time devoted by performers to their jobs will certainly do a great deal for the art and practice of music. In the same way, inferior talent will be weeded out—a thing very much desired.

Queen's Hall Quality.

"The B.B.C. showed very good sense when they selected the Queen's Hall for their broadcast concerts. It is an ideal place from every point of view. Although I do not want for one moment to underrate the importance of studio work, a certain 'something' is lost when performers are playing in a studio. The presence of a visible audience and the 'atmosphere' do so much towards drawing out all that is best in any artiste, while there is also the matter of acoustics to be considered.

"It cuts both ways, you see. The quality of the broadcast is heightened by the fact that the performer is in his natural element, while the audience in the hall get the benefit of the concentrated effort which is always there when an artiste knows that his potential critics are a million and more in number.

"Now that I have associated myself with broadcasting, and the great work which the B.B.C. have so splendidly done and are so splendidly doing, I intend to carry right on, certain that I shall never have any regrets. Rather am I convinced that music and wireless will go hand in hand from strength to strength until once undreamed-of feats have been accomplished."

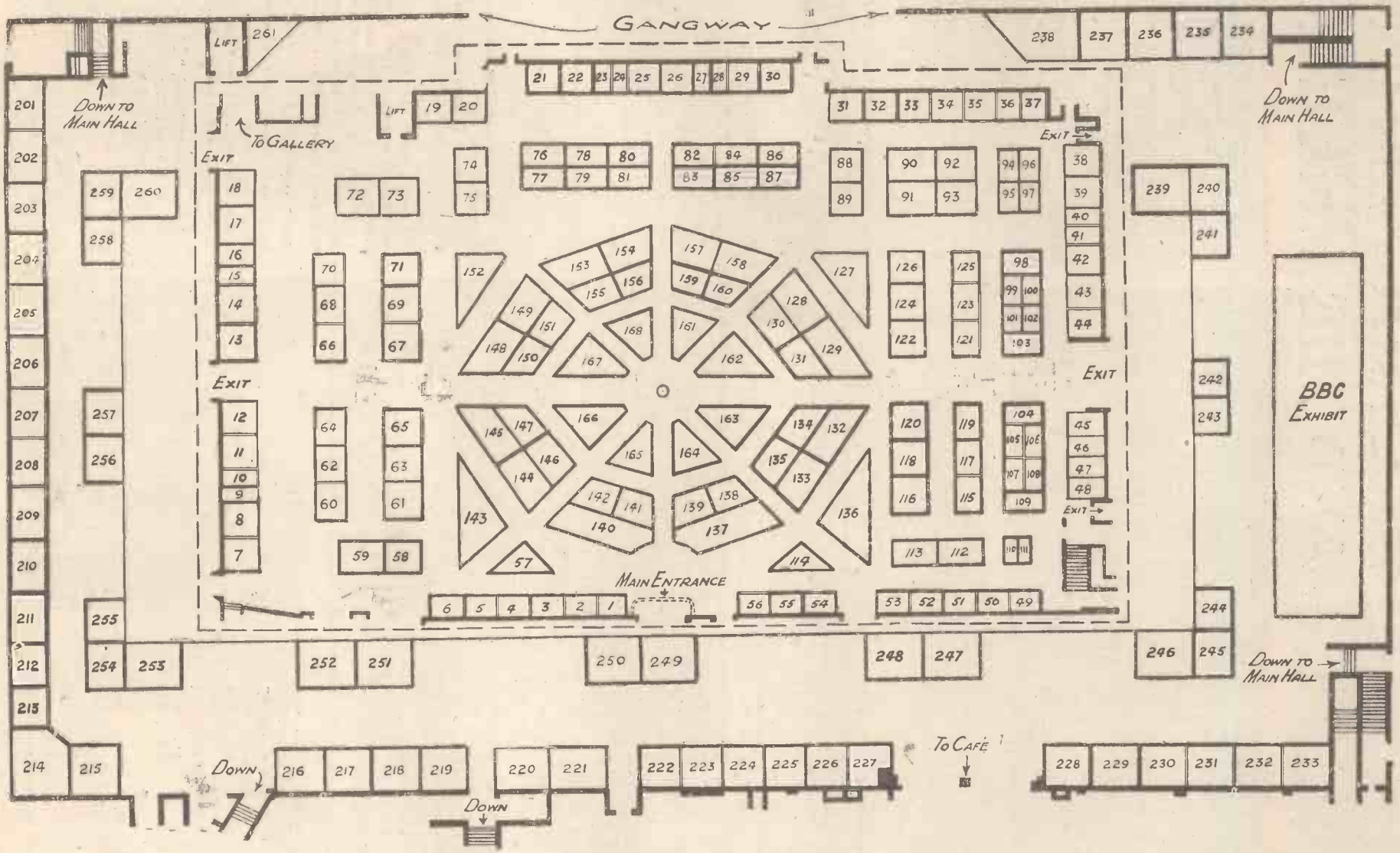
More Concerts Coming.

Sir Henry paused for a moment while he introduced Lady Wood, who had just entered the room. I then asked him to tell me something about his future broadcasting arrangements.

"Well," he continued, "I have, of course, several of the big national concerts that are to be held during the winter. The first is fixed for October 14th. During the same period there is also my tour of the larger provincial towns, including Birmingham, Edinburgh, Glasgow, Cardiff, Belfast, and Manchester. All these performances will be heard by radio listeners.

(*Continued on page* 191.)

THIS PLAN WILL HELP YOU AT OLYMPIA.



NOTE:- THE PLAN OF THE MAIN HALL IS SHOWN INSIDE THE DOTTED LINE: THE PLAN OF THE GALLERY WHICH SURROUNDS IT, IS DRAWN TO A SLIGHTLY LARGER SCALE.

In this section the products to be displayed at the National Radio Exhibition are reviewed in a brief and impartial manner for the benefit of visitors and all our readers.

The Exhibition is to be held at Olympia, London, from Sept. 24th to October 1st, inclusive. It affords the purchaser an incomparable opportunity of selection.

The Editor.

THE AMALGAMATED PRESS, LTD.

Stands Nos. 74 and 75.

POPULAR WIRELESS—together with its two companion radio journals, "Modern Wireless" and the "Wireless Constructor"—will be represented at the Exhibition by members of the Technical Staff. Every reader of any of these publications will be welcomed and special facilities for dealing with readers' radio problems have been arranged.

In addition, there will be on view the original models of some of the most popular receivers which have been described constructionally, so that set-builders may compare their own workmanship with that of the original design.

THE AUTOMATIC COIL WINDER AND ELECTRICAL EQUIPMENT CO., LTD.

Stand No. 38.

Here the manufacturers of the "Slektun" Coils will sell a limited number of these to the public, at *less than cost price*. This offer is, of course, only open to visitors during the period that the Exhibition is open. In addition to the range of tuning coils—claimed to give extremely high inductance value with very low distributed capacity—a feature of this stall is the "Avometer." This is a combination-measuring instrument which will give direct readings of volts, amps., and ohms.

For the coil-constructor there is the "Madacie" Automatic Coil Winder, which can "rev." up to 6,000 turns per minute if required. The instrument handles all the commonly used gauges of wire and winds coils of all sorts up to four inches in diameter, and of any length from one-eighth of an inch to five inches.

ATKINSON, C. CRESWICK.

Stand No. 55.

At this stall is shown a range of complete receiving sets. Full-size loud speakers are incorporated in many of the models exhibited, and the sets have been designed to work not only upon the broadcasting band covered by the British main and relay stations, but also upon the long waves. A feature of the claim for these sets is the long range which they will cover.

This five-valver, which is made by "Metro-Vick," derives both H.T. and L.T. from the electric-light mains.

AUTOMOBILE ACCESSORIES (BRISTOL), LTD.

Stand No. 260.

The range of exhibits will include wave-meters, transformers, lightning arresters, reaction units, volume controls, and complete receivers, all the P.D. products being represented.

One important and interesting exhibit here is the engraving machine, which will be shown in action.

BATTERIES, LTD.

Stand No. 53.

Extremely long life is claimed for the "Foolproof" Nife DX Batteries shown on this stand. The insulation across the H.T. accumulators is such that it is claimed that self-discharge due to leakage is completely overcome.

The accumulators on view at this stall are of the Edison type, the electrolyte being potassium hydrate, and the positive and the negative elements being nickel hydrate and iron oxide. The weight of these accumulators is less than that of the usual type, but each unit is of rather less voltage. The plate frames themselves, being manufactured of steel, are incapable of buckling and cannot sulphate.

BEDFORD ELECTRICAL & RADIO CO.

Stand No. 52.

At this stand there is a selection of all sorts of radio components. For those who do not favour home-construction, but prefer to have the complete set ready-made, there is a range of receivers covering a variety of reception conditions and priced accordingly.

BELLING & LEE, LTD.

Stand No. 207.

Gadgets of all kinds are temptingly displayed by this well-known firm, who have specialised in practical catering for radio requirements. Specially notable is the new "R" type terminal, which is marketed at an extremely low figure. It embodies a non-removable head, and is available in thirty letterings and various colours.

BENJAMIN ELECTRIC, LTD.

Stand No. 79.

Valve-users will find a complete range of the Benjamin Short-Path valves displayed at this stand, where details of the various types and advice as to their use are available. In addition, there are innumerable gadgets and small components on show, which will prove of especial interest to the set-builder and the would-be constructor. The attention of crystal-set owners particularly is drawn to the Benjamin Improved Earthing Device.

BOWYER LOWE CO., LTD.

Stand No. 124.

Amongst the good things on view here is a range of complete short-wave sets. The attention of the visitor is also sure to be attracted by the new super-heterodyne receiver, and by the attractive series of well-made and useful components.

Screening boxes, switches, and the well-known Bowyer-Lowe L.F. Transformers and L.F. Chokes will be found amongst the many articles shown, whilst the visitor interested in wave-meters should pay particular attention to the new model now made available to the public for the first time. Its tuning range covers the respectable wave-band between 150 and 2,000 metres.

This instrument, which is called the Mark II. Wave-meter, is provided with two coils and a calibration chart, and it embodies a self-contained battery and a buzzer. For transmitters who wish to use the method there is provided a lamp which indicates by a glow when resonance is obtained between the circuit of the wave-meter and that under test.

In this firm's "Whiteline" valve holder an attempt has been made to reduce inter-electrode capacity to an absolute minimum. The holder is of the anti-microphonic type, designed so that the springs take up any reasonable shock that may be imparted to the instrument, and absorb and damp out the vibrations as speedily as possible. It is made of bakelite, and is fitted with both soldering tags and terminals.

(*Continued on next page*).

This "Pure Music" loud speaker (Model "D") is one of the Mullard products.

ROUND THE STANDS.

(Continued from previous page).

BIRD & SONS, SYDNEY S.

Stand No. 121.

Those who are interested in the latest "thumb-drive" type of condenser will find plenty to look at on this stand. Unlike the usual parallel-to-the-panel dial, this later type is mounted in such a way that control is effected by means of a disc, which partly projects through a slot in the panel.

The "Pan-a-long" Gang Condenser is another noteworthy feature of this firm's exhibit.

BRANDES, LTD.

Stand No. 161.

The continued popularity of the Brandes products is shown by the fact that many of the lines on view at this stall were to be seen at last year's Exhibition. Among the new arrivals, however, mention in particular should be made of the "Brandeset IIIA."

This is fitted with a special selectivity device which enables the local station to be cut out at will in favour of the programmes of the distant stations. The set is contained in an oak cabinet, and embodies the well-known loud-speaker combination of a detector valve followed by two stages of L.F. amplification.

Recently a new method of distribution has been adopted by this firm, and a number of authorised dealers of Brandes goods have now been appointed. Further details are available upon application.

BRITISH RADIO CORPORATION.

Stand No. 59.

Prospective purchasers of powerful receivers are likely to linger long over this exhibit. The main items are. The Long-Range Five, the Long-Range Six, and the Radio Exchange Set.

The first-named receiver tunes from 200 to 2,000 metres, and employs two H.F. stages. The Long-Range Six goes down to 20 metres and up to 2,000, and embodies a new screened H.F. unit, which gives stability upon all wave-lengths and a wonderful degree of magnification.

In addition to the sets there will be found a selection of components on display, especial attention being paid to the H.F. amplification and to the requirements of the DX listener.

B.S.A. RADIO, LTD.

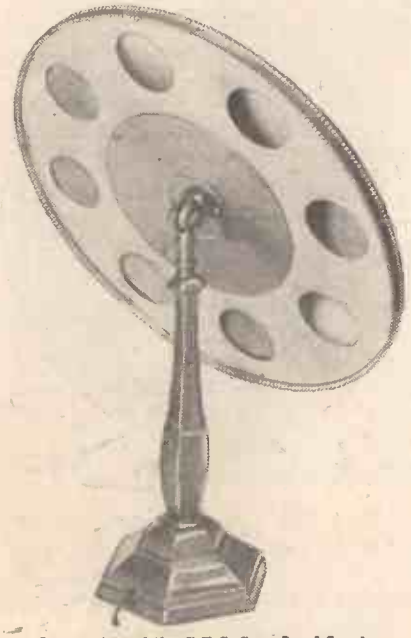
Stands Nos. 10 and 64.

In addition to last-moment new lines, this firm will show a range of the well-known B.S.A. sets, and also the B.S.A. loud speakers, horn and "Kone" types, and headphones. Besides 2-volt, 4-volt, and 6-volt valves, the little 1-volt "Wecovalve" will be showing at these stalls.

BOWERMAN, LTD., GEORGE.

Stand No. 205.

The Bowerman super-headphones—the head-bands of which are made of duralumin—and loud speakers, will be found here. The Picture-type loud speaker has been remodelled, and the new design is claimed to possess many advantages over its predecessor, giving greater volume and better tone.



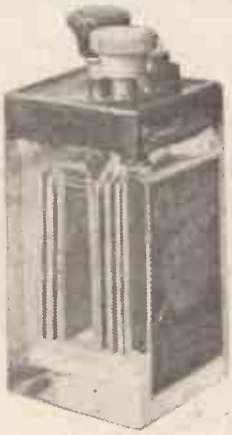
A rear view of the G.E.C. Cone Loud Speaker.

BRITISH EBONITE CO., LTD.

Stand No. 76.

Ebonite in every familiar and in a good many unfamiliar forms will be the feature which, as in past years, will attract visitors to this firm's display. The polished Becol panels will make many a home constructor break the Tenth Commandment.

With the advent of really high magnification valves the importance of good insulation in the various ebonite parts of the set is being realised more and more. This firm's high-quality products should therefore be increasingly appreciated. In the line of low-loss formers displayed there is to be an additional pair of models, one measuring 1 in. and the other 3½ in. in diameter. Sheets, panels, rods, mouldings and tubes will be on view at this stand.



A robust Oldham Accumulator of unusual design.

BRITISH GENERAL MFG. CO., LTD.

Stand No. 111.

An aerial tuning unit covering from 250 to 2,000 metres, will cause many a coil owner to think hard at this stall. Here, too, will be shown the British General shrouded transformer, which is made in two ratios (3 : 1 and 5 :-1), and in a quality that carries a year's guarantee.

BRITISH THOMSON HOUSTON CO., LTD.

Stands Nos. 138 and 139.

Familiar as are the products of this firm, it is safe to say that this year's display will attract as much attention as ever. For one thing, practically everybody will want to see the famous R.K. type loud speaker, and the keener the fan the greater will be his interest therein. On the other hand, the crystal-set owner will find he is catered for, whilst the full range of B.T.H. valves, including the new 2-volt types (B21, B22, B23, and B8) also will be displayed. Several new components, and at least one new type of receiver, will make this both an up-to-date and attractive exhibit.

Amongst the new components is a resistance-capacity coupling unit which embodies not only the necessary anode resistance, coupling condenser, and grid-leak resistance, but also the valve holder, which is of the anti-microphonic type.

The B.T.H. "Resistor" receiver which will be shown at this stand is a three-valver which employs a B.23 valve in the final stage, preceded by two of the B.T.H. B.8 valves. The set is enclosed in a handsome cabinet of the upright panel type, with the controls at the front.

BROWN LTD., S.G.

Stand No. 122.

If, indeed, not the very first set of its kind, the Brown "Crystaframe" is certainly one of the very earliest pioneers in the region of crystal reception with a frame aerial. Another exhibit at this stall that will be of great interest to the crystal man is the new permanent detector, of the two-crystal type. Other new, or recent additions to the Brown family of radio components and accessories, are the Pick-up for Gramophones, and the later loud speakers, which, together with the "Crystavox," form some of the attractive features at the sure-to be-popular stall.

Another noteworthy departure from the ordinary run of sets is to be found at this stand in the form of the "Ideal Junior" receiver. This consists of a crystal detector and a special amplifier, the latter being of the valveless type, which in itself marks the design as something quite out of the ordinary. The Ideal Junior is sold complete with loud speaker.

Following the success scored by this firm's Disc loud speaker, comes the new "Universal," which in essentials is very similar. Unlike the Disc, this loud speaker is encased in a polished mahogany cabinet, so that those who wish to retain the Disc design but are not in favour of its all-metal housing, or who prefer the appearance of mahogany, are now catered for. There is also a less expensive model in this series which is called the "Mascot."

BROWNIE WIRELESS CO. OF GREAT BRITAIN.

Stand No. 145.

Brownie crystal sets will naturally enough be taking a big place at this stall, together with a two-valve amplifier. The following price reductions—always a welcome "draw"—are announced: Permatector, from 3/- to 2/6; and the two-stage amplifier from £3 to £2 2s.

BROWN BROS., LTD.

Stands No. 25 & 26.

On these stands will be found a representative range of sets, components and accessories, made by well-known manufacturers who have already made friends with the radio public.

A. F. BULGIN & CO.

Stand No. 236.

Lots of new lines are scheduled to be on show here, so visitors may expect a comprehensive collection of wireless components and accessories, covering all sorts of needs and pockets.

WM. BULLEN.

Stand No. 152.

Right in the front of this exhibit we may expect to see the two new "Bullphones"—one a cone speaker, and the other of the cabinet type on the lines of an English bracket clock.

A new cone unit, at a popular price, is sure to attract a lot of attention at this stall.

BURNDEPT WIRELESS LTD.

Stand No. 127.

Several new lines will be displayed, and, of course, there will be Ethophones, Ethodynes, Ethocones, Ethovox speakers, Ethovernier dials, as well as a special show of battery-eliminators and chargers.

Amongst the new lines is the All-Battery Eliminator, which will interest town-dwellers whose houses are wired with A.C. mains of a supply frequency between 100 and 250 volts, 40 to 100 cycles.

BURNE JONES & CO., LTD.

Stand No. 123.

A Magnum show! From complete receivers down to dinky little components that seem to be just what the constructor needs, all the lines of this well-known firm will be on view. The latest copper screening boxes will be of especial interest to readers of this journal who contemplate the construction of receivers embodying this type of recently-evolved component.

A safety fuse for H.T., which costs 1s. 6d., and blows to smithereens at .06 amp. or at .5 amp., according to type, is one of the handy little gadgets that are likely to find a ready sale.

Those readers who are contemplating H.F. amplification by means of a choke, or who will be using this component in connection with shunt-feed or other circuit in which high inductive value and

A three-valve "Baby Grand" Receiver (C.A.V.).

low self-capacity are essential, will be particularly interested in the Magnum Cone Choke. This is a line which has only recently been designed, and its inductive value is given by the makers as 160,000 microhenries.

The cartridge resistors shown at this stand cover resistance values from ·3 ohm up to 50 ohms, and can be obtained separately or with base, the price of the resistor being 1s. 6d., and that of the base, 1s.

CAMDEN ENGINEERING CO., LTD.

Stand No. 96.

A screened coil of unique design and the "Centroid" square law condenser will be leading lines at this stall. Gang-condensers, dual-condensers, screening boxes, fixed resistors, and a lead-in and earthing switch will also be shown here.

CAMPBELL AND ADDISON.

Stand No. 34.

Two types of five-valve portable receivers will be prominent features of the display. There is also a

(Continued on next page).

ROUND THE STANDS.

(*Continued from previous page*).

de luxe model, not portable, but for drawing-room use, and a five-valve cabinet set, one dial control, for which a repertoire of six different programmes is claimed.

CARBORUNDUM CO., LTD.

Stand No. 125.

Several new lines will be introduced on this stall, including an anode resistance and grid leak, consisting of a rod of carborundum. An R.C. coupling unit recently perfected will also be on show.

The R.I.-Varley "Interdyne" receiver, which employs the new "Robinson" valve.

CARRINGTON MANFG. CO., LTD.

Stand No. 12.

Mr. Baldwin is not a whit more keen upon his Cabinet than, in a different field, is the radio constructor about his. The Carrington cabinets are of all types, forms, styles and prices, and he will be a most unusual radio-man who does not find a pleasure in looking, not only at the kind of cabinet he expects to get some day, but also at the kind he undoubtedly would get if that Calcutta Sweep number had come out of the hat in the manner that he had hoped!

This is a display that the ladies will find time to linger over.

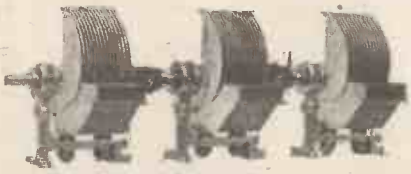
CELESTION RADIO CO.

Stand No. 151.

Here will be shown a complete range of the Celestion loud speakers. In addition, there will be a number of self-contained receivers on view, but probably the greatest interest will be taken in the two new loud-speaker models, which, it is understood, have already made a great hit with those who have heard the performance which they are capable of giving.

The older Celestion models which were designated A1, A2, and A3 are now all being replaced with more up-to-date instruments. Instead of the A1 the C10 will be on show, whilst the C12 is replacing both the A2 and the A3. The two new departures in loud speakers which are being added to the Celestion range are the C14 and the C24.

The former is a de luxe model incorporating all the best of this firm's well-known workmanship and



These separate variable condensers are "ganged" together by the Formo Universal Coupling Link,

design, whilst the latter is not only so sensitive that even quite a small set will work it, but it is capable of handling an amazing volume with wonderful clarity and purity of reproduction.

CHAMPION ACCUMULATOR CO.

Stand No. 18.

H.T. accumulator parts for home construction is the speciality of this firm, and those toying with the idea of H.T. accumulators will certainly find plenty to interest them at stand No. 18.

CITY AND GENERAL RADIO CO., LTD.

Stand No. 202.

The home constructor and all on the look-out for good sets will be well advised to pay this stall a visit as here there will be shown models of some of the most popular receivers ever designed. Amongst the firm favourites represented will be the Hale One-Valver, as described in "Modern Wireless," and the Twin-Tune Five, a description of which appears in the October number of the "Wireless Constructor" (now on sale).

In addition there will be a comprehensive stock of the most popular components.

H. CLARKE & CO. (Manchester), Ltd.

Stand No. 83.

The famous Atlas specialities will be the great attraction at this stall. Plug-in coils, centre-tapped and X-type coils, condensers, and the new Atlas R.C. coupler will be featured, and new exhibits will include battery eliminators, for both D.C. and A.C. mains, and an L.T. unit for A.C. mains which consists of a battery charger and a floating battery. The battery eliminator apparatus is designed for mains of various voltages, and there are several types to suit different requirements.

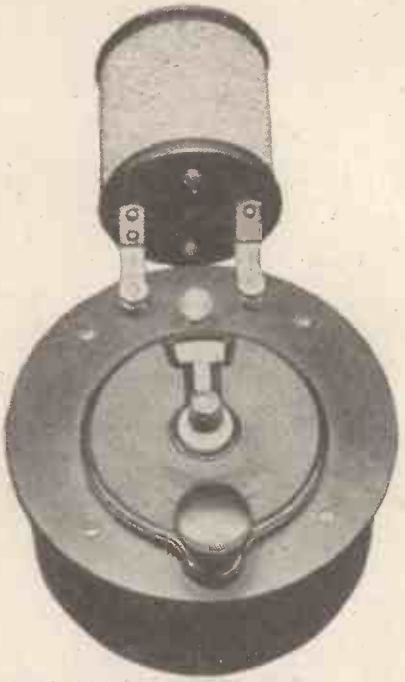
All the "Atlas" battery eliminators are enclosed in steel cases of the art metal type, the colour being olive green. To cover the various direct current voltages of input there are models D.C.6, D.C.10, D.C.12, and D.C.14; whilst the A.C.10, A.C.11, A.C.12, A.C.13, A.C.14, and A.C.15 are for use with alternating-current mains with voltages ranging from 100 to 250. Special care has been taken with the filtering system of all the various units to ensure that the final output from the eliminator is free from roughness and ripple.

CLIMAX RADIO ELECTRIC, LTD.

Stands Nos. 88 & 89.

"Auto-bat" components are on show here in large numbers and wide variety. A noteworthy feature of this stall is that it is one of those where receivers which will work entirely from the house electricity supply are on view.

Amongst new lines there is an H.T. supply unit for D.C. mains, which, it is claimed, will provide an output up to fifty milliamps.



This absorption wave-meter is an Igranic product.

E. K. COLE, LTD.

Stand No. 11.

Ekco H.T. units will again be well to the fore in this firm's display, and, in addition, there are a number of other lines of great interest to those who have electric light in their houses.

Further proof of the popularity of the "all-from-the-mains" type of receiver is afforded at this stand, where a set known as the "Ekco Mains IV." is displayed. All current for this receiver is taken from the mains, and provision is made whereby the wires of the house-lighting system act as an aerial, too, thus obviating the necessity for an outside mast and aerial. The circuit arrangement is one high-frequency amplifier, detector, and two stages of low-frequency amplification.

A. C. COSSOR, LTD.

Stands Nos. 86 & 87.

Everybody knows the Cossor valves, but not everybody will be familiar with all the members of that large and popular family. There will, of course, be a complete range on show, covering the 2-volt, 4-volt and 6-volt types. The latter will include the 610 R.C. valve, for resistance or choke coupling, the 610 H.F., the 610 L.F. and the "Stentor 6."

Amongst the brand-new Cossor products, mention must be made of a series of valves which are suitable for operating direct from the house-lighting mains. There is also a new Cossor 4-electrode valve, and—yet another novelty—a valve on the lines of the latest screened grid type.

Rectifiers, both of the single and two-wave types, will also be included in the list of this firm's activities, and altogether the two stands will be closely packed with exhibits of the kind that every radio man will like to linger over.

COLONIAL TECHNICAL PRESS, LTD.

Stand No. 232.

Here the DX man will find a very large number of foreign radio papers are represented, and traders

Inductances which are both shielded and ganged (Lewcos).

with foreign interests will doubtless discover a good deal of valuable information from the world-wide activities of the various periodicals.

D.A.R., LTD.

Stand No. 104.

Everybody who has an accumulator ought to have a look at this stand, for here is shown the latest liquid preparation which absolutely hates to see sulphation in a battery. Remarkable recoveries of accumulators treated with D.A.R. have already been described in this journal, and readers who think that D.A.R. sounds too good to be true should prosecute the most searching inquiries at the stall, where a very convincing display has been arranged. There is nothing like a practical demonstration of "Before Use" and "After," when dealing with a preparation of this kind, and the manufacturers are hoping that sceptics will come to stand No. 104, and see for themselves what D.A.R. can do for an accumulator that has to all intents and purposes given up the ghost.

BERTRAM DAY & CO., LTD.

Stand No. 51.

All potential advertisers will be interested in this well-known advertising firm's display. Folders, booklets, catalogues and catch-the-eye advertisements are displayed, whilst details can be obtained of complete campaigns to interest and attract the radio public.

D. X. COILS, LTD.

Stand No. 213.

Several different types of coil are exhibited here, the prices ranging from one to four shillings for the standard D.X. type. Apart from the tuning coils there is a main's unit for D.C. on show, three different models being manufactured to meet the requirements of the different classes of receiving apparatus with which the unit can be used.

DETEX DISTRIBUTORS, LTD.

Stand No. 2.

As well as the various Detex products, the well-known Rolls portable sets will be on show at this stand. Several attractive new lines have made their appearance, notably the Detex low-wave station separator, which is claimed to be something quite out of the rut. A feature of the Detex H.F. tapped choke, which appears to be quite a recent addition to the firm's activities, is the high inductance and low self-capacity which the component is claimed to possess.

The Burne-Jones screened three-valve receiver.

(*Continued on next page*).

ROUND THE STANDS.

(Continued from previous page.)

A. J. DEW & CO.
Stands Nos. 21 and 22.

Here is a wholesale exhibit which includes specimens of all the many radio lines in which this firm are interested. It forms an exhibition in itself.

WM. DIBBEN & SONS.
Stand No. 68.

Complete sets are the order on this stall, the three types on view being the "Monarch," "Cromwell," and the "All Clear." As all-in prices are given, the purchaser can see exactly where he stands, without having to mentally add the price of batteries or other accessories to the cost of the set.

The Relay portion of the Lotus Remote Control.

DUBILIER CONDENSER CO. (1925), LTD.
Stand No. 162.

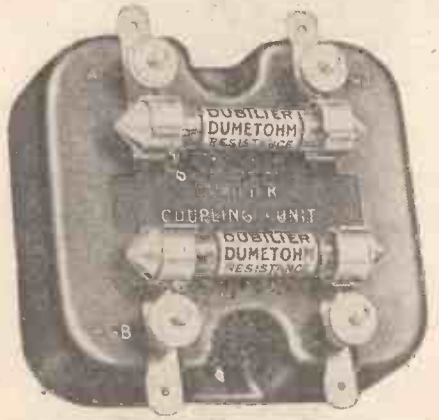
Condensers, of course, are the mainstay of the productions which are displayed by this famous firm, but in addition to all sorts and sizes and shapes of condensers, there is a whole series of Dubilier radio components to choose from. Three models of H.T. supply units, for instance, will catch the eye of the visitor who has electric light in the house; whilst a bewildering variety of anode resistances, grid leaks, fixed resistors, volume controls, and similar components attest to the many activities outside condenser manufacture in which this firm is engaged.

