

LARGEST RADIO CIRCULATION IN THE WORLD

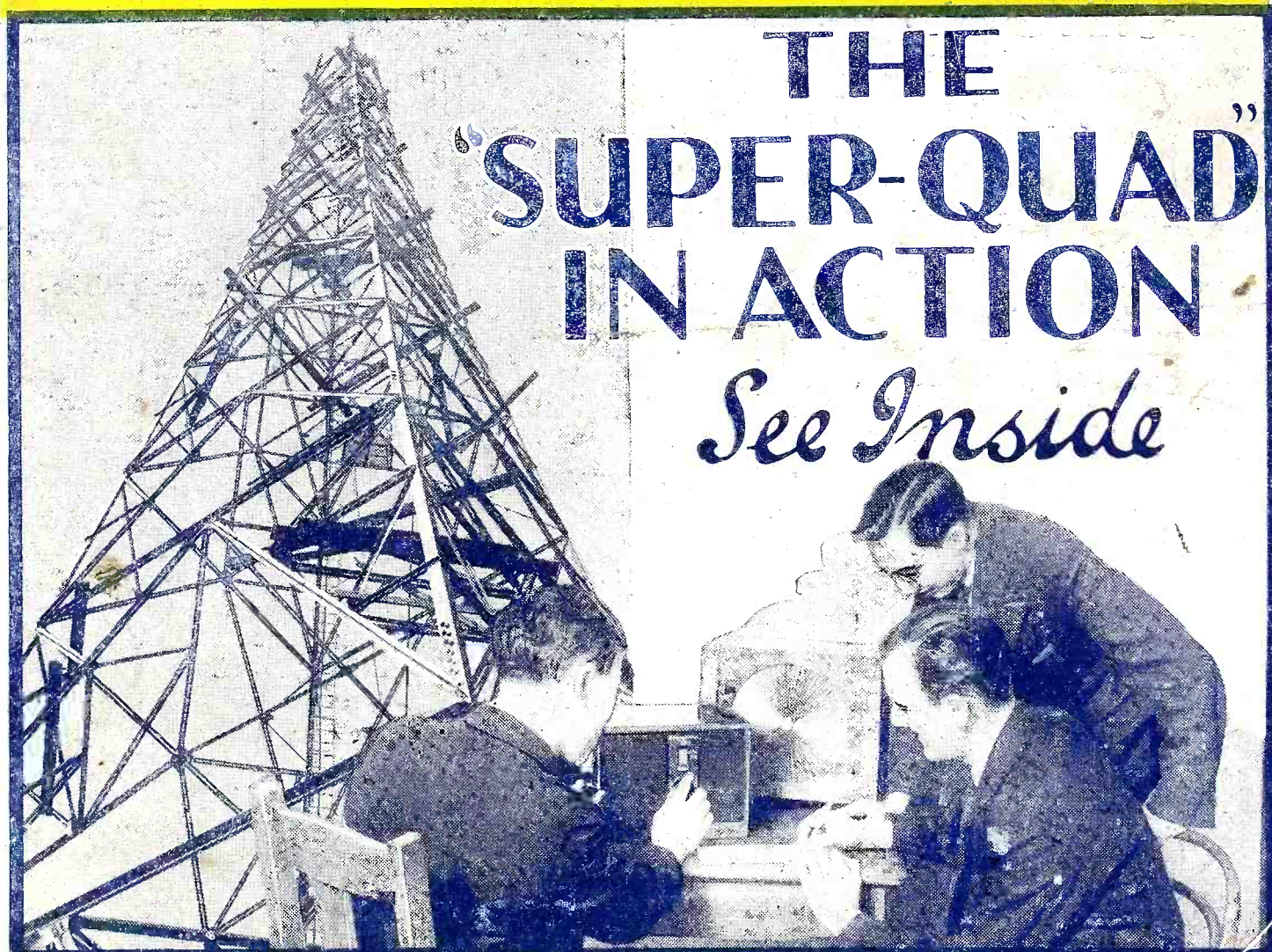
Popular Wireless

Every Thursday
PRICE
3d.

No. 482. Vol. XIX.

INCORPORATING "WIRELESS"

August 29th, 1931.



THE "SUPER-QUAD" IN ACTION

See Inside

Also Among the Fine Articles This Week:—

FOR THE LISTENER

CAPTAIN ECKERSLEY'S QUERY CORNER

WITH THE B.B.C. IN THE NORTH

STATIONS WORTH HEARING

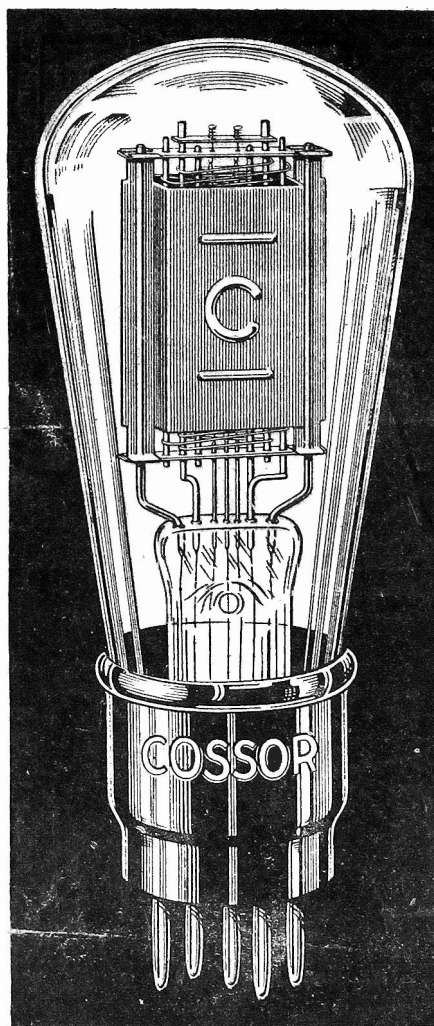
And for the man with mains:— **AN A.C. "POP-VOX"**

Bring in those feeble stations

—at full Loud
Speaker strength

Cossor Pentodes
are available from
any Wireless Shop
in types to suit
Battery and A.C.
Mains Receivers

THOSE faint
"foreigners"
that now you
can only just hear
will come in at
full volume if you
replace your Power Valve with
a Cossor Pentode.
When receiving a distant station
louder signals are obtained with
a power valve than with a super-
power type. This is because the
amplification given by the power
valve is greater. But the super-power
valve is preferable for receiving



strong signals be-
cause the volume
of pure sound it
can handle is
greater than that
which a power

valve can deliver. In Cossor Pen-
todes amplification greater than that
obtainable from a power valve is
combined with the power handling
capacity of the super-power valve.
Therefore, by fitting a Cossor Pen-
tode, distant stations that before
could only be heard as a whisper
come in at local station volume.

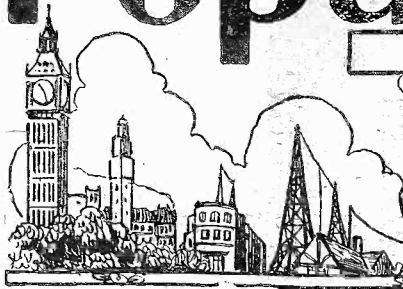
— use a

COSSOR PENTODE

To Messrs. A. C. Cossor Ltd., Highbury Grove, London, N.5.
Please send me free of charge Folder No. L.34 which gives
full technical details of Cossor Pentode Valves.
Name.....
Address.....
P. W. 29/8/31

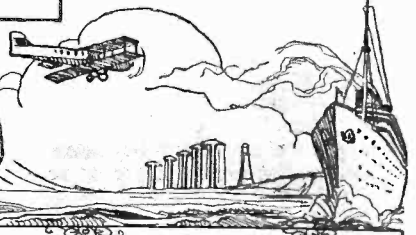
Popular Wireless

LARGEST NET SALES



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**DAVENTRY CHANGES?
NEWCASTLE ANNOYED
TO THE RESCUE
LINDBERGH PASSES**

RADIO NOTES & NEWS

**SUMS BY ELECTRICITY
THE RELAY RACKET
OUR LATEST TROUBLE
CIVIC AUTHORITIES**

"P.W.'s" Great Summer Hint.

BBETTER late than never! We have been verifying the following formula by means of a divining rod, and the darned rod ran away with the operator and didn't stop wagging till it reached the Thames, when it burst into small fragments, like the "wonderful one-horse-shay." Still, I think we can risk it! Look out! *When in the summer reception falls off, a few buckets of water poured over a buried "earth" will improve matters.* Copyright! This formula can be found in no other paper.

Mind the Water!

IN response to hundreds of requests, I give a few technical notes on the Great Summer Sell. The bucket should not be procured from a "bucket shop," but from under the scullery sink. Be careful not to kick it.

Distilled water should be used, but failing that, H₂O from the Nile, Niagara, Sahara, or the falls of Lodore should be obtained. *On no account use rain water!*

Keeping the eye steadily on the "earth," swing booket cheerily hence and hither, keeping time with a metronome. To make a metronome—(This is not the "B.O.P."—Ed.)

With Regrets.

OH, all right, then! Let's get on to something solemn. It is with the deepest surprise and regret that we announce that a Britisher has been foolhardy enough to win the International Relay competition which is promoted by the American Radio Relay League.

The dare-devil in question, Mr. H. L. O'Heffernan, received more than twice as many marks as any other competitor. The contest is very exacting, lasts a fortnight, and involves a lot of night work.

We congratulate Mr. O'Heffernan, and bid him beware of any likely-looking gangsters. Does he want to be "taken for a ride"?

Changes at Daventry?

I HAVE become quite confused between one and another of the B.B.C.'s explanations of their "schemes," changes of wave-lengths, and power, etc., so that I do not understand what is at the back of

sea. A good many of the dwellers in that part got useless results when the change was made, which is a bit rough considering that the north-east region is a prolific source of income to the B.B.C.

Moreover, the Newcastleers feel that Tyneside and district need special programmes. I expect that the B.B.C. will do its best to meet the views of the complainants, but lacking knowledge of their side of the question, I hesitate to do more than sympathise with W. B. E. and others who have written.

HERE ARE THE DAUGHTERS—WHERE'S THE SUN?



Bathing belles of Brighton who checkmated the dull holiday weather by taking a portable set to enliven them on the beach.

Radio Advertising.

AN interesting sidelight on the small controversy I had about the value of radio advertising in the States, or elsewhere, is thrown by an article by Sir John Reith in the "Nineteenth Century." He believes that the great wireless "chains" of the U.S.A. will be the means of reducing considerably the advertising and that the public are dissatisfied with the programmes, as also are the broadcasting chiefs themselves.

Now why, if radio advertising is so successful (as we are told), should there be any question of reducing it? For the more successful it is the better the programmes it can sponsor.

I pause for a reply.

Heartless Trick on Radio Man!

TAKING advantage of the attraction which the McMichael "portables" have for discriminating freelance "collectors" of radio apparatus, a hard-hearted Bond Street dealer placed a dummy model in his window, and this hollow sham was in due course gathered in by an unsuspecting smasher-and-grabber.

Is there no limit to the brutality of modern
(Continued on next page.)

the rumour that, if the Post Office agrees, Daventry is to be boosted up to 100 kw. at a cost of between £150,000 and £200,000.

If the idea is to put Daventry as a large blob on the radio map of Europe, I think it is rotten, but if it is to spread the National programmes over a bigger slice, I would rather see more stations put up, subject to there being ether-room—and that's where the rub is, I expect.

Newcastle Annoyed.

THEN, the changing of Newcastle's wave-length to that of the Northern Regional started a violent scream from the Geordies, who consider themselves to be now between the devil and the deep

"ARIEL" REVIEWS THE NEWS OF THE WEEK

business methods? Here a poor, hard-working man goes and expends a perfectly good brick in good faith, upon a mere lath-and-varnish model. Probably he is by now the butt of the "crook" fraternity and has been chucked out of his Club. It's really too bad.

Such methods may be all very well for Chicago but we look for more humanity from the West End.

To the Rescue.

A HANDY tip from A. H. R. (Malvern Link) for trying the effect of fixed condensers of different values in the aerial. The various connections cannot well be described in one Note, but given the idea your own gumption will suffice.



A two-inch square of ebonite is screwed to the wall by the aerial lead-in; into each corner is fixed a terminal with a square nut

and a milled finger nut. The two top nuts will take "Formo" type condensers, which can be connected in circuit by means of leads with spade terminals.

I am returning his photograph, because it won't reproduce well, and I apologise for the lack of a covering letter; my typist is swimming the Channel!

Lindbergh Passes.

THIS talk of examinations—cuss 'em! brings to mind that the great Lindbergh and his wife, who have been flying to Japan and getting into the papers thereby, sat for an examination in telegraphy before they started and succeeded in getting "commercial third-class licences."

Such licences demonstrate that the holders can send or receive at least fifteen words a minute in code. Good for Lindy & Co.

Lindy is not only a good plucked 'un and a fine airman, he is a gentleman in grain, and a credit to the telegraph fraternity.

"Let the Credit Go."

WE may not all see eye to eye with Mr. Lloyd George, but everyone is sorry that his illness prevented us from having an opportunity of hearing him on August 6th. Let's hope he'll soon be fit enough to tread his native heath and spout about the Eisteddfod. And, by the way, the Welshman who wrote me about the Abbey Players' presentation of



"Let the Credit Go," on August 10th, is unlucky, because I was at Southend on that day, making merry with the E. K. Cole Convention, and hearing some fine sets demonstrated. We had a great time, too, finishing up at "The White Horse Inn." Not the pub—the play, mark you!

Sums by Electricity.

TOO late, too late for "Ariel," who was ever a duffer at "maths," comes the invention of Dr. T. S. Gray, Massachusetts Institute of Technology, of a device for solving mathematical problems by electrical means, the device being called the "Photo-Electric Integrator."

You put the sum in the slot and the answer is shown on the screen. Dearie me, how useful that would have been to me on many a stricken field in the days when I had to pass exams.

One of the Arielettes is on the brink of matriculating and is having frightful times

SHORT WAVES.

There's one thing to be said in favour of the hiker—he can't take a portable set with him.

MODERN MUSIC.

A music critic, referring to the B.B.C.'s modernistic effort at the Queen's Hall, at which taxicab horns were included in the instruments of the orchestra, observes: "Yet mingled among it all were moments of great beauty."

I take it that he is referring to the intervals. "Morning Post."

A Brixton man has just been sentenced to three months' hard labour for "receiving" a stolen wireless set.

He probably thinks it well worth while—if it was stolen from his next-door neighbour.

"I am of the firm opinion that wireless is the cause of all this unnatural weather," writes a critic.

It's the cause of quite a lot of unnatural language, anyway.

An Atlantic liner has been supplied with a natural flower bed. It is said that the officer responsible pinched the earth from the wireless operator.

"Inarticulate sounds from a loud speaker can only be classed as noise," we read in the "Northern Echo."

Yes, and not only the inarticulate ones, either.

(Wireless telephone messages between London and New York are stated to have been picked up by listeners in several parts of the world):

It was my brilliant notion
To propel in your direction
O'er the intervening ocean
Pledges of my fond affection.

For a private talk I would not
Mind a charge distinctly bigger,
But to tell my love—I could not,
While the fans sit round and snigger.

Since the ether may disclose all
Secrets in this same conjunction,
I'm determined my proposal
Shall not be a public function.
"Morning Post."

with those two ghastly men who have nothing better to do than to walk from A to B, and with taps which run, quite uselessly, into tanks. If she sees this note I shall be pestered to buy her a "Photo-Electric Integrator."

"Yew Gotta Have It!"

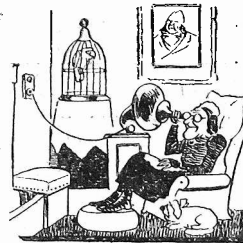
SO convinced are the U.S. army authorities that radio is good for all ills, they have arranged for all their hospitals, one hundred and five of 'em, to be equipped for reception. Every bed has "gotta" have it, and if the patient can't sit up and wear the telephones, then

by heck! he's gotta have one of these here "radio-pillows." Killed by kindness, eh?

Pity they don't give the poor fellows time to think and time to pray. But possibly Americans don't feel the need to do either!

The "Relay" Racket.

THE relay service is proving a great boon, especially to invalids and deaf old ladies with car trumpets. Mr. N. R. Phelps, radio dealer, of Brighton, has shown that he is a man of broad views and sound business instinct, for when he found his business threatened by the possibility of a relay service being opened near him he promptly went into the relay game himself, and is, I hope, doing well. Mr. Phelps confirms what I have always maintained, that "radio relays" are a legitimate form of competition. Recourse to petitions to Town Councils is a sign of weakness and malappreciation of the functions of town councils.



Our Latest Trouble.

FIRST bedsteads, then bees; now beans! Gosh! Shall we ever work down to Z? The bedstead man at last has dropped us and the bee chap seems to have cooled off, but every other day—almost—I get two foolscap pages from somebody, J. Trick or T. Trick or H. Brick, who seems to think that radio is the cause of beans not being what they were in his young days.

Granting his theory—which I do because I believe in soft answers to hard-baked theorists—I would point out to P. Thick (or T. K. Rick) that his quarrel is really with Hertz, Lodge and Marconi—not "P.W."

We are a remarkable publication—but radio cannot be laid at our door. Try long walks and cold baths, there's a dear fellow. I'm busy.

Civic Authorities.

VERY interesting reports are coming in about the attitude and arguments adopted by the various civic authorities in regard to the establishment of radio exchanges. In Colchester the council was disposed to give the idea a chance, but local dealers petitioned against it and the matter was referred back to the Highways Committee. Camberwell turned the idea down; ditto Folkestone. Leeds Council approved a minute of the Highways Committee approving in principle the proposal to instal relay exchanges.



ARIEL

THE SUPER-QUAD IN ACTION

NO doubt by now most of you who intend doing so will have completed the "Super-Quad." So this week I am going to tell you how to get the very best from it.

That it is capable of giving good results I can confirm from experience, as I have just spent a most enjoyable week testing the original model out. And I can honestly say that during that short period I heard most, if not all, of the more important broadcasting stations of Europe.

There is no fuss.

The first thing that will probably strike you on switching the set on is that there is no oscillation whatever. The stations just rolling in with a lack of fuss which is almost uncanny.

When I say there is no oscillation, I mean in the sense that it is used in ordinary receivers to boost up the strength of weak stations. All super-heterodynes have an oscillating valve attached to them, for changing the wavelength of the received signal to that of the intermediate amplifier, as Mr. Dowding explained in his first article. But it is not accompanied by all the squeaks and squeals which are the more or less recognised indication that a receiver is in an oscillating condition.