Toroid coils in two ranges, and the K.C. variable condenser, with a special slow-motion drive geared to 200 to 1, are two of the new lines which are sure to prove of special interest to constructors.

The Toroid coils are made up in the usual way so as to cover the two chief broadcasting bands, viz., 200 to 600 metres, and the higher wave-lengths above 1,000 metres. It is interesting to note that in this higher range the Eiffel Tower station is catered for, as well as Radio-Paris, the range being from 1,000 to 3,000 metres. Tapped Toroid coils are provided for the types of set in which a neutralising winding is necessary.

DONTONE LOUD SPEAKERS.
Stand No. 206.

Twenty-four tuned gongs form the basis of the Dontone Loud Speaker, the earlier model of which gained many warm adherents. We understand that a new model will be shown which possesses many advantages over the type formerly sold by this firm.



A complete Resistance-Capacity Coupling Unit, with interchangeable resistances.

DIONOID BATTERY CO., LTD.
Stand No. 107.

The tendency to break away from the old-established ideas about accumulators is further illustrated by this exhibit, which consists of batteries with many unusual features. In addition to L.T. accumulators having windows through which can be seen the level of the electrolyte, an H.T. battery will be on show, together with patent carriers, charge-indicators, and other novelties of universal appeal.

EAGLE ENGINEERING CO., LTD.
Stand No. 58.

Both complete sets and components will be featured by this firm, the former line including a portable five-valver, and table and pedestal models. Dry batteries, rheostats, potentiometers and vernier friction drives for tuning dials are amongst the many useful components forming part of this exhibit.

EAST LONDON RUBBER CO.
Stands Nos. 29 and 30.

Many of the well-known makes of sets, components and accessories will be shown here. The part of the display which will probably be of the greatest interest to set-makers is that devoted to workshop tools, of which there will be a large variety.

J. J. EASTICK AND SONS.
Stand No. 245.

In addition to the various Eelex lines which have proved popular in the past, several new ventures will be on view. These have mostly been on the lines of improving connections at terminals, etc., and are of the low cost and universal appeal type in which every home constructor is likely to be interested.

ECONASIGN CO.
Stand No. 223.

Traders will be particularly interested in the display here, which is of printing outfits suitable for notices, window-tickets, showcards, etc.

EDISON BELL, LTD.
Stand No. 153.

In addition to a full selection of Edison Bell sets, components and accessories, such as have been shown previously, there will be a number of new lines on view. A five-valve portable will be making its debut, as well as the "Regency Bureau" receiver, which is not only a handsome piece of furniture and a wireless set, but is fitted up as a writing-desk as well. Readers on the look out for gramophone attachments would do well to inspect this stand carefully, as great popularity is anticipated for the Edison Bell products of this nature.

EDISON SWAN ELECTRIC CO., LTD.
Stands Nos. 144 and 146.

Valves, complete sets, components and accessories are all represented on this firm's stands. As the sets will include the popular R.C. models there is sure to be a great interest in these and in the valves with which they are associated.

For the man who would like to make his own set there is not only the special line devoted to this branch of radio, but there are components of various kinds, as well as new types of accumulators, for both anode and filament supply.

The chief attraction at this stand in past years has proved to be the Ediswan valves, and there is no doubt that again this year the valve section of the exhibit will attract its full share of attention. Full details of all the different types will be displayed, and owners or prospective owners of Filadyne sets will be specially interested in the Ediswan D.R. 2. This 2-volt valve is one of the low-consumption type, with a filament current of only ·1 amp., and the economical anode-voltage limits of forty to eighty volts. Used in the Filadyne circuit it has proved to be remarkably efficient both as regards the sensitivity to input and the excellence of the volume obtainable.

ELECTRON CO., LTD.
Stand No. 141.

"Six-Sixty" valves of the types already well known, and of new design which have only recently been produced, will be the attraction at Stand 141. Amongst these new arrivals is a non-microphonic valve with a double bulb, which is in the 6-volt ·1 amp. class. (The amplification factor is 20 and the impedance 20,000 ohms). Super-power and resistance-coupling valves will also be open to inspection here.

EMPRESS RADIO AND ELECTRIC CO.
Stand No. 118.

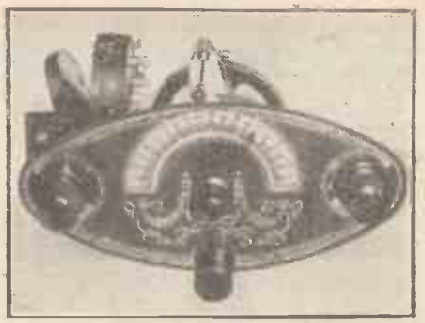
Complete receivers are the main feature of this display, but in addition will be found eliminators and chargers for utilising the house mains for radio work. Amongst the complete sets are two four-valvers, the "Concert Four" and the "Empress Classic." The former is a single-control set, whilst the latter is capable of tuning from 150 to 3,000 metres. In both these models the circuit is H.F., Det. and 2 L.F.

ENTERPRISE MANUFACTURING CO.
Stand No. 259.

"Emaco" screened coils, screens, filament dimmers, grid leaks, anode resistances, cabinets and coil holders will constitute the main attraction of the firm's own products, but in addition there will be a display here of various proprietary lines. The loud-speaker cabinet which will be shown has the merit of being designed to enable loud-speaker units of various makes to be employed.

EVERREADY CO. (GT. BRITAIN), LTD.
Stand No. 154.

Dry batteries of all sizes and types, including the real big fellows that are beloved of super-power valves, will be found in profusion at this stall. The dry batteries for L.T. supply and the new unit for portable sets are also shown. The latter is a 63-volt battery, measuring 6 in. by 5 in. by 3 in., with tappings at every three volts. The weight is 4 lb. 10 oz., and the price 12/6.



This "Panel Plate" comprises a complete tuning unit

FALK, STADELMANN & CO., LTD.
Stand No. 147.

"Cromwell," "Wolfe," "Kitchener" and "Havelock" are on this stall—not the soldiers, but the sets of those names. The first-named is a two-valver (Det. and L.F.), the second a Det. and 2 L.F. (resistance-capacity coupled), and the others are four-valvers.

In addition there are the Efesca components, including an aerial tuner, with Reinartz type reaction, and the regenerative aerial tuner, which has come down in price.

If you haven't the cash in your pocket for one of the sets, we understand that this is one of the firms that are willing to grant deferred payment terms. No doubt full details will gladly be given upon enquiry at the stall.

FELLOWS MAGNETO CO., LTD.
Stand No. 116.

All the "Jolly Good Fellows" sets and components are here on view, the sets ranging from crystal receivers to multi-valvers in posh cabinets of various types. H.T. units, headphones, and other accessories will be shown, and in addition there will be a complete range of the Louden valves in evidence.

FERRANTI, LTD.
Stand No. 142.

If only the A.F. 3 and the A.F. 4 types of L.F. transformer were to be shown here there would no doubt be a crowd of admirers and would-be purchasers around this stand. But the new output transformers of special types that have been evolved by this firm, also are to be on view, together with a selection of transformers. Measuring instruments also are included in the display, including voltmeters and ammeters for panel mounting.

The Oldham High-Tension Accumulator.

THE FORMO CO.
Stand No. 81.

Gang-condensers, rheostats, vernier dials, valve holders, L.F. transformers, chokes, and all the other Formo lines, are on view, as well as a host of new gadgets. The mid-line variable condenser, and the "Individual-Gang" control condenser are newcomers of exceptional interest, whilst an illuminated dial, a collapsible screen, and a low loss two-range coupler will tempt the purchaser to this display.

A. W. GAMAGE, LTD.
Stand No. 69.

The chief attraction at this stand will be the complete range of Gamage receivers, which are suitable to a variety of radio needs and to a diversity of pockets. Buzzers and various other signalling gear of a similar type will also appear on view at this stand.

(Continued on next page)

ROUND THE STANDS.

(Continued from previous page.)

One of the valves in the "Six-Sixty" range.

GAMBRELL BROS., LTD.
Stand No. 66.

Neutro-vernier condensers and the Gambrell "Efficiency" coils are to be found here, and the new centre-tapped coils are sure to make a number of new friends.

One unique feature of the Gambrell display is the series of sets which work direct from the mains. Housed in cabinets, they include two, three, and four-valve models, at various prices.

GARNETT, WHITELEY & CO., LTD.
Stand No. 93.

All the "Lotus" components will be on show here, including the six types of coil-holder chokes, switches, valve holders, etc. Probably the centre of interest will be the new Lotus Remote Control Unit, which will tempt many a man who now finds loud-speaker distribution the chief fly in the radio ointment.

For the benefit of those who are not sure what the remote control does, it may be advisable to say that it is an easily-fixed gadget by which wireless can be laid on from the set to a number of different rooms. The advantage of the system is that the set can be switched on from any room, and as soon as the last person who is listening in disconnects his loud speaker the set "packs up" until it is wanted again.

GENERAL ELECTRIC CO., LTD.
Stands Nos. 15 and 140.

The new Gecophone radio receivers and gramophone reproducers will be sure to attract attention to these stalls. All-in prices make it easy to see what the cost of entertainment will be, and the fact that the wireless receiver may instantly be adapted for the reproduction of gramophone records, if so desired—making it entirely independent of the broadcasting programme for the time being—will doubtless prove a great attraction.

Some of the popular complete sets for which the firm is famous have been greatly reduced in price, and purchasers will be glad to know that not only complete receivers but components and accessories have also been revised in this important particular. The ambitious new four, and six-valve sets, the new portable and the new loud speakers, as well as such handy little accessories as a 7/6 volume control, make the G.E.C. exhibit one that will prove extremely difficult for visitors to pass.

This new receiver is made by Metro-Vick Supplies, Ltd.

GENERAL RADIO CO., LTD.
Stands Nos. 46, 47, & 48.

Loud speakers, complete sets, and components will be the main attractions, but few particulars are available at the time of writing, as it is understood that extensive redesigning has been going on in this firm's laboratories. The sets will range from the simpler 2-valve models to ambitious affairs employing up to 8 valves.

GILLAN RADIO ELECTRIC, LTD.
Stand No. 235.

Motorists to whom it has occurred to wonder why they can't easily and conveniently charge up their radio accumulators from the car lighting system should pay particular attention to this stand. For here will be showing the "Charge-Adapta," designed for the purpose, and suitable for cars with 6 or 12-volt batteries. In addition there will be exhibited a complete range of the Gillan receivers.

F. J. GORDON & CO., LTD.
Stand No. 28.

An automatic programme selector is on view at this stand. It enables the listener to choose his programmes ahead, and then he can rest assured that at the time selected by him the set will automatically start up and deliver the programme desired, cutting off again at the predetermined time.

Other exhibits will be a selection of batteries by the leading manufacturers, and also the Gordon battery charger, a device for connecting to the lamp socket.

A compact unit for resistance-capacity L.F. coupling.

GRAHAM AMPLION, LTD.
Stand No. 137.

Every type of Amplion loud speaker is represented in this display, from the popular little fellows that are so well known, to the huge Public Speech and Band Repeater types. Most of the models will need no introduction to the public, but there are some extremely interesting newcomers. One of these, the A.C.1, is an open cone, which can either be stood upon a table or hung up on a wall like a picture. Its stand is of the type that can act either as a sort of easel, for table use, or as a fixture for hanging.

Another Amplion Cone, the A.C.4, is housed in a handsome cabinet, which can be had in either oak or mahogany; and although this model has not long been on sale, it is proving extremely popular already, and the makers are anticipating a big run upon it.

Certain of the horn type Amplion models have now been discontinued, these being the A.R.58, A.R.88, A.R.880, and A.R. 88M. We understand, however, that if specially required, delivery of these models is still possible.

Amongst the cone type of loud speaker which will be on view are several with which the public will be glad to familiarise themselves, for the models in question have only recently been released from the factory. These are the new cone types, for example the A.C.3, the A.C.5, the A.C.7 and the A.C.9; and in addition there is a pair of cone assemblies (one 10-inch model and one 12-inch), which can be incorporated into home-constructed sets.

Altogether the Amplion display is one which must not be missed by any prospective purchaser of a loud speaker, for the firm is not content to rely upon the high reputation which it has gained by the success of its earlier models, but it strives continually to surpass all its own precedents by evolving better, and even better still, loud speakers.

GRAHAM & CO., R. F.
Stand No. 201.

An interesting little gadget exhibited by this firm is a crystal detector, which is designed as a substitute for a valve should the latter cease to do its duty by the set. Traders will be interested in this stand, as Messrs. R. F. Graham & Co. make a speciality of receivers designed to the order of dealers.

The Ediswan Variable Condenser, showing the gearing.

GRAHAM FARISH MFG. CO.
Stand No. 218.

Enclosed coils and enclosed mica condensers will be on view, together with a variety of grid-leak clips, grid and anode resistances, etc. We understand that in addition to its usual lines this firm will be showing several new lines.

H.T.C. ELECTRICAL CO., LTD.
Stand No. 258.

A 2-valve and a 3-valve set are the main attractions here. The former is the "H.T.C. Twin," and is designed for good loud-speaker results. It is in an oak cabinet complete with 2-volt valves, speaker, coils, H.T. and grid batteries, and aerial and earth fittings, price £6 4s.

HALCYON WIRELESS CO., LTD.
Stand No. 168.

To their popular range of complete-in-themselves portable receivers, we understand this firm has added a new model. A complete range of all the Halcyon sets will be on show.

HART ACCUMULATOR, LTD.
Stand No. 112.

Wireless accumulators of all types, styles, sizes and capacities will be the feature of this firm's exhibit. For L.T. alone there are seven or eight different types, including non-spillers, and the M.E.Z., which is contained in ebonite and is intended for use in countries where they not only get some summer, but where they get it "real hot." There are also H.T. accumulators of various types.

HART COLLINS, LTD.
Stand No. 114.

In addition to the standard Hart Collins lines of 3-, 4-, 5-, and 8-valve receivers, a new 5-valver will be making its bow to the public. It is a portable that can be used either with batteries or connected up to the mains units. Some of the other sets have recently been re-designed, various improvements having been found possible to bring them right up to date.

(To be concluded next week.)

A reactive tuner made by R.I.-Varley.

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

A DIRECT-CURRENT TRANSFORMER

STEPPING-DOWN D.C.—R.C. VALVE DESIGN, Etc.

A Direct-Current Transformer.

An entirely new type of charger, for operating from *direct-current* electric-light supply, makes use of a step-down transformer and rectifier, exactly as with the usual type of alternating-current charger.

Probably every reader knows that when a low-tension battery, say 6 volts, is recharged by connecting it straight to the D.C. electric-light supply, using a resistance, a very large proportion of the total energy drawn from the mains is wasted in the resistance. For example, supposing the alternating-current mains happen to be 250 volts D.C. and the battery 6 volts.

Let us assume that it requires 10 volts to drive the necessary current through the battery (as a matter of fact the actual voltage is probably more like 7½ volts to 8 volts). Then, suppose the charging current is 2 amperes, so that the battery is drawing 10 by 2, that is 20 watts. The other 240 volts is wasted in the resistance, and since the current in the resistance is the same as that through the battery, there are 480 watts dissipated in the resistance for every 20 watts usefully employed in charging the battery. That is to say 24-25ths of the current drawn from the mains are thrown away, only 1-25th being used.

With alternating current mains it is an invariable practice to employ a transformer to step-down the voltage to a value approximating to that of the battery to be charged, so that the above enormous wastage of energy is avoided.

Stepping-Down D.C.

In the new direct-current battery charger referred to a step-down transformer and a rectifier are used, but since direct current cannot, in the ordinary way, be used with a transformer, it is necessary to *interrupt* the direct current and feed the interrupted D.C. into the primary of the transformer; this produces stepped-down A.C. in the secondary. The low-tension A.C. is then rectified in the usual way and the system becomes as efficient as though A.C. were used.

Efficiency.

In a working model of this new arrangement an input current of considerably less than 100 milliamps at the high-tension side gave an output rectified D.C. at the low-tension side of over 1 ampere—that is, over 1,000 milliamps—the ratio of the output current to the input current being evidently greater than 10 to 1. It would seem that this device should be an enormous boon to amateurs whose electric supply is D.C., as it means that where they have been using, say ten shillingsworth of electricity, they need only use (with this charger) one shillingsworth.

R.C. Valve Design.

An interesting step forward in valve design has been made by a well-known American manufacturer, who has now introduced a special valve for resistance-coupled amplification, having a very high amplification factor. The other characteristics of the valve are, filament voltage, 5 volts; filament current, 0·25 amp.; and H.T. voltage 135 to 180.

In resistance-coupled amplification the step-up effect depends upon the valve, whereas with transformer coupling the step-up depends upon the transformer as well as upon the valve. It is for reasons of this kind that the high "mu" has been provided.

The overall amplification of a single stage of resistance-coupled amplification, using this new valve, is said to be equivalent to the average amplification obtained per stage with a good combination of transformer and valve. This is somewhat contrary to the general belief that the amplification per stage with resistance coupling is decidedly below that obtainable with transformer coupling. In fact, it has always been regarded as a safe working rule that three stages of resistance coupling are required to give the equivalent of two stages of transformer coupling.

R.C. versus Transformer.

In view of the other advantages of resistance coupling as compared with transformer coupling, it is interesting to note that efforts are actively on foot to make resistance coupling equal per stage to transformer coupling. With the very high "mu" of the new valve it becomes possible for amateurs to reduce their resistance-coupled amplification stages to two, namely, the first stage with this new valve following the detector employing the same type of valve and the second stage with a power amplifier. It is further claimed that the cost of the condenser, anode resistance and grid leak employed in each resistance-coupled stage is much less than the cost of a high-quality transformer.

Low H.T. Current.

Resistance-coupled circuits have been somewhat limited in popularity owing, amongst other things, to the fact that they impose a heavy burden upon the source of high-tension supply. This was more true when the general purpose valve was misapplied to resistance-coupled circuits which require a high "mu" valve. The plate current of this new valve, however, is only about one-tenth of that consumed by the average general purpose valve employed in the same circuit, even when operating at H.T. voltages up to 180.

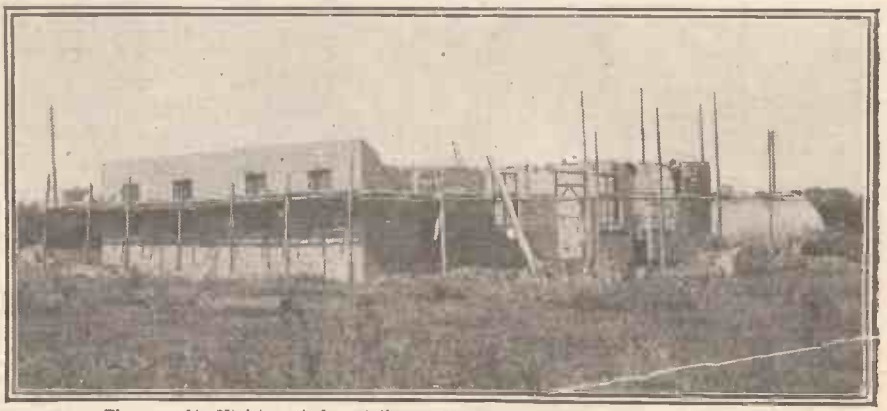
Screened Grid.

I have had a number of letters from readers with regard to the screened-grid valve invented by Dr. A. W. Hull.

This is a valve in which the internal or inter-electrode capacity is neutralised inside the valve itself, without the use of any external balancing circuit.

It is well-known that the capacity coupling inside the ordinary three-electrode valve limits its efficiency, especially for short-wave or H.F. work. In consequence of this inter-electrode capacity it is impossible to obtain the theoretical amplification value or, in fact, anything approaching that value, as the capacity between the plate and grid throws the circuit into oscillation long before the theoretical amplification is reached.

In the well-known Neutrodyne circuit the inter-electrode capacity and its coupling effect are neutralised by means of an external neutralising condenser. This is connected between the grid and the anode coil, and it has the effect of opposing the capacity coupling inside the valve.



The new Air Ministry wireless station at Mitcham in the course of construction.

Amplification per Stage.

The Hull screened-grid valve gives a very considerably greater amplification per stage in H.F. amplification, and this has been placed at five times that obtainable with an ordinary valve. Consequently signals can be received which are only, perhaps, one-twentieth of the minimum which could otherwise be received.

The Hull screened-grid valve is in effect an ordinary so-called four-electrode valve, i.e. with two grids, except that it is designed in a special way. The second or screen grid, i.e. the one nearest to the anode, prevents most of the lines of electric force from the anode from reaching the grid proper (or "control" grid), which is

(*Continued on page* 190.)

WHEREVER RADIO PARTS ARE WANTED—USE LISSEN—

NO matter what may be mentioned or used in any circuit of any booklet or periodical you may be building from, remember that the best parts have not necessarily been used. There are many advertising manufacturers—all expect a share in the use and mention of their products, and they usually get it. LISSEN gets a share, too, but obviously it is not possible for the periodical to use all one maker's parts, although they may be known to be the best. Remind yourself of that when building—remember, too, that the best parts are LISSEN, and that if you build with them you will use all the energy available, and get louder, clearer signals from near and far in consequence.

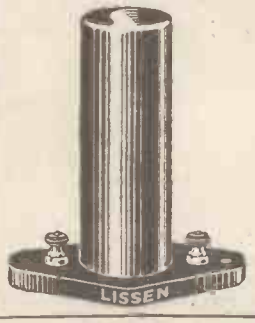
FACTS OF IMPORTANCE ABOUT LISSEN PARTS—

LISSEN FIXED CONDENSERS

Fixed condensers should be leak-proof, and if they are **LISSEN**, which **DELIVER *ALL* THEIR STORED-UP ENERGY *ALL* THE TIME**, nothing is lost. Note the case in the **LISSEN** condenser, how it can be clipped into the **LISSEN COMBINATOR** in resistance circuits, how it can easily be used upright or flat. Then the price of **LISSEN FIXED CONDENSERS** is half what it was a year ago. The plates are properly laid in a **LISSEN**—they are homogeneous with each other, and cannot move or come apart.

Capacities ·0001 to ·001, 1/- each (much reduced).
Capacities ·002 to ·006, 1/6 each (much reduced).

DEMAND LISSEN FIXED CONDENSERS.



LISSEN H.F. CHOKE

Previously 10/-

NOW 5/6

LISSEN FIXED GRID LEAKS

1/-

1/-

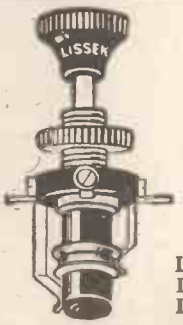
They do not alter—they are pertectly silent. You can put a **LISSEN** half-megohm leak in circuit direct on to a 220-volt supply and leave it on indefinitely—it will not alter. It can then be put straight into a critical radio circuit—it will be absolutely silent. **LISSEN** grid leaks have been further tested by exposure to rain and sun on the roof of the **LISSEN** factory. They never altered, never varied. Patented.

All resistances—Previously 1/8, NOW 1/- each.

LISSEN VALVE HOLDER

Has both low losses and also low capacity, twin virtues found in few valve holders. Sent out ready for baseboard mounting, but can also be used for panel mounting by bending springs straight.

Patented, previously 1/8, NOW 1/- each.



LISSEN 2-way switch

LISSEN SWITCHES

There is one for every switching need in radio. Designed for radio work where currents are small—they will not waste current. They fit easily—take up little room. **LISSEN ONE-HOLE FIXING, OF COURSE.**

	Previously.	NOW
LISSEN 2-way	2/9	1/6
LISSEN Series-parallel ..	3/9	2/6
LISSEN Double Pole Double Throw	4/-	2/6
LISSEN Key Switch ..	2/6	1/6

HOW TO MAKE H.T. BATTERIES LAST LONGER

Every ordinary H.T. battery can be made to yield more energy if a **LISSEN** 2 mfd. (or 1 mfd. but the larger capacity is the better) is put across it. It will absorb all the noises when the battery gets old. Your dealer will be pleased to show you how to connect it easily.

LISSEN (Mansbridge type) Condenser

2 mfd. 4/8;		1 mfd., 3/10	
·01	2/4	·1	2/6
·025	2/4	·25	3/-
·05	2/4	·5	3/4

Specially moulded case makes it impossible for the condenser to short circuit on to case—a feature exclusive to **LISSEN**.

BASEBOARD RHEOSTATS

Reduced from 2/6 to 1/6

To popularise baseboard mounting resistors, **LISSEN** has now just reduced the price. Baseboard type are without knob dial, and pointer, which are not needed for baseboard.

	Previously.	From Jan. 24.
Prices 7 ohms	2/6	1/6
35 ohms	2/6	1/6
400 Potentiometer	2/6	1/6

Quality Rheostats for Panel Mounting previously 4/- NOW 2/6

LISSEN quality—look how they are made, and note the irresistible appeal of price.

	Previously.	NOW
LISSEN 7 ohms, patented ..	4/-	2/6
LISSEN 35 ohms, patented ..	4/-	2/6
LISSEN DUAL, patented ..	6/-	4/6
LISSEN Potentiometer, patented	4/6	2/6

LISSEN ONE-HOLE FIXING, OF COURSE

USE ANY CIRCUIT BUT ONLY LISSEN PARTS, NO MATTER WHAT ELSE MAY BE NAMED, and you will gain in volume and eliminate distortion. LISSEN PARTS—WELL THOUGHT OUT, THEN WELL MADE.

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.2593

THE UNIVERSAL CHARGER.

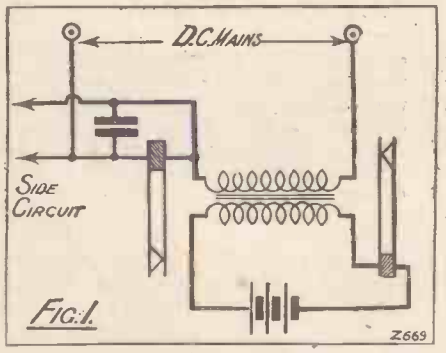
The second of two special articles in which full practical details are given of the new charging device. This can be used on either A.C. or D.C. mains, and appears to be a most practical solution to the universal home-charging of radio batteries.

By Dr. J. H. T. ROBERTS, F.Inst.P.

IN view of the interest shown by my readers in the two previous articles in connection with this subject—and I would like to take this opportunity of thanking all those who have written to me in connection with the matter (letters will be acknowledged individually in due course)—I now give some concluding remarks on the invention, together with some simpler circuit diagrams and other illustrations.

As many readers of the second article had not seen the first, it is presumable that some readers of the present article may not have seen the previous ones, and therefore I will give a very brief outline of the contents of the two preceding articles.

When we speak of a "battery-charger" it is usually understood that what is meant is a combination of a step-down transformer



and a rectifier; the presence of the step-down transformer indicates that the battery-charger is intended to be used with *alternating* current. Hitherto, those whose electric supply happens to be *direct* current (and these, according to official information, constitute about 60 per cent of the electricity users in and around the principal towns) have been left almost entirely out of consideration, from the battery-charging point of view. This is probably for two principal reasons:

Direct-Current Charging.

(1) It has previously been impossible to step-down the voltage of direct-current mains (except by means of a motor generator, which is an engineering job); and (2) it is possible to charge batteries from direct-current mains by connecting into the main supply to the electric lights of the house, or by connecting to an electric-light socket and using some form of series resistance.

Connecting into the electric-light mains requires a certain amount of technical knowledge; it is usually very inconvenient and, furthermore, it is contrary to regulations and is attended with a good deal of risk.

Current Waste.

The use of a series resistance is extremely wasteful, since the current which passes through the battery is drawn at a voltage of (say) 200 volts, instead of about 10 volts, which is all that is necessary. Energy represented by the remaining 190 volts is thrown away in the series resistance. The result is that for every unit of electricity usefully employed in charging the battery, 19 units are thrown away. In terms of pounds, shillings and pence, this means that for every shillingsworth of electricity stored in the accumulators nineteen shillingsworth is lost and, therefore, the electricity bill for battery-charging in these circumstances is 20 times as much as it need be, or 20 times as much as it *would* be if the voltage were stepped-down to the correct value.

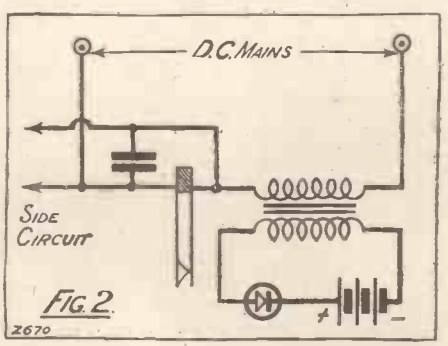
In short, with *alternating* current, a transformer may be used to step-down the voltage to the proper value; with *direct* current a transformer may *not* be used, and, therefore, the extremely important advantages of stepping-down the voltage are not (in the ordinary way) available with direct current.

For Both D.C. and A.C.

The invention which has been described in the two preceding articles is one whereby the step-down transformer may be made to operate on *direct* current just as it does on *alternating* current. This, at a single step, puts the direct-current user in precisely the same advantageous position as the alternating-current user. Moreover, the invention, by its nature, is instantly adaptable either to alternating current or to direct current, and therefore a person possessing one of these new universal A.C.-D.C. chargers is just as well equipped if he should move from a house where the current is A.C. to one where the current is D.C., or if he should, for example, wish to lend the charger to a friend whose electric supply is of the opposite kind to his own.

Universal Voltage.

The charger is not only universal as regards D.C. or A.C., but also as regards voltage, and thus a single instrument may



be used for any voltage from 100 to 250 volts, A.C. or D.C.