It is easily the most stable and genteel super that I have handled. In fact, in this connection, it could quite well put a number of ordinary straight sets in the shade! I tuned in over forty stations on the first night without a single squeak!

Now, I suppose I must get down to "brass tacks," otherwise there will be no space left to tell you how to put "ginger" into your "Super-Quad."

Ordinary Aerial.

To start with, most super-hets. are designed for working off a frame aerial. The main reason for this is that the average super, if connected to an outside aerial, would spoil other listeners' reception for miles round by the radiations from its oscillating valve.

This account of a week's working with the "Super-Quad" makes fascinating reading, for the set seems to put the world at your finger-tips. Some very useful operating hints are included.

By F. BRIGGS.

The "Super-Quad," however, surmounts this difficulty by using band-pass tuning in the aerial circuit, so you need not be afraid of hitching it on to your best outdoor aerial! In fact, you could not use it on a frame if you wanted to—so that's that!

Perhaps a few words about the H.T. voltages would not be out of place here. There are five tapings, and they feed the following points: bi-grid valve, screen of intermediate valve, S.G. plate, second detector, and the last one the output valve.

The only one that is at all critical is H.T. + 2, which is the screen tapping for the S.G. valve. This should not be given more than about 100 volts, otherwise it may be found that the potentiometer volume control is a little sudden.

The remaining tapings should be tried in various voltages. Assuming you have a 120-volt battery, I should suggest: No. 1, 80 volts; No. 2, 90 volts; No. 3, 120 volts; No. 4, 80 volts; and No. 5, 120 volts.

Mains Unit Suitable.

My own experience was, however, that they could all be given the full 120 volts (with the exception of No. 2) without any loss in strength. Of course, if you can scrape up 150 volts all the better, as most valves nowadays will stand it quite well.

I also tried the set on a mains unit with excellent results. There was not the slightest sign of instability and there is no doubt that it is a great improvement over the dry battery method. If you do decide to use a mains unit then be sure to get one giving an output of at least 20 to 25 m.a.

The same also applies if you decide to work the set from dry batteries. Don't go and buy the "standard" sizes, as these are really only suitable for small receivers, using a couple of valves or so. The triple-capacity type is the most economical in the long run, and if you are wise and get this larger size you will not be disappointed.

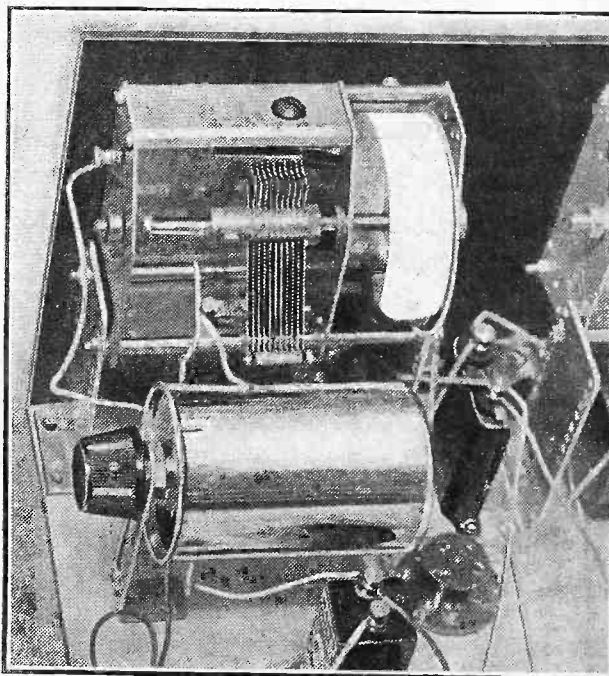
"On-off" Switching.

You will notice that a three-point on-off switch has been used. The reason for this is that the potentiometer which controls the voltage on the screen of the H.F. intermediate valve is normally across the H.T. supply, and when the receiver is switched off it is necessary to break this circuit in addition to the L.T. circuit.

Valves are rather important in the "Super-Quad." The first one acts both as a first detector and also as oscillator. It is of a special

(Continued on next page.)

THE OSCILLATOR TUNING



Mounted on the extreme right of the panel is the oscillator condenser, shown here from the back. Close to it is the oscillator coupler. The knob at one end is for easy wave-change switching.

THE "SUPER-QUAD" IN ACTION

(Continued from previous page.)

type, having two grids wound one outside the other.

This valve is really the heart of the receiver and has only just come on the market. The one I used was a Cossor, although the Osram people also make one.

Efficient S.G. Stage.

The intermediate S.G. valve is quite normal. And it is as well to give it as much H.T. as possible up to the limit stated by the manufacturers. If you use the metallised type be careful which side of

the filament is joined to the metal coating. It should be L.T. minus.

Now the second detector is also not very important, almost any ordinary detector valve will do—something of about 15,000 to 20,000 ohms impedance, say.

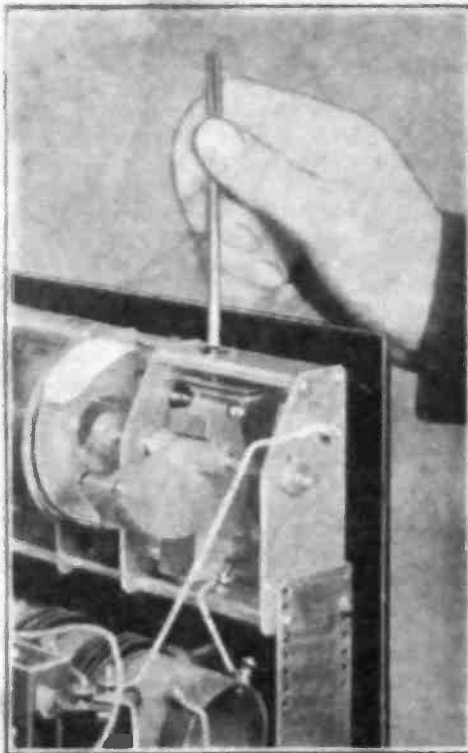
Choice of Output Valve.

Last, but by no means least, is the output or power valve. The whole performance of the set depends on this one, and it should be of sufficient size to handle a fair amount of power.

If you do not want very loud results, an ordinary power valve would do. It is a much better plan to use a good super-power valve if you have ample H.T. current available.

A pentode has not been used in this set, as the amplification obtainable with normal power valves is ample and the introduction of such a valve would probably only make the set unstable.

THE FINAL TRIM



To get the ganging exactly right adjust the two balancing condensers, as shown above. Set the tuning to receive a very weak station first, and you will find that the final trim gives you the last ounce of sensitivity.

Adjusting the Ganging.

There is one other small point that should be mentioned and this concerns the ganged condenser for tuning the band-pass coil. On the top of this component there are two small adjusting screws for balancing purposes and these should be adjusted for maximum signal strength when tuned to a fairly weak transmission.

Before a set of this type can be fully appreciated it must be heard under "hoop conditions." During the week I had the "Super-Quad" on test, every one of the medium-wave stations given in the attached list were actually identified.

Of course, there were dozens more to be heard, but they were either on the weak side, or the stations did not give any announcements from which they could be identified.

There was one point which struck me rather forcibly during this brief test. That was the extreme selectivity of the receiver. As an instance, it was found possible—with a little care in tuning—to completely separate Graz from London Regional at a distance of about 12 miles from the latter.

Dozens of Stations.

If you refer to the list of stations given on this page, you will see that there is only one degree difference in the readings—not bad, is it? I assure you that if you build

one of these wonderful sets it will do just the same for you. There is nothing difficult about the tuning, so don't let that worry you.

On the other side of London Regional there is Mülhacker. This, by the way is the station which interferes with the London programmes so badly, with that annoying whistle. Well, he was only half

Station	Reading	Station	Reading
Vienna	81	Strasbourg	30
Brussels No. 1	80	Brno	33
Milan	80	Brussels No. 2	33
Prague	78	Naples	53
Northern Reg.	77	Breslau	53
Langenberg	76	Göteborg	51
Beromünster	75	Genoa	49
Rome	72	Cardiff	48
Stockholm	72	Bordeaux	47
Dublin	68	Northern Nat.	46
Witzleben	69	Hilversum	46
Sottens	67	Turin	45
Midland Reg.	66	British Relays	44
Bucharest	66	Bratislava	41
Frankfurt	65	Heilsberg	40
Toulouse	64	Bremen	38
Lwow	63	Lille	37
Hamburg	61	Moravia-Os.	
Radio L. L.	61	trava	30
Mülhacker	59	London Nat.	33
London Reg.	58	Leipzig	34
Graz	57	Horby	34

a degree above the Regional transmission and yet, much you, it was very nearly possible to receive him also without interference.

The Last Word.

When you go over to the long waves you will not find quite so many stations, because this waveband is not by any means so thickly populated. But you will get all there is to be had, and that is saying something.

Now I think that covers everything, and I only hope you will have as enjoyable a time with your "Super-Quad" as I did with mine. The evenings are drawing in and soon there should hardly be a transmission in Europe that is not within the reach of this wonderful set. So you can look forward to a good "bag" before many weeks are out.

A SHORT COMPONENT LIST FOR A POWERFUL SET!

- 1 Panel, 16 in. x 8 in. (Pencil, or Peto-Scott, Porex, Permacol).
- 1 Cabinet, baseboard 16 in. deep (Cantex, or Pickett, Osborn, Peto-Scott, Ready Radio).
- 1 8000-mfd. two-gang condenser with vernier drum drive (J.B., or Polar, Lotus, Cydon, Formo).
- 1 4000-mfd. condenser with vernier drum drive (J.B., etc.).
- 1 Square-pole aerial coil (Varley).
- 1 Oscillator unit, type 0-2 (Weirite, or Lewcos O.S.S. 126).
- 1 Band filter unit with pig-tail (Weirite, or Lewcos).
- 1 Band filter unit (Weirite, or Lewcos).
- 1 5-contact push-pull switch (Ready Radio, or Bulgin, Peto-Scott, Weirite, Tulson, Gellione).
- 1 25,000-ohm spag. resistance (Lowson, or Bulgin, Ready Radio, Tulson).

- 1 50,000-ohm potentiometer (Gibson, or Conquest, Igranite).
- 5 4-pin valve holders (Giz and Weirite, or Tulson, Lotus, Bulgin, Formo, Igranite).
- 1 6-pin valve holder (Giz, or Tulson, Weirite, Bulgin).
- 2 1-mfd. fixed condensers (Formo and Dubilier, or T.C.C., Igranite, Hydra, Relab, Peto-Scott).
- 1 2-mfd. fixed condenser (Dubilier, or Formo, T.C.C., Igranite, Hydra, Relab, Peto-Scott).
- 1 64-mfd. non-inductive fixed condenser (Dubilier).
- 1 1-5 meg. grid leak and clips (Lowson, or combined grid-leak and holder, Dubilier, Tulson, Formo, Ediswan, Ready Radio, Igranite, Graham-Farish, Watmel, Varley).

- 1 4000-mfd. grid condenser (T.C.C., or Ready Radio, Tulson, Gellione, Formo, Ediswan, Igranite, Formo, Watmel).
- 2 501-mfd. fixed condensers (T.C.C., etc.).
- 1 H.F. choke (Lowson, or Ready Radio, Peto-Scott, Tulson, R.I., Varley, Lotus, Weirite).
- 1 L.F. transformer, high ratio 7-1 (Tulson).
- 1 Fuse holder (Ready Radio, or Bulgin, Tulson).
- 1 Terminal block (Junk, or Bell & Lee).
- 2 Terminals (Junk, or Bell & Lee, Igranite, Gell, Gellione).
- Battery plugs and spade terminals (Bell & Lee, or Relab, Giz, Igranite).
- G.B. battery clip (Weirite, or Bulgin, Relab, Gellione, wire, screws, etc., etc.).

RECOMMENDED ACCESSORIES.

(Manda P.220 A or Osram P.P.). (If other valves are used characteristics should be as near those of valves mentioned as possible.)

BATTERIES.—G.B. to suit last valve. H.T. 150-180 volts super capacity (Dryden, Portrix, Ever Ready, Linsen, Magnet).

ACCUMULATORS.—Voltage to suit valves (Exide, Ediswan, Linsen, Portrix, G.E.C.).

GAUGES.—State voltage and type of mains, and give details of set when ordering (Heather, Regentone, Lotus, Atlas, R.I., Exide, Tatham).

LOUD SPEAKER.—Blue Spot, B.T.-H., Amphion, Celestion, Udy.
VALVES.—1 Double grid (Cossor or Osram), 1 S.G. (Manda, or Cossor, Osram, Six-Sixty), 1 H.F. type or 2nd Detector (Six-Sixty, Manda, Tulson, Osram, Linsen, Cossor), 1 L.F. valve of power type

AUGUST, I am glad to say, has not let me down as a prophet in long-distance matters, for though we had a very bad time owing mainly to atmospherics during the first few days of the month, a very steady improvement in the strength of foreign stations and in the number receivable has been noticeable ever since.

On the long waves the improvement has been quite remarkable. There are, of course, quite a number of long-wave stations which hardly ever fail us, stations I mean such as Huizen, Radio-Paris, and Kalundborg. But there are others which are much more affected by adverse conditions, and from these reception was possible only now and then during the height of summer and for some little time after the longest day.

This Month's Log.

An examination of my log for the middle fortnight of August shows that first-rate reception has generally been possible from almost every big station on the long waves. Huizen, Zeesen, Radio-Paris, the Eiffel Tower, Warsaw, Motala, Kalundborg, and Oslo have all come in at full loud-speaker strength on almost every occasion when entertainment was sought from them.

On the medium wave-band stations that were faithful standbys during the summer have strengthened up greatly and there are a good many old friends which are



Some practical distant-programme notes compiled by a special contributor who nightly searches the ether in order to obtain really up-to-the-minute information for "P.W." readers.

making a reappearance after weeks of partial or complete silence.

Amongst the latter I would mention particularly Berlin, Witzleben, Bordeaux, Prague, and Katowice. Budapest, though not yet thoroughly into his stride, is trying hard to let us hear him. This station is always worth trying for now, for reception at full loud-speaker strength is often obtainable, whilst there are few nights upon which he cannot be found.

Vienna, who seemed recently to be on the verge of staging a come-back, still remains rather a chancy station, though I do not think that it will be very long before he becomes as reliable as ever. Milan is another station worth attention and Langenberg shows great improvement.

"Fickle" Stockholm.

Stockholm was one of those worst affected by adverse conditions all this summer, and this is rather curious. His power is exactly the same as that of Rome, and both stations are about equally distant from the middle of this country.

But whereas Rome has always been a

good station, Stockholm has shown enormous variations, being unreceivable on some nights and coming in at full loud-speaker strength on others. His good nights, though, are now beginning to outnumber those upon which he is weak.

Sottens is also better and Frankfurt

usually gives fine reception. Toulouse Midi seems to have come to anchor after a period of wave-length wandering which resulted in his jamming other stations and being jammed himself. Strasbourg is better heard than for some time, and other very good stations just now are Breslau, Brussels No. 2, Goteborg, Hilversum and Turin.

For Long Wave Listeners.

On the long waves readers have probably heard tests from the new big Paris station which is shortly to replace the present Radio-Paris. With a power rating of 80 kilowatts this station should be one of the best heard Continentals in this country.

Paris has always given us fine transmissions since the days when the original Eiffel Tower station was the only regular broadcaster in existence. When the wave-bands were less crowded the original Radio-Paris with his 8 kilowatts was the easiest of foreign stations to receive, and on the medium band we used to obtain wonderful results from the old Ecole Supérieure, though in those days the station was rated at a modest half-kilowatt.

A GAIN there is no event of outstanding interest to chronicle except, perhaps, the fact that the "Nautilus" (Sir Hubert Wilkins' Polar submarine) has been heard at last. G 2 T K, of Hull, worked him when he was in Devonport Dockyard.

The "Nautilus" was using the call sign K 7 X 1, on the 40-metre amateur band, using telephony. A schedule arranged then for 11 p.m. has apparently failed to produce anything of interest.

A Good "Yank."

W 2 X A D is very good again, though unreliable. On one evening, for instance, he was every inch as good as Rome on 25.4 metres. Yet for the next two evenings he was completely spoilt by quick fading and the distortion that accompanies it.

One of the best telephony it is possible to hear nowadays is P L E (Bandoeng, Java). He works on 15.9 metres, and gives broadcasts on Tuesday afternoons from 1.40 to 3.40 p.m. His transmissions are *always* as loud as those from Rome!

Our mutual friend Mr. Fred Easter (of Cincinnati) kindly sends Melbourne's latest schedule. He is again transmitting (from V K 2 M E) at the following times, on 31.28 metres: 5 a.m. to 7 a.m., 9 a.m. to 1.30 p.m., and 7 p.m. to 9 p.m.

These times apply every Sunday, and are in G.M.T. In view of the weather at the moment I simply have not the heart to talk of British Summer Time.

In Cincinnati G 5 S W, Rome, and the Pontoise station on 25.6 metres are

SHORT-WAVE NOTES



By W. L. S.

all received well. All the European stations round about this wave-length increase in strength, as one would expect, till 10 p.m. (again G.M.T.), and then begin fading out.

Generally speaking, the 25-metre band appears to be getting across better than the 32-metre band, while the latter seems more efficient for transmissions from Australia to the U.S.A.

Varying "Best" Times.

Mr. Easter makes one observation that is very interesting to us over here. This is that there is a noticeable difference in the best times for the reception of Zeesen and Rabat. How well we notice this sort of thing on the American stations! I often find that W 3 X A L's harmonic on 24.5 metres odd is far stronger than W 8 X K, and yet on other nights the reverse will hold good.

J. K. M., of Liverpool, having just returned from West Africa, in company with a short-wave receiver, thinks that the dance music transmissions mystifying one or two readers emanated from the Copenhagen

relay on 31.51 metres. Anent the remarks upon American short-wave receivers, he says "Buy British every time."

He also mentions logging a station calling "Hallo, hallo, Radio Español, Madrid!" This was located just below P C J. Has anyone else a claim on this one?

Strangely enough, J. K. M. remarks that W 2 X A D seems to have gone out of existence. I remember what happened to me when I made a similar remark early in the year, and consequently will not be hard on J. K. M.

Have You Heard These?

Other stations about which information is wanted are these: Radio L L, between 38 and 40 metres; a Buenos Aires station in the region of 32 metres; and a French station that transmits a little below W S X K. This latter does not refer to Pontoise on his lower wave, but to another, and unknown, station.

Having had many pathetic letters from would-be operators that want to know how to learn Morse, I am constrained to repeat my old advice.

Stage 1, learn it up first of all in terms of dots and dashes. Stage 2, get a good-tempered and patient friend to send strings of letters to you very slowly on a buzzer. Stage 3, find a station that is sending slowly enough for you to pick out a letter here and there, and just stick to him until you find you are improving.

It is most encouraging to find yourself drawing fewer and fewer blanks, and is a sure incentive to success. There are several suitable stations on short waves.

THE MIRROR OF THE B.B.C.

A NEW BOARD OF GOVERNORS? STAFF CHANGES—ECONOMY CUTS—POINTS FROM PROGRAMMES—SOME IMPORTANT TALKS.

ALTHOUGH I still incline to the view that the Prime Minister will prefer to make no change this year in the Board of Governors of the B.B.C., some political circles continue in agitation about the matter. It is believed that the Postmaster-General is really anxious to make changes in the direction of a younger board.

What are the views of Mr. Whitley, the recently appointed chairman, has not yet emerged. The decision will, I understand, be controlled primarily by his recommendation direct to the Prime Minister.

Staff Changes.

Some important staff changes will take place in the B.B.C. about the end of the year. I should not be surprised to see a considerable reduction of administrative posts, and a greater concentration on programme organisation.

It is felt in official circles that such a rationalisation would not only effect economy but would also increase efficiency.

B.B.C. Pension Scheme.

Sir John Reith had a very busy time during the last few days before he left London for his holiday on the Continent, but apparently he went away with a feeling that everything will be safe both inside and outside Savoy Hill until his return.

Just before he left he explained the outlines of a scheme to provide staff pensions by the purchase of annuities at the age of sixty. The scheme is to be operated by compulsory deductions from salaries, to which the Corporation will contribute an equal amount, as is done by some of the large business houses.

Economy Cuts.

Sir John also decided, after consultation with his departmental chiefs, what shall be the reply of the Corporation to the recommendations contained in Sir George May's Economy Report that the B.B.C.'s revenue shall be reduced.

The Corporation requires more, rather than less, money to carry out its commitments and schemes of development. There is no doubt that whatever attitude the country generally may adopt concerning savings in other directions, the majority of people will be inclined to the view that the work of the B.B.C. must not be reduced or curtailed for want of funds.

Points from Programmes.

Melville Gideon, who recently came into the programmes as the conductor of the Dorchester House Dance Band, which has been taking the place of Ambrose's Band in the Saturday night programmes, is appearing in the National vaudeville programme

on Thursday, September 3rd. Other artists already engaged are Elizabeth Pollock (impressionist), Rex Evans, Athene Seyler and Maurice Cole.

On the previous day London Regional listeners are to hear a relay from the Palace Pier, Brighton, of the concert by the band of the Coldstream Guards. Their programme, which will consist mainly of popular items, will include a cornet solo by Sergeant George Morgan.

Thursday, September 24th, is rather a long way ahead, but National listeners will probably like to know that on that day a running commentary will be broadcast on the launching of H.M.S. "Leander" at Devonport Dockyard.

Some Important Talks.

Two important broadcasts are down for Wednesday and Thursday, September 23rd

HE WROTE

A THRILLER!

This is the Eton schoolboy whose play, "The Smugglers," was broadcast some weeks ago from London. He was only fifteen years of age when he wrote it, but the B.B.C. productions department were so struck by it that it was produced in the main programme.



FOR THE LISTENER

By "PHILEMON."

Our popular contributor is now abroad, and this week he throws an interesting side-light on radio in Italy.

WHEN I arrived here in Italy the other day, I found several copies of the Official Programme waiting to greet me. After I had unpacked my kit and had a bathe, I looked through them.

I looked at the pictures first, as I always do. The pictures were mostly photographs. In the three copies there were nearly a hundred photographs.

There were faces of broadcasters. I had heard practically all of them at one time or another. Some I had heard many times.

Broadcasting—and Beauty.

I had formed my judgment of their merits as broadcasters; and now I looked into their faces. And I came to this rather amusing conclusion—that the success of your broadcasting is in inverse proportion to the success of your face!

Please do not misunderstand me. They were all good faces. Whether they were long or short, broad or narrow, square or round, regular or irregular, they were all good faces. Some of them very good faces.

But what I mean is, if you made a composite photograph of the faces of successful broadcasters, you would get a face which any woman might fall in love with, or

and 24th—the first being a relay to National listeners of the Presidential Address by General Smuts at the British Association Meeting at the Central Hall, Westminster, and the second, a talk by Mr. H. G. Wells, which starts the new series entitled, "If I Were World Dictator."

The Faraday Centenary.

I am also able to announce that speeches and an orchestral concert will be relayed from the Queen's Hall on Monday, September 21st, in connection with the Faraday Commemorative Meeting which marks the centenary of the scientist's greatest electrical discovery. The opening ceremony of the Faraday Centenary Exhibition at the Albert Hall will also be broadcast on Wednesday, September 23rd.

Coming Radio Comedies.

The Productions Department at Savoy Hill is looking for more radio comedies of the type of "The Romantic Young Lady" by the Spanish writer, Sierra, which is to be broadcast on Monday and Tuesday, August 31st and September 1st.

It seems strange that playwrights, and particularly those with ambitions, should be so neglectful of the opportunities offered by the microphone, but there are signs that more are turning their attention to what is one of the best methods of achieving wide-spread fame.

After all, it should not be difficult for mature writers to do as well, as the Eton schoolboy (whose photograph is reproduced on this page) recently showed is possible, by an intelligent examination of the technique required for turning out a successful radio play or sketch.

which any man would be willing to trust with a blank cheque, but it would not be a face which would come very close to the measurements and proportions of Apollo Belvedere.

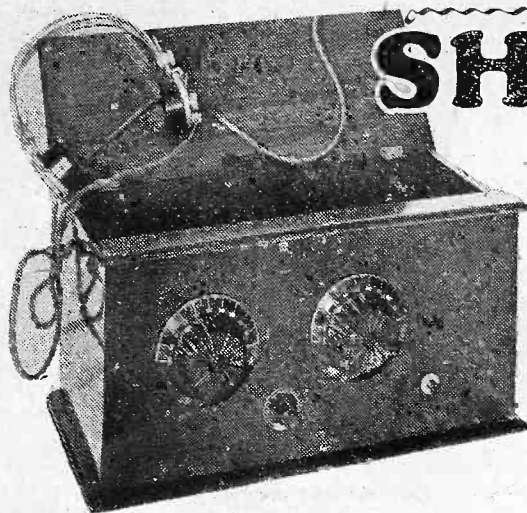
Are You Good Looking?

It is rather important to know this. If, for example, you yourself have the itch to become a broadcaster, and wish to know whether you would be likely to make a success of it, there is no need for you to go to the expense of consulting an astrologer or a phrenologist or a palmist. You need only to look in a mirror.

If you fancy what you see there very much, and if there are solid, mathematical grounds for your fancy, the chances are that the microphone is not for you, and you may as well save your bus-fare to Savoy Hill to seek an audition. If, on the other hand, you find yourself turning quickly away from the mirror with a sigh or a shudder or a scream of terror, then my advice to you is to be bold and back yourself for a winner.

Indeed, I should not be surprised, now that this discovery has been made by me

(Continued on page 782.)



SHORT-WAVE REMINISCENCES

"Below 100 metres! Why, however was one going to get down to that?" Thus writes our correspondent in describing his adventures of the days when Trans-Atlantic telephony was first being accomplished on short waves.

had arranged to listen in spells of one hour each, so that we could manage to get a little sleep alternately.

I picked up the spare pair of 'phones and glued them to my ears. Sure enough someone was talking, but for a while fading made it impossible to catch anything intelligible.

Eventually, however, modulation became steadier, and to our intense delight we distinctly heard an announcer say, "This is K D K A Westinghouse Electric at Pittsburgh: the pioneer broadcasting station of the world." A talk followed, but we were too excited to pay much attention to it, and for days after all we could converse on was K D K A, until everyone to whom we spoke must have loathed the name.

Then came those two wonderful stations at Schenectady, 2 X A D and 2 X A F, which worked on wave-lengths of about 22

perfectly good for reception on, say, 400 metres, might be hopeless on 25 metres.

I can recollect the day I first became acquainted with 2 X A D as if it were yesterday. The time was somewhere round 5.30 p.m., and I was turning the dials without expecting to hear much, when I suddenly heard a very strong carrier wave.

From Across "The Pond."

I resolved it into a dance tune: "My Blue Heaven." Who could this be, I wondered—some new high-powered continental? I was soon enlightened.

The music ceased, and then came the announcement: "This is 2 X A D, the experimental short-wave station of the General Electric Company, at Schenectady, New York, on a wave-length of 21.96 metres."

Reception was wonderfully clear with no fading, and I could hardly believe this

THOSE "veterans" who can proudly claim to have been owners of radio receivers, say, eight years ago, would undoubtedly be able to reveal some thrilling episodes, but how much more stirring would be the tales that the short-wave experimenters of the "dark ages" could unfold if they really got going!

I well remember the day when a friend rushed excitedly to me with the news that a station in the U.S.A. called K D K A was going to put out test programmes below 100 metres for the benefit of far-distant listeners. Until my friend showed me the article I could hardly credit it.

A Bold Attempt.

Below 100 metres! Why, however was one going to get down to that? I had already tried to obtain oscillation on about 120 metres without result. I foresaw, therefore, that this new American transmitter was likely to prove a severe tax on our skill as successful set builders.

Nevertheless, my pal and I started on the job enthusiastically. We entirely demolished our two-valver, and rebuilt it on approved ultra low-loss lines; even to the extent of cradling the valves upside down on pieces of cotton wool, and soldering the leads direct to the legs. The coils were self-supporting and held together between turns by slices of thin rubber.

What excitement when we came to test the set out! Would it oscillate? It did; although only on the upper portion of the tuning dial, and we seemed unable to get any feedback below 60 degrees or so, try as we might.

Then my friend had an inspiration! Perhaps a power valve would work better in the det. stage, he suggested, owing to it possessing a lower impedance. No sooner said than tried, and to our joy we found we could now get oscillation over the whole dial by suitably varying the aerial coupling.

Nearing "Zero Hour."

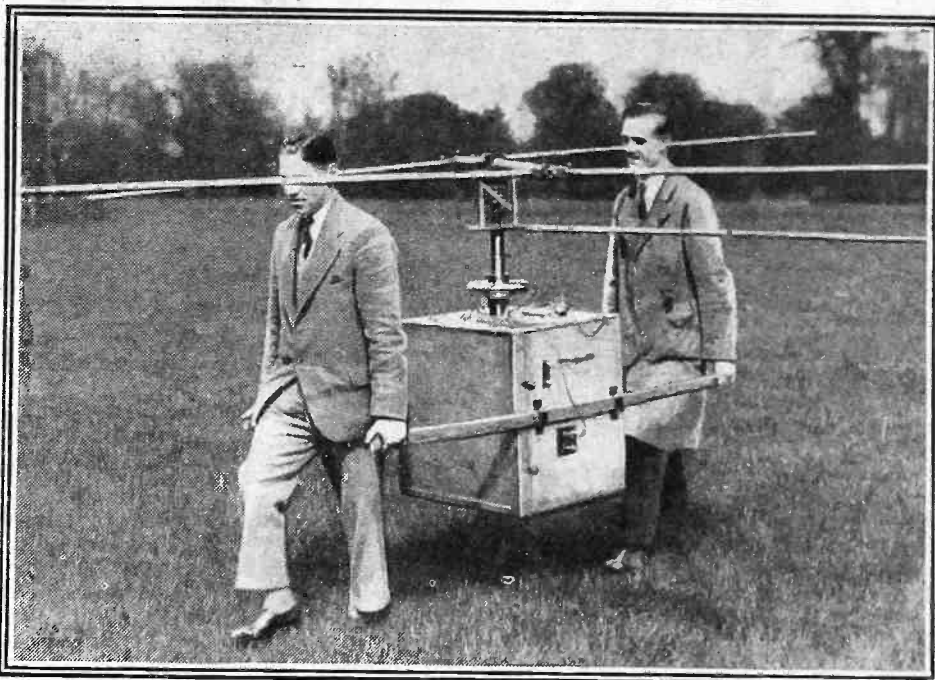
The time for the great trial arrived, when K D K A was scheduled to be operating on the 80-metre band again. Literally shaking with excitement we connected up, and ranged over the wave-band covered by the grid coil. Incidentally, we had no idea what this range was, as all we had heard so far had been ships' Morse and a few harmonies of the broadcast stations.

It must have been two o'clock in the morning when my chum woke me to say he had heard an American speaking. We

and 32 metres respectively. What snags we struck in attempting to drop down to 20 metres!

It took us weeks before we hit on a satisfactory circuit, and we must have tested dozens of valves in order to find a detector that would oscillate on this then amazing wave-band. I am afraid the radio dealer who allowed us to test his stock of valves thought we were mad.

Short waves were Greek to him, and he could not understand why a valve that was



The war against atmospherics, usually known as "X's," is as old as radio itself, and this is a special short-wave direction-finder which enables the exact location of a thunderstorm to be projected on a map by a special cathode-ray oscillograph. It should prove helpful to scientists who are endeavouring to "exterminate" such interference.

transmission was emanating from the other side of the "pond." Several other records followed, and then the announcer signed off, after intimating that the station would be on the air again at 6 p.m., Eastern Day-light-Saving Time, when the regular evening programme of W G Y would be radiated.

Since then, whenever I hear "My Blue Heaven," my mind instinctively bridges the years to that summer afternoon when with bated breath I received my first taste of 20 metres transatlantic telephony.

"FIRST AID" FOR "X" FIGHTERS

FROM THE TECHNICAL EDITOR'S NOTE BOOK.

Tested and Found—?



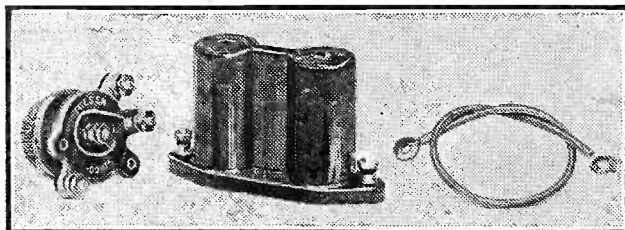
THREE TELSEN COMPONENTS.

I HAVE just had a batch of the new Telsen components along, and a very nice bunch of stuff it looks.

I am unable to deal with every item in detail, for there wouldn't be room to do so on this page.

But I have chosen quite at random three of them, and the accompanying photo shows you what they are.

First of all there is the Telsen Differential Reaction Condenser, and I can find no fault with this at all. On the contrary, I have



The three Telsen components dealt with on this page.

no hesitation in saying that I consider it to be one of the best differentials I have come across.

Electrically, it reaches a high standard, and my sample tested out exactly to its specification in regard to maximum capacity, and not many "diffs." do that, I can assure you.

But what I particularly like about it is its chubby robustness—it is unusually compact, but its assembly exhibits a rigidity not, unhappily, universally found in such components.

Nevertheless, its action is quite smooth, and I can imagine that the keenest of "D.X." fans will find it perfectly to their liking.

A FINE H.F. CHOKE.

Next we come to the Telsen H.F. Choke. This is built into a beautiful bakelite moulding, but we never take such things at their "face value" and this is no reflection on Messrs. Telsen—it is one of our quite invariable rules.

But initially I gave the component a "once over" on our choke tester, and it came through with flying colours. It is certainly a good H.F. Choke.

Subsequently I broke the casing and examined the "innards." And it was immediately apparent that these are just as carefully finished as the polished exterior.

There are moulded sectional formers,

and the wire is neatly and efficiently disposed upon them.

I do like clean "works," don't you? I feel that the policy of "what the eye doesn't see, etc.," can never really pay, and that a conscientious craftsman will always give just as much attention to the hidden parts of an article as he does to those which immediately

come within the view of potential purchasers.

Well, Telsen's H.F. Choke is 100 per cent in this regard, and it would have extracted some admiration from me if it had been dud in operation. But it isn't—it is good, and when you come to think of it, that is a natural corollary to care in construction!

The third and last Telsen component with which I propose to deal on this occasion is a Spaghetti resistance. It is one of their least expensive lines, but will surely prove to be one of their best sellers.

There is little to be said about a Spaghetti—if it is good it will be up to specification and strong mechanically. I have no hesitation in saying that my Telsen Spaghetti is perfectly satisfactory, and if all its brothers are of equal standard, and there is no reason at all why they should not be, then you can use them wherever "Spags" are needed.

By way of a P.S. I can point out that a fourth of the new range of Telsen components figures in the "P.W." "Super Quad." This is the 1-7 L.F. Transformer, and its inclusion in that very special design is a clear indication of our opinions regarding it.

JELECTRO ACCUMULATORS.

I have recently received a whole range of Jelectro accumulators. These are made by Jelectro Laboratories, of Bartholomew Close, London, E.C.1, and they are all of the unspillable type for the reason that they embody the substance after which they are named. Jelectro solidifies sulphuric acid without interfering with its normal action, and as the electrolyte ceases to be a fluid no very special design of cell container is necessary, with the result that the Jelectros attain abnormal capacities for their sizes, no small advantage where portable sets are concerned!

Additionally, it is claimed that every Jelectro accumulator contains a de-sulphating material which removes or prevents the formation of sulphate, hitherto one of the greatest bugbears to be met in accumulators.

A further point is that spraying and creeping cannot originate from the "solid" electrolyte, and thus terminal corrosion and sulphation are vastly reduced. Altogether these accumulators certainly command attention.

Manufacturers and traders are invited to submit radio apparatus of any kind for review purposes. All examinations and tests are carried out in the "P.W." Technical Department, with the strictest of impartiality, under the personal supervision of the Technical Editor.

We should like to point out that we prefer to receive production samples picked from stock, and that we cannot in any circumstances guarantee their return as it is our practice thoroughly to dissect much of the gear in the course of our investigations!

And readers should note that the subsequent reports appearing on this page are intended as guides to buyers, and are, therefore, framed up in a readily readable manner free from technicalities unnecessary for that immediate purpose.

At the present moment I have the whole range undergoing tests of various natures, and so far no faults have been discovered. All their capacities are as stated, and their directly measurable efficiencies well up to standard.

Obviously, it will take time to test for reliability, and I hope to be able to say a bit more about this in due course.

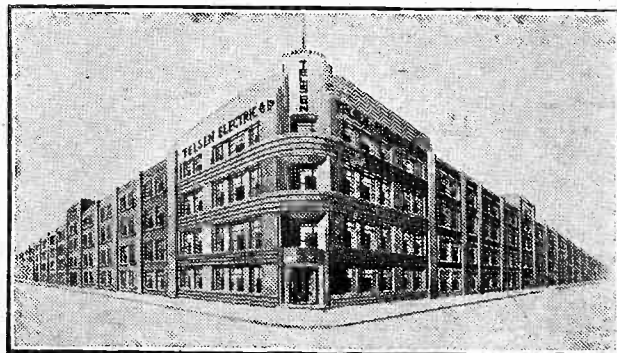
JUNIT UNITS.