In the previous article a photograph was shown of one of the earlier rough models, in which an open-cored transformer was used, with vibratory interrupter in the D.C. input, and by means of which a current ratio (or "cost efficiency") of more than 10 to 1 was immediately obtained.

Various types of interrupter have been used, including vibratory and rotary interrupters, and also special circuits in conjunction with the primary, which have already been described previously.

Steady Output.

The reading of the D.C. ammeter on the low-tension output side is quite as steady

(Continued on next page.)

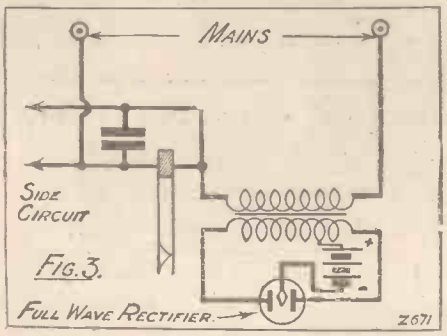
The complete universal charger "hooked-up" in an experimental form. Note the various meters employed for measuring input and output characteristics.

THE UNIVERSAL CHARGER.

(Continued from previous page.)

as though the transformer were being supplied from alternating-current electric-light mains.

With certain kinds of transformer (particularly the hedgehog type, which is quite efficient and comparatively cheap to make) it has been found more convenient to make up the interrupter as a separate unit, this

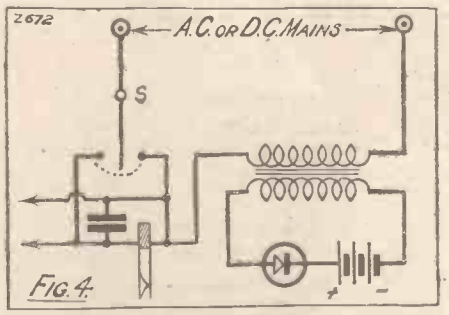


being of a simple low-resistance type connected in series with the transformer primary.

A Special Case.

A special case which calls for mention is that in which the alternating-current output from the secondary of the transformer is rectified by extra contacts on the same interrupter (vibratory or rotary) which creates the interruptions in the primary circuit.

In the last article, photographs of the open-core transformer and the semi-open-core transformer were shown. One of the photographs herewith shows the D.C. transformer complete with special rectifier, arranged for charging a 4-volt accumulator battery, a D.C. *milliammeter* being included in the input circuit and D.C. *ammeter* in the output circuit. In another photograph is shown the complete instrument made up into a wooden box or cabinet



on the lines of the usual commercial alternating-current charger.

The accompanying circuit diagrams will no doubt prove helpful to those who desire to make up their own chargers according to this invention. (I have already said that patents are in progress in connection with this matter, but that bona-fide experimenters are welcome, so far as I am concerned, to make the charger for their own private use.)

The first circuit diagram shows the interrupter in the primary circuit of the transformer, this being actuated by the magnetic flux from the iron core, whilst at the other end of the core is a synchronous vibrator-rectifier. A condenser of fairly large capacity (0·5 to 1 microfarad) is connected across the spark gap. A side circuit will also be noted connected across the spark gap, but the exact details of this I do not at present disclose: it has the effect of reducing the spark at the interrupter until it is practically invisible even in the dark. The device will, however, work quite sufficiently well as shown, with the side circuit leads left open.

For A.C. or D.C.

In another circuit diagram is the same arrangement, but with single-wave electrolytic rectifier in the output circuit and 6-volt battery on charge.

The third circuit diagram shows the same arrangement as the second one, but arranged for full-wave rectification by means of an electrolytic rectifier with two rectifying electrodes and one neutral electrode, in the usual way. It should be noted that the tapping is not at the centre of the secondary winding of the transformer: this is for reasons which will, no doubt, be evident to the experienced experimenter, but it would take too long to enter into a discussion of this matter at the moment.

I have already said that the device may be used on either alternating current or direct current, and the fourth circuit diagram shows this in a very simple way. "S" is a two-way switch. When the arm is placed in the right-hand position, the mains are connected straight through the primary of the transformer: this is the position of the switch when *alternating* current is to be used. In these conditions the device is the usual A.C. charger consisting of step-down transformer and rectifier.

When the device is to be used on *direct* current, the switch arm is placed in the left-hand position, and a little examination of the circuit diagram will show that the arrangement then becomes the same as that in the second circuit diagram.

Charging Current.

It is quite an easy matter to obtain a battery-charging current of from 1 to 3 amperes with this device and, as far as my

The universal charger can be compactly made up into one small unit, measuring but 7 x 5 x 4 inches.

experience has gone, the device seems to be perfectly satisfactory in every way. Where the vibratory interrupter is used, there is, of course, a slight buzzing noise, but this can be reduced so as to be almost inaudible. Where the device is to be used as a trickle-charger, the electrolytic interrupter is preferable and, in any case, simple switching arrangements have been made by which the primary (not the secondary, as is usual) is switched out of circuit when the battery is connected to the receiving set.

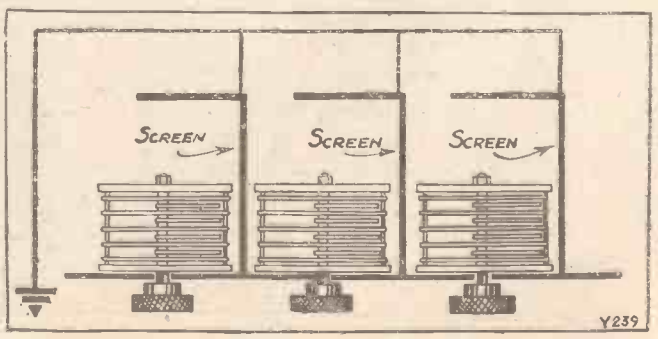
SCREENED TUNING CONDENSERS.

RECENTLY an effort has been made to popularise screened stages, a stage comprising a tuning coil or transformer along with its valve, balancing condenser, by-pass condensers, and other incidental apparatus. This scheme is certainly a distinct improvement on the previous arrangement, but we are still left with the tuning condensers. It so happens that these are usually mounted side by side in the receiver—either on the panel or one behind the other as in gang condensers.

We are therefore faced with the fact that these condensers have capacity one with the other, and further, that the capacity of one condenser to another may vary during the process of tuning because of the varying exposure of the moving plates. This stray capacity is the cause of a good deal of trouble in high-frequency amplifiers. In fact it frequently happens that this stray capacity is sufficient to prevent the proper functioning of the circuit, for if the balancing condensers are set when the wave-length of the circuit is, say, 400 metres, the stray capacity of the circuit is different at 300 metres, and the balance obtained at the longer wave-length no longer holds good.

We should, therefore, screen our tuning condensers, for by so doing we shall be able to obtain a more perfect balance than when no screening is used.

It may not be necessary to enclose the tuning condensers with a metal cover—although this is the ideal arrangement, as dust, etc., is excluded, but it is quite necessary to use screens of some sort. A simple screen, consisting of a sheet of copper or aluminium, placed between the condensers and connected to earth has been found quite effective.

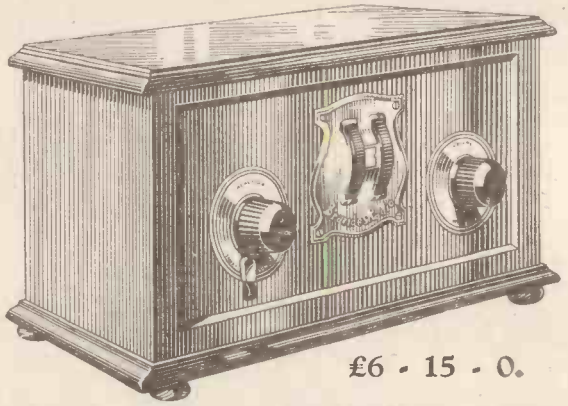


Brandes

GREAT PUBLIC TEST SCHEME

AN IMMEDIATE AND COMPLETE SUCCESS

Our plan to determine how the public felt about our new 3-valve receiver before placing it on the market, has shown that it completely satisfies an urgent need. Until now the necessity for a really simple, inexpensive and perfectly reliable set had never been met. The Brandes Public Test Scheme has proved beyond question that the Brandeset IIIA is justly described as this long-looked for instrument. Fifty private individuals, one from each of fifty towns throughout Great Britain, were drawn from many thousands of applicants. They were given facilities for submitting an advance model of this new set to an extended test in their own homes. This happened last June. Since then their reports show that the receiver is a complete vindication of our claims, and the Brandeset IIIA is now on sale to the Public. As a loud speaker set it is ideal and has no equal at double its price. Single control, 3 valves, adjustable sensitivity and selectivity, improved station selector and polished oak cabinet. It is unsurpassed in distance, selectivity, tone, ease of control, quality and price. Remember, we ask you to accept the considered opinions of your fellow men—you have the solid satisfaction of 50 honest recommendations. You may have further proof by asking for a demonstration from any Authorised Brandes Dealer.



£6 - 15 - 0.

THE BRANDESET IIIA

Ask an Authorised Brandes Dealer to demonstrate the Set the Public chose

READ WHAT SOME OF THE PUBLIC TEST PARTICIPANTS SAY:—

—from RHYL, N. WALES: "We found the set in every way a splendid job, and at about 11.50 p.m. on August 1st, we tuned in on the speaker on the short wave band 16 stations in approximately one minute."

—from CREDITON, DEVON: "As a 3-Valve Set it is the limit of efficiency—excellent in tone, volume and simplicity. It is really remarkable the number of European stations that are perfectly available."

—from ROCHESTER: "The tuning is very simple and gives great selectivity, and my small son of seven can tune in any station as quickly and as quietly as I myself . . . The set is astonishingly good, and undoubtedly the very best 3-Valve Set yet devised."

—from KENSINGTON: "The absolute realness of everything I heard on this Set was, I thought, really wonderful, and I would go so far as to say that consummate excellence has been reached."

GREATLY REDUCED PRICES

The Ellipticon, 95/-; The Brandola, 57/6; The Table-Talker, 30/-; The Variable Condenser, 15/- and 15/6; The Audio Transformers, 15/- and 15/6; The Matched Tone Headphones, 13/6

THE SIGN OF A GOOD DEALER

It hangs outside every shop authorised to sell Brandes Products. This sign is for your protection. It means reliable service and guaranteed satisfaction.

—on Stand 161 at the Radio Exhibition, Olympia, Sept. 24–Oct. 1

BRANDES LIMITED 2 & 3 NORFOLK ST., STRAND, LONDON, W.C.2

B, Ltd, 0360

ANNOUNCEMENTS

of great importance

to those interested in wireless

FILONATOR

DARIMONT ELECTRIC BATTERIES LIMITED beg to announce the introduction of a new type of Primary Battery which will rapidly replace the ordinary Accumulator.

These unique batteries can be recharged instantly at home simply by inserting special compressed tablets. Nothing else is necessary! These batteries have passed stringent tests over a period of years and will now be available to the public.

The foremost Radio Manufacturers—Messrs. General Radio Company, Ltd., of Radio House, Regent Street, London, have acquired the sole manufacturing and selling rights of this revolutionary invention (which is fully patented) and after exhaustive tests in their modern Laboratories they have decided to supply this Unit as standard equipment, instead of Accumulators, with every General Radio Receiving Set. The name of this type of electric supply Unit is the General Radio Filonator (*Patented throughout the World*).

The Filonator will be on display for the first time at General Radio Company's Stands Nos. 45, 46, 47, 48, at the National Radio Exhibition.

DARIMONT ELECTRIC BATTERIES, LTD., 329, HIGH HOLBORN, LONDON, W.C.1.

NEW VALVE

THE MULLARD P.M.O. VALVE is so designed as to operate with the new General Radio Filonator, which supersedes the Accumulator and is re-chargeable instantly in your own home, simply by inserting special compressed tablets.
These Valves require less than 1½ volts to operate at full efficiency and are equipped with the Mullard P.M. filament.
They will be supplied with General Radio Receiving Sets.

THE ELECTRON COMPANY, LIMITED, take pleasure in announcing that they have designed and produced a new type of valve, in accordance with the specifications of the Engineers of General Radio Company, Ltd., Radio House, Regent Street.
This valve is designed to operate with the new General Radio Filonator (which supersedes the ordinary Accumulator) and is re-chargeable instantly at home.
The new valve requires less than 1½ volts to operate at full efficiency and is equipped with a *double filament.* Its characteristics are practically those of a power valve. These valves will be supplied with General Radio Receiving Sets.

THE ELECTRON COMPANY, LTD., 122/4, CHARING CROSS ROAD, LONDON, W.C.2.

RADIOBATS

Manufacturers of Electrical Batteries, beg to announce that all products of the Company, including Radiobat High Tension Battery, will in future be obtainable as standard equipment with General Radio Receiving Sets, as Messrs. General Radio Company, Ltd., of Radio House, Regent Street, have purchased the whole of this business, including manufacturing equipment, patents, processes, Trade Marks, etc., and all communications regarding Radiobats should now be addressed to the Head Offices of General Radio Company, Limited.

RADIOBATS,
18, SNOW'S FIELDS,
BERMONDSEY, S.E.1.

NEW SET

These announcements by prominent manufacturers are of great importance to prospective purchasers of Wireless Sets.

The new Cabinet Model, General Radio Set which will be on view at Stands 45, 46, 47, 48 at Olympia, is the *only one on the market* incorporating these outstanding Radio improvements!

Many other superior features will also be found in the General Radio Set, and in view of the great advances in design, you will be well advised to write to us for details before deciding on the set you will buy.

GENERAL RADIO Co. Ltd.

Head Office: 235, Regent Street, London, W.1.

Showrooms: 105, Regent Street, London, W.1.

The coupon will bring you full particulars. *SEND IT NOW.*

To General Radio Co., Ltd.,
Radio House, 235, Regent St., London, W.

Please send me, without obligation, details of your new set incorporating the Filonator and New Valves.

Name.....

Address.....

.....

E/29

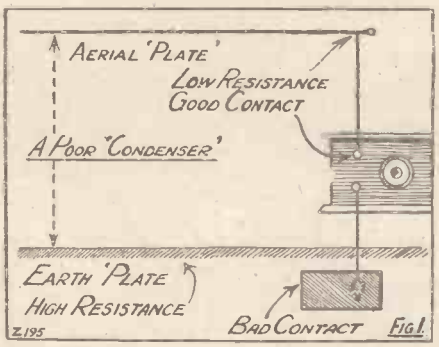
AERIAL EFFICIENCY

An article which emphasises the necessity of having an efficient aerial system in the case of the less powerful sets, and which gives some practical hints on how one can be arranged in an ordinary garden.

By J. ENGLISH.

NOWADAYS so much of our attention is devoted to the remodelling and improvement of receivers that we are apt to overlook the advantages of an efficient aerial-earth system. In fact, in many cases, where the constructor has just completed the latest in multi-valve sets, and has not an aerial already, he puts up a length of wire, connects a lead to the water-pipe, and then proceeds to forget all about them.

If the new receiver is really up to date and efficient the neglected aerial will probably remain neglected, because such a set will give remarkably good results on



the worst of aerials. However, if the receiver is a more modest affair of perhaps one or two valves, an efficient aerial system makes all the difference to long-distance reception. In the case of crystal receivers, the aerial system is of vital importance, because the volume of signals is entirely dependent upon the signal current induced in the aerial. Unlike a valve receiver, there is nothing to magnify this current or to make up for losses. Whatever the receiver, aerial efficiency means louder signals, sharper tuning and less local interference.

What Is an Aerial?

I do not propose to deal with the many types of aerial systems, some of which are of a freak nature, but to consider the theoretical aspects of the common or "garden" variety. Of the latter the most popular are the well-known T or inverted L wires with some form of contact earth.

Although not ideal, the elevated wire and contact earth system has proved sufficiently efficient and inexpensive for general requirements to remain practically unchanged in principle since the advent of broadcasting. If properly installed in the first instance such an aerial system *can* be forgotten until repairs become necessary. During all this time the owner has the satisfaction of knowing that his aerial is thoroughly efficient and reliable.

Before dealing with the best way of putting up an efficient aerial system let us consider briefly what constitutes an aerial. This will show more clearly where losses are likely to occur, and suggest means of guarding against them.

First of all, any conductor having capacity to another conductor is an aerial system. This naturally suggests the idea of a two-plate condenser, one plate being the aerial wire, and the earth the other, with the air between as the dielectric.

The earth lead should take the shortest possible route to earth.

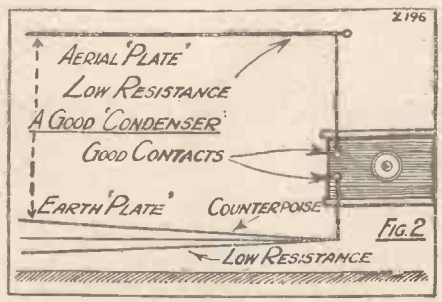
Electro-magnetic waves coming in contact with this condenser set up opposing electrical charges on the two plates, thus causing an H.F. current to flow along the wire joining them.

Owing to the potential gradient in space due to the wireless waves, the further apart the plates the greater the potential difference of the induced charges with a correspondingly greater H.F. current.

In the wire joining the plates, of course, is the tuning coil and condenser which serves to adjust the electrical constants of the system so that the H.F. current shall be a maximum for one particular wavelength.

An Imaginary Condenser.

Now, the nearer our imaginary two-plate condenser approaches the ideal of low-loss construction, the greater the efficiency of the aerial system. If we were to go and buy a low-loss two-plate condenser, we should expect to get a component having metal plates of very low resistance, contacts to each plate of negligible resistance, and a dielectric entirely air except for the small amount of the highest grade insulation necessary to keep them apart.



Now how does this ideal compare with the actual aerial system as we generally find it? First of all, one plate of the condenser, the elevated wire, is quite satisfactory, as it is usually thick enough to have a low resistance and, if brought in one unbroken length to the receiver, its contact resistance is negligible.

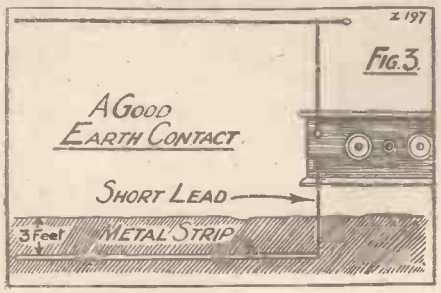
(Continued on next page.)

AERIAL EFFICIENCY.

(*Continued from previous page.*)

The other plate, however, is by no means as satisfactory. The nature of the soil varies greatly, and in some localities is stony and dry. Then the resistance of the "earth plate" is very high; in any case, whatever the soil, it will be large compared with the resistance of the other plate (aerial wire).

Unfortunately, it is not generally possible to reduce the resistance of this plate, but we can see that the contact to it is as good as we



can make it. The things we usually call "earths," such as buried plates and water-pipes, are actually only the contacts to the real "earth plate." A poor earth connection is like a condenser with a slice of bread for one plate with a pin stuck through the crust for a contact.

The insulation between the two plates is just a matter of using a sufficient number of insulators in the right place. This can generally be arranged to satisfy all the demands of low-loss construction, without difficulty.

The dielectric between the plates, however, is far from the ideal of nothing but air, which as a dielectric is quite good. As usually erected we have such things as trees, shrubs, parts of the house, and the masts, all between or close to the two plates. As these things are partial conductors (i.e. very poor dielectrics) the resulting mass of mixed dielectric gives rise to large losses by abstracting energy from the electric field between the plates.

Practical Details.

Having considered briefly the nature and weak points of the aerial system we can now formulate some useful rules for the installation of an efficient system.

The elevated wire should be a continuous length of generous cross section raised as high as possible above the earth. Height is much more important than length. The word earth does not mean the actual soil but anything at earth potential such as parts of the house, outhouses or trees underneath the elevated wire. In order to get a good effective height it is necessary to select the position of the supporting pole or poles so that the wire will be as far as possible from such undesirable objects. Similarly, the proximity of large buildings, acting as a shielding screen, lowers the reception power of the aerial system.

The aerial wire need not have the full permissible length of 100 feet for reception on the usual band round about 200 to 500 metres. The best results are often obtainable with a horizontal length of thirty or forty feet with a vertical down-lead up to forty feet long, according to the facilities for erecting high masts. If sufficient space is available you cannot do better than put up a T aerial, the top being sixty to eighty feet long, with a vertical lead-in up to forty feet in length.

Having decided on the dimensions and position of the aerial wire and supporting masts, you should next consider insulation and the down lead. The question of aerial insulation has, in my opinion, been largely overdone in the past, being of more importance where the aerial is to be used for transmission. Doubtless some of you will remember the days when no amateur was considered worth his salt unless his aerial masts were festooned with rows of massive insulators!

For general use you cannot do better than connect in series three or four small egg-shape insulators, the combined insulator so formed to be used wherever the aerial wire is to be supported. In the country such insulators are entirely satisfactory, for while they remain clean, the insulation will be high even in wet weather. Elsewhere the atmosphere is generally contaminated with smoke or grime so that insulators of the special type for maintaining a dry and clean surface under these conditions should be used. One at each point of suspension is sufficient.

The down lead should not make an acute angle with the horizontal portion, and in descending should be kept well away from pipes, guttering, and other metallic conductors. H.F. currents flowing in the aerial wire induce eddy currents in any nearby metallic masses. The loss due to the formation of these eddy currents reduces signal strength.

The lead-in wire ought to be well-insulated and preferably airspaced where it enters the house, while the receiver itself must be situated as near as possible to the point of lead-in. If the aerial wire goes trailing round the house before reaching the set, it is absolutely waste of time and money attempting to install an efficient aerial system.

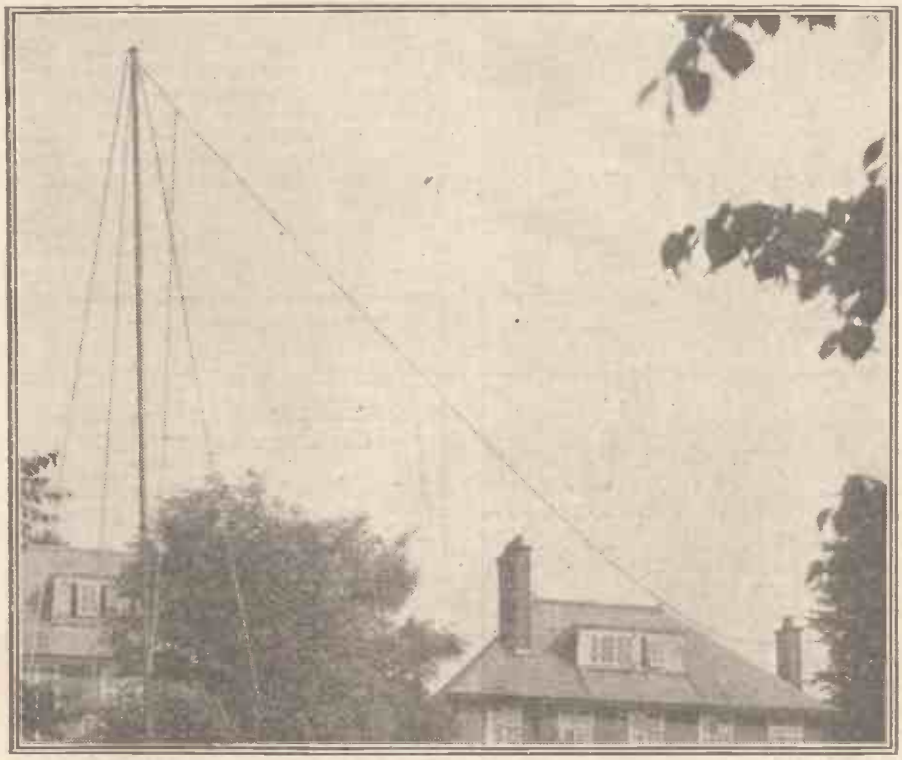
The Earth Connection.

In connection with the down lead do not forget that some form of earthing device or lightning arrester must be set up near the lead-in to comply with the regulations of insurance companies.

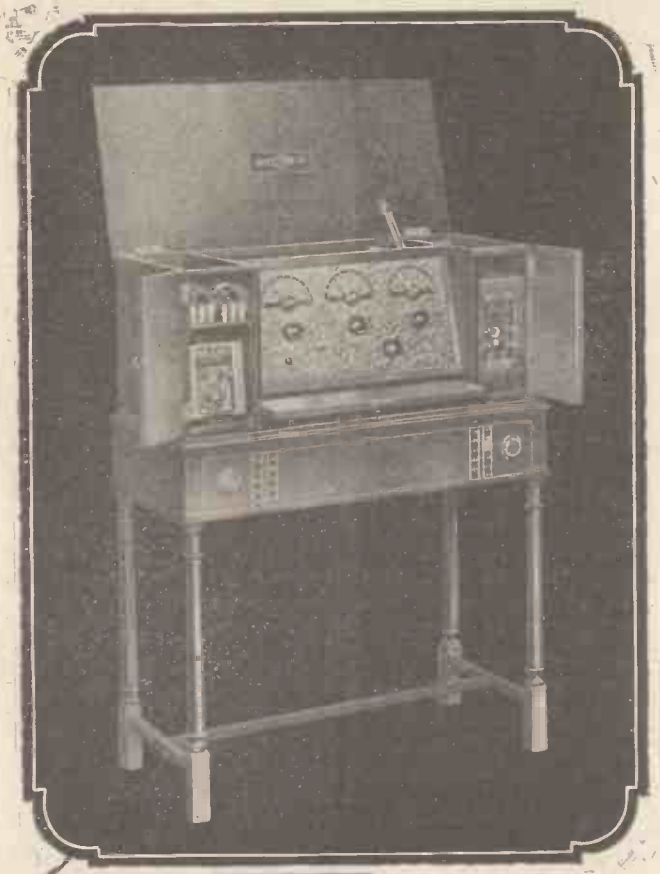
Now for the other plate of our imaginary condenser, the earth and the contact to it. You will have gathered from what has been said above that this is the weakest part of the whole system and the point where losses are most likely to occur. If a water-pipe running direct to the main can be found within a few feet of the aerial lead-in it will generally prove quite satisfactory as an earth contact. A water-pipe is not a true earth connection, because in many cases the pipe system nearest the elevated wire is not in contact with the soil. However, such a contact is generally satisfactory if a stout length of wire is used well soldered to the water-pipe at the point of contact.

Whatever form of earth contact you may employ, it is essential for best results that the earth wire be as short as possible. The nearer the aerial tuning coil to the actual earth, the louder will be your signals. If the earth lead cannot be less than six feet or so, it is advisable to use heavily insulated wire.

A much better contact with earth is obtained by burying beneath the aerial wire one or more copper plates, all soldered to the earth lead. Thin copper strip three or four inches wide can be purchased fairly cheaply. A length of this, the longer the better, should be buried some three feet deep directly underneath the elevated wire starting at the lead-in end. The earth wire is soldered at this end to the copper strip, the joint being well coated with pitch.



An efficient receiving aerial, having plenty of effective height. The effective height of an aerial wire is not its height from the ground, but its *average* height above any large conductive areas, such as lead roofing, the earth, etc., which it may pass over.



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 stabilized 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 leaflet 4117/9.

MET-VICK

Battery Eliminators

"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. Obtain List 7117/8.

A.N.P.
(Astatic-Non-Parasitic)
Coils

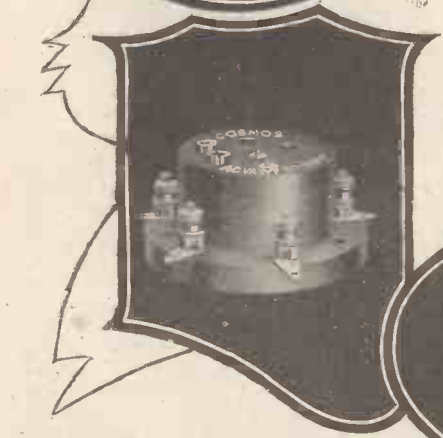
These new Met-Vick products provide a clever solution of a difficult problem. They overcome, simply and efficiently, the three difficulties associated with H.F. amplification, namely, Magnetic coupling between coils—Stabilisation and Parasitic Oscillation.
Obtain List 4117/8.

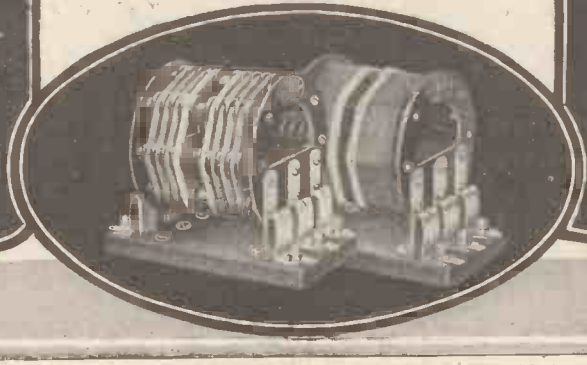
Resistance Coupling Units

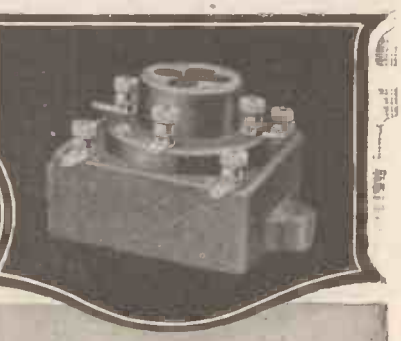
"Cosmos" (Met-Vick) Resistance Coupling Units are well known to all wireless enthusiasts. The "V" type can now be obtained fitted with new "Met-Vick" A.C. Valve Holder. The latter is also supplied separately.
Obtain List 7117/8

The various literature mentioned above gives full details and prices. Ask at the Met-Vick Stands or your local dealers for copies.