There is now available a folder describing Junit mains units, valve holders, etc., that is well worth sending for from the Junit Manufacturing Co., Ltd.

AN ORIGINAL DESIGN.

The Rothermel Corporation, Ltd., recently sent me full details of the Columair receiver which they are handling. The Columair covers only a square foot of floor space, and is not unlike a tall grandfather clock in appearance.

As a matter of fact, there actually is a clock at the very top. No loud speaker grille, knobs, dials or anything at all are in evidence to show that the artistic column is a wireless set. The loud speaker directs the sound upwards for even distribution in the room. A remote control with an automatic station-selector can be provided. Certainly for those readers who can afford to pay the price for it, the Columair is a distinctly interesting proposition, indeed it is well worth going out of one's way merely to examine.



The big Telsen Radio factory, where, it is said, a quarter of a million components are being made per day.



BEFORE you proceed with the actual work of calibration, a word should be said on the choice of the tuned circuit to be dealt with.

If there is only one dial, you have, of course, no option, but if there are two or three, do not select that of the circuit coupled directly to the aerial. Should the circuit chosen incorporate reaction, all readings should be taken with the set just below the oscillation point.

Having prepared your chart, as described last week, tune in the London National station, whose reading we will suppose is 23 divisions. Run the point of your pencil upwards until you come to the horizontal line representing 23.

Plotting the Points.

Now move quickly along to the right, till you come to the vertical line, which stands for 250 metres. Make the next step carefully. Go two small squares to the right and you are on the 260-metre mark. The wave-length of the London National is 261.3 metres. The width of each little square represents 5 metres. Move to the right the amount which you estimate represents 1.3 metres, and make a dot with the pencil point. Write in the station.

Next tune in the London Regional, whose wave-length is 356.3 metres and whose condenser setting we will suppose is 54. Mark in your dot in the same way just where the horizontal line halving the 54th and 55th squares crosses the vertical one representing 356.3 metres.

This imaginary vertical line is found in the same way as the previous one. Go across to the 350-metre line. One small square to the right gives you 355, then the amount equivalent to 1.3 metres must again be added.

The First Curve.

Dot in the London Regional and deal in the same way with the Midland Regional and the Northern Regional. You have now four points marked in on your chart.

Lay a ruler on the chart, and you will probably find that its edge cannot be made to lie on all four points. Lay it across the London National and London Regional dots and join them with a straight line. Join also the London Regional and the

Recording the readings of your foreign stations—for which some excellent ideas were given last week—is made still more fascinating by means of the specially compact chart described here.

By R. W. HALLOWS, M.A.

Midland Regional, and the Midland Regional and the Northern Regional. Fig. 1 shows you what the chart looks like at this stage.

You have realised that the graph will eventually take the form of a very gentle curve, but for the present this combination of straight lines will do quite well. With the rough curve shown in Fig. 1 to help you, you will very quickly be able to pick up a number of other stations.

Hilversum, for example, is a powerfully received station working on a wave-length of 298.8 metres. Running up the 300-metre line you will find that it coincides with the graph at a point representing 35½ scale divisions. You will find Hilversum, then, somewhere very near this setting.

In any case, your search will be narrowed

down to not more than one scale division. Let us suppose that you find it at 35 exactly. Mark in a dot, which will lie slightly off the straight line, corresponding to this station. In the same way find and record the settings of, say, Gothenburg, Brussels No. 2, Strasbourg, Hamburg, Toulouse, Berlin, Witzleben, Rome, Bero-münster and Brussels No. 1.

French Curve Substitutes.

If you cannot get all of these stations, you can get a good many of them with the help of your first rough curve, and you will probably find others as well. Mark them all in.

This having been done, you have a string of dots extending right across your paper. Mark out a new chart and very carefully transfer all the dots to it. If you possess a set of French curves or know a friend who has one, it is now a simple matter to rule in a line passing through or almost through every point.

Even if you have not French curves and are not good at freehand drawing, there is a way out of the difficulty. The pantry contains no doubt several oval dishes of different sizes. By laying these in turn face downwards on the paper you will probably be able to find one whose edge has just the right sweep for one part of the curve; another will come to your aid for another portion of the curve and in a very short time the thing is done. (See Fig. 2.)

A Frequency Graph.

A frequency calibration is made exactly on the same lines, except that the bottom edge of the chart is marked off into kilocycles instead of metres. The vertical edge of each large square can well stand for 100 kilocycles. Thus you may start on the left with 1,200, the next heavy vertical line will be 1,100 (don't forget that kilocycles work backwards), the next 1,000, and so on until you come to 600.

Again make use of the four high-power British stations already mentioned. The London National is dotted in where the 23-division horizontal line crosses the 1,148 kilocycle line, the London Regional where the 54½-division horizontal line crosses the 842 kilocycle vertical line, and so on.

(Continued on next page.)

THE LOUD ONES FIRST

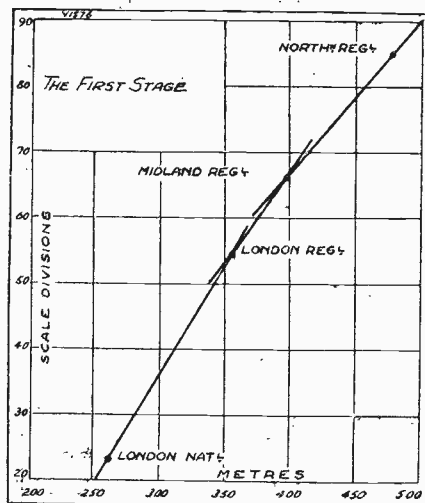


Fig. 1. You begin by putting in three or four easily received programmes, like the four shown here.

STATION FIXATION.

(Continued from previous page.)

As before, join each pair of dots with a straight ruled line. Then find more stations with the aid of the rough graph and plot in their settings. When sufficient settings have been obtained draw the necessary gentle curve.

The small scale curves that we have been discussing will suffice for the needs of many listeners, but the man with a large set who likes to be able to bring in a big number of foreigners will find something rather more elaborate most useful.

Fig. 3 shows how on a sheet of paper measuring only 9 in. \times 7 in. a tuning graph no less than 5 ft. in length can be made for the broadcast band. For this a sheet of paper ten large squares in width is required.

The depth of the sheet is the same as that used for the small-scale curve; it will depend of course upon whether the condenser has 0-100 divisions or 0-180 degrees. Here is how the "multum in parvo" chart is prepared.

Preparing the Chart.

Rule rather heavy vertical lines in pencil at every ninth small square from the left-hand edge. This will give you eleven vertical lines including the two at the edges.

Each small square now represents 1 kilocycle and since the present Prague Plan is based on a 9-kilocycle separation, each of the vertical pencilled lines represents one channel—or rather, as we shall see in a moment, one set of channels. The large-scale chart is made from a small-scale frequency graph as soon as a fair number of stations has been identified and their positions plotted in.

The London National is a good one to begin with. Its frequency is 1,148 and five channels away there is Rennes, which you are almost certain to be able to tune in. If you cannot get Rennes, other stations on neighbouring channels which you will be able to receive when London is not working are Toulouse P.T.T., Horby, Leipzig, and Moravska-Ostrava.

The Calibration Lines.

We will suppose, though, that Rennes is duly logged and inserted in the small-scale chart. We now make a dot representing the condenser setting of Rennes, on the 1,103 kilocycle vertical line of the large chart, draw a line joining the London National and Rennes dots, and continue it to the left.

The setting of Rennes we will suppose is 25½. A similar dot is made at the left-hand vertical edge which represents the same frequency as the right. To enable us to rule the next portion of the line we want some station with a frequency between 1,103 and 1,013 kilocycles.

The British relays can help us here and possibly Copenhagen may be logged. We will take it that the British relays are used and that their setting is found to be 32. A dot is made opposite this on the seventh vertical line from the left, which corresponds to 1,040 kilocycles.

The 1,103 kilocycle dot and the 1,040 are now joined and the line is produced to meet the right-hand margin, the vertical line here representing 1,013 kilocycles. As before, the condenser setting where this line cuts the right-hand edge is transferred back to the left-hand edge and we start the next portion of the graph.

Many Good Points.

A little examination of the chart will show you that it has very many good points, besides the actual length of the tuning curve, which, of course, means that very

close readings can be taken. First of all, all channels fall upon the various vertical lines which means that once you have discovered the settings needed for, say, Witzleben and Rome, you can immediately ascertain those required for the stations in between.

An Interesting Fact.

The 707 kilocycle channel belongs to Madrid and the tuning graph cuts this in the chart shown at 73. Belgrade is off his wave-length at the moment of writing. He should be on the 698 kc. channel, but he is actually working on 697, which is found with the condenser set at 74. On 689 kes. comes Stockholm, setting 75½.

GETTING THE FINAL CURVE

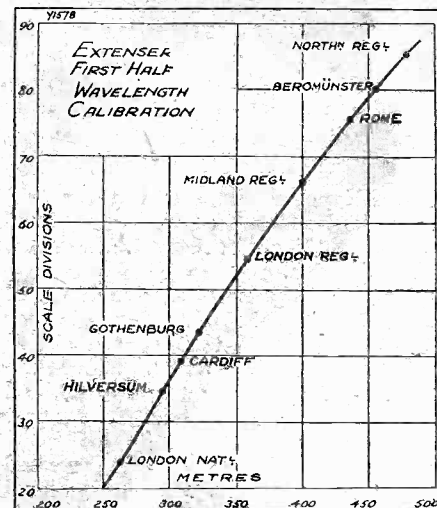


Fig. 2. As more and more readings are inserted the line connecting them becomes a gentle curve.

You can thus go straight on to the reading required for a station that you want to receive provided that it is working on its proper channel. Notice an interesting point in connection with the vertical lines which you will find very useful.

If you look you will see that starting from the bottom of any vertical line the hundreds go down whilst the tens go up and the units remain unchanged. Thus the line upon which the London National stands starts at 1,148, next above comes 1,058, above that 968, then 878, 788, and 698.

A similar large-scale chart can be made for a wave-length calibration on a piece of paper one large square wider. Here each section of the graph covers 100 metres. Each large square is made to represent 10 metres and each small square 1 metre.

Wave-length As Well.

Since the paper is 10 large squares wide there are eleven heavy vertical lines, including those at the edges. If you start at 200 metres the vertical lines cutting the first portion of your graph will be marked 200, 210, 220, and so on up to 300 at the right-hand edge. Then you come back again to 300 on the left and go up to 400.

You can of course draw either wave-length or frequency graphs to a large-scale all-in-one piece instead of in this sectional way. But there is no advantage in doing so and there is the very distinct drawback that the calibration chart is of unwieldy size; also there is something much more fascinating in the use of one of these charts than in using an ordinary one.

YOUR "TUNING CURVE" WILL BE NEARLY TWO YARDS LONG—AND ALL ON A 9" \times 7" SHEET OF PAPER!

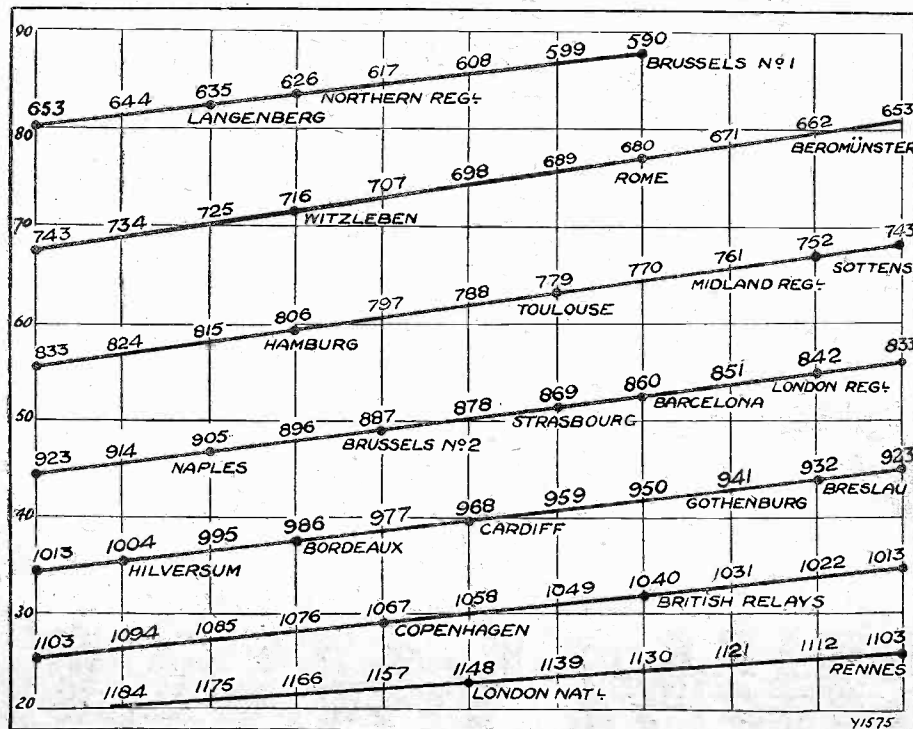


Fig. 3. This is a wonderful stunt. Read all about its many advantages, and the easy way in which this super-chart can be made, in the really practical article above.



**S.G.
A.C.
D.C.**

A complete new range of Tungram Barium Valves will shortly be announced, comprising General Purpose, Screened Grid, Multi Grid, High Power Output, Double Grid, Power Detector, and Power Valves, at prices from 5/6 to 19/-; built to the Tungram tradition of quality in the largest valve factory in Europe. Write to Dept. ST3 for full particulars. Tungram Photo Electric Cells, Nava "E." (for scientific measurement) £2:17:6; Nava "R," Red sensitive cell (for colour matching devices) £3:3:0; Nava "EH" (for public address work) £3:13:6. Tungram Electric Lamp Works (Gt. Britain) Ltd., Radio Dept., Commerce House, 72, Oxford Street, W.1. *Makers of the famous Tungram Electric Lamps.* Branches in Birmingham, Bristol, Glasgow, Leeds, Manchester, Newcastle, Nottingham, Southampton, Lamp, Valve and Glass Factories in Austria, Czecho-Slovakia, Hungary, Italy and Poland.

I.F.S. Organisation, Tungram Lamps and Radio Ltd., 11, Burgh Quay, Dublin.



BARIUM VALVES



CAPT. ECKERSLEY'S QUERY CORNER

**"FREAK" RECEPTION—UNBREAKABLE
VALVES—IS SINE LAW A FICTION?**

Under the above title, week by week, our Chief Radio Consultant comments upon radio queries submitted by "P.W." readers. Don't address your questions to Capt. Eckersley, however—a selection of those received by the Query Department in the ordinary way will be answered by him.

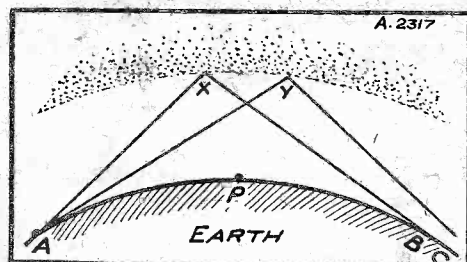
"Freak" Reception.

G. A. (Hounslow).—"I have heard the term 'Skip Distance,' used with reference to freak reception sometimes obtained over long distances. What is the exact meaning of this term?"

The theory of the propagation of wireless waves postulates an electric roof over the world. I have drawn a section of the world, A P B, and above it you will see the electric roof.

This roof lets through heat and light—it consists, in fact, of tiny particles carrying

REFLECTED WAVES



This gives a very clear impression of how radio waves sometimes "skip" many hundreds of miles before coming to earth again.

electricity, and it is called the Heavyside Layer.

A wireless station A radiates both along the surface of the earth and upwards. If the wave-length is short, the ray along the ground gets quickly tired, because it loses energy by coming into contact with matter on the ground.

But the upward rays A X, A Y. (see my picture) do not keep in contact with the ground, they fly upwards. They hit the underside of the electric roof at X and Y and are bent earthwards again, hitting the earth at B and C.

But at a typical point P the radiation has "skipped" over the head of an observer. There is nothing at P. All the rays are overhead.

The skip distance is thus roughly the distance A B, the distance from the station at which signals become loud after being very weak or negligible, even though the observer is nearer the point of radiation.

Unbreakable Valves.

E. L. (Cardiff).—"Does glass possess qualities making it peculiarly suited for use in valve manufacture?"

"I used to think that a glass envelope was used so that one could see the 'works.' Now, however, the metallic coating on the inside of the valve envelopes makes it impossible to see the electrodes and it occurs to me that the valve would become a much less fragile component if the bulb were constructed of a more robust material.

"Is there any objection to enclosing the electrodes of a valve in, for instance, a steel cylinder which could not easily become broken with careless handling?"

Glass is peculiarly suited for holding in the vacuum for several reasons.

Firstly, it is easy to handle and the well-known past technique of lamp manufacture has been of great value to the valve manufacturer—glass is essential to the lamp and so convenient for the valve—much of the same machinery suffices.

It is, however, possible to make valves in a metal container, but the great difficulty is that metal, unless made very thin and extremely carefully handled, gives off fresh gas after the valve has been pumped.

Thus, metal valves might be inclined to soften after manufacture. The big, water-cooled transmitting valves are made of metal, of course, but it would be taking unnecessary risks and incurring the expense of special machinery and new research to go away from glass only for the reason that people sometimes drop a valve.

But have you remarked that a dropped valve seldom bursts, and that its the delicate inside 'works' which go awry? So there's no advantage really in the metal valve at all.

Is Sine Law a Fiction?

"In reading 'radio' literature, one is always encountering the term 'sine wave.' Is the conception of a current or voltage varying according to a sine law purely a fiction?"

"As I understand the definition of a 'sine wave,' no such thing can exist. It would appear that, if a current varies *always* in accordance with a law governing its amplitude, frequency, etc., it must go on for ever. If a wave 'dies away' the amplitude must be decreasing and the law is not being obeyed.

"Since it would naturally be impossible for an oscillation to be maintained indefinitely, all 'sine waves' must, sooner or later, disobey their own sine law, and,

therefore, there cannot be such a thing as a current varying according to a sine law.

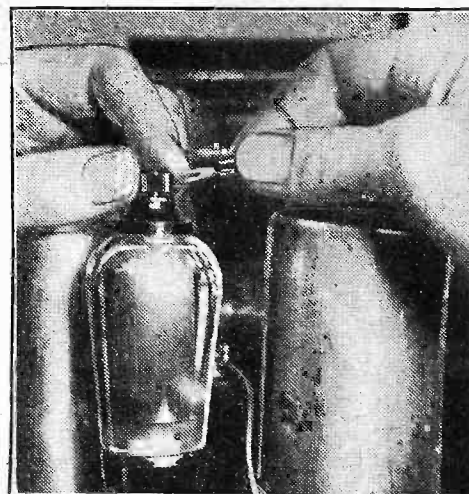
"What is wrong with this amateur attempt at philosophical speculation?"—G. McG. (Dundee).