METRO-VICK SUPPLIES LIMITED
(Proprietors: Metropolitan-Vickers Elec. Co. Ltd.)
155, Charing Cross Road : : LONDON, W.C.2
STANDS Nos. 155–156.







What GREAT BRITAIN thinks about the BRANDESET IIIA

The great Public Test Scheme proved that the Brandeset IIIA is ideal from all viewpoints. You operate easily! You hear wonderfully! You pay reasonably! Fifty people carried out private tests in their own homes throughout Great Britain and pronounced it the receiver which will revolutionise wireless entertainment. The map shows the different localities where the receiver was publicly tested before being put on the market. Read what some of the fifty say about this ideal loudspeaker set:

—from MOFFAT, SCOTLAND
"We had it working on Daventry to-day, and it is an ideal loud-speaker Set. We were particularly struck with the absence of impurity."

—from FORT WILLIAM, INVERNESS
"For volume and purity it beats any 3-Valve Set I have heard. The Set is simplicity itself—a beginner can master it without the least trouble or tuition. My friends are delighted with the results."

—from CREDITON, DEVON
"As a 3-Valve Set it is the limit of efficiency—excellent in tone, volume and simplicity. It is really remarkable the number of European stations that are perfectly available."

—from RHYL, N. WALES
"We found the Set in every way a splendid job, and at about 11.50 p.m. on August 1st, we tuned in on the speaker on the short wave band 16 stations in approximately one minute."

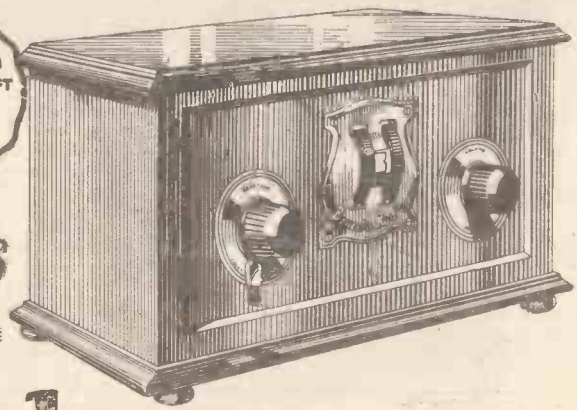
—from ROCHESTER
"The tuning is very simple and gives great selectivity, and my small son of seven can tune in any station as quickly and as quietly as I myself . . . The Set is undoubtedly the very best 3-Valve Set yet devised."

—from KENSINGTON
"The absolute realness of everything I heard on this Set was, I thought, really wonderful, and I would go so far as to say that consummate excellence has been reached."

THE BRANDESET IIIA

Distinct simplicity and perfect efficiency at low price. Single control, 3 valves, improved station selector, sensitivity and selectivity adjustable, polished oak cabinet. Absolutely no equal at its price in distance, selectivity, tone quality and ease of control. Fine technical and mechanical features and a definite official guarantee. (Width 16ins., depth 8 ins., height 9½ ins.)

£6 - 15 - 0
(Excluding Royalty)



Brandes

The name to know in Radio

Brandes Limited - 2 & 3 Norfolk Street, Strand, W.C.2

GREATLY REDUCED PRICES

The Ellipticon, 95/-; The Brandola, 57/6; The Table-Talker, 30/-; The Variable Condensers, 15/- & 15/6; The Audio Transformers, 15/- & 15/6; The Matched Tone Headphones, 13/6.

THE SIGN OF THE GOOD DEALER

It hangs outside every shop authorised to sell Brandes Products. This sign is for your protection. It means reliable service and guaranteed satisfaction.

—on Stand 162 at the Radio Exhibition, Olympia, Sept. 24—Oct. 1

Ed, 0362

MORE CAUSES OF DISTORTION.

Some few weeks ago the author contributed an article on "Causes of Distortion" (P.W. No. 270) and in the following article he carries his subject to a logical conclusion and deals with loud speakers of various types and their use—and misuse!

By BAYNHAM HONRI.

EVEN before peace has been declared in the great "resistance-capacity versus transformer-coupling" war, another great controversy, "horn versus hornless loud speakers," has broken out. Owners of three-inch horn loud speakers have solemnly stated (on oath) that their loud speakers have reproduced organ pedal notes; cone loud-speaker supporters have retaliated by stating that their loud speakers reproduce notes below audibility, which are felt, not heard. The Correspondence columns of "P.W." have become a hotbed of righteous indignation. Wireless societies have feverishly erected screens around loud speakers and tortured innocent audiences with the rival noises. The controversy threatens to develop on more exciting lines than a general election. Wire-pulling, in this case, would become a practical proposition so far as the opposite "party's" grid-bias connections were concerned. Family propaganda may eventually mean (with apologies to Gilbert) that every babe born in this world is either a "horn-blower" or a little "moving-coiler."

Drugged by Distortion!

It is a difficult task to sit in fair judgment on the merits of rival loud speakers. It must be admitted that the decision of a constant listener to a wireless loud speaker is the most unreliable of all. The ear gradually becomes accustomed to a certain type of loud speaker and to a certain extent "corrects" for its most outrageous distortions. The ear has become "drugged"

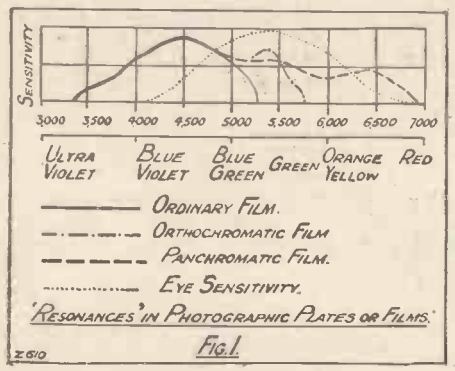
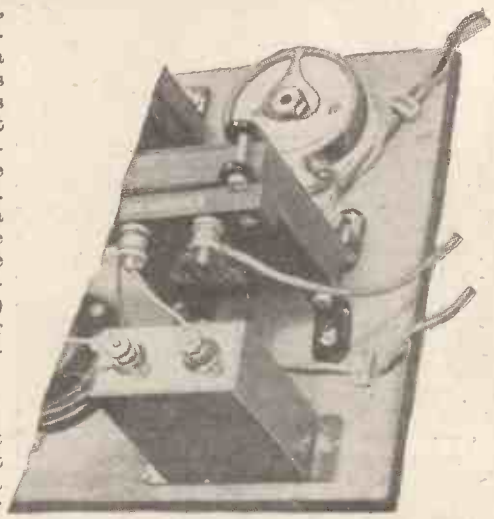


Fig. 1.

with the tone and resonances of this particular type of loud speaker, and is thereafter unconsciously prejudiced in favour of it. The same applies to the different types of low-frequency coupling and their resultant tones. A large condenser across the loud speaker may be as soothing as opium, but its after effects may be difficult to eradicate.

The photographer becomes unconsciously accustomed to his incorrect photographic rendering of colours; reds as blacks, greens as dark greys, blues as whites. Orthochromatic plates and films (which partially corrected things) were rather a startler for him, and he still regards the wonderful panchromatic process with suspicion. The case is absolutely parallel to that of the loud-speaker dipsomaniac, the only differences being in the frequencies concerned! The frequency of "middle green" is 600×10^{12} cycles per second, while that of "middle C" is 256 cycles per second. Fig. 1 gives some idea of the "resonances" of the response of photographic



A typical loud-speaker output circuit embodying an L.F. choke and a large fixed condenser.

plates and films to various colours (acknowledgments to the Wratten Research Dept., Kodak Ltd.). These curves are on a wave-length basis, the numbers representing the lengths of the waves in Ångström Units (A.U.), which are ten-millionths of millimetres (!), and the colour ranges are indicated. It will be seen that the visible spectrum extends from 4,000 to 7,000 (A.U.) and may be roughly divided into three "regions," blue-violet, green, and red. The invisible violet rays, to which photographic plates are so sensitive, are "above audibility," as would be said in connection with sound frequencies. Remembering that the curves are on a wave-length (not frequency) basis, the red region corresponds to our extreme bass notes. Hence, by the use of filters ("shunt condensers") and panchromatic films or plates, we can put the "pedal notes" into photography!

The ideal loud speaker should give equal variations of air pressure for equal voltage variations on the output of the loud-speaker amplifier on all audible frequencies. The average loud speaker does not do this. The most "popular" faults are bad resonances on about 300 cycles and on 1,000 cycles, being due respectively to horn and diaphragm resonance. In cone loud speakers, the resonances are at about 150 cycles and 1,500 cycles, the former being due to the natural period of the cone itself and the latter to reed or driving rod resonance. In this case the lower resonance brings in bass notes which would not otherwise be there. It is possible with the better designed cone type loud speakers to reproduce a fairly pure note as low as a hundred cycles. The short horn loud speakers and the poorer cones reproduce such a note as being one or two octaves higher in the musical scale! Moving-coil cone loud speakers (with baffle board) reproduce a very pure hundred cycle note, providing the strength is not too great. Unless very special precautions are taken, it is not possible with these loud speakers to reproduce notes as low as fifty cycles without getting the "octave higher" effect. In order to reproduce these low notes on a horn type loud speaker it would be necessary to use a carefully designed horn about thirty feet long! So much for the gentleman who hears pedal notes on his "Baby's Own" loud speaker!

"Awe-Inspiring" Loud Speakers.

In actual practice it is possible to enjoy apparently perfect loud-speaker reproduction with instruments which do not do justice to fifty-cycle notes. I have only heard two loud speakers which reproduced *pure* notes of that frequency; both were built in an experimental laboratory, and were far from being "commercial." The pure notes of fifty cycles and less were most awe-inspiring. They could only be heard some distance away from the loud speakers, and seemed to literally shake one.

A hundred cycle note was reproduced with varying success by quite a number of commercial moving-coil and cone type loud speakers. At about 200 cycles the best of the horn type loud speakers began to reproduce pure notes. At 500 cycles (an octave above middle C!) the worst of the horn loud speakers began to reproduce pure notes!

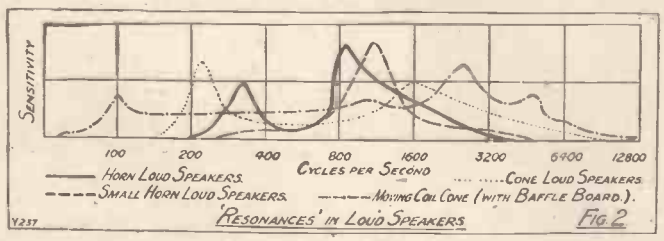


Fig. 2.

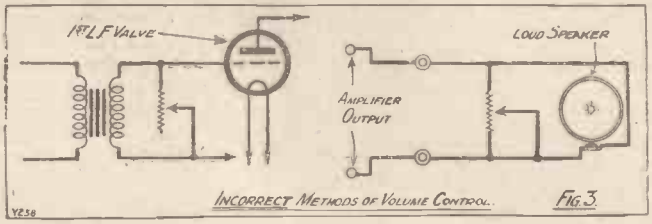
It has often been stated that cone loud speakers give a poor reproduction of the "top"—i.e. the higher audible frequencies. Further experiments with a variable "pure tone source" proved that, on the whole, this was not so. As the pure note went

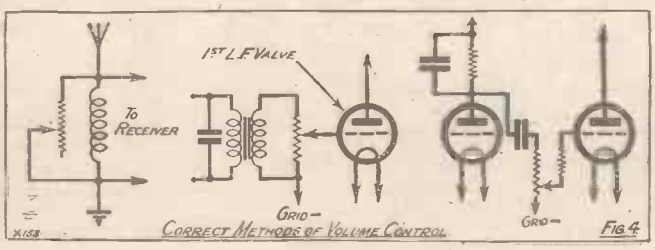
(*Continued on next page.*)

MORE CAUSES OF DISTORTION.

(Continued from previous page.)

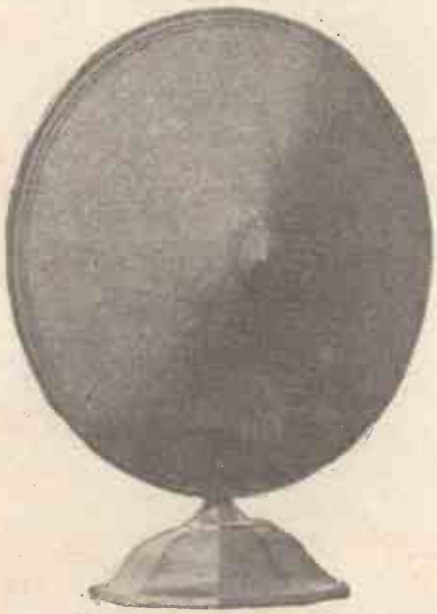
higher in frequency, the first loud speakers to "cease fire" were the larger horn loud speakers. Next came the smaller horn speakers and the poorer cones. The well-designed cones and the moving-coil type loud speakers gave an excellent reproduction practically to the upper limit of audibility. Apparently the abundance of good bass notes on these loud speakers has given rise to the impression that they are lacking in "top." They certainly give a low-toned effect on speech, when the loud speaker is reproducing at a greater strength than the actual speaker is speaking in the broadcasting studio; this is a function of their excellent audible-frequency characteristics. If you stand near a person when he is speaking very quietly you will notice the low-pitched effect of his voice. The "chest tones" are very prominent compared with the sound coming from his mouth. If the same person talks loudly, the strength of the "chest tones" will remain practically the same as before, but the strength of speech from his mouth will be much louder. It would be unnatural for the chest tones to be reproduced in the same ratio on loud speech, which is exactly what the too-loud "good" loud speaker is doing. It is very necessary to operate the better types of loud speakers so that they are reproducing sound as nearly as possible at the same strength as the original broadcasting studio sound. With the loud speaker working at "natural" strength for piano reproduction, it is usually necessary to reduce strength for speech, when the speaker is addressing the microphone in a confidential manner.





"Feeding" the Loud Speaker.

A point which is often neglected in L.F. amplifiers is the matching of the output impedance to suit the loud speaker. The valve preceding the loud speaker should have an impedance equal to the impedance of the loud speaker at the lowest frequency it is desired to reproduce. Unfortunately, this important figure is not often supplied by the makers, the only particulars given usually being the D.C. resistance. However, it may be taken that a "2,000 ohm" loud speaker has an impedance at 100 cycles of eight to ten thousand ohms. Those loud speakers marked "650" ohms have an impedance (at 100 cycles) of about 3,000 ohms. It is obvious that the last valve, whether it be "power" or "super power," should always be kept in circuit, and that if an L.F. valve is to be cut out, the first L.F. valve should be switched out. The best and smoothest method is to use a volume control in the first L.F. stage. Shunt variable resistances across the transformer primary or loud speaker are to be avoided on account of the loading effects they introduce. The v best type of volume control is a high-resistance potentiometer (250,000 to 500,000 ohms), which should be across the secondary of the first L.F. transformer, the moving point being connected to the grid of the next valve, and the grid bias applied normally. In resistance-capacity coupled amplifiers this potentiometer may take the place of the first grid leak, the moving point again going to the grid of the next valve, but this time through a 50,000-ohm stabilising resistance. With this arrangement very fine variations in strength may be obtained with a consequent improvement in natural tone.



The B.S.A. "Kone" which is capable of dealing with the lower notes very efficiently.

TINNING A SOLDERING IRON.

ONE of the chief causes of dry joints in soldering is a poorly-tinned soldering iron—and, although we get tips from time to time on how to solder and tin the iron, the novice probably still finds it a difficult job. Now here is a method of tinning the soldering iron, which, although not adopted by the expert, will be found of assistance to the beginner.

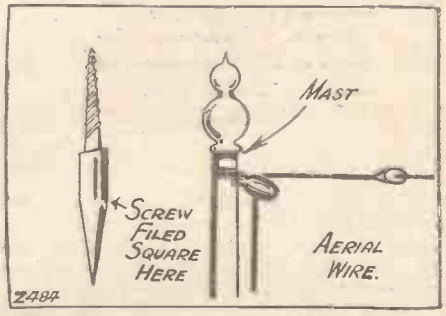
Procure a lump of sal-ammoniac, gently bore a hole in this with the point of the hot iron, about a quarter of an inch deep; heat the iron again and clean the point with an old file, melt a bit of solder in the hole previously made in the sal-ammoniac and give the iron a turn in it, and it will be well tinned. If any difficulty is found in getting lump sal-ammoniac, small pieces may be powdered and pressed tightly in a small tin box.

Some of the most popular horn type of loudspeakers are included in the "Amplion" range due to the Graham Amplion people.

IMPROVING WIRELESS MASTS.

THERE must be many amateurs who find it difficult to protect and finish off the top of their wireless masts in neat and artistic ways.

This can easily be overcome by a search through the attic or lumber-room for the knob from the end of an old or broken curtain pole. Unfortunately, when the knob is unscrewed the screw is left secure in the pole. This can usually be taken out with pliers.



A substitute for the screw can be made by cutting the head from a long screw and filing the end to a point. A piece of wood should be put on the screw to protect the threads while it is being knocked into the pole.

The most comprehensive range of loud speakers in existence

Amplion Swan-neck
Model AR 38 - 38/-

For every taste and every purse there is an AMPLION — 23 models from which to choose at prices from 38/-. Obtainable from all Radio Dealers of repute at the fixed, advertised prices.

Amplion Open Cone Model
AC 3 - - - **£3.15.0**
Model AC 1- - **£2.12.6**

AMPLION

Amplion Wood-horn
Dragon Model AR 65·0
£3.15.6 AR 19 **£5.5.0**

See the full range at the
NATIONAL RADIO EXHIBITION
OLYMPIA
SEPT. 24 to OCT. 1

Amplion Cone "Chippendale"
Mahogany Model AC 9 **£7.0.0**
Other cabinet models from **£4.0.0**

STAND No. 137
(FACING MAIN ENTRANCE)

Amplion Radiolux Model
R.S.I.M. **£6.6.0** Other
models from - **£3.17.6**

Demonstrations at
AMPLION HOUSE
(NEXT DOOR TO OLYMPIA)

Amplion Cabinette Oak
Model AR 100 - **£2.2.0**

THE WORLD'S STANDARD WIRELESS LOUD SPEAKER

Announcement of Graham Amplion, Limited, 25, Savile Row, London, W.1.

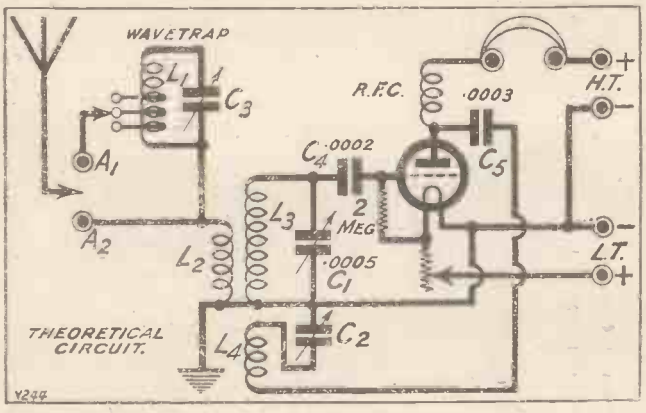
The "REGIONAL" ONE-VALVER

A Sensitive and Selective Set for Alternative Programmes.

By G. P. KENDALL, B.Sc.

THE advent of the first of the high-power regional stations (Daventry Junior) has shown that in future it will be necessary to provide a considerably higher degree of selectivity, even in "local" receivers, than has been customary in the past. The proof of this may be found easily enough in the sad stories we all heard in the course of the first few weeks of "alternative programme" transmission from 5 G B from disappointed listeners who have found it quite impossible to cut out their local transmitter when they attempted to receive the new station.

Reports have even been received from certain areas in north-west London of difficulties from actual mutual interference *between* 2 L O and 5 G B; these unlucky people have found that they hear a background of 5 G B when listening to 2 L O, and a background of 2 L O when they try to change over to 5 G B. Such a state of affairs, of course, is exceptional, and indicates an extremely flatly tuned set and a very unfortunate geographical situation, the normal difficulty being merely to get rid of the local when the high-power alternative is desired.



To solve the problem when designing future sets will be fairly easy in the case of receivers incorporating a stage of H.F., since in such instruments there are usually a sufficient number of tuned circuits to render it no difficult matter to obtain the necessary moderate amount of selectivity. Where there are several tuned circuits this can be done quite simply and without making any of them so sharply tuned as to spoil the quality of reproduction by cutting off the side bands of the carrier wave, but in the case of single-valve sets, where there is usually only one tuned circuit, it is quite otherwise.

Using a Trap.

To obtain a high degree of genuine selectivity here is difficult unless the circuit is made so sharp-tuning that a loss of quality is inevitable. Hence it seems probable that the wave-trap, that much-abused but none the less useful appliance, will at last come into its own for such sets, giving, as it does when properly arranged, the power to shut out one particular station quite easily.

Some Difficulties.

Very probably, then, many of our future "local" sets will contain a built-in wave-trap of one of the reliable kinds, and it will be interesting to observe the methods adopted by different designers in doing so. Actually, it is not so easy to secure efficiency in a built-in trap as might at first appear, since the problem of interaction between the trap circuit coil and the other coils in the set is quite a troublesome one to overcome. The question seems likely to be an important one, and the Research Department of "P.W." is now working on a design for a standard trap which can be incorporated in practically any set. More of this at a later date.

The present set, the "Regional" One, is the first design specially prepared for "P.W." readers as a local set to meet the new conditions, and the difficulty has been met here in a very simple but quite effective fashion. The expedient adopted is to use a flat coil which can be so placed in the set that its field only interacts to a slight extent with those of the tuning and reaction coils, and this seems to be quite an adequate arrangement in a simple set like this. The trap coil is actually of the basket or spider variety, and it may be seen in the photographs screwed down flat on the baseboard.

The trap circuit used is the reliable "auto-coupled" one embodied in the special wave-trap described in "P.W." No. 271,

COMPONENTS AND MATERIALS.

- 1 Ebonite panel, 12 in. x 7 in. x $\frac{3}{16}$ in.
- 1 Cabinet to suit, and baseboard 9 in. deep.
- 2 ·0005 variable condensers, with slow-motion drives or separate vernier dials. (Square law, S.L.F., etc., according to preference, of any good make. Those seen in photos are Formo.)
- 1 Sprung valve socket (Lotus, Burndept, Benjamin, Magnum, Precision, etc.)
- 3 Board-mounting single-coil sockets.
- 1 H.F. choke (Lissen, Wearite, R.I. & Varley, McMichael, etc.).
- 1 Filament rheostat to suit valve.
- 1 Fixed condenser, ·0002 mfd. (Lissen, Dubilier, Mullard, T.C.C., etc.).
- 1 Ditto, ·0003 mfd.
- 1 Grid leak, 2 megs., and holder (Dubilier, Lissen, etc.).
- 1 "Formodenser," capacity ·0005 mfd. if local station works on wave of 400 metres or over; if wave is below 400 metres use a ·0003 mfd.
- 1 Terminal strip, 3 in. x 1½ in.
- 7 Terminals.
- 2 Sockets and 1 plug (Eelex or similar type).
- 1 Basket coil former, and supply of No. 30 D.C.C. wire.
- 1 Tapping clip.

(*Continued on next page.*)

The "Regional" One-Valver is of very pleasing appearance, and all the controls are accessibly placed for easy handling.

THE "REGIONAL" ONE-VALVER.

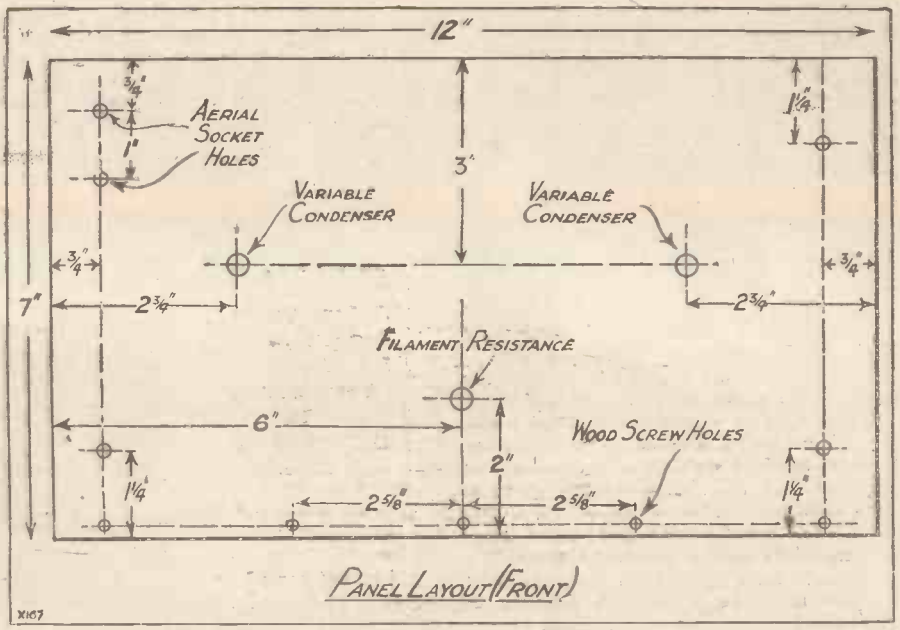
(Continued from previous page.)

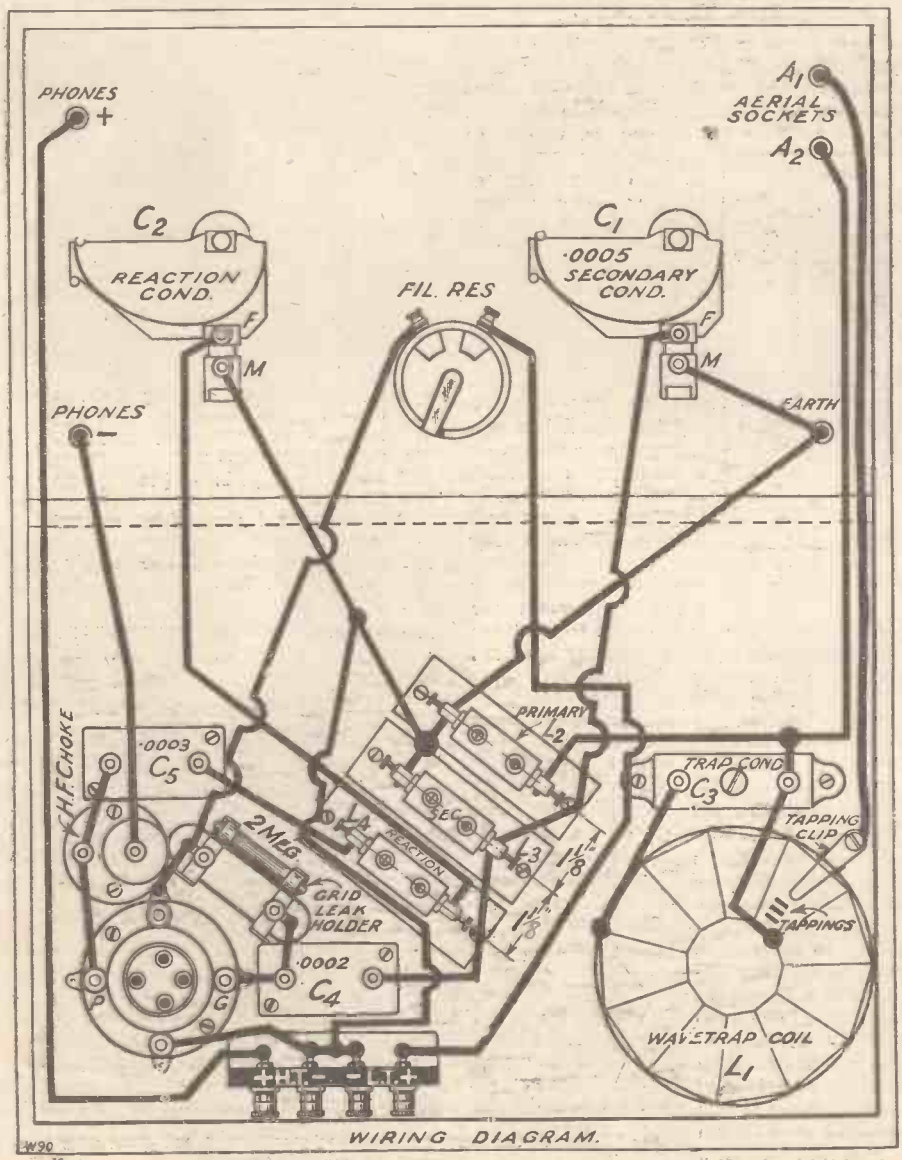
the coil being tuned by means of one of the very compact little variable condensers known as "Formodensers," also mounted on the baseboard.

The complete circuit of the receiver will be found in one of the accompanying diagrams, and the exact connections of the trap will be seen here, and it should be noted that two sockets are provided for the aerial, the trap being brought into use by one and cut out by the other (A_2).

The Circuit.

The remainder of the set is of a very straightforward type, using what is generally called the Reinartz circuit, with plug-in coils for tuning and reaction purposes. The aerial circuit is of the so-called aperiodic type, consisting of a plug-in coil whose size must be chosen to suit the aerial, wavelength to be received, and degree of selectivity required, closely coupled to which is another coil forming the tuned circuit, coupled to this again being a third plug-in coil for reaction. These three coils are mounted in fixed holders, no variation of coupling being needed beyond that which can be obtained by altering the coil sizes, since the actual reaction adjustment is obtained by means of the reaction condenser, which is the right-hand one on the panel. The left-hand one, of course, is for tuning.





WIRING DIAGRAM.

DX Possibilities.

The main purpose of this set is the reception of the local station and also of 5 G B at good 'phone strength (it should not be expected to work a loud speaker at even the shortest distance) up to considerable ranges when an outside aerial is used, or in an area of, say, fifteen miles radius when a small to medium indoor aerial is used. It has considerable possibilities as a long-distance receiver, however, when careful and judicious use is made of reaction, and quite a lot of Continental stations can be tuned-in with a little practice, but this should not be attempted until you have got the hang of the set and can be sure that you are not making a nuisance of yourself by constant oscillation.

This is a point which must be especially impressed upon the beginner, because a single-valve set is probably the very worst of all offenders when it *does* oscillate.

Make Sure of This.

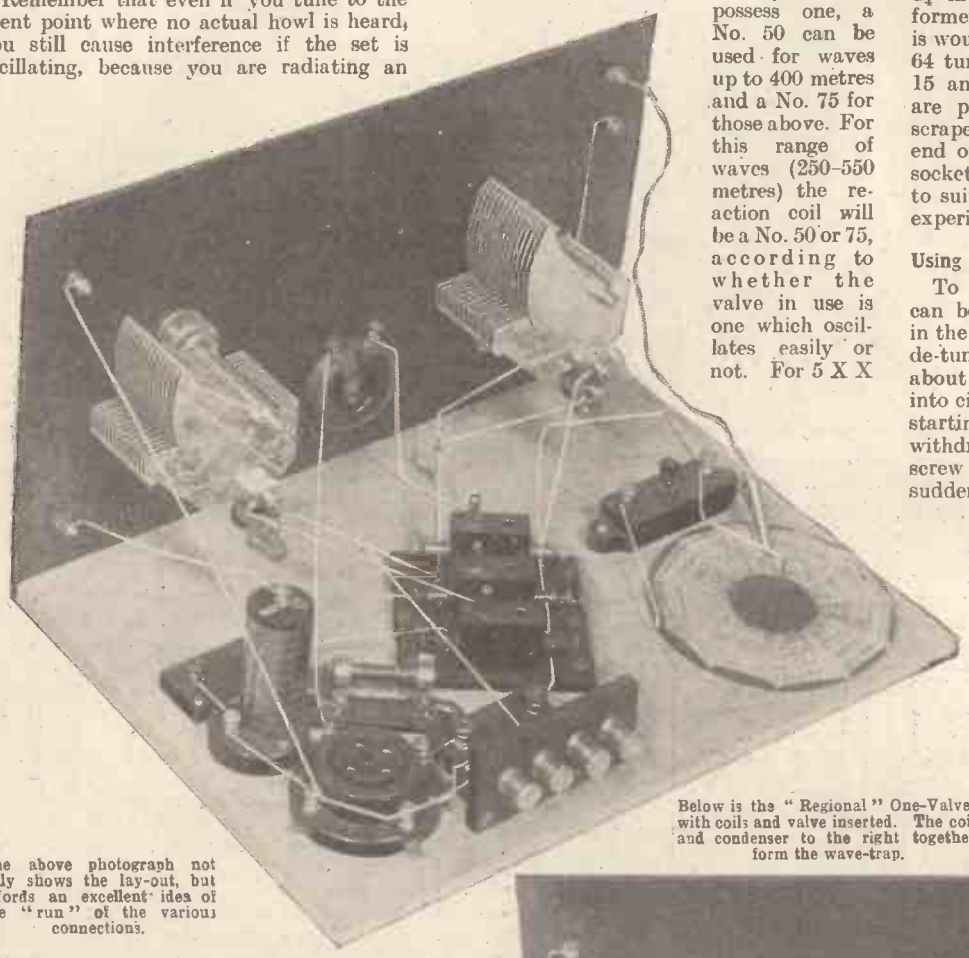
Here is a simple test by which you can be sure whether you are causing trouble or not: When you have tuned in a station, carefully turn the tuning dial a little bit one way, and then a trifle the other, and note the effect. If this merely causes the station to grow weak and disappear, all is well, but if when you de-tune you hear a squeal or howl, which starts as a low note and rises in pitch, you may be sure you are spoiling the reception of that station for everyone for miles round, and that is not cricket, is it?

(Continued on next page.)

THE "REGIONAL" ONE-VALVER.

(Continued from previous page.)

Remember that even if you tune to the silent point where no actual howl is heard, you still cause interference if the set is oscillating, because you are radiating an interfering wave which will make that station sound distorted and mushy to all your neighbours. To get the loudest results, then, you must learn to adjust the reaction condenser so that you are using as much reaction as you can without running the risk of spilling over into actual oscillation. Do not forget, however, that if you work very close indeed to the verge of oscillation, the quality of reception will be rather poor and distorted, and therefore it pays to use a little less reaction than the maximum possible, to avoid the curious hollow, woolly quality otherwise obtained.



The above photograph not only shows the lay-out, but affords an excellent idea of the "run" of the various connections.

Use Good Coils.

The secret of success with this little set undoubtedly lies in the coils used, as regards their efficiency and the choice of correct sizes for a given purpose. Almost any kind of coil, however poor, will give the local station, but if you want long distances, efficient coils are essential.

Now as to sizes: The size of the aerial coil governs selectivity and signal strength, and a little experiment is usually needed on any given aerial.

For the 250-550 metre band of waves, sizes 25, 35 and 50 are commonly used, the last-named being only suitable for waves above 400 metres, or in cases where a very small indoor aerial is being used. For normal purposes on waves below 400 metres a No. 25 or 35 will be correct, the larger size giving slightly louder signals but somewhat reduced selectivity.

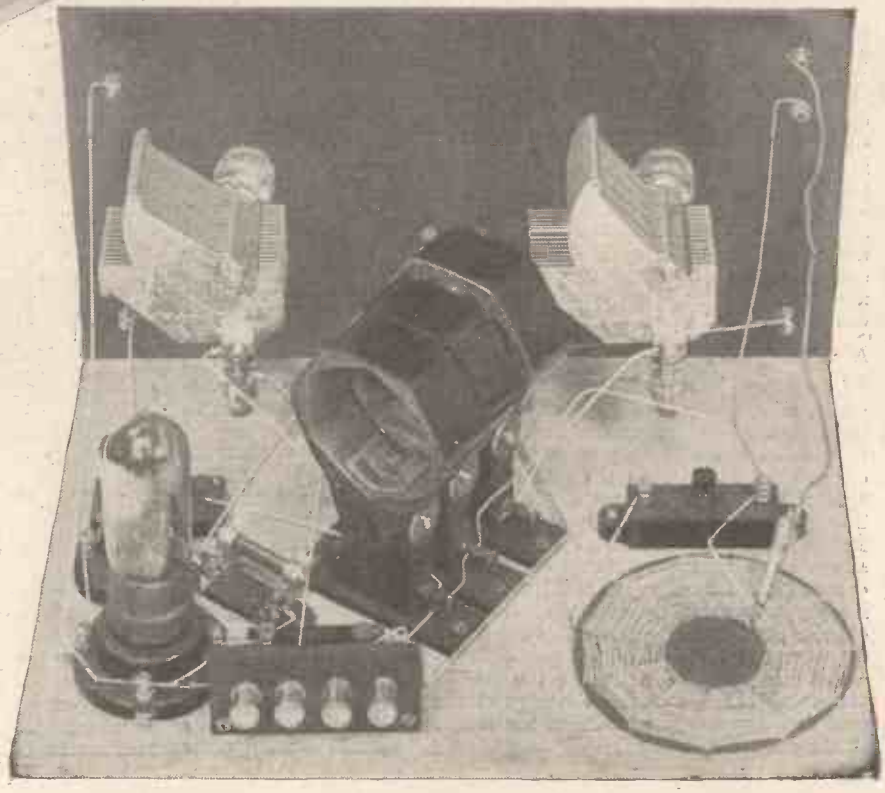
The secondary coil should be a No. 60, but if you do not possess one, a No. 50 can be used for waves up to 400 metres and a No. 75 for those above. For this range of waves (250-550 metres) the reaction coil will be a No. 50 or 75, according to whether the valve in use is one which oscillates easily or not. For 5 X X the aerial will be a No. 100; secondary, No. 250; reaction, 150.

The actual construction of this little set calls for no special instructions, since the photos and diagrams make it all quite clear, but the necessary details must be given for the trap coil. This is wound on a spider former with 11 slots, an inner diameter of 1¼ inches, and over-all diameter 4 (any former of roughly this size will serve). This is wound in ordinary basket formation, with 64 turns of No. 30 D.C.C. Turns Nos. 10, 15 and 20, counting from the inner end, are prised up slightly with a knife and scraped bare so that the tapping clip on the end of the flex lead from the upper aerial socket may make contact, the best tapping to suit the conditions being determined by experiment.

Using the Trap.

To set the trap is a simple matter, and can be done once and for all. First tune in the local station, without reaction. Next, de-tune until the signals are reduced to about half-strength, and bring the trap into circuit. Take a screw-driver and then, starting with the Formodenser control screw withdrawn as far as possible, proceed to screw it downwards until, probably quite suddenly, you find the trapping point. On reaching this point the signals will suddenly die down practically to nothing and will reappear again when the point is passed. Set the condenser to the point giving the best extinction effect, and then you can proceed to search for distant stations.

As regards general adjustments, there is little to be said: A 60-volt H.T. battery will be sufficient for the majority of valves, and a little adjustment of this voltage and the filament current will soon enable you to find a combination which gives smooth reaction control.

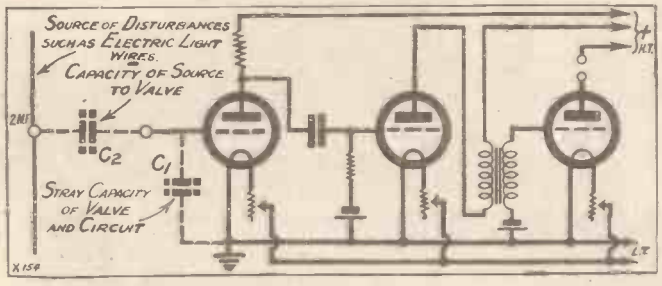


Below is the "Regional" One-Valver with coils and valve inserted. The coil and condenser to the right together form the wave-trap.

An article which will help those readers whose sets suffer from a peculiar but common fault.

By W. JAMES.

MOST people having a set comprising a valve detector with a low-frequency amplifier will have noticed at some time or other that a mains hum or other interference is heard when a disconnection is made in the detector valve's grid circuit. Removal of the grid tuning coil in many instances results in a noise being heard and, in fact, the set appears to acquire an enormous sensitivity to extraneous low-frequency disturbances just as soon as the disconnection is made, for the noise vanishes when the circuit is completed once more.



A "Free" Grid.

The effect is a peculiar one and well worth investigating, as certain troubles in low-frequency amplifiers designed for high magnification are directly traceable to this effect. We have, when the grid circuit is broken, in certain instances, a "free" grid. The impedance of the grid to filament path is, therefore, extremely high and, in fact, is about equal to the reactance of the condenser formed by the grid and its connecting wires to the filament and earth. The electric field of a nearby electric light wire or other source of low-frequency disturbances can, therefore, influence the grid of the valve because of the capacity of the grid and its connecting wire to the source of the disturbance.

Naturally, the impedance of the source of the disturbing E.M.F. is high, being due to the capacity of the source to the grid circuit, and the E.M.F. actually applied to the grid will be proportional to the impedance of the capacities C_1 and C_2, Fig. 1.

If we represent the impedances by Z_1 and Z_2 we have the grid voltage:

$$E = \text{E.M.F.} \times \frac{Z_1}{Z_1 + Z_2}.$$

From this it follows that the larger the value of the impedance of the grid circuit the greater is the voltage impressed on the grid and, therefore, the louder the disturbance is heard. If the grid filament path of the valve is shunted in any way by a resistance, the impedance Z_1 is reduced and so is the loudness of the disturbance. In other words, the better insulated the grid, and the smaller its capacity, the more one would expect low-frequency interference to be heard.

An important application of this is to be found in the case of a detector which uses a grid condenser and leak. We have a grid condenser of small capacity, usually of ·0002 or ·0003 mfd., and a grid leak of high resistance, normally of about 2 megohms. The grid circuit of the valve, therefore, offers a high impedance to low-frequency currents, from which it follows that the grid will be extremely sensitive to neighbouring electric fields. These may be due to electric light wires as we have explained above, but it is more than likely that we shall find the electric fields due to conductors carrying amplified low-frequency currents will be more troublesome. It is, therefore, of great importance so to place the low-frequency conductors carrying amplified currents that the grid wire of the detector is more or less isolated from the remainder of the low-frequency circuit.

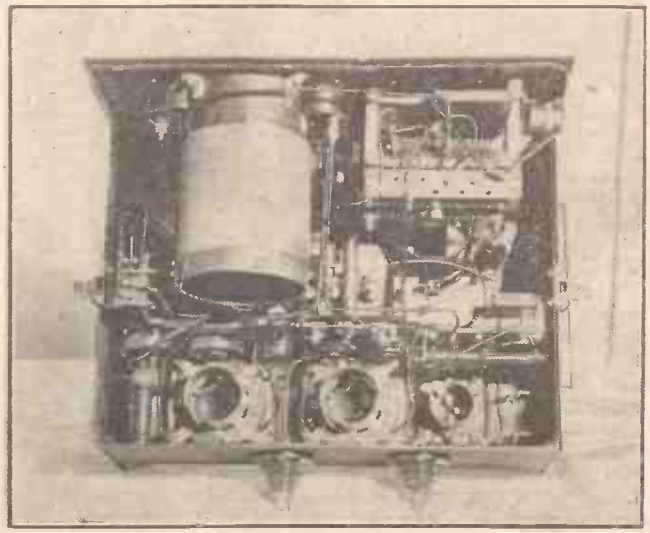
Stray Capacities.

The voltage picked out by the lead attached to the grid of the detector acting as an aerial is, of course, reduced by making it as *short* as possible, but very often this simple precaution is not sufficient. The stray capacities, tiny as they are, provide a sufficient back coupling to cause a low-frequency howl, or at all events tend to make the amplifier magnify the notes around a certain frequency out of all proportion to the others, simply because of the reaction effect. Bad quality therefore results. This may be lessened on occasions by reversing the connections to one of the intervalve transformers, but the only really satisfactory method is completely to eliminate the coupling by shielding.

A Practical Remedy.

From the explanation given above, it follows that the pick-up of the grid wire attached to the detector valve will be reduced by lowering the value of the grid leak and, of course, the capacity of the grid condenser. The latter method is not recommended, however, as low-frequency distortion of another sort may be set up. Fortunately, the effect of lowering the grid-leak resistance is to improve the quality—hence this is a very useful way of stabilising the set and reducing interference troubles.

It will be noticed that the effects which we have described do not occur when anode bend rectification is used, for with this method the grid is in effect connected direct to the filament so far as low-frequency currents are concerned, although if the grid circuit of the detector is broken the interference referred to will probably be experienced.



The transmitter to be carried on one of the aeroplanes figuring in transatlantic tests.

A view from the windows of the Station Director's office at 2 Z Y. Looking across the dark waters of the Irwell one sees the above gaunt, drab cotton-mill.

2 Z Y

An account of Mr. G. V. Dowding's visit to the Manchester Broadcasting Station.

THROUGH the heart of Manchester flows the River Irwell, a narrow thread of dark, evil-looking water, seeming to bear with it all the light refuse of the multitude of factories which line its sinuous course. And on the eastern bank of this canalised waterway, immediately opposite a gaunt, drab cotton mill, are situated, appropriately enough, the headquarters and studios of the Manchester Broadcasting Station.

Originally these were located at the top of a four-storeyed building in Dickenson Street, but now they have sunk eight floors, right down into the depths of a large house of commerce in the Parsonage. Originally, I believe, the Parsonage was a series of beautiful terrace gardens sloping down to a cool, translucent river, but there now remains no evidence of this, barring the anomalous manner in which the various present-day buildings along it are disposed. From the street, one enters a rather imposing doorway and takes a lift three floors *down*—only to find, after having done so, that

evanescent shafts from the sun enter the windows of some of the offices! So one cannot refer to 2 Z Y's premises as underground ramifications, although one gains the impression that they are, until one surprisedly glimpses this daylight.

Being somewhat early for my appointment with the Station Director, I drifted into the artistes' waiting-room, wherein a radio mystery was immediately solved for me by a prominent notice which, headed "Clapping in Studio," ran: "Audiences in the studio, unless very considerable, are requested not to clap after items. Applause by a few persons sounds forced and artificial and does no real credit to the artiste."

"Man's wants are *not* little here below," I misquoted to myself, turning to the excellent assortment of illustrated magazines tidily laid out on the table.

In due course, Mr. Liveing, the Station Director, returned from lunch and it was not long before we were engaged in a most interesting conversation in his private office. I soon discovered that broadcasting is taken very seriously indeed at the Manchester station, and this is, of course, as it should be, for Manchester City has world fame as a centre of intellectual and artistic pursuits and has a quarter of the country's population within a radius of 50 miles from its centre. And although everybody I met at 2 Z Y seemed to be bursting with pride-of-station, if I may coin a term, no one who had recounted to them the list of 2 Z Y's achievements could find aught but commendation in that.

Popularity of Operas.

Like the sinuous river outside the room in which we sat, our conversation strayed through various channels of broadcasting and came to rest for a moment on the subject of opera. On my asking Mr. Liveing what the station had done in this direction, he replied, "We were the first station to broadcast complete opera performed in the studio, and also the first one to issue libretti, and we were also first in the field with a complete play and again with the issue of dramatic booklets."

He agreed with my suggestion that the sale of libretti and booklets gave some indication of the popularity of broadcast opera and plays, and informed me that the average demand for these was 20,000 and 10,000 copies respectively. When one considers the fact that these figures probably represent but small proportions of the numbers of listeners who take an intelligent interest in and who appreciate such transmissions, the presence of such in the programmes would appear to be more than justified. And Mr. Liveing was most definite in an assertion that operas especially are exceedingly popular among the listeners to 2 Z Y, while the development of radio drama as a new art-form was being followed with interest.

Musical Advisory Committee.

As everyone knows, the relaying of the Hallé Society's concerts is a special feature of the Manchester station's activities, and has contributed greatly to the spreading of Manchester's musical reputation throughout the country. Nevertheless, it should be remembered, as Mr. Liveing pointed out to me, that some of the station's own concerts have been of a very ambitious nature, and have included many of the foremost national artistes. And a few months ago, a musical advisory committee was formed, on which are some of the most prominent musicians of Manchester, including Sir Hamilton Harty, who is the chairman.

"Are you rich in local talent in Manchester?" I asked Mr. Liveing.

"Manchester, and Lancashire generally, possesses a wealth of musical talent," he replied. "Music seems to be inborn among the inhabitants, many of whose choral societies and bands are famous throughout the country, while the Hallé traditions have gathered together groups of instrumentalists of very high standing."

Large Postbags.

I learnt that only six or seven per cent of the people who attend auditions are found suitable as microphone artistes. Of these, it appears that seventy per cent are women, although there are more successes, comparatively speaking, among the men who attend auditions, these being chiefly baritone singers.

"Generally speaking," I enquired, "do you find your listeners appreciative?"

"Yes, we certainly do," was Mr. Liveing's immediate answer to this. "At times we have had as many as one thousand letters of appreciation concerning one successful programme, though usually we should consider a hundred letters a very good token of appreciation.

"And criticisms?" I pursued.

"About five per cent of the total number of letters dealing with programmes received." And in support of this, Mr. Liveing produced the official postbag analysis.

"And what, in your opinion, proved to be your most successful broadcast during the past two or three years?" I enquired.

This caused Mr. Liveing to lapse into thought and, despite some gentle prompting on my part, it was quite two minutes before

(*Continued on next page.*)

The old studio at Dickenson Street as it is to-day. Note the bales of cotton! A fire occurred in this studio, and signs of this are still to be seen in the charred wooden walls.

2 Z Y.

(Continued from previous page)

I could get him to make a definite statement. "You see," he protested, "we have broadcast so many important programmes that it is exceedingly difficult to pick any one out."

"Tell me, then," I urged, "what 2 Z Y broadcast occasioned the greatest quantity of correspondence?"

"Well, the 'Voice and Personality Tests' in January of this year brought in about four thousand six hundred letters, but——" the Station Director paused, and I could see that he was still grappling with the problem.

"I suppose you have a large staff here?" I asked, changing the subject.

"Yes, one of the largest in the provinces," Mr. Liveing said. "There are seven administrative and programme officials and the engineering staff, including the engineer in-charge, numbers nine. There are fourteen other permanent members of the staff, such as typists, telephone operators and office boys."

The Station Orchestra.

"You also have a large orchestra?" I suggested.

"Yes, we have a permanent station orchestra of seventeen, and this is frequently augmented to thirty-five. Sometimes," added Mr. Liveing, "it is brought up to as many as sixty for important symphony concerts or public performances."

"Reverting to the question of programmes," I said, "are you able to co-operate with the various local authorities, or do you meet with opposition from any quarters?"

"I think that we are on friendly relations with everyone," answered Mr. Liveing with animation, "and there is the closest co-operation between us and all the local municipal, religious and other authorities. We have the guidance of several representative committees, including an Educational Advisory Committee, presided over by Dr. Moberly, the Vice-Chancellor of Manchester University, a Religious Advisory Committee, with the Dean of Manchester, Dr. Hewlett Johnson, as Chairman, and a newly-formed Musical Advisory Committee under the ægis of Sir Hamilton Harty."

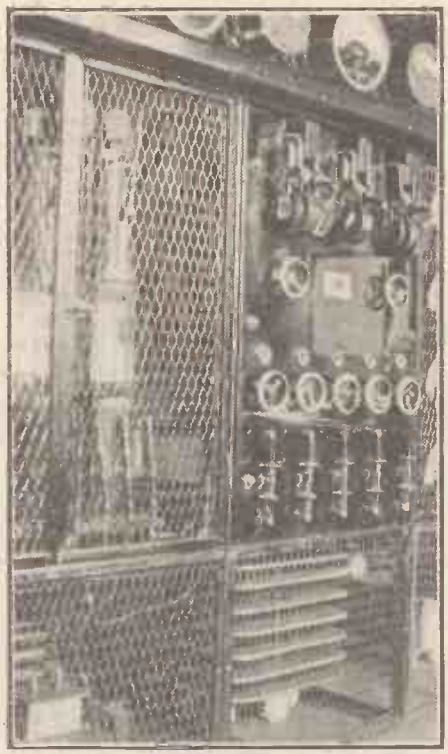
"Outside Broadcasts."

Mr. Liveing then proceeded to give me full details of this phase in the station's activities, and also mentioned the work that has been accomplished at the station in the organisation of public charity concerts which have been instrumental in raising funds totalling many thousands of pounds. Subsequently, he introduced me to Miss Violet Fraser, who organises the Manchester Station's Children's Hour and Radio Circle, which numbers 15,000, and which has directly contributed over £700 towards the installation of wireless in children's wards in hospitals and other charitable undertakings.

"Are you doing many 'outside broadcasts' these days?" I asked Mr. Liveing, strolling over to the window of his office and gazing down at the inky, oily Irwell slumberously receiving the drizzling rain that was falling.

"Yes, we are pursuing a policy of extending these so as to cover not only Manchester and its immediate surroundings, but also to identify ourselves with musical and cultural interests much farther afield. We have a very big O.B. scheme in operation this summer, which we are running in conjunction with the neighbouring relay stations, Leeds-Bradford, Sheffield and Liverpool. By pooling engineering and financial resources, we have been able to relay music and entertainment from the principal resorts of Lancashire and Yorkshire, including Harrogate, Blackpool, Grange-over-Sands, Morecambe and Buxton," was Mr. Liveing's reply as he came over to my side.

"This is my balcony," he laughed, pointing to a small railed, ironwork platform just beneath his window. "In the summer I frequently spend a few minutes on it 'taking the air.' It's quiet here, and the surroundings are not too uninspiring." And, with



A section of 2 Z Y's transmitter, which is compactly arranged behind protective wire netting.

the aid of a chair, he nimbly climbed through the window and invited me to follow. For a short time we stood there in the rain, watching the hundreds of small pieces of flotsam and jetsam gliding along beneath us.

"A fascinating, but extremely unwholesome river," I remarked.

The Station Director smiled.

"Yes," he agreed, "I have heard it said that when Queen Victoria paid a visit to Manchester and came down the Irwell on a barge, pails of eau-de-Cologne were poured into the river in order to render it more attractive for the occasion."

The Two Flamingos.

"Have you ever used this river in broadcasting?" I asked him.

"Oh, yes, we have used it several times in one way and another. For instance, once we had barges brought down for the purpose of providing realistic effects in a W. W. Jacobs' play."

"That was clever," I remarked, as we climbed back into the office. "But," I added jokingly, "it is by no means the cleverest thing the Manchester Station has done."

"And what was that?" queried Mr. Liveing, as he jumped down from the chair.

"Broadcast an S.O.S. that the Zoo had lost a flamingo, with the result that two of these weird birds were duly handed in," I replied.

"That was before my time," he laughed. "But I have heard the story and have often wondered where the second one came from."

He then invited me to have a walk round. First of all we peeped into the main studio, where Mr. Morrison, the Musical Director, comfortably reclining on a settee, was conducting an audition. For a moment we stopped and listened to a boy of about fourteen years old playing a violin. To my "lay" ears it sounded really beautiful, and I could not help hoping that the youthful minstrel would pass the test.

The Musical Director.

The main studio at 2 Z Y is a pretty large affair, although I cannot say that it conveyed any definite impressions to me. When I say that besides being large it has the usual curtains and draperies and other studio paraphernalia I have said all that there really is to be said about it. I found the principal occupant of it at that moment much more interesting.

Mr. Morrison has that engaging and enthusiastic, yet dignified presence I always associate with our leading musicians. And my respect for him increased when later I was shown the station's music library. The nucleus of this is Mr. Morrison's own personal property, and it must form a valuable addition to a broadcasting station. It includes many first editions of pieces of music which are quite irreplaceable. One whole room is devoted to this library, and it is properly catalogued and in charge of a librarian.

In Mr. Morrison's office I was introduced to Mr. Eric Fogg, 2 Z Y's station accompanist, and a promising young composer whose works have frequently been broadcast. Unfortunately, Mr. Victor Smythe, who is responsible for the Manchester Station's dramatic and variety productions, was away, but Mr. Liveing took me along to a small studio where most of the plays are presented.

Broadcasting Plays.

"This," he explained, "is one of Smythe's dramatic 'sets.'" Around three sides of the studio were portable wooden walls, in which several doors were fitted. On the fourth side the microphone was arranged in a small recess. "The doors are provided in order that the artistes shall make their proper entrances and exits as on the stage," Mr. Liveing said.

"And the microphone is the auditorium?" I suggested.

"Yes," he agreed. "But," he added reflectively, "I am not too sure that the scheme represents the ideal method of producing a radio play. Broadcast drama is an art of its own and it is debatable whether or not one should endeavour to emulate stage practices."

"Nevertheless," I argued, "this 'set' must greatly facilitate the grouping of characters and make entrances and exits run smoothly and naturally."

(Continued on next page 161.)

TUNGSTONE 12-96 volt. H.T. DE LUXE

Special Ebonite and Rubber Insulation.
No Current Leakages. 3 Amp. Hour Actual Capacity.

PATENTED 12-16 LOW TENSION REMOVABLE CHARGING

Equipment shown on the Front of Illustration.

Price: 60 Volt. £5 15s. 0d.; 96 Volt. £10 10s. 0d.
Sold U.K. on Extended Monthly Payments. Apply for Details.

FREE for Asking

Illustrated Pocket Battery Guide

on

MODERN BATTERY FAILURES

TUNGSTONE DE LUXE HIGH TENSIONS FITTED WITH Patent Equipment for Charging on 12-16 Volt Low Tension Plant. First Charge completed in the Short Period of 12 Continuous Hours. Re-Charges in SEVEN Continuous Hours

The practical advantages of Tungstone's Exclusive Feature of BALANCED PLATES, in combination with Low Tension Charging Equipment, guarantees that the first charge and all re-charges are fully completed, consistently and reliably, which the existing present day charging cannot guarantee and never secures.

FIRST CHARGE ONLY FOUR CONTINUOUS HOURS

For any Tungstone Storage Battery from 6 to 5,000 Amps.

On Car or Bench the Charging Rates for Portable Storage Batteries are from 6 to 30 amps. based on the rated Ampere Hour. House Lighting, Works and Central Station Batteries can be discharged for Light only during the First Charging period.

All Competitive Makers of High or Low Tension

Batteries "pass on" to the Purchaser the many serious risks of Forming and giving the First Full Charge, also the increased cost of a necessary and exceedingly long First Charging period extending from 24 to 72 hours and longer.

For Post Free Copy of Free Booklet on MODERN BATTERY FAILURES containing Special Illustrated Articles, send name on Postcard to:— M

TUNGSTONE ACCUMULATOR CO., LTD., SALISBURY SQUARE, FLEET ST., LONDON, E.C.4.

2 Z Y.

(*Continued from page* 158.)

Mr. Liveing concurred and, still discussing this interesting subject, we continued our tour. In the office of Mr. Bird, the Engineer-in-Charge, another holiday absentee, by the way, a lady was polishing a microphone cover. A trivial sort of action, no doubt, but it struck me as being highly appropriate!

The various offices and studios at 2 Z Y open up from one central corridor. As Mr. Liveing remarked, it is very much like being down on one of the lower decks of a ship, more especially as one glimpses daylight and water through the windows of the offices on the one side, while on the other artificial light is in constant use.

The transmitting station at Manchester is located in Dickenson Street, and in due course I bade farewell to Mr. Liveing and his staff, and adjourned there to have a look at 2 Z Y's more-technical department.

The Transmitter.