Let me take the philosophic speculation under a modern reading lamp. That lamp is lit by alternating current varying (nearly in practice, perfectly in theory) sinusoidally.

If you keep the lamp switch on surely the lamp keeps alight as nearly for ever as makes no difference to *this* speculation.

A sinusoidal current does not die away if there is something to keep it going—coal in a boiler furnace with the reading lamp. If you set up a sinusoidal vibration in a resonant circuit by giving that circuit an

THE VITAL LINK



An important connection, joining up the anode of the S.G. valve in the "P.W." "Super-Quad" to its filter unit.

electric kick and you remove all outside sources of energy, then the current dies away.

But keep up the little kicks and the sinusoidal circuit goes on drawing energy from something.

A pendulum vibrates sinusoidally. If you give a pendulum a tap it vibrates slowly and the vibrations die away. But the pendulum of a clock goes on for ever, because you supply it with energy.

A sinusoidal current can go on for ever if there's something to make it do so!

**You
threw away
5/- every time
you scrapped
a 10/-
battery!**

**Now comes the
DOUBLE EXCITANT giving
87.9 % Active energy**

Five shillings flung in the dustbin—every time you scrapped an old "used-up" battery! Every battery user knows that chemical salts eat up the zinc cell walls long before the potential energy is exhausted.

Now comes Palaba to turn waste into Power! Palaba with a radically new chemical compound of seven salts forming a DOUBLE EXCITANT. The first excitant starts the discharge, leaving the zinc perfectly clean. As soon as the first excitant deteriorates, the second becomes active, and gives the battery new vigorous life.

Exhaustive tests prove that Palaba Batteries give an average of 87.9% active energy—37.9% more than the most powerful battery produced hereto.

Palaba costs no more! 60-volt 8/-, 100-volt 13/-, 120-v. 15/6. Also super capacity, flash lamps, etc.

PALABA

**Double Excitant
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PALA BATTERY CO (LONDON) Ltd

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Telegrams: Palabattery, Kincross, London

Telephone: North 5937.



EVERYONE who has had the chance of making comparisons knows that a set running on the modern A.C. valves is far and away better than a similar set running on battery-fed valves.

A.C. valves mean more stations at better strength. There is no question about it. They are so much more efficient that the difference is plain to all.

Better Valves.

A curious thing to notice is that even without this extreme efficiency the new class of valve would have found a high place in popular favour. Its ease of upkeep equals that of an electric lamp, for all the attention that it requires from its owner is to be switched on or off as required.

Instead of requiring batteries it works direct from the mains, and all the trouble of an intermediate battery supply, with its bother of charging, is abolished. Add these advantages to the higher efficiency, and we

THE VALVES TO USE.

For V1.—A.C. H.L. type (Cossor, Osram, Mazda, Eta, or Six-Sixty).

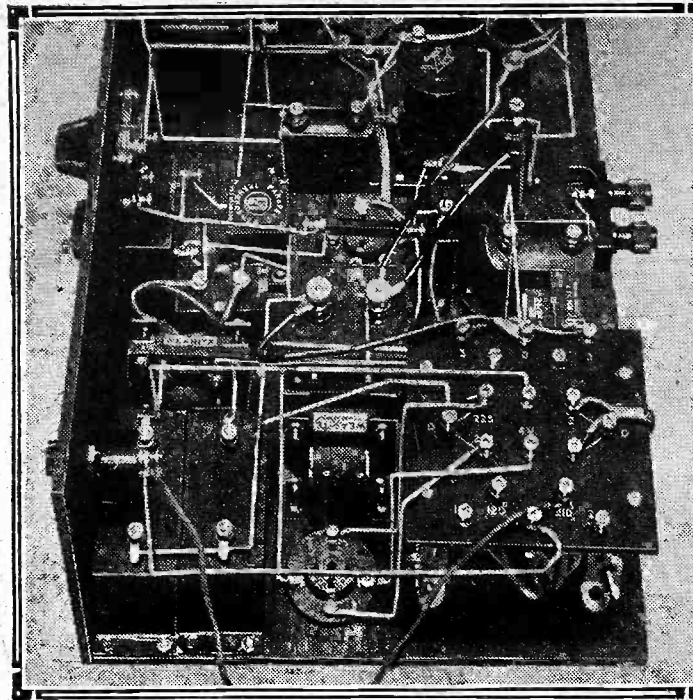
For V2.—A.C. detector type (Six-Sixty), or A.C. H.L. type (Eta, Mazda, Cossor, Osram).

For V3.—P.625 type (Osram, Mazda, Eta, Six-Sixty, or Cossor).

For Rectifier.—UU 60/250 type (Mazda, Osram, Cossor, Eta.)

can easily see why A.C. valve sets are fast forging ahead in popularity!

And now we present the A.C. "Pop-Vox"—"P.W.'s" latest contribution to better radio reception. It is a set of superlative merits.



The "power" end of the receiver, showing (to the right) the wiring of the big mains transformer.

This may seem a big claim to make, but just consider for a moment how well and truly it is based on fact. First and foremost, we have a completely battery-less set employing valves that represent the very last word in thermionic tube development.

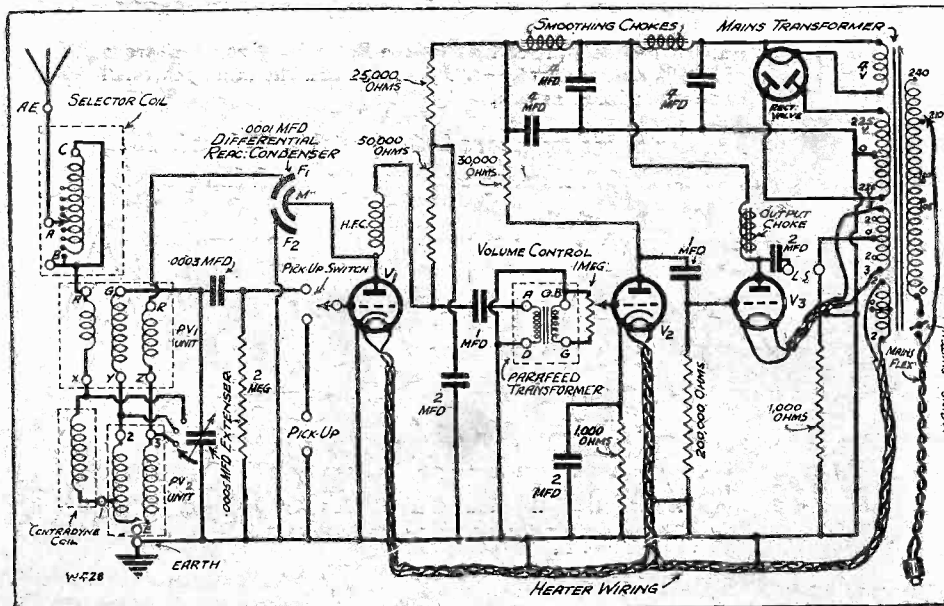
A Wonderful Set.

These valves are not hooked up in the first method that suggested itself, but are incorporated into that latest combination of selectivity, power and quality known as the "Pop-Vox" circuit. Can you wonder that the result is a receiver of unique merit?

Let us get down to precise particulars, and enumerate just a few of the really telling points that make the A.C. "Pop-Vox" such an astoundingly good receiver.

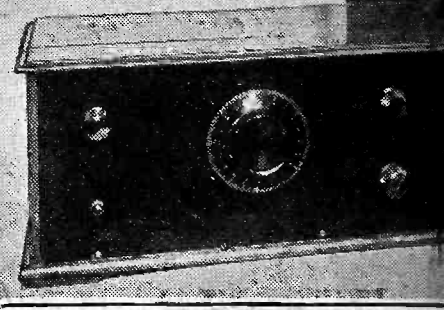
We have shown that the main conception

A CIRCUIT WITH MANY EXCLUSIVE FEATURES



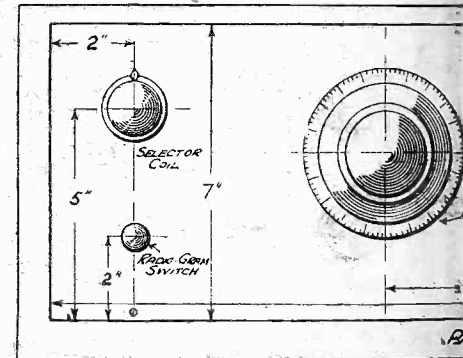
There is a lot to look at in this diagram, including, as it does, the simplified wave-change system. Note the special symbol that denotes the Extenser for all-wave tuning. Valve rectification (full wave) is used, and ample de-coupling ensures complete freedom from hum.

AN A.C. "POP-VOX"



DESIGNED AND DESCRIBED BY T.

This mains version of a very famous "P.W." includes Extenser tuning, Selector, Contram, and Radio-Gram switching. Read all about tuning and tr

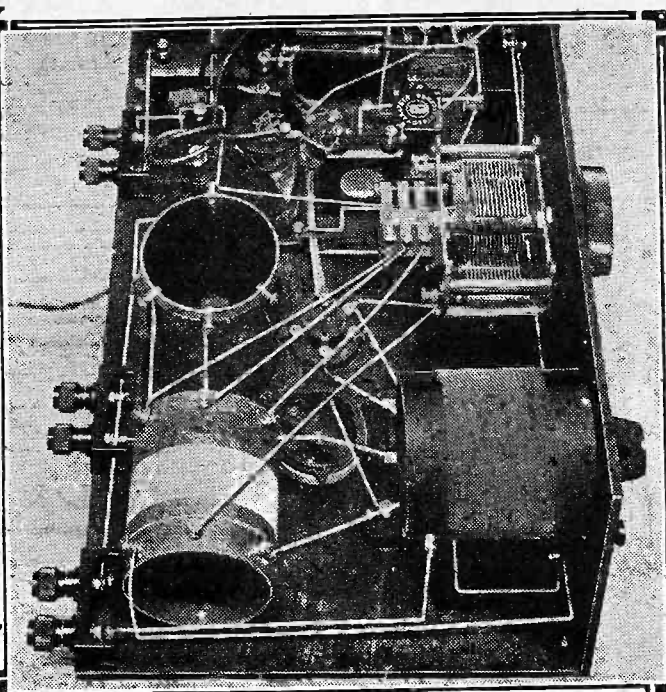
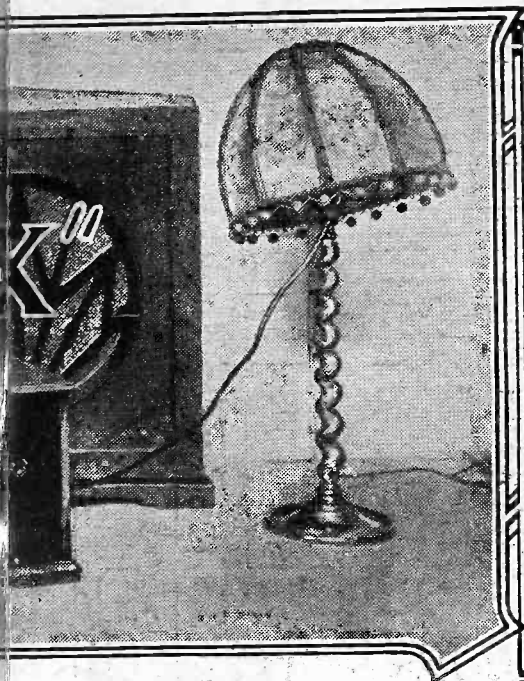


Here are all the details, yo

SELECT YOUR COMPONENTS

- | | |
|---|------------------------------------|
| 1 Panel 21 ins. by 7 ins. (Permeol, or Peto-Scott, Goltone). | 1 .0003 mfd. (Dubilier, Goltone). |
| 1 Cabinet with 10 in. deep base-board (Camco, Pickett, Gilbert). | 1 Radio, Telsen. |
| 1 Selector Coil (Goltone, or Ready Radio, R.I., Formo). | 1 2-meg. leak (Ediswan, Ferranti). |
| 1 Single Pole double throw push-pull switch (Wearite or Goltone, Igranice). | 2 5-pin valve (Lotus, Clix). |
| 1 .0005 mfd. Extenser (Cyldon or Formo, Wavemaster). | 1 Wearite, Dan. |
| 1 .0001 mfd. or over differential reaction condenser (Ready Radio or Telsen, Lotus, S.B., Formo). | 1 H.F. Choke (Ready Radio). |
| 1 1-meg. Volume Control (A.E.D. or R.I.). | 2 1 mfd. (Lisse). |
| 1 Mains Switch (Bulgin or Igranice). | 3 2 mfd. (Lisse). |
| 1 P.V.1 and P.V.2 coils (Parex, or Ferranti, Lewcos, R.I.). | 3 4 mfd. (Formo). |
| 1 Coil Quoit (Peto-Scott or Wearite, Goltone). | 1 Parafeed L.F. (Lotus, Telsen). |
| | 1 Output Choke (Lotus, Telsen). |
| | 2 Smoothing (Ferranti, Igranice). |

A MAGNIFICENT MA



Concentrated coil efficiency is ensured by the Selector (on the panel), backed up by the P.V.1. and P.V.2 units, and a Contradyne coil quito.

the tuning in any way. The coil units employed by this set are also famous, consisting of the "P.V.1" for ordinary-wave reception, and its fellow, the "P.V.2" for long waves. The fact that these two in combination have now definitely become the favourite form of coupling is a sufficient guarantee of their great efficiency on both the wave-bands.

The "P.V." Coils.

Besides the "Selector" and the "P.V." Coils, we have also the "Contradyne," which knocks out that annoying old trouble of the local station "breaking through" at the bottom of the long-wave dial. There is none of that when using the A.C. "Pop-Vox."

We now come to what is undoubtedly the most important single item of all—the "Extenser." As you probably know, it is an ultra-efficient tuning com-

ponent that does its own wave-band switching. The "Extenser" has revolutionised tuning.

RECOMMENDED LOUD SPEAKERS

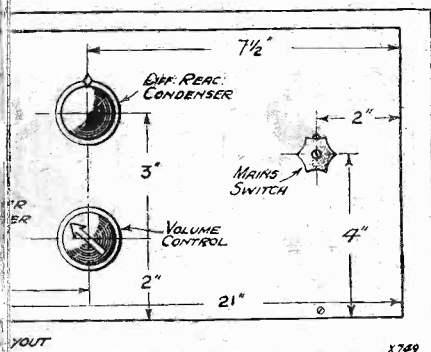
British Blue Spot.
British Thomson-Houston.
Whiteley Electric.

It has a tuning dial covering 0—99 on one half, and 100—200 on the other. All the medium-wave stations come in as two-figure readings, and all three-figure readings are long-wavers. How's that for simplification?

There is, of course, no wave-change switch to alter. You don't have to twist

(Continued on next page.)

P.W. RESEARCH DEPARTMENT.
circuit bristles with fine features; it in-
and P.V. coils, Automatic Grid Bias
wonderful receiver with its simplified
ous power.



for drilling the panel.

MAKES FROM THIS LIST.

- ed condenser or Ready
- der (Lissen or Igranice, Telsen.
- rs (Telsen or Igranice,
- (Telsen, etc., y or Lewcos,
- .C.C.).
- Ferranti, and
- .C.C.).
- former (R.I.).
- , or Bulgin,
- (Wearite or Varley).
- 1 50,000 ohm "Spaghetti" resistance (Ready Radio or Bulgin, Peto-Scott, Graham Farish, Sovereign, Telsen, Goltone, Igranice, Varley, Lissen.)
- 1 25,000 ohm Spaghetti resistance (Lewcos or as above).
- 1 30,000 ohm Spaghetti resistance (Bulgin or as above).
- 2 1,000 ohm Spaghetti resistances (Lewcos or as above).
- 1 200,000 ohm resistance (Graham Farish or Peto-Scott, Wearite).
- 1 Mains Transformer (Igranice Universal Type B.)
- 3 Terminal Blocks (Belling & Lee). Copper Sheathed Cable for heater leads, Flex, Glazite, screws, wire for hank coil, etc.

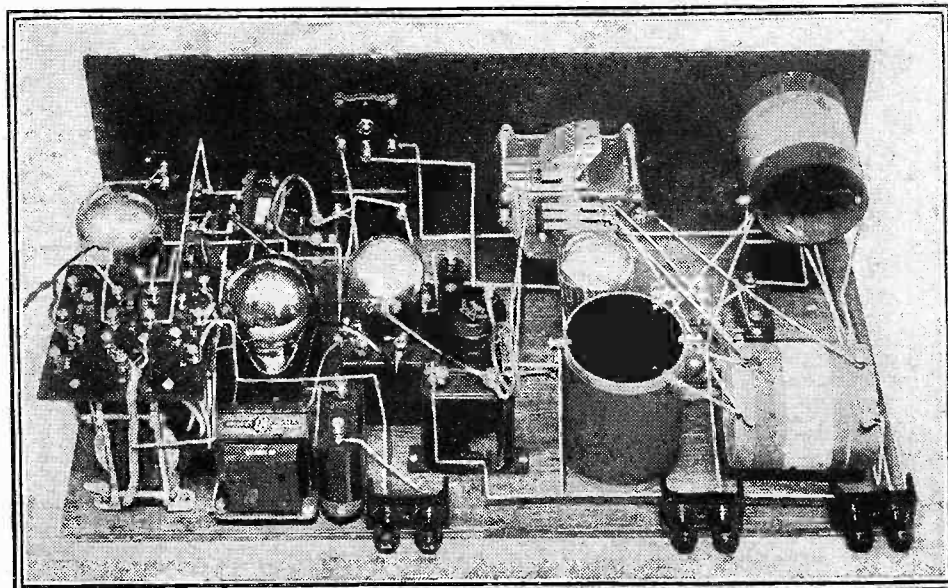
of the design takes advantage of the latest radio advances in technical development; what of the circuit details?

Even the reader who is not specially interested in circuit diagrams can appreciate some of the special features of the A.C. "Pop-Vox" design. For it incorporates items that have made names for themselves with the general public—names synonymous with simplified efficiency.

Very Selective.