Arrived at Dickenson Street, I climbed the ten or eleven—or was it nineteen or twenty?—flights of stairs up to the B.B.C. quarters. A very cheery young engineer was in charge of the transmitter, and we were soon engaged in an animated conversation concerning radio telephony and other such matters. It is interesting to note that Manchester's transmitter differs from those at the majority of the B.B.C. stations—where more or less standard assemblies are in use—and is closed in rather similarly to a ship's set. The plates of some of the valves run at a red heat, but, despite this, I learnt that most of them have lives running into several thousands of hours.

It must be very hot work in the summer-time attending to one of these B.B.C. transmitters, for a considerable heat is radiated from the valves. The engineer was in shirt sleeves, and, even so, I could see that he was pretty warm. In a few moments I was, too, and I eagerly availed myself of the engineer's invitation to examine the machine room and 2 Z Y's old studio. As we were proceeding to do this the young fellow who had acted as my guide to Dickenson Street invited me to follow his example—frequently repeated with relish!—and test the pick-up qualities of a metal bracket by rubbing my nose on it!

"You get quite a nice shock," he pleaded.

"*I* don't," I pointed out, leaving him to indulge his vice.

The Old Studio.

I had a look at the small generators busily humming away, and passed on, with the engineer leading the way, to the accumulator room.

"Didn't you have a fire here some three or four years ago?" I asked the engineer.

"Yes, but it wasn't a very serious fire. It happened in the old studio," he replied. "You will remember that at one time we had the studio over here as well—the whole outfit was contained on this floor of the building. Come along. I'll show you the old studio."

He led me along a short passage and opened another door. This gave access to a place that looks like a large loft. It is now used for storing cotton, and one side was almost hidden from view by a large pile of bales of this material. To my astonishment I saw that walls, floor, ceiling, and roof all consisted of uncovered wooden boards, many of which still bear the scorch marks of the fire.

"Only the studio draperies were actually burnt, I suppose?" I said.

"Yes," replied the engineer; "the fire engines were soon here, thank goodness."

"What an escape!" I exclaimed. "Had these walls caught fire the whole building would have blazed up like a torch."

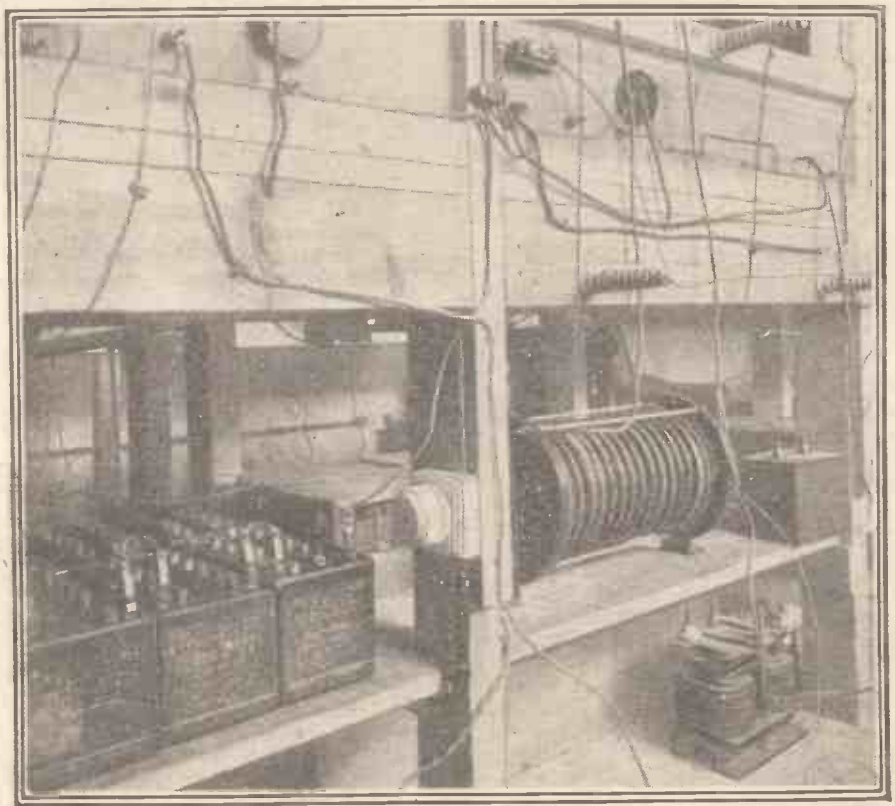
By the way, with reference to fires, I mustn't forget to mention that all the carpets, draperies, and curtains employed in present-day B.B.C. studios are adequately "fireproofed," and that there are practically no probabilities of a recurrence of any of the early studio blazes. Nevertheless, it is my opinion that 2 Z Y should shift its transmitter at the earliest opportunity. It may prove very difficult to find other premises as suitable, but I am sure it would be difficult to duplicate their insecurity!

In Conclusion.

Now, regarding the Manchester Broadcasting Station as an entity of our broadcasting service, what are my general impressions? As I have already said, they take broadcasting very seriously at 2 Z Y, but don't let it be thought that I found education and "mental uplift" bristling out from every office and studio at Ormes Buildings, The Parsonage. The "high-brow" element is strongly in force, and I am told that it is highly appreciated by an ever-growing section of "Cottonopolis," but they appear to deal with their tasks so scientifically at the Manchester Station that I am sure all classes of listeners to 2 Z Y discover hours of programmes every week entirely to their individual likings. It must be remembered that there is as much real science involved in the production of successful variety shows as there is in the knitting together of a chamber concert that will pass the critical audition of a student of music!

And, in conclusion, let me add that I could easily fill a book with the information I collected at 2 Z Y, and it is my fear that in these brief remarks I have not done the station justice. It has accomplished big things, and it is doing big things, and the only small thing about it, as far as I can see, is this very sketchy outline of its past and present activities.

OUR AMATEUR EMPIRE BROADCASTER.



Mr. Gerald Marcuse, of Caterham (2 N M), is using first-class apparatus in his experimental Empire broadcasts, and, as this photograph indicates, it is fully capable of handling the necessary 1 kw. The bias batteries and speech choke are shown in this small section of the gear.

THAT MINIMUM GUARANTEE.

The Empire Broadcasting situation summarised

BY THE EDITOR.

IN a recent article published in the "Daily News," I suggested that the B.B.C.'s association with Empire broadcasting does not make pleasant reading, and hard upon the heels of this article was issued yet another "official statement" from 2, Savoy Hill.

The gist of this statement is that, in the opinion of the B.B.C., the problem of effective Empire broadcasting is the linking together of the various broadcasting systems for the benefit of the ordinary listener, that is, for the general public of the Empire rather than the provision of sporadic technical entertainment for comparatively few amateurs. Unfortunately,

The Colonial Technical Press, Ltd., have informed us that they recently received the following wireless message from the Editor of "Popular Radio Weekly," of Melbourne.

"3 A R Melbourne, five thousand watts, proposes fifty-five metre transmission in three or four weeks' time, commencing 1 p.m. G.M.T. Approach B.B.C. regarding possibilities of a re-broadcast. If B.B.C. agrees please arrange. Combined efforts should assist Radio."

The B.B.C. have been approached—and with what result?

The B.B.C. officials have replied that they ARE NOT PREPARED TO CONSIDER RE-BROADCASTING UNTIL SUCCESS HAS BEEN PROVED ! !

In other words, the B.B.C. refuses to co-operate until someone else has proved the idea a practical one—and a successful one ! How on earth can progress be expected when the B.B.C.—whose co-operation is essential in such an experiment sits on the fence and refuses to stir a hand or foot to help progressive Australians to improve short-wave broadcasting ?

Further comment is superfluous.

the subject of Empire broadcasting is being exploited as a publicity "stunt." The admittedly unsatisfactory and irregular direct reception which is now possible for a very limited number of wireless experimenters is given a wholly artificial importance.

The Latest Statement.

The B.B.C. is convinced that premature and unsound proposals so vigorously advocated in certain quarters are definitely inimical to the cause which they are presumably designed to serve. The B.B.C. will not undertake a service of Empire transmissions until it is possible to give a minimum guarantee of the fulfilment of the elementary conditions requisite for service. There must be some ingredient of reliability, continuity, intelligibility, and quality.

Results up to now (continues this interesting statement) are purely sporadic and fortuitous. The experimental relay of Sydney on the Sunday was recognisable; the parallel attempt to relay Melbourne on Tuesday yielded complete silence. The B.B.C. is of opinion that the time is close when it will be able, for instance, to invite the King to address his 450,000,000 subjects throughout the world by word of mouth; but it would be of singularly little advantage to the Empire if such a transmission were a fiasco. At the present rate of progress a new series of experiments will be attempted in October, and upon the results of these will depend the date of the inauguration of an Empire service.

Savoy Hill's Stock Argument.

Our readers will notice that the B.B.C. is now attempting to explain away interest in Empire broadcasting on the grounds that it is being exploited as a publicity "stunt." No doubt any matter of public interest with which the B.B.C. does not agree is regarded at 2, Savoy Hill as a "stunt," so long as the B.B.C.'s critics continue to criticise in the Press. Well, it's a rather weak way of meeting criticism.

The trouble about this question of Empire broadcasting is quite easily explained—out of contradictory statements from Savoy Hill there at last emerges a fairly clear idea of the B.B.C.'s "policy." It has been a long time taking shape; its beginnings were evasive, not to say tortuous; but the ventilation of the question of Empire broadcasting in the Press has really done some good inasmuch as the tame Machiavelli at Savoy Hill, who is responsible for the public voice of the B.B.C. in the Press, has at last come down to bedrock, and with the help of the technical views of Captain Eckersley, has made it clear that:

B.B.C.'s Policy Analysed.

1. The B.B.C. is desirous of taking its "rightful part in the development of Empire broadcasting," etc.

2. The problem (from the technical point of view) is one of reception rather than one of transmission.

3. The B.B.C. will not undertake a service of Empire broadcasts until it is possible to give a minimum guarantee of the fulfilment of elementary conditions prerequisite to service. (Machiavelli again).

4. There must be *some* (*sic*) ingredient of reliability, continuity, intelligibility, and quality. (This ingredient will be found in the work done by P C J J and others.)

5. Results up to now are purely sporadic and fortuitous.

6. The B.B.C. is convinced the time is close when it will be able to invite the King to address his 450,000,000 subjects throughout the world by word of mouth.

7. At the present rate of progress a new series of experiments will be started in October. (*Vide* Press.)

8. It will be at least a year before the B.B.C. will be ready for Empire broadcasting. (*Vide* Press.)

9. The subject of Empire broadcasting is being exploited as a publicity "stunt."

And against this "policy" (which contradicts itself) we have the following facts:

1. K D K A, P C J J, and other foreign short-wave stations, have already shown that they are capable of transmitting programmes on short waves which, on a fair average, are capable of being received in distant parts of the world. Notably P C J J.

2. Australia has already built and put into operation a 15-kw. short-wave station which has been heard and relayed with reasonable success by the B.B.C. The attempt to relay Melbourne was, from the first, doomed to failure owing to the fact that the time chosen for the transmission was unsuitable and the power much lower than that of Sydney.

3. Mr. Marcuse (with 1 kw. power) has been clearly heard in Australia a sufficient number of times to warrant the continuation of his service.

4. The B.B.C. demands a minimum guarantee before it starts an Empire service. The public demand a service (to begin with) similar to that given by P C J J, etc. The B.B.C. refuses on the grounds that such a service would be unreliable and "damaging to the Empire." Consequently the service given by K D K A, 2 X A F, etc., is "damaging" to the U.S.A.; P C J J is "damaging" to Holland, and 2 N M is "damaging" to Great Britain. In actual fact, the reluctance of the B.B.C. to stir out of its cotton wool is more than damaging to the reputation of Great Britain as a country which "gives the lead," and which in other departments of life (Atlantic aviation, for example) is usually in the van.

General Inference.

Net result of the publicity "stunt," the B.B.C. as a whole is overridden by the short-sighted policy of its technical branch, refuses to start without a "minimum, guarantee," and eventually promises a series of experiments in October—backed by a strong rumour that it has a short-wave station "up its sleeve" nearly ready.

General inference: Interest in Empire broadcasting caught the B.B.C. napping: it played for time—got it—and is now, we sincerely hope, about to start the nucleus of a service.

We shall see !

These three soldiers are carrying between them a complete radio transmitting and receiving outfit. It is one of the latest portable sets designed for our "mechanised" army.

BROADCAST NOTES.

By OUR BROADCASTING CORRESPONDENTS.

The Empire Wrangle—B.B.C. and the Trade—Dr. Saleeby's Return—The First National Concert—Broadcasting and the Films—The Concert Industry: Another War—"Provided" Concerts—Will Cecil Lewis Return?

A B.B.C. Gesture to the Trade.

ON Monday next (September 26th) the B.B.C. restores its morning transmissions for the trade on 2 L O and 5 X X. Since the drastic curtailment of these transmissions last summer, there has been a good deal of justifiable annoyance among traders who had come to depend on the service as a normal adjunct to selling and demonstrating. The settlement of this grievance is the first concrete result of the working of the Radio Trade Committee on Broadcasting.

Under the restored service 5 X X will function from 11 a.m. to 2 p.m. from Monday to Friday inclusive. 2 L O will function from 12 to 2 on these days and both stations will be on the air from 1 to 2 on Saturday. The Committee had asked for 2 L O to come on the air for the first hour; but the B.B.C. would not go quite this distance. Nevertheless, the agreed solution gives general satisfaction. Both the B.B.C. and the Trade Committee are to be congratulated on such a happy outcome of what looked at one time to contain all the elements of a nasty and prolonged struggle. Let the B.B.C. keep up the good work and get busy on National Wireless Week without more ado.

The Empire Wrangle.

Judging by recent press announcements, the Die-hard element at Savoy Hill is definitely on top in connection with the rather silly and unworthy controversy about Empire broadcasting. There is a marked stiffening in the attitude of the broadcasting pundits, and a tendency to carry hostilities into the other camp. But once again a new pledge has emerged from the smoke of battle.

Now the B.B.C. are promising a new series of experiments in October. Last time, it was to be towards the end of the year. So we are really getting ahead. And, as Mr. Marcuse rightly says, it doesn't matter what they say to save their faces; what matters is what they actually do. But there is rather too much insistence on the experiments which are alleged to have been conducted since 1923. It would be singularly illuminating to know something about these "progressive experiments."

Dr. Saleeby's Return.

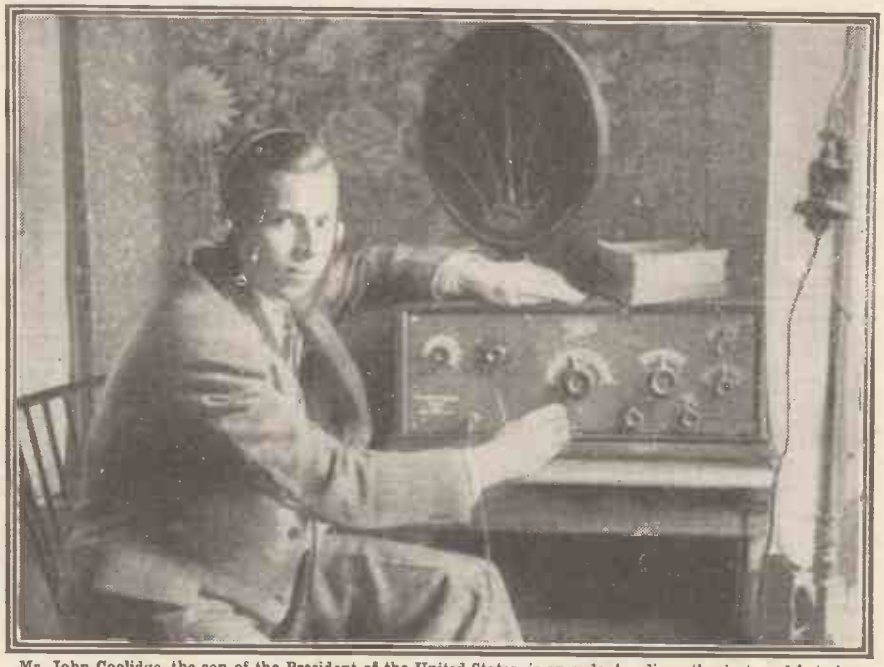
Dr. Saleeby, one of the most liked of all the serious broadcasters, returns to the "mike" on Saturday, October 1st, at 7 p.m. when he will talk about "Health in Autumn."

The First National Concert.

The First of the B.B.C. National Concerts for the 1927–28 season will be conducted by Sir Henry Wood at the Queen's Hall on Friday, October 7th. Under Sir Henry's baton will be the National Symphony Orchestra, a new aggregation of musical talent of which much is expected. The Ninth Symphony of Beethoven will be included in the initial programme of the season. The concerts on October 14th and on November 18th will be given at the People's Palace, Mile End Road, the others at the Queen's Hall.

Broadcasting and the Films.

Donald Calthrop, who is now in films, reports that the B.B.C. has just led him up the garden path and left him in a nasty hole. He had been given enough encouragement over a proposition to make a film of B.B.C. work to induce him to enter into some commitments with a well-known film concern. And then suddenly he was told that that new and mysterious body, the B.B.C. Control Board, had turned down his scheme out of hand, and added that they thought broadcasting should have nothing whatever to do with films. No explanation was vouchsafed, but it is presumed that the high and mighty at Savoy Hill think they are so wonderful that they would not contaminate themselves by contact with a common thing such as a film. If this is so, the day will come when they will beg for what they are now spurning.



Mr. John Coolidge, the son of the President of the United States, is an ardent radio enthusiast, and is to be seen above tuning his favourite set.

The Concert Industry: Another War.

The success of the B.B.C. Queen's Hall season is being followed by an intensified campaign against broadcasting undertaken by the concert industry, aided by some newspapers. This is primarily working through inspired publicity and, of course, will do the B.B.C. much more good than harm.

Provided Concerts.

A number of offers of provided studio material are being made to Savoy Hill, and some of those concerned are determined to ventilate the whole matter if they are turned down. The Corporation are much more sniffy and a shade more hypocritical than even the old company was.

The policy-mongers of the B.B.C. are looking down their noses even at gift-horses. No taint of advertisement is the new catch-word. What about the Savoy Bands? What about Sandler and the Grand Hotel at Eastbourne? What about scores of other good programme pieces? Of course they are all advertising, and they are perfectly justified. Therefore, let's get on with the programme work and cut out all the sham and hypocrisy about ideals. The rule should be—take good programme material wherever it comes from; and take as much as possible for nothing. And the money that is released thereby should be spent on new and better features for the alternative station.

Will Cecil Lewis Return?

There is great activity in Cecil Lewis circles. His programmes have been so good that discerning critics have begun to ask whether he should not be restored to his old post at the head of the programme organisation at Savoy Hill. This view is being strengthened by the breadth of grasp shown in Cecil Lewis' programme criticisms now appearing in a Sunday newspaper. The argument for the removal of Cecil Lewis was that he was too much of an artist and too little of an administrator for the chief of programmes.

His successor, Captain Eckersley's brother, has proved an admirable administrator and has got the machine working smoothly.

(*Continued on page* 192.)

BOWYER-LOWE AGAIN LEADS THE WAY FOR 1928

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

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

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/-

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/-

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 ¼" or ¼" spindles.

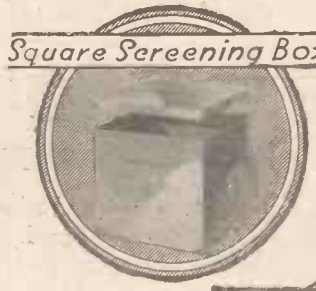
List No. 253. Complete with Station recorder .. 9/-

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/-

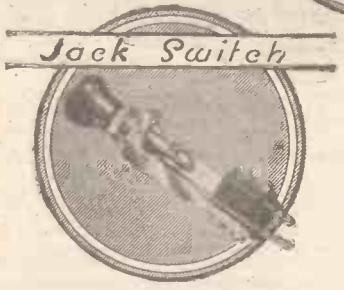
NATIONAL RADIO EXHIBITION OLYMPIA STAND NO 124



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/-



TESTED RADIO
Bowyer-Lowe
APPARATUS

JACK SWITCH

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

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

SEND FOR THIS BOOK TO-DAY

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

By A. Bowyer-Lowe.

Price 2/-.

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.

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

Cut This Out

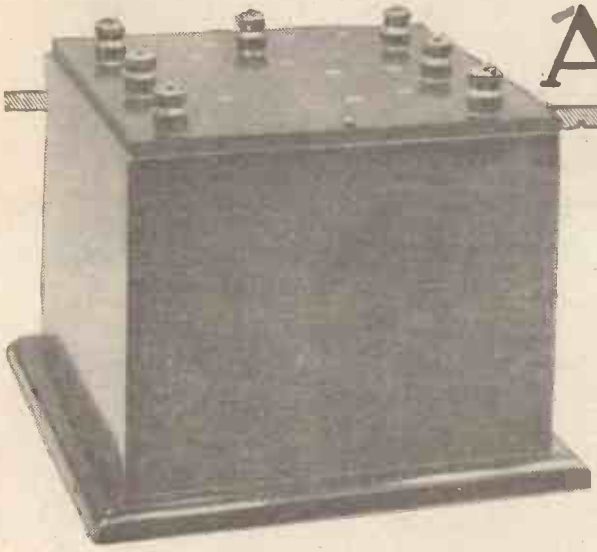
THE BOWYER-LOWE CO., LTD.,
LETCHWORTH, HERTS.

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 .....

508



A Stabilising Unit

A Unit which will enable H.F. enthusiasts to overcome the evil effects of H.T. Battery coupling.

Designed and described by PERCY W. HARRIS, M.I.R.E.
(*Editor of the "Wireless Constructor."*)

WHEN wireless reception was distinctly a novelty, when the reception of any kind of recognisable speech and music was hailed with delight, and the quality of the transmission itself was indifferent, we had little knowledge of, still less did we trouble to remedy, many of the faults which are most important to-day. Having reached the stage when, technically, the broadcast transmissions are practically perfect and a whole range of high-grade components for good quality reproduction is available, the aspect of things has naturally changed.

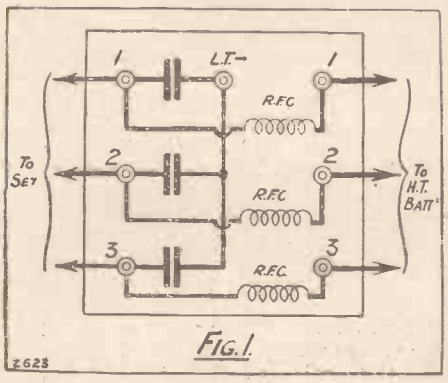


FIG. 1.

Yet even with the best components and well-tried circuits, the quality of reproduction many obtain is often far from what it should be. We all know of sets, built with the greatest care, with the best valves and transformers, and with the most careful attention to grid bias, which still distort badly. What is the trouble?

The Coupling Effect.

In very many cases—far more than is generally realised—we are "up against" the coupling effect of the high-tension battery. A few weeks ago (POPULAR WIRELESS for May 14th) I gave a brief summary of some investigations carried out by Mr. J. E. Anderson, and published in the proceedings of the Institute of Radio Engineers. Here it was shown that the impedance of a common high-tension battery may play havoc with the best designed set. Since writing the article, I have devoted much thought to what it implies, and I have also noted many troubles which I can now see are attributable to just this source.

It is all very well to know the *reasons* for our troubles, but it is much more important to know how to effect a cure! One of the faults due to common battery impedance, which you will come across frequently if you belong to a wireless society and exchange experiences with friends, is the variation of stability of high-frequency stages when a set is taken from one man's house to another's! Here is a typical case. A set with two stages of high frequency, a detector and two audio stages, was built up and worked perfectly in the home of one particular experimenter. The reproduction was pure, the set neutralised easily, and generally it was a most pleasant set to handle. To exhibit his prowess in the art, the builder took this set to the house of a friend, where, connecting it up, he switched on and proudly waited for the praise to come. But horrors!

The set was oscillating violently! Immediately the constructor suspected that someone had been tampering with the adjustment of the neutralising condensers, but no amount of re-setting would bring satisfaction. Furthermore, there was obviously something wrong with the audio-frequency side. As I happened to be present, I was able to point out that the trouble was probably a slightly run-down high-tension battery.

This proved to be the case, for on switching over to high-tension accumulators, the trouble immediately ceased.

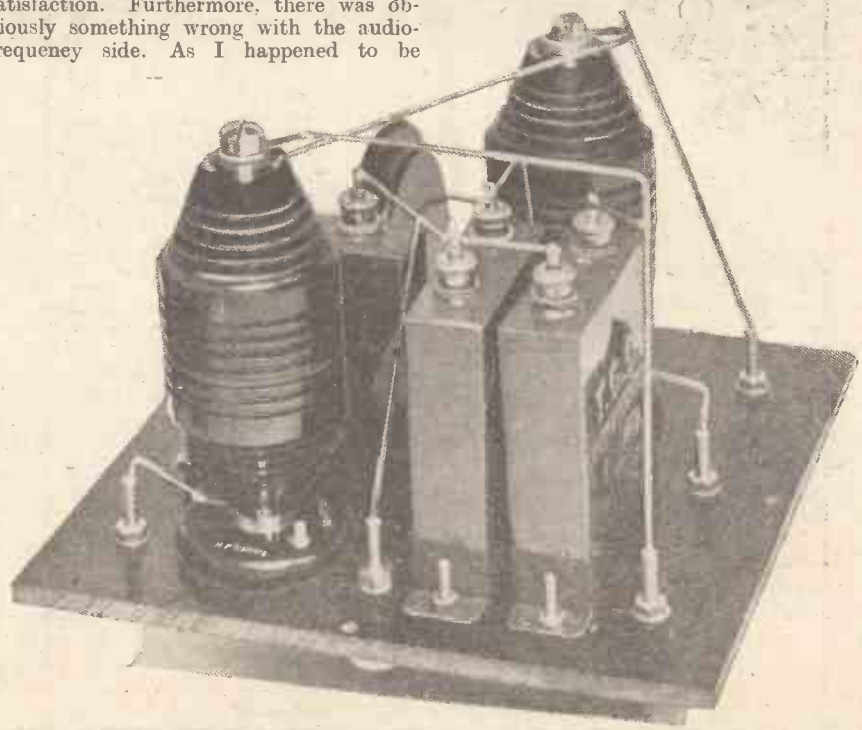
Various Types of Batteries.

I am rather anxious that this last remark should not be interpreted as meaning that H.T. accumulators are an unfailing cure for such troubles. Believe me, they are not! There are good and bad H.T. accumulators, just as there are good and bad H.T. batteries of the "dry" type.

About a year ago I had to scrap a 120-volt H.T. accumulator for no other reason than that on discharge well within its normal rating it had a habit of developing a high internal resistance sufficient to cause horrible distortion in a really well-designed receiver. Another friend of mine had to do precisely the same. In my laboratory I use both H.T. accumulators and the large type of dry H.T. battery, both with equal success. The largest type of H.T. dry battery is, however, rather an expensive proposition.

Now I recognise that a very large number of people have neither the facility nor the desire to buy the large type of H.T. dry

(*Continued on next page.*)



The unit consists merely of three large fixed condensers, and three H.F. chokes mounted on a single panel, together with six terminals.

A STABILISING UNIT.

(*Continued from page* 167.)

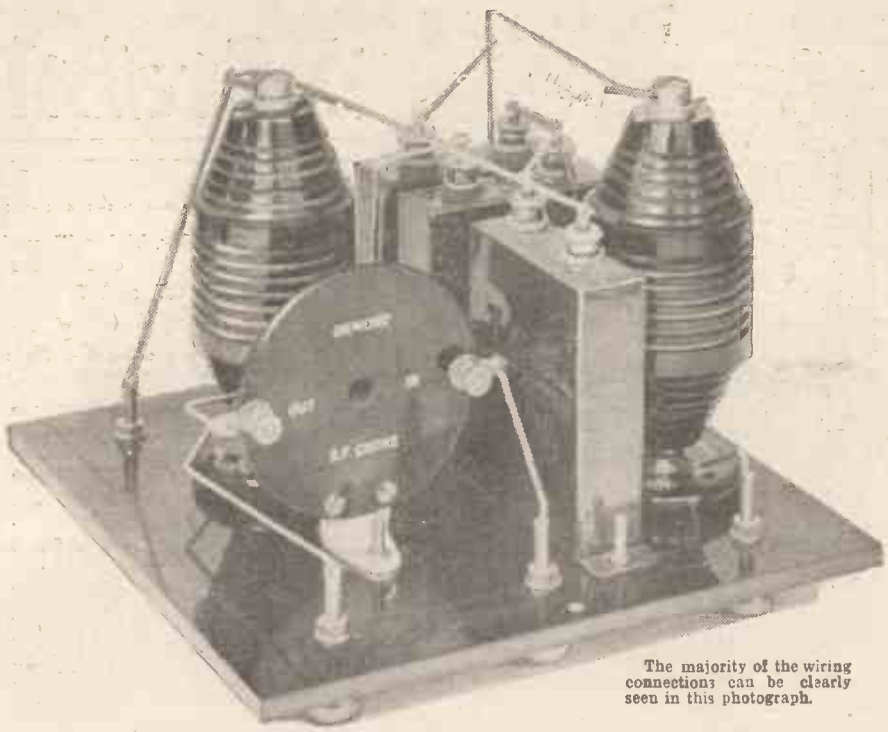
battery, nor can they conveniently arrange for the re-charging of the H.T. accumulators. Is there any means of making better use of the medium size of H.T. battery, and of obviating the troubles due to common battery impedance?

Only a Partial Remedy.

Fortunately, the answer is in the affirmative, and by means of the shunting box to be described many readers will be able to get rid of troubles which have been exasperating them for many months. The shunting box consists of the usual Mansbridge condensers, but in addition three radio-frequency chokes. The main purpose of the unit is to get rid of troubles on the high-frequency side, but it may also help in audio-frequency stages. Fig. 1 shows the general principle on which it is built.

On the left we have three terminals on the unit, being marked respectively 1, 2 and 3. At the top is a terminal marked L.T.—.

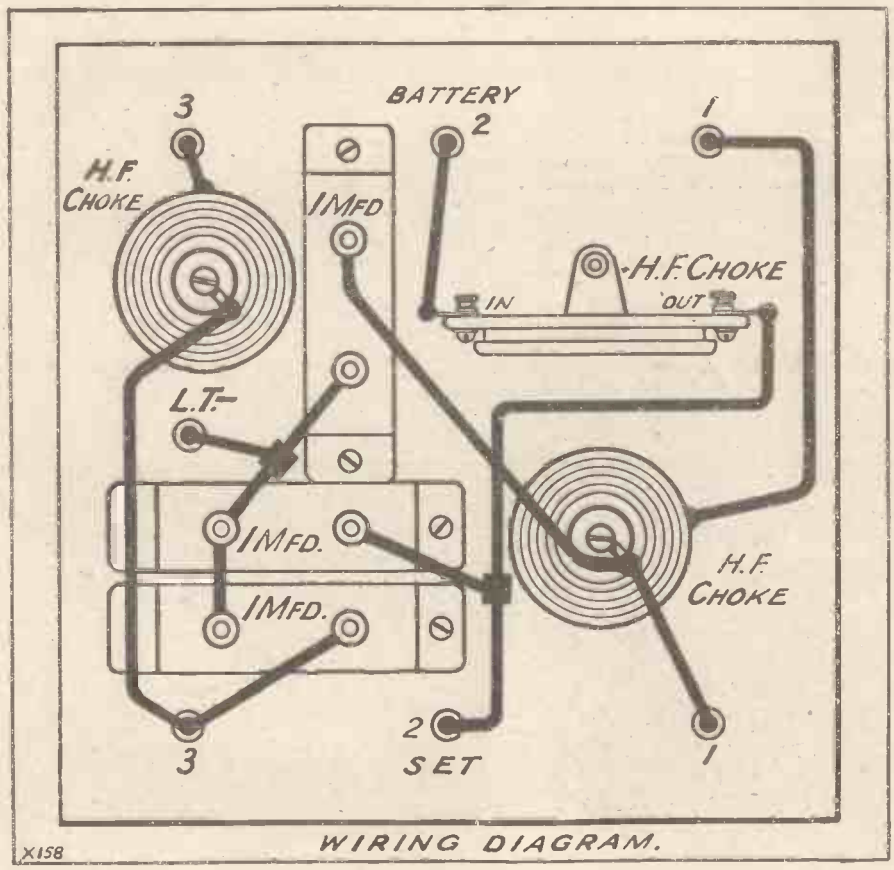
It is a common practice to shunt out H.T. tappings with large condensers, with the idea of by-passing the radio-frequency component, and thus preventing them passing through the battery. This remedy, however, is only a partial one, for it must be remembered that radio-frequency currents have parallel paths through the battery and the Mansbridge condensers. The more the capacity of these condensers the larger proportion of the radio-frequency current they will take, but experience goes to show that with a partially run-down H.T. battery, even three or four mfd. does not cure the trouble.



The majority of the wiring connections can be clearly seen in this photograph.

What the Unit Does.

In the box I am describing this week, we have, in addition to the condensers, three radio-frequency chokes joined as shown and marked R.F.C. Now of these three chokes, each offers very high impedance to the radio-frequency currents, while offering a negligible resistance to the direct current supply for the plates of the valves. Now compare what happens when this box is used with the state of affairs when only shunting Mansbridges are available. When only the Mansbridge type of condenser is used, we have two paths in parallel for the radio-frequency current, one offering a higher impedance than the other, but not sufficient to prevent the radio-frequency current from flowing in both paths. When the chokes are used it is made enormously difficult for the radio-frequency current to reach the battery at all. Take, for example, any one of the paths. One terminal on one side of the box is connected to the H.T. terminal on the set and the corresponding terminal on the other side to the H.T. battery tapping. The ohmic resistance of R.F.C. is negligible compared with the rest of the circuit, and therefore there is no real hindrance to the direct current. The radio-frequency current, however, has an easy path from H.T. of set to L.T.— through the Mansbridge, but no effective path at all through R.F.C., and if the choke is well designed, it offers an enormous impedance to its flow. The net result is that radio-frequency currents are really confined to the set and to the box, which should be close to the set and the leads as short as possible.



WIRING DIAGRAM.

The constructional work is of the simplest character, and the constructor has a very wide choice of components. Any good radio-frequency choke will do (you will see I have used two different makes), and any good make of Mansbridge condenser. Either the 1 or the 2 mfd. size can be used, but the 1 mfd. size should be large enough in practically all cases.

For convenience, the box has been made up with three condensers and three chokes to allow for three H.T. tappings. It is important to remember, however, that

(*Continued on page* 171.)

A STABILISING UNIT.

(*Continued from page* 168.)

each valve should have its own H.T. tapping when this box is used, otherwise if this is not done and if two valves are connected, for example, to H.T. 2, then the radio-frequency choke will be a common impedance in the path of two valves, and the last state will be worse than the first. If two valves have the same H.T. voltage, then the two terminals on the *battery* side should be connected to the same H.T. tapping. This will give the necessary isolation of the parts.

Remember that this box is primarily designed to get rid of trouble when it exists in radio-frequency amplifiers and in this case it is best for H.T. 1 to be the first radio-frequency valve, H.T.2 to be the second radio-frequency valve, and H.T. 3 the detector valve. If you are having trouble with audio-frequency feedback through the battery, the simplest way of overcoming the difficulty is to use a separate H.T. battery for the detector. Instead of this, another way which may be tried is to have a separate H.T. battery for the first audio stage. In most cases, however, a separate detector battery will effect a cure, and as this can usually be a small 60-volt H.T. battery the additional cost will not be large.

The same general principle of this box can be applied effectively to the audio-frequency stages, but in this case *audio*-frequency chokes will have to be used instead of *radio*-frequency chokes.

A SIMPLE FAULT.

By H. J. B. C.

AS the title suggests, the trouble I am about to describe was clearly a case of "erect in haste and repent at leisure." A friend of mine called me in the other day to see if I could ascertain why his wireless reception was so poor. He possessed a three-valve receiver which had given good service previously, but since moving into a new house, the only station he could receive was the local one, and these signals were far from being strong. Added to this, the tuning position for the station was vastly different from what it should have been.

Very Puzzling!

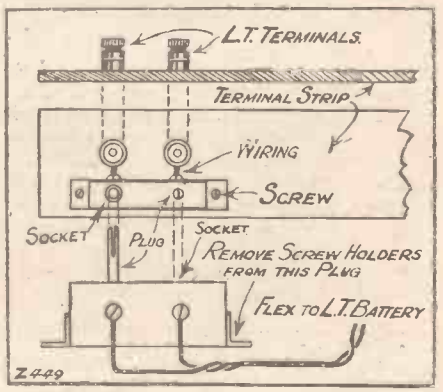
A thorough overhaul of the set itself was made, each connection and wire was examined and tests carried out on the components themselves to ascertain if they had broken down in any way. Valves, batteries and loud speaker next came under observation, but everything appeared to be perfectly in order. During the course of conversation, however, I ascertained that the new aerial had been erected using 7/22's enamelled copper wire, which had been well insulated with the usual porcelain insulators, while the earth consisted of a buried copper plate. Previous experience in these matters then prompted me to examine his aerial-earth switch and the respective earth and down leads were removed from their positions under the securing screw heads and washers.

The trouble at once became apparent. In his haste to get the set working at the earliest possible moment the aerial had been erected rather hurriedly, and he had omitted to remove the enamel insulation from each of the seven individual wires forming the continuous aerial and down leads. This had effectively insulated his aerial and the explanation of his reception of the local station lay in the fact that there was rather a long earth lead, and this had served as an aerial, and also accounted for the large alteration from normal of the aerial tuning condenser reading. It was the work of a few moments to remove the offending enamel at the end of the down lead and reconnect, and at once the set verily sprang to life.

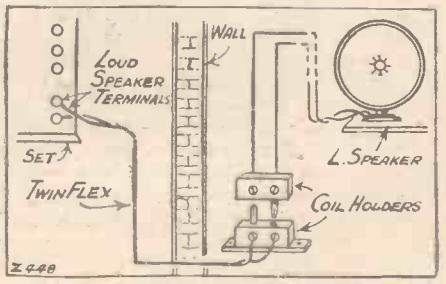
The moral of this short note is quite obvious, and in view of the fact that at this time of the year many new aerials are erected, constructors using enamelled aerial wire are warned against falling into the same little trap.

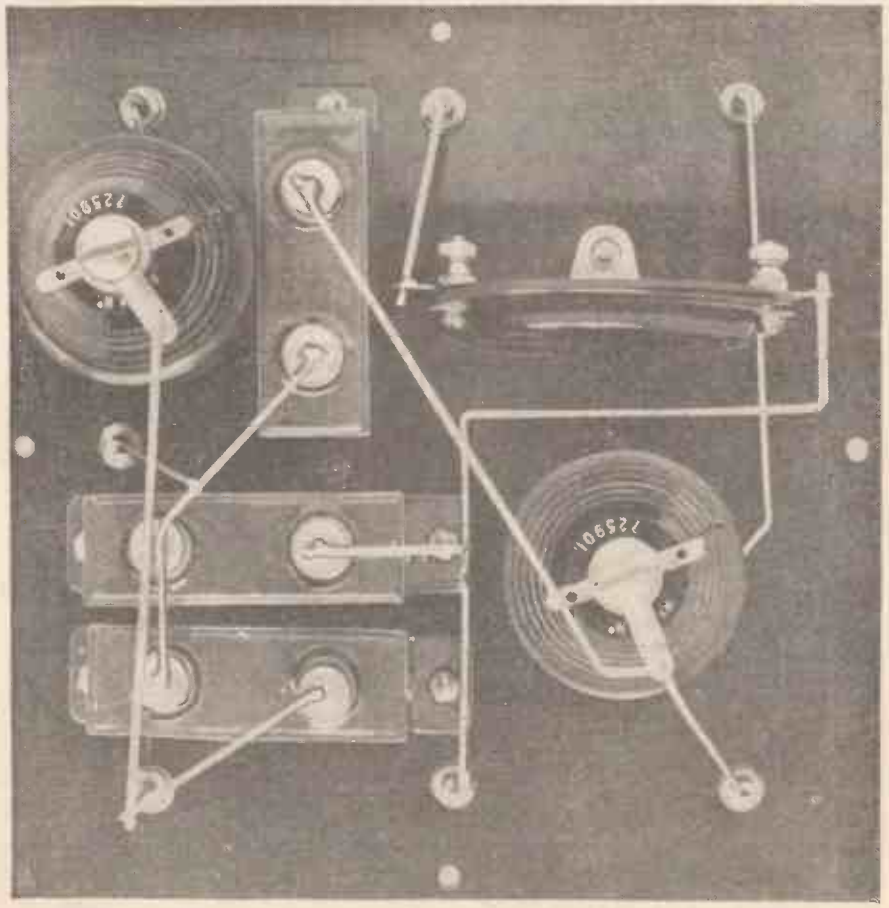
COIL HOLDERS AS PLUGS

A GOOD plug and socket arrangement can be devised from a couple of ordinary coil holders. The one shown in the first diagram is used as an L.T. on-and-off switch. The one coil holder is mounted on the panel or baseboard and the other is connected to the L.T. battery. By this means it is impossible to make a wrong L.T. connection.



The second diagram shows the coil holders used as a loud speaker plug-in arrangement, and is self-explanatory.





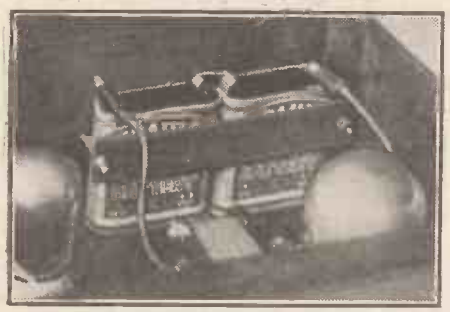
The constructor will find it interesting to compare this photograph with the wiring diagram which appears on the preceding page. There should be no difficulty in discovering to where the various leads go.

MOUNTING the GRID BATTERY

An article of a practical nature.
By HUMPHREY PURCELL.

THE grid battery, with its connecting leads, is rather a nuisance. If it were bigger, it would have to be treated with more respect and provided with a place of its own, like the high-tension battery and the accumulator. But it is so comparatively small, and it requires so little attention after it has been installed, that by far the best place for it is inside the set. This not only gets the battery itself out of the way, but avoids the risk of confusion between grid-battery leads and high-tension leads. It also saves two or three additional terminals on the battery strip.

One way of fixing the grid battery inside the set is to screw the lid of the battery to



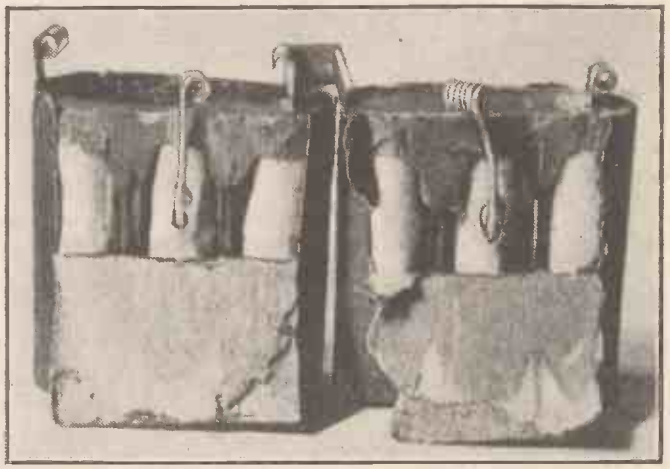
One method of fixing the battery.

the baseboard and then stand the battery inside the lid. But this is a makeshift, and is not very secure. Another method is to affix specially made clips to the baseboard, but this (and the previous method, too) makes necessary a larger baseboard than would otherwise be required. Moreover, the lay-out of the set is rendered more difficult if room has to be left on the board for an additional component of rather awkward shape.

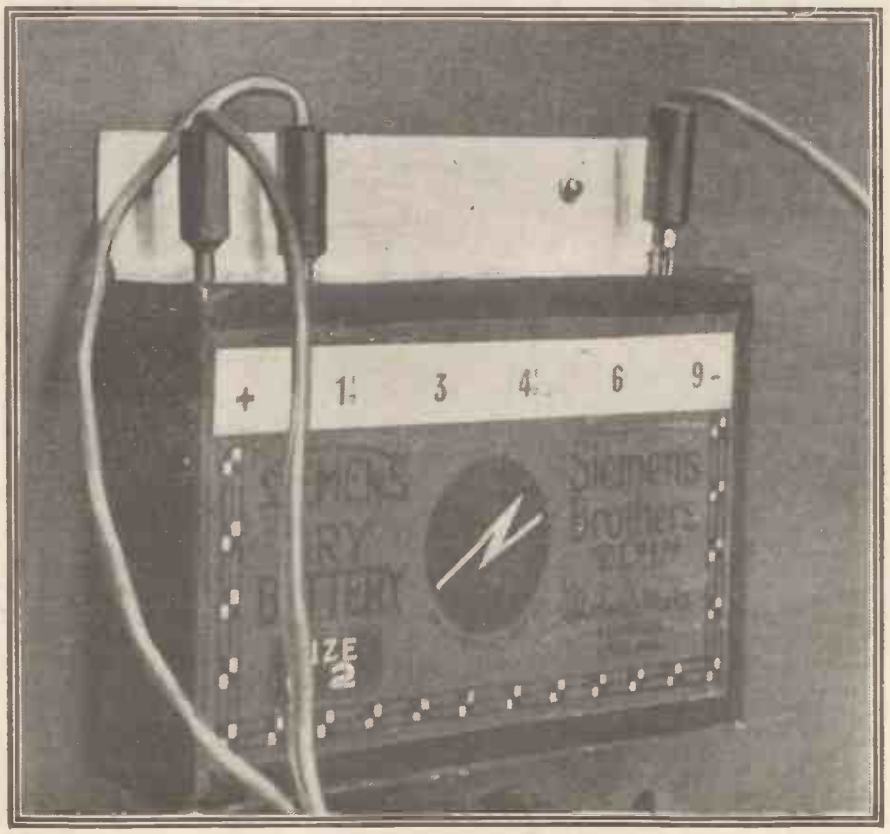
Mounting the Battery.

So although the grid battery is best housed inside the set, it is rather a nuisance on the baseboard. A better place for it is on the walls of the cabinet, where there is plenty of room to spare. Mounting is quite a simple matter. One method is to affix a small piece of wood to the back of the cabinet, by means of screws or glue, so that it forms a ledge on which the battery may rest. A piece of stout wire is then bent so that when screws are passed through the looped ends the wire holds the battery in position. Another method is to use a strip of ebonite or thin wood, about one inch wide, instead of the wire. Holes are drilled near the ends of the strip, and long 4 B.A. bolts, passing through the back of the cabinet, clamp it firmly in position. It is not essential to use a ledge under the battery in this case.

There is no current drain on a grid battery, and even a very small battery will last many months in constant use. It is thus possible to use flash-lamp batteries, if the question of appearance is not of importance. If intermediate tappings are required, these may be provided by soldering lengths of No. 18 tinned copper wire to the zinc cases of one or two cells, and twisting the wires so that they form sockets into which wander plugs will fit. This is done by winding the wire tightly, with the help of pliers, about the end of a wander plug before soldering in position.



A method of taking tappings from flash-lamp batteries.



This type of battery—invented by the author—has a special cardboard-hinged lid, which can be screwed to the back of the cabinet, as shown.

CONCERNING 5 G B.

The Editor, POPULAR WIRELESS.

Dear Sir,—Kindly allow me space in your valuable medium to congratulate "all those" who were associated with the first transmission, which I think was perfect. On Saturday night, 20th ult., when the chief declared the station open, I plugged in coils 50 and 75, and in came "Petite Daventry" like a baby grand. Bravo, 5 G B!

Then, again, one must extend a hand of welcome to Birmingham, the first to possess a local regional transmitter. This will probably prove a lasting improvement (time will tell), no doubt. At the same time, one could not fail to notice the B.B.C.'s anxiety and concern with regard to the temporary inconvenience to Birmingham. (A good sign perhaps?)

So now that the B.B.C have initiated the first stage, I hasten to endorse the views of your Cheshire correspondent, who says London has the choice of three programmes, whilst we here have—what? Surely the licensees' position is the fundamental thought of the B.B.C., therefore they cannot fail to recognise the necessity of a link for those who, like myself, are some 200 miles from London. We feel a very neglected area, and, with the advent of 5 G B, reasonably request a look in our direction with equal consideration from the B.B.C. The views of the B.B.C. on this question would be very interesting, if not amusing! Then, again, to discontinue the Daventry 11 a.m. concert has robbed many men who work afternoon shifts of their only "joy." Most of these licensees leave home for work about midday or shortly afterwards, as per distance from home, only to hear dance music on their return. There must be hundreds of these men up and down the country. To the B.B.C. I would say give all your listeners equal opportunity to listen—with equal distribution, too. No doubt this is a problem at the moment, but the B.B.C. have the genius to cope with even a critical position!

Wishing "P.W." every success.

Yours faithfully,
D. EDWARDS.

Cefn Mawr, near Wrexham.

The Editor, POPULAR WIRELESS.

Sir,—In view of the many letters which have appeared in the Press of late blaming Daventry Junior for loss of volume and selectivity, may I suggest that my own experience may prove of interest to your readers. On a straight three-valve set, series tuned, A.T.I.75 and reaction 100, ·0005 variable condenser, I have no difficulty in separating 2 L O and the new station. I use an indoor aerial about twelve feet above the set, and have noticed

CORRESPONDENCE.

CONCERNING 5 G B

RECEIVING AUSTRALIA DIRECT— A STANDARDISATION SCHEME.

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.

no decrease in volume on the speaker. Practically every evening I manage to tune in either a French or German station with the same degree of ease as before 5 G B opened. I might mention that 2 L O, 5 G B, and two Continental stations (unidentified at present) can all be found between 0 and 120 on the condenser dial, and no interference is noticeable on the loud speaker. Complaints of loss of range, etc., seem to indicate faulty handling and/or limited knowledge of constructional and theoretical problems, rather than the alleged interference of Daventry Junior.

Yours faithfully,
FRANK WARREN.

Croydon, Surrey.

The Editor POPULAR WIRELESS.

Dear Sir,—After all the fuss the B.B.C. have made for months past, re their "Alternative Programme Scheme," I think the new 5 G B station an absolute fiasco, as far as Bournemouth is concerned, for nothing can be heard of it on a crystal set, and scarcely anything on a two-valve receiver, which gives quite good reception from many of the Continental stations that transmit on about one-sixth of the supposed power of 5 G B, and are a matter of four or five times as far away. I should say it would be time well spent if our engineers took a trip across to Germany and Holland and had a few lessons on how to deliver the goods before disseminating any more hot air on the subject, for I think we have had enough eyewash for our money since the B.B.C. has become a Government Department.

Yours very faithfully,
H. I. KNOWLER.

Parkstone.

RECEIVING AUSTRALIA DIRECT.

The Editor, POPULAR WIRELESS.

Dear Sir,—On Saturday evening, September 3rd, from 7.45 p.m. until 8.03 p.m. B.S.T., Australian 2 F C was received here at good telephone strength with a two-valve receiver, every word being audible and readable, using O-v-O alone.

On Sunday evening, before, during and after the B.B.C. relay, strength was about 75 per cent of the previous evening, the announcements being read with little difficulty.

Before the B.B.C. relay it was announced from 2 F C that they were to be relayed by 2 L O (London.)

Yours faithfully,
THOMAS CRUNDWELL.

Bexley Heath, Kent.

The Editor, POPULAR WIRELESS.

Dear Sir,—I thought perhaps it would interest short-wave enthusiasts to know that I succeeded in receiving the Australian station, 2 F C of Sydney, during its first Empire broadcast on Sunday, September 4th. The receiver used was a 0-v-1 Schnell specially adapted for short-wave reception.

I first heard 2 F C at about 5.45 p.m., when a soprano solo was being broadcast. Signal strength was R4, with occasional fading to R3. This strength was maintained throughout, until I switched off at about 7.40 p.m.

I should like to draw attention to the fact that I was NOT picking up a harmonic of 2 L O, as that station ceased to relay 2 F C at about 6.50 p.m., and I continued to receive it until 7.40 p.m. I found that the transmission was almost entirely free from atmospherics, every word spoken being quite clear and distinct.

My aerial is a single L, 35 ft. high, 70 ft. long, and I was using a counterpoise "earth."

During the transmission I disconnected the aerial and still received 2 F C at about R3.

I should be very grateful if you could find room to publish this letter, as I should like to know if the reception of telephony, minus an aerial, over so great a distance, constitutes a record or whether any of your readers have beaten it.

Yours faithfully,
K. H. RANDALL.

Addiscombe, Croydon.

(*Continued on page* 176.)

CORRESPONDENCE.

(*Continued from page 174.*)

THE "ALL PURPOSE" TWO.

The Editor, POPULAR WIRELESS.

Dear Sir,—I thought the following details might interest you concerning the "All Purpose Two," described in a previous issue of "P.W."

I have received the following short wave stations: 3 L O (Melbourne), testing on about 40-60 metres; 2 F C (Sydney), 2 X A F, 2 X A D, K D K A (on a wave-length below 2 X A D), P C J J and numerous amateurs, including 6 F D (Cowes, I. of W.), 6 F Z (Woking), 6 V D B (Birmingham), 5 Y S (Coventry), 5 C T (London), 6 N F (West Norwood). On the medium and long waves I have had about forty stations, including all main British stations, and several relays.

The part that astounds me most is that I have made this set on an experimental baseboard, using three-ply wood as a panel.

Wishing your paper every success and thanking you for this wonderful circuit, I remain,

Yours faithfully,
W. J. S.

Exeter.

MORE ABOUT DANIELL CELLS.

The Editor, POPULAR WIRELESS.

Dear Sir,—I was pleased to read Mr. Perkins' letter in your issue for July 23rd, regarding Daniell Cells. I made up this charger shortly after the article appeared in "P.W.," and have had fair success with it. I had much the same trouble as that mentioned by Mr. Robb—i.e. beads of pure copper sticking to the porous pot; but I have been put right by Mr. Perkins, as I was making the mistake of putting the sulphuric acid into the outer pot. The wording of the article certainly gives one that impression at first glance.

The greatest difficulty seems to be to know just when to add fresh copper sulphate to the cells, and I would like to say how I do this.

When the charger is doing its work the voltage of the accumulator will rise to about 4½ volts, and if an eye is kept on this voltage one can't go wrong, as, immediately the charger stops putting in juice, the accumulator falls to 4 volts and fails to rise again. These voltages, of course, are taken with the valves off.

In my own case, using ·2 amp., I find a charge will last about a fortnight. I think if Mr. Perkins tries this he won't need to add other two cells, and thereby make the charger still more expensive to run.

The zincs are a trouble, and it would be very welcome if someone would tell us how to cut down the wastage here.

I would also like the author of the original article to come forward and let us know if he has any improvements to make, as his idea is certainly good, and it is a boon to listeners in isolated districts who can't get near a charging station.

Yours faithfully,
WILLIAM F. CROWE.

Glendale,
Skye, N.B.

A STANDARDISATION SCHEME.

The Editor, POPULAR WIRELESS.

Dear Sir,—With regard to the controversy in your Correspondence columns as to the respective merits of R.C. coupling or transformer coupling for L.F. work, I have a suggestion to make which, if followed out, would, I believe, be of considerable benefit to amateurs, to the radio trade, and to the general body of "listeners-in."

My suggestion is that valve manufacturers should standardise the impedance of all receiving valves to certain agreed standards, these standards being the same for 2-volt, 4-volt, and 6-volt valves, the amplification factors being the best that can be made in the circumstances.

For instance, if impedances were standardised at, say, 70,000 ohms, 20,000 ohms, 10,000 ohms, 6,000 ohms, and 3,000 ohms. The first impedance would be useful for first or detector stage R.C. coupling, the second impedance for second stage R.C. coupling, for detector valves followed by a low-ratio transformer (say 2½ to 1), and for H.F. work. The third impedance for first or second L.F. valve, with either a resistance or a transformer in its anode circuit; 6,000 ohms would do for the impedance of valves in the output stage of sets designed to work a small loud speaker, also for power amplification with a high-ratio transformer in its anode circuit; 3,000 ohms would do for the "last" valve of a powerful receiver. The idea of all this being that L.F. transformer windings could be standardised in three ratios, say, for instance, 2½ to 1, for connecting in the plate circuit of a valve of 20,000 ohms impedance, 4 to 1 for connecting in the plate of a valve of 10,000 ohms impedance, and 6 to 1 for the plate circuit of a valve of 6,000 ohms impedance. Transformer manufacturers could then have a chance of designing transformers which, when used with their corresponding valves, would give even amplification up to 5,000 cycles.

Makes of R.C.C. units could standardise their products in two types, one for use with valves of, say, 70,000 ohms impedance, and the other for valves of 20,000 ohms impedance. Loud-speaker windings could also be standardised into two types, one for connecting in the output circuit of the 6,000 ohm valves, and the other for connecting in the output of 3,000 ohm valves. H.F. transformer ratios might also be fixed at, say, 3 to 1, and 4½ to 1, the first being for use in receivers with two or more H.F. stages, and the second for use in sets with one or two H.F. stages.

There may be disadvantages to this scheme of which I have no knowledge, but I should like to hear your readers' opinions for and against it.

Yours truly,
T. H. MATTHEWS.

Penzance, Cornwall.

RAIN RUINS RECEPTION.

The Editor, POPULAR WIRELESS.

Dear Sir,—I am experiencing a difficulty at the moment which makes me think that most of your readers would be interested in its elimination, and I should be glad to hear from anyone who has had a similar experience.

Whenever rain commences, reception from all stations, Daventry included, is completely blotted out by a continuous crackle which can be more or less tuned in but never cut out. I have *once only* found my aerial sufficiently charged to produce a spark 1-16th in. long when bringing aerial and earth leads together. I am convinced that an electrical charge takes place, as I have thoroughly gone over the question of aerial insulation, but the peculiar part is that *every* rainstorm affects me.

I use bare 7/20 copper aerial wire, Climax insulators, and Presland lead-in tube, along with Climax earth tube. It is not a question of the spark gap on lead-in tube, as the same conditions obtain when I cut out this gap.

I should be obliged if the foregoing could be published in your paper, as all my friends interested in wireless are at a loss to account for it, and I am sure others would be interested.

Yours truly,
J. D. HUDSON.

Boston, Lincs.

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.

USEFUL SMALL SPANNER.

MESSRS. CAMP & CO., Ltd., of Fore Street, London, E.C.2, recently sent us one of their new wireless spanners. The design of this is rather novel. The active end of the article is hinged so that when this is opened it lays at right angles to the shaft. Each side of this "T" head carries a spanner and the two sizes provided are those most commonly used in radio sets. The device can be used in the same way as a box spanner or as a flat spanner, and the hinging has the advantage that any angle between can be obtained and nuts in most awkward places tackled with ease.

The turnscrew end of this useful little spanner can be used on screws that are situated in out-of-the-way corners. The price is 6d., and, in our opinion, it is a spanner of such an eminently practical nature that it should achieve some popularity among radio constructors.

"DETEX" "LOWAVE" COIL.