In the aerial circuit, for instance, is the "P.W." Selector Coil, a device that achieves results of quite remarkable selectivity and increased power by enabling the aerial to be tuned to resonance for the reception of weak stations. It is simply invaluable to the searcher for long-distance programmes, and yet it does not complicate

HOW IT LOOKS WHEN THE WIRING IS DONE



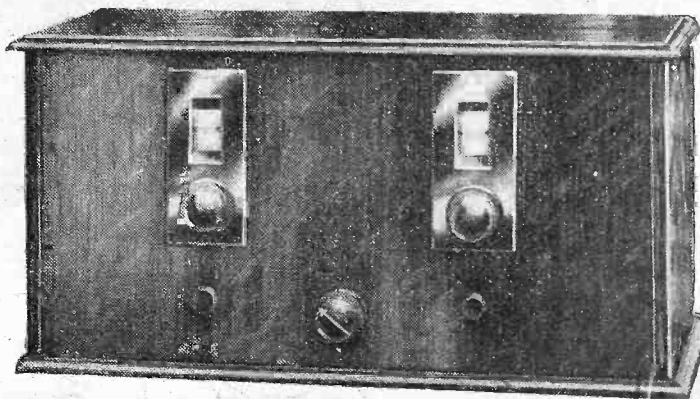
This shows the complete receiver with the valves in position. The rectifying valve is on the left, behind the mains transformer, with the power-valve next to it, and the detector on the right behind the Extenser. Note the three contacts on the latter, that make a wave-change switch a mere redundancy.

S-DRIVEN RECEIVER

The SUPER KIT for the "SUPER-QUAD"

Four reasons why you should use a READY RADIO KIT.

- 1 JIFFILINX.** Simplify construction, give more certain degree of electrical efficiency, and eliminate the possibilities of poor reception.
- 2 SERVICE.** Free information and advice from the experts of the READY RADIO Service Department.
- 3 CHOSEN COMPONENTS.** Components chosen for their high efficiency and reliability. Your set will be the best of its kind.
- 4 SPECIFIED COMPONENTS.** With a READY RADIO Kit your set can be identical in appearance and performance to the original model.



THE "SUPER-QUAD"

	£	s.	d.
1 Polished ebonite panel, 16" x 8" x 3/16", drilled to specification	5	4	
1 ReadRad polished oak cabinet with 10-inch deep baseboard	1	2	6
1 Jackson Bros. model D.2 gang condenser with drum drive	1	6	6
1 Jackson Bros. model D.1 .0005-mfd. condenser with drum drive	19	0	
1 Varley square-peak coil	15	0	
1 Set Lewcos super-het. coils to specification	1	17	6
1 Link resistance, 25,000 ohms	1	6	
1 ReadRad 3-pt. push-pull switch	1	6	
1 Sovereign 50,000-ohm potentiometer	4	6	
1 Clix 4-pin valve holders	3	4	
1 Clix 5-pin valve holder	1	0	
2 T.C.C. 1-mfd. fixed condensers	5	8	
1 T.C.C. 2-mfd. fixed condenser	3	10	
1 Dubilier .04 non-inductive fixed condenser	2	0	
1 Grid leak, 1.5-megohm, with clips	1	6	
1 T.C.C. .0002-mfd. fixed condenser	1	0	
1 T.C.C. .001-mfd. fixed condensers	1	0	
1 ReadRad "Hilo" H.F. choke	4	6	
1 Telsen L.F. transformer, ratio 7-1	12	6	
1 ReadRad fuse and holder	1	3	
1 Junit terminal block	1	8	
2 Belling-Lee "R" terminals L.S., L.S.	1	8	
2 Belling-Lee wander plugs, 6 H.T. and 2 G.B.	1	4	
2 Snade terminals	1	3	
1 Aerial and earth block	2	6	
1 Packet "Jiffilinx" for wiring	2	6	
4 Valves to specification, Cosor 210 D.G., 21 5SG., Mazda HF240 and B.220A	3	12	0
Wire, flex, grid-bias clip, etc.	1	2	
TOTAL (including valves and cabinet)	£12	1	6

Any component can be bought separately.

THE "SUPER-QUAD."

Completely assembled, with valves and cabinet, ready for use and aerial tested.

Royalties included, **£14-1-6**

Or 12 monthly payments of **25/9**

Kit A

(less valves and cabinet) **£7-17-0**

or twelve equal monthly payments of **14/3**

Kit B

(with valves less cabinet) **£10-19-0**

or twelve equal monthly payments of **£1-0-0**

Kit C

(with valves and cabinet) **£12-1-6**

or twelve equal monthly payments of **£1-2-3**

BE SURE YOUR KIT IS A GENUINE READY RADIO KIT

Recommended Accessories.

	£	s.	d.
1 Fuller S.W.X.7 Acc.	-	-	11 0
1 Fuller 16-volt C.B. Batt.	-	-	2 10
2 Fuller 60-volt Super-Cap. H.T. Batteries	-	-	1 7 0
1 Celestion D.10 Loud Speaker	3	0	0

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Your goods are despatched post free or carriage paid.

OVERSEAS BUSINESS.

Everything Radio can be supplied against cash. In case of doubt regarding the value of your order, a deposit of one third of the approximate value will be accepted and the balance collected by our Agent upon delivery of the goods. All goods are very carefully packed for export and insured: all charges forward.

A.C. "POP-VOX"

	£	s.	d.
1 Polished ebonite panel, 21 x 7 x 1/8 in. drilled to specification	6	0	
1 Oak cabinet to specification, with 10-in. deep baseboard	1	10	0
1 Wavemaster .0005-mfd. Extensifier condenser	15	6	
1 ReadRad .00015 Differential reaction condenser	5	0	
1 Bulgin single-pole push-pull switch, type S.33	2	0	
1 Bulgin rotary mains switch, type S.85	1	9	
1 ReadRad Star Turn Selector Coil	12	6	
2 ReadRad "Pop-Vox" Coils, P.V.1 and P.V.2	8	6	
1 ReadRad Quoit Coil	2	6	
1 ReadRad .0003-mfd fixed condenser	10		
2 T.C.C. 1-mfd. fixed condensers	5	8	
3 T.C.C. 2-mfd. fixed condensers	11	6	
3 T.C.C. 4-mfd. fixed condensers, type 80	1	5	6
2 Clix 5-pin valve holders	2	0	
2 Clix 4-pin valve holders	1	8	
1 R.I. 1-meg. volume control	5	6	
1 50,000-ohm spaghetti resistance	1	6	
1 25,000-ohm spaghetti resistance	1	6	
1 30,000-ohm spaghetti resistance	1	6	
2 1,000-ohm spaghetti resistances	1	6	
1 Graham-Farish 200,000 resistance Ohmite type	1	6	
1 ReadRad 2-meg. grid leak and holder	1	4	
1 ReadRad "Hilo" H.F. choke	4	6	
1 R.I. general purpose output choke	12	6	
2 R.I. Hypercore smoothing chokes	1	15	0
1 R.I. Parafed L.F. transformer	8	6	
1 Igranic Universal Mains transformer, type B	1	19	6
3 Belling-Lee terminal blocks	2	0	
6 Belling-Lee "B" type terminals	3	0	
1 Packet "Jiffilinx" for wiring	2	6	
4 Valves to specification, 2 A.C. H.L., 1 P.625, D.W.2	2	18	6
Flex, twin braided copper-covered flex, plug adaptor and screws	1	3	

TOTAL INCLUDING VALVES AND CABINET **£15 12 6**

Any component can be obtained separately.

Kit "A."—£11.4.0, or 12 monthly instalments of £1.0.6

Kit "B."—£14.2.6, or 12 monthly instalments of £1.6.0

Kit "C."—£15.12.6, or 12 monthly instalments of £1.2.9.

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IMMEDIATE DESPATCH ORDER FORM

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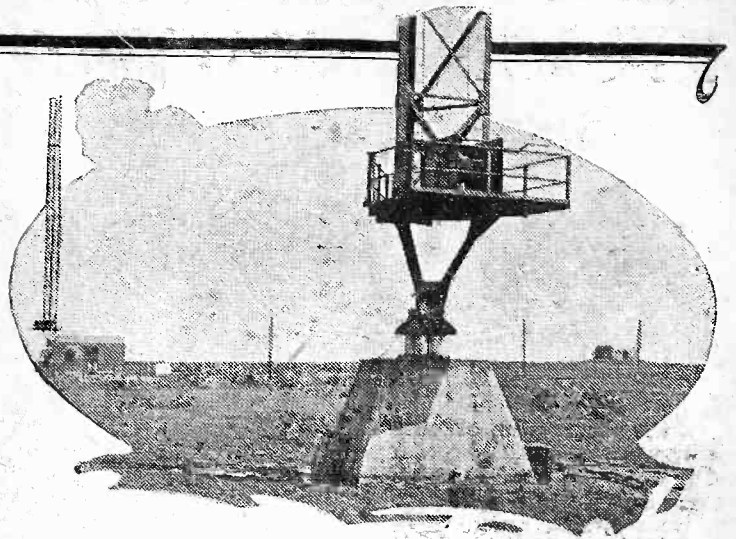
CASH ORDER. Please despatch to me at once the goods specified for which I enclose payment in full of £..... Kit required.....
G.O.D. ORDER. Please despatch to me at once goods specified for which I will pay in full the sum of £.....
EASY PAYMENT ORDER. Please despatch my Easy Payment Order for the Goods specified for which I enclose first deposit of £.....

Name.....

Address.....

WITH THE B.B.C. *in the* NORTH

No. 8. The North's Radio "Junction"
at Leeds.



THE recent Census shows that Leeds still lags behind Sheffield in population. Nevertheless, many Yorkshire activities have been centralised upon Leeds, and so far as broadcasting is concerned (and broadcasting exerts a weighty influence in such matters, whether the B.B.C. wishes it to or not), Leeds is now definitely the "capital" of Yorkshire, that vast county which encompasses a huge chunk of the service area of the North Regional station, which is populated by a million of the B.B.C.'s northern licence-holders, and which is expected to contribute richly in talent and interest to the North Regional station's programmes.

Serving Moorside Edge.

Upon Leeds, therefore, devolves a serious responsibility. To send up to Moorside Edge a steady supply of programmes representing the talent and activities of Yorkshire, a county covering an eighth of the area of England, a county of swarming industrial towns and spacious dales and moors, a county that includes several cathedral and university cities.

This is too big a job for one man, and when I tell you that the B.B.C. has only one programme representative in Yorkshire you must bear in mind that the programme organisers at the Regional headquarters at Manchester are constantly visiting Yorkshire in pursuit of fresh ideas, new talent, and new opportunities.

Close Contact.

Every Wednesday G. Philip Fox, the B.B.C.'s Yorkshire representative, goes over to Manchester to attend the Programme Board Meetings, and day by day the telephone lines between Leeds and Manchester are busy. Thus

Leeds is now the B.B.C.'s Yorkshire headquarters. It is also the "S.B." distribution centre for the North. In this article our contributor, Leslie W. A. Baily, describes what goes on at this important B.B.C. depot.

close contact is maintained between the regional headquarters and the subordinate Yorkshire headquarters at Leeds.

When the old studios at Hull and Sheffield were abolished and, more recently, when the local transmitters were suspended there were many people who feared that this meant the end of contributions from those parts of Yorkshire to the broadcast programmes.

I have the word of the North Regional Director, however, that the new system does not imply any favouritism towards

Leeds, that the centralisation of the B.B.C. administration in Yorkshire is merely a matter of convenience, and that the B.B.C. will draw more rather than less upon the resources of the towns and country districts in Yorkshire, provided that the material attains the high quality standard that is now imposed.

Outside broadcast plays an important part in Yorkshire's contributions to the North Regional programmes. It may be an organ recital from York Minster, a concert from a Yorkshire seaside resort, a relay from a Yorkshire theatre—hardly a week passes but there is an "O.B."

Just One Studio.

It is often a question, however, whether to bring Mahomet to the mountain or to send the mountain to Mahomet—thus, when the Sheffield police band broadcasts, a microphone is installed at the police headquarters at Sheffield, but single Sheffield

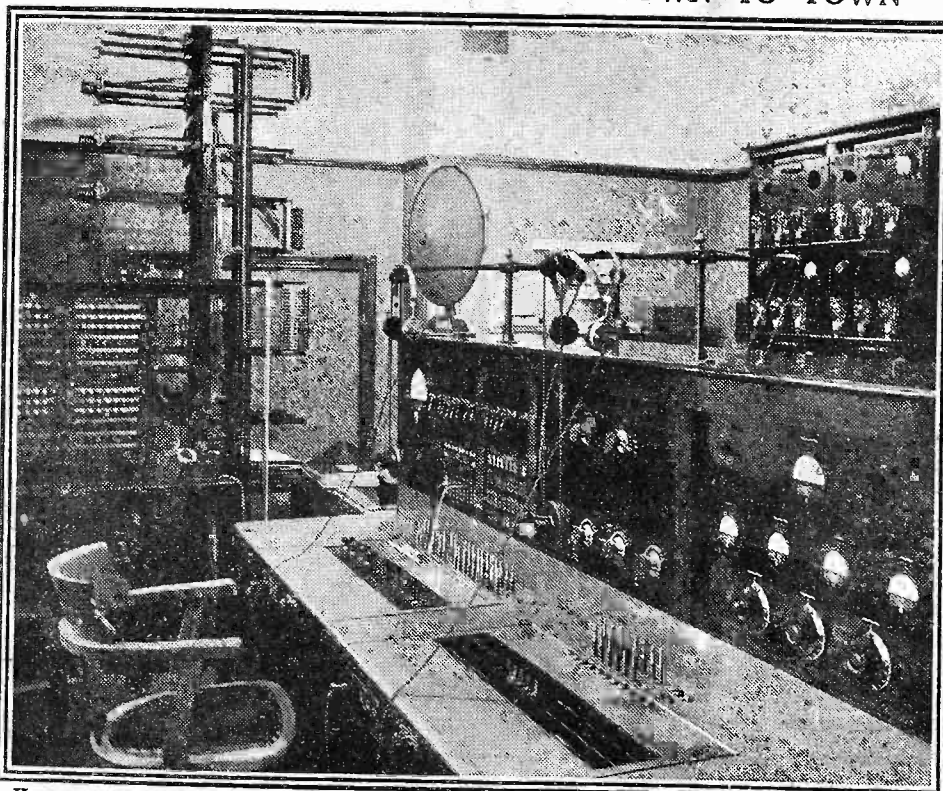
artists or speakers usually travel to Leeds and broadcast from the studio there.

Now that this is the only studio in Yorkshire it ill-befits its responsibilities. When it was opened in 1924 the B.B.C. was proud of it, but now it must be ashamed. It is too small for a pukka concert, too big and bare for a talker's comfort, its acoustics are bad, and its ventilation worse. But the B.B.C. is taking over a large building in Carlton Hill, Leeds, which was formerly a Quaker meeting house.

S.B. Control.

The present studio and control room are on two high floors in Basinghall Street, Leeds, together with offices for Philip Fox, for G. W. Gibson, who has recently been appointed B.B.C. Education Officer for

SHUNTING PROGRAMMES FROM TOWN TO TOWN



Here you see a B.B.C., S.B. control panel of the old type, which is situated at Gloucester. The installation at Leeds does not look so much like an ordinary telephone exchange, but has rows of switches and little lights reminiscent of a modern signal box.

(Continued on page 776.)

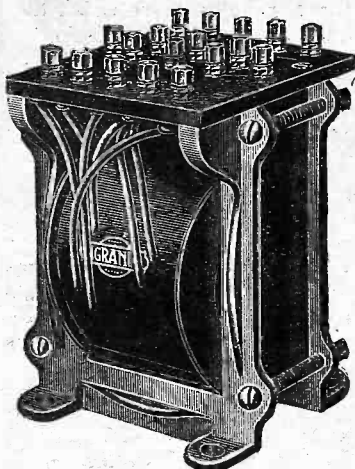
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Mains Transformer

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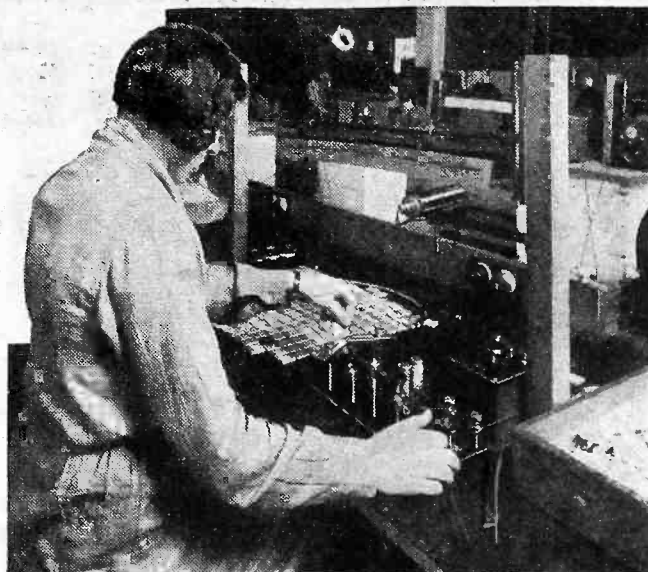
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Because of that high reputation, no T.C.C. can possibly find its way to you until, after repeated tests, we find it "O.K." Thus we maintain our reputation—and thus you are assured of a condenser of unquestionable accuracy and downright reliability.

T.C.C.

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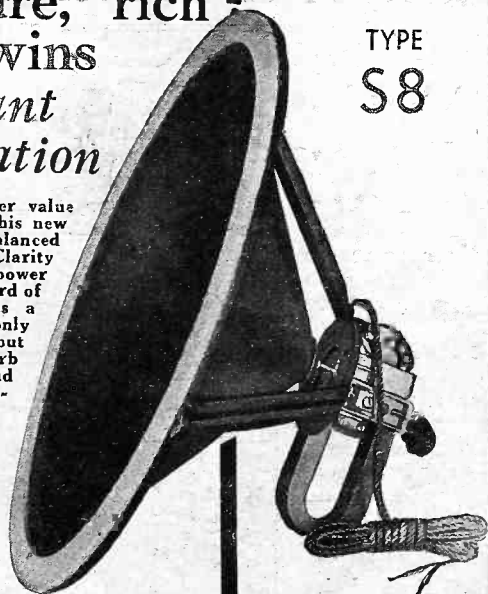
MOTOR

SUPER LOUD-SPEAKER UNIT

Its pure, rich
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Every loud-speaker value is outclassed by this new wonder MoToR balanced armature unit. Clarity—tone—purity—power—by every standard of comparison it is a revelation, not only in performance, but also in its superb workmanship and more than reasonable price.

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Type S8
UNIT **23'6**

C88 Chassis, complete with Unit and Cone **43'6**
(as illustrated)

"THANKS to broadcasting, everyone can now hear the newest music for himself and form his own opinion of it—." That is an extract from an article in the official B.B.C. publication.

The statement is true in so far as it applies to loud-speaker music, for that began with broadcasting itself. But the writer meant to convey that radio affords its listeners opportunities to hear contemporary music as performed by contemporary musicians, whereas, in actual fact, it does nothing of the kind.

The processes of radio re-write the scores of orchestral constructions and censor the work of conductors. The notes of some instruments are entirely suppressed, the proportional volume of others varied, and the characteristics of all are changed.

Mangled Music.

This "mangling" starts at the microphone itself, and is continued through the whole electrical chain between the studio or concert hall and the loud speakers of listeners. And it is only fair to say that the last links are the weakest.

The average radio receiver is completely incapable of reproducing with any accuracy at all more than a mere "handful" of musical frequencies.

Nevertheless, a decidedly pleasing imitation of the real thing can, under good conditions, be heard on a loud speaker. But it won't be Sir Thomas Beecham's or Sir Hamilton Harty's or Sir Landon Ronald's

"ELECTRIFIED" MUSIC

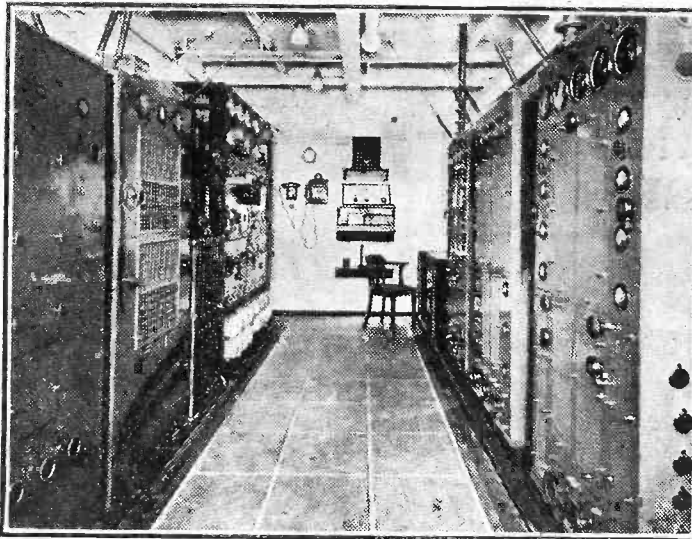
By H. A. R. BAXTER.

Who claims that broadcast music is a type in itself, differing from that directly heard in concert halls, etc.

rendering of the work of a Great Master; it won't even be the work of that Great Master! And it is high time these facts were fully appreciated.

The listening public is not being educated

A SEA-GOING RADIO "SET"



This is not a general view of some broadcasting station but the radio installation on the new Canadian Pacific liner "Empress of Britain."

in the appreciation of "classical" music; it is being educated, or rather familiarised with "electrified" music.

This is the sort of thing that happens: A conductor chooses a piece of music and

serves out the "band parts" to the members of his orchestra. After a prolonged series of rehearsals he has all the instruments more or less perfectly balanced. Over-exuberant "strings" have been subdued to the proper level, the "brass" has been thoroughly drilled, and so on. He is completely satisfied that he is able to interpret every requirement of the composer. Then the huge transmitting valves glow with smug satisfaction and the broadcast commences—and so does the "mangling."

But the wireless waves carry a fairly good rendering through the ether; anyway, there is little missing at the listener's aerial except all the harmonics above about five thousand cycles!

But by the time the average loud speaker is reached, many notes have been dropped by the wayside. Those so-carefully-produced bass features of the orchestration will almost certainly have vanished.

It is true the listener might think he can hear something deep-toned that ought to be a string bass or trombone at work, but in all probability that will merely be a few harmonics of these sombre instruments.

Adapting Music For Broadcasting.

On the other hand, the higher notes of violins and clarinets will be shorn of practically the whole of their harmonics; as a matter of fact not even the first harmonics of some violin notes manage to get into the ether around some broadcasting stations, let alone the second and third. And that is why in radio a flute or a piccolo is an excellent substitute for a Strad violin.

Realisation of these very elementary facts is steadily dawning on a few of the dance bands which are broadcast from without the B.B.C. organisation, and they are moulding their music to suit the limitations imposed upon it by broadcasting. Meanwhile, the B.B.C. itself continues to pursue impossible and unrealisable ideals. There are none so deaf as those who cannot hear their own ether-twisted voices!

Yorkshire, and for their lady secretaries. Through these offices passes the routine organisation of all Yorkshire programmes.

Through the control-room pass all programmes travelling between London and North Britain, for Leeds is the "S.B." distribution centre for the North. It is the halfway house where programmes bound on their long land-line journeys are refreshed and then sent onwards. There are six engineers.

To Savoy Hill, Leeds is connected by underground land-lines, usually three, but more if required by programme arrangements. Sometimes there is a programme

WITH THE B.B.C. IN THE NORTH

(Continued from page 774.)

travelling from some Northern source to London (for transmission, perhaps, from London Regional), as well as a programme coming northwards from London, and then the job of the engineers at Leeds becomes complicated.

This junction of land-line routes is the scene every night of a continuous shunting of programmes, and it is all controlled by a man sitting at a desk which, with its rows of switches and signal lights, is for all the world like a miniature railway signal-box.

Curing The Bumps.

The control-room equipment also includes a desk on which is mounted line-testing equipment for measuring the characteristics of the land-lines. Every line is tested regularly. A modern underground line, after suitable correction, should have a tolerably straight-line frequency characteristic from 50 to 7,000 cycles.

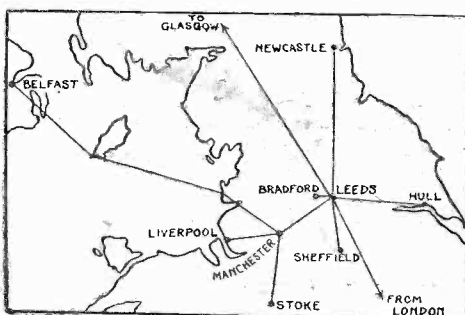
If for some reason a "bump" develops in the characteristic of a line, it is remedied

by adding a corrector circuit consisting of inductance, capacity or resistance to the line until the "bump" disappears.

Such circuits are provided at Leeds to be inserted in the lines as desired.

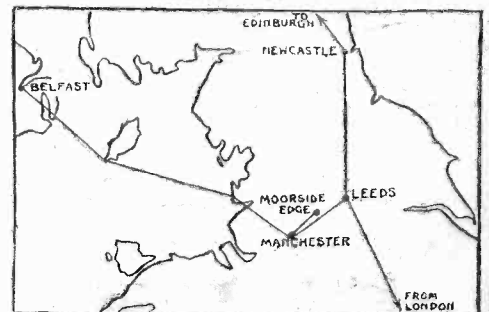
Due to developments in the Post Office trunk telephone system, a big alteration in the "S.B." system in the North is now being carried out. Figure One shows the system of land-lines used until a few weeks ago. Figure Two shows the new, simplified system. Programmes for Scotland will travel via Newcastle in the future, instead of via Glasgow.

"AS THEY WERE"



This is how the land-lines for northern stations were arranged a few weeks ago before the North Region station commenced work.

SEE HOW THEY RUN



The system of land-lines is being considerably simplified, partly due to the closing down of certain stations. The lines are to be as indicated in this diagram.

The
R & A
"100"
**PERMANENT MAGNET
MOVING COIL
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There is no high grade Permanent Magnet M.C. Speaker on the market at this phenomenal price; nor is there one at any price that can improve on its remarkable performance.

The R. & A. '100' is highly sensitive and equal to mains energised types. It handles small inputs perfectly and also those considerably in excess of domestic requirements.

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If any difficulty, write us direct.

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Simple to use and lasts for years in constant use. Contains special "small-space" soldering iron with non-heating metal handle; pocket blow-lamp. Fluxite, Solder, etc.; and full instructions.

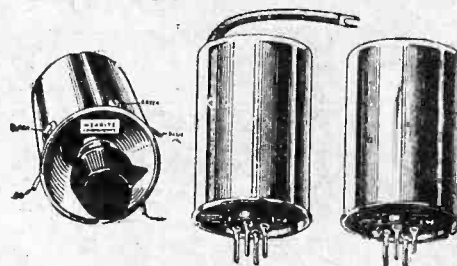
COMPLETE, 7/6, or LAMP only, 2/6

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IT SIMPLIFIES ALL SOLDERING

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The wonderful results obtained with the P.W. "Super-Quad" were made possible only by the introduction of "Wearite" Super-Het Coils. (British Pat. No. 349403.)



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Three of the original "Wearite" Super-Het Coils (British Patent No. 349403) are used in the "Super Quad." 1 Oscillation Unit Type O.2, 1 Band Filter Unit with pig-tail, Type OT.1, and 1 Band Filter Unit, Type OT.2. The original coils are supplied only by the concessionaires, Wright & Weaire, Ltd. Price per set of three **37/6**

WEARITE H.F. CHOKE

A first-class component especially recommended for the P.W. "Super-Quad." It covers efficiently the remarkable range from 10 to 2,000 metres without any marked resonances. Self-capacity very low. Type H.F.O. **6/6**



PAXOLIN PANELS

Supplied in Mahogany, Black or Walnut finish. Size 8 in. by 16 in. drilled to specification for the "Super-Quad." Price **7/6**

Supplied in all sizes.

G.B. BATTERY CLIP

Grid-bias battery clips, strong and robust construction, as specified in the "Super Quad." Price **3d. EACH.**

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STAND 152

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If you are looking for a fine long-range loud-speaker set consider

THE "EXTENSER" FIVE

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A Screened-grid H.F., Det. & L.F. that puts up a really
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**THE MONTH ON SHORT WAVES
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ROUND THE DIALS

PICK-UP HINTS AND TIPS

A PRACTICAL MAN'S CORNER

AND

**How to Make an
All-Metal Mains Unit**

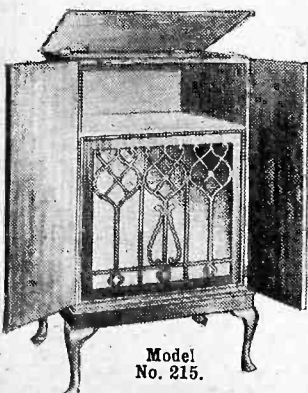
are among the other fine features in the

SEPTEMBER

WIRELESS CONSTRUCTOR

Sixpence - - - On Sale Everywhere

GET IT NOW—IT'S A "WOW"



Model
No. 215.

STAND 205.

**FIRST FLOOR, EMPIRE HALL,
NATIONAL RADIO EXHIBITION,
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OSBORN

Ready-to-Assemble RADIO CABINETS

*There is an Osborn Cabinet for every set on
the market.*

**Model No. 215 specified for the "Popular
Wireless" Comet Two.**

4ft. high, 2ft. 2ins. wide, 1ft. 6ins. deep.
Size of baffle board behind fret is 24ins. by
24ins. Metallic Fabric for the fret front is
included. Opening at top and back. Cabinet
takes panel 2ft. by 9ins. (or smaller).

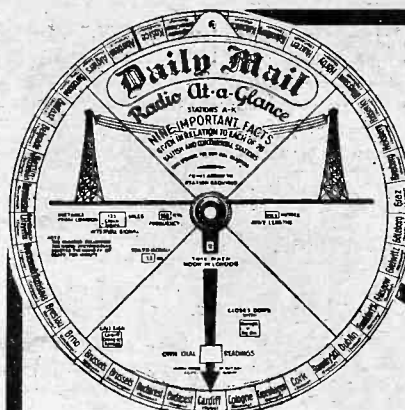
PRICES:
Machined, Ready to Assemble: Oak, 60/-;
Mahogany, 65/-; Walnut, 75/-; Assembled,
ready to polish, Oak, 80/-; Mahogany, 85/-;
Walnut, 95/-; Assembled and Polished Oak,
100/-; Mahogany, 115/-; Walnut, 130/-. All
Models carriage paid.

For 5/- extra cabinet made four inches higher
and converted into a Radio Gramophone
Cabinet, complete with Motor Board.

Send 3d. in stamps for 56-page illustrated catalogue.

CHAS. A. OSBORN, Dept. P.W.

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London, N.1. Telephone: Clerkenwell 5095
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"At-a-Glance"

TWO-SIDED,
DIAMETER
9½ ins.

1/-
EACH

ON SALE

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AT ALL

WIRELESS

DEPOTS,

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STATIONERS.

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BRITISH AND CONTINENTAL STATIONS
With 9 important facts about each, and
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YOUR OWN DIAL READINGS

ASSISTS LISTENERS

in locating and identifying all principal
stations.

ORDER YOUR COPY NOW

"At-a-Glance"

QUALITY AND QUANTITY

MAKE

*Player's
please*



THE FULL VALUE CIGARETTE

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 778.)

This, of course, is a very drastic step to have to take, but we are afraid it is the only way, unless you can get the makers or some qualified person to overhaul it and let you know what is really wrong with it.

SETTING OUT THE DIAL READINGS.

J. L. (Ashford, Kent).—"I am very interested in the method of spreading out the dial readings which was introduced by W. L. S. in Short Wave Notes. I mean the method of using a condenser of small capacity connected in parallel with the other condenser, and tuning over a certain part of the wave-range with this.

"Could the method be applied to an ordinary broadcast receiver, so the dial readings for a given part of the tuning range would spread from 0 to 100 degrees on, say, a .0091 mfd.? If so, what would be the best way of doing this?"

The method is quite applicable to ordinary wavelengths, as well as to short waves, and there is really no difference in the procedure for such a change. All you have to do is to clip a pair of short flexible leads to the moving and fixed vanes of your tuning condenser, and join them to the (rigidly mounted) extra condenser, of smaller capacity.

Then to explore that part of the dial say between London National and London Regional you would set your new tuning dial to 0 and adjust the main tuning dial so that London National was sharply tuned in there. Then proceed to tune not on the main dial, but on the new dial, which even at the full-scale reading will take you up only to somewhere in the vicinity of the Regional station.

You will thus get the advantage of "spread out" dial readings over this portion of the scale, but of course, there is always the difficulty that the slightest variation in the setting of the main condenser will throw out your reading on the smaller condenser, so that they cannot easily be repeated from a prepared calibration chart.

USING THREE L.F. STAGES.

A. E. (Wandsworth, London, S.W.18).—"I have just completed the Unipower Amplifier

from "P.W." I find it makes a noise as if it is not earthed.

"On making enquiries I find I have already got two L.F. stages in my set, which is a four-valver. Is there any other way in which I could use the amplifier?"

It is a great pity you built it without taking notice that it was intended only to be used with a set employing one stage of low-frequency amplification. Broadly speaking it is not possible to use three L.F. amplifying stages, so that we are afraid there is no way of working it with your present set.

TESTING FIXED CONDENSERS.

T. G. G. (Hamilton).—"Is it possible to test a condenser leakage by means of a sensitive voltmeter?"

Yes, in conjunction with a battery. If one side of the voltmeter is connected to one side of the battery and then the other voltmeter and the other battery leads are connected to opposite sides of the

YOUR BIT TOWARDS ECONOMY

Have you ever thought how difficult it is for a newsagent to order just the right number of copies of any particular paper each week? You can make his task much easier if you place a regular order with him. You will not only help him to order correctly and avoid waste, but will make sure of getting your copy regularly each week.

condenser, the voltmeter needle will flick over as the charging current flows, and will then drop to zero again if the insulation of the condenser is perfect. If, however, there is a leak a slight deflection will be noted, and, of course, if the condenser is shorted altogether the full value of the battery will show on the voltmeter.

WHAT IS AN EXTENSER?

"SAILOR BOY" (Cambridge).—"I am employed on a boat which makes two trips a year to the Far East, and although I get some

of the "P.W.'s" sent to me, I miss quite a number of them when abroad.

"Since returning this time, I have been greatly interested in the Extenser. What is the difference between an ordinary variable condenser and a switch compared with an Extenser?"

There is all the difference in the world. It is true that the Extenser combines the functions performed by an ordinary .0005-mfd. condenser and those of a wave-change switch, but there are many advantages in addition with the Extenser.

(a) It ensures the use of exactly the right kind of switch, for this is integral with the tuning, and not purchased as a separate component which may be faulty or unsuitable.

(b) It eliminates all the wiring between switch and tuning circuit—which, in these days of high efficiency tuned circuits, is very important indeed.

(c) It completely revolutionises tuning by doing away with double dial readings (whereby different programmes were received at the same setting after an alteration in the wave-change switching).

(d) It enables one calibration chart to be prepared with progressive straight-line readings, from the lowest to the longest stations.

(e) It gives two-figure readings for all the low-wave stations, and three-figure readings (over 100) for all the long-wave stations.

There are other advantages as well, but we think the foregoing are quite sufficient to show the versatility and importance of the Extenser.

WHEN THE VALVE RINGS.

M. G. (Bayswater).—"Twice lately I have come across cases of valves 'ringing,' or being what I believe is known as microphonic.

"I have never seen it stated what is the actual cause of this. Can you give me any details about it?"

You know that when the filament is heated it emits electrons, which form the plate current. This plate current is controlled by minute electrical charges on the grid of the valve, and the grid is always carefully placed close to the filament in such a position that it is enabled to modify the plate current, in accordance with the speech or music being reproduced.

The relative positions of the grid, anode and the filament—that is to say, the exact distances between them—is important. So that it should not vary, these

(Continued on next page.)

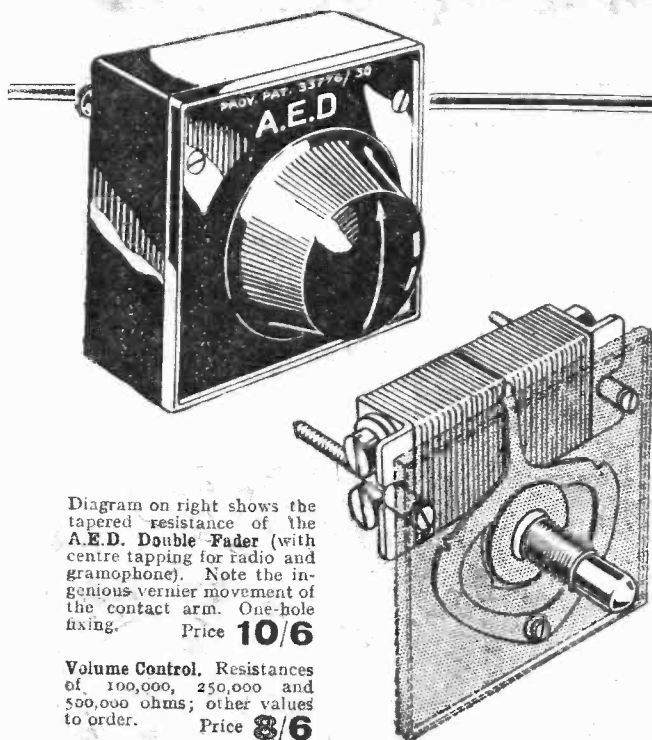


Diagram on right shows the tapered resistance of the A.E.D. Double Fader (with centre tapping for radio and gramophone). Note the ingenious vernier movement of the contact arm. One-hole fixing. Price 10/6

Volume Control. Resistances of 100,000, 250,000 and 500,000 ohms; other values to order. Price 8/6

Another
Honour
for



The A.C. "POP-VOX" described in this issue of POPULAR WIRELESS employs the A.E.D. Log-Law Volume Control and an A.E.D. Double-Fader is used in the POPULAR WIRELESS "Selectivity Three."