"Detex" Distributors of 125-129, Rosebery Avenue, London, E.C.1, recently sent us one of their "Detex" "Lowave" coils. It is a small plug-in coil having an extra terminal fitted to it and attached to this terminal is a length of flexible wire. The object of the coil is to introduce selectivity into an aerial circuit of the conventional paralelled condenser-single coil type. It is stated that the coil enables 2 L O and 5 G B to be easily separated.

We were rather intrigued by the directions for fitting the coil which are provided. These read as follows: "Remove the aerial coil from the coil holder and insert the 'Lowave' Coil. Break the wire connecting the aerial coil and the aerial tuning (variable) condenser to grid of the first valve, and connect in its place the length of flexible wire attached to the coil."

From this it seemed to us that some rather curious arrangement of windings was involved. And having broken one of the leads inside the set and carried a grid lead way over to the coil, we could imagine that a listener would be disappointed if this were not the case. However, on dissecting the "Lowave" we found that the "length of flexible wire" goes to one end of a fifty or so turn winding, while a central tapping and the other end of the winding go to the base connections of the coil. Therefore, the "Lowave" is a simple tapped coil, only the tapping is taken to one of the base points instead of to the terminal. This would seem to indicate an unnecessary complication to us. Surely it would be better to take the tapping to the terminal in the usual way? By so doing, exactly the same effect could be achieved without the necessity of breaking any of the set leads and merely by taking the aerial lead wire to the terminal on the coil instead of to the aerial terminal on the set.

We can only regard the "Lowave" as a centre-tapped coil, but as such it certainly gives good results. It enables the specified selectivity to be obtained, although we should like to have had a few more turns in order to bring 5 G B down a little on the condenser scale. The price of this "Detex" product is 3s. 3d. By the way, the statement on the carton "Makes any set selective without alteration to wiring" hardly applies!

THE "STUTZBERG" CRYSTAL.

Mr. Leslie G. Russell, of Birmingham, recently sent us a sample of the "Stutzberg" Crystal, of which he has secured sole

(*Continued on page* 180.)

APPARATUS TESTED.

(*Continued from page* 178.)

selling rights in this country. It is a very good crystal, and on test we found it to be excellently sensitive and stable. It is sold complete with cat's-whisker, and we can recommend it to the attention of all crystal enthusiasts who are looking for something a little better than the usual synthetic galena.

A SCREENED-VALVE HOLDER.

The new screened or shielded valve requires a special form of holder as it has not the usual four pins, but is fitted with five pins, three at the one end and two at the other. A special holder has been designed by E. Paroussi of 10, Featherstone Buildings, High Holborn, W.C.1, and is to be marketed under the name of the "Parex." The design is quite a novel one. The holder consists of two main portions, each of which screws down separately on the baseboard. The one portion has three sockets corresponding with the grid and filament pins-end of the shielded valve, while the other portion has a removable head containing two sockets. The advantage of this particular holder is that it enables the valve to be passed through a hole in a metal screen just large enough to clear its end pieces. And this can be accomplished without using flexible leads.

The "Parex" holder is made of very good materials, and if it is marketed at a reasonable figure it should prove popular among screened valve enthusiasts. The sample sent us for examination has its sockets slightly misplaced and it is practically impossible to fit a valve into it, but no doubt this is a hand-made sample. Anyway we trust so, for otherwise it would mean that a good idea is in danger of being ruined through minor assembly errors.

TWO CORRECTIONS.

On page 883 of our issue of August 20th, we published a photograph of a very large accumulator and credited this to the Edison Co., of America. The information was supplied to us, with the photograph, by a photographic agency and we published it in all good faith; but subsequently it was pointed out to us that the accumulator is an "Exide," and to the makers of this we now extend our apologies.

That admirable little handbook on radio, "Easy Lessons in Wireless," which is published by the University Tutorial Press, Ltd., costs 1s. 6d., and not 1s. 3d. as stated in a recent issue of "P.W." It is excellent value for money at 1s. 6d.!

TECHNICAL INSTRUCTION BY POST.

The Bennett College of Sheffield is, we are informed, opening a new and enlarged college. This has been found necessary owing to the considerable success and growth of this famous correspondence centre of learning. The Bennett College runs postal courses in all the technical grades and professions and specialises in preparing candidates for examinations.

A METRO-VICK LEAFLET

We recently received a leaflet describing the new "Cosmos" Astatic-non-parasitic Tuning Coils. These are most interesting devices. They are wound astatically in order to reduce their external magnetic fields, and it is stated that two of these coils can be mounted but six inches apart with negligible linkage. Additionally, each coil embodies a tiny winding which has the effect of automatically balancing out voltages likely to set up parasitics.

We advise readers to send for the leaflet. They will find it most interesting reading.

VALVE PRICE REDUCTIONS.

Impex Electrical, Ltd., inform us that they have made considerable price reductions in respect of their well-known "Dario" valves. The "Dario" Micro Bivolt, a dull emitter with the very low consumption of ·05 amps at 2 volts, is now 5s. 3d., while the "Dario" Super-power retails at 7s. 6d.

The M.H. 5-valve portable set, made by L. McMichael, Ltd., and sold at the reasonable inclusive figure of 32 guineas.

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

MAINTAINING A WET H.T. BATTERY.

T. W. H. (Exeter).—"Can cardboard be used to separate the cells forming a wet H.T. battery, and how much oil should be filled in on top of the acid?"

Cardboard is of little or no use in such batteries unless it has been well soaked in wax. When this has been done it is quite suitable to separate cell from cell. Owing to the greater voltage developed "across" the battery it is particularly important to insulate the cells in one row from those in the next row as efficiently as possible. Unless this is done, leakage will occur, and the battery will "run down" much faster than necessary.

Only a thin layer of oil is required on the top of the electrolyte. Generally a depth of one-sixteenth of an inch is quite sufficient.

A DEAFENING HOWL.

E. W. (West Hampstead, London, N.W.).—"I did as you advised and added the resistance-coupled stage of L.F. *after* the transformer, with splendid results. For volume and clarity the set now comes absolutely up to my highest hopes, but it has one terrible fault.

"On several occasions it has started to hum to itself, and this gets louder and louder until a terrible roar fills the house. In fact, you can hear it at piercing and deafening strength right at the bottom of a long garden! Of course it has to be shut off at once—the noise is simply unbearable.

"What is the cause of it, and how can I cure the trouble?"

A roar of this kind which slowly builds itself up from small beginnings, is generally quite easily cured. It is due to the vibrations set up by the loud speaker. If the latter is placed quite close to the set, it is possible for a very loud note to set up such a strong sound-impulse that the filament of one of the valves is shaken by it.

When this occurs, the slight movement of the filament causes a corresponding vibration in the loud speaker; and this, of course, causes a further shaking of the filament, which thus sets up more disturbance! In this way a powerful howl is built up, which is limited only by the power the loud speaker can develop!

The cure is to place the loud speaker further from the set, so that no filament-shaking occurs. If a good position cannot be found easily, try moving the set a little and turning the loud speaker so that its output is reflected from a wall or ceiling. A cone-type loud speaker should have its surface placed

(*Continued on page* 184.)

World's Record achieved on Peto-Scott 5-valve set

244 Stations

identified during trip to Australia. Station W B B M (Chicago) received at distance of 6,840 miles on loud speaker every evening whilst in New Zealand waters.

SOME months ago one of our standard 5-valve receivers was sent to Australia and back on a six-months' trip. In mid-Atlantic over 20 stations in Europe and U.S.A. were received on the Loud Speaker during a terrific storm. All results were logged and verified by independent witnesses. A copy of the log and the actual chart are being shown at our Stand 163 at the Olympia Exhibition. Remember that the tuning of the Five-Fifty-One is simplicity itself. One control only. All wave-lengths from 250 to 2,000 metres are covered without any coil changing—the movement of one switch only being required.

The Five-Fifty One

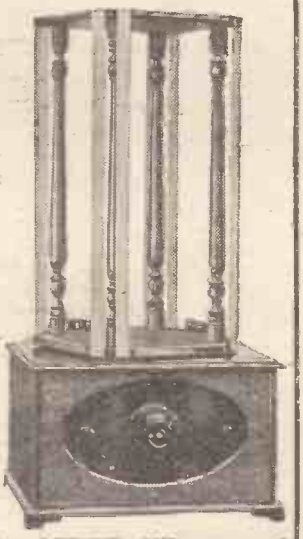
Table Model, as above, in Oak or Mahogany, **£27 10 0**

Console Model, with battery compartment - - - - - - **£33 7 6**

Marconi royalties 62/6 extra.

The Sociable Three

Entirely self-contained—fully equipped—simplicity itself.



THREE valves—single dial tuning—self-contained frame aerial—all batteries within cabinet. Just switch on and enjoy the music. Loud-speaker range 30 miles main stations and 100 miles high-power stations. Outdoor aerial increases distances. Principal Continental stations well within range. Best quality components, oak or mahogany cabinet, polished aluminium panel with oval vignette. Price **£7 10 0.** Marconi Royalties 37/6 extra.

NOTE: This set can be supplied complete with valves and the best accessories for less than £15. Write for copy of our new illustrated Art Catalogue.

Arrangements can be made to demonstrate this set in your own home. No obligation. See us at Stand 163, Olympia.

PETO-SCOTT CO., LTD.

REGISTERED OFFICE:

77, City Road, London, E.C.1.

62, High Holborn, W.C.1; 4, Manchester Street, Liverpool; and 29, Old Town Street, Plymouth. 9557

"Cosmos" A.C. Valves seen for the first time at the Exhibition are now available. With them it is possible to operate a receiving set from the electric light supply without any aggravating "mains noises." The exclusive features of these valves are protected by patents or patents pending and include:—

1 A Non-inductive insulated heater which eliminates hum.

2 A Special cap and adaptor avoids need for special wiring.

3 No grid emission—can be operated up to 180 Volts H.T.

4 Shortpath—give unequalled sensitivity.

For full details of "Cosmos" A.C. Valves and the complete range of the well-known "Cosmos" Battery Valves see leaflets 4117/3 and 7117/8.

PRICES OF COSMOS VALVES.

VOLTS.	TYPE.	PURPOSE.	PRICE.
1 Volt	D.E. 11	General Purpose	10/6
2 Volt	SP. 18/B	Extra High Amplification	10/6
2 Volt	SP. 18/G	High Amplification	10/6
2 Volt	SP. 16/R	General Purpose	10/6
2 Volt	SP. 18/RR	Power Amplification	12/6
6 Volt	A. 45	Bright Filament	5/-
6 Volt	SP. 50/B	Extra High Amplification	10/6
6 Volt	DE. 50	Low Consumption	10/6
6 Volt	SP. 50/R	Power Amplification	12/6
A.C. Supply Mains	AC/G	High Amplification	22/6
	AC/R	Power Amplification	22/6

Special Adaptor Disc .. 6d.

See them at the Exhibition

STANDS NOS. 155-156

METRO-VICK SUPPLIES LTD. LONDON, W.C.

RADIOTORIAL QUESTIONS AND ANSWERS

(*Continued from page* 182.)

edgeways to the set, and the horn-type loud speaker should not be placed with the horn pointing in the direction of the valves.

It may be advantageous to mount the set itself upon spongy rubber pads to act as shock absorbers. Alternately, if the valve holder is of the rigid type it should be replaced by one of the springy anti-microphonic class of valve holder.

DISTORTIONLESS VOLUME CONTROL.

S. C. R. (Nuneaton, Warwickshire).—"Using an H.F., Det., and 2 L.F. set, I get heavy overloading when tuning in strong transmissions, and I should like to fit some form of distortionless volume control. What is the best method, employing only simple additional apparatus, and giving ample control with perfect purity at all strengths?"

Your best plan would be to fit a non-inductive variable resistance or potentiometer in the first grid circuit. A suitable value for the resistance of this is 400 ohms, and it should be inserted in the oscillatory circuit itself, preferably on the earthed side. The easiest way is to break the connection between the aerial coil and the aerial tuning condenser, and to insert the non-inductive resistance at this point. It should not, of course, be shunted with a fixed condenser (as is usually done with a potentiometer), as the whole idea is to deliberately insert losses when the input is too great for the set to handle. The method gives excellent control without distortion.

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.

SHARPENING TUNING FOR 5 G B.

G. N. (Edgware, Middlesex).—"Tuning on my crystal and 2 L.F. amplifier set (particulars enclosed herewith), I find that I can get 2 L O's programme prefectly without any trace of 5 G B, but when I am tuned to Daventry Experimental I can plainly hear 2 L O in the background.

"I don't want to bother with wave-traps or alterations to the set, but is there any way I can cure this two-at-once trouble? Knowing nothing about wireless, I am not in a position to interfere with wiring, and I couldn't solder a joint to save my life. But isn't there something I could buy and connect up that would take away this trace of 2 L O?"

As you are using a fairly long aerial, and the usual aerial tuning coil and condenser in parallel, it will be a very easy matter to sharpen the tuning. All that is necessary in such a case is to connect a *small* condenser in the aerial circuit, say between the

(*Continued on page* 186.)

RADIOTORIAL QUESTIONS AND ANSWERS

(*Continued from page* 184.)

aerial lead-in and the aerial terminal on the set. Probably a fixed condenser of ·0001 mfd. capacity would prove efficacious, but the ideal plan would be to use a small *variable* condenser, such as the Keystone "Midget" ·0001, and to adjust this to the position which gives best results. Shortening your aerial, too, would help a lot.

ADDING AN H.F. STAGE FOR 5 G B AND FOREIGN STATIONS.

D. F. A. (St. Leonards-on-Sea).—"Having a first-class gramophone cabinet on hand, which I wished to keep as an article of furniture, I had a set built into this. And, thinking I should only want two or three different programmes to choose from, I decided on a 3-valve set, Det., and 2 L.F. amplifiers. It is a 'straight' set, built from the diagram supplied by 'P.W.' Query Department, and it gives perfect loud-speaker results, with wonderful purity.

"But, contrary to my expectations, it brought in quite a number of foreign stations, notably Langenberg, and now that 5 G B has started, too, I find that the more programmes I can get the more I want!

"At the time the diagram was supplied you said that if necessary a high-frequency stage could be added later. As there is plenty of room in the cabinet, please say what extra components are required, and how they should be connected up."

The following additional components will be required to add a choke-coupled stage of high-frequency amplification:

1 Rheostat.
1 Valve-holder.
1 High-frequency choke.
1 Fixed condenser (·001 or ·002 mfd.).
1 Fixed condenser (·0001 mfd.).
1 Variable condenser (·0005 mfd.).
1 Aerial tuning coil, and single-coil holder.
4 Terminals, wire, etc.

Before commencing the mounting of the various components upon the baseboard, the "run" of the wiring to these must be considered carefully, as the spacing of wiring and of components at the high-frequency end of the set is of far greater importance than similar connections at the low-frequency end of the set. (Unless you are confident that you can run the high-frequency leads—particularly those of the grid circuits—in a direct and well-spaced manner, it would be advisable to send us a sketch of the cabinet, so that we may indicate upon this the best positions for the different apparatus.)

When the components are mounted upon the baseboard, connect up as follows:

L.T. negative lead to one filament of the valve holder. Other filament socket of the valve holder to one side of the rheostat, and remaining side of the rheostat to L.T. plus lead.

Join one side of the aerial coil holder and one side of the ·0005 mfd. variable condenser together, and to the L.T. negative wiring.

The other sides of this coil holder and condenser are connected together, and joined to the grid terminal of the new valve holder, to the new A terminal, and to one side of the ·0001 mfd. fixed condenser.

The other side of the ·0001 mfd. fixed condenser is joined to a second new A terminal, which we will call A1.

The lead to the original aerial terminal is removed and carried instead to one side of the larger fixed condenser, ·001 or ·002 mfd., as the case may be. The other side of this condenser goes to the plate terminal of the valve holder, and to one side of the high-frequency choke.

The final connection is from the other side of this high-frequency choke to a new H.T. plus terminal. (By using a separate H.T. terminal to this valve, its plate voltage may be varied according to the valve in use, irrespective of the H.T. voltage applied to the other valves.)

An inspection of the alterations show that what was formerly the aerial circuit of the detector valve is now the tuned grid circuit, and it will be necessary to use a coil having a few more turns in this coil holder (about 20 or 25 turns extra), pulling out the coil that was originally there, and placing this in the new coil holder, where it will still act as the aerial coil.

The valve for the first valve holder will be of the same range as those already employed, but will be of the high-frequency type, with an amplification factor of round about 20. Probably the same valve-makers have one of which the impedance will be 20, or 30,000 ohms, and the H.T. required will be somewhere about 90 or 100 volts.

(*Continued on page* 188.)

RADIOTORIAL QUESTIONS AND ANSWERS

(*Continued from page* 186.)

The earth connection will remain unaltered, but the aerial lead will now be taken to either the new A terminal or to A1, whichever gives best results. Instead of one there will now be two tuned circuits to adjust, but the extra sensitivity and selectivity will be found to be well worth the extra trouble.

STRAY HIGH-FREQUENCY IN LOW-FREQUENCY CIRCUITS.

G. J. E. (Ross-on-Wye).—"In my three-valver (H.F., Det., and L.F.) I have been getting a little trace of distortion, which I now believe to be due to high-frequency currents getting across into the low-frequency valve. To cure this I understand that I shall need to insert a ·25 meg. grid leak in the grid circuit of the low-frequency valve, between the grid itself and the coupling condenser and grid-leak lead. Does this mean that I shall need a new grid leak as well, as the extra resistance would appear to be in series with the old one (which was a 1 meg. leak), thus adding to its resistance, in effect?"

The new resistance will certainly be in series with the old grid leak, but generally it is not necessary to add a resistance having a value of ·25 meg.—probably a ·1 meg. resistance would be quite sufficient—and, as this will only increase the grid-leak value by one-tenth, it is unlikely that a new value of leak will be required, unless you have found by experience that upon your set the value of the grid leak for this valve is critical.

COMBINED BATTERY LEADS.

F. J. J. (Newark, Notts).—"Do you think that these pretty braided cords containing half-a-dozen flexible leads in one cable are really efficient?

"I should rather like to employ one of these for my own set, instead of a mass of separate leads going to the various batteries, but I should have thought that there would be considerable capacity existing between such long leads running close together. They look good, but do they work as well as separated leads?"

This is quite a good point to bring forward, F. J. J., and we have occasionally traced trouble to unwanted capacity in leads of the type you mention. But normally there is absolutely no fear of any undesirable effects occurring, for in most sets the circuit arrangement deliberately allows for a very large capacity across the points in question. Probably in your own set you will find that between H.T. negative and the different H.T. positives, large fixed condensers are already connected, thus rendering immaterial any additional capacity due to the flexible leads.

The sets in which we have occasionally traced trouble due to capacity across battery leads have been "stunt" sets of the super type, in which the smallest unwanted capacity may upset the whole functioning of the set. With an ordinary set there is no fear of trouble from this source.

MAGNETIC EFFECT OF PLATE CURRENT THROUGH LOUD SPEAKER.

G. K. H. (Cowes, Isle of Wight).—"I notice that I have to readjust my loud speaker's diaphragm every time I work it through a filter output. Why is that necessary?"

As you are probably aware, the idea of employing a filtered output for a loud-speaker set is to relieve the loud-speaker windings of the heavy direct plate current to the last valve, which otherwise would pass through the loud speaker. This current is a steady one of several milliamps, and in a large set employing a super-power valve quite heavy currents (up to say 50 milliamps) may be flowing. Apart from the faint hiss when it is turned on, this current makes no noise in the loud speaker, which is worked not by the steady plate current but by the *variations* of this, due to modulation.

When a filter circuit is employed, this steady plate current is passed through a low-frequency choke. The loud speaker is then connected across this choke, in series with a large fixed condenser, which prevents any *direct* current from entering the loud-speaker windings. (Such a condenser is no bar to the modulation variations, so these are shunted by the choke through the condenser and loud speaker, and the latter responds to speech or music just as well as though it were connected direct in the plate circuit of the last valve.)

(*Continued on next page.*)

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from previous page.)

But although the steady plate current does not operate the loud speaker, and is not necessary to its correct working, it has a decided magnetic effect, and is therefore capable of helping (or hindering) the permanent magnetism of the loud speaker. When you use the loud speaker on the filter circuit, the magnetic effect of the plate current is absent from it, and consequently you must adjust the diaphragm until it is quite close to the pole pieces of the loud speaker's permanent magnet, to get the loud speaker into its most sensitive condition. But if now the filter is cut out, and the loud speaker is placed direct in the last valve's plate circuit, the magnetism due to the plate current is added to the permanent magnetism of the loud speaker, and consequently there is a considerably increased pull upon its diaphragm. It is to overcome this that the instrument has to be readjusted.

VALUES OF COUPLING RESISTANCE AND GRID LEAK.

W. A. (Stockport, Cheshire).—"What value of coupling condenser, anode resistance and of grid leak shall I use for DEH210 valves, followed by a DEP215? Are these values *very* critical?"

No, not very critical. In the plate circuit of the DEH210 you can use an anode resistance of from 100,000 to 500,000 ohms, according to the degree of amplification aimed at, the coupling condensers being anything from ·001 to ·01 mfd. (the larger value being recommended if the really low notes are to be reproduced).

The grid leak should have a value of from one to two megohms.

TESTING AN EARTH LEAD.

C. R. (Haileybury, Herts).—"My best earth is a water-tap one, but owing to the leads to this being awkward, I have to use a buried earth. Lately reception has fallen off, and I suspect the buried earth-plate is the cause of the trouble. How can I test it?"

Your best test is a simple comparison between it and a temporary water-tap earth. Tune in a weak station (in daylight, if possible) and listen carefully to it when using the buried earth. Then disconnect that, and join up in its place an earth wire (temporary) from the tap which is known to give good results. A comparison of signals will soon determine whether there is considerable loss upon the buried earth-plate, or whether the falling off in reception persists when the water-tap is used for earth connection. If the latter proves to be the case you can, of course, exonerate the buried earth-plate from blame.

SIZE OF WIRE FOR LOUD-SPEAKER EXTENSIONS.

"Music in Every Room" (Chester-le-Street, Durham).—"I want to work a speaker in four rooms, so I am going to run wires from the set all over the house, and bring it out to points in the different rooms, plugging in the speaker as required. I don't want to spend more on the job than necessary, and I am writing to ask if the wiring must be done with rubber-covered flex, or whether something cheaper would be all right?

"What I should like to do is to use No. 22 D.C.C. wire, of which I have got nearly half a pound left over from making some coils. But I don't want the trouble of putting that down and then finding it is unsuitable."

You can use the No. 22 D.C.C. with every confidence, as this gauge of wire is quite O.K. for the purpose mentioned.

SEDIMENT IN AN ACCUMULATOR.

T. F. (Oswestry, Salop).—"Some months ago I noticed upon bringing back my accumulator from the charging station that it had a sort of sediment at the bottom of the liquid. Every time it is charged it gets a little worse—or else I fancy it does. Is there any harm in this?"

Yes, if you allow the sediment to accumulate at the bottom of the container until it is sufficiently bulky, it will short the plates and cause them to buckle, or impair them in other ways. We should get an expert to look over the battery, as if taken in time the damage may not be very serious.

TECHNICAL NOTES.

(Continued from page 138.)

nearest to the filament. In this way any capacity leakage is prevented.

The screening grid has to be made sufficiently open-meshed to allow the electron stream to pass without being impeded, and yet, at the same time, the screening grid must be of sufficiently close mesh to act efficiently as an electrostatic shield.

In practice, the screening grid is made in the form of a helix of metal "tape," "edge on." so to speak, to the filament; the screening grid being not unlike the metal turnings which sometimes come from the cutting tool in a lathe. In this way the screening grid offers a considerable surface area for the lines of electric force, and yet this area is practically parallel to the direction of the electron stream, and so does not offer much obstruction.

Irish Patents.

I have received a communication from Messrs. Rayner & Co., patent agents, of 5, Chancery Lane, W.C.2, dealing with the new features of the Patents and Trade Marks Act in the Irish Free State.

Hitherto British patents and trade mark registration have included the whole of Ireland, but when the new Patent Act is in force they will automatically cease to function in Saorstat Eireann.

It is therefore necessary for all holders of British patents and trade marks desiring to retain protection in Southern Ireland to take out fresh patents or trade marks there.

British patents, however, which were granted before December 6th, 1921, will be continued upon the Irish register if a copy of the patent is lodged in Ireland and renewal fees paid as in England. Similar privileges apply to registered trade marks and designs.

In the event of an application for patent being made without reference to any earlier British patent, it must be accompanied by the report of a registered patent agent based upon a search for novelty in the British records.

Any readers desiring further information on this subject may obtain the same, free of charge, from Messrs. Rayner & Co., as above.

Hand-Capacity.

In order to overcome hand-capacity effects, the tuning condenser may be operated from a little distance by means of a belt. In one simple arrangement, which is described in Patent 245919, the rotor of the condenser is provided with a groove for the belt, and the control knob is removed to a distance of 3 in. or 4 in., and is similarly provided with a belt pulley, the belt itself consisting of a spiral spring of small diameter. In order to avoid play or backlash in the control knob, this is secured with a cork washer which lies between a metal washer and the panel, and is normally slightly compressed. The same device is applicable to coil holders, variometers, and so on.

Remote Control.

Another very simple arrangement which was shown recently used a stiff spiral

(Continued on next page.)

TECHNICAL NOTES.

(Continued from previous page.)

spring connected to the shaft of the condenser rotor, the other end of the spring being connected to the control knob mounted a little distance away. On turning the control knob the spiral spring was twisted, and the rotary motion was conveyed to the condenser, somewhat after the fashion of a motor-car speedometer. With this arrangement not only could hand-capacity effects be avoided (a suitable length of insulator was introduced into the driving system), but also the condenser and the control knob could be mounted in practically any positions in relation to one another.

Metal for Shields.

Referring to the matter of H.F. shields, which has been touched upon once or twice recently in these Notes, I am frequently asked what is the best metal for use in such shields.

It is not easy to say at once that any one metal possesses all possible advantages. Aluminium, for example, is very useful owing to its lightness in weight and its high electrical conductivity, whilst copper has the latter advantage without the former. Brass sheeting is suitable, but, like copper, it is both heavy and expensive.

With well-designed coils placed well away from the shield, either magnetic or non-magnetic metal may be used for the shield, but the popular preference seems to be for non-magnetic metal.

Practically any ordinary thickness is satisfactory for broadcast frequencies, but 20 to 24 gauge has been used extensively.

(Continued on next page.)

BROADCASTING AND THE "PROMS."

(Continued from page 131.)

"There is just one other point I wish to stress before you go," added Sir Henry, as he prepared to return to the hall where the audience was waiting impatiently for his reappearance, and to the microphone with its far greater throng of listeners, "it is my absolute conviction that everyone will come round to acknowledge the value of wireless as a great factor in modern life and art sooner or later. The carpers and critics are being confounded almost from day to day by some new wireless wonder, and those who scoff at broadcasting now will regret their rash words in the long run.

"Just think of all that has been accomplished in less than five years! Try to imagine to what state of perfection we shall have attained ere another period like this has passed! I cannot speak too highly of the tremendous feats which the B.B.C. have successfully carried through. With them, as with the wireless world as a whole, I am only too proud and happy to be associated.

"You will excuse me now? Good-night."

And with that Sir Henry returned to his rostrum, and I returned to my office, there to make notes of one of the most interesting interviews I have ever undertaken before any of its vivid impressions should have faded from my mind.

TECHNICAL NOTES.

(Continued from previous page.)

Of course, metal shields have been made of considerable thickness up to $\frac{1}{16}$ in., but this is really unnecessary.

A Curious Valve.

On the subject of shields, I think I mentioned some time ago a valve, hailing from U.S.A., which is completely shielded with copper. I have now had an opportunity of examining and testing these valves, and the efficiency of the shield is certainly very good indeed. The glass envelope or bulb of the valve is completely covered on the outside with thin copper, which appears to have been deposited thereon by an electrolytic process. The copper shield is connected by a wire to the negative filament terminal, and so, when the valve is in use, is connected automatically to earth. The copper is so thick that, by the aid of a knife, it can be peeled off as a coherent layer.

This same result may be achieved with any valve by means of a special valve shield, which may be of plain or perforated sheet metal.

BROADCAST NOTES.

(Continued from page 164.)

This side of the affair has been dealt with. Now, therefore, there is need to reimpose the artistic direction so that the soul of the business will not be stifled by organisation efficiency. Those who sponsor the reversion would put Captain Eckersley's brother "on the road," that is, make him a travelling manager of B.B.C. interests outside London. Cecil Lewis would resume control with A. Corbett Smith as his lieutenant. Then genius and brilliance would have a real innings, argue the reformers. Before these changes are effected there will be some interesting discussions at Savoy Hill.

Peace With Daisy Kennedy?

The B.B.C. announcement that Daisy Kennedy is to give a recital of violin works by British composers, including Elgar, McEwen, and Cyril Scott, at Manchester on October 1st, signifies a burial of the hatchet with reference to the recent row at the Queen's Hall about rehearsals. It is understood that the B.B.C. have undertaken to overhaul their rehearsal arrangements and to introduce reforms next year.

The Battle of Finchley Church.

In reply to the complaint of the Vicar of Finchley that the B.B.C. had no right to interfere in local affairs already settled, the B.B.C. have claimed the right to take an independent line in the interests of architectural beauty regardless of local opinion. This claim presumes full knowledge of all facts, and consistently good judgment. It is hoped the Savoy Hill people recognise the implications of their claim.

The Ghostly Transmissions.

The truth about the alleged backgrounds of 2 L O and 5 G B is incomplete insulation of certain studios at Savoy Hill. The matter is being attended to, and the cause of grievance will probably have gone before this is read.

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, 17/4 per annum, 8/8 for six months. Abroad, 19/6 per annum, 9/9 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, September 24th, 1927.