THESE A.E.D. Components have been chosen by many of the leading experts for their latest designs, and have definitely proved by their performance that they have no equal for smooth and stable control, combined with neat, compact and robust construction. Ask your radio dealer to show you these A.E.D. products.



Write for particulars of the A.E.D. Gramophone Pick-up—the golden-toned reproducer, which will give volume to fill a hall with only a two-valve amplifier!

AUTO ELECTRIC DEVICES, LTD.,
Diamond Works, Brighton, Sussex.

Telephone: Brighton 2404.
Telegrams: "Seliwind, Brighton."

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from previous page.)

electrodes are firmly suspended inside the valve by metal supports.

Unfortunately, if these happen to be "springy," they may have a tendency to vibrate very slightly. This is fatal.

The slightest movement of them will always disturb the normal working of the valve by momentarily altering the relative positions of the electrodes, and when such a displacement occurs the valve will "ring."

With such a valve in use, any sort of shock absorber is helpful. It is for this reason that the anti-microphonic valve holders are successful, for in them the base into which the pins of the valve fit is cushioned by springs, and consequently external shocks either do not reach the filament at all, or they are very greatly reduced.

Remember that such microphonic effects are most noticeable when you attempt to use the valve in question as a detector. And also that not only will mechanical vibration cause the trouble, but it may be started acoustically by pointing the loudspeaker to the set, so that the valve is shaken by the sound waves.

For this reason, moving the loudspeaker from the set will often help to cure the trouble.

REVERSING THE LOUD-SPEAKER CONNECTIONS.

G. L. (Aston, Birmingham).—"I do not know if you can throw any light on the following rather curious fact, but I have proved it to be a stunt well worth trying.

"I discovered it with my 'Magic' Three, when quite by accident one day I reversed the

TECHNICAL TWISTERS

No. 76.—PREFIXES.

CAN YOU FILL IN THE MISSING WORDS?

When big numbers have to be frequently employed, it is often easier to express them by the aid of suitable prefixes, denoting so many thousands, or so many

To denote numbers 1,000 times greater than unity the prefix is used, and thus 1,000 cycles is referred to as 1-cycle, or 1,000 watts as 1-watt.

To denote numbers one million times greater than unity we use the prefix mega (or meg.), and thus a "2- leak" means a grid leak with a resistance of ohms.

Last week's missing words (in order) were: Small, Milli, Milli, Milli, Milli.

leads to the loudspeaker and got far better reception, which fell off when I joined them back again.

"Having proved how distinct the difference was, I put it on several other sets I have come in contact with at various times, and although it does not always work, it certainly does mostly meet with improved reception. Why is it?"

The explanation is simple enough. The operation of most loudspeaker units depends upon the magnetic effect of the current flowing through the speaker windings, in combination with a permanent magnet.

The direction of those magnetic effects, caused by the current flowing through it, will depend upon the way in which the speaker is connected round in the circuit. So important is this that many loudspeaker makers always mark one side of the speaker + and the other side —, to indicate that one terminal must be connected towards the H.T. battery positive and the other towards the plate of the valve (—of the H.T. supply).

Although there are certain other loudspeakers which are constructed so that the effect is not important, as in others, the majority of speakers have a right and a wrong way of connecting them in circuit.

So in cases where no output filter circuit is used, it is always necessary to examine the speaker terminals, or its leads, to see if one (generally coloured red, or marked +) should be connected towards H.T. +.



TRANSFORMERS

Dario Transformers are made under a special process of wiring and insulating the different circuits. Notwithstanding their very low price they give marvellous results.

Ratios 1-3 and 1-5.	
Constructor	4/8
Normal	5/-
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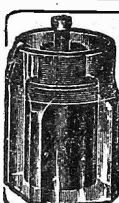
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FOR THE LISTENER

(Continued from page 762.)

and exclusively announced in "P.W.," to find that in future the audition committee will proceed on this simpler plan. They will not require you to recite "Casabianca" before them, or to play your favourite piece on the fiddle, or to read the MS. of your pet theory; they will just look at you; and one look may be enough.

They will say, "Obviously, you have gifts, Mr. MacGregor, but we regret to see that you are much too aquiline. We congratulate you on your personal appearance; but our rule is 'Handsome does who handsome is not.' Sorry you've been troubled." Or, on the contrary, "Sir, you have a nubby face; you have a rugged face; parts of it look as if they had been put on hot; we like it; consider yourself engaged."

Selecting Your Programme.

Take my own case. In the matter of faces, I am an outsize and an outsider. As I never lose an opportunity of telling you, I once broadcasted with a fair success, and imagined that it was due to my merits. I now realise that it may have had more to do with my nose, a shameless retroussé—which is no merit in me, but an original gift.

Some time ago, going home by train one night, I bought an evening paper. I turned to the broadcasting page. It was decorated by a photograph. I do not, as a rule, lay much store by photographs in evening papers. Usually they do a man less than justice.

They are often misleading smudges. This one was smudgy enough. It was indeed like nothing else on earth. It looked as if it might have been transmitted to London from Valparaiso, by television, and had crashed on the way. I said to myself, "Now, that man will broadcast well." So, when I got home, I listened to him.

I was right. He was very good indeed. My theory about faces was confirmed. I made a note of his name. On the following evening, an apology appeared in the paper. By some unaccountable error, the photographs had got mixed up; and the one I had seen was meant to be a basket of Pekinese puppies going to the Dog Show!

The Picture Guide.

My view now is that the official programmes should print a photograph with each item; so that listeners, seeking an evening's good enjoyment, may study the alternatives offered them. Not the alternative items, but the alternative faces. You can go wrong over an alternative item; but you can scarcely ever go wrong over an alternative face. Beware of the Apollos. Bank on the nubby ones.

You will observe that, in expounding this theory, I have spoken only in the masculine gender. This is because, as you know well, I am no fool.

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TECHNICAL NOTES

Some diverse and informative jottings about interesting aspects of radio reception.

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

Doing Without a Choke.

REFERRING to the question of high-frequency chokes, you will remember that I said something about this in these Notes a few weeks back, and several readers have raised the question as to whether a choke is always worth while.

A high-frequency choke of good make is not a particularly inexpensive item, and furthermore, chokes are rather peculiar components and are apt to exhibit little idiosyncrasies which cannot always be readily accounted for.

You will sometimes find that in a certain circuit you can use one make of choke, whereas as soon as you substitute another make the results are not nearly as good, although apparently, according to specification, the two chokes would act equally well.

The H.F. choke connected between the anode of the detector and its coupling—L.F. transformer or otherwise—is not always worth while and can sometimes be dispensed with.

In some cases a resistance in the grid-lead of the next valve will give equally good results, and, of course, at lower cost. This is a method which is quite often used, and in those cases where it is applicable it is also perfectly reliable.

Valve Improvements.

There are now so many valves on the market, and new ones keep coming along so often, especially screened-grid valves, that the amateur is often bewildered in making a choice.

You may have your receiver working quite satisfactorily, when you read the description and specification of a new type of valve and think it might be worth getting the valve and substituting it for one in the present set.

Perhaps you go to this expense, only to find that the results are inferior, or at any rate no better, and you jump to the conclusion that you have been "had" on the valve and wish that you had not spent your money.

All this kind of thing only emphasises what has been so often said before, and that is that the working of a receiver depends not merely upon the merits of the valves, or upon the merits of the other components, but upon these in relation to one another.

It is, generally speaking, impossible to say that one valve is "better" than another valve; it depends so very greatly upon the purposes for which it is intended and the conditions in which it is to be used.

Important Conditions.

So before attempting to go in for a new type of valve, make sure whether the present one suits the case reasonably well, and whether the new one is likely to suit it any better.

(Continued on next page.)

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TECHNICAL NOTES

(Continued from previous page.)

You may easily go in for newly designed valves which may be superior to your present ones, in the sense that they are of more recent design and incorporate corresponding improvements, but which nevertheless may not be as suitable in your particular set as the one you already have there.

In fact, the substitution of new valves for old ones sometimes produces not only inferior results, but actually runs you into a whole lot of oscillation and other troubles, and may put paid to the selectivity of the set altogether.

A Push-Pull Trouble.

A reader sends me an account of some trouble he had with a push-pull output stage which—although I am, of course, obliged to him for his letter—is not nearly so uncommon as he appears to think.

To tell you the end of the story first, the trouble was found to be due to the two halves of the transformer giving unequal voltage outputs, although it apparently took him some time to find this out. The effect of this was that the quality was bad, although the volume was all right.

Apparently the trouble was got over by connecting a very high resistance (one megohm) across the half of the transformer which was giving the higher voltage. I have sometimes seen improved results obtained in a case like this by connecting, say, half a megohm across each of the two halves of the transformer.

Equalising Voltages.

This method, however, although it is sometimes used, is obviously only a makeshift, and if you want to do the job properly you should test out the voltages of the two halves of the transformer (preferably by means of a valve voltmeter, by the way) and then add windings to the lower half until the output voltages are equal. But this is a job which is outside the scope of the ordinary amateur.

In point of fact, push-pull transformers are often not tested for equality on the two halves as carefully as they should be, and although the push-pull arrangement appears to be a perfectly easy one, you see from the above that it is not always quite so simple as it looks.

Detector Reaction.

With a valve detector which provides both detection and reaction effects, as is so often the arrangement, it frequently happens that, in the process of getting smooth reaction, the efficiency of the valve as a detector is lessened.

In order to get the desired reaction effects the grid-leak is often connected to the negative low-tension, and, so far as the detecting is concerned, this may be an unsatisfactory arrangement. For the maximum sensitivity the grid often has to be biased by connecting the grid leak to the positive terminal of the filament.

A good deal depends upon the nature of the circuit, and it is impossible to state any hard-and-fast rule. What I want to point out, however, is the desirability of using a potentiometer across the filament circuit, as

(Continued on next page.)

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TECHNICAL NOTES

(Continued from previous page.)

this gives a satisfactory reaction arrangement without the disadvantages mentioned above.

Once the best position for the tapping (it need not be a slider) on the potentiometer has been found, there is no need to adjust this afterwards, and consequently the potentiometer does not need to be provided with any panel control. It can be set inside the receiver once for all and left in the best position.

Choosing Your Valves.

Beginners in radio are often very much puzzled to know how to judge the qualities of a valve or its suitability for a particular purpose from the characteristic curves supplied with the valve. The commonest form of characteristic curve indicates the manner of variation of the anode current with variations in the grid voltage.

This curve then indicates the voltage amplification and the slope of the curves (assuming that different curves to be compared are drawn on the same scale) gives an immediate visual indication of the relative magnification factors for different valves.

I mention particularly that the curves should be drawn on the same scale, because if you are comparing two similar curves and in one case the horizontal scale representing the grid volts is drawn out to twice as much as in the other case, then the slope of the curves in the second case, other things being equal, will be reduced *apparently* to half what it was in the first case. So

that if you are comparing different curves you want to keep this point in mind.

As a rule, however, you are not so much concerned with comparing curves as with examining those of a particular valve, in order to see whether this valve will be suitable for the special purpose to which you intend to apply it.

In this case you have to notice the amount of variation in plate current which is produced by a given variation in grid voltage, this, of course, for (or rather around) the particular value of H.T. voltage which you intend to use.

This gives a measure of the magnification factor of the valve which is sometimes referred to as the slope of the curve. Do not confuse the slope of the anode current/grid volts curve with the "slope" of the valve.

The Amplification Factor.

The slope of the valve is really most important, and this is the ratio of the magnification factor to the impedance.

Now what you have got to consider is how the impedance of the valve will suit your particular conditions, bearing in mind the amplification factor. Suppose, for instance, you have two valves with the same amplification factor and one has an impedance of twice as much as the other; then it may be in your particular conditions the one with the lower impedance will give you much better results than the other.

This is generally the case with valves intended as low-frequency amplifiers, particularly for the final or output stage, although here again it is not safe to state a hard and fast rule.

What you want then for high amplification per stage is a valve having a steep

slope, the slope, as I say, being the magnification factor/impedance ratio.

Dodging Distortion.

There is another important point which has to be kept in view as well, and that is the grid swing which the valve is capable of handling. You may have a valve which has a very steep slope and is therefore capable of giving a large magnification per stage and yet this valve may not be capable of handling sufficient power for your purpose.

This again is a point to be borne in mind, particularly for a valve in the output stage where heavy power has to be handled with consequently large grid swings.

The usual way to judge this is to look at the characteristic curve and to see how many volts of swing from zero you have to give before you begin to get from the straight part to the curved part of the characteristic curve.

In actual practice you cannot usually allow so much as this, because distortion will begin to set in before you reach the really curved part.

AN A.C. "POP-VOX"

(Continued from page 772.)

You will see that the grid of the detector valve (V_1) can be switched over to "pick-up" if desired. So if you have a gramophone you can do your own electrical reproduction via the loud speaker, with all the attendant advantages of increased purity and volume.

Coupling the detector to V_2 we have a *shunt-fed* L.F. transformer of the latest nickel-iron type, complete with volume control. There is no doubt about the up-to-date-ness of the A.C. "Pop-Vox"!

The final stage is R.C. coupled, and the set has a standard arrangement of output filter and valve rectifier, with suitable smoothing and simplified decoupling.

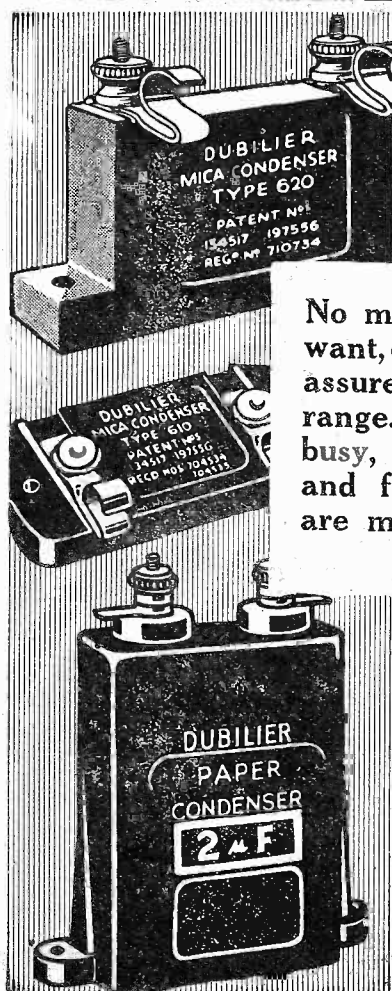
In addition "free grid bias" is provided, so that G.B. batteries are not needed. It will be seen that the output valve is directly—and the two preceding valves indirectly—heated, the supply circuits being conveniently obtained from one single mains transformer.

Coil Particulars.

Both the "Selector" coil and the "Contradyne" may be constructed at home quite easily, if desired, and particulars of the actual methods of winding the "Selector" coil were given in the May 23rd issue of "P.W." Similarly, the more experienced constructor may like to make his own "P.V." coils, the details of these having appeared in "P.W." dated July 11th.

The "Contradyne" coil will hardly take you any time to make, it is simply 60 turns of No. 24 D.S.C. wire, wound on a standard Coil Quoit. The ends of this winding are taken out to "X" and to "No. 1" respectively, as shown in the accompanying diagrams.

This week we have not space to deal with further construction (which, by the way, is not at all difficult), so details of this will be given in our next issue. But a full list of the required components is appended, and the wily constructor will be well advised to get his order forward, for there is sure to be a big demand for the parts for the A.C. "Pop-Vox."



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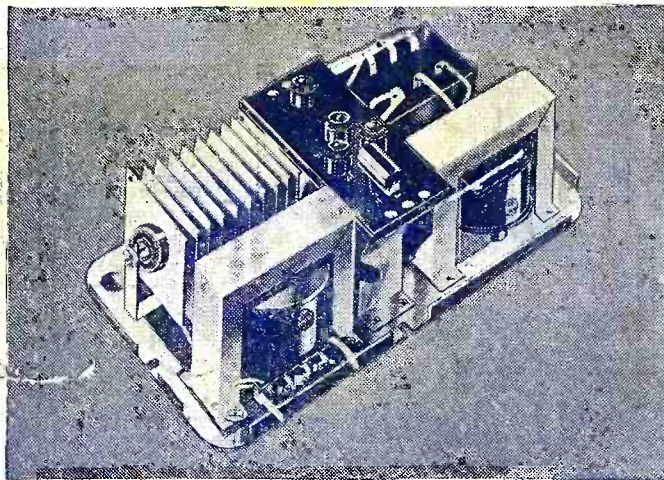
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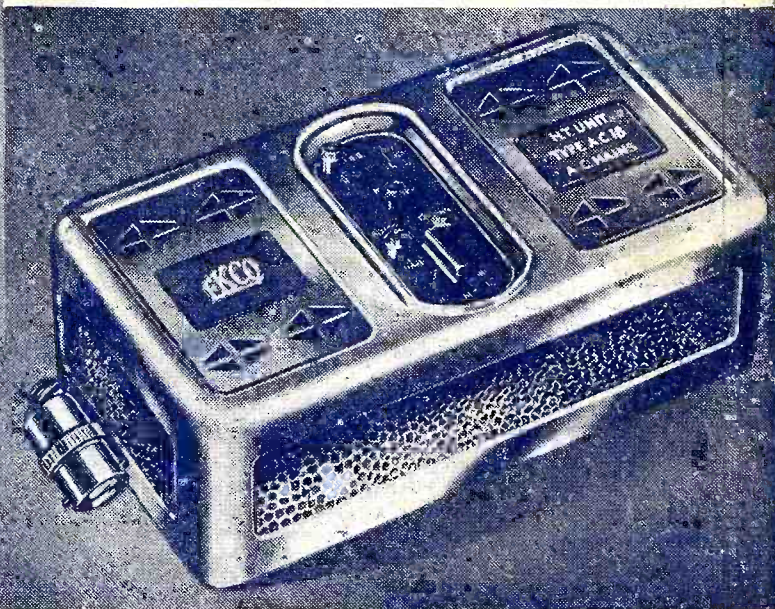
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